City of San Diego, solely in its capacity as the designated Successor Agency to the Redevelopment Agency of the City of San Diego, a former public body, corporate and politic, herein referred to as

Successor Agency

CONTRACTOR'S NAME:_____
ADDRESS:_____
TELEPHONE NO.:_____ **FAX NO.:**_____
CITY CONTACT: Damian Singleton, Contract Specialist, Email: DSingleton@sandiego.gov
Phone No. (619) 533-3482, Fax No. (619) 533-3633
DKay/BDoringo/egz

CONTRACT DOCUMENTS

FOR

HORTON PLAZA IMPROVEMENT PROJECT

VOLUME 1 OF 2

BID NO.: K-14-6120-DBB-3
SAP NO. (WBS/IO/CC): 24002919
CLIENT DEPARTMENT: 1714
COUNCIL DISTRICT: 3
PROJECT TYPE: BE/GA

THIS CONTRACT IS SUBJECT TO THE FOLLOWING:

- THE CITY'S SUBCONTRACTING PARTICIPATION REQUIREMENTS FOR SLBE PROGRAM.
- PREVAILING WAGE RATES: STATE ☒ FEDERAL ☐

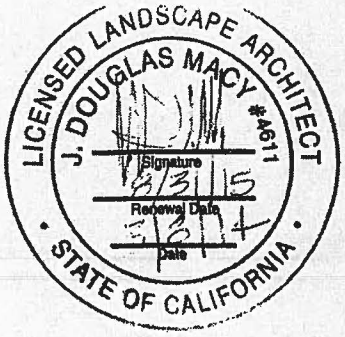
BID DUE DATE:

2:00 PM
APRIL 24, 2014
CITY OF SAN DIEGO
PUBLIC WORKS CONTRACTING GROUP
1010 SECOND AVENUE, 14th FLOOR, MS 614C
SAN DIEGO, CA 92101

ENGINEER OF WORK

The technical content of the engineering Specifications and Special Provisions contained herein has been prepared by or under the direction of the following Professional Engineer and Architect:

1) Registered Architect, Douglas Macy — Date: 3/8/14 — Seal:



The contractual content of the engineering Specifications and Special Provisions contained herein has been reviewed by the following Professional Engineer:

2) Registered Project Engineer, Daniel Kay — Date: 3/8/14 — Seal:



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The Successor Agency is defined in SECTION 1 – TERMS, DEFINITIONS, ABBREVIATIONS, UNITS OF MEASURE, AND SYMBOLS of Volume 1 of this solicitation. **All references herein to City shall be deemed to refer to the Successor Agency where necessary to identify the agency in privity of contract for the performance of this project**.

CITY OF SAN DIEGO, CALIFORNIA

NOTICE INVITING BIDS

1. **RECEIPT AND OPENING OF BIDS:** Bids will be received at the Public Works Contracting Group at the location, time, and date shown on the cover of these specifications for performing work on **Horton Plaza Improvement Project** (Project).

2. **SUMMARY OF WORK:** The Work involves furnishing all labor, materials, equipment, services, and other incidental works and appurtenances for the construction of the Project as described in ATTACHMENT A.

3. **BIDS ARE PUBLIC RECORDS:** Upon receipt by the City, Bids shall become public records subject to public disclosure. It is the responsibility of the respondent to clearly identify any confidential, proprietary, trade secret or otherwise legally privileged information contained within the Bid. General references to sections of the California Public Records Act (PRA) will not suffice. If the Contractor does not provide applicable case law that clearly establishes that the requested information is exempt from the disclosure requirements of the PRA, the City shall be free to release the information when required in accordance with the PRA, pursuant to any other applicable law, or by order of any court or government agency, and the Contractor will hold the City harmless for release of this information.

4. **SUBCONTRACTING PARTICIPATION PERCENTAGES:**

4.1. The City has incorporated **mandatory** SLBE-ELBE subcontractor participation percentages to enhance competition and maximize subcontracting opportunities. For the purpose of achieving the mandatory subcontractor participation percentages, a recommended breakdown of the SLBE and ELBE subcontractor participation percentages based upon certified SLBE and ELBE firms has also been provided to achieve the mandatory subcontractor participation percentages:

1. SLBE participation **3.6%**
2. ELBE participation **13.1%**
3. Total mandatory participation **16.7%**

4.2. The Bidders are **required** to attend the Pre-Bid Meeting to better understand the Good Faith Effort requirements of this contract. See the City's document titled "SLBE Program, Instructions For Bidders Completing The Good Faith Effort Submittal" available at: http://www.sandiego.gov/eoc/

4.3. The Bid will be declared non-responsive if the Bidder fails the following mandatory conditions:

4.3.1. Attending the Pre-Bid Meeting.

4.3.2. Bidder's inclusion of SLBE-ELBE certified subcontractors at the overall mandatory participation percentage identified in this document; OR.

4.3.3. Bidder's submission of Good Faith Effort documentation demonstrating the Bidder made a good faith effort to outreach to and include SLBE-ELBE Subcontractors required in this document within **3 Working Days** of the Bid opening if the overall mandatory participation percentage is not met.

4.4. For additional Equal Opportunity Contracting Program requirements, see Attachment C.

5. PRE-BID MEETING:

5.1. There will be a Pre-Bid Meeting to discuss the scope of the Project, bidding requirements, pre- qualification process, and Equal Opportunity Contracting Program requirements and reporting procedures in the Public Works Contracting Group, Conference Room at 1010 Second Avenue, 14th Floor, San Diego, CA 92101 **at 10:00 AM, on MARCH 26, 2014.**

5.2. **The Pre-Bid Meeting has been designated as MANDATORY. All potential bidders are required to attend.** Bid will be declared **non-responsive** if the Bidder fails to attend the Pre-Bid Meeting when specified to be mandatory. Attendance at the Pre-Bid Meeting will be evidenced by the representative's signature on the attendance roster. It shall be the responsibility of the Bidder's representative to complete and sign the attendance roster. **No Bidder will be admitted after the specified start time of the mandatory Pre-Bid Meeting.**

5.3. To request a copy of the agenda on an alternative format, or to request a sign language or oral interpreter for this meeting, call the Public Works Contracting Group at (619) 533-3450 at least 5 Working Days prior to the Pre-Bid Meeting to ensure availability.

6. CONTRACTOR REGISTRATION AND ELECTRONIC REPORTING SYSTEM:

6.1. **Prior** to the Award of the Contract or each Task Order, you and your Subcontractors and Suppliers must register with the City's web-based contract compliance website, Prism®, located here:

https://pro.prismcompliance.com/default.aspx.

6.2. The Successor Agency may not award the contract until registration of all subcontractors and suppliers is complete. In the event this requirement is not met within the time frame specified in the Notice of Intent to Award letter, the Successor Agency reserves the right to rescind the Notice of Award / Intent to Award and to make the award to the next responsive and responsible bidder / proposer.

7. PRE-BID SITE VISIT: The prospective Bidders are encouraged to visit the Work Site with the Engineer. The purpose of the Site visit is to acquaint Bidders with the Site conditions. To request a sign language or oral interpreter for this visit, call the Public Works Contracting Group at (619) 533-3450 at least 5 Working Days prior to the meeting to ensure availability. A Pre-Bid Site Visit is offered when the details are provided as follows:

Time: **11:00 a.m.**
Date: **MARCH 26, 2014**
Location: **900 4th Avenue, San Diego CA 92101**

8. JOINT VENTURE CONTRACTORS: Provide a copy of the Joint Venture agreement and the Joint Venture license to the City within 10 Working Days after receiving the Contract forms. See 2-1.1.2, "Joint Venture Contractors" in The WHITEBOOK for details.

9. PREVAILING WAGE RATES: Prevailing wage rates apply to this contract.

9.1. STATE REQUIREMENTS FOR CONTRACTS SUBJECT TO STATE PREVAILING WAGE REQUIREMENTS.

9.1.1. In accordance with the provisions of California Labor Code Sections 1770, et seq. as amended, the Director of the Department of Industrial Relations has determined the general prevailing rate of per diem wages in accordance with the standards set forth in such Sections for the locality in which the Work is to be performed. Copies of the prevailing rate of per diem wages may be found at http://www.dir.ca.gov/dlsr/statistics_research.html. The Contractor shall post a copy of the above determination of the prevailing rate of per diem wages at each job site and shall make them available to any interested party on request.

9.1.2. Pursuant to Sections 1720 et seq., and 1770 et seq., of the California Labor Code the Contractor any Subcontractor shall pay not less than said specified rates determined by the Director of the California Department of Industrial Relations to all workmen employed by them in the execution of the Work.

9.1.3. The wage rates determined by the Director of Industrial Relations and published in the Department of Transportation publication entitled, "General Prevailing Wage Rates", refer to expiration dates. If the published wage rate does not refer to a predetermined wage rate to be paid after the expiration date, said published rate of wage shall be in effect for the life of this contract. If the published wage rate refers to a predetermined wage rate to become effective upon expiration of the published wage rate and the predetermined wage rate is on file with the Department of Industrial Relations, such predetermined wage rate shall become effective on the date following the expiration date and shall apply to this contract in the same manner as if it had been published in said publication. If the predetermined wage rate refers to one or more additional expiration dates with additional predetermined wage rates, which expiration dates occur during the life of this contract, each successive predetermined wage rate shall apply to this contract on the date following the expiration date of the previous wage rate. If the last of such predetermined wage rates expires during the life of this contract, such wage rate shall apply to the balance of the contract.

9.1.4. The successful bidder intending to use a craft or classification not shown on the prevailing rate determinations may be required to pay the rate of the craft or classification most closely related to it.

10. INSURANCE REQUIREMENTS:

10.1. All certificates of insurance and endorsements required by the contract are to be provided upon issuance of the Successor Agency's Notice of Intent to Award letter.

10.2. Refer to sections 7-3, "LIABILITY INSURANCE", and 7-4, "WORKERS' COMPENSATION INSURANCE" of the Supplementary Special Provisions (SSP) for the insurance requirements which must be met.

11. PREQUALIFICATION OF CONTRACTORS:

11.1. Contractors submitting Bid must be pre-qualified for the total amount proposed, inclusive of all alternate items prior to the date of submittal. Bids from contractors who have not been pre-qualified as applicable and Bids that exceed the maximum dollar amount at which contractors are pre-qualified will be deemed **non-responsive** and ineligible for award. Complete information and prequalification questionnaires are available at:

http://www.sandiego.gov/cip/bidopps/prequalification.shtml

11.2. The completed questionnaire, financial statement, and bond letter or a copy of the contractor's SLBE-ELBE certification and bond letter, must be submitted no later than 2 weeks prior to the bid opening to the Public Works Contracting Group, Prequalification Program, 1010 Second Avenue, 14th Floor, San Diego, CA 92101. For additional information or the answer to questions about the prequalification program, contact David Stucky at 619-533-3474 or dstucky@sandiego.gov.

12. REFERENCE STANDARDS: Except as otherwise noted or specified, the Work shall be completed in accordance with the following standards:

Title	Edition	Document Number
Standard Specifications for Public Works Construction ("The GREENBOOK")	2012	PITS070112-01
City of San Diego Standard Specifications for Public Works Construction ("The WHITEBOOK")*	2012	PITS070112-02
City of San Diego Standard Drawings*	2012	PITS070112-03
Caltrans Standard Specifications	2010	PITS070112-04
Caltrans Standard Plans	2010	PITS070112-05
California MUTCD	2012	PITS070112-06
City Standard Drawings - Updates Approved For Use (when specified)*	Varies	Varies
Standard Federal Equal Employment Opportunity Construction Contract Specifications and the Equal Opportunity Clause Dated 09-11-84	1984	769023
NOTE: Available online under Engineering Documents and References at: http://www.sandiego.gov/publicworks/edocref/index.shtml		

13. CITY'S RESPONSES AND ADDENDA: The City at its option, may respond to any or all questions submitted in writing, via letter, or FAX in the form of an addendum. No oral comment shall be of any force or effect with respect to this solicitation. The changes to the

Contract Documents through addendum are made effective as though originally issued with the Bid. The Bidders shall acknowledge the receipt of Addenda on the form provided for this purpose in the Bid.

14. CITY'S RIGHTS RESERVED: The City reserves the right to cancel the Notice Inviting Bids at any time, and further reserves the right to reject submitted Bids, without giving any reason for such action, at its sole discretion and without liability. Costs incurred by the Bidder(s) as a result of preparing Bids under the Notice Inviting Bids shall be the sole responsibility of each bidder. The Notice Inviting Bids creates or imposes no obligation upon the City to enter a contract.

15. CONTRACT PRICING FORMAT: This solicitation is for a Lump Sum contract with Unit Price provisions as set forth in the Bid Proposal Form(s), Volume 2.

16. SUBMITTAL OF "OR EQUAL" ITEMS: See Section 4-1.6, "Trade Names or Equals" in The WHITEBOOK and as amended in the SSP.

17. AWARD PROCESS:

17.1. The Award of this contract is contingent upon the Contractor's compliance with all conditions precedent to Award.

17.2. Upon acceptance of a Bid, the Successor Agency will prepare contract documents for execution within approximately 21 days of the date of the Bid opening and award the Contract approximately within 7 days of receipt of properly executed Contract, bonds, and insurance documents.

17.3. This contract will be deemed executed, and effective, only upon the signing of the Contract by the Mayor or designee of the Successor Agency.

18. SUBCONTRACT LIMITATIONS: The Bidder's attention is directed to Standard Specifications for Public Works Construction, Section 2-3, "SUBCONTRACTS" in The GREENBOOK and as amended in the SSP which requires the Contractor to self perform the amount therein stipulated. Failure to comply with these requirements shall render the Bid **non-responsive** and ineligible for award.

19. AVAILABILITY OF PLANS AND SPECIFICATIONS: Contract Documents may be obtained by visiting the City's website: http://www.sandiego.gov/cip/. Plans and Specifications for this contract are also available for review in the office of the City Clerk or Public Works Contracting Group.

20. SUBMISSION OF QUESTIONS:

20.1. The Director (or designee), of the Public Works Department is the officer responsible for opening, examining, and evaluating the competitive Bids submitted to the City for the acquisition, construction and completion of any public improvement except when otherwise set forth in these documents. All questions related to this solicitation shall be submitted to:

Public Works Contracting Group
1010 Second Avenue, 14th Floor
San Diego, California, 92101
Attention: [Contract Specialist listed on the front cover hereof]

OR:

Email address of the Contract Specialist listed on the front cover hereof.

20.2. Questions received less than 14 days prior to the date for opening of Bids may not be considered.

20.3. Clarifications deemed by the City to be material shall be issued by Addenda and uploaded to the City's online bidding service.

20.4. Only questions answered by formal written addenda will be binding. Oral and other interpretations or clarifications will be without legal effect. It is the Bidder's responsibility to become informed of any Addenda that have been issued and to include all such information in its Bid.

21. ELIGIBLE BIDDERS: No person, firm, or corporation shall be allowed to make, file, or be interested in **more** than one (1) Bid for the same work unless alternate Bids are called for. A person, firm or corporation who has submitted a sub-proposal to a Bidder, or who has quoted prices on materials to a Bidder, is not hereby disqualified from submitting a sub-proposal or quoting prices to other Bidders or from submitting a Bid in its own behalf. Any Bidder who submits more than one bid will result in the rejection of all bids submitted.

22. SAN DIEGO BUSINESS TAX CERTIFICATE: The Contractor and Subcontractors, not already having a City of San Diego Business Tax Certificate for the work contemplated shall secure the appropriate certificate from the City Treasurer, Civic Center Plaza, first floor and submit to the Contract Specialist upon request or as specified in the Contract Documents. Tax Identification numbers for both the Bidder and the listed Subcontractors must be submitted on the City provided forms with the Notice Inviting Bids and Contract forms.

23. PROPOSAL FORMS: Bid shall be made only upon the Bidding Documents i.e., Proposal form attached to and forming a part of the specifications. The signature of each person signing shall be in longhand.

23.1. Bidder shall complete and submit all pages in the "Bidding Document" Section (see Volume 2) as their Bid per the schedule given under "Required Documents Schedule," (see Volume 1). Bidder is requested to retain for their reference other portions of the Contract Documents that are not required to be submitted with the Bid. The entire specifications for the bid package do not need to be submitted with the bid.

23.2. The City may require any Bidder to furnish a statement of experience, financial responsibility, technical ability, equipment, and references.

23.3. Bids and certain other forms and documents as specified in the Volume 2 of 2 of the Contract Documents shall be enclosed in a sealed envelope and shall bear the title of the work and name of the Bidder and the appropriate State Contractors License designation which the Bidder holds.

23.4. Bids may be withdrawn by the Bidder prior to, but not after, the time fixed for opening of Bids.

24. BIDDER'S GUARANTEE OF GOOD FAITH (BID SECURITY):

24.1. With the exception of the contracts valued $5,000 or less, JOC and Design-Build contracts, and contracts subject to the Small and Local Business Program of $250,000 or less e.g., ELBE contracts, each Bidder shall accompany its Bid with either a cashier's check upon some responsible bank, or a check upon such bank properly certified or an approved corporate surety bond payable to the Successor Agency of the City, for an amount of not less than 10% of the aggregate sum of the Bid, which check or bond, and the monies represented thereby shall be held by the Successor Agency as a guarantee that the Bidder, if awarded the contract, will in good faith enter into such contract and furnish the required final bonds.

24.2. The Bidder agrees that in case of Bidder's refusal or failure to execute this contract and give required final bonds, the money represented by a cashier's or certified check shall remain the property of the Successor Agency, and if the Bidder shall fail to execute this contract, the Surety agrees that it will pay to the Successor Agency damages which the Successor Agency may suffer by reason of such failure, not exceeding the sum of 10% of the amount of the Bid.

24.3. A Bid received without the specified bid security will be rejected as being **non-responsive**.

25. AWARD OF CONTRACT OR REJECTION OF BIDS:

25.1. This contract may be awarded to the lowest responsible and reliable Bidder.

25.2. Bidders shall complete the entire Bid schedule (also referred to as "schedule of prices" or Proposal form). Incomplete price schedules will be rejected as being non-responsive.

25.3. The City reserves the right to reject any or all Bids, and to waive any informality or technicality in Bids received and any requirements of these specifications as to bidding procedure.

25.4. Bidders will not be released on account of their errors of judgment. Bidders may be released only upon receipt by the City from the Bidder within 3 Working Days, excluding Saturdays, Sundays, and state holidays, after the opening of Bids, of written notice which includes proof of honest, credible, clerical error of material nature, free from fraud or fraudulent intent, and of evidence that reasonable care was observed in the preparation of the Bid.

25.5. A non-selected Bidder may protest award of the Contract to the selected Bidder by submitting a written "Notice of Intent to Protest" including supporting documentation which shall be received by Public Works Contracting Group no later than 10 days after the City's announcement of the selected Bidder or no later than 10 days from the date that the City issues notice of designation of a Bidder as non-responsible in accordance with San Diego Municipal Code Chapter 2, § 22.3029, "Protests of Contract Award."

25.6. The City of San Diego or Successor Agency will not discriminate with regard to race, religious creed, color, national origin, ancestry, physical handicap, marital status, sex or age, in the award of contracts.

25.7. Each Bid package properly executed as required by these specifications shall constitute a firm offer, which may be accepted by the City within the time specified in the Proposal.

25.8. The City reserves the right to evaluate all Bids and determine the lowest Bidder on the basis of any proposed alternates, additive items or options, at its discretion that will be disclosed in the Volume 2 of 2.

26. BID RESULTS:

26.1. The Bid opening by the City shall constitute the public announcement of the Apparent Low Bidder. In the event that the Apparent Low Bidder is subsequently deemed non-responsive or non-responsible, a public announcement will be posted in the City's web pagehttp://www.sandiego.gov/cip/index.shtml, with the name of the newly designated Apparent Low Bidder.

26.2. To obtain Bid results, either attend Bid opening, review the results on the City's web site, or provide a self-addressed, stamped envelope, referencing Bid number, and Bid tabulation will be mailed to you upon verification of extensions. Bid results cannot be given over the telephone.

27. THE CONTRACT:

27.1. The Bidder to whom award is made shall execute a written contract with the Successor Agency and furnish good and approved bonds and insurance certificates specified by the City within 14 days after receipt by Bidder of a form of contract for execution unless an extension of time is granted to the Bidder in writing.

27.2. If the Bidder takes longer than 14 days to fulfill these requirements, then the additional time taken shall be added to the Bid guarantee. The Contract shall be made in the form adopted by the City, which includes the provision that no claim or suit whatsoever shall be made or brought by Contractor against any officer, agent, or employee of the City, Successor Agency, or Civic San Diego for or on account of anything done or omitted to be done in connection with this contract, nor shall any such officer, agent, or employee be liable hereunder.

27.3. If the Bidder to whom the award is made fails to enter into the contract as herein provided, the award may be annulled and the Bidder's Guarantee of Good Faith will be subject to forfeiture. An award may be made to the next lowest responsible and reliable Bidder who shall fulfill every stipulation embraced herein as if it were the party to whom the first award was made.

27.4. Pursuant to the San Diego City Charter section 94, the Successor Agency may only award a public works contract to the lowest responsible and reliable Bidder. The City will require the Apparent Low Bidder to (i) submit information to determine the Bidder's responsibility and reliability, (ii) execute the Contract in form provided by the City, and (iii) furnish good and approved bonds and insurance certificates

specified by the City within 14 Days, unless otherwise approved by the City, in writing after the Bidder receives notification from the City, designating the Bidder as the Apparent Low Bidder and formally requesting the above mentioned items.

27.5. The award of the Contract is contingent upon the satisfactory completion of the above mentioned items and becomes effective upon the signing of the Contract by the Successor Agency. If the Apparent Low Bidder does not execute the Contract or submit required documents and information, the Successor Agency may award the Contract to the next lowest responsible and reliable Bidder who shall fulfill every condition precedent to award. A corporation designated as the Apparent Low Bidder shall furnish evidence of its corporate existence and evidence that the officer signing the Contract and bond for the corporation is duly authorized to do so.

28. EXAMINATION OF PLANS, SPECIFICATIONS, AND SITE OF WORK: The Bidder shall examine carefully the Project Site, the Plans and Specifications, other materials as described in the Special Provisions, Section 2-7, and the proposal forms (e.g., Bidding Documents). The submission of a Bid shall be conclusive evidence that the Bidder has investigated and is satisfied as to the conditions to be encountered, as to the character, quality, and scope of Work, the quantities of materials to be furnished, and as to the requirements of the Bidding Documents Proposal, Plans, and Specifications.

29. CITY STANDARD PROVISIONS: This contract is subject to the following standard provisions. See The WHITEBOOK for details.

29.1. The City of San Diego Resolution No. R-277952 adopted on May 20, 1991 for a Drug-Free Workplace.

29.2. The City of San Diego Resolution No. R-282153 adopted on June 14, 1993 related to the Americans with Disabilities Act.

29.3. The City of San Diego Municipal Code §22.3004 for Pledge of Compliance.

29.4. The City of San Diego's Labor Compliance Program and the State of California Labor Code §§1771.5(b) and 1776.

29.5. Sections 1777.5, 1777.6, and 1777.7 of the State of California Labor Code concerning the employment of apprentices by contractors and subcontractors performing public works contracts.

29.6. The City's Equal Benefits Ordinance (EBO), Chapter 2, Article 2, Division 43 of The San Diego Municipal Code (SDMC).

29.7. The City's Information Security Policy (ISP) as defined in the City's Administrative Regulation 90.63.

30. PRE-AWARD ACTIVITIES:

30.1. The selected contractor by the City to execute a contract for this Work shall provide the information required within the time specified in "Required Documents," of this bid package. Failure to provide the information within the time specified may result in the Bid being rejected as **non-responsive.**

30.2. If the Bid is rejected as non-responsive, the selected contractor by the City to execute a contract for this Work shall forfeit the required Bid. The decision that the selected contractor by the City to execute a contract for this Work is non-responsive for failure to provide the information required within the time specified shall be at the sole discretion of the City.

31. REDEVELOPMENT-FUNDED PROJECTS: This contract is funded with monies presently available or anticipated to become available, to the Successor Agency and may become subject to termination or suspension for loss of project funds. See 6-5.9, "Successor's Agency Right to Terminate or Suspend for Loss of Project Funds" for more details.

32. ADDITIVE/DEDUCTIVE ALTERNATES:

32.1. The additive/deductive alternates have been established to allow the Successor Agency to compare the cost of specific portions of the Work with the Project's budget and enable the Successor Agency to make decision prior to award. The award will be established as described in the Bid. The City reserves the right to award the Contract for the Base Bid only or the Base Bid plus any combination of Additive and Deductive Alternate(s).

33. REQUIRED DOCUMENT SCHEDULE:

33.1. The Bidder's attention is directed to the City's Municipal Code §22.0807(e), (3)-(5) for important information regarding grounds for debarment for failure to submit required documentation.

33.2. The specified Equal Opportunity Contracting Program (EOCP) forms are available for download from the City's web site at:

http://www.sandiego.gov/eoc/forms/index.shtml

ITEM	WHEN DUE	FROM	DOCUMENT TO BE SUBMITTED
1.	BID SUBMITTAL DATE/TIME	ALL BIDDERS	Bid
2.	BID SUBMITTAL DATE/TIME	ALL BIDDERS	Bid Bond
3.	BID SUBMITTAL DATE/TIME	ALL BIDDERS	Non-collusion Affidavit to be Executed By Bidder and Submitted with Bid under 23 USC 112 and PCC 7106
4.	BID SUBMITTAL DATE/TIME	ALL BIDDERS	Contractors Certification of Pending Actions
5.	BID SUBMITTAL DATE/TIME	ALL BIDDERS	Equal Benefits Ordinance Certification of Compliance
6.	BID SUBMITTAL DATE/TIME	ALL BIDDERS	Form AA35 - List of Subcontractors

ITEM	WHEN DUE	FROM	DOCUMENT TO BE SUBMITTED
7.	BID SUBMITTAL DATE/TIME	ALL BIDDERS	Form AA40 - Named Equipment/Material Supplier List
8.	BID SUBMITTAL DATE/TIME	ALL BIDDERS	Form AA45 - Subcontractors Additive/Deductive Alternate
9.	WITHIN 3 WORKING DAYS OF BID OPENING WITH GOOD FAITH EFFORT DOCUMENTATION	ALL BIDDERS	SLBE Good Faith Efforts Documentation
10.	WITHIN 3 WORKING DAYS OF BID OPENING WITH GOOD FAITH EFFORT DOCUMENTATION	ALL BIDDERS	Form AA60 – List of Work Made Available
11.	WITHIN 3 WORKING DAYS OF BID OPENING WITH GOOD FAITH EFFORT DOCUMENTATION	ALL BIDDERS	Proof of Valid DBE-MBE-WBE-DVBE Certification Status e.g., Certs.
12.	WITHIN 10 WORKING DAYS AFTER RECEIPT BY BIDDER OF CONTRACT FORMS	APPARENT LOW BIDDER	Names of the principal individual owners of the Apparent Low Bidder
13.	WITHIN 10 WORKING DAYS AFTER RECEIPT BY BIDDER OF CONTRACT FORMS	APPARENT LOW BIDDER	If the Contractor is a Joint Venture: • Joint Venture Agreement • Joint Venture License
14.	WITHIN 10 WORKING DAYS AFTER RECEIPT BY BIDDER OF CONTRACT FORMS	APPARENT LOW BIDDER	Form BB05 - Work Force Report
15.	WITHIN 10 WORKING DAYS AFTER RECEIPT BY BIDDER OF CONTRACT FORMS	APPARENT LOW BIDDER	Contract Forms - Agreement
16.	WITHIN 10 WORKING DAYS AFTER RECEIPT BY BIDDER OF CONTRACT FORMS	APPARENT LOW BIDDER	Contract Forms - Payment and Performance Bond
17.	WITHIN 10 WORKING DAYS AFTER RECEIPT BY BIDDER OF CONTRACT FORMS	APPARENT LOW BIDDER	Certificates of Insurance and Endorsements
18.	WITHIN 10 WORKING DAYS AFTER RECEIPT BY BIDDER OF CONTRACT FORMS	APPARENT LOW BIDDER	Contractor Certification - Drug-Free Workplace

ITEM	WHEN DUE	FROM	DOCUMENT TO BE SUBMITTED
19.	WITHIN 10 WORKING DAYS AFTER RECEIPT BY BIDDER OF CONTRACT FORMS	APPARENT LOW BIDDER	Contractor Certification - American with Disabilities Act
20.	WITHIN 10 WORKING DAYS AFTER RECEIPT BY BIDDER OF CONTRACT FORMS	APPARENT LOW BIDDER	Contractors Standards - Pledge of Compliance

CONTRACT FORMS

AGREEMENT

CONTRACT FORMS

CONSTRUCTION CONTRACT

This contract is made and entered into between THE CITY OF SAN DIEGO, SOLELY IN ITS CAPACITY AS THE DESIGNATED SUCCESSOR AGENCY OF THE REDEVELOPMENT AGENCY OF THE CITY OF SAN DIEGO, A FORMER PUBLIC BODY, CORPORATE AND POLITIC, herein called "Successor Agency", and **ECHO PACIFIC CONSTRUCTION, INC.**, herein called "Contractor" for construction of **Horton Plaza Improvement Project**, Bid No. **K-14-6120-DBB-3** in the amount of **FOURTEEN MILLION, FOUR HUNDRED FIFTY-SIX THOUSAND, FIVE HUNDRED FIFTY-FIVE DOLLARS AND 00/100 ($14,456,555.00)**, which is comprised of the Base Bid plus/ Additive Alternates A.

IN CONSIDERATION of the payments to be made hereunder and the mutual undertakings set forth herein, the parties hereto agree as follows:

1. The following are incorporated into this contract as though fully set forth herein:

   (a) The attached Faithful Performance and Payment Bonds.

   (b) The attached Proposal included in the Bid documents by the Contractor.

   (c) Reference Standards listed in the Notice Inviting Bids and the Supplementary Special Provisions (SSP).

   (d) That certain documents entitled **Horton Plaza Improvement Project**, on file in the office of the Public Works Department as Document No. **24002919**, as well as all matters referenced therein.

2. The Contractor shall perform and be bound by all the terms and conditions of this contract and in strict conformity therewith shall perform and complete in a good and workmanlike manner **Horton Plaza Improvement Project**, Bid Number **K-14-6120-DBB-3,** San Diego, California.

3. For such performances, the Successor Agency shall pay to Contractor the amounts set forth at the times and in the manner and with such additions or deductions as are provided for in this contract, and the Contractor shall accept such payment in full satisfaction of all claims incident to such performances.

4. No claim or suit whatsoever shall be made or brought by Contractor against any officer, agent, or employee of the Successor Agency for or on account of anything done or omitted to be done in connection with this contract, nor shall any such officer, agent, or employee be liable hereunder.

5. This contract is effective as of the date that the designee of the Successor Agency signs the agreement.

IN WITNESS WHEREOF, this Agreement is signed by the Successor Agency, acting by and through its Mayor or designee, pursuant to Municipal Code §22.3102 authorizing such execution.

THE CITY OF SAN DIEGO SOLELY IN ITS CAPACITY AS THE DESIGNATED SUCCESSOR AGENCY OF THE REDEVELOPMENT AGENCY OF THE CITY OF SAN DIEGO, A FORMER PUBLIC BODY, CORPORATE AND POLITIC

By: David Graham

Print Name: David Graham
Deputy Chief Operation Officer

Date: 8/19/14

APPROVED AS TO FORM AND LEGALITY

Jan I. Goldsmith, City Attorney
By: Mark M. Mercer

Print Name: Mark M. Mercer
Deputy City Attorney

Date: 8/18/14

CONTRACTOR

By: Christopher A Rowe

Print Name: Christopher A Rowe

Title: President

Date: July 30, 2014

City of San Diego License No.: B1994003787

State Contractor's License No.: 669251

CONTRACT FORMS

ATTACHMENTS

CONTRACT FORMS ATTACHMENTS
PERFORMANCE BOND AND LABOR AND MATERIALMEN'S BOND

FAITHFUL PERFORMANCE BOND AND LABOR AND MATERIALMEN'S BOND:

ECHO PACIFIC CONSTRUCTION, INC., a corporation, as principal, and Hartford Fire Insurance Company, a corporation authorized to do business in the State of California, as Surety, hereby obligate themselves, their successors and assigns, jointly and severally, to The City of San Diego acting as the Successor Agency of the Redevelopment Agency of the City of San Diego in the sum of **FOURTEEN MILLION, FOUR HUNDRED FIFTY-SIX THOUSAND, FIVE HUNDRED FIFTY-FIVE DOLLARS AND 00/100 ($14,456,555.00)** for the faithful performance of the annexed contract, and in the sum of **FOURTEEN MILLION, FOUR HUNDRED FIFTY-SIX THOUSAND, FIVE HUNDRED FIFTY-FIVE DOLLARS AND 00/100 ($14,456,555.00)** for the benefit of laborers and materialmen designated below.

Conditions:

If the Principal shall faithfully perform the annexed contract **Horton Plaza Improvement Project**, Bid Number **K-14-6120-DBB-3**, San Diego, California then the obligation herein with respect to a faithful performance shall be void; otherwise it shall remain in full force.

If the Principal shall promptly pay all persons, firms and corporations furnishing materials for or performing labor in the execution of this contract, and shall pay all amounts due under the California Unemployment Insurance Act then the obligation herein with respect to laborers and materialmen shall be void; otherwise it shall remain in full force.

The obligation herein with respect to laborers and materialmen shall inure to the benefit of all persons, firms and corporations entitled to file claims under the provisions of Chapter 3 of Division 5 of Title I of the Government Code of the State of California or under the provisions of Section 3082 et seq. of the Civil Code of the State of California.

Changes in the terms of the annexed contract or specifications accompanying same or referred to therein shall not affect the Surety's obligation on this bond, and the Surety hereby waives notice of same.

CONTRACT FORMS ATTACHMENTS (continued)
PERFORMANCE BOND AND LABOR AND MATERIALMEN'S BOND

The Surety shall pay reasonable attorney's fees should suit be brought to enforce the provisions of this bond.

Dated August 12, 2014

Approved as to Form and Legality

Jan I. Goldsmith, City Attorney

By _____
Deputy City Attorney

Approved:

By: _____
Deputy Chief Operation Officer

Echo Pacific Construction, Inc.
Principal

By _____

Christopher A. Rowe, President
Printed Name of Person Signing for Principal

Hartford Fire Insurance Company
Surety

By _____
Attorney-in-fact - Lawrence F. McMahon

One Pointe Drive, 6th Floor
Local Address of Surety

Brea, CA 92821
Local Address (City, State) of Surety

714-674-1223
Local Telephone No. of Surety

Premium $ 141,030.00
Premium Includes Two (2) Year Warranty Charge
Premium is for Contract Term and Subject to Adjustment Based on Final Contract Price

Bond No. 72BCSGU3087

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

STATE OF CALIFORNIA

County of San Diego }

On 8/12/2014 (Date) before me, Sarah Myers (Insert Name of Notary exactly as it appears on the official seal), Notary Public,

personally appeared Lawrence F. McMahon (Name(s) of Signer(s)),

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

Witness my hand and official seal.

Signature _____ (Signature of Notary Public) Sarah Myers

SARAH MYERS
Commission # 1958463
Notary Public - California
San Diego County
My Comm. Expires Nov 8, 2015

Place Notary Seal Above

OPTIONAL

Though the information below is not required by law, it may prove valuable to persons relying on the document and could prevent fraudulent removal and reattachment of the form to another document.

Description of Attached Document

Title or Type of Document: _____

Document Date: _____ Number of Pages: _____

Signer(s) Other Than Named Above: _____

Capacity(ies) Claimed by Signer(s)

Signer's Name: _____
- ☐ Individual
- ☐ Corporate Officer — Title(s): _____
- ☐ Partner ☐ Limited ☐ General
- ☑ Attorney in Fact
- ☐ Trustee
- ☐ Guardian or Conservator
- ☐ Other: _____

Signer is Representing:
Hartford Fire Insurance Company

RIGHT THUMBPRINT OF SIGNER
Top of thumb here

Signer's Name: _____
- ☐ Individual
- ☐ Corporate Officer — Title(s): _____
- ☐ Partner ☐ Limited ☐ General
- ☐ Attorney in Fact
- ☐ Trustee
- ☐ Guardian or Conservator
- ☐ Other: _____

Signer is Representing:

RIGHT THUMBPRINT OF SIGNER
Top of thumb here

POWER OF ATTORNEY

Direct Inquiries/Claims to:
THE HARTFORD
BOND, T-4
One Hartford Plaza
Hartford, Connecticut 06155
call: **888-266-3488** *or fax:* **860-757-5835**

KNOW ALL PERSONS BY THESE PRESENTS THAT: **Agency Code: 72-160200**

- [X] **Hartford Fire Insurance Company**, a corporation duly organized under the laws of the State of Connecticut
- [X] **Hartford Casualty Insurance Company**, a corporation duly organized under the laws of the State of Indiana
- [ ] **Hartford Accident and Indemnity Company**, a corporation duly organized under the laws of the State of Connecticut
- [ ] **Hartford Underwriters Insurance Company**, a corporation duly organized under the laws of the State of Connecticut
- [ ] **Twin City Fire Insurance Company**, a corporation duly organized under the laws of the State of Indiana
- [ ] **Hartford Insurance Company of Illinois**, a corporation duly organized under the laws of the State of Illinois
- [ ] **Hartford Insurance Company of the Midwest**, a corporation duly organized under the laws of the State of Indiana
- [ ] **Hartford Insurance Company of the Southeast**, a corporation duly organized under the laws of the State of Florida

having their home office in Hartford, Connecticut, (hereinafter collectively referred to as the "Companies") do hereby make, constitute and appoint, ***up to the amount of unlimited:***

Lawrence F. McMahon, James Baldassare Jr., Sarah Myers, Maria Guise, Lilia Robinson, Charlotte Aquino, Jennifer L. Clampert, Janice Martin
of
San Diego, CA

their true and lawful Attorney(s)-in-Fact, each in their separate capacity if more than one is named above, to sign its name as surety(ies) only as delineated above by ☒, and to execute, seal and acknowledge any and all bonds, undertakings, contracts and other written instruments in the nature thereof, on behalf of the Companies in their business of guaranteeing the fidelity of persons, guaranteeing the performance of contracts and executing or guaranteeing bonds and undertakings required or permitted in any actions or proceedings allowed by law.

In Witness Whereof, and as authorized by a Resolution of the Board of Directors of the Companies on August 1, 2009 the Companies have caused these presents to be signed by its Vice President and its corporate seals to be hereto affixed, duly attested by its Assistant Secretary. Further, pursuant to Resolution of the Board of Directors of the Companies, the Companies hereby unambiguously affirm that they are and will be bound by any mechanically applied signatures applied to this Power of Attorney.

Wesley W. Cowling, Assistant Secretary

M. Ross Fisher, Vice President

STATE OF CONNECTICUT }
COUNTY OF HARTFORD } ss. Hartford

On this 12th day of July, 2012, before me personally came M. Ross Fisher, to me known, who being by me duly sworn, did depose and say: that he resides in the County of Hartford, State of Connecticut; that he is the Vice President of the Companies, the corporations described in and which executed the above instrument; that he knows the seals of the said corporations; that the seals affixed to the said instrument are such corporate seals; that they were so affixed by authority of the Boards of Directors of said corporations and that he signed his name thereto by like authority.

Kathleen T. Maynard
Notary Public
My Commission Expires July 31, 2016

CERTIFICATE

I, the undersigned, Vice President of the Companies, DO HEREBY CERTIFY that the above and foregoing is a true and correct copy of the Power of Attorney executed by said Companies, which is still in full force effective as of August 12, 2014

Signed and sealed at the City of Hartford.

Gary W. Stumper, Vice President

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

CIVIL CODE § 1189

State of California
County of San Diego }

On Aug. 13, 2014 (Date) before me, Erica L. Babcock, Notary Public (Here Insert Name and Title of the Officer),

personally appeared Christopher A. Rowe (Name(s) of Signer(s))

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/~~are~~ subscribed to the within instrument and acknowledged to me that he/~~she/they~~ executed the same in his/~~her/their~~ authorized capacity(~~ies~~), and that by his/~~her/their~~ signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

ERICA L. BABCOCK
Commission # 1986646
Notary Public - California
San Diego County
My Comm. Expires Aug 26, 2016

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature: Erica L. Babcock (Signature of Notary Public)

Place Notary Seal Above

OPTIONAL

Though the information below is not required by law, it may prove valuable to persons relying on the document and could prevent fraudulent removal and reattachment of this form to another document.

Description of Attached Document

Title or Type of Document: _____

Document Date: _____ Number of Pages: _____

Signer(s) Other Than Named Above: _____

Capacity(ies) Claimed by Signer(s)

Signer's Name: _____	Signer's Name: _____
☐ Corporate Officer — Title(s): _____	☐ Corporate Officer — Title(s): _____
☐ Individual	☐ Individual
☐ Partner — ☐ Limited ☐ General	☐ Partner — ☐ Limited ☐ General
☐ Attorney in Fact	☐ Attorney in Fact
☐ Trustee	☐ Trustee
☐ Guardian or Conservator	☐ Guardian or Conservator
☐ Other: _____	☐ Other: _____
Signer Is Representing: _____	Signer Is Representing: _____
RIGHT THUMBPRINT OF SIGNER — Top of thumb here	RIGHT THUMBPRINT OF SIGNER — Top of thumb here

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CONTRACTOR CERTIFICATION

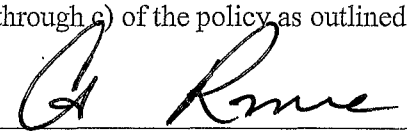
DRUG-FREE WORKPLACE

PROJECT TITLE: **Horton Plaza Improvement Project**

I hereby certify that I am familiar with the requirements of San Diego City Council Policy No. 100-17 regarding Drug-Free Workplace as outlined in the WHITEBOOK, Section 7-13.3, "Drug-Free Workplace", of the project specifications, and that;

Echo Pacific Construction, Inc.
(Name under which business is conducted)

has in place a drug-free workplace program that complies with said policy. I further certify that each subcontract agreement for this project contains language which indicates the subcontractor's agreement to abide by the provisions of subdivisions a) through c) of the policy as outlined.

Signed 

Printed Name Christopher A Rowe

Title President

CONTRACTOR CERTIFICATION

AMERICAN WITH DISABILITIES ACT (ADA) COMPLIANCE CERTIFICATION

PROJECT TITLE: **Horton Plaza Improvement Project**

I hereby certify that I am familiar with the requirements of San Diego City Council Policy No. 100-4 regarding the American With Disabilities Act (ADA) outlined in the WHITEBOOK, Section 7-13.2, "American With Disabilities Act", of the project specifications, and that;

Echo Pacific Construction, Inc.
(Name under which business is conducted)

has in place a workplace program that complies with said policy. I further certify that each subcontract agreement for this project contains language which indicates the subcontractor's agreement to abide by the provisions of the policy as outlined.

Signed _____

Printed Name Christopher A Rowe

Title President

CONTRACTOR CERTIFICATION

CONTRACTOR STANDARDS – PLEDGE OF COMPLIANCE

PROJECT TITLE: **Horton Plaza Improvement Project**

I declare under penalty of perjury that I am authorized to make this certification on behalf of Echo Pacific Construction, Inc., as Contractor, that I am familiar with the requirements of City of San Diego Municipal Code § 22.3224 regarding Contractor Standards as outlined in the WHITEBOOK, Section 7-13.4, ("Contractor Standards"), of the project specifications, and that Contractor has complied with those requirements.

I further certify that each of the Contractor's subcontractors whose subcontracts are greater than $50,000 in value has completed a Pledge of Compliance attesting under penalty of perjury of having complied with City of San Diego Municipal Code § 22.3224.

Dated this 30th Day of July, 2014.

Signed 

Printed Name Christopher A Rowe

Title President

AFFIDAVIT OF DISPOSAL

WHEREAS, on the _____ DAY OF _____, the undersigned entered into and executed a contract with the Successor Agency, for:

Horton Plaza Improvement Project
(Name of Project)

as particularly described in said contract and identified as Bid No. **K-14-6120-DBB-3,** SAP No. (WBS/IO/CC) **24002919** and **WHEREAS**, the specification of said contract requires the Contractor to affirm that "all brush, trash, debris, and surplus materials resulting from this project have been disposed of in a legal manner"; and **WHEREAS**, said contract has been completed and all surplus materials disposed of:

_____

_____

_____

NOW, THEREFORE, in consideration of the final payment by the Successor Agency to said Contractor under the terms of said contract, the undersigned Contractor, does hereby affirm that all surplus materials as described in said contract have been disposed of at the following location(s)

_____

_____

_____

and that they have been disposed of according to all applicable laws and regulations.

Dated this _____ DAY OF _____, _____.

_____ Contractor
by

ATTEST:

State of _____
County of _____

On this_____ DAY OF _____, 2____, before the undersigned, a Notary Public in and for said County and State, duly commissioned and sworn, personally appeared _____ known to me to be the _____
Contractor named in the foregoing Release, and whose name is subscribed thereto, and acknowledged to me that said Contractor executed the said Release.

Notary Public in and for said County and State

ATTACHMENTS

ATTACHMENT A

SCOPE OF WORK

SCOPE OF WORK

1. **SCOPE OF WORK:** Development of a 37,000 square foot urban plaza including but not limited to an amphitheater, architectural luminaries, three (3) food and beverage/retail pavilions with glass curtain walls, public restrooms, underground storage room, mechanical equipment rooms, granite paving, stone walls, interactive water feature, public right of way improvements, rehabilitation of the existing 20,000 square foot historic park, restoration of the Broadway Fountain, and new landscaping.

1.1. The Work shall be performed in accordance with:

1.1.1. This Notice Inviting Bids and Plans 37098-1-D through 37098-17-D; 37098-T01-D through 37908-T07-D and 37342-D, inclusive.

2. **CONSTRUCTION COST:** The Successor Agency's estimated construction cost for this contract is **$10,011,000.**

3. **LOCATION OF WORK**: The location of the Work is Block surrounded by Broadway Circle, Broadway, Fourth Avenue, and E Street. Location Map attached in Appendix Section.

4. **CONTRACT TIME:** The Contract Time for completion of the Work shall be **305 Calendar Days.**

5. **CONTRACTOR'S LICENSE CLASSIFICATION:** In accordance with the provisions of California Law, the Contractor shall possess valid appropriate license(s) at the time that the Bid is submitted. Failure to possess the specified license(s) shall render the Bid as **non-responsive** and shall act as a bar to award of the Contract to any Bidder not possessing required license(s) at the time of Bid.

5.1. The Successor Agency has determined the following licensing classification(s) for this contract:

- CLASS A

ATTACHMENT B

INTENTIONALLY LEFT BLANK

ATTACHMENT C

EQUAL OPPORTUNITY CONTRACTING PROGRAM

EQUAL OPPORTUNITY CONTRACTING PROGRAM

1. To The WHITEBOOK, Chapter 10, Sections D and E, DELETE each in its entirety, and SUBSTITUTE with the following:

D. CITY'S EQUAL OPPORTUNITY COMMITMENT.

1. Nondiscrimination in Contracting Ordinance.

1. The Contractor, Subcontractors and Suppliers shall comply with requirements of the City's Nondiscrimination in Contracting Ordinance, San Diego Municipal Code §§22.3501 through 22.3517.

   The Contractor shall not discriminate on the basis of race, gender, religion, national origin, ethnicity, sexual orientation, age, or disability in the solicitation, selection, hiring, or treatment of subcontractors, vendors, or suppliers. The Contractor shall provide equal opportunity for subcontractors to participate in subcontracting opportunities. The Contractor understands and agrees that violation of this clause shall be considered a material breach of the contract and may result in contract termination, debarment, or other sanctions.

   The Contractor shall include the foregoing clause in all contracts between the Contractor and Subcontractors and Suppliers.

2. Disclosure of Discrimination Complaints. As part of its Bid or Proposal, the Bidder shall provide to the City a list of all instances within the past 10 years where a complaint was filed or pending against Bidder in a legal or administrative proceeding alleging that Bidder discriminated against its employees, subcontractors, vendors, or suppliers, and a description of the status or resolution of that complaint, including any remedial action taken.

3. Upon the City's request, the Contractor agrees to provide to the City, within 60 days, a truthful and complete list of the names of all Subcontractors and Suppliers that the Contractor has used in the past 5 years on any of its contracts that were undertaken within San Diego County, including the total dollar amount paid by the Contractor for each subcontract or supply contract.

4. The Contractor further agrees to fully cooperate in any investigation conducted by the City pursuant to the City's Nondiscrimination in Contracting Ordinance, Municipal Code §§22.3501 through 22.3517. The Contractor understands and agrees that violation of this clause shall be considered a material breach of the Contract and may result in remedies being ordered against the Contractor up to and including contract termination, debarment and other sanctions for violation of the provisions of the Nondiscrimination in Contracting Ordinance. The Contractor further understands and agrees that the procedures, remedies and sanctions provided for in the Nondiscrimination in Contracting Ordinance apply only to violations of the Ordinance.

E. EQUAL EMPLOYMENT OPPORTUNITY OUTREACH PROGRAM.

1. The Contractor, Subcontractors and Suppliers shall comply with the City's Equal Employment Opportunity Outreach Program, San Diego Municipal Code §§22.2701 through 22.2707.

   The Contractor shall not discriminate against any employee or applicant for employment on any basis prohibited by law. Contractor shall provide equal opportunity in all employment practices. Prime Contractor shall ensure their subcontractors comply with this program. Nothing in this section shall be interpreted to hold a prime contractor liable for any discriminatory practice of its subcontractors.

   The Contractor shall include the foregoing clause in all contracts between the Contractor and Subcontractors and Suppliers.

2. If the Contract is competitively solicited, the selected Bidder shall submit a Work Force Report (Form BB05), within 10 Working Days after receipt by the Bidder of Contract forms to the City for approval as specified in the Notice of Intent to Award letter from the City.

3. If a Work Force Report is submitted, and the City determines there are under-representations when compared to County Labor Force Availability data, the selected Bidder shall submit an Equal Employment Opportunity Plan.

4. If the selected Bidder submits an Equal Employment Opportunity Plan, it shall include the following assurances:

   1. The Contractor shall maintain a working environment free of discrimination, harassment, intimidation and coercion at all sites and in all facilities at which the Contractor's employees are assigned to work.

   2. The Contractor reviews its EEO Policy, at least annually, with all on-site supervisors involved in employment decisions.

   3. The Contractor disseminates and reviews its EEO Policy with all employees at least once a year, posts the policy statement and EEO posters on all company bulletin boards and job sites, and documents every dissemination, review and posting with a written record to identify the time, place, employees present, subject matter, and disposition of meetings.

   4. The Contractor reviews, at least annually, all supervisors' adherence to and performance under the EEO Policy and maintains written documentation of these reviews.

   5. The Contractor discusses its EEO Policy Statement with subcontractors with whom it anticipates doing business, includes the EEO Policy Statement in its subcontracts, and provides such documentation to the City upon request.

6. The Contractor documents and maintains a record of all bid solicitations and outreach efforts to and from subcontractors, contractor associations and other business associations.

7. The Contractor disseminates its EEO Policy externally through various media, including the media of people of color and women, in advertisements to recruit, maintains files documenting these efforts, and provides copies of these advertisements to the City upon request.

8. The Contractor disseminates its EEO Policy to union and community organizations.

9. The Contractor provides immediate written notification to the City when any union referral process has impeded the Contractor's efforts to maintain its EEO Policy.

10. The Contractor maintains a current list of recruitment sources, including those outreaching to people of color and women, and provides written notification of employment opportunities to these recruitment sources with a record of the organizations' responses.

11. The Contractor maintains a current file of names, addresses and phone numbers of each walk-in applicant, including people of color and women, and referrals from unions, recruitment sources, or community organizations with a description of the employment action taken.

12. The Contractor encourages all present employees, including people of color and women employees, to recruit others.

13. The Contractor maintains all employment selection process information with records of all tests and other selection criteria.

14. The Contractor develops and maintains documentation for on-the-job training opportunities, participates in training programs, or both for all of its employees, including people of color and women, and establishes apprenticeship, trainee, and upgrade programs relevant to the Contractor's employment needs.

15. The Contractor conducts, at least annually, an inventory and evaluation of all employees for promotional opportunities and encourages all employees to seek and prepare appropriately for such opportunities.

16. The Contractor ensures the company's working environment and activities are non-segregated except for providing separate or single-user toilets and necessary changing facilities to assure privacy between the sexes.

ATTACHMENT D

INTENTIONALLY LEFT BLANK

ATTACHMENT E

SUPPLEMENTARY SPECIAL PROVISIONS

SUPPLEMENTARY SPECIAL PROVISIONS

The following Supplementary Special Provisions (SSP) modifies the following documents:

1) Standard Specifications for Public Works Construction (The GREENBOOK) currently in effect.

2) The City of San Diego Standard Specifications for Public Works Construction (The WHITEBOOK).

SECTION 1 – TERMS, DEFINITIONS, ABBREVIATIONS, UNITS OF MEASURE, AND SYMBOLS

1-2 TERMS AND DEFINITIONS. ADD the following:

Civic San Diego: Administrator of the Project.

Owner: Successor Agency.

Successor Agency: The City of San Diego, solely in its capacity as the designated Successor Agency to the Redevelopment Agency of the City of San Diego, a former public body, corporate and politic.

Night and Weekend Work: Construction in the ROW may be performed at night or on weekends at no extra costs to the Agency. The Contractor must have prior authorization from the Resident Engineer and the City Traffic Engineer to perform Work on weekends or at night. In addition, the Contractor will be required to obtain a Noise Abatement Permit to perform Work outside the normal working hours. The Contractor shall be aware that some work may be required at night for traffic control purposes. Cost of the permits shall be included in the various unit price Bid items for the Work.

SECTION 2 - SCOPE AND CONTROL OF WORK

2-3.2 Self Performance. DELETE in its entirety and SUBSTITUTE with the following:

1. You must perform, with your own organization, Contract work amounting to at least 50% of the base bid alone. Additive Alternate A will not be used toward the computation of the amount required to be performed by the Contractor within its own organization.

2. The self performance percentage requirement will be waived for contracts when a “B” License is required or allowed.

2-5.3 Submittals.

2-5.3.1 General. To the City Supplement, ADD the following

7. For products for which an AML is available, products listed in the AML shall be used. A submittal review will be conducted for products not identified on an AML on a case-by-case basis when:

   a) The product type or category is not in the AML.

   b) The AML does not list at least two available manufacturers of the product.

   c) The material or manufacturer listed in the AML is no longer available. Documentation to substantiate the product is no longer available or in production is required as part of the submittal.

   In the case of conducting a submittal review when required by the Plans or Special Provisions, or when requested by the Engineer, all submittals shall be accompanied by the City's submittal form.

   The Product Submittal Form is available for download at:

   http://www.sandiego.gov/publicworks/edocref/index.shtml

8. Prior to submission, the Contractor shall carefully review and coordinate all aspects of each item being submitted and ensure each item in submittal conforms to the requirements of Contract Documents. The Contractor shall sign and date a statement indicating that they have reviewed the submittal and that the information is complete and complies with the requirements of the project documents.

9. Work requiring submittals will not be allowed to commence prior to acceptance of all submittals related to that work.

10. Delays caused by tardiness in making submittals or resubmittals will not be acceptable basis for extension of Contract completion time.

11. Revise and resubmit submittals as required. Identify all changes made since previous submittal. Resubmittals are subject to the same terms and conditions as the original submittal. Resubmittal and Consultant's review time required will not constitute adequate reason for an extension of the time required to complete the Work. Contractor shall pay for Consultant's review time in excess of one submittal review for the same item

12. Submittal review shall not relieve Contractor from responsibility for errors or deviations from requirements of Contract Documents. Acceptance of submittals with deviations shall not relieve Contractor from responsibility for additional costs of changes required to accommodate such deviations, as described in Section 7, "Responsibilities of the Contractor".

2-5.3.3 Shop Drawings. To the City Supplement, ADD the following:

A. General:

1. The Contract Drawings show the general arrangement and such details as are necessary to provide a comprehensive description of the work to be performed.

2. Supplement the Contract Drawings with such Shop Drawings as are necessary to adequately control and implement the work as indicated below. Reproduction of Contract Drawings will not be accepted as Shop Drawings.

3. Except as noted hereinafter, submit all Contractor's drawings on sheets measuring 11 inches by 17 inches or 22 inches by 34 inches unless otherwise approved by the Resident Engineer. Provide a blank area, 5 inches by 5 inches, adjacent to the title block for the Consultant's stamp. The title block shall display the following:

   a. Contract number and name.

   b. Number and title of the drawing.

   c. Name of Contractor and subcontractor submitting drawing.

   d. Submission number and date.

   e. Contract drawings and/or specification reference(s) to which the submittals apply.

   f. Name, California registration number, seal and signature of Professional Engineer responsible for contractor submitted Drawings if engineering design and computations are required.

B. Definitions: Work-related drawing submittals are categorized for convenience as follows:

1. Shop Drawings required for permanent work, and as further specified in individual sections of the Specifications, include but are not limited to custom-prepared data such as fabrication and erection/installation drawings, setting diagrams, actual shop work and manufacturing instructions, custom templates, special wiring diagrams, coordination drawings, and performance and test data as applicable to the Work.

   a. Such drawings shall show the principal dimensions, weight, structural and operating features, space required, clearances and type and/or brand of finish or shop coat, depending on the subject of the drawing. When it is customary to do so, when the dimensions are of particular importance, or when so specified, the drawings shall be certified by the manufacturer or fabricator as correct for the Contract.

b. When so specified or if considered by the Owner's Representative to be acceptable, manufacturer's specifications, catalog data, descriptive matter, and illustrations may be submitted for acceptance in place of Shop Drawings. In such cases, the requirements shall be as specified for Shop Drawings, insofar as applicable. Unless provided in another acceptable manner, catalog cuts and manufacturer's standard drawings shall be in form that can be clearly photocopied.

2. Shop Drawings required for temporary work sometimes referred to as Working Drawings:

a. Such drawings, as further specified in individual sections of the Specifications, shall consist of detailed drawings for cribs, falsework, temporary support systems, formwork, and other temporary work and methods of construction that the Contractor proposes to use.

3. Shop Drawings for work requiring engineering design or compliance with fire, safety codes, standards, or regulations, shall be accompanied by calculations and/or other sufficient information to completely explain the structure, or system described, and the intended manner of use. All such drawings and computations shall bear the name, California registration number, seal and signature of Professional Engineer responsible for preparation.

C. Variation from Contract Requirements:

1. If Shop Drawings show variations from the Contract requirements because of standard shop practice or for other reasons, describe such variations in the letter of transmittal. If acceptable, the Resident Engineer may accept any or all such variations, subject to a proper adjustment in the Contract. Failure of the Contractor to describe such variations shall not relieve the Contractor of the responsibility for executing the Work in accordance with the Contract, even though such Shop Drawings have been accepted.

2-6 WORK TO BE DONE. To the City Supplement, ADD the following

4. ALTERNATE BID ITEMS

A. Additive Alternate A Scope of Work: The Contractor shall insert the cost to construct an interactive fountain per Drawings WF 2.1 through WF-2.16 and Division 13 of the Technical Specifications.

B. Deductive Alternate B Scope of Work: The Contractor shall insert the cost to construct the Pavilion Trellis Structures with Uniform Diameter Support Columns in lieu of Tapered Trellis Support Columns on line item 2 of Deductive Alternate B. The Trellis Support Columns are labeled as item 5B in the Architectural Drawings. The Contractor shall utilize a uniform diameter of 9.5-inches for the columns at the South

Pavilion and a uniform diameter of 8-inches for the columns at the Northeast and Northwest Pavilions.

5. The Contractor will be required to excavate and backfill an area for a 24”x24”x24” time capsule provided by the Successor Agency. The general location will be in the Historic Park area beneath the proposed landscaping. The exact location will be determined in the field and shall be marked in the as-builts provided by the Contractor.

2-7 SUBSURFACE DATA. ADD the following:

4. In preparation of the Contract Documents, the designer has relied upon the following reports of explorations and tests of subsurface conditions at the Work Site:

    1. Geotechnical Investigation and Fault Hazard Assessment Rehabilitation of Historic Park and Construction of New Urban Plaza at Horton Plaza, City of San Diego, California. Prepared by URS Corporation dated April 11, 2012.

5. The report(s) listed above is available as Appendix A.

2-9.2 Survey Service. DELETE in its entirety and SUBSTITUTE the following:

The Contractor is responsible for any survey services required to complete the work. If re-staking is required due to Contractor’s work, the cost for said surveying shall be paid for by the Contractor. Payment for survey services outside those specified herein shall be included in the Bid items of work and no additional compensation shall be allowed therefore.

2-10 AUTHORITY OF BOARD AND ENGINEER. ADD the following:

The Resident Engineer is the representative of the Successor Agency authorized to advise the Agency on construction matters related to the Contract. The Agency has delegated his authority to the Resident Engineer to make initial decisions regarding questions, which may arise as to the quality or acceptability of materials furnished and Work performed, as to the manner of performance, and rate of progress of the Work under the Contract. The Resident Engineer interprets the Contract Documents and makes initial decisions with respect to the Contractor’s fulfillment of the Contract obligations and the Contractor’s entitlement to compensation. The Contractor shall look initially to the Resident Engineer in matters relating to the Contract.

ADD:

2-11.1 Rejected Work. The Agency may reject all work that is not done in accordance with the Contract. All work that has been rejected shall be remedied or removed and replaced by the Contractor in an acceptable manner and no compensation will be allowed for such removal, replacement or remedial work.

Any work done beyond the boundaries established by the Agency or any work as hereinafter specified which is done without proper permits, inspection and testing,

will be considered as unauthorized work and will be rejected. Upon order of the Agency, unauthorized work shall be remedied, removed, or replaced at the Contractor's expense.

Upon failure of the Contractor to comply promptly with an order, the Agency may cause rejected or unauthorized work to be remedied, removed, or replaced, and deduct the costs from any monies due or to become due to the Contractor.

2-14.2 Integration of the Work with Separate Contractors. To the City Supplement, ADD the following:

The list of Separate Contractors includes:

1. Westfield's Contractor (TBD) to perform Right of Way Work along 4th Avenue. See Phasing & Permit Project Numbers Key Plan within the drawing set. PTS #294306.
2. Westfield's Contractor (TBD) to perform Urban Park Improvements along the E Street Corridor, Broadway Circle, and around the Lyceum Theatre near the north entrance of Horton Plaza Mall. See Phasing & Permit Project Numbers Key Plan within the drawing set. PTS#294474
3. Tenant Improvement (TI) Contractors to perform tenant improvements on the three pavilions as depicted in the contract documents. See coordination section 2-14.3 below.

2-14.3 Coordination. To the City Supplement, ADD the following:

a) The Contractor shall provide the access and laydown areas as shown in Appendices of this SSP for Westfield's Tenant Improvement (TI) Contractor. The TI Contractor is responsible for the tenant improvements within each Pavilion. The Contractor shall deliver a completed project area for each pavilion as described in Section 6-7.4 of this SSP.

b) The Contractor shall provide Westfield or it's designated vendor/contractor a minimum 30 day notice for work to be performed immediately north of the existing Bradley Building. The notice shall include the dates and durations for the closure of the exit at the northeast corner of the building. The Contractor is responsible for any coordination with the City Fire Marshall for emergency exit requirements and any fees associated with this effort.

c) The Contractor is required to coordinate with Westfield or its designated vendor/contractor for the paving along the property line as shown in the Construction Drawings. The quantity of paving shall be included in the bid as shown in the Construction Drawings, however for constructability purposes, the Contractor may 'swap' paving areas to provide a seamless transition along the property lines. The Contractor shall submit a plan to the Owner's Representative for approval depicting the areas where paving will be 'swapped'.

2-15 TECHNICAL STUDIES AND DATA. To the City Supplement, ADD the following:

5. In preparation of the Contract Documents, the designer has relied upon the following reports of explorations and tests at the Work Site:

1. Conservation Assessment of the Electric Fountain at Horton Plaza, San Diego, California by Griswold Conservation, dated July 7, 2009.

6. The report listed above is available as Appendix E

SECTION 4 - CONTROL OF MATERIALS

4-1.3.6 Preapproved Materials. To the City Supplement, ADD the following:

3. You shall submit in writing a list of all products to be incorporated in the Work that are on the AML.

4-1.6 Trade Names or Equals. ADD the following:

You must submit your list of proposed substitutions for "an equal" ("or equal") item(s) **no later than 5 Working Days after the determination of the Apparent Low Bidder** and on the City's Product Submittal Form available at:

http://www.sandiego.gov/publicworks/edocref/index.shtml

SECTION 6 - PROSECUTION, PROGRESS AND ACCEPTANCE OF WORK

6-1.1 Construction Schedule. ADD the following:

22. The initial CPM schedule submitted shall be the Base Line Schedule. The Base Line Schedule (BLS) must be submitted by the Contractor within 30 calendar days after the NTP. The BLS must be approved by the Owner's Representative and be of sufficient detail as described herein to define the Contractors approach to the project based upon the initial contract documents. Revisions required as part of the initial review of the BLS must be made within 10 Calendar days.

6-2.1 Moratoriums. To the City Supplement, ADD the following:

Construction activities shall not interfere with any scheduled civic event in or around the construction area. The Contractor is responsible for coordination of construction activities with the City of San Diego City Manager's Civic Events Coordinator to ensure construction activities do not conflict with any civic events in the project area. No additional compensation shall be allowed for delays or changes to the construction schedule due to scheduled civic events.

A waiver may be granted to the Contractor if it can be demonstrated that the work will not impact City activities.

6-5.9 City's Right to Terminate or Suspend for Loss of Project Funds. To the City Supplement, DELETE in its entirety and SUBSTITUTE with the following:

The Parties acknowledge that the sole anticipated funding source for payments owed under the Contract will be redevelopment funds presently available, or anticipated to become available, to the Successor Agency. The Parties further acknowledge that the City's general fund and general assets shall not be exposed to any liability or claim whatsoever under the Contract. The Successor Agency may

terminate or suspend the Contract at its sole discretion if the State of California or its agents deny or delay, in whole or in part, the expenditure of redevelopment funds that are anticipated to be used to fund this Project. A seven-member Oversight Board and the State Department of Finance must approve the Successor Agency's expenditure of redevelopment funds for this Project through a payment structure that is re-evaluated every six months through successive versions of the Recognized Obligation Payment Schedule. If the Successor Agency chooses to suspend the Contract due to the unavailability of redevelopment funds, that suspension will last until the redevelopment funds become available or until alternative funds are identified and approved by the City Council, or Mayor, whichever is appropriate, to be used to complete the Project. If the Successor Agency elects under this provision to terminate the Contract, then neither Party is entitled to compensation from the other Party for any costs, losses or damages arising from such termination. The Successor Agency may also elect to terminate the Contract after invoking a suspension under this provision.

ADD:

6-7.5 Time of Completion for Pavilions. To the City Supplement, ADD the following:

The Contractor is required to deliver the construction of each Pavilion for accommodation of Westfield's Tenant Improvement Contractor. (See Section 2-14.3, Coordination). The Contractor shall deliver each Pavilion and the associated improvements surrounding the Pavilion (Pavilion Work) per the Schedule of Performance and Contractor's Responsibilities specified below. These requirements are specified to provide the Tenant Improvement Contractor enough time to complete their tenant improvements at the same time the Contractor completes the Horton Plaza Improvement Project The Pavilion Work shall be defined as: Installation of all structures, utilities, connections, paving, trellis structures, irrigation, planters, landscaping, stone work, mechanical work, framing, curtain walls, roofing, electrical and other ancillary work associated with the construction of each Pavilion as shown in the construction drawings.

The Schedule of Performance:

1. South Pavilion: 210 calendar days from the issuance of the NTP

2. Northeast Pavilion: 270 calendar days from the issuance of the NTP.

3. Northwest Pavilion: 270 calendar days from the issuance of the NTP.

The Contractor's Responsibilities include:

1. Meeting the Schedule of Performance above.

2. Obtaining a Temporary Certificate of Occupancy per the City of San Diego Requirements.

3. Providing the limits of work for staging and access corridors as depicted in Appendix D.

4. Providing secure access points at the perimeter of the project area for use by the TI Contractor. Temporary gates shall be provided at the access points and shall have the capability "daisy chaining" a lock to the gate for the TI Contractor's use.

5. Submittal of a plan depicting the means and methods and the materials used to delineate the areas as depicted in Appendix D.

6. Coordination of the roof penetrations per the Contract Drawings to determine exact locations with the TI Contractor.

7. Providing a written assertion on each Pavilion that all necessary improvements for the Pavilion Work are complete and ready for use by the Tenant Improvement Contractor.

8. Notifying the Owner's Representative of any potential work performed by the TI Contractor that will conflict with the Horton Plaza Improvements Construction. The Contractor shall submit a detailed scope of work and how it affects the delivery of the overall project schedule. The Contractor shall include a detailed schedule update and describe the impacts and delays (if any) on the schedule.

SECTION 7 - RESPONSIBILITIES OF THE CONTRACTOR

7-3 LIABILITY INSURANCE. DELETE in its entirety and SUBSTITUTE with the following:

The insurance provisions herein must not be construed to limit your indemnity obligations contained in the Contract.

7-3.1 Policies and Procedures.

1. You must procure the insurance described below, at its sole cost and expense, to provide coverage against claims for loss including injuries to persons or damage to property, which may arise out of or in connection with the performance of the Work by you, your agents, representatives, officers, employees or Subcontractors.

2. Insurance coverage for property damage resulting from your operations is on a replacement cost valuation. The market value will not be accepted.

3. You must maintain this insurance for the duration of this contract and at all times thereafter when you are correcting, removing, or replacing Work in accordance with this contract. Your liabilities under the Contract, e.g., your indemnity obligations, is not deemed limited to the insurance coverage required by this contract.

4. Payment for insurance is included in the various items of Work as bid by you, and except as specifically agreed to by the Successor Agency in writing, you are not entitled to any additional payment. Do not begin any work under this

contract until you have provided and the Successor Agency has approved all required insurance.

5. Policies of insurance must provide that the Successor Agency is entitled to 30 days (10 days for cancellation due to non-payment of premium) prior written notice of cancellation or non-renewal of the policy. Maintenance of specified insurance coverage is a material element of the Contract. Your failure to maintain or renew coverage or to provide evidence of renewal during the term of the Contract may be treated by the Successor Agency as a material breach of the Contract.

7-3.2 Types of Insurance.

7-3.2.1 Commercial General Liability Insurance.

1. Commercial General Liability Insurance must be written on the current version of the ISO Occurrence form CG 00 01 07 98 or an equivalent form providing coverage at least as broad.

2. The policy must cover liability arising from premises and operations, XCU (explosions, underground, and collapse), independent contractors, products/completed operations, personal injury and advertising injury, bodily injury, property damage, and liability assumed under an insured's contract (including the tort liability of another assumed in a business contract).

3. There must be no endorsement or modification limiting the scope of coverage for either "insured vs. insured" claims or contractual liability. You must maintain the same or equivalent insurance for at least 10 years following completion of the Work.

4. All costs of defense must be outside the policy limits. Policy coverage must be in liability limits of not less than the following:

General Annual Aggregate Limit	Limits of Liability
Other than Products/Completed Operations	$2,000,000
Products/Completed Operations Aggregate Limit	$2,000,000
Personal Injury Limit	$1,000,000
Each Occurrence	$1,000,000

7-3.2.2 Commercial Automobile Liability Insurance.

1. You must provide a policy or policies of Commercial Automobile Liability Insurance written on the current version of the ISO form CA 00 01 12 90 or later version or equivalent form providing coverage at least as broad in the amount of $1,000,000 combined single limit per accident, covering bodily injury and property damage for owned, non-owned, and hired automobiles ("Any Auto").

2. All costs of defense must be outside the limits of the policy.

7-3.3 **Rating Requirements.** Except for the State Compensation Insurance Fund, all insurance required by this contract as described herein must be carried only by responsible insurance companies with a rating of, or equivalent to, at least "A-, VI" by A.M. Best Company, that are authorized by the California Insurance Commissioner to do business in the State, and that have been approved by the City.

7-3.3.1 **Non-Admitted Carriers.** The Successor Agency will accept insurance provided by non-admitted, "surplus lines" carriers only if the carrier is authorized to do business in the State and is included on the List of Approved Surplus Lines Insurers (LASLI list).

All policies of insurance carried by non-admitted carriers must be subject to all of the requirements for policies of insurance provided by admitted carriers described herein.

7-3.4 **Evidence of Insurance.** Furnish to the Successor Agency documents e.g., certificates of insurance and endorsements evidencing the insurance required herein, and furnish renewal documentation prior to expiration of this insurance. Each required document must be signed by the insurer or a person authorized by the insurer to bind coverage on its behalf. We reserve the right to require complete, certified copies of all insurance policies required herein.

7-3.2.5 **Contractors Builders Risk Property Insurance..**

1. You must provide at its expense, and maintain until Final Acceptance of the Work, a Special Form Builders Risk Policy or Policies. This insurance must be in an amount equal to the replacement cost of the completed Work (without deduction for depreciation) including the cost of excavations, grading, and filling. The policy or policies limits must be 100% of this contract value of the Work plus15% to cover administrative costs, design costs, and the costs of inspections and construction management.

2. Insured property must include material or portions of the Work located away from the Site but intended for use at the Site, and must cover material or portions of the Work in transit. The policy or policies must include as insured property scaffolding, falsework, and temporary buildings located at the Site. The policy or policies must cover the cost of removing debris, including demolition.

3. The policy or policies must provide that all proceeds thereunder must be payable to the Successor Agency as Trustee for the insured, and must name the City, the Contractor, Subcontractors, and Suppliers of all tiers as named insured. We as Trustee will collect, adjust, and receive all monies which may become due and payable under the policy or policies, may compromise any and all claims thereunder, and will apply the proceeds of such insurance to the repair, reconstruction, or replacement of the Work.

4. Any deductible applicable to the insurance must be identified in the policy or policies documents and responsibility for paying the part of any loss not covered because of the application of such deductibles must be apportioned among the parties except for the Successor Agency as follows: if there is more than one claimant for a single occurrence, then each claimant must pay a pro-

rata share of the per occurrence deductible based upon the percentage of their paid claim to the total paid for insured. The Successor Agency must be entitled to 100% of its loss. The Contractor must pay the Successor Agency any portion of that loss not covered because of a deductible, at the same time the proceeds of the insurance are paid to the Successor Agency as trustee.

5. Any insured, other than the Successor Agency, making claim to which a deductible applies must be responsible for 100% of the loss not insured because of the deductible. Except as provided for under California law, the policy or policies must provide that the Successor Agency is entitled to 30 days prior written notice (10 days for cancellation due to non-payment of premium) of cancellation or non-renewal of the policy or policies.

7-3.5 Policy Endorsements.

7-3.5.1 Commercial General Liability Insurance

7-3.5.1.1 Additional Insured.

a) You must provide at your expense policy endorsement written on the current version of the ISO Occurrence form CG 20 10 11 85 or an equivalent form providing coverage at least as broad.

b) To the fullest extent allowed by law e.g., California Insurance Code §11580.04, the policy must be endorsed to include the City, Successor Agency, Civic San Diego and its respective elected officials, officers, employees, agents, and representatives as additional insured.

c) The additional insured coverage for projects for which the Engineer's Estimate is $1,000,000 or more must include liability arising out of: (a) Ongoing operations performed by you or on your behalf, (b) your products, (c) your work, e.g., your completed operations performed by you or on your behalf, or (d) premises owned, leased, controlled, or used by you.

d) The additional insured coverage for projects for which the Engineer's Estimate is less than $1,000,000 must include liability arising out of: (a) Ongoing operations performed by you or on your behalf, (b) your products, or (c) premises owned, leased, controlled, or used by you.

7-3.5.1.2 Primary and Non-Contributory Coverage. The policy must be endorsed to provide that the coverage with respect to operations, including the completed operations, if appropriate, of the Named Insured is primary to any insurance or self-insurance of the City, Successor Agency, Civic San Diego and its elected officials, officers, employees, agents and representatives. Further, it must provide that any insurance maintained by the City, Successor Agency, Civic San Diego and its elected officials, officers, employees, agents and representatives must be in excess of your insurance and must not contribute to it.

7-3.5.1.3 Project General Aggregate Limit. The policy or policies must be endorsed to provide a Designated Construction Project General Aggregate Limit that will apply only to the Work. Only claims payments which arise from the Work must reduce

the Designated Construction Project General Aggregate Limit. The Designated Construction Project General Aggregate Limit must be in addition to the aggregate limit provided for the products-completed operations hazard.

7-3.5.2 Commercial Automobile Liability Insurance.

7-3.5.2.1 Additional Insured. Unless the policy or policies of Commercial Auto Liability Insurance are written on an ISO form CA 00 01 12 90 or a later version of this form or equivalent form providing coverage at least as broad, the policy must be endorsed to include the City, Successor Agency, Civic San Diego and its respective elected officials, officers, employees, agents, and representatives as additional insured, with respect to liability arising out of automobiles owned, leased, hired or borrowed by you or on your behalf. This endorsement is limited to the obligations permitted by California Insurance Code §11580.04.

7-3.5.5 Builders Risk Endorsements.

7-3.5.5.1 Waiver of Subrogation. The policy or policies must be endorsed to provide that the insurer will waive all rights of subrogation against the City, Successor Agency, Civic San Diego and its respective elected officials, officers, employees, agents, and representatives for losses paid under the terms of the policy or policies and which arise from work performed by the Named Insured for the Successor Agency.

7-3.5.5.2 Builders Risk – Partial Utilization. If the Successor Agency desire to occupy or use a portion or portions of the Work prior to Acceptance in accordance with this contract, the Successor Agency will notify you and you must immediately notify your Builder's Risk insurer and obtain an endorsement that the policy or policies must not be cancelled or lapse on account of any such partial use or occupancy. You must obtain the endorsement prior to our occupation and use.

7-3.6 Deductibles and Self-Insured Retentions. You must pay for all deductibles and self-insured retentions. You must disclose deductibles and self-insured retentions to the Successor Agency at the time the evidence of insurance is provided.

7-3.7 Reservation of Rights. The Successor Agency reserves the right, from time to time, to review your insurance coverage, limits, deductibles and self-insured retentions to determine if they are acceptable to the Successor Agency. The Successor Agency will reimburse you, without overhead, profit, or any other markup, for the cost of additional premium for any coverage requested by the Engineer but not required by this contract.

7-3.8 Notice of Changes to Insurance. You must notify the Successor Agency 30 days prior to any material change to the policies of insurance provided under this contract.

7-3.9 Excess Insurance. Policies providing excess coverage must follow the form of the primary policy or policies e.g., all endorsements.

7-4 WORKERS' COMPENSATION INSURANCE. DELETE in its entirety and SUBSTITUTE with the following:

7-4.1 Workers' Compensation Insurance and Employers Liability Insurance.

1. In accordance with the provisions of §3700 of the California Labor Code, you must provide at your expense Workers' Compensation Insurance and Employers Liability Insurance to protect you against all claims under applicable state workers compensation laws. The City, Successor Agency, Civic San Diego, its elected officials, and employees will not be responsible for any claims in law or equity occasioned by your failure to comply with the requirements of this section.

2. Limits for this insurance must be not less than the following:

Workers' Compensation	Statutory Employers Liability
Bodily Injury by Accident	$1,000,000 each accident
Bodily Injury by Disease	$1,000,000 each employee
Bodily Injury by Disease	$1,000,000 policy limit

3. By signing and returning the Contract you certify that you are aware of the provisions of §3700 of the Labor Code which require every employer to be insured against liability for worker's compensation or to undertake self-insurance in accordance with the provisions of that code and you must comply with such provisions before commencing the Work as required by §1861 of the California Labor Code.

7-4.1.1 Waiver of Subrogation. The policy or policies must be endorsed to provide that the insurer will waive all rights of subrogation against the City, Successor Agency, Civic San Diego and its respective elected officials, officers, employees, agents, and representatives for losses paid under the terms of the policy or policies and which arise from work performed by the Named Insured for the Successor Agency.

7-5 PERMITS, FEES, AND NOTICES. To the City Supplement, ADD the following:

The Successor Agency will obtain, at no cost to the Contractor; the following permits:

1. The General Building Permit for the Horton Plaza Improvement Project.

Civic San Diego will be the permit holder prior to contract award. The Contractor shall be required to transfer the 'Permit Holder Name' to their name prior to NTP. The Contractor is responsible for any fees associated with the transfer of the permit.

7-8.6 Water Pollution Control. ADD the following:

4. The Project is subject to the Storm Water Pollution Control requirements listed in the Water Quality Technical Report (Appendix F), the requirements on Construction Drawings C200 and C201, and the requirements of the SWPPP (Appendix I)

5. The SWPPP has been prepared and approved by the Regional Water Quality Control Board, WDID#9 37C368989. The Contractor is not required to

develop a new SWPPP or submit an NOI, however the Contractor is required implement the SWPPP and its requirements upon Contract Award.

7-8.6.3 **Storm Water Pollution Prevention Plan (SWPPP)**. From the City Supplement DELETE 'Section 801' and REPLACE with 'Section 701'.

7-10.2.2.3 **Engineered Traffic Control Plans Provided by the Contractor.** To the City Supplement, ADD the following:

1. The Project site currently has existing traffic control permit and plans in place and in working condition. It is the Contractor's responsibility to transfer the existing traffic control permit into their name upon Award of the Contract. The Contractor shall be responsible for all setup, maintenance, and modifications of the traffic control until the Project has been completed and accepted.
2. The Successor Agency holds contracts with American Fence Company for temporary fence rental, Cecilia's Safety Services for traffic control device rental, and Art's Trench Plate & K-Rail for K-Rail rental to maintain the existing traffic control in place. The Successor Agency will terminate the contracts with these entities upon Award of the Contract with the Contractor. It is the Contractor's responsibility to provide similar services and maintain a seamless transition of traffic control measures when the traffic control permit and responsibilities have been transferred as described in Item 1.
3. The Contractor shall be responsible for all permit fees associated with the transfer of the permit and modifications necessary to complete the Work within the ROW and the Project Site as shown in the Construction Drawings.

7-10.5.3 **Steel Plate Covers.** Table 7-10.5.3(A), REVISE the plate thickness for 5'-3" trench width to read 1 ¾".

7-10.7.2 **Storage and Staging Areas**: To the City Supplement, ADD the following:

4. An offsite staging and storage area will be available to the Contractor at the following location: The east side of 13th Street approximately mid-block between Market Street and Island Avenue. Address: 529 13th Street, San Diego, CA 92101. The approximate area is 5,000 SF and is surrounded by a perimeter fence. The Contractor may use this premises for the entire duration of the Project. The Contractor must fill out a conditional use permit and enter into a no cost lease agreement (form provided by Agency) to use this property.
5. The Contractor is responsible to obtain and pay for any additional storage or staging areas.

ADD:

7-10.7.5 **Barricade Maintenance**: ADD the following:

The Contractor is responsible for the maintenance of the existing barricade surrounding the Project site. Responsibilities include maintaining the structural integrity of the barricade, painting and repairing any defects, damage, or graffiti on green portions of the barricade. The Contractor is also responsible for the

modifications and relocations of the barricade necessary to perform the Work. The Contractor shall also coordinate the location of the barricade to accommodate work performed by Westfield's contractor for construction of the Urban Plaza and ROW work that are part of Westfield's responsibility. These projects are PTS#294474 and PTS#294306 as shown on the Phasing and Permit Project Numbers Key Plan within the Contract Drawings. The Contractor is not responsible for the maintenance of the graphics on the barricade, however coordination and notice of damage to these graphics is required in a timely manner. The maintenance of the graphics will be performed by Westfield or its designated vendor/contractor.

7-15 **INDEMNIFICATION AND HOLD HARMLESS AGREEMENT.** To the City Supplement, fourth paragraph, last sentence, DELETE in its entirety and SUBSTITUTE with the following:

Your duty to indemnify and hold harmless does not include any claims or liability arising from the established active or sole negligence, or willful misconduct of the City, Successor Agency, and CivicSD, its officers, or employees.

SECTION 8 - FACILITIES FOR AGENCY PERSONNEL

8-2 **FIELD OFFICE FACILITIES.** To the City Supplement, ADD the following:

Due to the site constraints of the Project, it will be the Contractor's responsibility to chose a Class 'A' Field Office or Class 'D' Field Office as defined in the City Supplement. The Contractor shall submit to the Owner's Representative the chosen option prior to NTP.

SECTION 9 - MEASUREMENT AND PAYMENT

9-3.2.5 **Withholding of Payment.** To the City Supplement, item i), DELETE in its entirety and SUBSTITUTE with the following:

i) Your failure to comply with 7-2.3, "PAYROLL RECORDS" and 2-16, "CONTRACTOR REGISTRATION AND ELECTRONIC REPORTING SYSTEM."

ADD:

9-3.7 **Compensation Adjustments for Price Index Fluctuations.** This Contract is not subject to the provisions of The WHITEBOOK for Compensation Adjustments for Price Index Fluctuations for the paving asphalt.

SECTION 201 – CONCRETE, MORTAR, AND RELATED MATERIALS

201-1.1 **Requirements.** ADD the following:

A. Shop Drawings: Include details of steel reinforcement placement including material, grade, bar schedules, spacing, bent bar diagrams, arrangement, and supports. Provide plans and details for each paving section.

B. Formwork Observation: Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed. Notify Owner's Representative 48 hours minimum prior to placing concrete that formwork is in place and ready for observation. Do not proceed with concrete placement prior to obtaining Owner's Representative's approval that formwork meets the lines and grades intended on the Drawings. Concrete placed without the Owner's Representative's approval of formwork shall be removed and replaced at no additional cost to the Owner.

201-1.1.4 Concrete shall have a minimum compressive strength of 3500 psi by its 28th day.

201-1.2.2 Maximum Coarse-Aggregate Size: Not exceeding 1 inch nominal.

DELETE:

201-1.2.6 Reclaimed Concrete Material.

201-1.6 Pervious Concrete.

201-2 REINFORCEMENT FOR CONCRETE. ADD the following:

Joint Dowel Bars: Plain steel bars, ASTM A 615, Grade 60. Cut bars true to length with ends square and free of burrs.

201-2.4.6 Joint Dowel Plates: Steel load plates, ASTM A36, ASTM A615 or A108-03 grade 1018, with high density ABS plastic pocket former. Load plate size: 3/8-inch thick by 4 ½ inches x 4 ½ inches.

201-2.4.7 Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars, welded wire reinforcement, and dowels in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete of greater compressive strength than concrete.

201-2.4.8 Slip Dowel Sleeves: Proprietary plastic sleeve consisting of a polypropylene plastic sleeve and a reusable base.

201-3.2 Expansion Joint Filler Strips: ASTM D 3575, closed-cell polyethylene foam backing, with removable joint cap, for joints wider than 1/4-inch.

Joint Primer: ASTM C 920, Type S, Grade P, Class 25. Material recommended by the joint sealant manufacturer where required for adhesion of sealant to joint substrates, as determined from preconstruction joint sealant substrate tests and fields tests.

Backer Rod: Non-gassing, reticulated closed-cell polyethylene rod designed for use with cold-applied joint sealants where joint depth exceeds manufacturer's recommended depth for joint sealant. Comply with ASTM C 1330, Type C. Size as required for joint design.

Joint Sealant for use on exposed concrete paving: Non priming, single-component, polyurethane sealant. Comply with ASTM C 920, Type S, Grade NS, Class 50. Color to be selected by Owner's Representative from available color palette.

Silica Sand for sealant application: Spherical, round or subangular quartz sand, clear to light grey in color, No. 70 mesh, or equal.

Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.

SECTION 207 – PIPE

207-17.2.3 **Pipe Manufacturer.** To the City Supplement, DELETE in its entirety and SUBSTITUTE with the following:

PVC products as manufactured or distributed by J-M Manufacturing Company shall not be used on the Contract for pressurized pipe.

207-27 **FUSIBLE NON-PRESSURE POLYVINYLCHLORIDE PIPE.** DELETE in its entirety.

SECTION 209 – STREET LIGHTING AND TRAFFIC SIGNAL MATERIALS

209-6.4 **Induction Cobra Head Luminaire.** To the City Supplement, CORRECT certain section numbering as follows:

OLD SECTION NUMBER	TITLE	NEW SECTION NUMBER
209-6.4.7	**Luminaire Identification**	**209-6.4.8**
209-6.4.8	**Photometric Documentation**	**209-6.4.9**
209-6.4.9	**Quality Assurance**	**209-6.4.10**

SECTION 211 - SOILS AND AGGREGATE TESTS

To the City Supplement, ADD the following:

211-2 **AGRONOMIC SOILS TEST.** Soil test shall be submitted to an approved and qualified laboratory. Testing methods should comply with the United States Department of Agriculture Handbook Publication No. 60, Methods of Soil Analysis published by the Soil Science Society of America and peer-viewed methods published in scientific journals. Evaluations and recommendations should be based on University of California publications and peer-viewed articles published in scientific journals.

The Resident Engineer shall appoint a representative to oversee soil sampling that may be required. The time, depth, location, and number of samples to be taken will be as per instructions from the Resident Engineer. A minimum of three

representative samples shall be taken from random and varied locations of the project site that will receive turf, shrub, or tree planting. Samples should represent major conditions of exposed cut soils and fill soils. Sample from the top foot for turf and shrub areas and from the expected depth for large container stock. Label each sample for location/origin, type of soil condition visibly observed, and sampling depth. Laboratory report shall identify each sample with the same information. All samples taken shall be split into two samples, one half will be retained by the Resident Engineer. All samples shall be at least one pint in volume. All samples shall go to an approved soil-testing laboratory. Pre-approved soil-testing laboratories are as follows, however the Contractor may submit on other laboratories for review and approval:

Wallace Laboratories
365 Coral Circle
El Segundo, CA 90245
Phone: 310-615-0116
Fax: 310-640-6863

Or

Soil & Plant Laboratory
41 East Hunter Ave. Suite A
Anaheim, CA 92807
Phone: (714) 282-8777
Fax: (714) 282-8575

The Contractor shall provide the Resident Engineer and the Landscape Architect with a copy of the written report by the approved laboratory.

All soil samples shall show the following information:

a) Date of Testing

b) Project Name

c) The Contractor's Name

d) Source of Materials and Supplier's Name

e) Estimate of Quantity Needed

f) Soil Gradation

g) Soil Permeability

h) Toxic Elements

i) pH

j) EC

k) Organic Content

l) Recommendations for adding amendments, chemical corrections, or both.

m) Measurement of sodicity (Sodium Adsorption Ratio).

n) Recommendations for soil leaching.

o) Pounds of pre-plant fertilizer per 1,000 sq. ft. and recommended NPK analysis of fertilizer.

p) Pounds of maintenance fertilizer per 1,000 sq. ft. and recommended NPK analysis of fertilizer.

Each soil analysis shall include written recommendations for soils treatments and soils amendments to be added based upon test results.

SECTION 212 - LANDSCAPE AND IRRIGATION MATERIALS

212-1.1 Topsoil.

212-1.1.2 Class "A" Topsoil. To the City Supplement, Paragraph 4, between the words "the" and "agricultural", ADD the following:

gradation limits, permeability rate, and

Third paragraph, at the end of the test results list, ADD the following:

m) Measurement of sodicity (Sodium Adsorption Ratio).

n) Recommendations for soil leaching.

o) Pounds of pre-plant fertilizer per 1,000 sq. ft. and recommended NPK analysis of fertilizer.

p) Pounds of maintenance fertilizer per 1,000 sq. ft. and recommended NPK analysis of fertilizer.

ADD after third paragraph: Topsoil shall be Class "A" as specified herein, except green roof shall receive light weight soil as specified in Section 212-1.1.5 Light Weight Soil for Green Roof.

ADD:

212-1.1.5 Light Weight Soil for Green Roof. Light weight soil shall be Skyland USA 'Rooflite Extensive MC', or approved equal and shall meet the following specifications:

Particle Size Distribution			
Proportion of silting components	< 0.063 mm	Mass %	≤ 15
Proportion of particles < 0.25 mm	60 mesh	Mass %	5 - 30
Proportion of particles < 1.00 mm	18 mesh	Mass %	10 - 50
Proportion of particles < 2.00 mm	10 mesh	Mass %	30 - 70
Proportion of particles < 3.20 mm	1/8 inch	Mass %	40 - 80
Proportion of particles < 6.30 mm	1/4 inch	Mass %	65 - 95
Proportion of particles < 9.50 mm	3/8 inch	Mass %	80 - 100
Proportion of particles < 12.50 mm	1/2 inch	Mass %	100

Density Measurements		
Bulk Density (dry weight basis)	g/cm^3	0.70 - 0.85
Bulk Density (dry weight basis)	lb/ft^3	44 - 53
Bulk Density (at max. water-holding capacity)	g/cm^3	1.15 - 1.35
Bulk Density (at max. water-holding capacity)	lb/ft^3	72 – 85
Water/Air Measurements		
Total Pore Volume	Vol. %	$\geq$ 50
Maximum water-holding capacity	Vol. %	35 – 65
Air-filled porosity at max water-holding capacity	Vol. %	$\geq$ 10
Water permeability (saturated hydraulic conductivity)	cm/sec	0.001 – 0.12
Water permeability (saturated hydraulic conductivity)	in/min	0.024 – 2.83
pH and Salt Content		
pH (in $CaCl_2$)		6.0 - 8.5
Soluble salts (water, 1:10, m:v)	g (KCl)/L	< 3.5
Organic Measurements		
Organic matter content	g/L	25 - 65
Nutrients		
Phosphorus, P205 (CAL)	mg/L	$\leq$ 200
Potassium, K2O (CAL)	mg/L	$\leq$ 700
Magnesium, Mg (CaCl2)	mg/L	$\leq$ 200
Nitrate + Ammonium (CaCl2)	mg/L	$\leq$ 80

ADD:

212-1.1.6 Sand Soil Mix for Turf. Sand Soil Mix shall meet the following specifications:

Amount/cubic yard
90% Specified Sand with gradation as defined below
10% Class A Humic Compost (available through Agri-Service or approved equal)
1 lb 6-20-20 commercial fertilizer
2 lbs Gypsum

Sand Gradation:

Sieve Size	Weight Percent Passing
#4/4.75 mm	100
#8/2.36 mm	95 – 100
#16/1.18 mm	70 -95
#30/600 um	45-70
#200/75 um	0-5

Sand Equivalent – 75 minimum

ADD:

212-1.1.7 **Structural Soil.** Structural soil shall be CU Structural Soil by AMEREQ, or approved equal. See technical specification section 32-91-13 Structural Soil (Load Bearing Soil).

ADD:

212-1.1.8 **Biofiltration Soil.** The loamy sand filtration layer shall consist of the following components: Loamy Sand Soil Mix shall consist of an approximate ratio of 75%-90% sand, 5%-20% silt and <5% clay. The loamy sand soil mix shall be combined with organic matter at a rate of 65-70% loamy sand soil mix and 30-35% compost material per the product specifications described below, to create the loamy sand filtration mix. The final product shall provide a permeability rate of not less than 2" per hour or greater than 6" per hour. These ratios were selected to minimize filtration layer compaction, and formation of an anaerobic soil condition resulting in the formation of off-gas (methane) and bacterial growth.

The final loamy sand mixture shall have the following physical properties:

Property	**Test Method**	
pH	5.5- 8.0 (6.0-7.5 is optimum) (ASTM D4972)	
Magnesium	32 ppm (use authorized soil test procedures)	
Phosphorous (phosphate P2O5)	Not to exceed 69 ppm (use authorized soil test procedures)	
Potassium (K2O)	Minimum 78 ppm (use authorized soil test procedures)	
Salt Concentration	< 4.0 mmhos/cm (use authorized soil test procedures)	
Permeability (Darcy's k)	2.3 x10^-2 centimeters per second, minimum (see sand mixture requirements)	
Permeability (Saturation Hydraulic Conductivity)	USDA Hydraulic Properties Calculator – 2006 2-6 inches per hour	
Maturity	80% or above (Minimum of 6 on the Stability/Maturity Scale) (TMECC 05.05-A for Germination and Vigor, Seed Emergence Seedling Vigor, % Relative to Positive Control)	
Carbon/Nitrogen Ratio	Less than 20:1 will indicate compost is stable (TMECC 05.02-A)	
Pathogen	Fecal Coliform Bacteria < 1000 MPN/gram dry weight (TMECC 07.01-B)	Salmonella < 3 MPN/4 grams dry weight (TMECC 07.01-B)
Physical Contaminants	Less than 1.0% No Sharps (Sewing needles, straight pins and hypodermic needles, TMECC 02.02-C), Glass, Plastic, Paper	
Organic Matter Content	30-70% Dry Weight Basis (50%-60% preferred) Loss-On-Ignition Organic Matter Method (LOI) (TMECC 05.07-A)	
Moisture Content	35-55% (40-50% preferred) Use authorized test procedures) (TMECC 03.09-A)	
NOTE: TMECC refers to "Test Methods for the Examination of Composting and Compost," published by the United States Department of Agriculture and the United States Compost Council (USCC).		

If the pH of the final loamy sand mixture falls outside the acceptable range, it may be modified with lime (to raise) or iron sulfate plus sulfur (to lower). The lime or iron sulfate must be mixed uniformly into the soil mix prior to use in bio-retention areas.

Should the soil mix not meet the minimum requirement for magnesium, it may be modified with magnesium sulfate. Likewise, should the soil mix not meet the minimum requirement for potassium, it may be modified with potash. Magnesium sulfate and potash must be mixed uniformly into the soil mix prior to use in bio-retention areas.

Limestone shall contain not less than 85 percent calcium and magnesium carbonates. Dolomitic (magnesium) limestone shall contain at least 10 percent magnesium as magnesium oxide and 85% calcium and magnesium carbonates.

Limestone shall conform to the following gradation:

Sieve Size	-	Minimum Percent Passing By Weight
No. 10	-	100%
No. 20	-	98%
No. 100	-	50%

Iron Sulfate. Iron sulfate shall be a constituent of an approved horticultural product produced as a fertilizer for supplying iron and as a soil acidifier.

Magnesium Sulfate. Magnesium sulfate shall be a constituent of an approved horticultural product produced as a fertilizer.

Potash. Potash (potassium oxide) shall be a constituent of an approved horticultural product produced as a fertilizer.

The materials making up the loamy sand filtration mixture shall have the following properties:

1) Topsoil: The base topsoil shall be free of stones, stumps, roots, or other similar objects larger than 2 inches. The topsoil shall have less than 5% clay content and no more than 20% silt and shall meet the following requirements:

   pH range: 5.5 to 8.0
   Organic matter: >5%
   Carbon to Nitrogen Ratio: <20:1
   Moisture content: 25-55%

2) Sand: The sand used shall be clean sand (Unified Soil Classification System group SW or SP) that is free of organic and deleterious materials. The sand shall be classified as coarse or medium sand, with grain sizes falling between the #10 and the #40 sieve size. No more than 5% of the sand by weight shall pass through the #100 sieve. The sand mixture shall fall within the envelope presented in Figure 1, below. The contractor shall demonstrate that the sand has these geotechnical properties by conducting grain size distribution testing (ASTM D422-63) at a frequency of one per 20 cubic yards of material. The sand layer shall possess a minimum permeability of 2.0 x10^-2 centimeters per

second. The contractor shall demonstrate that the sand material has this permeability through a constant head permeability test (ASTM D2434) at one test per 100 cubic yards of material.

3) Compost: The compost used must not be derived from mixed municipal solid waste and must be reasonably free of visible contaminates. The compost must not contain paint, petroleum products, pesticides, or any other chemical residues harmful to animal life or plant growth (less than 1% by dry weight basis). The compost must not possess objectionable odors. The compost shall have a grain size distribution where 98% is passing the 3/4" sieve and less than 25% passing the 3/8" sieve. The compost shall not have any materials larger than the 2" in length. The compost shall also meet the following requirements:

pH: 5.5-8.0
Moisture: 30-60% wet weight basis
Organic Matter: 30-65% dry weight basis
Stability (Carbon Dioxide evolution rate): >80% relative to positive control
Maturity (Seed emergence and seedling vigor): >80% relative to positive control

The compost producer must be fully permitted as specified under the California Integrated Waste Management Board, Local Enforcement Agencies and any other State and Local Agencies that regulate solid waste facilities. If exempt from State permitting requirements, the composting facility must certify that it follows guidelines and procedures for production of compost meeting the environmental health standards of Title 14, California Code of Regulations, Division 7, Chapter 3.1, Article 7.

ADD:

212-1.10 Herbicide. Pre-emergent herbicide shall be as determined by Contractor. The purpose of the pre-emergent herbicide is to control the growth of weeds within planter areas below the bark mulch layer. Contractor shall submit a sample label and Material Safety Data Sheet (MSDS) to the Resident Engineer for approval prior to purchase and applications.

Post-emergent herbicide shall be non-selective type for total control of undesirable vegetation, available as Roundup or approved substitution as determined by the Contractor. Contractor shall submit a sample label and Material Safety Data Sheet (MSDS) to the Resident Engineer for approval prior to purchase and applications. Application shall be in accordance with precautions and rates suggested by the manufacturer.

212-1.5 Headers, Stakes, and Ties.

212-1.5.3 Tree Stakes. REPLACE subsection with the following:

All new trees shall be secured using the Platipus Tree Anchoring System.

Shade Trees: Model RF2P

The Contractor shall immediately notify the Resident Engineer if installation conflicts with existing site conditions.

212-1.2.3 Fertilizer. ADD at the end of subsection.

Palm Tree Fertilizer

Fertilizer for transplanted palm trees shall be Grow Power Premium Palm and Tropical Plant Food (9-3-9) with 25% humus, 5% humic acid, controlled release nitrogen, 3% calcium, 4% magnesium, 2% iron, and micronutrients. Apply at the rate specified by the manufacturer.

212-2 IRRIGATION SYSTEM MATERIALS. ADD the following:

Work included in these specifications shall consist of the furnishing of labor, tools, materials, permits, fees, appliances, taxes and other costs necessary for the installation of an automatic irrigation system in an acceptable operational condition as specified and shown on the project drawings.

Material List: Contractor shall furnish articles, equipment, materials, and processes specified by name in construction documents. No substitution shall be allowed without prior written approval by the Owner's Representative.

Complete material list shall be submitted prior to performing work.

Material list shall include manufacturer, model number, and description of materials and equipment to be used.

Equipment and materials provided without prior approval of the Owner's Representative may be rejected and Contractor required to remove such materials from the site at his own expense.

Acceptance of items, alternates and substitutes indicates only that the product(s) apparently meets requirements of contract documents based on information or samples submitted to the Successor Agency.

Manufacturer's warranties shall not relieve Contractor of his liability under the guarantee. Such warranties shall only supplement the guarantee.

212-2.1 Pipe and Fittings.

212-2.1.1 General. REVISE to read as follows:

Contractor shall furnish only new pipe and fittings of types designated on the Plans and in accordance with the specifications.

ADD:

212-2.1.17 Sand Encasement. Sand Encasement for all irrigation pipe, direct burial control wire and electrical conduit shall be clean plaster or mortar sand, as per section 200 of the Greenbook, with a minimum sand equivalent of 50.

ADD:

212-2.5 **Equipment to be Furnished.** Contractor shall provide the following to the Owner's Representative prior to final acceptance:

(a) Five irrigation heads with nozzles (of each type used) for every 100 irrigation heads, or portions thereof, used.

(b) 2 sets of special tools required for removing, disassembling and adjusting each type of sprinkler and valve supplied on this project.

(c) 2 five ft. valve keys for operation of gate valves.

(d) 2 keys for each automatic controller, locking valve boxes and locking quick couplers.

(e) 2 keys for pump.

(f) 2 valve keys for ACME and 2 valve keys for potable quick couplers.

ADD:

212-2.6 **Drip Irrigation Equipment.** Drip irrigation equipment shall be of the types and sizes shown on the Plans. Such equipment shall be pre-assembled and constructed with a wrapping of polypropylene fleece material and pressure-compensating, non-draining inline emitter tubing. The wrapped drip tubing shall have a nominal outside diameter of 17mm and shall have 0.6 GPH emitters. Emitters shall be uniformly spaced at 12 inch intervals. Tubing shall be constructed to landscape grade specifications with a nominal wall thickness not less than 1.1mm and a UV protection rating of seven years. Each roll shall be delivered with solid caps inserted to protect the tubing from debris during installation.

212-3 **ELECTRICAL MATERIALS.**

ADD:

212-3.2.2.4 **Wires in Pull** Boxes. Wires in Pull Boxes shall be loose and shall not come within 3" from lid. Boxes shall be sized accordingly to accommodate this requirement.

ADD:

212-3.2.2.5 **Wire Testing.** Wire shall be tested for continuity, open circuits, and unintentional grounds prior to connecting to equipment. Any wiring that is defective shall be replaced, at the Contractor's expense.

SECTION 300 – EARTHWORK

300-1.4 **Payment.** To the City Supplement, paragraph (2), DELETE in its entirety and SUBSTITUTE with the following:

2. Payment for existing pavement removal and disposal of up to 12" thick, within the excavation e.g., trench limits, shall be included in the Bid item for installation of the mains or the Work item that requires pavement removal.

SECTION 302 – ROADWAY SURFACING

302-3 **Preparatory Repair Work**. To the City Supplement, DELETE in its entirety and SUBSTITUTE with the following:

302-3 **Preparatory Repair Work**.

1. Prior to roadway resurfacing or the application of slurry, the Contractor shall complete all necessary preparation and repair work to the road segment e.g., tree trimming, weed spray, weed abatement, crack sealing, asphalt repair, hump removal, miscellaneous asphalt patching, removal of raised pavement markers, removal of pavement markings, etc. and as specified in the Special Provisions.

2. Preparatory work shall include, but not be limited to, tree trimming, weed spray, weed abatement, crack sealing, asphalt repair i.e., mill and pave, hump removal, miscellaneous asphalt patching, removal of raised pavement markers, removal of pavement markings, etc.

3. The Contractor shall repair areas of distressed asphalt concrete pavement by milling or removing damaged areas of pavement to a minimum depth of 2" for Residential streets, and a minimum depth of 3" for all others to expose firm and unyielding pavement. The Contractor shall prepare subgrade as needed and install a minimum of 2" for residential streets, and a minimum of 3" for all others, of compacted asphalt concrete pavement over compacted native material as directed by the Engineer.

4. If, in order to achieve the minimum specified depth, the base material is exposed, the material shall be compacted to 95% relative compaction to a depth 10" below the finished grade (dig out). Compaction tests shall be made to ensure compliance with the specifications. The Engineer will determine when and where the test will occur. The City will pay for the soils testing required by the Engineer, which meets the required compaction. The Contractor shall reimburse the City for the cost of retesting failing compaction tests. If additional base material is required, the Contractor shall use Class 2 Aggregate Base in accordance with 200-2.2, "Crushed Aggregate Base."

5. Recycled base material shall conform to Crushed Miscellaneous Base Material in accordance with 200-2.4, "Crushed Miscellaneous Aggregate Base."

6. Prior to replacing asphalt, the area shall be cleaned by removing all loose and damaged material, moisture, dirt, and other foreign matter and shall be tack coated in accordance with 302-5.4 "Tack Coat."

7. The Contractor shall install new asphalt within the repair area or for patches in accordance with 302-5, "ASPHALT CONCRETE PAVEMENT." Asphalt concrete shall be C2-PG 64-10 in compliance with 400-4, "ASPHALT CONCRETE."

8. No preparatory asphalt work shall be done when the atmospheric temperature is below 50°F or during unsuitable weather.

9. Following the asphalt placement, the Contractor shall roll the entire area of new asphalt in both directions at least twice. The finished patch shall be level and smooth in compliance with 302-5.6.2 "Density and Smoothness." After placement and compaction of the asphalt patch, the Contractor shall seal all finished edges with a 4" wide continuous band of SS-1H.

10. The minimum dimension for each individual repair shall be 4' x 4' and shall be subject to the following conditions:

    a) If the base material is exposed to achieve the required minimum removal thickness, the base material shall be prepared conforming to 301-1, "SUBGRADE PREPARATION."

    b) When additional base material is required, then the contractor shall use Class 2 Aggregate Base in accordance with 200-2.2, "Crushed Aggregate Base." Recycled base material shall conform to Crushed Miscellaneous Base Material in accordance with 200-2.4, "Crushed Miscellaneous Base."

    c) The Contractor may use grinding as a method for removal of deteriorated pavement when the areas indicated for removal are large enough (a minimum of the machine drum width) and when approved by the Engineer.

    d) For both scheduled and unscheduled base repairs, failed areas may be removed by milling or by excavation provided that the edges are cut cleanly with a saw. The areas shall be cleaned and tack coated in accordance with 302-5.4, "Tack Coat" before replacing the asphalt. The areas for scheduled repairs have been marked on the street.

302-3.1 Asphalt Patching.

1. Asphalt patching shall consist of patching potholes, gutter-line erosion, and other low spots in the pavement that are deeper than ½" per 302-5.6.2, "Density and Smoothness." These areas are generally smaller and more isolated than those areas in need of mill and pave.

2. The areas requiring patching have been identified in the Contract Documents, marked on the streets, or as directed by the Engineer. The Contractor shall identify any new areas that may require patching prior to slurry work to ensure the smoothness and quality of the finished product.

3. The Contractor shall identify and repair any areas that may require patching, prior to the placement of slurry seal for smooth finished product.

4. Asphalt overlay shall not be applied over deteriorated pavement. Preparatory asphalt work shall be completed and approved by the Engineer before proceeding with asphalt overlay.

5. The Contractor shall remove distressed asphalt pavement either by saw cutting or milling, to expose firm and unyielding pavement; prepare subgrade (as needed); and install compacted asphalt concrete pavement over compacted native material as directed by the Engineer.

6. Prior to replacing asphalt, the area shall be cleaned and tack coated per 302-5.4, “Tack Coat”.

7. Following the asphalt placement, the Contractor shall roll the entire patch in both directions covering the patch at least twice.

8. After placement and compaction of the asphalt patch, the Contractor shall seal all finished edges with a 4” wide continuous band of SS-1H.

9. Base repairs shall not exceed 20% RAP in content.

302-3.2 Payment.

1. Payment for replacement of existing pavement when required shall be included in the unit bid price for Asphalt Pavement repair for the total area replaced and no additional payment shall be made regardless of the number of replacements completed. No payment shall be made for areas of over excavation or outside trench areas in utility works unless previously approved by the Engineer. No payment for pavement replacement will be made when the damage is due to the Contractor’s failure to protect existing improvements. The Contractor shall reimburse the Successor Agency for the cost of retesting all failing compaction tests.

2. The areas and quantities shown on the road segments and in appendices are given only for the Contractor’s aid in planning the Work and preparing Bids. The Engineer will designate the limits to be removed and these designated areas shall be considered to take precedent over the area shown in an Appendix to the Contract Documents. The quantities shown in the appendices are based on a street assessment survey and may vary.

3. At the end of each day, the Contractor shall submit to the Engineer an itemized list of the asphalt pavement repair work completed. The list shall include the location of the work and the exact square footage of the repair.

4. Preparatory repair work and tack coating will be paid at the Contract unit price per ton for Asphalt Pavement Repair. No payment shall be made for areas of over excavation unless previously approved by the Engineer.

5. Milling shall be included in the Bid item for Asphalt Pavement Repair unless separate Bid item has been provided.

6. Payment for miscellaneous asphalt patching shall be included in the Contract unit price for slurry and no additional payment shall be made therefore.

302-5.1.1 Damaged AC Pavement Replacement. To the City Supplement, DELETE in its entirety.

302-5.1.2 Measurement and Payment. To the City Supplement, DELETE in its entirety.

302-5.2.1 Measurement and Payment. To the City Supplement, item c), ADD the following:

Imported Subgrade material shall be paid per bid item “Imported Backfill”.

SECTION 303 - CONCRETE AND MASONRY CONSTRUCTION

ADD:

303-5.1.1 General. Proof-roll prepared sub-base surface to check for unstable areas and verify need for additional compaction. Proceed with pavement only after nonconforming conditions have been corrected and subgrade is ready to receive pavement.

303-5.2.3 Steel Reinforcement.

General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.

Clean reinforcement of loose rust and mill scale, earth, ice, or other bond-reducing materials.

Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement. Maintain minimum cover to reinforcement.

Install welded wire reinforcement in lengths as long as practicable. Lap adjoining pieces at least one full mesh, and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.

Install fabricated bar mats in lengths as long as practicable. Handle units to keep them flat and free of distortions. Straighten bends, kinks, and other irregularities, or replace units as required before placement. Set mats for a minimum 2-inch overlap of adjacent mats.

303-5.4.4 Doweled Isolation Joints and Contraction Joints.

Doweled Isolation Joints: Install dowel plates and support assemblies at isolation joints in concrete paving where indicated as doweled isolation joints (DIJ) on the Drawings. Provide Proprietary plastic pocket former per manufacturer’s directions, on one-half of dowel length to prevent concrete bonding to one side of joint.

Contraction Joints: Form weakened-plane contraction joints, sectioning concrete into areas as indicated on the Drawings. Construct contraction joints for a depth equal to at least 1/4 of the concrete thickness, at intervals of 10 feet maximum, unless otherwise indicated on the Drawings.

303-5.5.1 General. Wetting of concrete surfaces during screeding, initial floating, or finishing operations is prohibited.

SECTION 306 – UNDERGROUND CONDUIT CONSTRUCTION

306-1 OPEN TRENCH OPERATIONS. To the City Supplement, CORRECT certain section numbering as follows:

OLD SECTION NUMBER	TITLE	NEW SECTION NUMBER
306-1.8	**House Connection Sewer (Laterals) and Cleanouts**	**306-1.9**
306-1.7.1	**Payment**	**306-1.9.1**
306-1.7.2	**Sewer Lateral with Private Replumbing**	**306-1.9.2**
306-1.7.2.1	**Location**	**306-1.9.2.1**
306-1.7.2.2	**Permits**	**306-1.9.2.2**
306-1.7.2.3	**Submittals**	**306-1.9.2.3**
306-1.7.2.4	**Trenchless Construction**	**306-1.9.2.4**
306-1.7.2.5	**Payment**	**306-1.9.2.5**
306-1.7.3.6	**Private Pump Installation**	**306-1.9.2.6**
306-1.7.3.7	**Payment**	**306-1.9.2.7**

306-1.6 **Basis of Payment for Open Trench Installations.** ADD the following:

Payment for imported backfill when the Contractor elects to import material from a source outside the project limits and when authorized by the Engineer shall be included in the Bid unit price for Imported Backfill. The price shall include the removal and disposal of unsuitable materials.

306-1.8.3 **Polyurethane Lining.** To the City Supplement, item 5., DELETE in its entirety

306-20.8 **Carrier Pipe**. To the City Supplement, DELETE in its entirety and SUBSTITUTE with the following:

Carrier pipe materials shall be approved by the Engineer. The Contractor shall use only HDPE. The Contractor shall furnish and install a structurally sound, leak-proof, fusible high density polyethylene pipe, for all piping identified for installation by horizontal directional drilling. The Contractor shall be responsible for the sizing of the carrier pipe to withstand all installation forces, curvature, and residual forces and final in place loading. The selected material shall have an inside diameter no less than stated on the drawings. Individual pipe lengths shall be assembled by butt-fusion unless otherwise specified.

306-22 **Pipe Fusion.** DELETE in its entirety.

SECTION 308 - LANDSCAPE AND IRRIGATION INSTALLATION

308-2 **EARTHWORK AND TOPSOIL PLACEMENT.**

308-2.1 **General.** After the third paragraph, ADD the following:

Moisture Content: Do not perform soil preparation and earthwork if soil moisture content is such that excessive soil compaction will result. Apply water to control dust, break up soil clods, and provide suitable moisture content for tilling and planting.

ADD:

308-2.1.1 **Equipment.** Equipment necessary for soil preparation, finish grading, and handling and placing of materials shall be available and in good working condition before starting work.

308-2.2 **Trench Excavation and Backfill**. DELETE the last paragraph, and REPLACE with the following:

Trenches shall not be backfilled, except to anchor pipe, until required tests are completed and accepted by the Successor Agency. Pipe joints shall remain exposed until satisfactory completion of testing. Lateral trenches, and mainline trenches after initial sand backfill, shall be carefully backfilled with approved fine select material, consisting of loam, sandy clay, sand, and other approved materials-free from large clods of earth and stones. Backfill shall be mechanically compacted in landscaped areas to dry density equal to adjacent undisturbed soil in planting areas. Backfill shall conform to adjacent grades without settlement, sunken areas, humps, and other surface irregularities.

Flooding of trenches will be permitted only with approval of the Successor Agency, in accordance with subsection 306-1.3.3.

If trench settlement occurs and subsequent adjustments in pipe, valves, sprinkler heads, drip emitters, planting, and other installations are necessary, then Contractor shall make required adjustments at no extra cost to the Successor Agency.

ADD:

308-2.2.1 **Trenching and Backfilling Under Paving.** PVC Schedule 40 sleeves shall be placed for irrigation pipe installed below paving.

Trenches located below paving (asphaltic concrete and concrete) shall be backfilled with sand (six inches above and below the pipe). Compact backfill in layers to 95% relative density (minimum) with manual or mechanical tamping devices.

Trenches shall be flush with adjoining subgrade. Contractor shall set in place, cap and pressure test piping under pavement prior to start of paving work.

Install piping under existing walks by jacking or boring. If cutting or breaking of sidewalks is necessary, then Contractor shall replace concrete walks at no extra cost to the Successor Agency. Permission to cut or break sidewalks shall be obtained from the Resident Engineer. No hydraulic boring shall be permitted under concrete paving.

ADD:

308-2.3.1 **Light Weight Soil Preparation.** The thickness shall be as specified on the Plans, or if not shown, shall be filled to 1” below perimeter parapet wall.

Soil shall not be worked on when it is so wet or dry as to cause excessive compaction or the forming of hard clods or dust.

Soil to be placed in 6” lifts and compacted to 85% density.

Soil placement shall not disturb or damage waterproofing or drainage layer.

ADD:

308-2.3.2 **Sand Soil Mix.** The thickness shall be as specified on the Plans.

Soil shall not be worked on when it is so wet or dry as to cause excessive compaction or the forming of hard clods or dust.

Soil to be placed in 6" lifts and compacted to 85% density.

Soil placement shall not disturb or damage subterranean drainage.

ADD:

308-2.3.3 **Structural Soil.** See technical specification section 32-91-13 Structural Soil (Load Bearing Soil).

ADD:

308-2.3.4 **Biofiltration Soil Placement.** The Contractor shall provide the Owner's Representative with the required material testing and manufacturer data for review and approval prior to delivery of the material to the site. Prior to blending the loamy sand filtration mixture, the Contractor shall provide particle size distribution for all material components, and shall provide an agricultural suitability test for the topsoil and compost at a rate of one test per 100 cubic yards of material. After blending the loamy sand filtration mixture, the Contractor shall provide a test of the blended product for approval prior to delivery. The Contractor shall also provide a quality control test at a rate of one test per 100 cubic yards of blended material upon delivery.

Upon delivery, the materials shall be stored so that they are not exposed to the elements. All filtration mixture materials shall be kept dry during the storage and final application. The materials shall be stored to prevent contamination of fines and other deleterious materials. The loamy sand shall be thoroughly mixed prior to application. The loamy sand mixture shall be poured into the design area. The filtration layer shall not be compacted.

The loamy sand filtration mixture shall be placed on top of a ¾-inch gravel layer containing the under-drain system. The loamy sand filtration layer and the gravel layer shall be separated by a woven geo-textile (Mirafi FW402). The loamy sand filtration layer shall be overlain with 2 to 3 inches of a non-chemically treated mulch. Mulch shall be well-aged, shredded, or chipped woody debris (no redwood) or plant material. Well-aged mulch is defined as mulch that has been stockpiled or stored for at least twelve (12) months. This mulch is intended to help sustain nutrient levels, suppress weeds, and maintain infiltrative capacity. The mulch shall have a grain size distribution where 98% is passing the 3/4" sieve.

308-4 **PLANTING.**

308-4.1 **General.** DELETE the section and REPLACE with the following:

1) Irrigation work shall be inspected and accepted prior to start of work of this Section.

2) Plant material quantities, species, and sizes shall be provided as shown on Plans. Plants shall be inspected and accepted by the Successor Agency before removal from containers and excavating soil for planting holes.

3) Planting areas shall be irrigated to a minimum depth of six inches prior to planting installation. Planting pits shall be filled and water allowed to percolate a minimum of three times prior to planting installation. If water is not completely absorbed within 24 hours during any of the three percolation tests, contact the Resident Engineer for further instruction prior to planting.

4) Plant quantities on Plans are for Contractor's convenience only. Symbols shall take precedence over written numeric quantities.

5) Scarify sides of plant root balls with sharp tool to depth of one inch to girdle circular root growth prior to planting.

6) Planting shall be performed with materials, equipment, and procedures most favorable to establishment and growth of plants.

7) Containers shall be opened and removed so that plant root balls are not injured.

308-4.3 Layout and Plant Location. ADD the following:

If underground construction work and obstructions are encountered during the planting operations, alternate locations for plant material will be selected by the Successor Agency. Plant relocation shall be performed at no extra cost to the Successor Agency.

308-4.4 Specimen Planting. Before first paragraph, ADD the following:

Planting pits for trees 24-inch box size and larger shall be excavated at least 12 inches larger than the original plant container. Scarify soil at sides and bottom of planting pit.

308-4.6 Plant Staking and Guying. Trees shall be staked per the manufacture's recommendations.

ADD:

308-4.11 Mulching. Spread mulch uniformly in planting areas as indicated on Plans, to a minimum depth of two inches.

ADD:

308-4.10 Tree Relocation. Tree relocation shall consist of on-site transplanting of existing palms from proposed construction areas to temporary and permanent positions. All procedures for palm tree transplanting shall be approved by the City of San Diego Urban Forester and Resident Engineer prior to commencing transplanting operations.

Before each palm tree is removed, dead fronds and frond stubs shall be removed from the trunk. In addition, green fronds shall be removed up to 3 rows of fronds away

from the center growth. The 3 remaining rows of fronds shall be tied in an upright position with light hemp or manila rope. Fronds and frond stubs shall be removed at the trunk in a manner that will not injure the tree trunk.

Palm trees to be relocated shall be root pruned at least 45 days before digging with clean, sharp equipment. Approval shall be obtained from the Resident Engineer and City Urban Forester before removing any palm tree to be transplanted. The diameter and depth of each root ball shall be a minimum of 24-inches as measured from the base of the trunk in all directions at the ground line. Exposed root balls shall be kept covered with wet burlap or canvas until the trees are relocated for temporary storage.

Trees shall be boxed in a minimum of 72-inch box containers or as directed by the Resident Engineer and relocated to the area designated by the Resident Engineer. Backfill containers with 100 percent washed plaster sand and fertilize with controlled release fertilizer as specified in "212-1.2.3 Fertilizer." Fertilizer shall be top dressed over the original root ball and extend a maximum of 12-inches beyond the root ball edge. Application rates shall be per the manufacturer's recommendations.

The trees shall be protected and watered in their temporary location until all grading operations are complete and the new landscape areas are ready to receive the trees.

Holes resulting from the removal of transplanted palm trees shall be backfilled the same day the trees are removed. Soil from the surrounding area may be used to backfill the holes. The backfill shall be mounded slightly above the surrounding ground level.

Palm trees shall not be dragged during transplanting operations and the trunks shall be protected from injury. Palms shall be hoisted with nylon straps or slings on the trunk. No rope or chain shall be used for hoisting. Splints shall be used on palm trees having slender or narrow trunks as directed by the City Urban Forester. Trees shall be transported on vehicles of adequate size to prevent overcrowding, broken limbs, foliage damage, or root ball damage. No plant will be acceptable if the ball is cracked and broken or if the stem or trunk is loose in the ball, either before or during transplanting. Boxed plants shall be lifted and handled in their containers from the bottom of the ball/box.

Relocated trees/palms shall be planted in their permanent positions per the Plans and these specifications. Backfill material for the palm tree planting holes shall be 100 percent washed plaster sand. After the planting holes have been backfilled, water shall be applied to the full depth of the backfill soil.

Palm trees to be transplanted shall be maintained by the Contractor from the time the palm trees are removed to final acceptance of the plant establishment period. The palm trees shall be watered as necessary to maintain the trees in a healthy condition. Contractor shall warranty the transplanted palm trees for a period of one year.

The replacement palm tree for each unsuitable transplanted palm tree shall be the same size and species as the palm tree being replaced. Each replacement palm tree shall be planted in the planting hole of the unsuitable palm tree which the new tree is replacing. The method for planting replacement palm trees shall be as specified in

this section for transplanting palm trees. Removed unsuitable transplanted palm trees shall be disposed of at a City-approved refuse center.

308-5 IRRIGATION SYSTEM INSTALLATION.

308-5.1 General. Between the second and third paragraph, ADD the following:

Existing Palm Trees: If excavating adjacent to existing palm trees, Contractor shall exercise caution to avoid injury to trees and tree roots. No excavation shall occur within the existing palm tree root zone (24" from base of palm trunk in all directions). The Contractor shall stop excavation operations when the fibrous root mat of the existing palm trees is encountered outside of the root zone. The Contractor shall consult with the Arborist prior to commencing excavation. Excavation and trenches adjacent to the existing palm trees should be closed within twenty-four hours; if not possible, side of the trench adjacent to the tree shall be kept shaded with burlap or canvas.

DELETE the last paragraph and REPLACE with the following:

Record and As-Built Drawings: Contractor shall provide and keep current complete "as-built" record set of blueline ozalid prints. Record set shall be corrected daily and show every change from original drawings and specifications and precise locations, sizes, and kinds of equipment. Prints for this purpose may be obtained at cost from the Successor Agency. Drawings shall be kept on site and shall be used only as a record set.

Drawings shall also serve as daily work progress sheets, and Contractor shall make neat and legible annotations as work proceeds, showing work as installed. Drawings shall be available at all times for inspection, and shall be kept in a location on site designated by the Successor Agency.

Contractor shall provide Resident Engineer with "as-built" record drawings (marked in red) prior to final acceptance. Successor Agency will prepare final mylar as-built drawings after review and approval of red-lined record set.

Contractor shall dimension from two (2) permanent points of reference (building corners, sidewalk, road intersections, etc.) locations of the following items:

(a) Remote control valves

(b) Routing of control wiring

(c) Quick coupling valves

(d) Ball valves and gate valves

(e) Connection to existing water lines/water meter location Connection to existing electrical power/automatic controller location

(g) Other related equipment as directed by the Successor Agency

(h) Significant changes in routing of lateral lines from those indicated on the plans

(i) Routing of pressure mainline piping (dimension every 100 feet along route)

On or before the date of final inspection, Contractor shall deliver corrected and completed as-builts to the Successor Agency. Delivery of final as-builts shall not relieve Contractor of the responsibility of providing required information that may be omitted from the prints.

Controller Charts: As-built record drawings shall be approved by the Successor Agency before Contractor prepares controller charts.

Provide two controller charts for each controller installed.

Two (2) reduced copies of the approved as-built irrigation plan, color coded by stations and laminated in plastic, shall be provided at 11x17 size (to Park and Recreation Department) at the time of final acceptance.

Charts shall be reduced plans of as-built systems. If control circuits are not legible when plans are reduced, then they shall be enlarged to a size that will be readable when reduced.

Charts shall be blackline or blueline ozalid prints, and different colors shall be used to indicate area of coverage for each station.

After approval by the Successor Agency , charts shall be hermetically sealed between two pieces of plastic-minimum 10 mils. thick each.

Charts shall be completed and approved by the Successor Agency prior to final inspection of irrigation system.

Operation and Maintenance Manuals: Prepare and deliver to the Owner's Representative within ten calendar days prior to completion of construction, two hard cover binders with three rings containing the following information:

(a) Index sheet stating Contractor's address and telephone number, list of equipment with name and address of local manufacturers' representatives.

(b) Catalog and parts sheets on material and equipment installed under this contract.

(c) Guarantee statement (refer to Subsection 308-7, Guarantee).

(d) Complete operating and maintenance instruction manuals on major equipment.

In addition to required maintenance manuals, provide the City's maintenance personnel with instructions for major equipment and show evidence in writing at the conclusion of the project that this service has been rendered.

308-5.6.3 Sprinkler Coverage Test. ADD the following:

After completion of irrigation system, and prior to planting, Contractor shall perform a coverage test in the presence of the Owner's Representative to determine whether coverage is complete and adequate. Contractor shall correct inadequate sprinkler coverage.

Adjustment of the System: Contractor shall flush and adjust sprinkler heads for optimum performance and to prevent overspray onto walks, roadways, and buildings.

If adjustments to irrigation equipment will provide better coverage and operation, then Contractor shall make such adjustments prior to planting. Adjustments may include changes in sprinkler nozzle sizes and degrees of arc. Adjustments to irrigation system equipment shall be made at no extra cost to the Successor Agency.

Lowering raised sprinkler heads by the Contractor shall be accomplished within ten (10) days after notification by the Successor Agency.

Sprinkler heads shall be set perpendicular to finished grades unless otherwise designated on the plans.

308-5.6.4 Operational Test. ADD the following:

Prior to final acceptance, the irrigation system shall be inspected by the Successor Agency and the City, and deficiencies shall be corrected by the Contractor.

The entire irrigation system shall be under full automatic operation for period of seven (7) days prior to planting work.

The Successor Agency reserves the right to waive or shorten the operation period.

308-6 MAINTENANCE AND PLANT ESTABLISHMENT.

ADD:

308-6.3 Palm Tree Trimming. The Contractor shall trim all existing Palm Trees within the Project area. Trimming of existing palm trees shall be conducted by a certified arborist having a minimum of 10 years experience in trimming mature palm tree species. The certified arborist shall be provided by the Contractor. All trimming shall be coordinated with the City Urban Forester prior to commencing work.

ADD:

308-6.3 Dead Tree Replacement. Any tree that is noted to be protected in place and is damaged by construction shall be replaced (at Contractor's expense) within fifteen (15) calendar days of written notification by the Resident Engineer. Syagrus romanzoffiana (Queen Palms) that are damaged by construction shall be replaced with 28' CTH Syagrus romanzoffiana to match existing.

ADD:

308-6.2 Rodent and Pest Control. Rodents, insects, and other pests shall be controlled as necessary and by approved means. Restoration and repair of work areas disturbed by pest control -shall be made by Contractor at no additional cost to the Successor Agency.

Contractor shall immediately establish a program of pest, fungus, and weed control. Applications of pesticides, fungicides, and herbicides shall be made by operators

licensed by the State of California Department of Food and Agriculture to perform such work. Materials used in this work shall be approved by State of California Department of Food and Agriculture and other agencies with jurisdiction.

308-8 **PAYMENT.** To the City Supplement, DELETE in its entirety.

SECTION 500 – PIPELINE

500-1.1.5 **Video Inspection.** To the City Supplement, after the last paragraph, ADD the following:

During the pre-installation video the contractor must identify all existing protruding laterals with the existing main and trim them flush to the main prior to rehabilitation. The cost of trimming the existing laterals will be included in the pipe rehabilitation bid item.

SECTION 705 – WATER DISCHARGES

705-2.6.1 **General. Paragraph (3), CORRECT reference to Section 803 to read "Section 703."**

705-2.6.3 **Community Health and Safety Plan.** To the City Supplement, DELETE in its entirety and SUBSTITUTE with the following:

705-2.6.3 **Community Health and Safety Plan.** See 703-2, "Community Health and Safety Plan."

SECTION 707 – RESOURCE DISCOVERIES

ADD:

707-1.1 **Environmental Document.** Civic San Diego, formerly CCDC has prepared an **Environmental Secondary Study** for the **Horton Plaza Revitalization Project**, known within these Contract Documents as the Horton Plaza Improvement Project, as referenced in the Contract **Appendix G**. You must comply with all requirements of the Mitigation Measures within the Environmental Secondary Study as set forth in the Contract Appendix G.

Compliance with the City's environmental document is included in the various Bid items, unless a bid item has been provided.

707-2 **Archeological and Native American Monitoring Program.** To the City Supplement, ADD the following:

The Successor Agency will retain a qualified archaeologist for this contract. The Contractor shall coordinate its activities and Schedule with the activities and schedules of the archaeologist monitor. Notify the Engineer before noon of the working day before monitoring is required. See 2-11, "INSPECTION" for details.

The Contractor shall contact the Owner's Representative for a preconstruction meeting prior to any trenching or excavation on site. The Contractor shall also invite the Successor Agency's Archeological Consultant:

Brian F. Smith and Associates
14010 Poway Rd., Ste A
Poway CA, 92064
(858) 679-8218

See Appendix H – Cultural Resources Test Plan for reference.

707-3 **Paleontological Monitoring Program.** To the City Supplement, ADD the following:

The Successor Agency will retain a qualified paleontologist for this contract. Coordinate its activities and Schedule with the activities and schedules of the paleontologist monitor. Notify the Engineer before noon of the working day before monitoring is required. See 2-11, "INSPECTION" for details.

The Paleontological Consultant is the same as the Archeological Consultant. See Section 707-2 of this SSP for Consultant information.

END OF SUPPLEMENTARY SPECIAL PROVISIONS (SSP)

TECHNICALS

HORTON PLAZA IMPROVEMENT PROJECT



PROJECT MANUAL

SEPTEMBER 27, 2013

San Diego, California

100% Construction Documents

CIVIC SAN DIEGO
WALKER MACY
CARRIER JOHNSON
SCHMIDT DESIGN GROUP

HORTON PLAZA IMPROVEMENT PROJECT

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SECTION 01 1610 – HISTORICAL SALVAGE AND PROTECTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes general removal and protection procedures for designated historic features, surfaces, and the related scope of work as indicated in the documents, to include:

1. Scope of Work.
    a. Preparation of Salvage Plan as part of Historic Treatment Program.
    b. Field engineering to determine bracing and shoring requirements.
    c. Coordinate with CalOSHA and pay fees as required.
    d. Provide equipment and services to perform operations.
    e. Dismantle and salvage as required by documents.
    f. Catalog, Storage and Retrieval.
    g. Protection and transport of salvaged material.
    h. Storage of salvaged material.
2. The Contractor shall provide labor, materials, equipment and services to perform operations required for the dismantling/salvage of historic features and related work as indicated on the Documents, and as may be required by conditions of the contract.

B. Related Sections:
1. Drawings and general provisions of the Contract as found in the *Standard Specifications for Public Works* also known as the “Greenbook” and “Whitebook”.
2. Section 01 3591 – Historic Treatment Procedures.
3. Section 02 2070 - Selective Demolition.
4. Section 04 4911 - Cast Stone Crack Repair
5. Section 07 6200 - Sheet Metal Flashing & Trim
6. Section 08 8000 - Glazing.

1.2 REGULATORY REQUIREMENTS

A. The following codes, standards, laws, regulations, specifications and manuals are applicable to this section and when referenced mean the latest adopted edition, amendment or revision of such referenced code in effect as of the date of these Contract Documents.
1. 2010 California Building Code (CBC), Title 24, Part 2 CCR.
2. 2010 California Historical Building Code (CHBC), Part 8, Title 24 CCR.
3. Secretary of the Interior's Standards for Historic Preservation Projects (Latest Edition).
4. Secretary of the Interior's Standards for the Treatment of Historic Properties (1995
5. Edition).
6. ANSI, American National Standards Institute;
7. ASTM, American Society for Testing and Material;
8. NEC, National Electric Code.
9. UL, Underwriters Laboratories, inc.;
10. AIC, American Institute for Conservation of Historic and Artistic Works, "Code of Ethics and Standards of Practice" (Latest Edition).

B. Comply with all hazardous abatement laws and regulations. All hazardous materials must be abated by a state licensed abatement contractor.

C. Comply with governmental regulations pertaining to environmental protection in the demolition and salvage processes.

1.3 RELATED DOCUMENTS:

A. Drawings and General Provisions of Contract, including General and Supplementary Provisions and other Division 1 Specifications Sections, apply to this Section.

B. Standard Specifications for Public Works Construction (Greenbook) Current Edition.

C. 2012 Standard Specifications for Public Works Construction (Whitebook)

D. The Secretary of the Interior's Standards for the Treatment of Historic Properties (1995 Edition).This document contains *The Standards* which are Federal codified preservation standards.

E. Conservation Assessment of the Electric Fountain at Horton Plaza, San Diego, CA (Conservation Report) prepared by Griswold Conservation Associates, dated 7/7/09.

1.4 DEFINITIONS:

1. Building Fabric: The physical material of a building, structure, or object in its completed form. Original fabric is the fabric remaining from the original construction, especially with Architectural or artistic value.
2. Demo or Demolish: To carefully remove and dispose of non-historic material as Contractor's property.
3. Dismantle: To disassemble and detach items from existing construction using approved tools and equipment so as to protect historic fabric and finishes in a condition to be reinstalled and refinished.
4. Existing to Remain: Existing items that are not to be removed or dismantled and are to be protected in place.
5. Remove: Detach an item from existing construction to the limits indicated using approved tools and equipment. Salvage or dispose per Owner's Representative direction.
6. Salvage: To remove or dismantle items to be restored and reinstalled in the work unless otherwise directed by the Owner's Representative. Salvage includes transit and storage of items at a location as directed by the Owner's Representative.
7. Salvage Plan: A written portion of the Historic Treatment Program that describes all methods and materials to be used in the dismantling, cataloging, transport, protection, and storage of each salvaged feature.

1.5 MATERIALS OWNERSHIP

A. Historic items, relics, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, stanchions and chains, antiques, and other items of interest or value to Owner that may be encountered during removal and dismantling work remain Owner's property. Carefully dismantle and salvage each item or object.

B. Coordinate with Owner's Representative, who will establish special procedures for dismantling and salvage.

C. All items found on the site are to be considered historic fabric. The Owner's Representative will make the final determination of which items may be demolished.

1.6 CONTRACTOR RESPONSIBILITIES

A. The Contractor's responsibilities shall include but are not necessarily limited to the following:
1. Accept the site as it exists on the first day of work under the contract. It shall be the Contractor's responsibility to visit the site prior to bidding the work and determine for himself the condition of the site, the exact nature and amount of work to be done, and conditions that affect his work.
2. Preparation of Salvage Plan as part of Historic Treatment Program.
3. Field engineering to determine bracing and shoring requirements.
4. Coordinate with CalOSHA and pay fees as required.
5. Provide equipment and services to perform operations.
6. Dismantle and salvage all historical building features indicated by the Documents and as directed by the Owners Representative or otherwise required by conditions of the contract.
7. Carefully handle, catalog and package all salvaged historic building features in an approved manner and as deemed appropriate by conservation practices to prevent damage, deterioration, loss or other adverse effects.
8. Contractor shall transport such salvaged features with care and store in a protected area until such features are ready for restoration or return to the site for installation, as indicated by the Contract Documents.
9. All salvaged items shall be stored by the Contractor for the duration of the Contract. The Contractor is responsible to transport back all salvaged items that were not reinstalled from the Contractor's storage to a place (on-site or within the City limits of San Diego) to be determined by the Owner at a later date.
10. Contractor shall document his work by photographs prior to dismantling, at any point during dismantling showing connection conditions.

1.7 SUBMITTALS

A. Construction Schedule for Salvage Operations: Indicate for entire Project the following for each activity to be performed in historic spaces, and on historic surfaces:

B. Qualification Data: For each historic removal and dismantling specialist's field supervisors, hazmat superintendant, and any qualification data requested in individual specification sections.

C. Demo Photographs: The Contractor shall submit photographs taken before during and following feature restoration. These photographs are essential as evidence to owner and Secretary of Interior that the work has been done per the Secretary of Interior’s Standards.
1. Digital photographs shall be color photographs.
2. Digital photographs shall be a minimum of 5 megapixels and sized to be not less than 500k per photo in JPEG format.
3. The Contractor shall digitally photograph the site and the fountain prior to demolition.
4. The Contractor shall photograph full views as well as detailed views of each type of disassembly. Provide at least 6 photos of each type of disassembly.
5. Provide a before and after of each monument salvaged.
6. See specification section 01-3591 for additional photo requirements.
7. Provide photos on CD-ROM disk(s) to Owner’s Representative.

D. Salvage Plan: After acceptance of the site, and prior to commencing with the Work, the Contractor shall submit to the Owners Representative for approval, a written description of all methods and

materials to be used in the dismantling, cataloging, transport protection and storage of each salvaged feature.

E. Salvage Inventory: Contractor to prepare a inventory of all salvaged materials and provide a copy to the Owner's Representative.

1.8 TRAFFIC AIDS AND ACCESS

A. The Contractor shall provide necessary equipment and services required to perform the salvage work per these specifications and the City of San Diego Standards.

B. Throughout progress of work, do not interfere with use of or access to streets and adjacent buildings.

C. Do not close or otherwise obstruct means of egress, sidewalks, or streets without permission from the City of San Diego and obtaining and paying for permits to do so.

1.9 QUALITY ASSURANCE

A. All work shall comply with *"The Secretary of the Interior's Standards for the Treatment of Historic Properties"* (1995 Edition).

B. Historic Removal and Dismantling Specialist Qualifications: A qualified historic treatment specialist. General selective demolition experience is not sufficient experience for historic removal and dismantling work.

C. With the assistance of the Dismantling Specialist, dismantle and salvage in an orderly and careful manner. Remove and undertake dismantling and salvage in a deliberate and systematic manner, taking note of all materials and systems encountered and providing photographs and drawings before and during the dismantling process.

D. Using the approved Salvage Plan as a guide, ensure that no existing construction is dismantled, demolished or removed without knowing specifically what it is, how it should be handled, and what impact on existing construction, structure and building services its removal or demolition will have.

E. Any questions concerning the disposition of existing construction encountered, notify Owners Representative in writing before proceeding.

F. Mockups: Prepare mockups of specific historic treatment procedures specified in this Section to demonstrate aesthetic effects and to set quality standards for materials and execution.

1. Basin Removal: Remove typical basin outer wall segment.
2. Dome Dismantling: Dismantle typical dome attachment.
3. Lower Basin Infill Removal: Remove concrete filled lower basin as shown on Drawings.

G. Historic Treatment Preconstruction conference: Conduct at Project site.
1. General: Review means and methods related to demolition and disassembly of historic features.
2. Review qualifications of disassembly personnel.
3. Review work included in Salvage Plan.
4. Review areas where existing construction is to remain and requires protection.
5. Inspect and discuss condition of construction to be removed or dismantled.

6. Review requirements of other work that relies on substrates exposed by removal and dismantling work.

H. Contractor assumes all responsibility and liability, including consequential damages, as a result of his failure to proceed without reasonable caution.

I. When working on historic fabric to remain, Pneumatic, roto-hammer drill, or other **PERCUSSION TOOLS ARE PROHIBITED** and shall not be used without the permission of the Owner's Representative.

J. Contractor shall diligently mark and catalogue historic fabric removed from the building and maintain records as to the location of salvaged materials.

1.10 UTILITIES

A. Protect and maintain existing utility lines which are to remain in service in such a manner as to avoid interruption of these lines. Cap all utility lines terminated by salvage operations in a manner approved by government authorities and utility companies having jurisdiction.

B. Contact and coordinate with governing authorities and utility companies for exact locations of utilities and for the timely termination of services.

1.11 REMOVAL OF MATERIALS

A. Remove all material resulting from the salvage operation that are not indicated as salvaged features, from the site in such a manner as to avoid creating a nuisance. Dispose of such material from the site on a daily basis to locations determined by the Contractor, at no additional cost to the Owner. As directed by Owner's Representative, take possession of all non-historic material and equipment as property of the Contractor and promptly remove from the site. Such material is not to be sold on the site.

1.12 STORAGE AND PROTECTION OF HISTORIC MATERIALS

A. Existing Historic Materials to Remain: Protect construction indicated to remain against damage and soiling from construction work. Where permitted by Owner's Representative, items may be dismantled and taken to a suitable, protected storage location during construction work and reinstalled in their original locations after historic treatment and construction work in the vicinity is complete.

B. Salvage Inventory
1. The Contractor shall maintain a catalog record system that readily identifies the salvaged feature by salvage number, description, original location, and photo of item. This system shall include a schedule(s) that tracks each feature through the construction phase to substantial completion.
2. The schedule shall also indicate the status of restoration.
3. The above described system and its schedules, once approved by the Owners Representative shall be updated and distributed on a monthly basis to the Owners Representative and his consultants, Sub-Contractors and others as necessary, so that at any given time, a salvaged feature may be researched, during normal business hours, with the assistance of at least one knowledgeable person of the Contractor's staff, who is on the premises.

C. Storage and Retrieval:
1. Employ appropriate conservation practices for protection, transportation and storage of salvaged features to a weather-tight facility.
2. Arrange storage to provide access for inspection. Periodically inspect to assure features are undamaged and are maintained under required conditions.
3. Provide equipment and personnel to handle features by methods which prevent soiling or damage due to stock and inventory movement necessary to provide access for inspection.
4. All items to be stored by the Contractor until completion of the Project.
5. The City of San Diego may have items stored off site. The contractor shall have access to and use of salvaged items.
6. The Contractor shall provide personnel and equipment for transit of all materials to and from the storage facility.

PART 2 - PRODUCTS (not used)

PART 3 - EXECUTION

3.1 HISTORIC REMOVAL AND DISMANTLING SPECIALIST

A. Historic Removal and Dismantling Specialist Firms: Have removal and dismantling work performed by a qualified historic removal and dismantling specialist. Ensure that historic removal and dismantling specialist's field supervisors are present when removal and dismantling work begins and during its progress. The following listed contractors have shown satisfactory evidence qualifications for the work in this project. The Contractor is not required to use Pre-Approved Specialty Sub-Contractors.

1. Preservation Arts, 8600 Venice Blvd., Los Angeles, CA 90034 Tel: (310)877-3112 ckibby@preservationarts.net
2. Spectra Company, 2510 Supply Street, Pomona, CA 91767, Tel (800) 375-1771.: Ray Adamyk.
3. Or other approved qualified specialist.

3.2 EXAMINATION

A. Preparation for Removal and Dismantling: Examine construction to be removed or dismantled to determine best methods to safely and effectively perform removal and dismantling work. Examine adjacent work to determine what protective measures will be necessary. Make explorations, probes, and inquiries as necessary to determine condition of construction to be removed or dismantled and location of utilities and services to remain that may be hidden by construction that is to be removed or dismantled.

1. Verify that affected utilities have been disconnected and capped.
2. Inventory and record the condition of items to be removed and dismantled for reinstallation or salvage.
3. Before removal or dismantling of existing building elements that will be reproduced or duplicated in final Work, make permanent record of measurements and photography showing materials, and construction details required to make exact reproduction.
4. Prior to demolition, Contractor to engage a California licensed structural or professional engineer to survey condition of building to determine whether removing any element might

result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures as a result of removal and dismantling work.

B. Perform surveys as the Work progresses to detect hazards resulting from historic treatment procedures.

C. Verify that utilities have been disconnected and sealed.

3.3 HISTORIC REMOVAL AND DISMANTLING

A. Report any discrepancies between observed conditions to Owner's Representative.

B. Provide all equipment as required to safely and protect finishes from damage.

C. Dismantling procedures shall be described in the Historic Treatment Program.

D. Conduct a pre-dismantling meeting with Owner's Representative and General Contractor to confirm intended procedures, equipment, and tools to be used.

E. Upon disassembly, provide protective materials as needed to transport removed element to the location for restoration.

3.4 PREPARATION

A. Protection:
1. Provide for the protection of persons passing around or through the area of salvage operations.
2. Perform salvage operations so as to prevent damage to adjacent improvements and facilities to remain.
3. Provide protective measures to ensure free and safe passage of persons to and from occupied areas.
4. Erect temporary protection such as walks, fences, railings, canopies, etc., where required by authorities having jurisdiction.

B. Structural Support:
1. Design shoring by as required by the building official, Construct, and maintain shoring, bracing, and supports as necessary to ensure the stability of structures.
2. Increase or add new supports as required by the progress of the work.
3. The Contractor shall be responsible for the design and construction of all needed shoring and bracing necessary for salvage operations and shall have a licensed Structural Engineer registered in the State of California design same. Costs for field engineering/design and bracing shall be borne by the Contractor.

C. Damages:
1. Without cost to the Owner and without delay, repair or replace any damaged property or construction as a result of salvage operations.

3.5 HISTORIC REMOVAL AND DISMANTLING EQUIPMENT

A. Removal Equipment: Use only hand-held tools except as follows or unless otherwise approved by Owner's Representative on a case-by-case basis: See the Quality Assurance paragraph above

prohibiting use of pneumatic tools on historic fabric. On non-historic materials (such as paving and curbs) and demolished historic material such as the outer basin wall:

1. Light jackhammers are allowed subject to Owner's Representative approval.
2. Large air hammers are not permitted.

B. Dismantling Equipment: Use manual, hand-held tools, except as follows or otherwise approved by Owner's Representative on a case-by-case basis:

1. Hand-held power tools and cutting torches are permitted only as submitted in the historic treatment program. They must be adjustable so as to penetrate or cut only the thickness of material being removed.
2. Pry bars more than 18 inches long and hammers weighing more than 2 lb are not permitted for dismantling work.

C. Unacceptable Equipment: Keep equipment that is not permitted for historic removal or dismantling work away from the vicinity where such work is being performed.

D. Perform work according to the Historic Treatment Program and approved mockup(s).

1. Design and provide supports or reinforcement for existing construction that becomes temporarily weakened by the work, until the work is completed.
2. Perform cutting by hand or with small power tools wherever possible. Cut holes and slots neatly to size required, with minimum disturbance of adjacent work.
3. Do not drill or cut columns, beams, joints, girders, structural slabs, or other structural supporting elements, without having Contractor's professional engineer's written approval for each location before such work is begun.
4. Do not use explosives.

E. Removing and Dismantling Items on or near Historic Surfaces:

1. Use only dismantling tools and procedures within 6 inches of historic surface. Do not use pry bars. Protect historic surface from contact with or damage by tools.
2. Unfasten items to be removed, in the opposite order from which they were installed.
3. Support each item as it becomes loosened to prevent stress and damage to the historic surface.
4. Dismantle anchorages.

F. Concrete Walls:

1. Remove concrete carefully and erect temporary bracing and supports as needed to prevent collapse of materials being removed.
2. Dismantle top edge and sides before removing wall. Stop removal work and immediately inform Owner's Representative if any structural elements above or adjacent to the work show signs of distress or dislocation during any phase of removal work.
3. Remove wall in easily managed pieces.
4. During removal, Contractor is responsible for the stability of the partially remaining wall. Notify Owner's Representative of the condition of temporary bracing for wall if work is temporarily stopped during the wall's removal.

G. Concrete Floor Surface Removal: Remove floor surfaces, fill, and topping, to the indicated lower elevations or cleavage planes as indicated on Drawings. Use dismantling methods when removing floor surfaces 6 inches or less away from historic walls. Take away material to a uniform surface at the indicated level.

3.6 CLEANING

A. Broom clean adjoining public streets and sidewalks. Clean planting areas of all demolition materials and debris.

END OF SECTION 01 1610

SECTION 01 3591 - HISTORIC TREATMENT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes general protection and treatment procedures for designated historic features, surfaces, and the related scope of work as indicated in the documents, and as listed in this specification section in the Project to include but not limited to the following specific work:

1. Historic Treatment Specialist (Conservator)
2. Prepare a Historic Treatment Program
3. Cleaning and bird excrement specialist and removal
4. Without restricting the totality of the work, this section shall include historic features restoration and reinstallation as indicated on the drawings and as specified herein.
5. Furnish and install all replications of historic features of the type indicated by symbols at each location and quantity shown on the drawings, and as documented by the Contractor during salvage of historic features. All materials, accessories, and any other equipment necessary for the complete and proper installation of these features shall be furnished by the Contractor.

1.2 RELATED SECTIONS:

1. Drawings and general provisions of the Contract, including General and Supplementary Conditions as found in *the Standard Specifications for Public Works* (Greenbook & Whitebook).
2. Section 01 1610 “Salvage of Historic Features” for procedures related to salvaging historic fabric.
3. Section 03 3000 “Cast in Place Concrete”
4. Section 03 4000 “Precast Concrete”
5. Section 04 0140 "Maintenance of Stone Assemblies" for specific requirements for cleaning and repairing stone.
6. Section 04 4911 “Cast Stone Crack Repair”
7. Section 04 4930 “Masonry Cleaning”
8. Section 05 9100 “Historic Treatment of Ornamental Metal”
9. Section 07-7180 “Migrating Corrosion Inhibitor”
10. Section 07-7180 “Liquid Water Repellant Coating”

1.3 REGULATORY REQUIREMENTS

A. The following codes, standards, laws, regulations, specifications and manuals are applicable to this section and when referenced mean the latest adopted edition, amendment or revision of such referenced code in effect as of the date of these Contract Documents.

1. 2010 California Building Code (CBC), Title 24, Part 2 CCR.
2. 2010 California Historical Building Code (CHBC), Part 8, Title 24 CCR.
3. Secretary of the Interior's Standards for Historic Preservation Projects (Latest Edition).
4. Secretary of the Interior's Standards for the Treatment of Historic Properties (1995
5. Edition).
6. ANSI, American National Standards Institute;
7. ASTM, American Society for Testing and Material;
8. NEC, National Electric Code.
9. UL, Underwriters Laboratories, inc.;
10. AIC, American Institute for Conservation of Historic and Artistic Works, "Code of Ethics and Standards of Practice" (Latest Edition).

B. All custom fabricated reproductions of historic lighting fixtures shall be made in accordance with the National Electric Code (NEC). Contractor to verify and provide all required labels indicating compliance with above standards, affixed to each fixture in a position concealing it from normal view.

C. Comply with all hazardous abatement laws and regulations. All hazardous materials must be abated by a state licensed abatement contractor.

D. Notifications: Comply with notification regulations of authorities having jurisdiction (e.g. City, OSHA) before beginning removal and dismantling work. Comply with hauling and disposal regulations of authorities having jurisdiction.

1.4 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions.
B. Standard Specifications for Public Works Construction (Greenbook) Current Edition.
C. 2012 Standard Specifications for Public Works Construction (Whitebook).
D. The Secretary of the Interior's Standards for the Treatment of Historic Properties (1995 Edition).
E. Griswold Conservation Associates: Conservation Report titled: Conservation Assessment of the Electric Fountain at Horton Plaza, San Diego, California dated 7/7/2009.

1.5 DEFINITIONS

A. Building Fabric: The physical material of a building, structure, or object in its completed form. Original fabric is the fabric remaining from the original construction, especially with Architectural or artistic value.

B. Conservator: A person with advanced training in science, studio arts and art history, and with experience in applying manual skills and theoretical knowledge towards the preservation of artistic and historic works.

C. Consolidate: To strengthen loose or deteriorated materials in place.

D. Demo or Demolish: To carefully remove and dispose of non-historic material as Contractor's property.

E. Dismantle: To disassemble and detach items from existing construction using approved tools and equipment so as to protect historic fabric and finishes in a condition to be reinstalled and refinished.

F. Dismantling Specialist: a person with training and experience in applying manual skills and knowledge of the means and methods to disassemble assemblies with minimal damage to the historic feature. A dismantling specialist must have experience in dismantling materials found on this project.

G. Existing to Remain: Existing items that are not to be removed or dismantled and are to be protected in place. With permission of Owner's Representative item may be located in a storage facility at Contractor's expense.

H. Historic: Surfaces, materials, finishes, and overall appearance which are important to the successful preservation / rehabilitation as determined by Owner's Representative. Designated historic and surfaces are indicated on Drawings and scheduled in this Section.

I. Historic Treatment Program: Written document that identifies historic fabric to be encountered and describes the means and methods used to salvage and restore historic features.

J. In-Kind Replication: An exact copy of an original feature. Reproductions shall match size, material, and details exactly.

K. Match: To blend with adjacent construction and manifest no apparent difference in material type, species, cut, form, detail, color, grain, texture, or finish; as approved by Owner's Representative.

L. Mock-up: An example of a repair or replicated element intended to be used in the work or example of a repair.

M. Patina: Any desirable surface quality acquired by a building element or work of art over time, especially when exposed to the elements.

N. Reconstruct: To remove existing item, replicate damaged or missing components, and reinstall in original position.

O. Refinish: To remove existing finishes to base material and apply new finish to match original, or as otherwise indicated.

P. Reinstall: To protect removed or dismantled item, repair and clean it as indicated for reuse, and reinstall it in original position, or where indicated.

Q. Remove: Detach an item from existing construction to the limits indicated using approved tools and equipment. Salvage or dispose per Owner's Representative direction.

R. Repair: To correct damage and defects, retaining existing materials, features, and finishes while employing as little new material as possible. Includes patching, piecing-in, splicing, consolidating, or otherwise reinforcing or upgrading materials.

S. Replace: To remove, duplicate, and reinstall entire item with new material. The original item is the pattern for creating duplicates unless otherwise indicated.

T. Replicate: To reproduce in exact detail, materials, and finish unless otherwise indicated.

U. Reproduce: To fabricate a new item, accurate in detail to the original, and in either the same or a similar material as the original, unless otherwise indicated.

V. Restoration: The act or process of accurately depicting the form, features, and character of a property (salvaged historic item) as it appeared at a particular period of time by means of the removal of features from other periods in its history and reconstruction of missing features from the restoration period. The limited and sensitive upgrading of mechanical, electrical, and plumbing systems and other code-required work to make properties (salvaged historic items) functional is appropriate within a restoration project.

W. Restore: To consolidate, replicate, reproduce, repair, and refinish as required to achieve the indicated results.

X. Retain: To keep existing items that are not to be removed or dismantled.

Y. Reversible: New construction work, treatments, or processes that can be removed or undone in the future without damaging historic materials unless otherwise indicated.

Z. Salvage: To remove or dismantle items to be restored and reinstalled in the work unless otherwise directed by the Owner's Representative. Salvage includes transit and storage of items at a location as directed by the Owner's Representative.

AA. Stabilize: To provide structural reinforcement of unsafe or deteriorated items while maintaining the essential form as it exists at present; also, to reestablish a weather-resistant enclosure.

BB. Strip: To remove existing finish down to base material unless otherwise indicated.

1.6 MATERIALS OWNERSHIP

A. Historic items, relics, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, stanchions and chains, antiques, and other items of interest or value to Owner that may be encountered during removal and dismantling work remain Owner's property.

1.7 ACTION SUBMITTALS

A. Construction Schedule for Historic Treatments: Indicate for entire Project the following for each activity to be performed in historic spaces, and on historic surfaces:

1. Detailed sequence of historic treatment work, with starting and ending dates, coordinated with Owner's continuing operations and other known work in progress.
2. Off-site Shop: Indicate when items will be shipped and returned from off-site shops.
3. Utility Services: Indicate how long utility services will be interrupted. Coordinate shutoff, capping, and continuation of utility services.
4. Coordination of Owner's and others' continuing occupancy of portions of existing property and of Owner's partial occupancy of completed Work.

B. Preconstruction Documentation: Show preexisting conditions of adjoining construction and site improvements, including finish surfaces, that might be misconstrued as damage caused by Contractor's historic treatment operations.

C. **Historic Treatment Program**: Submit historic treatment plan for approval before work begins in which the approach, means, methods, and techniques for restoring items are clearly outlined. The Contractor's Treatment Plan shall describe, in detail, how the Contractor will proceed with the following tasks: Identification, Recordation, Cataloging, Numbering, Labeling, Removal, Boxing, Crating, Storage, Protection, Restoration means and methods, Retrieval, Reinstallation, and Finishing.

D. Inventory of Salvaged Items: Establish an inventory that tracks the location of all salvaged items. At any time the Contractor must be able to identify the location of pieces and/or assemblies.

E. Photographs: Contractor shall submit photographs before treatment, during, and after treatment to show process, and during installation both in full views and close-up details.

F. Prototype sample of each replicated feature for review by the Owner’s Representative. Prototype samples shall be sufficiently detailed and operational to allow compliance with the notable features of the indicated example for replication and this specification. Preliminary design or shop drawings shall not be accepted in place of prototype samples. If approved by Owner’s Representative, prototype samples may be used in final construction.

1.8 INFORMATIONAL SUBMITTALS

A. Qualification Data: For each historic treatment specialist, historic removal and dismantling specialist's field supervisors, specialty replication, hazmat and bird-excrement-removal specialist, and any qualification data requested in individual specification sections.

B. Preconstruction Test Reports: Testing of existing historic materials to confirm materials, the nature of deterioration, and test reports for proposed treatment means and methods.

1.9 QUALITY ASSURANCE

A. All work shall comply with *"The Secretary of the Interior's Standards for the Treatment of Historic Properties"* (1995 Edition).

B. Salvage, storage, restoration and reinstallation of historic items shall comply with the American Institute for Conservation of Historic and Artistic Works "Code of Ethics and Standards of Practice" (Latest Edition).

C. Aggressive or destructive cleaning methods and materials (e.g. rotary wire wheels, grinding, and **sandblasting**) will not be acceptable.

D. When working on historic fabric to remain, Pneumatic, roto-hammer drill, or other **percussion tools are prohibited** and shall not be used without the permission of the Owner's Representative.

E. **Historic Treatment Specialist (Conservator) Qualifications**: Contractor to hire an experienced firm regularly engaged in historic treatments similar in nature, materials, design, and extent to this work as specified in each section, and that has completed a minimum of **five (5) recent projects** with a **verifiable** record of successful in-service performance that demonstrate the firm's qualifications to perform this work.

1. Field Supervisor Qualifications: Full-time supervisors experienced in historic treatment work similar in nature, material, design, and extent to that indicated for this Project. Supervisors shall be on Project site during times that historic treatment work is in progress.
2. This specification offers a list of "Pre-Approved Specialty Sub-Contracting". The listed contractors have shown satisfactory evidence qualifications for the work in this project. The Contractor is not required to use Pre-Approved Specialty Sub-Contractors listed.

F. Dismantling Specialist Qualifications:

1. May be the same as the Historic Treatment Specialist (Conservator).

2. Minimum of 5 verifiable projects with a **verifiable** record of successful in-service performance that demonstrate the firm's qualifications to perform this work.

G. Contractor's who meet the specifications listed in this section are as follows:

1. Conservator
   a. Griswold Conservation Associates, LLC., 8573 Higuera St. Culver City, CA 90232, Tel (310) 842-8133. www.griswoldconservation.com
   b. Architectural Conservation Inc., Molly Lambert, Berkeley, CA (510) 849-3811 email: lambert@there.net

2. Custom Light Fixture Restoration and Fabrication:
   a. Gibson & Gibson Antique Lighting, 180 Mace Street #C-9, Chula Vista, Ca. 91911-5878, (619)422-2447.
   b. Environmental Lighting for Architecture (ELA) 17891 Arneth Ave., City of Industry, CA. 91748, Phone (626) 965-0821, Fax (626) 965-9494.

3. Stone Repair:

a. Spectra Company, 2510 Supply Street, Pomona, CA 91767, Tel (800) 375-1771.: Ray Adamyk.
b. Kitson Specialty Contracting, Inc., 10370 Slusher Dr., Suite #9, Santa Fe Springs, CA 90670, Phone (562) 941-1949.
c. CK Arts, 8600 Venice Blvd., Los angeles, CA 90034, Tel. (951) 826-5852.

4. Cast Stone Molding:
   a. Spectra Company: 2510 Supply Street, Pomona, CA 91767, Tel (800) 375-1771 ext 104.
   b. Moonlight Molds Inc., 14920 S. San Pedro Street, Gardena, CA. 90248. Tel (310) 538-9142.
   c. Bellagio Pre-Cast, 3216 Island Ave., San Diego, CA 92102 Tel (858) 361-3458

5. Bronze Casting
   a. Bellagio Pre-Cast, 3216 Island Ave., San Diego, CA 92102 Tel (858) 361-3458
   b. Historical Arts & Casting , Inc., 5580 West Bagley Park Road, West Jordan, UT 84081-5697. Tel (800) 225-1414. www.historicalarts.com

6. Textured and Bent Glazing:
   a. TriView Glass Industries, LLC., 711 S. Stinson Ave., City of Industry, CA 91745. Tel (800) 452-7745. www.TriViewGlass.com
   b. Bendheim, Passaic, NJ 07055, Tel (800) 606-7621. www.bendheim.com

H. **Bird-Excrement-Removal Specialist Qualifications**: A firm that employs personnel experienced and skilled in the processes and operations indicated.

I. **Historic Treatment Program**: Prepare a written plan for historic treatment for whole Project, including each phase or process and protection of surrounding materials during operations. Describe in detail materials, methods, and equipment to be used for each phase of work. Show compliance with indicated methods and procedures specified in this and other Sections.

1. Dust and Noise Control: Include locations of proposed temporary dust- and noise-control partitions and means of egress from occupied areas coordinated with continuing on-site operations and other known work in progress.
2. Debris Hauling: Include plans clearly marked to show debris hauling routes, turning radii, and locations and details of temporary protective barriers.

J. Mockups: Prepare mockups of specific historic treatment procedures specified in this Section to demonstrate aesthetic effects and to set quality standards for materials and execution.

1. Typical Removal Work: Remove typical basin outer wall segment.
2. Typical Dismantling Work: Dismantle typical dome attachment.
3. Typical Removal Work: Remove concrete filled lower basin as shown on Drawings.
4. Bird-Excrement Removal: Remove excrement from an area 5 square feet for each type of building bronze on dome, stone cornice, and marble column substrate material.

   a. Test chemicals and methods on samples of adjacent building materials for possible adverse reactions. Do not use chemicals and methods known to have deleterious effect.
   b. Allow a waiting period of not less than seven days after completion of removal work to permit a study of mockup for deleterious effects.
5. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Owner's Representative specifically approves such deviations in writing.

K. Historic Treatment Preconstruction Conference: Conduct conference at Project site.

1. General : Review means and methods related to historic treatment including, but not limited to, the following:

    a. Review manufacturer's written instructions for precautions and effects of historic treatment procedures on materials, components, and vegetation.
    b. Review and finalize historic treatment construction schedule; verify availability of materials, equipment, and facilities needed to make progress and avoid delays.
    c. Review qualifications of personnel assigned to the work and assign duties.
    d. Review material application, work sequencing, tolerances, and required clearances.

1.10 STORAGE AND PROTECTION OF HISTORIC MATERIALS

A. Existing Historic Materials to Remain: Protect construction indicated to remain against damage and soiling from construction work. Where permitted by Owner’s Representative, items may be dismantled and taken to a suitable, protected storage location during construction work and reinstalled in their original locations after historic treatment and construction work in the vicinity is complete.

B. Salvage Inventory
1. The Contractor shall maintain a catalog record system that readily identifies the salvaged feature by salvage number, description, original location, photo of item. This system shall include a schedule(s) that tracks each feature through the construction phase to substantial completion.
2. The schedule shall also indicate the status of restoration.
3. The above described system and its schedules, once approved by the Owners Representative shall be updated and distributed on a monthly basis to the Owners Representative and his consultants, Sub-Contractors and others as necessary, so that at any given time, a salvaged feature may be researched, during normal business hours, with the assistance of at least one knowledgeable person of the Contractor's staff, who is on the premises.

C. Storage and Retrieval
1. When taken from their existing locations, catalog and store historic items within a weathertight enclosure where they are protected from theft, wetting by rain, condensation, or ground water.
2. Arrange storage to provide access for inspection. Periodically inspect to assure features are undamaged and are maintained under required conditions.
3. Provide equipment and personnel to handle features by methods which prevent soiling or damage due to stock and inventory movement necessary to provide access for inspection.
4. All items to be stored by the Contractor until completion of the Project.
5. The City of San Diego may have items stored off site. The contractor shall have access to and use of salvaged items.
6. The Contractor shall provide personnel and equipment for transit of all materials to and from the storage facility.

1.11 PROTECTION AND INSTALLATION

A. All salvaged features shall be protected throughout construction to substantial completion including dismantling, transit, storage, restoration, return to the Site, installation and in place at the location for which they are indicated, unless otherwise specified or directed by the Owners Representative.

B. Salvaged Features protected by the Contractor that are scratched, marred, stained, discolored or otherwise damaged as determined by the Owners Representative review where touch-up cannot be accomplished, shall be replicated "in kind" by the Contractor where all costs shall be borne by the Contractor.

C. Certain salvaged features will be stored only and not reinstalled, as indicated, but will be left in the City’s protected storage area for disposition as directed by the Owners Representative.

D. Historic Materials for Reinstallation:

1. Repair and clean historic items as indicated and to functional condition for reuse.
2. Pack or crate items after cleaning and repairing; cushion against damage during handling. Label contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in original locations. Coordinate with installation requirements for new materials and equipment unless otherwise indicated. Provide connections, supports, and miscellaneous materials to make item functional for use indicated.

E. Weather Limitations: Proceed with historic treatment of decorative metal only when existing and forecasted weather conditions are within the environmental limits set by each manufacturer's written instructions and specified requirements.

1. Provide enclosures as needed if forecasted conditions are at variance with the scheduled work causing a delay in the progress of work and such enclosures could provide acceptable work conditions.

2. Provide enclosures as needed if forecasted conditions are at variance with the proper curing of materials.

1.12 GENERAL REQUIREMENTS FOR FEATURE RESTORATION

A. General Size Limitation in Historic Spaces: Materials, products, and equipment used for performing the Work and for transporting debris, materials, and products shall be of sizes that clear surfaces within openings, including temporary protection, by 6 inches or more.

B. Accept the site as it exists on the first day of work under the Contract. It shall be Contractor's responsibility to attend a walk-through and visit the site prior to bidding the work and determine for himself the condition of the site, and exact nature and amount of work to be completed, and the conditions that affect his work. Some areas of the work are not available for a close-up inspection.

C. Notify Owner’s Representative of discrepancies between existing conditions and Drawings before proceeding with removal and dismantling work.

D. Halt the process of deterioration and stabilize conditions unless otherwise indicated. Perform work as indicated on Drawings. Follow the procedures in subparagraphs below and procedures approved in the Historic Treatment Program:

1. Retain as much existing material as possible; repair and consolidate rather than replace.
2. Use additional material or structure to reinforce, strengthen, prop, tie, and support existing material or structure.
3. Use reversible processes wherever possible.
4. Use historically accurate repair and replacement materials and techniques unless otherwise indicated.
5. Record existing work before each procedure (preconstruction) and progress during the work with digital preconstruction documentation photographs or video recordings.

E. Hazardous Materials: It is unknown whether hazardous materials will be encountered in the Work.

1. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Owner’s Representative and Owner. Owner will remove hazardous materials under a separate contract.

F. Storage or sale of removed or dismantled items on-site is not permitted unless otherwise indicated.

G. Where missing features are indicated to be repaired or replaced, provide features whose designs are based on accurate duplications rather than on conjectural designs, subject to approval of Owner's Representative.

H. All salvaged items used as "Models for Replication" shall be kept in good condition by Contractor for the duration of the project. At completion of the project all "Models for Replication" shall be turned over to the owner.

I. All replications shall match exactly the historic original in-kind. Any changes or substitutions of materials or techniques shall be submitted for approval to the Owner's Representative in accordance to Division 1 specification requirements prior to execution.

J. If an item listed for salvage cannot be removed in a manner that renders it recondition able for reinstallation, as judged by the Owner's Representative, the Contractor shall replicate the object new, to exactly match the original, and install that replication. Any item listed for salvage which is missing or has been damaged must be brought to the attention of the Owner's Representative within three (3) days of such a discovery by the Contractor.

K. No item listed for salvage in the following "Specific Features Restoration" in this specification section shall be disposed of without advance approval from the Owner's Representative.

L. In preparing salvaged items for reinstallation in the reconstructed fountain, the general objective will be to clean, consolidate and patch areas of loss and replace missing elements to provide a uniform and consistent appearance among like items as they would have been when the fountain was in use during 1910. Salvaged historic items shall be treated in a manner that will retain visual evidence of their age, their "patina", but the desired appearance after treatment for all salvaged historic items shall be that of items retaining the integrity of their original aesthetic character without subsequent overt damage by vandalism, neglect or invasive and anachronistic refurbishing.

1.13 SPECIFIC FEATURES RESTORATION

A. Granite
   1. Protect all granite.
   2. Structural pinning of granite
   3. Clean using Prosoco Sure Klean 942 Marble Cleaner, Light Duty Restoration Cleaner, or equal to reduce metallic staining, mineral accretions and grime.
   4. Repoint and mortar all cracks in existing mortar. See mortar specification.

B. Marble
   1. Protect all marble.
   2. Structural pinning of columns to structure per plans.
   3. Removal and replacement of existing ferrous joint cramps with stainless steel cramps at cornice.
   4. Inject cracks with adhesive micro-grout Jahn M30 or equal.
   5. Repair cracks and holes left from removed brackets, conduit, etc.
   6. Clean brown staining with 4% aqueous triammonium citrate solution as a poultice in kaolin. Clear with distilled water.
   7. Clean with Prosoco Sure Klean 942 Mable Kleaner and/or marble poultice or equal to reduce soiling, sulfation and grime; further reduce surface-related ferrous staining with materials and
   8. Repoint and mortar all cracks in existing mortar. See mortar specification.
   9. Treat with Conservare HCT and HCT Finishing Rinse to enhance resistance to acid degradation, etc.

C. Silicone, urethane flexible grouts and caulking
   1. Carefully remove using hand tools such as scalpels and X-acto blades
   2. Replace grout and caulking with custom color products matching historic colors or existing adjacent colors.

D. Bronze (Latticework on domes, column capitals, plaques)
   1. Patching material shall match existing in-kind.
   2. Preserve as much existing stable patina as possible.
   3. Excavate active pits of chloride corrosion, chemically passivate with silver nitrate, BTA or other accepted museum conservation-based treatment for “bronze disease”.
   4. Clean loose corrosion with careful hand methods
   5. Repair structural cracks in bronze using TIG welding methods with local hear isolation methods to minimize damage to adjacent surfaces
   6. Locally repatinate with liver of sulfur solution, ferric nitrate solution and other stable chemical patina formulation primarily to further passivate any exposed bare metal.

E. Copper (Cupola, dome ribs)
   1. Patching material shall match existing in-kind.
   2. Preserve as much existing stable patina as possible.
   3. Reduce corrosion and accretions, desalinate through immersion monitoring for chlorides, clean and chemically passivate surfaces and pits of active corrosion, coat with hot wax processes.

F. Glass (Prismatic Glass)
   1. Remove all caulking
   2. Texture to match existing exactly.
   3. Color to match existing.
   4. Clean with Lime-off. Apply and agitate with natural bristle brush
   5. Any required replicated glass shall match historic glass exactly in size, finish, and color. Provide minimum 4 samples for approval prior to production.

G. Iron
   1. Remove loose and flaky paint to well adhered surfaces.
   2. Assume all paint is lead-based coating.
   3. Repair or replace deteriorated iron section with stainless steel.
   4. Replace all bolts and screws with stainless steel of the same type.
   5. Refinish to specifications.

1.14 COORDINATION

A. Coordinate historic treatment procedures in this Section with public circulation patterns at Project site. Some work is near public circulation patterns. Public circulation patterns cannot be closed off entirely, and in places can be only temporarily redirected around small areas of work. Plan and execute the Work accordingly.

PART 2 - PRODUCTS

2.1 RESTORATION MATERIALS GENERAL

A. Select and use all restoration materials and equipment with care in accordance with appropriate conservation practices to avoid scratching, marring, defacing, staining, discoloring or otherwise degrading surfaces being restored.

B. Unless otherwise noted, materials used in restoration shall conform to Standard Conservation Practices and Archival Preservation Standards as specified herein. The selection of specific materials shall be dependent upon the condition of the features and the results of tests and sampling conducted by the Contractor at the job site.

C. The conservation standard concept of reversibility shall be employed where appropriate to the desired project outcome and shall be waived in those specific instances where adherence to the standard prevents restoration of the historic appearance of the feature. In these instances the Contractor shall submit notice of deviation from the standard to the Owner's Representative for approval with a description of the alternative practice and reason for its use.

D. Use restoration materials only on surfaces for which they are recommended by the restoration material manufacturer or appropriate conservation practices.

E. The Contractor shall inspect and confirm that all materials used in the restoration process are in compliance with federal, state and local codes and government regulations.

2.2 MATERIAL MANUACTURES

A. The following manufacturer's have products for use in feature restoration and are knowledgeable in the restoration of materials found in this project. They are an available source for reference to alternate products, methods and standards. The Contractor and his Conservator are responsible for the selection of the final products to be used. All proposed products are to be submitted to the Owner's Representative for approval.
   1. ABATRON Inc. 5501 95th Avenue, Kenosha, Wisconsin, 53144 (800)445-1754
   2. BWC Company, 15559 Union Ave. Los Gatos, CA 95032, Tel (800) 569-0394.
   3. Everbright Inc. 955 S. Virginia St. Ste 116, Reno, NV 89502 Tel (800) 304-0566.
   4. PMC Specialties Group, 501 Murray Rd. Cincinnati, OH 45217. Tel (800) 543-2466. ThomasJ@pmcsg.com
   5. Misco Products Corp. Reading, PA Tel (800) 548-4568, www.miscoprod.com
   6. Sika Corporation, 201 Polito Avenue, Lyndhurst, NJ 07071 Tel 1-800-933-SIKA, http://usa.sika.com
   7. SureKlean, ProSoCo Inc. P.O. Box 171677 Kansas City, KS, 66117 (913)281-2700

2.3 MATERIALS

A. Clean and Strip Products
   1. Concrete:
      a. "Limestone Restorer": SureKlean
      b. "Light Duty Restoration Cleaner": SureKlean
      c. "Heavy Duty Restoration Cleaner": SureKlean
   2. Grout:
      a. "Light Duty Restoration Cleaner": SureKlean
      b. "Grout Cleaner": SureKlean
   3. Stone:
      a. "Limestone Restorer": SureKlean
      b. "No. 600 Detergent": SureKlean
      c. "Vana Trol": SureKlean
   4. Marble:
      a. Marble Cleaner: "Marble Poultice" SureKlean
      b. Marble Cleaner: 942 Marble Cleaner, Light Duty Restoration Cleaner, SureKlean
      c. Marble Poultice: Whink rust remover with 4% aqueous triammonium citrate solution as a poultice in kaolin.

5. Bronze:
    a. Bronze Cleaner: “Lime-Off”, Misco Products Corp.
    b. Passivate corrosion with Benzotriazole (BTA) “Cobratec-99” PMC Specialties Group
    c. Scrub with nylon abrasive pad.
6. Prismatic Glass:
    a. Bronze Cleaner: “Lime-Off”, Misco Products Corp.

B. Fill / Patch Products
1. Concrete:
    a. Filler “Abocrete”: Abatron
2. Ferrous Metal
    a. Welding: TIG Welding
    b. Filler: MetalFix”: Abatron
3. Non-Ferrous Metal (Bronze & copper)
    a. Welding: TIG Welding
    b. Braze of similar materials and shape.

C. Consolidate and Protection Products
1. Cast Stone:
    a. Migrating Corrosion Inhibitor (MCI): “Ferrogard 903”: Sika
    b. Liquid Water Repellant (LWR): “Protectosil CIT”: Degussa Corp
2. Bronze:
    a. Repatination: Liver of Sulfur Solution, Ferric Nitrate Solution
    b. Paste wax 2 coats: Renaissance Micro-Crystalline “Butcher’s Wax”: BWC
3. Marble:
    a. Sealant: “Conservare HCT”: Prosoco
    b. Rinse: “HCT Finishing Rinse”: Prosoco

PART 3 - EXECUTION

3.1 PROTECTION GENERAL

A. Contractor to enclose the site with a perimeter fence.

B. Ensure that supervisory personnel are on-site and on duty when historic treatment work begins and during its progress.

C. Protect persons, motor vehicles, surrounding surfaces of building site, plants, and surrounding buildings from harm resulting from historic treatment procedures.

1. Use only proven protection methods, appropriate to each area and surface being protected.
2. Provide barricades, barriers, and temporary directional signage to exclude public from areas where historic treatment work is being performed.
3. Erect temporary protective covers over walkways and at points of pedestrian and vehicular entrance and exit that must remain in service during course of historic treatment work.
4. Contain dust and debris generated by removal and dismantling work and prevent it from reaching the public or adjacent surfaces.
5. Design and Provide shoring, bracing, and supports as necessary. Do not overload structural elements. The Contractor shall provide structural field engineering services of a licensed California structural or professional engineer.
6. Protect surfaces to remain along haul routes from damage, wear, and staining.

D. Temporary Protection of Historic Materials:

1. Protect existing historic materials with temporary protections and construction. Do not deface or remove existing materials.
2. Do not attach temporary protection to historic surfaces except as indicated as part of the historic treatment program and approved by Owner's Representative.

E. Comply with each product manufacturer's written instructions for protections and precautions. Protect against adverse effects of products and procedures on people and adjacent materials, components, and vegetation.

F. Utility and Communications Services:

1. Notify Owner, Owner's Representative, authorities having jurisdiction, and entities owning or controlling wires, conduits, pipes, and other services affected by the historic treatment work before commencing operations.
2. Disconnect and cap pipes and services as required by authorities having jurisdiction, as required for the historic treatment work.
3. Maintain existing services unless otherwise indicated; keep in service, and protect against damage during operations. Provide temporary services during interruptions to existing utilities.

G. Existing Drains: Prior to the start of work in an area, test drainage system to ensure that it is functioning properly. Notify Owner's Representative immediately of inadequate drainage or blockage. Do not begin work in an area until the drainage system is in working order.

1. Prevent solids such as stone or mortar residue from entering the drainage system. Clean out drains and drain lines that become sluggish or blocked by sand or other materials resulting from historic treatment work.
2. Protect drains from pollutants. Block drains or filter out sediments, allowing only clean water to pass.

3.2 PROTECTION DURING APPLICATION OF CHEMICALS

A. Protect motor vehicles, surrounding surfaces being restored, building site, plants, and surrounding buildings from harm or damage resulting from applications of chemical cleaners and paint removers.

B. Cover adjacent surfaces with protective materials that are proven to resist chemicals selected for Project unless chemicals being used will not damage adjacent surfaces as indicated in historic treatment program. Use covering materials and masking agents that are waterproof, UV resistant, and will not stain or leave residue on surfaces to which they are applied. Apply protective materials according to manufacturer's written instructions. Do not apply liquid masking agents or adhesives to painted or porous surfaces. When no longer needed, promptly remove protective materials staining.

C. Do not apply chemicals during winds of sufficient force to spread them to unprotected surfaces.

D. Neutralize and collect alkaline and acid wastes and legally dispose of off Owner's property.

E. Collect and dispose of runoff from chemical operations by legal means and in a manner that prevents soil contamination, soil erosion, undermining of paving and foundations, damage to landscaping, or water penetration into building interior.

3.3 GENERAL HISTORIC TREATMENT EXECUTION

A. Ensure that supervisory personnel are present when historic treatment work begins and during its progress.

B. Notify Owner's Representative of visible changes in the integrity of material or components whether due to environmental causes including biological attack, UV degradation, freezing, or thawing; or due to structural defects including cracks, movement, or distortion.

1. Do not proceed with the work in question until directed by Owner's Representative.

C. Where Work requires existing features to be removed or dismantled and reinstalled, perform these operations without damage to the material itself, to adjacent materials, or to the substrate.

D. Identify new and replacement materials and features with permanent marks hidden in the completed work to distinguish them from original materials. Record a legend of identification marks and the locations of the items on record Drawings.

3.4 BIRD-EXCREMENT REMOVAL

A. General: Before disturbing accumulated bird excrement, employ a qualified industrial hygienist to perform tests, make recommendations, and observe the work. Follow procedures required by authorities having jurisdiction and recommended by industrial hygienist.

B. Removing Bird Excrement: Have bird-excrement removal work performed by a qualified bird-excrement removal specialist. Remove exterior and interior bird-excrement accumulations.

1. Before removal, treat bird excrement to kill pathogens; dampen excrement to prevent particles becoming airborne.
2. Use only nonmetallic tools such as plastic spatulas and brushes with natural fiber or nylon bristles.
3. Collect excrement debris as it is removed and legally dispose of off-site.

C. Removing Bird-Excrement Stain: Clean as required in section pertaining to cleaning substrate material from which bird excrement was removed.

3.5 HISTORIC REMOVAL AND DISMANTLING SCHEDULE

A. Existing Items Construction to Be Removed shall include but not limited to:
1. Outer portion of concrete water basin
2. Concrete lid and hatch over vault
3. Mechanical pumps and pipes
4. Electrical panels, conduit, and fixtures
5. Structural framing under lower dome
6. Site electrical, water, and sewer piping per civil plans.
7. Paving, curbing, and pedestals with urns.
8. Park perimeter curbing
9. Landscaping except palms (per landscape drawings).

B. Existing Items to Be Removed and Salvaged shall include but not limited to:
1. Glazing Panels

C. Existing Items to Be Dismantled and Reinstalled shall include but not limited to:
1. Bronze domes of fountain
2. Plaques
3. Monuments
4. El Camino Bell with foundation
5. Stanchions and Chains

D. Existing Items to Remain:
   1. Central portion of fountain to include base columns and cornice.
   2. Portions of vault not scheduled for removal.

3.6 CLEANING

A. Clean all surfaces of fountain from marks, mortar and grout residue, and construction stains.

B. Broom clean adjoining walkways and public sidewalks.

C. Clean planting areas of all demolition materials and debris.

END OF SECTION 01 3591

SECTION 01 5639-TEMPORARY TREE AND PLANT PROTECTION

PART 1 - GENERAL

1.1 DESCRIPTION

A. This Section includes the protection and trimming of trees that interfere with, or are affected by, execution of the Work, whether temporary or new construction.

B. Related Sections include the following:

1. Drawings and general provisions of the Contract, including Part 1- “General Provisions” of the Greenbook and Whitebook apply to this Section.
2. Greenbook 2012Section 07 "Responsibilities of the Contractor" and the City of San Diego Whitebook 2012, for limits placed on Contractor's use of the site.
3. Greenbook/Whitebook 2012 Specification Sections 306 and 308 for building and utility trench excavation, backfilling, compacting, grading requirements, and soil materials placement.
4. Greenbook/Whitebook Specification Section 212 “Landscape and Irrigation Materials” for soil materials and amendments.
5. Supplemental Greenbook/Whitebook specifications for tree and shrub transplanting.
6. Supplemental Greenbook/Whitebook Specifications for tree and shrub planting, and tree support systems.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of Owner’s Representatives and owners, and other information specified.

C. Certification: From a qualified arborist that trees indicated to remain have been protected during construction according to recognized standards and that trees were promptly and properly treated and repaired when damaged.

D. Maintenance Recommendations: From a qualified arborist for care and protection of trees affected by construction during and after completing the Work.

1.3 QUALITY ASSURANCE

A. Tree Service Qualifications: An experienced tree service firm that has successfully completed tree protection and trimming work similar to that required for this Project and that will assign an experienced, qualified arborist to Project site on a full-time basis during execution of the Work.

B. Arborist Qualifications: An arborist certified by the International Society of Arboriculture or licensed in the jurisdiction where Project is located.

C. Tree Pruning Standards: Comply with ANSI A300, "Trees, Shrubs, and Other Woody Plant Maintenance, Standard Practices," unless more stringent requirements are dictated by the arborist or governing agencies.

D. Preinstallation Conference: Conduct a preinstallation conference at Project site before starting tree protection and trimming. Record discussions and agreements and furnish a copy to each participant.

1. Attendees: Representatives of authorities having jurisdiction, Owner, Owner's Representative, City of San Diego Urban Forester, consultants, and other concerned entities. Notify participants at least three working days before convening conference.
2. Agenda: Review tree protection and trimming procedures and responsibilities and obtain procedure approvals from the Urban Forester.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Drainage Fill: Selected crushed stone, or crushed or uncrushed gravel, washed, ASTM D 448, Size 24, with 90 to 100 percent passing a 2-1/2-inch sieve and not more than 10 percent passing a 3/4-inch sieve.

B. Topsoil: Fertile, friable, surface soil, containing natural loam and complying with ASTM D 5268. Provide topsoil that is free of stones larger than 1 inch in any dimension and free of other extraneous or toxic matter harmful to plant growth. Obtain topsoil only from well-drained sites where soil occurs in depth of 4 inches or more; do not obtain from bogs or marshes.

C. Filter Fabric: Manufacturer's standard, nonwoven, pervious, geotextile fabric of polypropylene, nylon, or polyester fibers.

D. Chain Link Fence: Metallic-coated steel chain link fence fabric, 0.120-inch- diameter wire size; 72 inches high, minimum; line posts, 1.9 inches in diameter; terminal and corner posts, 2-3/8 inches in diameter; top rail, 1-5/8 inches in diameter; bottom tension wire, 0.177 inch in diameter; with tie wires, hog ring ties, and other accessories for a complete fence system.

PART 3 - EXECUTION

3.1 PREPARATION

A. Temporary Fencing: Install temporary fencing located as indicated or outside the drip line of trees to protect remaining vegetation from construction damage.

1. Install chain link fence according to ASTM F 567 and manufacturer's written instructions.

B. Protect tree root systems from damage due to noxious materials caused by runoff or spillage while mixing, placing, or storing construction materials. Protect root systems from flooding, eroding, or excessive wetting caused by dewatering operations.

C. Protect all existing plant material to remain against unnecessary cutting, breaking, or skinning of roots and branches, skinning and bruising of bark.

D. Do not store construction materials, debris, or excavated material within the drip line of remaining trees. Do not permit vehicles or foot traffic within the drip line; prevent soil compaction over root systems.

E. Do not allow fires under or adjacent to remaining trees or other plants.

F. Do not spray any herbicide or toxic substance within drip line of all existing plant material without approval of Owner’s Representative.

G. Water trees and other vegetation which are to remain as necessary to maintain their health during the course of the work. Rate of frequency of application to be determined jointly by Arborist and Owner’s Representative.

3.2 EXCAVATION AROUND TREES

A. Do not excavate within drip line of trees, unless otherwise indicated.

B. Install shoring or other protective support systems to minimize sloping or benching of excavations.

C. Where trenching is required within drip lines, tunnel under or around roots by hand digging or boring. Do not cut main lateral roots or tap roots; cut smaller roots that interfere with installation of new work.

D. Where excavating for new construction is required within drip line of trees, hand excavate to minimize damage to root systems. Use narrow tine spading forks and comb soil to expose roots.

1. Relocate roots in backfill areas where possible. If encountering large, main lateral roots, expose roots beyond excavation limits as required to bend and relocate them without breaking. If encountered immediately adjacent to location of new construction and relocation is not practical, cut roots approximately 3 inches back from new construction.
2. Do not allow exposed roots to dry out before placing permanent backfill. Provide temporary earth cover or pack with peat moss and wrap with burlap. Water and maintain in a moist condition. Temporarily support and protect roots from damage until they are permanently relocated and covered with soil.

E. Where utility trenches are required within drip line of trees, tunnel under or around roots by drilling, auger boring, pipe jacking, or digging by hand.

1. Root Pruning: Do not cut main lateral roots or taproots; cut only smaller roots that interfere with installation of utilities. Cut roots with sharp pruning instruments; do not break or chop.

3.3 GRADING AND FILLING AROUND TREES

A. Maintain existing grade within drip line of trees unless otherwise indicated. Install protection measures as shown on the Drawings.

B. Grade Lowering: Where new finish grade is indicated below existing grade around trees, slope grade beyond drip line of trees. Maintain existing grades within drip line of trees.

C. Minor Fill: Where existing grade is 6 inches or less below elevation of finish grade, fill with topsoil. Place topsoil in a single uncompacted layer and hand grade to required finish elevations.

D. Moderate Fill: Where existing grade is more than 6 inches, but less than 12 inches, below elevation of finish grade, place drainage fill, filter fabric, and topsoil on existing grade as follows:

1. Carefully place drainage fill against tree trunk approximately 2 inches above elevation of finish grade and extend not less than 18 inches from tree trunk on all sides. For balance of area within drip-line perimeter, place drainage fill up to 6 inches below elevation of grade.
2. Place filter fabric with edges overlapping 6 inches minimum.
3. Place fill layer of topsoil to finish grade. Do not compact drainage fill or topsoil. Hand grade to required finish elevations.

3.4 TREE PRUNING

A. Prune remaining trees affected by temporary and new construction only as approved by Owner's Representative.

B. Prune remaining trees to compensate for root loss caused by damaging or cutting root system. Provide subsequent maintenance during Contract period as recommended by qualified arborist.

C. Pruning Standards: Prune trees according to ANSI A300 as follows:

1. Type of Pruning: Crown cleaning.
2. Type of Pruning: Crown thinning.
3. Type of Pruning: Crown restoration.

D. Cut using sharp pruning instruments; do not break or chop.

3.5 TREE REPAIR AND REPLACEMENT

A. Promptly repair trees damaged by construction operations within 24 hours. Treat damaged trunks, heads and roots according to written instructions of the qualified arborist. Engage a qualified tree surgeon to advise Contractor on appropriate protection measures and to perform tree repair work if required. Make repairs promptly after damage occurs at no additional cost to the Owner.

B. Remove and replace dead and damaged trees that the qualified arborist determines to be incapable of restoring to a normal growth pattern.

1. Provide new trees of the same size and species as those being replaced; plant and maintain as specified in Greenbook/Whitebook Section 308-4 “Planting.”

C. Aerate surface soil, compacted during construction as required by and at the direction of, the Arborist.

3.6 DISPOSAL OF WASTE MATERIALS

A. Burning is not permitted.
B. Disposal: Remove excess excavated material, trees, and excess chips from Owner's property.

END OF SECTION 01 5639

SECTION 02 2070 – SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Demolition and removal of portions of buildings or structures.
   2. Required demolition as indicated on the drawings.

B. Related Sections:
   1. Drawings and general provisions of the Contract, including General and Supplementary Conditions as found in the Standard Specifications for Public works Projects.
   2. Section 01 1610 – Salvage of Historic Features
   3. Section 01 3591 – Historic Treatment Procedures

C. Related Documents.
   1. Drawings and General Provisions of Contract, including General and Supplementary Provisions and other Division 1 Specifications Sections, apply to this Section.
   2. Standard Specifications for Public Works Construction (Greenbook) Current Edition.
   3. 2012 Standard Specifications for Public Works Construction (Whitebook)
   4. The Secretary of the Interior's Standards for the Treatment of Historic Properties (1995 Edition).This document contains *The Standards* which are Federal codified preservation standards.

1.2 DESCRIPTION OF WORK

A. Extent of selective demolition work is indicated in specifications and will be identified during pre-bid walkthrough.

B. Types of Selective Demolition Work: Demolition requires the selective removal of the following:
   1. Removal of existing plant material (except palms).
   2. Removal of all water, irrigation, and sewer systems.
   3. Removal of all concrete hardscape.
   4. Salvage of all monuments and plaques.
   5. Removal of water basin with soil excavation and painted surfaces.
   6. Removal of plumbing pumps and piping with painted surfaces.
   7. Removal of electrical service, panels, and conduit with painted surfaces.
   8. Removal and proper disposal of designated obsolete equipment and equipment supports, and subsequent offsite disposal.
   9. Salvage Historic Materials (e.g. fountain & stanchions): See Historic Salvage, Section 01 1610.
   10. Disassemble upper and lower domes with painted surfaces and caulking.

1.3 DEFINITIONS

A. Demolish (Demo): Unless items are otherwise indicated to be salvaged, Scrap items as directed by Owner's Representative.

B. Dismantle: To disassemble and detach items from existing construction using approved tools and equipment so as to protect historic fabric and finishes in a condition to be reinstalled and refinished.

C. Remove and Salvage: Items indicated to be salvaged will remain the owner's property. Carefully remove, transport, and store items indicated to be salvaged; catalogue, pack or crate to protect against damage; identify contents of containers; deliver to the locations indicated.

D. Existing to Remain: Construction or items indicated to remain shall be protected against damage during demolition operations. Where practicable, and with the Owner's Representative's permission, the contractor may elect to move items to a suitable storage location during demolition and then properly clean and reinstall the items at his own cost.

1.4 PROTECTIONS

A. Provide temporary barricades and other forms of protection as required to protect the City's personnel and general public from injury due to selective demolition work and roof installation. **Contractor or listed sub-contractor's shall be properly licensed for the removal and disposal of hazardous materials and comply with City of San Diego Environmental Requirements.**

B. Provide protective measures as required to provide free and safe passage of the City's personnel and general public adjacent to the work.

C. Protect walks, paving, landscaping, traffic signals and signage, etc. with suitable coverings when necessary.

D. Remove barricades and protections at completion of work.

E. Damages: Promptly repair damages caused to adjacent facilities by demolition work at no cost to the City.

F. Coordinate with City provided archaeological observation during excavation mandated by City regulations.

1.5 TRAFFIC

A. Conduct selective demolition operations and debris removal in a manner to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities.

B. Do not close, block, or otherwise obstruct streets, walks or other occupied or used facilities without written permission from the City or authorities having jurisdiction. Provide

alternate routes around closed or obstructed traffic ways if required by governing regulations.

C. Contractor to obtain a traffic control permit from the City of San Diego when road closure is required to allow construction operations. Contractor to prepare plans, applications, pay fees, and notify City as required.

1.6 UTILITY SERVICES

A. Do not interrupt any existing utilities serving occupied or used facilities, except when authorized in writing by authorities having jurisdiction.

B. Provide temporary services during interruptions to existing utilities, as acceptable to the City.

C. ENVIRONMENTAL CONTROLS
1. Use water sprinkling and other suitable methods to limit dust and dirt rising and scattering in air to lowest practical level. Comply with governing regulations pertaining to environmental protection.
2. Comply with City storm water protection program.
3. Comply with City noise regulations.

PART 2 - PRODUCTS

2.1 NOT USED

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that active utilities have been located and marked. Disconnect and seal all utilities to be abandoned.

B. Survey existing conditions and correlate with drawings and specifications to determine extent of demolition required.

C. Provide Historic Treatment Program, a written description of the means and methods the Contractor intends to use to execute this selective demolition operation as required by Section 01 3591.

D. Insofar as is practicable, arrange operations to reveal unknown or concealed structural conditions for examination and verification before removal or demolition.

E. Verify actual conditions to determine in advance whether removal or demolition of any element will result in structural deficiency, overloading, failure, or unplanned collapse. The contractor shall employ a registered California Structural engineer to provide

necessary shoring. Such calculations shall be provided to the satisfaction of the building department official.

F. If the Contractor discovers any conflicts or perceives any unaddressed condition, he shall contact the Owner's Representative for clarification.

3.2 PREPARATION

A. Traffic and Pedestrian ways: Do not obstruct walks or public ways without the written permission of governing authorities and of the owner. Where routes are permitted to be closed, provide alternate routes if required.

B. Protection:
1. Provide for the protection of persons passing adjacent to area of demolition.
2. Perform demolition so as to prevent damage to adjacent improvements and facilities to remain.
3. Erect temporary protection such as walks, fences, railings, canopies, etc., where required by authorities having jurisdiction.
4. Protect existing site appurtenances and landscaping (palms) to remain.

C. Structural Support:
1. Design, construct and maintain shoring, bracing, and supports as necessary to ensure the stability of structures.
2. Increase or add new supports as required by the progress of the work.

D. Damages
1. Without cost to the owner and without delay, repair any damages caused to facilities to remain.

3.3 DEMOLITION – GENERAL

A. All demolished or removed items and materials shall be considered historic fabric except for those indicated as non-historic. Confirm items to be considered scrap with Owner's Representative.

B. Provide a suitable, secure storage unit for items of value in a location as directed by the Owner's Representative. The Contractor may assume the storage unit will be located within 2 miles of the project site.

C. On the site or in the building, historical items, relics, and similar items (including but not limited to cornerstones and their contents, commemorative plaques and tablets, antiques, and other items of interest or value to the owner) which may be encountered in the course of demolition will remain the owner's property. Notify the Owner's Representative if such items are encountered. Obtain the Owner's Representative's and the owner's acceptance of removal methods, and salvage these items for the owner.

D. Perform selective demolition work in a systematic manner. Use such methods as required to complete work indicated in Specifications in accordance with demolition schedule and

governing regulations. Schedule demolition work to minimize risk of exposure to rain or other unfavorable weather conditions.

E. Make all cuts straight and true to the material being cut. Wavy and broken edges are not properly cut.

F. Aggressive or destructive cleaning methods and materials (e.g. rotary wire wheels, grinding, and **sandblasting**) will not be acceptable.

G. Perform selective demolition using methods which are least likely to damage work to remain and which will provide proper surfaces for patching.

H. Remove debris daily.

3.4 UTILITIY SERVICES

A. Protect or demolish utilities as required by the civil, plumbing, mechanical, and electrical drawings.

B. Coordinate demolition of utilities or portion thereof, with construction documents.

3.5 IMPACT TOOLS

A. Use of impact tools shall be minimized and will only be used as allowed by Owner's Representative.

B. When working on historic fabric to remain, Pneumatic, roto-hammer drill, or other **percussion tools are prohibited** and shall not be used without the permission of the Owner's Representative.

C. Contractor shall use cutting tools and methods to minimize vibration impact to the existing structures.

3.6 POLLUTION CONTROLS

A. Control as much as practicable the spread of dust and dirt.

B. Observe environmental protection regulations.

C. Do not allow water usage that result in freezing or flooding.

D. Do not allow adjacent improvements to remain to become soiled by demolition operations.

E. The Contractor shall assume full responsibility and liability for compliance with all applicable Federal, State and local regulations pertaining to work practices, hauling, disposal, and protection of workers, visitors to the site. The Contractor is responsible for providing medical examinations and maintaining medical records of personnel as required by applicable Federal, State and local regulations. The Contractor shall hold the City and

the City's representatives harmless for failure to comply with any applicable work, handling, disposal, safety, health or other regulation on the part of himself, his employees or his subcontractors.

F. Requirements pertaining to this work include, but are not limited to the following:
1. Cal/OSHA Title 8, Section 1529, Asbestos, California Administrative Code.
2. OSHA Asbestos Standards for the industry.
3. CFR 1910.1001 - General
4. CFR 1926.58 - Construction Industry
5. CFR 1910.134 – Use of Respirators
6. CFR 1910.20 – Access to Employees Exposed & Medical Records
7. CFR 1910.1200 – Hazard Communication
8. CFR 1910.145 – Specifications for Accident Prevention Signs & Tags
9. National Emission Standard for Hazardous Air Pollutants (NESHAP)
10. EPA Regulations 40 CFR Part 61 subparts A & M including NESHAP Revision; Final Rule, Federal Registers 11/20/99
11. 49 CFR 171 and 172 Hazardous Substances
12. San Diego County Air Pollution Control City Regulations

G. Contractor is responsible for all OSHA-required testing of Contractor's employees.

3.7 MATERIAL AND DEBRIS STORAGE

A. Provide suitable containers to hold debris and all material from selective demolition, so that all debris and material from selective demolition will occupy only areas authorized by the City.

3.8 DEMOLITION BELOW GRADE

A. Contractor to coordinate with utilities for utilities to mark locations of utilities prior to excavation.

B. Contractor to coordinate with City Engineering to mark locations of underground piping, conduits, and active and abandoned utilities.

C. Contractor to pot-hole all utilities to confirm location and depth.

3.9 DISPOSAL OF DEMOLISHED MATERIALS

A. Promptly dispose of materials resulting from demolition operations. Do not allow materials to accumulate on site.

B. Transport materials resulting from demolition operations and legally dispose of off-site.

C. Do not burn removed materials on project site.

D. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.

3.10 CLEAN-UP AND REPAIR

A. Upon completion of demolition work, remove tools, equipment, and demolished materials from site. Remove protections and leave interior areas broom clean.
   1. Repair demolition performed in excess of that required. Repair and restore structures and surfaces to remain to condition existing prior to commencement of selective demolition work. Repair adjacent construction or surfaces soiled or damaged by selective demolition work.

END OF SECTION 02 2070

SECTION 03 3000 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes.

B. Drawings and general provisions of the Contract, including Part 1- "General Provisions" of the Greenbook and Whitebook apply to this Section.

C. Standard Specifications for Public Works Construction and City of San Diego Supplement to the "Whitebook," (Current City adopted Editions)

D. Refer to Division 13- Section "Water Feature Waterproofing" for waterproofing of concrete slab on grade at water feature.

E. Refer to Division 09 – Section "Graffiti Resistant Coatings" for anti-graffiti coatings used on concrete.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Design Mixtures: For each concrete mixture, including identification of intended use.

C. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and placement.

D. Formwork Removal and Reshoring Procedure: Prepared by or under the supervision of a qualified professional engineer detailing fabrication, assembly, and support of formwork.

1.3 INFORMATIONAL SUBMITTALS

A. Welding certificates.

B. Material certificates.

C. Material test reports.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.

B. Welding Qualifications: Qualify procedures and personnel according to AWS D1.4/D 1.4M, "Structural Welding Code - Reinforcing Steel."

C. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:

1. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."

D. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.

E. Pre-installation Conference: Conduct conference at Project site.

F. Mock up for colored concrete walls: Provide a 6 foot x 6 foot vertically cast concrete sample panel with specified integral color and sandblast finish for review and approval. Include sandblast finishes from light to medium, typical joints, tolerances and standard of workmanship. Include at least one skate stop installation. Apply Anti-Graffiti coating to one half of the assembly.

G. Mock up for Board Form finish planter bases (Historic Park): Provide one (1) full scale colored concrete planter base with board form finish for approval. Boards shall be knot free and of uniform width. Refer to Division 32 “Concrete Paving” for concrete color used in Historic Park.

PART 2 - PRODUCTS

2.1 FORM-FACING MATERIALS

A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.

2.2 STEEL REINFORCEMENT

A. Reinforcing Bars: As indicated.

B. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice”.

C. Slip Dowel Sleeves: Proprietary plastic sleeve consisting of a polypropylene plastic sleeve and a reusable base.

D. Joint Dowel Bars: Plain steel bars, ASTM A 615/, Grade 60. Cut bars true to length with ends square and free of burrs.

E. Joint Dowel Plates: Steel load plates, ASTM A36, ASTM A615 or A108-03 grade 1018, with high density ABS plastic pocket former. Load plate size: 3/8-inch thick by 4 ½ inches x 4 ½ inches.

2.3 CONCRETE MATERIALS

A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:

1. Portland Cement: ASTM C 150, Type I/II. Supplement with the following:

a. Fly Ash: ASTM C 618, Class F.

B. Normal-Weight Aggregates: ASTM C 33, graded.

1. Maximum Coarse-Aggregate Size to comply with ACI requirements for bar and form clearance.
2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

C. Water: ASTM C 94/C 94M.

2.4 ADMIXTURES

A. Air-Entraining Admixture: ASTM C 260.

B. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.

1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
2. Retarding Admixture: ASTM C 494/C 494M, Type B.
3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
4. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

2.5 VAPOR RETARDERS

A. Sheet Vapor Retarder: Polyethylene sheet, ASTM D 4397, not less than 10 mils thick.

2.6 CURING MATERIALS

A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.

B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.

C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

D. Water: Potable.

E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.

2.7 COLOR MATERIALS

A. Color Pigment: ASTM C 979, colored water-reducing admixtures; color stable, free of carbon black, nonfading, and resistant to lime and other alkalis.
   1. Manufacturer: Davis Colors, L.M. Scofield Company, or approved equal.
   2. Color to be selected by Architect.

B. Custom Aggregate Mix for Use in Integrally Colored Concrete:
   1. Naturally occurring river pebble mined from a single source containing, tan, brown and gold earth tone colors. Aggregate shall be non-reactive.
   2. Size: 3/8 to 5/8 inch range.
   3. Provide mix options for review and selection by Architect.

2.8 RELATED MATERIALS

A. Expansion Joint Filler Strips: ASTM D 3575, closed-cell polyethylene foam backing, with removable joint cap, for joints wider than 1/4-inch

B. Joint Primer: Material recommended by the joint sealant manufacturer where required for adhesion of sealant to joint substrates, as determined from preconstruction joint sealant substrate tests and fields tests. Comply with ASTM C 920, Type S, Grade P, Class 25.

C. Joint Sealant: Non priming, single-component, polyurethane sealant. Comply with ASTM C 920, Type S, Grade NS, Class 50, high-movement, nonsag, fast curing, silyl-terminated polyether sealant, Color to be selected by Owner's Representative from available color palette.

D. Sealant for use when applied to porous materials subject to intermittent water immersion shall be ASTM C 920, Type S, Grade NS, Class 35, for Use NT, and I. Prime joints at special conditions and substrates as directed by manufacturer. Color to be selected by Owner's Representative. Backer Rod: Non-gassing, reticulated closed-cell polyethylene rod designed for use with cold-applied joint sealants where joint depth exceeds manufacturer's recommended depth for joint sealant. Comply with ASTM C 1330, Type C. Size as required for joint design.

E. Bonding Agent: Polyvinyl acetate or acrylic base.

2.9 CONCRETE MIXTURES

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.

B. Cementitious Materials: Use fly ash, as needed to reduce the total amount of portland cement, which would otherwise be used. Limit to 20 percent for slabs on grade.

C. Admixtures: Use admixtures according to manufacturer's written instructions.

1. Use water-reducing or plasticizing admixture in concrete, as required, for placement and workability.
2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
3. Use water-reducing admixture in pumped concrete, concrete required to be watertight, and concrete with a water-cementitious materials ratio below 0.50.

D. Proportion normal-weight concrete mixtures as follows:

1. Minimum Compressive Strength: As indicated.
2. Maximum Water-Cementitious Materials Ratio: As indicated.
3. Slump Limit: As indicated.
4. Air Content: Do not allow air content of trowel-finished floors to exceed 3 percent.

2.10 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.11 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94 and furnish batch ticket information.

1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

B. Integral Colored Concrete Admixture: Add coloring agent to mix according to manufacturer's written instructions.
1. Color admixture may not exceed 10 percent of the concrete design mix.

PART 3 - EXECUTION

3.1 FORMWORK

A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.

B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.

C. Radius exterior corners and edges of permanently exposed concrete, unless indicated otherwise.

3.2 EMBEDDED ITEMS

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

3.3 VAPOR RETARDERS

A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder according to ASTM E 1643 and manufacturer's written instructions.

1. Lap joints 6 inches and seal with manufacturers recommended tape.

3.4 STEEL REINFORCEMENT

A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.

1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

3.5 JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

B. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

C. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.

1. Doweled Construction Joints: Install dowel plates at construction joints/cold joints in concrete paving. Install pocket former and dowel plate per manufacturer’s printed instructions. Use templates for locating pocket former at the correct position for specified concrete thickness.

D. Continue steel reinforcement across construction joints, unless otherwise indicated. Reinforcing shown on structural drawings shall not be continuous where structural concrete elements adjoin concrete elements noted on landscaping or architectural drawings unless specifically noted.

E. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for the depth indicated:

1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.

F. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.

1. Doweled Isolation Joints: Install dowel plates and support assemblies at isolation joints in concrete paving as indicated on the Drawings. Provide proprietary plastic pocket former per manufacturer's directions, on one-half of dowel length to prevent concrete bonding to one side of joint.
2. Include continuous water stops at joints identified as Doweled Isolation Joint with Waterstop (DIJW). Refer to Water Feature Documents for additional waterstop information.

3.6 CONCRETE PLACEMENT

A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.

B. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.

1. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.

C. Cold-Weather Placement: Comply with ACI 306.1.

D. Hot-Weather Placement: Comply with ACI 301.

3.7 FINISHING FORMED SURFACES

A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.

1. Allowed at concrete surfaces not exposed to public view.

B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.

C. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

D. Sandblast Finish: Apply a uniform sandblast finish, matching the approved mockup finish, to all exposed surfaces of integrally colored concrete walls and curbs.

3.8 FINISHING FLOORS AND SLABS

A. General: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

B. Scratch Finish: While still plastic, texture concrete surface that has been screeded and bull-floated or darbied. Use stiff brushes, brooms, or rakes to produce a profile amplitude of 1/4 inch in one direction.

C. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture.

D. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
   1. Finish and measure surface so gap at any point between concrete surface and an unleveled, freestanding, 10-ft.-long straightedge resting on two high spots and placed anywhere on the surface does not exceed 1/4 inch.

E. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, ramps, and elsewhere as indicated.

3.9 CONCRETE PROTECTING AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.

B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

C. Cure concrete according to ACI 308.1, by one or a combination of the following methods:

   1. Moisture Curing: Keep surfaces continuously moist for not less than seven days.
   2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
   3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

3.10 CONCRETE SURFACE REPAIRS

A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

3.11 PROTECTION

A. Apply Anti-Graffiti coating to all exposed surfaces of walls and curbs. Follow manufacturer instructions for application procedures.

3.12 FIELD QUALITY CONTROL

A. Testing and Inspecting: Owner will engage a qualified testing and inspecting agency to perform field tests and inspections and prepare test reports in compliance with the Statement of Special Inspections.

END OF SECTION 03 3000

SECTION 03 4000 – PRECAST CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Provide all materials, equipment, labor, and supervision to fabricate and install new plant-precast architectural concrete (APC) work shown and specified.
   2. This section includes but not limited to: Replicated light poles, urns, and vent with urn.

B. Related Sections:
   1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
   2. Section 03 3000 – Cast-In-Place Concrete
   3. Section 13 1202 – Water Feature Concrete

C. Related Documents
   1. Drawings and General Provisions of Contract, including General and Supplementary Provisions and other Division 1 Specifications Sections, apply to this Section.
   2. Standard Specifications for Public Works Construction (Greenbook) Current Edition.
   3. 2012 Standard Specifications for Public Works Construction (Whitebook)
   4. The Secretary of the Interior's Standards for the Treatment of Historic Properties (1995 Edition).This document contains *The Standards* which are Federal codified preservation standards.

1.2 REFERENCES

A. American Concrete Institute (ACI).
   1. ACI 318 – "Building Code Requirements for Reinforced Concrete."

B. Resident Architectural Precast Association (APA).

C. American Society for Testing and Materials (ASTM).
   1. A-185 – "Specification for Steel Welded Wire Fabric, Plain, for Concrete Reinforcement."
   2. A-666 – "Specification for Austenitic Stainless Steel, Sheet, Strip, Plate, and Flat Bar."
   3. C-33 – "Specification for Concrete Aggregates."
   4. C-150 – "Specification for Portland Cement."
   5. C-260 – "Specification for Air-Entraining Admixtures for Concrete."
   6. C-330 – "Specification for Lightweight Aggregates for Structural Concrete."
   7. C-404 – "Specification for Aggregates for Masonry Grout."

8. C-494 – "Specification for Chemical Admixtures for Concrete."
9. C-979 – "Specification for Pigments for Integrally Colored Concrete."
10. C-1107 – "Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink)."
11. C-1240 – "Specification for Specification for Silica Fume for Use in Hydraulic-Cement Concrete.
12. D-412 – "Test Methods for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers – Tension."
13. F-539 – "Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs."

D. American Welding Society (AWS).

E. Cement and Concrete Reference Laboratory (CCRL).

F. Concrete Reinforcing Steel Institute (CRSI).
1. "Manual of Standard Practice."

G. Precast/Prestressed Concrete Institute (PCI).
1. MNL 117 – "Manual for Quality Control."
2. MNL 120 – "Design Handbook."

1.3 System Description

A. Performance Requirements: Comply with 2007 California Building Code (CBC), regulations or other governing agencies having jurisdiction.

1.4 QUALITY ASSURANCE

A. Fabricator's Qualifications: Firm shall have a minimum of five (5) years experience in producing units similar to those required for this Project, with sufficient production capacity to produce and deliver required units without causing delay in Work.
1. Fabricating Plant shall be certified by one of the following:
   a. Architectural Precast Association (APA)
   b. Precast/Prestressed Concrete Institute (PCI), Group A1.
   c. Applicable municipal building department.
2. Firms not certified by APA or PCI shall submit a written Quality Assurance/Quality Control program for approval.
3. A manufacturer not certified by APA or PCI will be required to provide special inspection acceptable to the applicable municipal building department at its own cost.

B. Design Responsibility: Precast pieces shall be designed under the supervision of a California registered professional engineer employed or retained by the manufacturer, using property data generated from the manufacturer's actual production, in accordance with procedures in Pre-stressed Concrete Institute (PCI) "PCI Design Handbook" MNL-120.

C. Installer's Qualifications: Installer shall have a record of at least five (5) years of successful installation of units similar to those required for this project.

D. Welder's Qualifications: Provide certification that welders to be employed in the Work certified by AWS D1.1 and applicable local building officials.

E. Applicable Standards: As specified under Paragraph 1.3 References.

F. Sub-Contractors: Submit qualifications of possible sub-contractors per submittals requirements of these specifications. The following sub-contractors are pre-approved for this section, there is no guarantee they are APA or PCI certified.
1. Moonlight Molds Inc., 14920 S. San Pedro Street, Gardena, CA. 90248. Tel (310) 538-9142.
2. Architectural Facades Unlimited, 600 East Luchessa Ave., Gilroy, CA. 95020, Tel (408) 846-5350.
3. Bellagio Pre-Cast, 3216 Island Avenue, San Diego, CA 92102, Tel 858-361-3458.
4. Spectra Company, 2510 Supply Street, Pomona, CA 91767, Tel (800) 375-1771 ext 104.

1.5 SUBMITTALS

A. Product Data: Submit product data for manufactured materials and products.

B. Shop Drawings
1. Show in-place location, fabrication details, plans, elevations, anchorages, reinforcement, connection details and methods, dimensions, finishes, relationships to adjacent materials, and erection and placement.
2. Show identification marks, coordinated to Shop Drawings,
3. Setting diagrams, templates, instructions, and directions as required for installation.
4. Shop Drawings shall be signed and sealed by a registered California Professional Engineer.

C. Molds: Contractor to identify the specific units on the building that will be used to make molds and submit a plan showing the units and an outline of the mold making procedure to Owner's Representative for approval.

D. Samples: For the Museum of Man roof APC replacements, submit sample for approval of quality, color, and texture of surface finish. Submit prior to fabrication.

E. Samples for Sealant Adhesion Testing: Submit samples with and without liquid water repellent to be used to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates. See Specification Section 07920 - Sealant.

F. Samples for concrete color. Provide 3 samples of each requested color. Samples shall be 12" x 12" and also be finished as requested. The contractor should be aware multiple submittals with small variations in color are often requested.

G. Mock-up of each type of precast item. Satisfactory mock-up samples may be used in the work.

1.6 DELIVERY

A. Deliver units to the Project site in such quantities and at such times to ensure continuity of installation.

1.7 STORAGE

A. Avoid job site storage. When job site storage is required, store in a manner to prevent physical damage and so that markings are visible.

1.8 HANDLING

A. Provide anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, templates, instructions, and directions as required for installation.

1.9 SITE CONDITIONS

A. Field Dimensions: General Contractor is responsible for obtaining field dimensions.

B. Molds: Contractor to identify the specific units on the building that will be used to make molds and submit a plan showing the units and an outline of the mold making procedure to Owner's Representative for approval.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Concrete Materials:
   1. Portland cement ASTM C150, Type I or III, mix white or custom colors to achieve desired finish colors. Use only one brand, type, and color from the same mill and batch. Gray cement may be used for non-exposed backup mixes.
   2. Aggregates: ASTM C33; gradation may differ to achieve desired finish characteristics. Select coarse and fine aggregate colors and screen sizes to match approved sample(s). Verify that adequate supply, from one pit or quarry, for each type of aggregate is available for the entire Project. If possible, obtain entire aggregate supply prior to starting Work, or have aggregate supply held in reserve by aggregate supplier.
   3. Water: Potable. Clean, clear, and free from deleterious amounts of salts, acids, alkalis, organic materials, oils, detergents, or other matter that may interfere with color, curing, or strength of concrete.
   4. Pigment: Custom colors by Davis Colors, Scofield Colors, or equal.
   5. Air Entraining: ASTM C260.
      a. Admixtures: Select to be compatible in specified mix.
      b. Water Reducing: ASTM C494, Type A, B, C, F, or G.

c. Silica Fume: ASTM C1240, for cement replacement for high performance concrete.
d. Coloring Agent: ASTM C979, compatible with other concrete materials.
e. Other Constituents: Integral water repellents and other chemicals, for which no ASTM standard exists, shall be previously established as suitable for use in concrete or shall be shown by test or experience not to be detrimental to the concrete.

B. Formwork
1. Provide forms with acceptable form facing materials that are non-reactive with concrete or form release agents and will produce required finish surfaces.
2. Construct and maintain forms to produce precast concrete units of shapes, lines, and dimensions indicated, within specified tolerances.

C. Reinforcing Materials
1. Stainless Steel Welded Wire Fabric: ASTM A185, Type 304, 2-inch x 2-inch x 12 ga.
2. Reinforcing Bars: Deformed stainless steel reinforcing bars conforming to ASTM A955M, Grade 304 or 316
3. Bar supports: Bolsters, chairs, spacers, tie-wires, and other devices for setting reinforcement should be of a non-corrosive material and compatible with reinforcement.
4. Alkali resistant glass fiber mesh conforming to PCI MNL-130 Appendix D.
a. Fibers with a minimum of 16% zirconia specifically designed to be compatible with portland cement-based products.

D. Connection Materials:
1. Stainless Steel Plate and rolled shapes: ASTM F593, Type 304 or Type 316.
2. Nuts bolts, studs, and washers: Type 304 or Type 316 stainless steel.
3. Concrete Anchors: Type 304 or 316 stainless steel ferrule thin slab inserts.
4. Elastomeric Bearing Pad: Neoprene shims, maximum 3/16" thickness.

2.2 MIXES

A. Design mixes for each type of concrete specified may be prepared by an independent testing agency or by architectural precast manufacturing plant personnel at precast fabricator’s option.

B. Provide 12” x 12” mock-up samples of designated colors, to be approved by Owner’s Representative prior to production of pre-cast objects.

C. Proportion mixes by either testing agency trial batch or field test data methods in accordance with ACI 211.l, using materials to be used on the project, to provide normal weight concrete with properties as follows:
1. Compressive Strength: 5,000 psi when tested in accordance with ASTM C39.
2. Maximum water cement ratio 0.40 at point of placement.
3. Add air-entrainment admixture to result in air content at point of placement complying with ACI 533 requirements.

4. Water absorption maximum 6% (by weight) when tested in accordance with ASTM C642.

2.3 FABRICATION

A. General
   1. Fabricate full-size model of each casting prior to casting units for the project.
   2. Fabricate precast concrete units with manufacturing and testing procedures, quality control recommendations, and dimensional tolerances as specified in ACI 533, unless more stringent requirements are shown or specified.
   3. Fabricate units straight, smooth, and true to size and shape, with exposed edges and corners precise and square, unless otherwise indicated.

B. Reinforcement: Comply with CRSI “Manual of Standard Practice” and ACI 318 recommendations. Reinforce Architectural precast concrete units to resist handling, transportation, and erection stresses, and to comply with specified performance criteria. All reinforcement shall be stainless steel.

C. Cast-in Items: Provide embedded anchors, inserts, steel shapes, and lifting devices as required to place precast in place. Any and all lifting devices not part of the design must be concealed or removed from sight. Firmly hold cast items in place by jigs, strongbacks, or other approved means. All cast-in items shall be stainless steel.

D. Wet cure concrete a minimum of 7 days in accordance with ACI 533 requirements.

E. Fabrication Tolerances: Fabricate to tolerances listed in ACI 533.

F. Consolidate concrete using equipment and procedures complying with ACI 533.

G. Permanently mark units with pick-up points as shown on reviewed Shop Drawings. Imprint casting date and piece mark on a surface to be concealed from view in the finished assembly.

H. Discard units that are warped, cracked, broken, spalled, stained, or otherwise defective unless repairs are approved by the Owner’s Representative and meet specified requirements. Refer to ACI 533 for product finish requirements unless otherwise shown or specified.

2.4 FINISHES

A. Match 12”x 12” mock-up samples setting an example for texture and color, Include a portion of the sample coated with liquid water repellant.

B. Finish surface to be smooth sand blasted or acid etched surface finish free from pockets, sand streaks, honeycomb, with uniform color and texture. No bugholes are acceptable.

C. Finish unexposed surfaces of units by float finish or as-cast form finish.

D. All exterior surfaces will receive a field applied liquid water repellant after installation.

E. Seams created by the joining of two components to make a monolithic shape shall not be visible following the fabrication process.

2.5 SOURCE QUALITY CONTROL

A. Inspect and test Architectural precast concrete in accordance with ACI 533.

B. Defective Work: Discard units that do not conform to requirements as shown or specified. Replace with units which meet requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Coordination: General Contractor, fabricator and installer to closely coordinate field measuring, and mold making.

B. Examine substrates and conditions for compliance with requirements for installation, tolerances, true and level bearing surfaces, and other conditions affecting performance of architectural precast concrete units. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 ERECTION

A. Erection shall be by persons experienced and trained in placement and securing of architectural precast concrete units.

B. The erection contractor shall be responsible to review drawings relating to other trades, mechanical services, and other repair situations to ensure that conflicts for space, connections hardware, plumbing lines, etc., do not exist.

C. Erect level, plumb, and true to line, with consideration of other façade components to remain. Report any damaged units to Owner’s Representative to be replaced in kind by contractor.

D. Erection Tolerances:
1. Erect within tolerances listed in ACI 533.
2. Erect to conform to structure tolerances listed in ACI 533.
3. Joints between new APC and existing cast stone to match original.

3.3 SETTING INDIVIDUAL REPLACEMENT UNITS

A. Fabricate replacement unit to match the size, shape, color, and texture of the mock-up unit.

B. Prior to setting new unit, wet down substrate with water to obtain a saturated surface dry condition.

C. Set new APC units in a full bed of setting mortar. All perimeter joints must be completely filled. Units with leveling bolts may be dry-packed after installation.

3.4 REPAIR

A. Repair exposed surfaces of units to match color, texture, and uniformity of surrounding units.

B. Remove and replace damaged units when repairs do not meet approval by Owner's Representative.

3.5 CLEANING

A. Clean exposed surfaces of units after erection and curing of mortar and grout.
   1. Wash and rinse according to architectural precast concrete fabricator's recommendations and before any mortar spillage sets. Protect other work from damage while cleaning.
   2. Do not use cleaning materials or methods that change the appearance of architectural precast concrete finishes or the finish of the adjacent cast stone. Test clean a small area to verify adequacy and safety of materials and methods.
   3. Remove all curing agents and form release compounds. Leave in condition for application of water repellents.

3.6 PROTECTION

A. Protect finished surfaces from soiling or damage.

END OF SECTION 03 4000

SECTION 04 0140 - MAINTENANCE OF STONE ASSEMBLIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:
1. Provide all materials, equipment, labor, and supervision to facilitate maintenance of stone assemblies consisting of stone restoration and cleaning as follows:
2. Unused anchor removal
3. Cleaning exposed stone surfaces
4. Mix mortar for patches
5. Repairing stone masonry, including crack repair and replacing partial units.
6. Repointing joints
7. Preliminary cleaning, including removing plant growth
8. Mix mortar for repointing
9. Non-Shrink Grout

B. Related Sections:
1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
2. Section 01 1610 Salvage of Historic Features
3. Section 01 3591 Historic Treatment Procedures
4. Section 04 0140 Maintenance of Stone
5. Section 04 4911 Cast Stone Crack Repair
6. Section 07 7180 Migrating Corrosion Inhibitor
7. Section 07 7190 Liquid Water Repellent Coating

C. Related Documents
1. Drawings and General Provisions of Contract, including General and Supplementary Provisions and other Division 1 Specifications Sections, apply to this Section.
2. Standard Specifications for Public Works Construction (Greenbook) Current Edition.
3. 2012 Standard Specifications for Public Works Construction (Whitebook)
4. The Secretary of the Interior’s Standards for the Treatment of Historic Properties (1995 Edition).This document contains *The Standards* which are Federal codified preservation standards.

1.2 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, fly ash and other pozzolans, ground granulated blast-furnace slag, and silica fume.

B. Dutchman Patches: Patches created by installing pre-formed Architectural Precast Concrete pieces into the prepared cast stone substrate.

C. Formed Patches: Patches made by pumping a cementitious material into a void formed by the existing cast stone substrate and form boards installed to retain the plastic cementitious material until it hardens.

D. Mortar Patches: Patches formed in place by hand applied or form-and-pour methods.

E. Spray Pressure Levels: Spray pressure prescribed in specifications shall be defined as follows:
1. Very Low-Pressure Spray: Under 100 psi, 4 to 6 gpm

2. Low-Pressure Spray: 100 to 400 psi; 4 to 6 gpm.
3. Medium-Pressure Spray: 400 to 800 psi ; 4 to 6 gpm.

F. Stone Terminology: ASTM C 119.

1.3 PRECONSTRUCTION TESTING

A. Preconstruction Testing Service: Engage a qualified testing agency to perform preconstruction testing on stone units as follows:

1. Provide test specimens as indicated and representative of proposed materials and construction.
2. Existing Mortar: Test according to ASTM C 295, modified as agreed by testing service and Owner's Representative for Project requirements, to determine proportional composition of original ingredients, sizes and colors of aggregates, and approximate strength. Use X-ray diffraction, infrared spectroscopy as necessary to supplement microscopical methods. Carefully remove existing mortar from within joints at two locations designated by Owner's Representative.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include recommendations for application and use. Include test data substantiating that products comply with requirements.

B. Shop Drawings: For the following:
1. Partial replacement stone units (Dutchmen when occurs).
2. Setting number of each new stone unit (when occurs) and its location on the structure in annotated plans and elevations.
3. Provisions for sealant joints and glazing sealants.
4. Provisions for flashing, lighting fixtures, conduits, and weep holes as required.
5. Replacement and repair anchors, including drilled-in pins. Include details of anchors within individual stone units, with locations of anchors and dimensions of holes and recesses in stone required for anchors, including direction and angle of holes for pins.

C. Samples for Initial Selection: Submit samples to Owner's Representative for the following:

1. Pointing Mortar: Submit six (6) sets of mortar for pointing in the form of sample mortar strips, 6 inches long by matching existing joint width, set in aluminum or plastic channels.
   a. Have each set contain a close color range of at least six Samples of different mixes of colored sands and cements that produce a mortar matching the cleaned stone when cured and dry.
   b. For each set submit with precise measurements on ingredients, proportions, gradations, and sources of colored sands from which each Sample was made.

2. Grout: Submit six (6) sets of grout for stone placement matched to stone.

3. Patching Compound: Submit sets of patching compound Samples in the form of plugs (patches in drilled holes) in sample units of stone representative of the range of stone colors on the fountain.

   a. Have each set contain a close color range of at least six 8" x 8" Samples of different mixes of patching compound that matches the variations in existing stone when cured and dry.

4. Dutchmen Unit: Submit three samples of each type of stone (as required by Owner's Representative)
   a. No specific areas for Dutchman repairs are identified in the plans.

b. Damage to stone resulting from dismantling or repair procedures may result in the use of Dutchman repairs.

D. Mix Designs: Prior to delivery, submit proposed mix designs in compliance with the applicable Specifications referenced herein to the Resident Engineer for review and approval.
1. Mortars and grouts that are exposed are required to match the color of the adjacent cast stone. Submit samples showing color and texture for approval of the Resident Engineer.

E. Test Reports: Submit test reports from approved independent laboratory for all code and regulatory agency-required tests and all special testing as specified herein.
1. At start of job, test two (2) samples of historic mortar to determine compressive strength of existing mortar.
2. Test new mortars for compressive strength per ASTM C270.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: Provide a submittal of the experience for restoration specialists including field supervisors.

1.6 QUALITY ASSURANCE

A. **Stone Restoration Specialist Qualifications**: Engage an experienced stone restoration and cleaning firm to perform work of this Section. Firm shall have completed work similar in material, design, and extent to that indicated for this Project with a record of verifiable successful in-service performance on five (5) projects. Experience installing standard unit masonry or new stone masonry is not sufficient experience for stone restoration work.

1. At Contractor's option, stone restoration work may be divided between three specialist firms: one for cleaning work and one for repair work.
2. Field Supervision: Restoration specialist firms shall maintain experienced full-time supervisors on Project site during times that stone restoration and cleaning work is in progress. Supervisors shall not be changed during Project except for causes beyond control of restoration specialist firm.

B. **Stone Restoration Specialist Firms**: Subject to compliance with requirements, firms that may provide stone restoration and cleaning include, but are not limited to, the following:
1. Spectra Company, 2510 Supply Street, Pomona, CA 91767, Tel (800) 375-1771.: Ray Adamyk.
2. Kitson Specialty Contracting, Inc., 10370 Slusher Dr., Suite #9, Santa Fe Springs, CA 90670, Phone (562) 941-1949.
3. CK Arts, 8600 Venice Blvd., Los Angeles, CA 90034, Tel. (951) 826-5852.

C. **Bird-Excrement-Removal Specialist Qualifications**: A firm that employs personnel experienced and skilled in the processes and operations indicated.

D. **Source Limitations**: Obtain each type of material for stone restoration (stone, cement, sand, etc.) from one source with resources to provide materials of consistent quality in appearance and physical properties.

E. **Testing**:

1. The Contractor shall comply with all testing requirements as applicable and established by the San Diego Building Code and all other governing bodies.

2. Owner shall bear the costs of independent special inspectors and testing as required. However, if such tests or inspections indicate that the work does not conform to the Specifications, the Contractor shall bear the costs of all retesting and re-inspections.
   a. At start of job, test mortar to meet compressive strength requirements of ASTM C270. Mortar compressive strength requirements are:
      1) Type M mortar - 2500 psi.
      2) Type N mortar - 750 psi.
      3) Type O mortar - 350 psi.

F. **Historic Treatment Program**: Prepare a written, detailed description of materials, methods, equipment, and sequence of operations to be used for each phase of restoration work including protection of surrounding materials and Project site.

G. **Cleaning Program**: Prepare a written cleaning program that describes cleaning process in detail, including materials, methods, and equipment to be used, protection of surrounding materials, and control of runoff during operations.

1. If materials and methods other than those indicated are proposed for any phase of restoration work, add to the Quality-Control Program a written description of such materials and methods, including evidence of successful use on comparable projects, and demonstrations to show their effectiveness for this Project and worker's ability to use such materials and methods properly.

H. **Mockups**: Prepare mockups of restoration and cleaning to demonstrate aesthetic effects and set quality standards for materials and execution and for fabrication and installation.

1. Stone Repair Mock-up: Prepare sample areas for each type of stone indicated to have repair work performed in situ. Erect sample areas in existing stone in discreet locations, to demonstrate quality of materials, workmanship, and blending with existing work. Include the following as a minimum:
   a. Crack Injection: Apply crack injection in 2 separate areas as directed.
   b. Patching: Three small holes as directed.
   c. Epoxy Pin: Filler over one pin in marble.

2. Repointing: Rake out joints in 2 separate areas approximately 12” long for each type of repointing required and repoint one of the areas.

3. Cleaning: Clean an area 5’square for each type of stone and surface condition.
   a. Test cleaners and methods on samples of adjacent materials for possible adverse reactions. Do not use cleaners and methods known to have deleterious effect.
   b. Allow a waiting period of not less than seven days after completion of sample cleaning to permit a study of sample panels for negative reactions.

4. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Owner’s Representative specifically approves such deviations in writing.

5. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

I. **Preinstallation Conference**: Conduct conference at Project site.

1. Review methods and procedures related to stone restoration and cleaning including, but not limited to, the following:

a. Construction Schedule: Verify availability of materials, Restoration Specialist's personnel, equipment, and facilities needed to make progress and avoid delays.
b. Materials, material application, sequencing, tolerances, and required clearances.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver other materials to Project site in manufacturer's original and unopened containers, labeled with manufacturer's name and type of products.

B. Store cementitious materials on elevated platforms, under cover, and in a shaded, dry location. Do not use cementitious materials that have become damp or in open packages.

C. Store hydrated lime in manufacturer's original and unopened containers. Discard lime if containers have been damaged or have been opened for more than two days.

D. Store lime putty covered with water in sealed containers.

E. Store sand where grading and other required characteristics can be maintained and contamination avoided.

1.8 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit stone restoration and cleaning work to be performed according to manufacturers' written instructions and specified requirements.

B. Repair stone units and repoint mortar joints only when air temperature is between 40 and 90 deg F and is predicted to remain so for at least 7 days after completion of the Work unless otherwise indicated.

C. Hot-Weather Requirements: Protect stone repair and mortar-joint pointing when temperature and humidity conditions produce excessive evaporation of water from mortar and patching materials. Provide artificial shade and wind breaks and use cooled materials as required to minimize evaporation. Do not apply mortar to substrates with temperatures of 90 deg F and above unless otherwise indicated.

D. Clean stone surfaces only when air temperature is 40 deg F and above and is predicted to remain so for at least 7 days after completion of cleaning.

1.9 SEQUENCING AND SCHEDULING

A. Order replacement materials at earliest possible date to avoid delaying completion of the Work.

B. Order sand and gray portland cement for pointing mortar immediately after approval of mockups. Take delivery of and store at Project site a sufficient quantity to complete Project.

C. Perform stone restoration work in the following sequence:

1. Remove plant growth.
2. Clean stone surfaces.
3. Treat granite and concrete surfaces with Migrating Corrosion Inhibitor per Section 07 7180.
4. Where water repellents, specified in Section 07 7190 "Liquid Water Repellent," are to be used on or near stonework, delay application of these chemicals until after pointing.

5. Rake out mortar from joints surrounding stone to be replaced and from joints adjacent to stone repairs along joints.
6. Repair stonework, including replacing existing stone with new stone.
7. Rake out mortar from joints to be repointed.
8. Point mortar joints.
9. After repairs and re-pointing have been completed and cured, perform a final cleaning to remove residues from this work.

D. As scaffolding is removed, patch anchor holes used to attach scaffolding. Patch holes in stone to comply with item 3.3 of this specification section.

PART 2 - PRODUCTS

2.1 EQUIPMENT

A. Sawing equipment shall be capable of saw-cutting the existing concrete to the specified depth. Provide guides for straight cutting.

B. Other equipment such as scrapers, scarifiers, etc. as required to remove existing coatings.

C. **PNEUMATIC CHIPPING HAMMERS SHALL NOT BE USED** unless approved by Owner's Representative, maximum size 5-lb class.

D. **SANDBLASTING EQUIPMENT SHALL NOT BE USED** unless approved by Owner's Representative in locations where sandblasting will remove rust from exposed reinforcing and adjacent surfaces are protected from damage.

E. High pressure, oil-free, compressed air equipment capable of removing dust and dirt from concrete repair areas, exposed concrete surfaces, and holes of epoxied-in dowels.

F. Percussive drilling equipment shall not be used unless approved by Owner's Representative. Rotary drilling is preferred in all cases.

2.2 MORTAR MATERIALS

A. Portland Cement: ASTM C 150, Table 2, Type I, low-alkali white or gray or both where required for color matching of exposed mortar.
1. Provide cement containing not more than 0.60 percent total alkali when tested according to ASTM C 114.

B. Hydrated Lime: ASTM C 207, Type S.
1. Not all mortars are Type S, see manufactured repair materials below.
2. Preparing Lime Putty: On any lime other than Type S, Slake quicklime and prepare lime putty according to appendix to ASTM C 5 and manufacturer's written instructions.

C. Factory-Prepared Lime Putty: ASTM C 1489.

D. Mortar Sand: ASTM C 144 unless otherwise indicated.
1. Color: Provide natural sand or ground marble, granite, or other sound stone of color necessary to produce required mortar color.
2. For pointing mortar, provide sand with rounded edges.

3. Match size, texture, and gradation of existing mortar sand as closely as possible. Blend several sands if necessary to achieve suitable match.

E. Mortar Pigments: Natural and synthetic iron oxides, compounded for mortar mixes. Use only pigments with a record of satisfactory performance in masonry mortars complying with ASTM C979.

F. Water: Potable.

2.3 MANUFACTURED REPAIR MATERIALS

A. Cavity Grout filling large or reinforced cavities:
1. Use a masonry grout mix in accordance with ASTM C476 and a minimum compressive strength of 2500 psi. Minimum aggregate size shall be ½" diameter.
   a. Mix shall be designed by supplier after reviewing field conditions, intended use as indicated in the drawings, and Contractor's proposed construction sequence.
   b. Contractor shall submit mix design to Owner's Representative for approval.

B. Polymer Modified Patching Mortar: Type N mortar in accordance with ASTM C270 with the following mix proportion by volume:
1. Slurry Coat:
   a. Portland Cement 1 part
   b. Sand 1 part
   c. Bonding Agent 1:1 with water, enough to form pancake batter consistency
2. Scratch & Brown Coats
   a. Portland Cement 1 part
   b. Hydrated Lime 1 part
   c. Sand 5 parts
   d. Bonding Agent Enough to gauge. Final patch mixture to have minimum of 5% Polymer solids by weight.

C. Finish Patching Mortar: Type N mortar in accordance with ASTM C270 with the following mix proportion by volume:
1. Patching Mortar
   a. Portland Cement 1 part
   b. Hydrated Lime 1 part
   c. Sand 5 parts
   d. Pigments: 2% maximum by weight of cement.

D. Non-Shrink Grout:
1. Masterflow 555, manufactured by Degussa Building Systems Inc., Woodland, CA.
2. Five Star Special Grout 100, manufactured by Five Star Products, Fairfield, CT.
3. Or approved equal.

E. Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, Solvent-borne, acrylic material. Wax-based or silicate materials shall not be used. Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
1. Burke Spartan Cote V. O. C.; Edoco.
2. Dress & Seal 30; L&M Construction Chemicals, Inc.
3. Kure-N-Seal 30; Degussa Building Systems.

F. Reinforcing Bars: ASTM A304 Stainless Steel threaded rods, Sizes to be same diameter as existing reinforcing.

G. Welded Wire Fabric Reinforcing: Flat sheets of orthogonal wires welded at each wire-to-wire intersection per ASTM A185, and fabricated from as-drawn stainless steel wire with a 65,000-psi minimum yield strength per ASTM A82. Size per Drawings, minimum size: 2” x 2” x 16 gage.

H. Tie-wire: ASTM A 304 Stainless steel, minimum 18 gage.

I. Stainless Steel Dowels & epoxied-in wires: See Section 04 8000: Epoxy Anchors.

J. Epoxy grout for stainless steel dowels: See Section 04 8000: Epoxy Anchors.

K. Admixtures:
1. Bonding Agent: Acryl 60 as manufactured by BASF/Thoro Systems Products Miami, Florida.
2. No calcium chloride or admixtures containing calcium chloride shall be used in the mortar.
3. No air-entraining admixtures or material containing air-entraining admixtures shall be used in mortar.
4. No antifreeze compounds or other substances shall be added to mortar.
5. No corrosion-promoting admixtures shall be used in the mortar.
6. Water must be clean and free from deleterious amounts of acids, alkalis, or organic materials.
7. No admixtures shall be used without written approval.
8. Use colored sand to obtain desired mortar color.

L. Anticorrosion Coating for exposed rebar to remain:
1. Sika Armatec 110 Epocem, as manufactured by Sika Corp.
2. Sikadur 32 Hi-Mod LPL, as manufactured by Sika Corp.
3. Or approved equal

M. Stone Patching Compound: Factory-mixed cementitious product that is custom manufactured for patching stone.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
   a. Cathedral Stone Products, Inc; Jahn Restoration Mortars
   b. BASF / Thoro
   c. Conproco Corporation: Mimic, Forment
2. Use formulation that is vapor- and water permeable (equal to or more than the stone), exhibits low shrinkage, has lower modulus of elasticity than the stone units being repaired, and develops high bond strength to all types of stone.
3. Use formulation having working qualities and retardation control to permit forming and sculpturing where necessary.
4. Formulate patching compound in colors, textures, and grain to match stone being patched. Provide not less than three colors to enable matching each piece of stone.

N. Cementitious Crack Filler: See specification Section 04 4911

2.4 CLEANING MATERIALS

1. See specification section 04 4930 Masonry Cleaning

2.5 ACCESSORY MATERIALS

A. Liquid Strippable Masking Agent: Manufacturer's standard liquid, film-forming, strippable masking material for protecting glass, metal, and polished stone surfaces from damaging effects of acidic and alkaline masonry cleaners.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    a. PROSOCO; Sure Klean Strippable Masking.

B. Setting Buttons: Resilient plastic buttons, nonstaining to stone, sized to suit joint thicknesses and bed depths of stone units without intruding into required depths of pointing materials.

C. Masking Tape: Nonstaining, nonabsorbent material, compatible with pointing mortar, joint primers, sealants, and surfaces adjacent to joints; that will easily come off entirely, including adhesive.

D. Miscellaneous Products: Select materials and methods of use based on the following, subject to approval of a mockup:

1. Previous effectiveness in performing the work involved.
2. Little possibility of damaging exposed surfaces.
3. Consistency of each application.
4. Uniformity of the resulting overall appearance.
5. Do not use products or tools that could do the following:
    a. Remove, alter, or in any way harm the present condition or future preservation of existing surfaces, including surrounding surfaces not in contract.
    b. Leave a residue on surfaces.

2.6 MORTAR MIXES

A. Measurement and Mixing: Measure cementitious materials and sand in a dry condition by volume or equivalent weight. Do not measure by shovel; use known measure. Mix materials in a clean, mechanical batch mixer.

1. Mixing Pointing Mortar: Thoroughly mix cementitious materials and sand together before adding any water. Then mix again adding only enough water to produce a damp, unworkable mix that will retain its form when pressed into a ball. Maintain mortar in this dampened condition for 15 to 30 minutes. Add remaining water in small portions until mortar reaches desired consistency. Use mortar within one hour of final mixing; do not re-temper or use partially hardened material.

B. Colored Mortar: Produce mortar of custom color required by using specified ingredients. Do not alter specified proportions without Owner’s Representative's approval.

C. Do not use admixtures in mortar unless otherwise indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Ensure that supervisory personnel are on-site and on duty when historic treatment work begins and during its progress.

B. Examine stone features and individually list damages to stone, both those part of the work in the documents and any not noted in the drawings. Assign a number to each repair.

C. Identify fountain components that will need to be removed prior to commencing with repair work. Coordinate with disassembly specialist.

D. Collect samples of mortar and stone for testing and color testing.

3.2 PROTECTION

A. Protect persons, motor vehicles, surrounding surfaces of building being restored, building site, plants, and surrounding buildings from harm resulting from stone restoration work.

1. Erect temporary protective covers over walkways and at points of pedestrian and vehicular entrance and exit that must remain in service during course of restoration and cleaning work.
2. Protect the concrete elements that are susceptible to damage from impacts and foot traffic.

B. Comply with chemical-cleaner manufacturer's written instructions for protecting building and other surfaces against damage from exposure to its products. Prevent chemical cleaning solutions from coming into contact with people, motor vehicles, landscaping, buildings, and other surfaces that could be harmed by such contact.

1. Cover adjacent surfaces with materials that are proven to resist chemical cleaners used unless chemical cleaners being used will not damage adjacent surfaces. Use materials that contain only waterproof, UV-resistant adhesives. Apply masking agents to comply with manufacturer's written instructions. Do not apply liquid masking agent to painted or porous surfaces. When no longer needed, promptly remove masking to prevent adhesive staining.
2. Keep wall wet below area being cleaned to prevent streaking from runoff.
3. Do not clean stone during winds of sufficient force to spread cleaning solutions to unprotected surfaces.
4. Neutralize and collect alkaline and acid wastes for disposal off Owner's property.
5. Dispose of runoff from cleaning operations by legal means and in a manner that prevents soil erosion, undermining of paving and foundations, damage to landscaping, and water penetration into building interiors.

C. Prevent mortar from staining face of surrounding stone and other surfaces.

1. Cover sills, ledges, and projections to protect from mortar droppings.
2. Keep wall area wet below rebuilding and pointing work to discourage mortar from adhering.
3. Immediately remove mortar in contact with exposed stone and other surfaces.
4. Clean mortar splatters from scaffolding at end of each day.
5. Provide temporary rain drainage during work to direct water away from building.

3.3 UNUSED ANCHOR REMOVAL

A. Remove stone anchors, brackets, wood nailers, and other extraneous items no longer in use unless identified as historically significant or indicated to remain.

1. Remove items carefully to avoid spalling or cracking stone.
2. Where directed, if an item cannot be removed without damaging surrounding stone, do the following:
   a. Cut or grind off item approximately **3/4 inch** beneath surface and core drill a recess of same depth in surrounding stone as close around item as practical.
   b. Immediately paint exposed end of item with two coats of antirust coating, following coating manufacturer's written instructions and without exceeding manufacturer's recommended dry film thickness per coat. Keep paint off sides of recess.
3. Patch the hole where each item was removed unless directed to remove and replace the stone unit.

3.4 CLEANING STONE, GENERAL

A. See Specification Section 04 4930 for cleaning execution notes.

3.5 PARTIAL STONE REPLACEMENT

A. Stone replacement is not encouraged. The Secretary of the Interior's Standards requires repair over replacement unless stone deterioration is severe enough to justify replacement.

B. At locations indicated, remove stone that has deteriorated or is damaged beyond repair or is to be reused. Carefully demolish or remove entire units from joint to joint, without damaging surrounding stone, in a manner that permits replacement with full-size units.

C. Remove defective portion of existing stone unit (backing stone). Carefully remove defective portion of stone by making vertical and horizontal saw cuts at face of backing stone and demolishing defective material to depth required for fitting partial replacement (dutchman).

1. Make edges of backing stone at cuts smooth and square to each other and to finished surface; essentially rectangular. Make back of removal area flat and parallel to stone face.
2. Do not overcut at corners and intersections. Hand trim to produce clean sharp corners with no rounding and no damage to existing work to remain.
3. If existing stone that is to remain becomes damaged, remove damaged area and enlarge partial replacement as required.

D. Remove mortar from joints that abut area of stone removal to same depth as stone was removed. Remove loose mortar particles and other debris from surfaces to be bonded and surfaces of adjacent stone units that will receive mortar by cleaning with stiff-fiber brush.

E. Cut and trim partial replacement to accurately fit area where material was removed from backing stone. Fabricate to size required to produce joints between partial replacement and backing stone of no more than 1/16 inch in width, and joints between partial replacement and other stones that match existing joints between stones.

F. Concealed Pinning: Before applying adhesive, prepare for concealed mechanical anchorage consisting of 1/4-inch- diameter, threaded stainless-steel pins set into 1/4-inch- diameter holes drilled into backing stone and into, but not through, the partial replacement. Center and space pins between 3 and 5 inches apart and at least 2 inches from any edge. Insert pins at least 2 inches into backing stone and 2 inches into partial replacement, but no closer than 3/4 inch from exposed face of partial replacement.

G. Apply stone-to-stone adhesive to comply with adhesive manufacturer's written instructions. Coat bonding surfaces of backing stone and partial replacement, completely filling all crevices and voids.

H. Apply partial replacement while adhesive is still tacky and hold securely in place until adhesive has cured. Use shims, clamps, wedges, or other devices as necessary to align face of partial replacement with face of backing stone.

I. Clean adhesive residue from exposed surfaces and patch chipped areas.

3.6 STONE PATCHING

A. Patch the following stone units unless another type of replacement or repair is indicated:

1. Units indicated to be patched.

2. Units with holes.
3. Units with small areas of deep deterioration.

B. Remove and replace failing existing patches unless otherwise indicated or approved by Owner's Representative.

C. Remove deteriorated material and remove adjacent material that has begun to deteriorate. Carefully remove additional material so patch will not have feathered edges but will have square or slightly undercut edges on area to be patched and will be at least 1/4 inch thick, but not less than recommended by patching compound manufacturer.

D. Mask adjacent mortar joint or rake out for repointing if patch will extend to edge of stone unit.

E. Mix patching compound in individual batches to match each stone unit being patched. Combine one or more colors of patching compound, as needed, to produce exact match.

F. Brush-coat stone surfaces with slurry coat of patching compound according to manufacturer's written instructions.

G. Place patching compound in layers as recommended by patching compound manufacturer, but not less than 1/4 inch or more than 2 inches thick. Roughen surface of each layer to provide a key for next layer.

1. Trowel, scrape, or carve surface of patch to match texture and surrounding surface plane or contour of the stone. Shape and finish surface before or after curing, as determined by testing, to best match existing stone.

H. Keep each layer damp for 72 hours or until patching compound has set.

I. Remove and replace patches with hairline cracks or that show separation from stone at edges, and those that do not match adjoining stone in color or texture.

3.7 REPOINTING STONEWORK

A. Rake out and repoint joints to the following extent:
1. Joints where mortar is missing or where they contain holes.
2. Cracked joints where cracks can be penetrated at least 1/4 inch by a knife blade 0.010 inch thick.
3. Cracked joints where cracks are 1/32 inch or more in width and of any depth.
4. Joints where they sound hollow when tapped by metal object.
5. Joints where they are worn back 1/8 inch or more from surface.
6. Joints where they are deteriorated to point that mortar can be easily removed by hand, without tools.
7. Joints where they have been filled with substances other than mortar.
8. Joints indicated as sealant-filled joints.

B. Do not rake out and repoint joints where not required.

C. Rake out joints as follows, according to procedures demonstrated in approved mockup:

1. Remove mortar from joints to depth of 2 times joint width, but not less than 1/2 inch or not less than that required to expose sound, unweathered mortar.
2. Remove mortar from stone surfaces within raked-out joints to provide reveals with square backs and to expose stone for contact with pointing mortar. Brush, vacuum, or flush joints to remove dirt and loose debris.

3. Do not spall edges of stone units or widen joints. Replace or patch damaged stone units as directed by Owner's Representative.

    a. Cut out mortar by hand with chisel and resilient mallet. Do not use power-operated grinders without Owner's Representative's written approval based on approved quality-control program.

D. Notify Owner's Representative of unforeseen detrimental conditions including voids in mortar joints, cracks, loose stone, rotted wood, rusted metal, and other deteriorated items.

E. Pointing with Mortar:

1. Rinse joint surfaces with water to remove dust and mortar particles. Time rinsing application so, at time of pointing, joint surfaces are damp but free of standing water. If rinse water dries, dampen joint surfaces before pointing.
2. Apply pointing mortar first to areas where existing mortar was removed to depths greater than surrounding areas. Apply in layers not greater than 3/8 inch until a uniform depth is formed. Fully compact each layer thoroughly and allow it to become thumbprint hard before applying next layer.
3. After low areas have been filled to same depth as remaining joints, point all joints by placing mortar in layers not greater than 3/8 inch. Fully compact each layer and allow to become thumbprint hard before applying next layer. Where existing stone has worn or rounded edges, slightly recess finished mortar surface below face of stone to avoid widened joint faces. Take care not to spread mortar beyond joint edges onto exposed stone surfaces or to featheredge the mortar.
4. When mortar is thumbprint hard, tool joints to match original appearance of joints as demonstrated in approved mockup. Remove excess mortar from edge of joint by brushing.
5. Cure mortar by maintaining in thoroughly damp condition for at least 72 consecutive hours, including weekends and holidays.

    a. Acceptable curing methods include covering with wet burlap and plastic sheeting, periodic hand misting, and periodic mist spraying using system of pipes, mist heads, and timers.
    b. Adjust curing methods to ensure that pointing mortar is damp throughout its depth without eroding surface mortar.

6. Hairline cracking within the mortar or mortar separation at edge of a joint is unacceptable. Completely remove such mortar and repoint.

F. Where repointing work precedes cleaning of existing stone, allow mortar to harden at least 30 days before beginning cleaning work.

3.8 FINAL CLEANING

A. After mortar has fully hardened, thoroughly clean exposed stone surfaces of excess mortar and foreign matter; use wood scrapers, stiff-nylon or -fiber brushes, and clean water, spray applied at low pressure.

1. Do not use metal scrapers or brushes.
2. Do not use acidic or alkaline cleaners.

B. Sweep and rake adjacent surfaces to remove mortar and debris. Where necessary, pressure wash pavement surfaces to remove mortar, dust, dirt, and stains.

3.9 FIELD QUALITY CONTROL

A. Inspectors: Owner will engage qualified independent inspectors to perform inspections and prepare test reports. Allow inspectors use of lift devices and scaffolding, as needed, to perform inspections.

B. Notify inspectors in advance of times when lift devices and scaffolding will be relocated. Do not relocate lift devices and scaffolding until inspectors have had reasonable opportunity to make inspections of work areas at lift device or scaffold location.

END OF SECTION 04 0140

SECTION 04 2200 - CONCRETE UNIT MASONRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Concrete masonry units (CMU's).
2. Steel reinforcing bars.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: For reinforcing steel. Detail bending and placement of unit masonry reinforcing bars. Comply with ACI 315, "Details and Detailing of Concrete Reinforcement."

C. Samples: For each type and color of exposed masonry unit.

1.3 INFORMATIONAL SUBMITTALS

A. Material Certificates: For each type and size of product indicated. For masonry units include material certificates substantiating compliance with requirements.

B. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.

1. Include test reports for mortar mixes required to comply with property specification. Test according to ASTM C 109/C 109M for compressive strength, ASTM C 1506 for water retention, and ASTM C 91 for air content.
2. Include test reports, according to ASTM C 1019, for grout mixes required to comply with compressive strength requirement.

1.4 QUALITY ASSURANCE

A. Masonry Standard: Comply with ACI 530.1/ASCE 6/TMS 602 unless modified by requirements in the Contract Documents.

1.5 PROJECT CONDITIONS

A. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

PART 2 - PRODUCTS

2.1 MASONRY UNITS, GENERAL

A. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated in the standard. Do not use units where such defects will be exposed in the completed Work.

2.2 CONCRETE MASONRY UNITS

A. Regional Materials: CMUs shall be manufactured within 500 miles (800 km) of Project site from aggregates and cement that have been extracted, harvested, or recovered, as well as manufactured, within 500 miles (800 km) of Project site.

B. Shapes: Provide shapes indicated and for lintels, corners, jambs, movement joints, headers, bonding, and other special conditions.

C. CMUs: ASTM C 90.

1. Unit Compressive Strength: As indicated.
2. Density Classification: As indicated.

2.3 MORTAR AND GROUT MATERIALS

A. Regional Materials: Aggregate for mortar and grout, and lime shall be extracted, harvested, or recovered, as well as manufactured, within 500 miles of Project site.

B. Portland Cement: ASTM C 150, Type I or II,. Provide natural color.

C. Hydrated Lime: ASTM C 207, Type S.

D. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.

E. Aggregate for Mortar: ASTM C 144.

F. Water: Potable.

2.4 REINFORCEMENT

A. Uncoated Steel Reinforcing Bars: ASTM A 615/A 615M Grade 60.

2.5 TIES AND ANCHORS

A. Partition Top anchors: As indicated.

1. Corrosion Protection: Hot-dip galvanized to comply with ASTM A 153/A 153M.

B. Anchor Bolts: As indicated..

2.6 MISCELLANEOUS MASONRY ACCESSORIES

A. Compressible Filler: Premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; formulated from neoprene.

2.7 MORTAR AND GROUT MIXES

A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.

1. Do not use calcium chloride in mortar or grout.
2. Use portland cement-lime mortar unless otherwise indicated.

B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.

C. Mortar for Unit Masonry: ASTM C 270, Type S.

D. Grout for Unit Masonry: ASTM C 476.

1. Use grout of type (fine or coarse) that will comply with Table 1.15.1 in ACI 530.1/ASCE 6/TMS 602 for dimensions of grout spaces and pour height.
2. Proportion grout in accordance with ASTM C 476, for specified 28-day compressive strength indicated.
3. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C 143/C 143M.

PART 3 - EXECUTION

3.1 TOLERANCES

A. Dimensions and Locations of Elements:

1. For dimensions in cross section or elevation do not vary by more than plus 1/2 inch or minus 1/4 inch.
2. For location of elements in plan do not vary from that indicated by more than plus or minus 1/2 inch.
3. For location of elements in elevation do not vary from that indicated by more than plus or minus 1/4 inch.

B. Lines and Levels:

1. For bed joints and top surfaces of bearing walls do not vary from level by more than 1/4 inch in 10 feet, or 1/2 inch maximum.

2. For conspicuous horizontal lines, such as lintels, sills, and reveals, do not vary from level by more than 1/8 inch in 10 feet.
3. For vertical lines and surfaces do not vary from plumb by more than 1/4 inch in 10 feet.
4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet.

C. Joints:

1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch.
2. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch or minus 1/4 inch.
3. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch.

3.2 LAYING MASONRY WALLS

A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.

B. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

C. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond; do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.

D. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.

E. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below and rod mortar or grout into core.

F. Fill cores in hollow CMUs solid with grout.

3.3 MORTAR BEDDING AND JOINTING

A. Lay hollow CMUs as follows:

1. With face shells fully bedded in mortar and with head joints of depth equal to bed joints.
2. With webs fully bedded in mortar.

B. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.

C. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint) unless otherwise indicated.

3.4 REINFORCED UNIT MASONRY INSTALLATION

A. Placing Reinforcement: Comply with requirements in ACI 530.1/ASCE 6/TMS 602.

B. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.

1. Comply with requirements in ACI 530.1/ASCE 6/TMS 602 for cleanouts and for grout placement, including minimum grout space and maximum pour height.

3.5 FIELD QUALITY CONTROL

A. Testing and Inspecting: Owner will engage special inspectors to perform tests and inspections and prepare reports. Allow inspectors access to scaffolding and work areas, as needed to perform tests and inspections. Retesting of materials that fail to meet specified requirements shall be done at Contractor's expense.

B. Inspections: as indicated in the Statement of Special Inspections.

1. Begin masonry construction only after inspectors have verified proportions of site-prepared mortar.
2. Place grout only after inspectors have verified compliance of grout spaces and of grades, sizes, and locations of reinforcement.
3. Place grout only after inspectors have verified proportions of site-prepared grout.

C. Testing Frequency: One set of tests for each 5000 sq. ft. of wall area or portion thereof.

D. Concrete Masonry Unit Test: For each type of unit provided, according to ASTM C 140 for compressive strength.

E. Mortar Test: For each mix provided, according to ASTM C 780. Test mortar for compressive strength.

F. Grout Test (Compressive Strength): For each mix provided, according to ASTM C 1019.

3.6 REPAIRING, POINTING, AND CLEANING

A. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.

B. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:

1. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes.
2. Clean concrete masonry by cleaning method indicated in NCMA TEK 8-2A applicable to type of stain on exposed surfaces.

3.7 MASONRY WASTE DISPOSAL

A. Waste Disposal as Fill Material: If approved by the Geotechnical Engineer, dispose of clean masonry waste, including excess or soil-contaminated sand, waste mortar, and broken masonry units, by crushing and mixing with fill material as fill is placed.

1. Do not dispose of masonry waste as fill within 18 inches of finished grade.

B. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above, and other masonry waste, and legally dispose of off Owner's property.

END OF SECTION 04 2200

SECTION 04 4200 - EXTERIOR STONE CLADDING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Dimension stone panels set with individual anchors.
2. Dimension stone trim units, including bands, copings, sills, jambs, and soffits.

B. Related Requirements:

1. Section 04 43 00 "Adhered Stone Veneer" for setting dimension stone adhered to walls.

1.2 ACTION SUBMITTALS

A. Product Data: For each variety of stone, stone accessory, and manufactured product.

B. Shop Drawings: Show fabrication and installation details for dimension stone cladding assembly, including dimensions and profiles of stone units.

1. Show locations and details of joints both within dimension stone cladding assembly and between dimension stone cladding assembly and other construction.
2. Show locations and details of anchors.
3. Show direction of veining, grain, or other directional pattern.

C. Stone Samples: Sets for each variety, color, and finish of stone required; not less than 12 inches (300 mm) square.

D. Colored Pointing Mortar Samples: For each color required.

E. Sealant Samples: For each type and color of joint sealant required.

F. Delegated-Design Submittal: For dimension stone cladding assembly.

1.3 INFORMATIONAL SUBMITTALS

A. Material Test Reports:

1. Stone Test Reports: For each stone variety proposed for use on Project, by a qualified testing agency, indicating compliance with required physical properties, other than abrasion resistance, according to referenced ASTM standards. Base reports on testing done within previous five years.

B. Preconstruction test reports.

C. Source quality-control reports.

1.4 QUALITY ASSURANCE

A. Testing Agency Qualifications: Qualified according to ASTM E 329 for testing indicated.

B. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Build mockups of typical exterior wall not less than 10 feet (3 m) long by 8 feet (2.4 m) high.

1.5 PRECONSTRUCTION TESTING

A. Preconstruction Stone Testing: Engage a qualified independent testing agency to perform preconstruction testing.

1. Furnish test specimens that are representative of materials proposed for incorporation into the Work.
2. Physical Property Tests: For each stone variety proposed for use on Project, tested for compliance with physical property requirements, other than abrasion resistance, according to referenced ASTM standards.
3. Flexural Strength Tests: For each combination of stone variety, thickness, orientation of cut, and finish, proposed for use on Project, tested according to ASTM C 880/C 880M, in both wet and dry conditions.
4. Anchorage Tests: For each combination of stone variety, orientation of cut, finish, and anchor type proposed for use on Project, tested according to ASTM C 1354/C 1354M.

1.6 FIELD CONDITIONS

A. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Remove and replace dimension stone cladding damaged by frost or freezing conditions. Comply with cold-weather construction and protection requirements for masonry contained in ACI 530.1/ASCE 6/TMS 602.

B. Hot-Weather Requirements: Comply with hot-weather construction and protection requirements for masonry contained in ACI 530.1/ASCE 6/TMS 602.

C. Environmental Limitations for Sealants: Do not install sealants when ambient and substrate temperatures are outside limits permitted by sealant manufacturer or below 40 deg F (5 deg C) or when joint substrates are wet.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations for Stone: Obtain each variety of stone, regardless of finish, from single quarry.

2.2 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer to design dimension stone cladding assembly.

B. General: Design stone anchors and anchoring systems according to ASTM C 1242.

1. Stone anchors shall withstand not less than two times the weight of the stone cladding in both compression and tension.

C. Structural Performance: Dimension stone cladding assembly shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:

1. Wind Loads: As indicated on structural drawings.
2. Equipment Loads: Allow for loads due to window cleaning and maintenance equipment.

D. Seismic Performance: Dimension stone cladding assembly shall withstand the effects of earthquake motions determined according to ASCE/SEI 7 .

1. Component Importance Factor: 1.0.

E. Safety Factors for Stone: Design dimension stone cladding assembly to withstand loads indicated without exceeding stone's allowable working stress determined by dividing stone's average ultimate strength, as established by testing, by the following safety factors:

1. Safety Factor for Oolitic Limestone: 8.
2. Safety Factor for Dolomitic Limestone: 6.

2.3 LIMESTONE

A. Material Standard: Comply with ASTM C 568.

1. Classification: II Medium-Density except as follows: absorption, 2.5 percent by weight maximum; density, 150 lb/cu. ft. (2400 kg/cu. m) minimum; compressive strength, 14,000 psi (96 MPa) minimum; and flexural strength 2,000 psi (14 MPa) minimum.

B. Varieties and Sources: Subject to compliance with requirements, provide the following:

1. Kinaro Tan Limestone Split-Faced and Lychee finish, supplier: Nelson Architectural, Inc. PH 971.255.0962., or Dromedary Limestone Split-Faced and Lychee finish, supplier: Arris Stoneworks, Inc. PH: 206.370.0000, or Aurelia Limestone Light Lychee and Sandblasted finishes, supplier: Yellow Mountain Stoneworks PH: 206.932.5696

C. Match Architect's samples for color, finish, and other stone characteristics relating to aesthetic effects.

D. Thickness: 5 cm.

2.4 ANCHORS AND FASTENERS

A. Fabricate anchors, including shelf angles, from stainless steel, ASTM A 240/A 240M or ASTM A 666, Type 316; temper as required to support loads imposed without exceeding allowable design stresses. Fabricate dowels and pins for anchors from stainless steel, ASTM A 276, Type 316.

B. Cast-in-Place Concrete Inserts: Either threaded or wedge type unless otherwise indicated; galvanized ferrous castings, either ASTM A 47/A 47M malleable iron or ASTM A 27/A 27M cast steel, with capability to sustain, without failure, a load equal to 4 times the loads imposed as determined by testing per ASTM E 488, conducted by a qualified independent testing agency. Provide bolts, washers, and shims as needed, all hot-dip galvanized per ASTM F 2329.

C. Postinstalled Anchor Bolts for Concrete and Masonry: Chemical anchors, torque-controlled expansion anchors, or undercut anchors made from stainless-steel components complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2 (ASTM F 738M and ASTM F 836M, Alloy Group A1 or A4) for bolts and nuts; ASTM A 240/A 240M, ASTM A 276, or ASTM A 666, Type 304 or 316, for anchors, with capability to sustain, without failure, a load equal to 4 times the loads imposed, for concrete, or 6 times the load imposed, for masonry, as determined by testing per ASTM E 488, conducted by a qualified independent testing agency.

D. Threaded Fasteners: Heavy hexagon structural bolts, heavy hexagon nuts, and hardened washers.

1. For stainless steel, use annealed stainless-steel bolts, nuts, and washers; for bolts, ASTM F 593 (ASTM F 738M); and for nuts, ASTM F 594 (ASTM F 836M), Alloy Group 1 (A1).

E. Weld Plates for Installation in Concrete: Comply with Section 05 50 00 "Metal Fabrications."

2.5 MORTAR MATERIALS

A. Portland Cement: ASTM C 150, Type I or Type II, except Type III may be used for cold-weather construction, natural color or white as required to produce mortar color indicated.

1. Low-Alkali Cement: Portland cement for use with limestone shall contain not more than 0.60 percent total alkali when tested according to ASTM C 114.

B. Hydrated Lime: ASTM C 207.

C. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes and complying with ASTM C 979. Pigments shall have a record of satisfactory performance in mortar.

D. Aggregate: ASTM C 144; except forpointing mortar, 100 percent shall pass No. 16 (1.18-mm) sieve.

E. Water: Potable.

2.6 STONE ACCESSORIES

A. Setting Shims: Strips of resilient plastic or vulcanized neoprene, Type A Shore durometer hardness of 50 to 70, nonstaining to stone, of thickness needed to prevent point loading of stone on anchors and of depths to suit anchors without intruding into required depths of pointing materials.

B. Concealed Sheet Metal Flashing: Fabricated from stainless steel in thicknesses indicated, but not less than 0.0156 inch (0.4 mm) thick, and complying with Section 076200 "Sheet Metal Flashing and Trim."

C. Cementitious Dampproofing for Limestone: Cementitious formulation recommended by ILI and nonstaining to stone; compatible with joint sealants and noncorrosive to anchors and attachments.

D. Weep and Vent Tubes: Medium-density polyethylene tubing, 1/4-inch (6-mm) OD, of length required to extend from exterior face of stone to cavity behind.

E. Cellular Plastic Weep Hole/Vents: One-piece, flexible extrusion made from UV-resistant polypropylene copolymer, of length required to extend from exterior face of stone to cavity behind, in color selected from manufacturer's standard.

F. Mesh Weep/Vent: Free-draining mesh; made from polyethylene strands, of length required to extend from exterior face of stone to cavity behind, in color selected from manufacturer's standard.

G. Sealants for Joints in Dimension Stone Cladding: Manufacturer's standard chemically curing, elastomeric sealants of base polymer indicated below that comply with applicable requirements in Section 07 92 00 "Joint Sealants" and do not stain stone:
   1. Urethane joint sealant.
   2. Preformed foam joint sealant.

H. Sealant for Filling Kerfs: Same sealant used for joints in dimension stone.

2.7 STONE FABRICATION

A. Control stone and back check to maintain minimum clearance of 1 inch (25 mm) between backs of stone units and surfaces or projections of structural members, backup walls, and other work behind stone.

B. Dress joints (bed and vertical) straight and at right angle to face unless otherwise indicated. Shape beds to fit supports.

C. Finish exposed faces and edges of stone to comply with requirements indicated for finish and to match approved samples and mockups.

D. Cut stone to produce uniform joints as indicated.

E. Contiguous Work: Provide chases, reveals, reglets, openings, and similar features as required to accommodate contiguous work.

F. Fabricate molded work, including washes and drips, to produce stone shapes with a uniform profile throughout entire unit length, with precisely formed arris slightly eased to prevent snipping, and with matching profile at joints between units.

2.8 MORTAR MIXES

A. General: Comply with referenced standards and with manufacturers' written instructions. Do not use admixtures unless otherwise indicated.

B. Portland Cement-Lime Setting Mortar: Comply with ASTM C 270, Proportion Specification, Type N.

C. Pointing Mortar: Comply with ASTM C 270, Proportion Specification, Type N.

PART 3 - EXECUTION

3.1 SETTING DIMENSION STONE CLADDING, GENERAL

A. Coat limestone with dampproofing to extent indicated below:

1. Stone at Grade: Beds, joints, and back surfaces to at least 12 inches (300 mm) above finish-grade elevations.
2. Stone Extending Below Grade: Beds, joints, back surfaces, and face surfaces below grade.

B. Execute dimension stone cladding installation by skilled mechanics and employ skilled stone fitters at Project site to do necessary field cutting as stone is set. Use power saws with diamond blades to cut stone.

C. Set stone to comply with requirements indicated. Install anchors, supports, fasteners, and other attachments indicated or necessary to secure dimension stone cladding in place. Shim and adjust anchors, supports, and accessories to set stone accurately in locations

indicated, with uniform joints of widths indicated, and with edges and faces aligned according to established relationships and indicated tolerances.

D. Provide expansion, control, and pressure-relieving joints of widths and at locations indicated.

1. Sealing expansion and other joints is specified in Section 079200 "Joint Sealants."

E. Install concealed flashing at continuous shelf angles, lintels, ledges, and similar obstructions to downward flow of water, to divert water to building exterior. Extend flashing 6 inches (150 mm) at ends and turn up not less than 2 inches (50 mm) to form end dams.

F. Keep cavities open where unfilled space is indicated between back of stone units and backup wall; do not fill cavities with mortar or grout.

1. Place weep holes in joints where moisture may accumulate, including at base of cavity walls and above shelf angles and flashing. Locate weep holes at intervals not exceeding 24 inches (600 mm).
2. Place vents in cavity walls at tops of cavities, below shelf angles and flashing, and at intervals not exceeding 20 feet (6 m) vertically. Locate vents in joints at intervals not exceeding 60 inches (1500 mm) horizontally.

3.2 SETTING MECHANICALLY ANCHORED DIMENSION STONE CLADDING

A. Attach anchors securely to stone and to backup surfaces. Comply with recommendations in ASTM C 1242.

B. Provide compressible filler in ends of dowel holes and bottoms of kerfs to prevent end bearing of dowels and anchor tabs on stone. Fill remainder of anchor holes and kerfs with sealant indicated for filling kerfs.

C. Set stone supported on clips or continuous angles on resilient setting shims. Use material of thickness required to maintain uniform joint widths and to prevent point loading of stone on anchors. Hold shims back from face of stone a distance at least equal to width of joint.

D. Point stone joints by placing pointing mortar in layers not more than 3/8 inch (10 mm). Compact each layer thoroughly and allow to become thumbprint hard before applying next layer.

E. Tool joints for a “weathered” joint, when pointing mortar is thumbprint hard.

3.3 JOINT-SEALANT INSTALLATION

A. Prepare joints and apply sealants of type and at locations indicated to comply with applicable requirements in Section 07 92 00 "Joint Sealants."

3.4 INSTALLATION TOLERANCES

A. Variation from Plumb: For vertical lines and surfaces of walls, do not exceed 1/4 inch in 10 feet (6 mm in 3 m), 3/8 inch in 20 feet (10 mm in 6 m), or 1/2 inch in 40 feet (12 mm in 12 m) or more. For external corners, corners and jambs within 20 feet (6 m) of an entrance, expansion joints, and other conspicuous lines, do not exceed 1/8 inch in 10 feet (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 3/8 inch in 40 feet (10 mm in 12 m) or more.

B. Variation from Level: For lintels, sills, water tables, parapets, horizontal bands, horizontal grooves, and other conspicuous lines, do not exceed 1/8 inch in 10 feet (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 3/8 inch (10 mm) maximum.

C. Variation of Linear Building Line: For positions shown in plan and related portions of walls and partitions, do not exceed 1/4 inch in 20 feet (6 mm in 6 m) or 1/2 inch in 40 feet (12 mm in 12 m) or more.

D. Variation in Joint Width: Do not vary from average joint width more than plus or minus 1/8 inch (3 mm) or a quarter of nominal joint width, whichever is less. For joints within 60 inches (1500 mm) of each other, do not vary more than 1/8 inch (3 mm) or a quarter of nominal joint width, whichever is less from one to the other.

E. Variation in Plane between Adjacent Stone Units (Lipping): Do not exceed 1/16-inch (1.5-mm) difference between planes of adjacent units.

3.5 ADJUSTING AND CLEANING

A. In-Progress Cleaning: Clean dimension stone cladding as work progresses. Remove mortar fins and smears before tooling joints. Remove excess sealant and smears as sealant is installed.

B. Final Cleaning: Clean dimension stone cladding no fewer than six days after completion of pointing and sealing, using clean water and stiff-bristle fiber brushes. Do not use wire brushes, acid-type cleaning agents, cleaning agents containing caustic compounds or abrasives, or other materials or methods that could damage stone.

END OF SECTION 04 4200

SECTION 04 4300 - ADHERED STONE VENEER

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Dimension stone veneer and related setting materials adhered to walls.

B. Related Requirements:

1. Section 04 42 00 "Exterior Stone Cladding" for setting dimension stone with individual anchors to walls.
2. Section 03 30 00 “Cast-in-Place Concrete” for concrete footings, concrete substrates and walls.
3. Section 09 96 00 “Graffiti Resistant Coatings” for coating to be applied to stone.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include brand, type, and name of manufacturer.

B. Shop Drawings: Show fabrication and installation details for dimension stone, including dimensions and profiles of stone units. Provide all shop drawings in English and with all dimensioning in Standard (not metric) units of measurement.

1. Show locations and details of joints both within dimension stone veneer assembly and between dimension stone veneer assembly and other construction.

C. Samples: Show direction of veining, grain, or other directional pattern.:

1. Each type of stone veneer in each finish required.
2. Assembled Samples with grouted joints for each type of stone and for each finish required.

D. Mortar and grout additives. Provide test reports indicating additives have been tested with stone pavers for compatibility and adhesion. Include recommendations for installation practices to obtain desired adhesion.

1.3 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match and are from same production runs as products installed and that are packaged with protective covering and identified with labels describing contents.

1. Dimension Stone: Furnish quantity of full-size units equal to 3 percent of amount installed, for each type, composition, color, pattern, and size indicated.

1.4 QUALITY ASSURANCE

A. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Build mockup of each type of stone wall installation.
2. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

B. Provide stone mason who is familiar with the materials and methods of installation on this project, has 12 years minimum experience with similar projects and has achieved a high level of workmanship previously performed on similar projects.

C. Stone masons shall specialize in stone masonry only. Brick and concrete block masons are not acceptable for this Work.

1.5 PROJECT CONDITIONS

A. Protection of Stone Masonry: During construction, cover tops of walls, projections, and wall caps with waterproof sheeting at end of each day's work. Cover partially completed stone masonry when construction is not in progress.

1. Extend cover a minimum of 24 inches down both sides and hold cover securely in place.

B. B.Stain Prevention: Immediately remove mortar and soil to prevent them from staining the face of stone masonry.

1. Protect base of walls from rain-splashed mud and mortar splatter by coverings spread on the ground and over the wall surface.
2. Protect wall caps, ledges, and projections from mortar droppings.
3. Turn scaffold boards near the wall on edge at end of each day to prevent rain from splashing mortar and dirt on completed stone masonry.

PART 2 - PRODUCTS

2.1 STONE PRODUCTS

A. Source Limitations for Stone: Obtain each variety of stone, regardless of finish, from single quarry.

2.2 LIMESTONE

A. Material Standard: Comply with ASTM C 568.

B. Classification: II Medium-Density except as follows: absorption, 2.5 percent by weight maximum; density, 150 lb/cu. ft. (2400 kg/cu. m) minimum; compressive strength, 14,000 psi (96 MPa) minimum; and flexural strength 2,000 psi (14 MPa) minimumVarieties and Sources: Subject to compliance with requirements, provide the following:

1. Kinaro Tan Limestone Light Lychee and Sandblasted finishes, supplier: Nelson Architectural, Inc. PH 971.255.0962., or Dromedary Limestone Light Lychee and Sandblasted finishes, supplier: Arris Stoneworks, Inc. PH: 206.370.0000, or Aurelia Limestone Light Lychee and Sandblasted finishes, supplier: Yellow Mountain Stoneworks PH: 206.932.5696

C. Match Architect's samples for color, finish, and other stone characteristics relating to aesthetic effects.

D. Thickness: 1 inch

2.3 SETTING MATERIALS

A. Dry-Set Portland Cement Mortar (Thin Set): ANSI A118.1.

1. For wall applications, provide nonsagging mortar.

B. Latex-Portland Cement Mortar (Thin Set): ANSI A118.4.

1. For wall applications, provide nonsagging mortar.

C. Water-Cleanable, Tile-Setting Epoxy: ANSI A118.3 with a VOC content of 65 g/L or less when calculated according to 40 CFR 59, Subpart D.

2.4 GROUT MATERIALS

A. Sand-Portland Cement Grout: ANSI A108.10.

B. Standard Cement Grout: ANSI A118.6.

C. Polymer-Modified Tile Grout: ANSI A118.7.

D. Water-Cleanable Epoxy Grout: ANSI A118.3, with a VOC content of 65 g/L or less when calculated according to 40 CFR 59, Subpart D.

2.5 ELASTOMERIC SEALANTS

A. General: Provide sealants, primers, backer rods, and other sealant accessories that comply with the applicable requirements in Section 07 92 00 "Joint Sealants" and that do not stain stone.

2.6 MISCELLANEOUS MATERIALS

A. Trowelable Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of stone-setting materials for installations indicated.

B. B.Corrugated-Metal Masonry Anchors: Not less than 0.030-inch thick by 7/8-inch wide hot-dip galvanized steel sheet with corrugations having a wavelength of 0.3 to 0.5 inch and amplitude of 0.06 to 0.10 inch.

2.7 FABRICATION

A. Facial Dimensions of Stone with Sandblasted Faces: Do not vary facial dimensions from specified dimensions by more than plus or minus 1/64 inch (0.4 mm).

B. Thickness of Stone with Sandblasted Finish: Do not vary from specified thickness by more than plus or minus 1/32 inch (0.8 mm).

C. Backs of Pieces: Gage units by dressing backs of pieces smooth and flat.

1. Clean backs of stone to remove rust stains and iron particles.

D. Finish exposed faces and edges of stone to comply with requirements indicated for finish and to match approved samples and mockups.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions where stone veneer will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of installed stone.

1. Verify that substrates for setting stone are firm, dry, clean, and free of coatings that are incompatible with tile-setting materials including curing compounds and other substances that contain soap, wax, oil, or silicone, and that they comply with flatness tolerances required by ANSI A108.01 for installations indicated.
2. Proceed with installation only after unsatisfactory conditions have been corrected to the satisfaction of the Owner's Representative.

3.2 PREPARATION

A. Fill cracks, holes, and depressions in concrete substrates for stone installed with thin-set mortar with trowelable patching compound specifically recommended by stone-setting material manufacturer.

B. Clean dirty or stained stone surfaces by removing soil, stains, and foreign materials before setting. Clean stone by thoroughly scrubbing with fiber brushes and then drenching with

clear water. Use only mild cleaning compounds that contain no caustic or harsh materials or abrasives.

C. Check alignment of supporting structure. Do not start unless horizontal and vertical surfaces are within 1/4 inch of dimensions indicated on the Drawings. Examine supporting structure and conditions under which masonry work is to be installed. Do not proceed until unsatisfactory conditions have been corrected to the satisfaction of the Owner's Representative. Dampen concrete surfaces receiving masonry.

D. Direct placing of dowels and inserts before concrete substrate is constructed. Coordinate location of piping, conduit, weep holes and other Work in masonry.

E. Install all bolts, anchors, sleeves, pipes, and other built-in items as masonry progresses. Device location, spacing and loading are subject to approval by Owner's Representative. Size and locations of openings not shown on Drawings are subject to approval of the Owner's Representative. Openings up to 6 inches in diameter may be drilled. No chipping of finished masonry permitted except as approved by Owner's Representative

3.3 INSTALLATION

A. Comply with TCA's "Handbook for Ceramic Tile Installation" for TCA installation methods specified in stone tile installation schedules. Comply with parts of the ANSI A108 Series "Specifications for Installation of Ceramic Tile" that are referenced in TCA installation methods specified in stone tile installation schedules, and apply to types of setting and grouting materials used.

B. Wipe backs of stone tiles with a damp cloth to remove dirt and dust before units are installed.

C. Extend stone veneer work into recesses and behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.

D. Accurately form intersections and returns. Perform cutting and drilling of stone without marring visible surfaces. Carefully grind cut edges of stone abutting trim, finish, or built-in items for straight aligned joints. Fit stone closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap stone.

E. Finish cut stone edges that will not be concealed by other construction by grinding and honing cut surfaces and beveling edges as detailed.

F. Jointing Pattern: Lay stone veneer in pattern indicated Provide uniform joint widths unless otherwise indicated.

G. Mix stone tiles to achieve a uniformly random distribution of color shadings and patterns.

H. Pattern Orientation: For stone varieties with directional pattern, orient pattern as indicated or as directed by Architect.

I. Expansion Joints: Provide expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated. Form joints during installation of setting materials, mortar beds, and stone . Do not saw-cut joints after installing stone.

1. Where joints occur in concrete substrates, locate joints in stone surfaces directly above them.

3.4 INSTALLATION OF ANCHORED STONE MASONRY

A. Anchor stone masonry to concrete with corrugated-metal veneer anchors unless otherwise indicated. Secure anchors by inserting dovetailed ends into dovetail slots in concrete.

B. Space anchors to provide not less than 1 anchor per 2 sq. ft. of wall area. Install additional anchors within 12 inches of openings, sealant joints, and perimeter at intervals not exceeding 12 inches.

C. Brush stone free of dust or foreign matter and thoroughly wash with clean water.

D. Set stone in full bed of mortar with full head joints unless otherwise indicated. Build anchors into mortar joints as stone is set. Mortar color shall be as specified and approved.

E. Dress joints as indicated on the drawings.

3.5 INSTALLATION TOLERANCES

A. Variation from Plumb: For vertical joints, external corners, and other conspicuous lines, do not exceed 1/8 inch in 8 feet (3 mm in 2.4 m).

B. Variation in Level: For horizontal joints and other conspicuous lines, do not exceed 1/8 inch in 10 feet (3 mm in 3 m), or 1/2 inch (12 mm) maximum.

C. Variation in Plane between Adjacent Units (Lipping): Do not exceed the following differences between faces of adjacent units as measured from a straightedge parallel to stone tiled surface:
1. Units with Honed Faces: 1/32 inch (0.8 mm).
2. Units with Lychee Faces: Depth of thermal finish or 3/16 inch (5 mm), whichever is less.

D. Variation in Joint Width: Do not vary joint thickness more than 1/16 inch (1.6 mm) or one-fourth of nominal joint width, whichever is less.

3.6 ADJUSTING AND CLEANING

A. Remove and replace material that is stained or otherwise damaged or that does not match adjoining stone tile. Provide new matching units, installed as specified and in a manner to eliminate evidence of replacement.

B. Cleaning: On completion of placement and grouting, clean stone tile surfaces so they are free of foreign matter.

C. After stone has dried completely, apply Graffiti Control to all exposed stone surfaces per manufacturer's recommendations and Section 09 9600.

END OF SECTION 04 4300

SECTION 04 4911 – CAST STONE CRACK REPAIR

PART 1 - GENERAL

1.1 SUMMARY

A. The work shall consist of providing all necessary labor, equipment, materials and supervision to repair cracks in cast stone masonry as follows:
   1. Prepare and inject cracks with epoxy where designated on the drawings.
   2. Prepare and inject observed cracks with epoxy exceeding .020 inches.
   3. Install mortar surface repairs where designated.

B. Related Sections:
   1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
   2. Section 01 3591 – Historic Treatment Procedures
   3. Section 04 0140 – Maintenance of Stone
   4. Section 04 8000 – Epoxy Anchors.
   5. Section 04 4930 – Masonry Cleaning.
   6. Section 07 7180 – Migrating Corrosion Inhibitor.
   7. Section 07 7190 – Liquid Water Repellant Coating

C. Related Documents
   1. Drawings and General Provisions of Contract, including General and Supplementary Provisions and other Division 1 Specifications Sections, apply to this Section.
   2. Standard Specifications for Public Works Construction (Greenbook) Current Edition.
   3. 2012 Standard Specifications for Public Works Construction (Whitebook)
   4. The Secretary of the Interior's Standards for the Treatment of Historic Properties (1995 Edition).This document contains *The Standards* which are Federal codified preservation standards.

1.2 REFERENCES

A. Titles, designations, dates of issue or revision of reference standards and documents shall be those in effect at the time bids are received, unless otherwise specified herein.

B. American Society for Testing and Materials Standards:
   1. Standard Test Method for Viscosity of Epoxy Resins and Related Components (ASTM D2393).
   2. Standard Test Method for Gel Time and Peak Exothermic Temperature of Reacting Thermosetting Resins (ASTM D2471).
   3. Standard Test Method for Flexural Strength of Concrete (Using Simple Beam with Third-Point Loading) (ASTM C78).
   4. Standard Test Method for Compressive Properties of Rigid Plastics (ASTM D695).

5. Standard Test Method for Deflection Temperature of Plastics Under Flexural Load (ASTM D648).
6. Standard Test Method for Tensile Properties of Plastics (ASTM D638).
7. Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials (ASTM D790).
8. Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (ASTM C109).

C. American Association of State Highway and Transportation Officials Test for Slant Shear Strength of Epoxy Bonding Agent (AASHTO 237).

1.3 SUBMITTALS

A. The Contractor shall submit the following to the Owner's Representative:
   1. Documentation showing Contractor meets the qualifications as specified.
   2. Technical data sheets for each epoxy product or formulation to be used showing that the products meet the requirements of the specifications. Technical data shall include:
      a. Intended use.
      b. Pot life (neat).
      c. Initial cure time (1000 psi).
      d. Tack free (thin film).
      e. Final cure (75% ultimate strength).
      f. Tensile strengths by ASTM D638 (14 days).
      g. Tensile elongation by ASTM D638 modified (14 days).
      h. Flexural strength and modulus per ASTM D790 at 24 hours, 3 days, and 7 days at 77 degrees F.
      i. 24-Hour compressive strength by ASTM C109 modified (1 part epoxy to 3-1/4 parts aggregate).

B. Surface Seal Material for Low Pressure Injection:
   1. Physical sample of surface seal material applied to a mortar tile. Apply sample, allow to set for 3 days, than remove half of the seal. Minimum length to be 12 inches.
   2. Technical data sheets for surface seal material.

1.4 QUALITY ASSURANCE

A. Contractor/Sub-Contractor Qualifications:
   1. Contractor performing this work must have relevant and documented five (5) years experience in the treatment of historic masonry similar in material, design, and extent to that indicated for this Project, whose work has resulted in a record of successful in-service performance.
   2. Supervisory personnel shall have not less than three continuous years experience in supervising the treatment of historic masonry. Apprentices shall be under the direct supervision of an experienced supervisor at all times.

3. A qualified superintendent/working foreman satisfactory to the Owner's Representative shall be kept at the project site at all times during the period when work is being performed.
4. The approved working foreman shall not be removed from the project without cause or without prior notification of the Owner's Representative. If removal is for cause, submit justification in writing within 48 hours of the removal. Work will cease until a new working foreman is on site, at no additional cost to the Owner.

B. Testing:
1. The Contractor shall comply with all testing requirements as applicable and established by the applicable Building Code and all other governing bodies.
2. Contractor shall bear the costs of independent special inspectors and testing as required.

C. Field Samples (Mock-up) required:
1. The Contractor shall prepare sample areas not less than 5 lineal feet of each crack repair type showing the method of preparation and installation for review and approval by the Owner's Representative.
2. Areas where samples are to be performed shall be selected by the Owner's Representative in consultation with the Contractor.
3. Sample areas shall include locations with ornate surface relief and areas with flat surfaces.
4. Additional samples shall be made until an acceptable result is achieved.
5. Do not proceed with the Work without prior approval of the samples.
6. Completed approved samples shall be protected during the Work and shall be the standard for all Work.

1.5 DELIVERY

A. Products shall be delivered and handled according to the manufacturer's recommendations.

B. Damaged, open containers shall not be used.

C. All labels shall clearly indicate:
1. Name of the manufacturer.
2. Manufacturer's product name or product number.
3. Manufacturer's lot number.
4. Mix ratio.
5. Conformance with the injection adhesive specification.
6. Hazardous material rating and appropriate warnings for handling.

1.6 SITE CONDITIONS

A. Existing and environmental conditions: The Contractor shall examine the condition of surfaces into which the epoxy is to be injected. The Contractor shall follow the recommendations of the manufacturer with regard to limitations of the materials in various and temperature levels.

B. See related work specified elsewhere for additional job conditions.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Epoxy for wide cracks (.05 to 0.25 inch):
   1. Concresive Standard LVI as manufactured by BASF.
   2. Sikadur Injection Gel as manufactured by Sika Corporation, Santa Fe, Springs, California.

B. Epoxy for narrow cracks (.005 to .020 inches):
   1. SBC Concresive 1350, 1360, or 1380 as manufactured by BASF
   2. Sikadur 52 or Sikadur 55 SLV as manufactured by Sika Corporation, Santa Fe Springs, California.

C. Surface Seal for Low Pressure Injection: Surface seal material shall not spall, stain, leave a residue nor otherwise mar the existing cast stone surface after it is removed. The surface seal shall not inhibit penetration of Migrating Corrosion Inhibitor or Liquid Water Repellant.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Following demo work, cleaning and removal of paint and sealants, inspect the entire fountain for cracks in all stone and concrete surfaces.

B. Number and catalogue all cracks exceeding .020 inches in width. Review all observed cracks with Owner’s Representative for direction.

C. Conduct a pre-injection meeting with the Owner’s Representative to evaluate all cracks identified in the crack inspection. Identify any conditions where reinforcing is exposed.

D. Cracks shall be repaired by one of two injection methods:
   1. High Pressure Epoxy Injection (wide cracks)
      a. Intent: High pressure epoxy injection is intended to fill the deeper-inner portions of wide cracks to block water migration and adhere surfaces.
      b. Use only for cracks designated to receive a mortar surface repair.
   2. Low Pressure Epoxy Injection (narrow cracks)
      a. Intent: Low-pressure epoxy injection is intended to fill the outer portions of narrow cracks to block water migration into the crack from the exterior surfaces.
      b. Mortar surface repair is not required.

3.2 HIGH PRESSURE EPOXY INJECTION

A. Preparation
1. Remove from the crack and from adjacent surfaces, all loose particles, deteriorated patching materials, or any substances which may interfere with the adhesive bond of the epoxy, mortar, or sealant, including dirt, organic materials, efflorescent salts and other contaminants.
2. Grind surface of crack to profile required for surface repair. **If surface repair is not required do not grind crack**. Blow cavity clean with compressed air.
3. Do not sandblast. Establish cleaning methods during installation of the sample areas.
4. If damaged or corroded reinforcing bars or structural steel is found during crack preparation, do not proceed with epoxy repair. Notify Owner's Representative for evaluation.

B. Epoxy Injection
1. Cracks less than 1/32-inch wide (0.03inch)(30 mils) are defined as "thin cracks" and shall be injected with a low-viscosity grade epoxy. Cracks greater than or equal to 1/32-inch wide are defined as "wide cracks" and shall be injected with a non-sagging grade epoxy.
2. Apply an adequate surface seal to the crack to prevent the escape the epoxy. Materials and procedures used for surface seal shall be as established by Owner's Representative approved sample panels. Surface seal shall be removable and shall not damage existing surface, nor have a cross sectional profile which exceeds that of the final surface finish. Maximum width of routed crack is 1/2 inch.
3. Establish entry ports along the crack. Fill crack with a 100 percent solid epoxy adhesive, forcing the adhesive into the crack at the first entry port with sufficient pressure to advance the epoxy to the adjacent port. Seal the original port and shift entry to the port at which the epoxy appears. Continue until crack has been injected over its entire length.
4. Pressure-inject epoxy using a two-component epoxy system with an in-line mixing and metering system. The system shall be capable of injection pressures sufficient to ensure complete penetration of the crack. Epoxy component proportions shall be as recommended by the manufacturer.
5. The epoxy shall be injected into cracks or joints only from the lower elevations of the cracks or joints. All surfaces of cracked members shall be sealed prior to injection, and shall contain appropriate injection ports.
6. The Contractor shall notify the Owner's Representative prior to the start of injection work.
7. In the event that unsound material is located in a zone along the crack, and this prevents complete injection, that unsound material shall be removed prior to injection.
8. The Contractor shall clean surfaces of injection ports, excess epoxy, and surface seal material. Unless noted otherwise, only the edge thickness of completed epoxied cracks shall be visible. No spray or injection ports shall extend beyond the plane of the surfaces of the masonry members. Surface of cast stone shall not be damaged by epoxy injection process.
9. Repair all delaminations or spalls caused by pressure injection by method approved by Owner's Representative.

C. Crack Surface Repair:
1. Rout crack to establish cross sectional profile of crack surface to accept mortar pointing.

2. Inject epoxy into crack
3. Remove injection surface seal without damaging substrate and remove residue from surface.
4. Remove all sealant and epoxy from sides of routed area before installing mortar.
5. Repoint per specification 04 0140 “Maintenance of Stone”.

3.3 LOW PRESSURE EPOXY INJECTION

A. General:
1. Use at all cracks where surface patching is not designated on the drawings.
2. Intent: Low-pressure epoxy injection is intended to fill the outer portions of narrow cracks to block water migration into the crack from the exterior surfaces.
3. **Do not route cracks to be injected using low-pressure epoxy injection**.

B. Preparation:
1. Remove all loose particles, deteriorated patching materials and other substances that may hinder the bond of the surface seal and injected epoxy.
2. Establish surface mounted injection ports at intervals along the crack. Do not drill into the stone. Drilled-in ports are permitted in mortar joints only.
3. Apply surface seal along the crack. The surface seal must prevent the escape of any epoxy from the crack, and must be removable without marring the surface finish of the cast stone.

C. Low Pressure Injection:
1. Inject epoxy into crack using low-pressure equipment such as syringes.
2. Begin injections from lower elevations of the crack and inject epoxy to a level of the next highest port.
3. Seal port and commence injection from the next port in sequence. Continue until entire length of crack has been filled.
4. Remove epoxy spillage immediately.

END OF SECTION 04 4911

SECTION 04 4930 – MASONRY CLEANING

PART 1 - GENERAL

1.1 SUMMARY

A. The Work shall consist of providing the necessary labor, materials, equipment and supervision to include the following Work:
   1. Apply general cleaning to entire façade using warm water pressure wash.
   2. Apply chemical cleaning test samples to existing cast stone and test as specified. After selection of one chemical cleaning method, proceed with chemical cleaning at selected locations with heavy soiling.
   3. At the conclusion of work in each area, clean exterior facade of construction debris and dust by rinsing with water.
   4. At conclusion of work in each area, clean glass.
   5. Provide access to all areas of work during cleaning for review by Owner's Representative.

B. Related Sections:
   1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
   2. Section 01 3591 – Historic Treatment Procedures
   3. Section 02 2070 – Selective Demo
   4. Section 04 0140 – Maintenance of Stone
   5. Section 04 4080 – Epoxy Anchors
   6. Section 04 4911 – Cast Stone Crack Repair
   7. Section 07 7180 – Migrating Corrosion Inhibitor
   8. Section 07 7190 – Liquid Water Repellant

C. Related Documents
   1. Drawings and General Provisions of Contract, including General and Supplementary Provisions and other Division 1 Specifications Sections, apply to this Section.
   2. Standard Specifications for Public Works Construction (Greenbook) Current Edition.
   3. 2012 Standard Specifications for Public Works Construction (Whitebook)
   4. The Secretary of the Interior's Standards for the Treatment of Historic Properties (1995 Edition).This document contains *The Standards* which are Federal codified preservation standards.

1.2 DEFINITIONS

A. Very Low-Pressure Water: Less than 100 psi; 4 to 6 gpm.

B. Low-Pressure Water: 100 to 400 psi; 4 to 6 gpm.

C. Medium-Pressure Water: 400 to 800 psi; 4 to 6 gpm.

D. High-Pressure Water: 800 to 1200 psi; 4 to 6 gpm. High-pressure water cleaning is usually not appropriate for brick and soft stone, and can result in damage to the substrate. This pressure is not permitted without a mock-up and approval of Owner's Representative.

1.3 QUALITY ASSURANCE

A. Contractor Qualifications:
   1. Contractor performing this work must have at least five (5) years experience in the cleaning of masonry.
   2. Supervisory personnel shall have not less than five (5) years experience in supervising this type of work. All apprentices shall be under the direct supervision of an experienced supervisor.
   3. Contractor shall keep at the project site, during the period when work is being performed, a competent superintendent/working foreman satisfactory to the Owner's Representative.
   4. The approved working foreman shall not be removed from the project without cause or upon prior notification of the Owner's Representative. If removal is for cause, Contractor shall submit justification in writing within 48 hours of the removal. All work will cease until a new working foreman is on site.

B. Cleaning Program: Prepare a written cleaning program that describes cleaning process in detail, including materials, methods, and equipment to be used, protection of surrounding materials, and control of runoff during operations.

C. Field Quality Control: Work in place shall be subject to inspection testing. Work found to be unacceptable shall be re-cleaned, or if damage, replaced in kind without additional cost to owner.

D. Manufacturers: Materials shall be obtained only from manufacturers who will, if required, send a qualified technical representative to the project site, for the purpose of advising the Contractor of the procedures and precautions for the use of the materials.

1.4 SUBMITTALS

A. Experience: The Contractor shall submit to the Owner's Representative a list of similar masonry cleaning projects performed in the previous five years.

B. Product Data: Contractor shall submit manufacturer's name, specifications, and application instructions for all products used in cleaning before the work begins.

C. Cleaning Program: Prepare a written cleaning program that describes cleaning process in detail, including materials, methods, and equipment to be used, protection of surrounding materials, and control of runoff during operations.

D. Test Samples:

1. Contractor shall execute a test sample of each of the three cleaning materials and methods specified herein.
   a. Sample for cleaning shall be no less than a 10 square foot area of cast stone for each cleaning method.
   b. Completed samples shall be protected during the work to maintain as standard for the rest of the work. Sample shall be incorporated into the cleaned facade upon completion of work.
2. Acidic Cleaner for Dolomite Marble Polished Stone: Dilute with water to concentration demonstrated by testing that does not etch or otherwise damage polished surface, but not greater than that recommended by chemical-cleaner manufacturer.
3. The Owner's Representative in consultation with the Contractor shall select areas where samples are to be applied.
4. Additional samples shall be made until an acceptable result is achieved on each material.
5. Sample areas must be cleaned at least one week before examination and approval by Owner's Representative.
6. The cleaning samples shall be approved by the Owner's Representative before the commencement of the work.

1.5 QUALITY CONTROL

A. If the Owner's Representative determines that the cleaning is not sufficient, the Contractor shall re-clean the affected area without additional cost to the Owner.

B. Contractor shall permit the Owner's Representative to conduct tests on the cleaned and rinsed masonry surface. Tests will be performed at irregular intervals to determine if the Contractor is thoroughly rinsing the surface and removing all traces of the cleaning products. The pH value will be recorded before and after cleaning. Access shall be provided for random review of the work to access quality, perform tests, & quantify repairs.

C. If the Owner's Representative determines that the cleaning products are not being sufficiently rinsed, the Contractor shall re-rinse the affected area without any additional cost to the Owner.

D. The Contractor shall allow the Owner's Representative access to the cleaning products at the site when so requested by the Owner's Representative.

1.6 PROTECTION

A. Protect windows and doors, joints, and other openings from infiltration of water into the building.

B. Protect all metal-framed windows and all decorative metal features include sculpture, signs, and standards from the deleterious effects of the cleaning process.

C. Protect existing cast stone, new precast architectural concrete, and GFRC from exposure to chemical cleaning, and its rinse-off.

D. Damage: Any materials, wood, metal, or glass that has been damaged, the paint removed, or otherwise damaged, shall be repaired to the satisfaction of the Owner's Representative without additional cost to the Owner.

E. Removal: All protection of materials shall be carefully and thoroughly removed. Nail holes, adhesive, etc., shall be repaired to leave all surfaces in the same condition as that previous to the cleaning operations.

F. Comply with all applicable safety codes and regulations that govern the work, including OSHA and EPA regulations covering waste water disposal.

G. Paving and Sidewalk:
1. Protect sidewalks and roofs from staining or damage by the cleaning operations. Caulk or protect the joints to prevent water from penetration.
2. If improvements to remain are damaged by the work specified herein, the Contractor shall repair same without any additional cost to the Owner.

H. Mechanical Damage to Masonry:
1. Exercise caution in performing the work so as not to damage the masonry elements. Protect the masonry from mechanical damage due to the scaffolding, other equipment, and the cleaning operation.
2. If any masonry elements are damaged by the execution of the work, replace the damaged units at no additional cost to the Owner.

I. Workers, Pedestrians, Automobiles, Other Property, etc.
1. The work required herein may include the use of caustic materials that can harm workers, pedestrians, animals and damage automobiles, other buildings, street furniture, etc.
2. The Contractor shall be responsible for protecting workers, pedestrians, animals, adjacent buildings, parked or moving automobiles, other buildings, street furniture, and other persons and objects that are vulnerable to damage by the cleaning operations.
3. Any damage caused by the cleaning operation shall be the responsibility of the Contractor and shall be remedied at no additional cost to the Owner.
4. Collect and dispose of water in accordance with applicable laws and regulations. Direct clean water to storm drains. Do not allow water to undermine the building. See Section 7-8, Project Site Maintenance, of the City of San Diego Supplement Amendments to the Standard Specifications for Public Works Construction.

1.7 STORAGE

A. All cleaning products stored and used on the site shall be clearly labeled with proper warning to prevent accidental use of the products by unauthorized persons.

B. All cleaning products stored on the site shall have MSDS information kept on file on the site by the contractor.

PART 2 - PRODUCTS

2.1 CLEANING MATERIALS

A. Job-Mixed Detergent Solution: Solution prepared by mixing 2 cups of tetrasodium polyphosphate, 1/2 cup of laundry detergent, and 20 quarts of hot water for every 5 gal. of solution required.

B. Mild Acidic Cleaner: Manufacturer's standard mildly acidic cleaner containing no muriatic (hydrochloric), hydrofluoric, or sulfuric acid; or ammonium bifluoride or chlorine bleaches.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
   a. Dominion Restoration Products, Inc.; DR-60 Stone and Masonry Cleaner.
   b. PROSOCO; Enviro Klean BioWash.
   c. Proctor & Gamble: Orvis WA Paste for Marble

C. Acidic Cleaner: Manufacturer's standard acidic masonry cleaner composed of hydrofluoric acid or ammonium bifluoride blended with other acids, detergents, wetting agents, and inhibitors.

1. Products for Granite:
   a. PROSOCO; Sure Klean 942 Marble Cleaner, Sure Klean Light Duty Cleaner, Enviro Clean Restoration Cleaner, Sure Klean Heavy-Duty Restorationb Cleaner.
   b. Diedrich Technologies Inc.; Diedrich 101G Granite, Terra Cotta, and Brick Cleaner.
   c. Dumond Chemicals, Inc.; Safe n' Easy Heavy Duty Restoration Cleaner.
   d. Or approved Equal

2. Products for Marble:
   a. PROSOCO; Sure Klean 942 Marble Cleaner
   b. PROSOCO; Sure Klean Marble Poultice
   c. Proctor & Gamble: Orvis: WA Paste for marble
   d. Or Approved Equal

D. Rinse:
1. PROSOCO; Sure Klean ® 766 Limestone & Masonry Prewash
2. PROSOCO; Sure Klean Conserveware HCT and Finishing Rinse

2.2 WATER

A. Clean and free of deleterious impurities, acids, alkalis, abrasives, or organic matter. Water shall be potable.

PART 3 - EXECUTION

3.1 GENERAL

A. The purpose of the cleaning process is to remove oil, grease, dirt, algae, and chemical contamination without damage to, or disintegration of the cast stone surface at all locations.

B. The result of the cleaning is not expected to return the facade to a 100 percent clean or new appearance, but it is expected that 80 percent or more of the dirt, contaminants, etc., will be removed. The level of cleaning shall be as approved in the test samples as specified herein.

C. No cleaning shall take place when the surface temperature of the specific areas of the building to be cleaned is less than 50 degrees or greater than 90 degrees F.

D. It is recognized that variations of the cleaning materials and their application may be required as the job proceeds. However, no variation will be acceptable without written approval of the Owner's Representative.

E. Perform each cleaning method indicated in a manner that results in uniform coverage of all surfaces, including corners, moldings, and interstices, and that produces an even effect without streaking or damaging stone surfaces.

F. Water-Spray Applications: Unless otherwise indicated, hold spray nozzle at least 6 inches from surface of stone and apply water in horizontal back and forth sweeping motion, overlapping previous strokes to produce uniform coverage.

G. Proceed with cleaning in an orderly manner; work from bottom to top of each scaffold width and from one end of each elevation to the other. Ensure that dirty residues and rinse water will not wash over cleaned, dry surfaces.

1. Periodically during each rinse, test pH of rinse water running off of cleaned area to determine that chemical cleaner is completely removed. Apply neutralizing agent and repeat rinse if necessary to produce tested pH of between 6.7 and 7.5.

H. After cleaning is complete, remove protection no longer required. Remove tape and adhesive marks.

I. Use only those cleaning methods indicated for each stone material and location.

1. Do not use wire brushes or brushes that are not resistant to chemical cleaner being used. Do not use plastic-bristle brushes if natural-fiber brushes will resist chemical cleaner being used.
2. Use spray equipment that provides controlled application at volume and pressure indicated, measured at spray tip. Adjust pressure and volume to ensure that cleaning methods do not damage stone.
   a. Equip units with pressure gages.

3. For water-spray application, use fan-shaped spray tip that disperses water at an angle of 25 to 50 degrees.

J. Chemical-Cleaner Application Methods: Apply chemical cleaners to stone surfaces to comply with chemical-cleaner manufacturer's written instructions; use brush or spray application. **Do not spray apply at pressures exceeding 50 psi** Do not allow chemicals to remain on surface for periods longer than those indicated or recommended by manufacturer.

3.2 PRELIMINARY CLEANING

A. Removing Plant Growth: Completely remove visible plant, moss, and shrub growth from stone surfaces. Carefully remove plants, creepers, and vegetation by cutting at roots and allowing to dry as long as possible before removal. Remove loose soil or debris from open joints to whatever depth they occur.

B. Preliminary Cleaning: Before beginning general cleaning, remove extraneous substances that are resistant to cleaning methods being used. Extraneous substances include paint, calking, asphalt, and tar.

1. Carefully remove heavy accumulations of material from surface of stone with sharp chisel. Do not scratch or chip stone surface.

3.3 CLEANING STONEWORK

A. Clean stone using the mildest chemicals possible. Utilize more aggressive chemical cleaning when detergent cleaning is not effective.

B. Detergent Cleaning

1. Wet stone with hot water applied by low-pressure spray as recommended by manufacturer.
2. Scrub stone with detergent solution using medium-soft brushes until soil is thoroughly dislodged and can be removed by rinsing. Use small brushes to remove soil from mortar joints and crevices. Dip brush in solution often to ensure that adequate fresh detergent is used and that stone surface remains wet.
3. Repeat cleaning procedure above where required to produce cleaning effect established by mockup.

3.4 CHEMICAL CLEANING OF CAST STONE

A. General:
1. The cleaner shall not damage, burn, bleach, streak, or discolor the cast stone surface. Cleaning shall not etch the surface or cause efflorescence of the surface.
   a. Immediately before beginning any chemical cleaning thoroughly wet down adjacent areas of the façade and areas below the area to receive the chemical cleaning, and maintain wet until chemical cleaning is completed.
2. Dwell times and procedures will be verified by test samples.

B. Application of Cleaner:
   1. Thoroughly prewet the surface with clean water.
   2. Apply diluted cleaner using a densely packed, soft fibered tampico masonry washing brush or low pressure spray (50 psi max.).
   3. Allow the cleaning solution to remain on the surface for 3 - 5 minutes. Gently scrub heavily soiled areas.
   4. Reapply cleaner (light duty concrete cleaner only) and rinse with fresh water.
   5. Do not allow cleaner to dry on the surface.

C. Rinsing:
   1. Use low pressure water rinse (100 psi) first to remove residual dirt and cleaning chemical. Follow with moderate pressure water rinse (800 psi maximum).
   2. Rinse wall from upper portions of wall downward.
   3. Continually rinse wall below area being cleaned with soaker hose to prevent streaking.
   4. Contractor shall test acidity levels of water run-off left standing on material's surface. Continue rinsing until water run-off pH level equals that of potable water. pH tests shall be done after each section is cleaned.
   5. Water run-off shall be collected and disposed of in a manner approved by the Owner's Representative and in a manner meeting all regulations. Water shall not be permitted to collect or pond on any roofs.

3.5 WARM WATER PRESSURE WASH

A. Wash all cast stone surfaces with medium pressure water (190 degrees F) at no more than 800 psi (measured at the tip) at a flow rate of four gallons per minute. Use a stainless steel 40-degree fan tip nozzle; hold 12 to 18 inches from the wall surface. Washing shall not abrade or streak the surface of the units or damage the glaze or mortar joints. Repeat pressure washing until at least 80 percent cleaning is achieved.

B. Water run-off shall be collected and disposed of in a manner approved by the Owner's Representative and in a manner meeting all regulations. Water shall not be permitted to collect or pond on any roofs.

3.6 CLEAN-UP

A. The premises shall be kept in clean and orderly condition at all times during the progress of the work. Rubbish, barriers, dirt, debris, tools, equipment, and unused materials shall be removed from the site each day.

B. The sidewalk shall be thoroughly rinsed of all chemicals, dirt, pollutants, and other materials washed off the building each day.

C. The Contractor shall remove all empty drums, cleaning materials, and the like from the site.

D. After cleaning has been completed, remove all protection including all tape, polyvinyl sheets, strippable mask, etc. Clean all glass. Replace any glass damaged or etched during the cleaning process in kind at no cost to the Owner.

END OF SECTION 04 4930

SECTION 04 8000 - EPOXY ANCHORS

PART 1 - GENERAL

1.1 WORK INCLUDED

A. This work shall consist of providing the necessary labor, materials, equipment and supervision to install epoxy anchors as required in the Drawings.

1.2 RELATED SECTIONS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
B. Section 01 1610 Salvage of Historic Features
C. Section 01 3591 Historic Treatment Procedures
D. Section 04 0140 Maintenance of Stone Assemblies
E. Section 07 7180 Migrating Corrosion Inhibitor
F. Section 07 7190 Liquid Water Repellant Coating

1.3 RELATED DOCUMENTS

1. Drawings and General Provisions of Contract, including General and Supplementary Provisions and other Division 1 Specifications Sections, apply to this Section.
2. Standard Specifications for Public Works Construction (Greenbook) Current Edition.
3. 2012 Standard Specifications for Public Works Construction (Whitebook)
4. The Secretary of the Interior's Standards for the Treatment of Historic Properties (1995 Edition).This document contains *The Standards* which are Federal codified preservation standards.

1.4 REFERENCE STANDARDS

A. Titles, designations, dates of issue or revision or reference standards and documents shall be those in effect at the time the bids are received, unless otherwise specified herein.

B. Except as modified by the Project Specifications, applicable portions of the following reference standards and documents shall govern the Work:
   1. American Society for Testing Materials Standards.
      a. ASTM D2730 - Test for Sag Floor of Highly Viscous Resins.
      b. ASTM D2471 – Test for Gel Time and Peak Exothermic Temperature of Reacting Thermosetting Resins.
      c. ASTM C78 – Test for Flexural Strength of Concrete (Using Simple Beam with Third-Point Loading).
      d. ASTM D695 – Test for Compressive Properties of Rigid Plastics.
      e. ASTM D648 – Test for Deflection Temperature of Plastics under Flexural Load.
      f. ASTM D 638 – Test for Tensile Properties of Plastics.
      g. ASTM D790 – Test for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.

h. ASTM A276 – Specifications for Stainless and Heat-Resisting Steel Bars and Shapes.

2. American Association of State Highway and Transportation Officials Test for Slant Shear Strength of Epoxy bonding Agent (AASHTO 237).
3. American Concrete Institute "Manual of Standard Practice for Detailing Concrete Structures" (ACI 315).
4. Concrete Reinforcing Steel Institute "Manual of Standard Practice."

1.5 SUBMITTALS

A. The Contractor shall submit the following for approval of the Owner's Representative:
1. Technical data sheets for each product or formulation to be used showing that the products meet the requirements of the specifications.
2. Technical data for the epoxy shall include:
a. Intended use.
b. Pot life (neat).
c. Initial cure time (1000 psi).
d. Tack free (thin film).
e. Final cure (75% ultimate strength).
f. Tensile strength by ASTM D638 (14 days).
g. Tensile elongation by ASTM D638 modified (14 days).
h. Flexural strength and modules per ASTM D790 at 24 hours, 3 days, and 7 days at 77°F.
i. 24-hour compressive strength by ASTM C109 modified (1 part epoxy to 3-1/4 parts aggregate).
3. Related submittal(s) related to use of the epoxy anchor.

1.6 QUALITY ASSURANCE

A. Applicator Qualifications
1. The Contractor shall have three (3) years of experience in performing work similar to that shown on the drawings and described in these specifications.
2. The Contractor shall provide an on-site supervisor for the duration of the epoxy anchor work. This supervisor shall have two (2) years supervisory experience with the products to be used.
3. Contractor to provide special inspection as required by building code.

B. Source Quality Control
1. The Contractor shall provide the manufacturer's test data for the following properties for each production run or batch or epoxy formulation to be used.
a. Tensile Strength by ASTM D638.
b. Elongation at break by ASTM D638.
c. Flexural strength by ASTM D790.
d. Flexural modules by ASTM D790.
e. Compressive yield strength by ASTM D695.
f. Compressive modules by ASTM D695.
g. Heat deflection temperatures by ASTM D648.
h. Slant shear by ASSHTO 237.

C. Allowable Tolerances:

1. The epoxy anchors shall be installed such that the clear cover to the exterior face of patches or masonry falls within +0 and -1/4-inch of that specified.

1.7 PRODUCT DELIVERY

A. The product shall be delivered and handled according to the manufacturer's recommendations.
B. Damaged, open containers shall not be used.

1.8 JOB CONDITIONS

A. Existing and environmental conditions: The Contractor shall examine the condition of surfaces where epoxy anchors are required and shall follow the recommendations of the manufacturer with regard to limitations of the materials in various moisture and temperature conditions.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Epoxy for Anchors: The epoxy shall be:
1. "Sikadur Injection Gel" as manufactured by Sika Corporation, Santa Fe Springs, California.
2. Sika 32-Hi-Mod as manufactured by Sika Corporation, Santa Fe Springs, California.
3. CIA-Gel Epoxy as manufactured by Covert Operations, Long Beach California.
4. Or Approved Equal.

PART 3 - EXECUTION

3.1 INSPECTION

A. Examine surfaces where epoxy anchors are designated to be installed to verify the soundness of the substrate and to locate unsound brick or other conditions that would adversely affect the execution and quality of work.
B. Where such conditions are found, notify the Owner's Representative. Do not proceed with work until the adverse conditions have been remedied.

3.2 PREPARATION

A. Lay out the locations of epoxy anchors according to the Drawings and Specifications.

3.3 INSTALLATION OF STAINLESS STEEL ANCHORS

A. Drilling holes:
1. Drill holes into the existing masonry and back-up material. Avoid drilling into embedded steel reinforcing bars, spandrel beams and columns.
2. Holes to be 1/8-inch diameter larger than anchor.

3. Drill horizontal holes with a downward slant of about 10-degrees to the horizontal.
4. Drill holes for stainless steel wires at a 45 degree angle with the prepared substrate.
5. Blow holes clean of drill dust with oil-free compressed air. Use tube extension at the end of the air gun and begin cleaning from the back of the hole.
6. See Drawings and individual repair procedures for required anchor diameters, embedments, and configurations.

B. Installation:
1. Clean and degrease the stainless steel anchors to remove all contaminants, which may hinder the epoxy bond.
2. Pressure-inject a pumpable epoxy gel into the pre-drilled hole for its complete length.
3. Insert anchor into the epoxy-filled hole. Unless noted otherwise, the anchor shall be set back 3/4-inch from the exterior face of the masonry and patches.
4. The method of installation is intended to achieve 100 per cent filling of the annular space between the anchor and the drilled hole.
5. Leave repair area neat and clean. Excess epoxy and mortar shall be removed at once. After each work day, remove epoxy droppings. No epoxy shall be left unfinished at any locations.
6. Install anchors without breaking or chipping the exposed masonry. Repair damaged areas as specified in other sections.
7. Finish hole with finish patching mortar as described in Section 04 0140-3.3.

3.4 CLEAN-UP

A. The epoxy anchors shall be cleanly installed and squared up as shown on the Drawings. Excess epoxy shall be cleaned up immediately after anchor installation.
B. Safety of Personnel: Consult manufacturer’s literature for proper safety precautions for stage, handling, and clean-up of specified products.

END OF SECTION

SECTION 05 1200 - STRUCTURAL STEEL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes structural steel and grout.

1.2 DEFINITIONS

A. Structural Steel: Elements of structural-steel frame, as classified by AISC 303, "Code of Standard Practice for Steel Buildings and Bridges."

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Show fabrication of structural-steel components.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified fabricator and installer.

B. Welding certificates.

C. Mill test reports for structural steel, including chemical and physical properties, where required in the Statement of Special Inspections.

1.5 QUALITY ASSURANCE

A. Fabricator Qualifications: A qualified fabricator that participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant, Category STD.

B. Installer Qualifications: A qualified installer who participates in the AISC Quality Certification Program and is designated an AISC-Certified Erector, Category CSE.

C. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

D. Preinstallation Conference: Conduct conference at the Project site.

PART 2 - PRODUCTS

2.1 STRUCTURAL-STEEL MATERIALS

A. Grade as indicated.

2.2 BOLTS, CONNECTORS, AND ANCHORS

A. High-Strength Bolts, Nuts, and Washers: as indicated.

B. Tension-Control, High-Strength Bolt-Nut-Washer Assemblies: ASTM F 1852, Type 1, consisting of steel structural bolts with splined ends, heavy-hex carbon-steel nuts, and hardened carbon-steel washers.

1. Finish: Plain, except where indicated otherwise.

C. Shear Connectors: ASTM A 108, Grades 1015 through 1020, headed-stud type, cold-finished carbon steel; AWS D1.1/D1.1M, Type B.

D. Anchor Rods: as indicated.

1. Finish: Plain.

E. Threaded Rods: ASTM A 36/A 36M or ASTM A 193/A 193M, Grade B7, as indicated.

1. Finish: Plain, except where indicated otherwise.

2.3 PRIMER

A. Low-Emitting Materials: Paints and coatings shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

B. Primer: Comply with Section 099100 "Painting".

2.4 GROUT

A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive and nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

2.5 FABRICATION

A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and AISC 360.

B. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of headed-stud shear connectors according to AWS D1.1/D1.1M and manufacturer's written instructions.

2.6 SHOP CONNECTIONS

A. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.

B. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.

2.7 SHOP PRIMING

A. Shop prime steel surfaces except the following:

1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches.
2. Surfaces to be field welded.
3. Surfaces to be high-strength bolted with slip-critical connections.
4. Surfaces to receive sprayed fire-resistive materials (applied fireproofing).
5. Galvanized surfaces.

B. Surface Preparation: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces according to the following specifications and standards:

1. SSPC-SP 2, "Hand Tool Cleaning."

C. Priming: Immediately after surface preparation, apply primer according to manufacturer's written instructions and at rate recommended by SSPC to provide a minimum dry film thickness of 1.5 mils (0.038 mm). Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.

2.8 SOURCE QUALITY CONTROL

A. Testing Agency: Owner will engage an independent testing and inspecting agency to perform shop tests and inspections and prepare test reports.

1. Provide testing agency with access to places where structural-steel work is being fabricated or produced to perform tests and inspections.

B. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

C. Bolted Connections: Shop-bolted connections will be inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

D. Welded Connections: In addition to visual inspection, shop-welded connections will be tested and inspected according to AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option, or as required in the Statement of Special Inspections:

1. Liquid Penetrant Inspection: ASTM E 165.
2. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
3. Ultrasonic Inspection: ASTM E 164.
4. Radiographic Inspection: ASTM E 94.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify, with steel Erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 ERECTION

A. Set structural steel accurately in locations and to elevations indicated and according to AISC 303 and AISC 360.

B. Base and Bearing Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting plates. Clean bottom surface of plates.

1. Set plates for structural members on wedges, shims, or setting nuts as required.
2. Weld plate washers to top of baseplate, where indicated.
3. Snug-tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of plate before packing with grout.
4. Promptly pack grout solidly between bearing surfaces and plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for shrinkage-resistant grouts.

C. Maintain erection tolerances of structural steel within AISC's "Code of Standard Practice for Steel Buildings and Bridges."

3.3 FIELD CONNECTIONS

A. High-Strength Bolts: Install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.

B. Weld Connections: Comply with AWS D1.1/D1.1M and AWS D1.8/D1.8M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.

1. Comply with AISC 303 and AISC 360 for bearing, alignment, adequacy of temporary connections, and removal of paint on surfaces adjacent to field welds.

3.4 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to inspect field welds and high-strength bolted connections.

B. Bolted Connections: Bolted connections will be inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

C. Welded Connections: Field welds will be visually inspected according to AWS D1.1/D1.1M.

1. In addition to visual inspection, field welds will be tested and inspected according to AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option, or as required in the Statement of Special Inspections:

a. Liquid Penetrant Inspection: ASTM E 165.
b. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
c. Ultrasonic Inspection: ASTM E 164.
d. Radiographic Inspection: ASTM E 94.

D. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

END OF SECTION 05 1200

SECTION 05 1213 - ARCHITECTURALLY EXPOSED STRUCTURAL STEEL FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes architecturally exposed structural-steel framing.

1. Requirements in Section 05 12 00 "Structural Steel Framing" also apply to AESS framing.

B. Related Sections:
1. Section 05 1 200 "Structural Steel Framing" for additional requirements applicable to AESS.
2. Section 05 50 00 "Metal Fabrications" for steel lintels and shelf angles not attached to structural-steel frame, miscellaneous steel fabrications and other metal items not defined as structural steel.
3. Section 09 91 00 "Painting" for surface preparation and priming requirements.

1.3 DEFINITIONS

A. Architecturally Exposed Structural Steel: Structural steel designated as "architecturally exposed structural steel" or "AESS" in the Contract Documents.

1.4 ACTION SUBMITTALS

A. Shop Drawings: Show fabrication of AESS components. Shop Drawings for structural steel may be used for AESS provided items of AESS are specifically identified and requirements below are met for AESS.

1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
2. Include embedment drawings.
3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld. Show backing bars that are to be removed and supplemental fillet welds where backing bars are to remain. Indicate grinding, finish, and profile of welds.
4. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical high-strength bolted connections. Indicate orientation of bolt heads.
5. Indicate exposed surfaces and edges and surface preparation being used.

6. Indicate special tolerances and erection requirements.

A. Samples: Submit samples of AESS to set quality standards for exposed welds.

1. Steel plate, 3/8 by 8 by 8 inches (9.5 by 200 by 200 mm), with one end of a short length of rectangular steel tube, 4 by 6 by 3/8 inches (100 by 150 by 9.5 mm), welded to plate with a continuous fillet weld and with weld ground smooth and blended.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who participates in the AISC Quality Certification Program and is designated an AISC-Certified Erector, Category CSE.

B. Fabricator Qualifications: A qualified fabricator that participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant, Category STD.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Use special care in handling to prevent twisting, warping, nicking, and other damage. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from corrosion and deterioration.

1. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.

1.8 PROJECT CONDITIONS

A. Field Measurements: Where AESS is indicated to fit against other construction, verify actual dimensions by field measurements before fabrication.

1.9 COORDINATION

A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' recommendations to ensure that shop primers and topcoats are compatible with one another.

PART 2 - PRODUCTS

2.1 FABRICATION

A. Shop fabricate and assemble AESS to the maximum extent possible. Locate field joints at concealed locations if possible. Detail assemblies to minimize handling and to expedite erection.

B. In addition to special care used to handle and fabricate AESS, comply with the following:

1. Fabricate with exposed surfaces smooth, square, and free of surface blemishes including pitting, rust, scale, and roughness.
2. Grind sheared, punched, and flame-cut edges of AESS to remove burrs and provide smooth surfaces and edges.
3. Fabricate AESS with exposed surfaces free of mill marks, including rolled trade names and stamped or raised identification.
4. Fabricate AESS with exposed surfaces free of seams to maximum extent possible.
5. Remove blemishes by filling or grinding or by welding and grinding, before cleaning, treating, and shop priming.
6. Fabricate with piece marks fully hidden in the completed structure or made with media that permits full removal after erection.
7. Fabricate AESS to the tolerances specified in AISC 303 for steel that is designated AESS.
8. Fabricate AESS to the tolerances specified in AISC 303 for steel that is not designated AESS.
9. Seal-weld open ends of hollow structural sections with 3/8-inch (9.5-mm) closure plates for AESS.

C. Coping, Blocking, and Joint Gaps: Maintain uniform gaps of 1/8 inch (3.2 mm) with a tolerance of 1/32 inch (0.8 mm) for AESS.

2.2 SHOP CONNECTIONS

A. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.

B. Weld Connections: Comply with AWS D1.1/D1.1M and AWS D1.8/D1.8M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work, and comply with the following:

1. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding specified tolerances.
2. Use weld sizes, fabrication sequence, and equipment for AESS that limit distortions to allowable tolerances.
3. Provide continuous, sealed welds at angle to gusset-plate connections and similar locations where AESS is exposed to weather.
4. Provide continuous welds of uniform size and profile where AESS is welded.
5. Remove backing bars or runoff tabs; back-gouge and grind steel smooth for AESS.

6. At locations where welding on the far side of an exposed connection of AESS occurs, grind distortions and marking of the steel to a smooth profile aligned with adjacent material.
7. Make fillet welds for AESS oversize and grind to uniform profile with smooth face and transition.

2.3 GALVANIZING

A. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to structural steel according to ASTM A 123/A 123M.

1. Do not quench or apply post-galvanizing treatments that might interfere with paint adhesion.
2. Fill vent and drain holes that will be exposed in the finished Work, unless indicated to remain as weep holes, by plugging with zinc solder and filing off smooth.

2.4 SHOP PRIMING

A. Shop prime steel surfaces except the following:

1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches (50 mm).
2. Surfaces to be field welded.
3. Surfaces to be high-strength bolted with slip-critical connections.
4. Surfaces to receive sprayed fire-resistive materials.

B. Preparing Galvanized Steel for Shop Priming: After galvanizing, thoroughly clean steel of grease, dirt, oil, flux, and other foreign matter, and treat with etching cleaner.

C. Priming: Immediately after surface preparation, apply primer according to manufacturer's written instructions and at rate recommended by SSPC to provide a minimum dry film thickness of 1.5 mils (0.038 mm). Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.

1. Stripe paint corners, crevices, bolts, welds, and sharp edges.
2. Apply two coats of shop paint to surfaces that are inaccessible after assembly or erection. Change color of second coat to distinguish it from first.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify, with steel erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.

1. Prepare a certified survey of bearing surfaces, anchor rods, bearing plates, and other embedments showing dimensions, locations, angles, and elevations.

B. Examine AESS for twists, kinks, warping, gouges, and other imperfections before erecting.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Provide temporary shores, guys, braces, and other supports during erection to keep AESS secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place unless otherwise indicated.

1. If possible, locate welded tabs for attaching temporary bracing and safety cabling where they will be concealed from view in the completed Work.

3.3 ERECTION

A. Set AESS accurately in locations and to elevations indicated and according to AISC 303 and AISC 360.

1. Erect AESS to the tolerances specified in AISC 303 for steel that is designated AESS.

3.4 FIELD CONNECTIONS

A. High-Strength Bolts: Install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.

B. Weld Connections: Comply with requirements in "Weld Connections" Paragraph in "Shop Connections" Article.

1. Remove backing bars or runoff tabs; back-gouge and grind steel smooth for AESS.
2. Remove erection bolts in AESS, fill holes, and grind smooth.
3. Fill weld access holes in AESS and grind smooth.

3.5 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to inspect AESS as specified in Section 05 12 00 "Structural Steel Framing." The testing agency will not be responsible for enforcing requirements relating to aesthetic effect.

B. Architect will observe AESS in place to determine acceptability relating to aesthetic effect.

3.6 REPAIRS AND PROTECTION

A. Remove welded tabs that were used for attaching temporary bracing and safety cabling and that are exposed to view in the completed Work. Grind steel smooth.

B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

END OF SECTION 05 1213

SECTION 05 3100 - STEEL DECKING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Roof deck.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of deck, accessory, and product indicated.

B. Shop Drawings:

1. Include layout and types of deck panels, anchorage details, reinforcing channels, pans, cut deck openings, special jointing, accessories, and attachments to other construction.

1.3 INFORMATIONAL SUBMITTALS

A. Evaluation reports.

1.4 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel according to AWS D1.3, "Structural Welding Code - Sheet Steel."

1.5 DELIVERY, STORAGE, AND HANDLING

A. Protect steel deck from corrosion, deformation, and other damage during delivery, storage, and handling.

B. Stack steel deck on platforms or pallets and slope to provide drainage. Protect with a waterproof covering and ventilate to avoid condensation.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. AISI Specifications: Comply with calculated structural characteristics of steel deck according to AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members."

2.2 ROOF DECK

A. Roof Deck: Fabricate panels, without top-flange stiffening grooves, to comply with "SDI Specifications and Commentary for Steel Roof Deck," in SDI Publication No. 31, and with the following:

1. Galvanized-Steel Sheet: As indicated.
2. Deck Profile: As indicated.
3. Design Uncoated-Steel Thickness: As indicated.

2.3 ACCESSORIES

A. General: Provide manufacturer's standard accessory materials for deck that comply with requirements indicated.

B. Mechanical Fasteners: Corrosion-resistant, low-velocity, power-actuated or pneumatically driven carbon-steel fasteners; or self-drilling, self-threading screws.

C. Flexible Closure Strips: Vulcanized, closed-cell, synthetic rubber.

D. Miscellaneous Sheet Metal Deck Accessories: Steel sheet, of same material and finish as deck; of profile indicated or required for application.

E. Flat Sump Plates: Single-piece steel sheet, 0.0747 inch thick, of same material and finish as deck. For drains, cut holes in the field.

F. Galvanizing Repair Paint: ASTM A 780.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Install deck panels and accessories according to applicable specifications and commentary in SDI Publication No. 31, manufacturer's written instructions, and requirements in this Section.

B. Place deck panels on supporting frame and adjust to final position with ends accurately aligned and bearing on supporting frame before being permanently fastened. Do not stretch or contract side-lap interlocks.

C. Place deck panels flat and square and fasten to supporting frame without warp or deflection.

D. Cut and neatly fit deck panels and accessories around openings and other work projecting through or adjacent to deck.

E. Provide additional reinforcement and closure pieces at openings as required for strength, continuity of deck, and support of other work.

F. Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used for correcting welding work.

G. Mechanical fasteners may be used in lieu of welding to fasten deck. Locate mechanical fasteners and install according to deck manufacturer's written instructions.

H. Roof Sump Pans and Sump Plates: Install over openings provided in roof deck and weld or mechanically fasten flanges to top of deck. Space welds or mechanical fasteners not more than 12 inches on center with at least one connection at each corner.

I. Miscellaneous Roof-Deck Accessories: Install ridge and valley plates, finish strips, end closures, and reinforcing channels according to deck manufacturer's written instructions. Weld or mechanically fasten to substrate to provide a complete deck installation.

1. Weld cover plates at changes in direction of roof-deck panels unless otherwise indicated.

J. Pour Stops and Girder Fillers: Weld steel-sheet pour stops and girder fillers to supporting structure according to SDI recommendations unless otherwise indicated.

3.2 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

B. Field welds will be subject to inspection.

C. Testing agency will report inspection results promptly and in writing to Contractor and Architect.

D. Remove and replace work that does not comply with specified requirements.

E. Additional inspecting, at Contractor's expense, will be performed to determine compliance of corrected work with specified requirements.

3.3 PROTECTION

A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on both surfaces of deck with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

B. END OF SECTION 05 3100

SECTION 05 5000 – METAL FABRICATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Steel framing and supports for countertops.
2. Steel framing and supports for mechanical and electrical equipment.
3. Steel framing and supports for applications where framing and supports are not specified in other Sections.
4. Loose bearing and leveling plates for applications where they are not specified in other Sections.
5. Steel weld plates and angles for casting into concrete not specified in other Sections.
6. Metal security fabrics and supports (woven wire mesh detail 12/A9.1).
7. Metal ladder (details 3 & 7/A9.11)
8. Steel Skate Stops

B. Products furnished, but not installed, under this Section:

1. Loose steel lintels.
2. Anchor bolts, steel pipe sleeves, slotted-channel inserts, and wedge-type inserts indicated to be cast into concrete.
3. Steel weld plates and angles for casting into concrete for applications where they are not specified in other Sections.

C. Related Sections:

1. Section 03 30 00 "Cast-in-Place Concrete" for installing anchor bolts, steel pipe sleeves, slotted-channel inserts, wedge-type inserts, and other items cast into concrete.
2. Section 05 12 00 "Structural Steel Framing."
3. Section 09 91 00 “Painting”.
4. Division 05 Section “Exterior Metal Railings” for handrails and guardrails.
5. Division 05 Section “Luminaria Metal Panels and Attachment” for Luminaria panels and attachment

1.3 PERFORMANCE REQUIREMENTS

A. Delegated Design: Design ladders, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

1. Structural Performance of Ladders: Provide ladders capable of withstanding the effects of loads and stresses within limits and under conditions specified in ANSI A14.3.

B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.

1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

1.4 ACTION SUBMITTALS

A. Shop Drawings: Show fabrication and installation details for metal fabrications.

1. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items.
2. Provide templates for anchors and bolts specified for installation under other Sections.

B. Delegated-Design Submittal: For metal security fabric systems (woven wire mesh) to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified professional engineer.

B. Welding certificates.

C. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers certifying that shop primers are compatible with topcoats.

1.6 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
2. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum."
3. AWS D1.3, "Structural Welding Code--Sheet Steel."
4. AWS D1.6, "Structural Welding Code - Stainless Steel."

B. Qualification Data: For professional engineer.

1.7 PROJECT CONDITIONS

A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication.

1.8 COORDINATION

A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.

B. Coordinate installation of anchorages, steel weld plates and angles for casting into concrete. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

C. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

D. Protection: Use all means necessary to protect miscellaneous metal materials before, during and after installation and to protect the installed work of other trades. Make no marks on architectural exposed metals during fabrication or erection.

E. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the approval of the Owner’s Representative and at no additional cost to the Owner.

PART 2 - PRODUCTS

2.1 METALS, GENERAL

A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

2.2 FERROUS METALS

A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

B. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

C. Stainless-Steel Sheet, Strip, and Plate: ASTM A 240/A 240M or ASTM A 666, Type 304. Use only Type 316 for Skate stops

D. Stainless-Steel Bars and Shapes: ASTM A 276, Type 304. Use only Type 316 for Skate stops

E. Steel Tubing: ASTM A 500, cold-formed steel tubing.

F. Steel Pipe: ASTM A 53/A 53M, standard weight (Schedule 40) unless otherwise indicated.

G. Slotted Channel Framing: Cold-formed metal box channels (struts) complying with MFMA-4.

1. Size of Channels: As indicated.
2. Material: Galvanized steel, ASTM A 653/A 653M, structural steel, Grade 33 (Grade 230), with G90 (Z275) coating.

H. Cast Iron: Either gray iron, ASTM A 48/A 48M, or malleable iron, ASTM A 47/A 47M, unless otherwise indicated.

2.3 NONFERROUS METALS

A. Aluminum Plate and Sheet: ASTM B 209 (ASTM B 209M), Alloy 6061-T6.

B. Aluminum Extrusions: ASTM B 221 (ASTM B 221M), Alloy 6063-T6.

C. Aluminum-Alloy Rolled Tread Plate: ASTM B 632/B 632M, Alloy 6061-T6.

D. Aluminum Castings: ASTM B 26/B 26M, Alloy 443.0-F.

E. Bronze Plate, Sheet, Strip, and Bars: ASTM B 36/B 36M, Alloy UNS No. C28000 (muntz metal, 60 percent copper).

F. Bronze Extrusions: ASTM B 455, Alloy UNS No. C38500 (extruded architectural bronze).

G. Bronze Castings: ASTM B 584, Alloy UNS No. C83600 (leaded red brass) or No. C84400 (leaded semired brass).

H. Nickel Silver Extrusions: ASTM B 151/B 151M, Alloy UNS No. C74500.

I. Nickel Silver Castings: ASTM B 584, Alloy UNS No. C97600 (20 percent leaded nickel bronze).

2.4 FASTENERS

A. General: Unless otherwise indicated, provide Type 304 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633 or ASTM F 1941 (ASTM F 1941M), Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.

1. Provide stainless-steel fasteners for fastening aluminum.

2. Provide stainless-steel fasteners for fastening stainless steel.
3. Provide bronze fasteners for fastening bronze.

B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with hex nuts, ASTM A 563 (ASTM A 563M); and, where indicated, flat washers.

C. Stainless-Steel Bolts and Nuts: Regular hexagon-head annealed stainless-steel bolts, ASTM F 593 (ASTM F 738M); with hex nuts, ASTM F 594 (ASTM F 836M); and, where indicated, flat washers; Alloy Group 1 (A1). Use Type 316 Stainless Steel fasteners with Type 316L stainless steel.

D. Anchor Bolts: ASTM F 1554, Grade 36, of dimensions indicated; with nuts, ASTM A 563; and, where indicated, flat washers.

1. Hot-dip galvanize or provide mechanically deposited, zinc coating where item being fastened is indicated to be galvanized.

E. Eyebolts: ASTM A 489.

F. Machine Screws: ASME B18.6.3 (ASME B18.6.7M).

G. Lag Screws: ASME B18.2.1 (ASME B18.2.3.8M).

H. Wood Screws: Flat head, ASME B18.6.1.

I. Plain Washers: Round, ASME B18.22.1 (ASME B18.22M).

J. Lock Washers: Helical, spring type, ASME B18.21.1 (ASME B18.21.2M).

K. Anchors, General: Anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.

L. Cast-in-Place Anchors in Concrete: Either threaded type or wedge type unless otherwise indicated; galvanized ferrous castings, either ASTM A 47/A 47M malleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as needed, all hot-dip galvanized per ASTM F 2329.

M. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors.

1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F 1941 (ASTM F 1941M), Class Fe/Zn 5, unless otherwise indicated.
2. Material for Exterior Locations and Where Stainless Steel is Indicated: Alloy Group 1 (A1) stainless-steel bolts, ASTM F 593 (ASTM F 738M), and nuts, ASTM F 594 (ASTM F 836M).

N. Slotted-Channel Inserts: Cold-formed, hot-dip galvanized-steel box channels (struts) complying with MFMA-4, 1-5/8 by 7/8 inches (41 by 22 mm) by length indicated with

anchor straps or studs not less than 3 inches (75 mm) long at not more than 8 inches (200 mm) o.c. Provide with temporary filler and tee-head bolts, complete with washers and nuts, all zinc-plated to comply with ASTM B 633, Class Fe/Zn 5, as needed for fastening to inserts.

2.5 MISCELLANEOUS MATERIALS

A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

B. Shop Primers: Provide primers that comply with Section 099123 “Painting."

C. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.

1. Use primer containing pigments that make it easily distinguishable from zinc-rich primer.

D. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.

E. Zinc-Rich Primer: Complying with SSPC-Paint 20 or SSPC-Paint 29 and compatible with topcoat.

1. Available Products:
   a. Benjamin Moore & Co.; Epoxy Zinc-Rich Primer CM18/19.
   b. Carboline Company; Carbozinc 621.
   c. ICI Devoe Coatings; Catha-Coat 313.
   d. International Coatings Limited; Interzinc 315 Epoxy Zinc-Rich Primer.
   e. PPG Architectural Finishes, Inc.; Aquapon Zinc-Rich Primer 97-670.
   f. Sherwin-Williams Company (The); Corothane I GalvaPac Zinc Primer.
   g. Tnemec Company, Inc.; Tneme-Zinc 90-97.

F. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

G. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

H. Concrete: Comply with requirements in Section 03 3000 "Cast-in-Place Concrete" for normal-weight, air-entrained, concrete with a minimum 28-day compressive strength of 3000 psi (20 MPa), unless otherwise indicated.

2.6 FABRICATION, GENERAL

A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch (1 mm) unless otherwise indicated. Remove sharp or rough areas on exposed surfaces. Burned holes are not acceptable.

C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

D. Form exposed work with accurate angles and surfaces and straight edges.

E. Weld corners and seams continuously to comply with the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface. Remove weld spatter, heat tinting, discoloration, and weld ripple. Provide a finished product which is clean and free of contamination with assurance of no future rust formation on welds and adjacent steel members.

F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous.

G. Fabricate seams and other connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.

I. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.

1. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, 1/8 by 1-1/2 inches (3.2 by 38 mm), with a minimum 6-inch (150-mm) embedment and 2-inch (50-mm) hook, not less than 8 inches (200 mm) from ends and corners of units and 24 inches (600 mm) o.c., unless otherwise indicated.

J. Zinc coating for plates, bolts, anchor bolts, and threaded parts shall be in accordance with ASTM A 153.

2.7 MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.

B. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction retained by framing and supports. Cut, drill, and tap units to receive hardware, hangers, and similar items.

1. Fabricate units from slotted channel framing where indicated.
2. Furnish inserts for units installed after concrete is placed.

C. Galvanize miscellaneous framing and supports where indicated.

D. Prime miscellaneous framing and supports with zinc-rich primer where indicated.

2.8 SHELF ANGLES

A. Fabricate shelf angles from steel angles of sizes indicated and for attachment to concrete framing. Provide horizontally slotted holes to receive 3/4-inch (19-mm) bolts, spaced not more than 6 inches (150 mm) from ends and 24 inches (600 mm) o.c., unless otherwise indicated.

1. Provide mitered and welded units at corners.
2. Provide open joints in shelf angles at expansion and control joints. Make open joint approximately 2 inches (50 mm) larger than expansion or control joint.

B. Galvanize shelf angles located in exterior walls.

C. Furnish wedge-type concrete inserts, complete with fasteners, to attach shelf angles to cast-in-place concrete.

2.9 METAL SECURITY FABRIC AND SUPPORTS

A. General: Provide supports, turnbuckles and inserts not specified in other Sections as needed to complete the Work.

B. Basis-of-Design Product: Subject to compliance with requirements, provide GKD-USA, Inc. (800-453-8616) metal fabrics and supports:
1. Metal Fabric: Sambesi
    a. Material: AISI Type 316 Stainless Steel
    b. Open Area: 42%
    c. Weight: 2.25 lbs/sq ft
    d. Nominal Thickness: 0.28 IN.
    e. Cable: 0.08 IN. diameter
    f. Rod: 0.12 IN. diameter
    g. Center-to-center cable: 1.969 IN.
    h. Center–to-center rod: 0.25 IN.
    i. Maximum Width: 26 FT.
2. Woven-in-Bar with Eyebolt
    a. Material: AISI Type 316 Stainless Steel

2.10 METAL LADDERS

A. General:

1. Comply with ANSI A14.3 unless otherwise indicated.
2. For elevator pit ladders, comply with ASME A17.1.

B. Steel Ladders:

1. Space side rails 18 inches (457 mm) apart unless otherwise indicated.
2. Side rails: Continuous, 1/2-by-2-1/2-inch (15.8-by-64-mm) steel flat bars, with eased edges.
3. Rungsas shown on details 3 & 7/A9.11.
4. Fit rungs in centerline of siderails; plug-weld and grind smooth on outer rail faces.
5. Support each ladder at top and bottom and not more than 60 inches (1500 mm) o.c. with welded or bolted steel brackets.
6. Galvanize exterior ladders, including brackets and fasteners.

2.11 MISCELLANEOUS STEEL TRIM

A. Unless otherwise indicated, fabricate units from steel shapes, plates, and bars of profiles shown with continuously welded joints and smooth exposed edges. Miter corners and use concealed field splices where possible.

B. Provide cutouts, fittings, and anchorages as needed to coordinate assembly and installation with other work.

1. Provide with integrally welded steel strap anchors for embedding in concrete or masonry construction.

C. Galvanize exterior miscellaneous steel trim and interior miscellaneous steel trim, where indicated. Do not galvanize items to be finished with zinc-rich primer and corresponding high-performance paint finish.

D. Prime exterior miscellaneous steel trim and interior miscellaneous steel trim, where indicated with zinc-rich primer.

2.12 LOOSE BEARING AND LEVELING PLATES

A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction. Drill plates to receive anchor bolts and for grouting.

B. Galvanize plates.

2.13 LOOSE STEEL LINTELS

A. Fabricate loose steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated. Fabricate in single lengths

for each opening unless otherwise indicated. Weld adjoining members together to form a single unit where indicated.

B. Size loose lintels to provide bearing length at each side of openings equal to 1/12 of clear span but not less than 8 inches (200 mm) unless otherwise indicated.

C. Galvanize loose steel lintels located in exterior walls.

2.14 STEEL WELD PLATES AND ANGLES

A. Provide steel weld plates and angles not specified in other Sections, for items supported from concrete construction as needed to complete the Work. Provide each unit with no fewer than two integrally welded steel strap anchors for embedding in concrete.

2.15 FINISHES, GENERAL

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Finish metal fabrications after assembly.

C. Finish exposed surfaces to remove tool and die marks and stretch lines, and to blend into surrounding surface.

2.16 STEEL AND IRON FINISHES

A. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A 153/A 153M for steel and iron hardware and with ASTM A 123/A 123M for other steel and iron products.

1. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.

B. Preparation for Shop Priming: Prepare surfaces to comply with requirements indicated below:

1. Exterior Items: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
2. Other Items: SSPC-SP 3, "Power Tool Cleaning."

C. Shop Priming: Shop prime iron and steel items not indicated to be galvanized unless they are to be embedded in concrete, sprayed-on fireproofing, or masonry, or unless otherwise indicated. Apply shop primer to comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.

1. Stripe paint corners, crevices, bolts, welds, and sharp edges.

2.17 STAINLESS-STEEL FINISHES

A. Remove tool and die marks and stretch lines or blend into finish.

B. Grind and polish surfaces to produce uniform, directionally textured, polished finish indicated, free of cross scratches. Run grain with long dimension of each piece unless indicated otherwise.

C. Finishes:
1. Fountain drain grates: Sandblast finish to achieve a slip resistant surface.
2. All other items: Bright, Directional Satin Finish: No. 4.

D. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

2.18 ALUMINUM FINISHES

A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.

B. As-Fabricated Finish: AA-M10 (Mechanical Finish: as fabricated, unspecified).

C. Class I, Anodic Finish: AA-M12C22A41 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, clear coating 0.018 mm or thicker) complying with AAMA 611.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.

C. Field Welding: Comply with the following requirements:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.

E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

F. Restore finishes damaged during installation and construction period so no evidence remains of correction work. Return items that cannot be refinished in the field to the shop; make required alterations and refinish entire unit, or provide new units.

G. Corrosion Protection: Coat concealed surfaces of aluminum that will come into contact with grout, concrete, masonry, wood, or dissimilar metals with the following:

1. Cast Aluminum: Heavy coat of bituminous paint.
2. Extruded Aluminum: Two coats of clear lacquer.

3.2 INSTALLING MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.

B. Anchor supports for operable partitions securely to and rigidly brace from building structure.

C. Support steel girders on solid grouted masonry, concrete, or steel pipe columns. Secure girders with anchor bolts embedded in grouted masonry or concrete or with bolts through top plates of pipe columns.

1. Where grout space under bearing plates is indicated for girders supported on concrete or masonry, install as specified in "Installing Bearing and Leveling Plates" Article.

D. Install pipe columns on concrete footings with grouted baseplates. Position and grout column baseplates as specified in "Installing Bearing and Leveling Plates" Article.

1. Grout baseplates of columns supporting steel girders after girders are installed and leveled.

3.3 INSTALLING BEARING AND LEVELING PLATES

A. Clean concrete and masonry bearing surfaces of bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of plates.

B. Set bearing and leveling plates on wedges, shims, or leveling nuts. After bearing members have been positioned and plumbed, tighten anchor bolts. Do not remove wedges or shims but, if protruding, cut off flush with edge of bearing plate before packing with grout.

1. Use nonshrink nonmetallic grout, either in concealed locations where not exposed to moisture; or in exposed locations unless otherwise indicated.
2. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

3.4 ADJUSTING AND CLEANING

A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

1. Apply by brush or spray to provide a minimum 2.0-mil (0.05-mm) dry film thickness.

B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

END OF SECTION 05 5000

SECTION 05 5210 – EXTERIOR METAL RAILINGS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:
   1. Stainless-steel flat bar and tube guardrails and handrails.

B. Related Sections include the following:

   1. Drawings and general provisions of the Contract, including Part 1- "General Provisions" of the Greenbook and Whitebook apply to this Section.
   2. Division 03 Section "Cast-In-Place Concrete" for forming joints and recesses in cast concrete.
   3. Division 04 Section "Exterior Stone Cladding" for setting stone and veneer around railing posts.
   4. Division 32 Section "Stone Paving" for setting stone paving around railing posts.

1.2 PERFORMANCE REQUIREMENTS

A. General: In engineering railings to withstand structural loads indicated, determine allowable design working stresses of handrail and railing materials based on the following:

   1. Stainless Steel: 60 percent of minimum yield strength.

B. Structural Performance: Provide railings capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:

   1. Handrails:

      a. Uniform load of 50 lbf/ ft. applied in any direction.
      b. Concentrated load of 200 lbf applied in any direction.
      c. Uniform and concentrated loads need not be assumed to act concurrently.

   2. Top Rails of Guards:

      a. Uniform load of 50 lbf/ ft. applied in any direction
      b. Concentrated load of 200 lbf applied in any direction.
      c. Uniform and concentrated loads need not be assumed to act concurrently.

   3. Infill of Guards:

      a. Concentrated load of 50 lbf applied horizontally on an area not to exceed 12in. by 12in.
      b. Infill load and other loads need not be assumed to act concurrently.

C. Thermal Movements: Provide railings that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 degrees Fahrenheit, ambient; 180 degrees Fahrenheit, material surfaces.

D. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

1.3 SUBMITTALS

A. Product Data: For the following:
1. Grout, anchoring cement.

B. Shop Drawings: Show fabrication and installation of railings and guardrails. Include plans, elevations, sections, component details, and attachments to other Work.

1. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer, licensed in the state of California, responsible for their preparation.

C. Samples for Initial Selection: For products involving selection of color, texture, or design, including mechanical finishes on stainless steel. Submit short sections of railing or flat, sheet metal samples showing available mechanical finishes.

D. Samples for Verification: For each type of exposed finish required.

1. Sections of each distinctly different linear railing member, including handrails, top rails, posts, and balusters.
2. Sections of each distinctly different linear guardrail member, including top rails, posts, and balusters.
3. Fittings and brackets.
4. Assembled Sample of handrail systems and guardrail system, made from full-size components, including top rail, post, handrail, and infill. Sample need not be full height.

a. Sample shall include the method of finishing and connecting members (welded or mechanical) at intersections and display the quality of finished connections expected on the project.

E. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

F. Welding certificates.

G. Qualification Data: For professional engineer.

H. Product Test Reports: From a qualified testing agency indicating railings comply with ASTM E 985, based on comprehensive testing of current products.

1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain each type of handrail and railing through one source from a single manufacturer.

B. Welding: Qualify procedures and personnel according to the following:

1. AWS D1.1, "Structural Welding Code—Steel."
2. AWS D1.6, "Structural Welding Code—Stainless Steel."

1.5 STORAGE

A. Store railings in a dry, well-ventilated, weathertight place.

1.6 PROJECT CONDITIONS

A. Field Measurements: Verify actual locations of walls, stairs and other construction contiguous with railings by field measurements before fabrication and indicate measurements on Shop Drawings.

1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating railings without field measurements. Coordinate wall and other contiguous construction to ensure that actual dimensions correspond to established dimensions.
2. Provide allowance for trimming and fitting at site.

1.7 COORDINATION AND SCHEDULING

A. Coordinate installation of anchorages for railings. Furnish setting drawings, templates, and directions for installing anchorages, including box outs, sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

B. Schedule installation so wall attachments are made only to completed walls. Do not support railings temporarily by any means that do not satisfy structural performance requirements.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Stainless-Steel Pipe and Tube Railings:

a. Pisor Industries, Inc.
b. Sharpe Products.
c. Tubular Specialties Manufacturing, Inc.
d. Wagner, R & B, Inc.; a division of the Wagner Companies.
e. Or Approved equal.

2.2 METALS, GENERAL

A. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, blemishes and other imperfections where exposed to view on finished units..

B. Brackets, Flanges, and Anchors: Cast or formed metal of same type of material and finish as supported rails, unless otherwise indicated.

2.3 STAINLESS STEEL

A. Tubing: ASTM A 554, Grade MT 316L.

B. Pipe: ASTM A 312/A 312M, Grade TP 316L.

C. Castings: ASTM A 743/A 743M, Grade CF 8M or CF 3M.

D. Plate and Sheet: ASTM A 666, Type 316L.

2.4 FASTENERS

A. General: Provide the following:
1. Stainless-Steel Railings: Type 316 stainless-steel fasteners.

B. Fasteners for Anchoring Railings to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring railings to other types of construction indicated and capable of withstanding design loads.

C. Fasteners for Interconnecting Railing Components:

1. Provide concealed fasteners for interconnecting railing components and for attaching them to other work, unless otherwise indicated.
2. Provide tamper-resistant flat-head machine screws for exposed fasteners, unless otherwise indicated.

D. Anchors: Provide anchors and epoxy in place as indicated on the Drawings. Anchors shall be fabricated from corrosion-resistant materials with capability to sustain, without

failure, a load equal to six times the load imposed when installed in unit masonry and equal to four times the load imposed when installed in concrete, as determined by testing per ASTM E 488 conducted by a qualified independent testing agency.

2.5 MISCELLANEOUS MATERIALS

A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

B. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for exterior applications.

C. Anchoring Cement: Factory-packaged, nonshrink, nonstaining, hydraulic-controlled expansion cement formulation for mixing with water at Project site to create pourable anchoring, patching, and grouting compound.

1. Water-Resistant Product: At exterior locations provide formulation that is resistant to erosion from water exposure without needing protection by a sealer or waterproof coating and that is recommended by manufacturer for exterior use.

2.6 FABRICATION

A. General: Fabricate railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage, but not less than that required to support structural loads.

B. Assemble railings in the shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.

C. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch, unless otherwise indicated on the Drawings. Remove sharp or rough areas on exposed surfaces.

D. Form work true to line and level with accurate angles and surfaces.

E. Fabricate connections that will be exposed to weather in a manner to exclude water.

F. Provide weep holes to drain entrapped water in hollow sections of handrail and railing members that are exposed to exterior or to moisture from condensation or other sources.

G. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items.

H. Connections: Fabricate railings with welded connections, unless otherwise indicated on the Drawings.

I. Welded Connections: Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove flux immediately.
4. At exposed connections, finish exposed surfaces smooth and blended, pit- and crevice-free exhibiting no roughness with welded surface matching contours of adjoining surfaces. Remove weld spatter, heat tinting, discoloration, and weld ripple. Provide a finished product which is clean and free of contamination with assurance of no future rust formation on welds and adjacent steel members.

J. Form changes in direction as follows:

1. By radius bends of radius indicated on the Drawings.
2. By mitering and welding at elbow bends.

K. Close exposed ends of railing members with prefabricated end fittings.

L. Provide wall returns at ends of wall-mounted handrails, unless otherwise indicated. Close ends of returns unless clearance between end of rail and wall is 1/4 inchor less.

M. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work, unless otherwise indicated on the Drawings.

N. Provide inserts and other anchorage devices for connecting railings to concrete or masonry work. Fabricate anchorage devices capable of withstanding loads imposed by railings. Coordinate anchorage devices with supporting structure.

2.7 FINISHES, GENERAL

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Appearance of Finished Work: Noticeable variations in the same piece are not acceptable.

C. Provide exposed fasteners with finish matching appearance, including color and texture, of railings.

2.8 STAINLESS-STEEL FINISHES

A. Remove tool and die marks and stretch lines or blend into finish.

B. Grind and polish surfaces to produce uniform, directionally textured, polished finish indicated, free of cross scratches. Run grain perpendicular to the long dimension of each piece, i.e. following the circumference.

C. 180-Grit Polished Finish: Oil-ground, uniform, directionally textured finish.

D. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Fit exposed connections together to form tight, hairline joints.

B. Perform cutting, drilling, and fitting required to install railings. Set railings accurately in location, alignment, and elevation; measured from established lines and levels and free from rack.

1. Do not weld, cut, or abrade surfaces of handrail and railing components that have been coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.
2. Set posts plumb within a tolerance of 1/16 inch in 3 feet.
3. Align rails so variations from level for horizontal members and from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet.

C. Adjust railings before anchoring to ensure matching alignment at abutting joints. Space posts at interval indicated, but not less than that required by structural loads.

D. Fastening to In-Place Construction: Use anchorage devices and fasteners where necessary for securing railings and for properly transferring loads to in-place construction.

3.2 RAILING CONNECTIONS

A. Welded Connections: Use fully welded joints for permanently connecting railing components. Comply with requirements for welded connections in "Fabrication" Article whether welding is performed in the shop or in the field.

B. Expansion Joints: Install expansion joints at locations indicated but not farther apart than required to accommodate thermal movement. Provide slip-joint internal sleeve extending 2 inches beyond joint on either side, fasten internal sleeve securely to 1 side, and locate joint within 6 inches of post.

3.3 ANCHORING POSTS

A. Form or core-drill holes not less than 5 inches deep into supporting concrete slab and 3/4 inch minimum, larger than OD of post for installing posts in concrete where indicated. Clean holes of loose material, insert posts, and fill annular space between post and concrete with nonshrink, nonmetallic grout or anchoring cement, mixed and placed to comply with anchoring material manufacturer's written instructions.

B. Cover post base with stone as indicated on drawing or cover anchorage joint with flange of same metal as post if indicated.

3.4 ANCHORING RAILING ENDS

A. Anchor railing ends to concrete and masonry with round flanges connected to railing ends and anchored to wall construction with anchors and bolts, unless drawings indicate otherwise.

3.5 ADJUSTING AND CLEANING

A. Clean stainless steel by washing thoroughly with clean water and soap and rinsing with clean water.

3.6 PROTECTION

A. Protect finishes of railings from damage during construction period with temporary protective coverings approved by railing manufacturer. Remove protective coverings at time of Substantial Completion.

B. Restore finishes damaged during installation and construction period so no evidence remains of correction work. Return items that cannot be refinished in the field to the shop; make required alterations and refinish entire unit, or provide new units.

END OF SECTION 05 5210

SECTION 05 5213

PIPE AND TUBE RAILINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Steel pipe railings at the interior Stairs as indicated.

B. Related Sections:
1. Division 09 Section "Painting".

1.2 PERFORMANCE REQUIREMENTS

A. Delegated Design: Design railings, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

B. General: In engineering railings to withstand structural loads indicated, determine allowable design working stresses of railing materials based on the following:

1. Steel: 72 percent of minimum yield strength.

C. Structural Performance: Railings shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:

1. Handrails and Top Rails of Guards:

a. Uniform load of 50 lbf/ ft. applied in any direction.
b. Concentrated load of 200 lbf applied in any direction.
c. Uniform and concentrated loads need not be assumed to act concurrently.

2. Infill of Guards:

a. Concentrated load of 50 lbf applied horizontally on an area of 1 sq. ft.
b. Infill load and other loads need not be assumed to act concurrently.

D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.

1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

E. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

1.3 ACTION SUBMITTALS

A. Product Data: For the following:

1. Manufacturer's product lines of mechanically connected railings.
2. Railing brackets.
3. Grout, anchoring cement, and paint products.

B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

C. Delegated-Design Submittal: For installed products indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified professional engineer.

1.5 QUALITY ASSURANCE

A. Source Limitations: Obtain each type of railing from single source from single manufacturer.

B. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

1.6 PROJECT CONDITIONS

A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication and indicate measurements on Shop Drawings.
   1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating railings without field measurements. Coordinate wall and other contiguous construction to ensure that actual dimensions correspond to established dimensions.
   2. Provide allowance for trimming and fitting at site.

1.7 COORDINATION AND SCHEDULING

A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.

B. Coordinate installation of anchorages for railings. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

C. Schedule installation so wall attachments are made only to completed walls. Do not support railings temporarily by any means that do not satisfy structural performance requirements.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Steel Pipe, Tube Railings,:

a. Pisor Industries, Inc.
b. Sharpe Products
c. Wagner, R & B, Inc.; a division of the Wagner Companies.
d. Tubular Specialties
e. Or Equal

2.2 METALS, GENERAL

A. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.

B. Brackets, Flanges, and Anchors: Cast or formed metal of same type of material and finish as supported rails unless otherwise indicated.

2.3 STEEL AND IRON

A. Pipe: ASTM A 53/A 53M, Type F or Type S, Grade A, Standard Weight (Schedule 40), unless another grade and weight are required by structural loads.

1. Provide galvanized finish for exterior installations and where indicated.

B. Plates, Shapes, and Bars: ASTM A 36/A 36M.

C. Cast Iron: Either gray iron, ASTM A 48/A 48M, or malleable iron, ASTM A 47/A 47M, unless otherwise indicated.

2.4 FASTENERS

A. General: Provide the following:

1. Ungalvanized-Steel Railings: Plated steel fasteners complying with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5 for zinc coating.

B. Fasteners for Anchoring Railings to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring railings to other types of construction indicated and capable of withstanding design loads.

C. Fasteners for Interconnecting Railing Components:
1. Provide concealed fasteners for interconnecting railing components and for attaching them to other work, unless exposed fasteners are unavoidable or are the standard fastening method for railings indicated.
2. Provide [tamper-resistant flat-head machine screws for exposed fasteners unless otherwise indicated.

D. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.

1. Material for Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, unless otherwise indicated.

2.5 MISCELLANEOUS MATERIALS

A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

B. Epoxy Zinc-Rich Primer: Complying with MPI#20 and compatible with topcoat.

C. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

D. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

2.6 FABRICATION

A. General: Fabricate railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage, but not less than that required to support structural loads.

B. Assemble railings in the shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.

C. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.

D. Form work true to line and level with accurate angles and surfaces.

E. Fabricate connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

F. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items.

G. Connections: Fabricate guard rail extensions with welded connections unless otherwise indicated.

H. Welded Connections: Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove flux immediately.
4. At exposed connections, finish exposed surfaces smooth and blended so no roughness shows after finishing and welded surface matches contours of adjoining surfaces.

5. Fabricate splice joints for field connection using an epoxy structural adhesive if this is manufacturer's standard splicing method.

I. Form changes in direction as follows:
1. By bending.

J. Bend members in jigs to produce uniform curvature for each configuration required; maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.

K. Close exposed ends of railing members with prefabricated end fittings.

L. Provide wall returns at ends of wall-mounted handrails unless otherwise indicated. Close ends of returns unless clearance between end of rail and wall is 1/4 inch or less.

M. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work unless otherwise indicated.

1. At brackets and fittings fastened to plaster or gypsum board partitions, provide crush-resistant fillers, or other means to transfer loads through wall finishes to structural supports and prevent bracket or fitting rotation and crushing of substrate.

N. Provide inserts and other anchorage devices for connecting railings to concrete or masonry work. Fabricate anchorage devices capable of withstanding loads imposed by railings. Coordinate anchorage devices with supporting structure.

2.7 FINISHES, GENERAL

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Provide exposed fasteners with finish matching appearance, including color and texture, of railings.

2.8 STEEL AND IRON FINISHES

A. For nongalvanized steel railings, provide nongalvanized ferrous-metal fittings, brackets, fasteners, and sleeves, except galvanize anchors to be embedded in exterior concrete or masonry.

B. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with requirements indicated below:
   1. Railings Indicated to Receive Zinc-Rich Primer: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."

C. Primer Application: Apply shop primer to prepared surfaces of railings unless otherwise indicated. Comply with requirements in SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.

   1. Shop prime uncoated railings with zinc-rich primer.

D. Field-Painted Finish: Comply with Division 09 Section "Painting."

   1. Color As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine plaster and gypsum board assemblies, where reinforced to receive anchors, to verify that locations of concealed reinforcements have been clearly marked for Installer. Locate reinforcements and mark locations if not already done.

3.2 INSTALLATION, GENERAL

A. Fit exposed connections together to form tight, hairline joints.

B. Perform cutting, drilling, and fitting required for installing railings. Set railings accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.

1. Do not weld, cut, or abrade surfaces of railing components that have been coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.
2. Set posts plumb within a tolerance of 1/16 inch in 3 feet.
3. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet.

C. Adjust railings before anchoring to ensure matching alignment at abutting joints.

D. Fastening to In-Place Construction: Use anchorage devices and fasteners where necessary for securing railings and for properly transferring loads to in-place construction.

3.3 RAILING CONNECTIONS

A. Nonwelded Connections: Use mechanical or adhesive joints for permanently connecting railing components. Seal recessed holes of exposed locking screws using plastic cement filler colored to match finish of railings.

B. Welded Connections: Use fully welded joints for permanently connecting railing components. Comply with requirements for welded connections in "Fabrication" Article whether welding is performed in the shop or in the field.

C. Expansion Joints: Install expansion joints at locations indicated on Shop Drawings but not farther apart than required to accommodate thermal movement. Provide slip-joint internal sleeve extending 2 inches beyond joint on either side, fasten internal sleeve securely to one side, and locate joint within 6 inches of post.

3.4 ANCHORING POSTS

A. Core-drill holes not less than 5 inches deep and 3/4 inch larger than OD of post for installing posts in concrete. Clean holes of loose material, insert posts, and fill annular space between post and concrete with nonshrink, nonmetallic grout, mixed and placed to comply with anchoring material manufacturer's written instructions.

B. Cover anchorage joint with flange of same metal as post, attached to post with set screws.

3.5 ATTACHING RAILINGS

A. Anchor railing ends at walls with round flanges anchored to wall construction and welded to railing ends or connected to railing ends using nonwelded connections.

B. Attach railings to wall with wall brackets, except where end flanges are used. Provide brackets with 1-1/2-inch clearance from inside face of handrail and finished wall surface.

Locate brackets as indicated on Shop Drawings or, if not indicated, at spacing required to support structural loads.

C. Secure wall brackets and railing end flanges to building construction as follows:

1. For concrete and solid masonry anchorage, use drilled-in expansion shields and hanger or lag bolts.
2. For steel-framed partitions, use self-tapping screws fastened to steel framing or to concealed steel reinforcements.

3.6 ADJUSTING AND CLEANING

A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

1. Apply by brush or spray to provide a minimum 2.0-mil dry film thickness.

3.7 PROTECTION

A. Protect finishes of railings from damage during construction period with temporary protective coverings approved by railing manufacturer. Remove protective coverings at time of Substantial Completion.

END OF SECTION 05 5213

SECTION 05 7500

DECORATIVE FORMED METAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, Division 01 Sections. Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Exterior formed-metal-shaped panels, applied to hollow metal door number V100, S113B and S110 per Door Schedule note 2 on Sheet A9.0 and sheet A9.3.

B. Related Sections:

1. Section 05 50 00 "Metal Fabrications" for non-decorative metal fabrications.
2. Section 07 62 00 "Sheet Metal Flashing and Trim" for items made of formed metal for flashings and trim.

1.3 PERFORMANCE REQUIREMENTS

A. Structural Performance: Decorative formed metal items, including anchors and connections, shall withstand the effects of gravity loads and the following loads and stresses without exceeding the allowable design working stress of materials involved and without exhibiting permanent deformation in any components:

1. Wind Loads on Exterior Items: As indicated on Drawings.

B. Seismic Performance: Exterior decorative formed metal items, including anchors and connections, shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

1. Component Importance Factor is 1.0.

C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.

1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

D. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include finishing materials.

B. Shop Drawings: Show fabrication and installation details for decorative formed metal.

1. Include plans, elevations, component details, and attachments to other work.
2. Indicate materials and profiles of each decorative formed metal member, fittings, joinery, finishes, fasteners, anchorages, and accessory items.

C. Samples for Verification: For each type of exposed finish required, prepared on 6-inch-square Samples of metal of same thickness and material indicated for the Work.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified fabricator.

1.6 QUALITY ASSURANCE

A. Fabricator Qualifications: A firm experienced in producing decorative formed metal similar to that indicated for this Project for a minimum of 3 years and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

B. Powder-Coating Applicator Qualifications: A firm experienced in successfully applying powder coatings of type indicated to metals of types indicated and that employs competent control personnel to conduct continuing, effective quality-control program to ensure compliance with requirements.

C. Installer Qualifications: Fabricator of products.

D. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
2. AWS D1.3, "Structural Welding Code - Sheet Steel."

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver decorative formed metal products wrapped in protective coverings and strapped together in suitable packs or in heavy-duty cartons. Remove protective coverings before they stain or bond to finished surfaces.

B. Store products on elevated platforms in a dry location.

PART 2 - PRODUCTS

2.1 SHEET METAL

A. General: Provide sheet metal without pitting, seam marks, roller marks, stains, discolorations, or other imperfections where exposed to view on finished units.

B. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

C. Galvanized-Steel Sheet: ASTM A 653/A 653M, G90 coating, either commercial steel or forming steel.

2.2 MISCELLANEOUS MATERIALS

A. Filler Metal and Electrodes: Provide type and alloy of filler metal and electrodes as recommended by producer of metal to be welded or brazed and as necessary for strength, corrosion resistance, and compatibility in fabricated items.

B. Fasteners: Fabricated from same basic metal and alloy as fastened metal unless otherwise indicated. Do not use metals that are incompatible with materials joined.

1. Provide concealed fasteners for interconnecting decorative formed metal items and for attaching them to other work unless otherwise indicated on accepted Shop Drawings.
2. Provide Phillips flat-head machine screws for exposed fasteners unless otherwise indicated.

C. Anchor Materials:

1. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 stainless-steel bolts, ASTM F 593, and nuts, ASTM F 594.

D. Laminating Adhesive: Adhesive recommended by metal fabricator that will fully bond metal to metal and that will prevent telegraphing and oil canning and is compatible with substrate and noncombustible after curing.

1. Contact Adhesive: VOC content of not more than 80 g/L when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
2. Metal-to-Metal Adhesive: VOC content of not more than 30 g/L when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
3. Multipurpose Construction Adhesive: VOC content of not more than 70 g/L when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
4. Special-Purpose Contact Adhesive: (Contact adhesive used to bond melamine-covered board, metal, unsupported vinyl, ultrahigh molecular weight polyethylene, and rubber or wood veneer, 1/16 inch thick or less, to any surface): 250 g/L.
5. Adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile

Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.3 PAINTS AND COATINGS

A. Low-Emitting Materials: Paints and coatings shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

B. Etching Cleaner for Galvanized Metal: Complying with MPI#25.

C. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.

D. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

2.4 FABRICATION, GENERAL

A. Shop Assembly: Preassemble decorative formed metal items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

B. Coordinate dimensions and attachment methods of decorative formed metal items with those of adjoining construction to produce integrated assemblies with closely fitting joints and with edges and surfaces aligned unless otherwise indicated.

C. Form metal to profiles indicated, in maximum lengths to minimize joints. Produce flat, flush surfaces without cracking or grain separation at bends. Fold back exposed edges of unsupported sheet metal to form a 1/2-inch- wide hem on the concealed side, or ease edges to a radius of approximately 1/32 inch and support with concealed stiffeners.

D. Increase metal thickness or reinforce with concealed stiffeners, backing materials, or both, as needed to provide surface flatness equivalent to stretcher-leveled standard of flatness and sufficient strength for indicated use.

1. Support joints with concealed stiffeners as needed to hold exposed faces of adjoining sheets in flush alignment.

E. Build in straps, plates, and brackets as needed to support and anchor fabricated items to adjoining construction. Reinforce decorative formed metal items as needed to attach and support other construction.

F. Provide support framing, mounting and attachment clips, splice sleeves, fasteners, and accessories needed to install decorative formed metal items.

2.5 EXTERIOR FORMED-METAL-SHAPED PANELS

A. Form exterior formed-metal-shaped panels from metal of type and thickness indicated below, as indicated on Drawings:

1. Galvanized-Steel Sheet: Thickness and profile as indicated on Drawings.

2.6 GENERAL FINISH REQUIREMENTS

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Apply organic and anodic finishes to formed metal after fabrication unless otherwise indicated.

D. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.7 GALVANIZED-STEEL SHEET FINISHES

A. Preparing Galvanized Items for Factory Priming: Thoroughly clean galvanized decorative formed metal of grease, dirt, oil, flux, and other foreign matter, and treat with etching cleaner.

B. Preparing Galvanized Items for Factory Finishing: Clean surfaces with nonpetroleum solvent so surfaces are free of oil and other contaminants. After cleaning, apply a conversion coating suited to the organic coating to be applied over it.

C. Repairing Galvanized Surfaces: Clean welds and abraded areas and repair galvanizing to comply with ASTM A 780.

D. High-Performance Organic Finish: Two-coat fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

1. Color and Gloss: As indicated on Drawings by manufacturer's designations.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of decorative formed metal.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Locate and place decorative formed metal items level and plumb and in alignment with adjacent construction. Perform cutting, drilling, and fitting required to install decorative formed metal.

1. Do not cut or abrade finishes that cannot be completely restored in the field. Return items with such finishes to the shop for required alterations, followed by complete refinishing, or provide new units as required.

B. Use concealed anchorages except as indicated on accepted Shop Drawings.

C. Form tight joints with exposed connections accurately fitted together. Provide reveals and openings for sealants and joint fillers as indicated.

D. Install concealed gaskets, joint fillers, insulation, sealants, and flashings, as the Work progresses, to make exterior decorative formed metal items weatherproof.

E. Install concealed gaskets, joint fillers, sealants, and insulation, as the Work progresses, to make interior decorative formed metal items soundproof or lightproof as applicable to type of fabrication indicated.

F. Corrosion Protection: Apply bituminous paint or other permanent separation materials on concealed surfaces where metals would otherwise be in direct contact with substrate materials that are incompatible or could result in corrosion or deterioration of either material or finish.

3.3 ADJUSTING AND CLEANING

A. Unless otherwise indicated, clean metals by washing thoroughly with clean water and soap, rinsing with clean water, and drying with soft cloths.

B. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

1. Apply by brush or spray to provide a minimum 2.0-mil dry film thickness.

C. Restore finishes damaged during installation and construction period so no evidence remains of correction work. Return items that cannot be refinished in the field to the shop; make required alterations and refinish entire unit or provide new units.

3.4 PROTECTION

A. Protect finishes of decorative formed metal items from damage during construction period. Remove temporary protective coverings at time of Substantial Completion.

END OF SECTION 05 7500

SECTION 057513 – LUMINARIA METAL PANELS AND ATTACHMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Drawings and general provisions of the Contract, including Part 1- “General Provisions” of the Greenbook and Whitebook apply to work within this Section.

B. Section Includes:

1. Exterior metal of the luminaria panels.
2. Exterior metal of the luminaria base panels.
3. Concealed hinges and door stops.
4. Locks.
5. Light covers.
6. Attachment of luminaria panels to structural support.

C. Related Sections:

1. Division 05 "Metal Fabrications" for non-decorative metal fabrications.
2. Division 26 “Exterior Lighting” for exterior power, lighting and controls.

1.2 PERFORMANCE REQUIREMENTS

A. Delegated Design: Design exterior formed metal items, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

B. Structural Performance: Exterior formed metal items, including anchors, brackets and connections shall withstand the effects of gravity loads and the following loads and stresses without exceeding the allowable design working stress of materials involved and without exhibiting permanent deformation in any components:

1. Wind Loads on Exterior Items: As defined on the Structural Drawings.

C. Seismic Performance: As defined on the Structural Drawings.

D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.

E. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

1.3 ACTION SUBMITTALS

A. Submit in accordance with Part 1- "General Provisions" of the Greenbook and Whitebook.

B. Shop Drawings: Showing details of manufactured or assembled products proposed to be incorporated into the Work.

1. Include plans, elevations and component details of electrical and lighting equipment.

C. Product Data: For each type of product indicated. Include finishing materials.

D. Working Drawings: Show fabrication and installation details for luminaria panels and base panels and attachment system to structural support.

1. Include plans, elevations, component details, and attachments to other work.
2. Indicate materials and profiles of each metal member, fittings, joinery, finishes, fasteners, anchorages, and accessory items.

E. Samples for Initial Selection: For products involving selection of color, texture and including mechanical finishes.

F. Samples for Verification: After initial selection samples are approved submit samples for each type of exposed finish required, prepared on 18-inch wide by 36-inch long rectangular samples of metal of same thickness and material indicated for the Work.

1. Include the range of perforation as shown on the Drawings with the specified mechanical finish.
2. Include a sample of a weld and joinery between two panels.

G. Delegated-Design Submittal: For fabricated and installed products indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.4 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: For decorative metal elements that house items specified in other Sections. Show dimensions of housed items such as lights, drivers, junction boxes, etc including locations of housing penetrations and attachments and necessary clearances.

B. Qualification Data: For qualified installer, fabricator and professional engineer.

C. Mill Certificates: Signed by stainless-steel manufacturers certifying that products furnished comply with requirements.

D. Welding certificates.

1.5 QUALITY ASSURANCE

A. Fabricator Qualifications: A firm experienced in producing luminaria panels similar to that indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
   1. Acceptable Fabricators:
      a. Hanset Stainless Inc, Portland , OR
      b. CMF Inc., Orange, CA
      c. JLMC, Inc. Ontario, CA
      d. California Sheet Metal Works, Inc., El Cajon, CA
      e. Or Approved Equal

B. Installer Qualifications: Fabricator of products.

C. Welding Qualifications: Qualify procedures and personnel according to the following:

   1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
   2. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum."
   3. AWS D1.3, "Structural Welding Code - Sheet Steel."
   4. AWS D1.6, "Structural Welding Code - Stainless Steel."

D. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.

   1. Build mockups for the following types of luminaria panels

      a. Luminaria Panels showing the full range of perforations, inside corners and outside corners.

      b. Luminaria Panels showing concealed welds and or fasteners at stainless steel attachment arms.

      c. Luminria Base Panels showing lapped panels at corner conditions and the joint between the corner panels.

   2. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

E. Preinstallation Conference: Conduct conference at Project site.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver luminaria panel products wrapped in protective coverings and strapped together in suitable packs or in heavy-duty cartons. Remove protective coverings before they stain or bond to finished surfaces.

B. Store products on elevated platforms in a dry location.

1.7 PROJECT CONDITIONS

A. Field Measurements: Verify actual locations of footings, frames, columns, and other construction contiguous with luminaria panels by field measurements before fabrication and indicate measurements on Working Drawings.

1.8 COORDINATION

A. Coordinate installation of anchorages for items. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, brackets, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

B. Coordinate installation of luminaria panels with adjacent construction to ensure that assemblies, stone veneer, and joint sealants, are protected against damage from the effects of weather, age, corrosion, and other causes.

PART 2 - PRODUCTS

2.1 LUMINARIA PANELS

A. General: Provide sheet metal without pitting, seam marks, roller marks, stains, discolorations, or other imperfections where exposed to view on finished units.

B. Stainless-Steel Sheet: ASTM A 240/A 240M (chemical) or ASTM A 666 (temper), Type 316, stretcher-leveled standard of flatness.

1. Thickness: 12 gauge

2.2 LUMINARIA BASE PANELS

A. General: Provide plate metal without pitting, seam marks, roller marks, stains, discolorations, or other imperfections where exposed to view on finished units.

B. Stainless-Steel Plate: ASTM A 240/A 240M or ASTM A 666, Type 316, stretcher-leveled standard of flatness.

1. Thickness: 3/16-inch

2.3 CONCEALED HINGES

A. General: Provide stainless steel type 304 concealed hinges capable of supporting base door and access door.

1. Manufacturer and Model: EMKA, Inc. number, 1006-U1-PC or approved equal.

2.4 DOOR STOPS

A. General: Provide stainless steel type 316 door stop to prevent the base door from closing once opened. Door opening shall be 90 degrees.

1. Manufacturer and Model: EMKA, Inc. number, 1087-U or approved equal.

2.5 LOCKS

A. General: Provide stainless steel type 304 metal quarter turn cam locks and keys. Keys for access and base doors shall be different but the same for each luminaria. Depth of cylinder sized to fit width of door assembly

1. Manufacturer and Model: EMKA, Inc. number, 1048-U6-PH or approved equal.

2.6 LIGHT COVER

A. General: Provide abrasion resistant polycarbonate sheet without scratches, discolorations, or other imperfections where exposed to view on finished units.

1. Model: Makrolon AR abrasion resistant polycarbonate sheet or approved equal.

2.7 MISCELLANEOUS MATERIALS

A. Stainless-Steel Bars, Rods and Shapes: ASTM A 276, Type 316.

B. Gaskets: As required to seal joints in luminaria panels and remain weathertight and not allow light to escape; as recommended in writing by metal panel manufacturer.

1. ASTM D 1056, Type 1, Class A, grade as recommended by gasket manufacturer to obtain seal for application indicated.
2. Provide 50 year warranty.

C. Filler Metal and Electrodes: Provide type and alloy of filler metal and electrodes as recommended by producer of metal to be welded or brazed and as necessary for strength, corrosion resistance and compatibility in fabricated items.

1. Use filler metals that will match the color of metal being joined and will not cause discoloration.

D. Fasteners: Fabricated from same basic metal and alloy as fastened metal unless otherwise indicated. Do not use metals that are incompatible with materials joined.

1. Provide concealed fasteners for interconnecting luminaria panels and for attaching them to other work. Exposed fasteners are not allowed nor the standard fastening method.

E. Anchor Materials:
1. Material for Exterior Locations and Where Stainless Steel Is Indicated: stainless-steel bolts, ASTM F 593 and nuts ASTM F 594.

2.8 FABRICATION, GENERAL

A. Shop Assembly: Preassemble luminaria panel items in shop to greatest extent possible. Field welding is not allowed. Punching perforation openings in panel not allowed. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

B. Coordinate dimensions and attachment methods of luminaria panel items with those of adjoining construction to produce integrated assemblies with closely fitting joints and with edges and surfaces aligned unless otherwise indicated.

C. Form metal to profiles indicated, in maximum lengths to minimize joints. Produce flat, flush surfaces without cracking or grain separation at bends. Fold back exposed edges of unsupported sheet metal to form a 1/2-inch wide hem on the concealed side, or ease edges to a radius of approximately 1/32 inch and support with concealed stiffeners.

D. Increase metal thickness or reinforce with concealed stiffeners, backing materials, or both, as needed to provide surface flatness equivalent to stretcher-leveled standard of flatness and sufficient strength for indicated use.

1. Support joints with concealed stiffeners as needed to hold exposed faces of adjoining sheets in flush alignment.

E. Build in straps, plates, and brackets as needed to support and anchor fabricated items to adjoining construction. Reinforce luminaria panels as needed to attach and support other construction.

1. Reinforcements, support members and attachments shall be concealed, shall not overlap perforations and be unexposed to sight.

F. Provide support framing with attachments to structural support members, mounting and attachment clips, splice sleeves, fasteners, and accessories needed to install luminaria panel items.

G. Where welding or brazing is indicated, weld or braze joints and seams continuously. Grind, fill, and dress to produce smooth, flush, exposed surfaces in which joints are not visible after finishing is completed.

1. Use welding and brazing procedures that will blend with and not cause discoloration of metal being joined.

2.9 GENERAL FINISH REQUIREMENTS

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Complete mechanical finishes of flat sheet metal surfaces before fabrication where possible. After fabrication, finish all joints, bends, abrasions, and other surface blemishes to match sheet finish.

C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

D. Appearance of Finished Work: Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.10 STAINLESS-STEEL FINISHES

A. General: Luminaria perforated and lapped and corner base panels shall the same finish.

B. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.

C. Bright, Cold-Rolled, Unpolished Finish: No. 2B with non-directional mechanical finish applied so when metal is viewed from any angle there is no pattern or grain.

D. Create perforations in metal panels using water jetting or laser cutting process. When complete, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of decorative formed metal.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Locate and place luminaria panel items level and plumb and in alignment with adjacent construction. Perform cutting, drilling, and fitting required to install.

1. Do not cut or abrade finishes that cannot be completely restored in the field. Return items with such finishes to the shop for required alterations, followed by complete refinishing, or provide new units as required.

B. Use concealed anchorages.

C. Form tight joints with exposed connections accurately fitted together.

D. Install concealed gaskets, joint fillers, sealants, as the Work progresses, to make interior luminaria panel items lightproof as applicable to the joints between metal.

3.3 ADJUSTING AND CLEANING

A. Unless otherwise indicated, clean metals by washing thoroughly with clean water and soap, rinsing with clean water, and drying with soft cloths.

B. Restore finishes damaged during installation and construction period so no evidence remains of correction work. Return items that cannot be refinished in the field to the shop; make required alterations and refinish entire unit or provide new units.

C. Adjust door swings and closures so doors close flush with base panel. Adjust lock chambers and levers so door is tight against frame when lever is in the locked position.

3.4 PROTECTION

A. Protect finishes of luminaria panel items from damage during construction period. Remove temporary protective coverings at time of Substantial Completion.

END OF SECTION 057513

SECTION 05 9100 - HISTORIC TREATMENT OF ORNAMENTAL METAL

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes general removal and protection procedures for the restoration of ornamental metals.
   1. Cleaning metal.
   2. Removing corrosion.
   3. Removing paint and priming for repainting.
   4. Stabilizing and protecting metal.
   5. Repairing metal and replacing damaged and missing components in place.
   6. Removing and dismantling metal for shop repair, replacement of components, and refinishing; reinstalling repaired metal.
   7. Painting steel uncovered during the Work of this Section.

B. RELATED SECTIONS
   1. Section 01 1610 Historic Salvage
   2. Section 01 3591 Historic Treatment Procedures
   3. Section 02 2070 Selective Demo

1.2 RELATED DOCUMENTS

1. Drawings and General Provisions of Contract, including General and Supplementary Provisions and other Division 1 Specifications Sections, apply to this Section.
2. Standard Specifications for Public Works Construction (Greenbook) Current Edition.
3. 2012 Standard Specifications for Public Works Construction (Whitebook)
4. The Secretary of the Interior’s Standards for the Treatment of Historic Properties (1995 Edition).This document contains *The Standards* which are Federal codified preservation standards.
5. Conservation Report dated 7/7/09, prepared by Griswold Conservation Associates LLC.

1.3 SUMMARY

A. Restoration of various metal surfaces
   1. Bronze Plaques
   2. Copper alloy column capitals
   3. Upper and Lower Cupola Domes
   4. Copper alloy (Bronze) filigree
   5. Stanchions and Chains

1.4 DEFINITIONS

A. General: See Section 01 3591 "Special Procedures for Historic Treatment" for other definitions.

B. Conservator: A person with advanced training in science, studio arts and art history, and with experience in applying manual skills and theoretical knowledge towards the preservation of artistic and historic works.

C. Design Reference Sample: A mock-up sample that represents the Owner’s Representative's prebid selection of work to be matched; it may be existing work or work specially produced for the Project.

D. Dismantling Specialist: a person with training and experience in applying manual skills and knowledge of the means and methods to disassemble assemblies with minimal damage to the historic feature. A dismantling specialist must have experience in dismantling materials found on this project.

E. Historic: Surfaces, materials, finishes, and overall appearance which are important to the successful preservation / rehabilitation as determined by Owner's Representative. Designated historic and surfaces are indicated on Drawings and scheduled in this Section.

F. Historic Treatment Program: Written document that identifies historic fabric to be encountered and describes the means and methods used to salvage and restore historic features.

G. Historic Treatment Specialist: Conservator.

H. In-Kind Replication: An exact copy of an original feature. Reproductions shall match size, material, and details exactly.

I. Match: To blend with adjacent construction and manifest no apparent difference in material type, species, cut, form, detail, color, grain, texture, or finish; as approved by Owner's Representative.

J. Mock-up: An example of a repair or replicated element intended to be used in the work or example of a repair.

K. Patina: Any desirable surface quality acquired by a building element or work of art over time, especially when exposed to the elements.

L. Reconstruct: To remove existing item, replicate damaged or missing components, and reinstall in original position.

M. Refinish: To remove existing finishes to base material and apply new finish to match original, or as otherwise indicated.

N. Reinstall: To protect removed or dismantled item, repair and clean it as indicated for reuse, and reinstall it in original position, or where indicated.

O. Remove: Detach an item from existing construction to the limits indicated using approved tools and equipment. Salvage or dispose per Owner's Representative direction.

P. Salvage: To remove or dismantle items to be restored and reinstalled in the work unless otherwise directed by the Owner's Representative. Salvage includes transit and storage of items at a location as directed by the Owner's Representative.

Q. Strip: To remove existing finish down to base material unless otherwise indicated.

R. Low-Pressure Spray: 100 to 400 psi; 4 to 6 gpm.

S. Medium-Pressure Spray: 400 to 800 psi; 4 to 6 gpm.

T. High-Pressure Spray: 800 to 1200 psi; 4 to 6 gpm.

1.5 PRECONSTRUCTION ACTIVITIES

A. Review GCA Conservation Report dated 7/8/2009.

B. Conservator to provide written and photographic documentation of condition before treatment as part of the development of the **Historic Treatment Program**.

C. Conservator to locate and evaluate the effectiveness of treatment materials and methods found in Section 6 of the above referenced GCA conservation report.

D. Preconstruction Testing: Conservator to perform preconstruction testing on each type of historic metal.

1. Confirm types of metal identified in the GCA conservation report.
2. Confirm availability of recommended conservation materials.
3. Select sizes and configurations of existing work to adequately demonstrate capability of products to comply with requirements.
4. Test the recommended treatment methods for effectiveness and compliance with specified requirements.
5. Notify Owner's Representative seven days in advance of the dates and times when testing will be performed.

1.6 ACTION SUBMITTALS

A. Historic Treatment Program: See specification section 01 3591-1.6D for the content requirements of the Historic Treatment Plan.

B. Inventory of Salvaged Items: Provide update of the inventory at each project site meeting.

C. Product Data: For each type of product indicated. Include recommendations for application and use. Include test data substantiating that products comply with requirements.

D. Shop Drawings: For repair and replacement of decorative metal items and components. Show location and extent of replacement work, with enlarged details of replacement parts indicating materials, profiles, methods of attachment, accessory items, and finishes. Include field-verified dimensions and the following:

1. Full-size patterns with complete dimensions for new decorative metal components and their jointing, showing relation of existing to new components.
2. Templates and directions for installing anchor bolts and other anchorages.
3. Identification of each new metal item and component and its location on the structure in annotated plans and elevations.
4. Provisions for expansion weep holes and conduits as required for each location and exposure.
5. Provisions for sealant joints.

E. Samples for Verification: For the following items in sizes indicated, finished as required for use in the Work:

1. Each type of new material to be used for replacing existing or missing decorative metal; 6 inches long in least dimension or whole item.

    a. Patterns for Casting: Before manufacturing new cast components, submit the actual patterns from which molds will be made for casting new components. Package and ship to prevent loss or damage, or if local to site, make patterns available for inspection by Owner's Representative at fabrication plant.
    b. For new castings, provide one of each shape, color, and texture of component, suitable and ready for installation. Make this submittal after acceptance of patterns for casting.

2. Fittings and brackets.

3. Each type of exposed connection between components. Show method of finishing components at intersections.
4. Each type of exposed finish prepared on metal of the same alloy to be used for the Work of this Section; 6 inches long in least dimension.
5. Sealant Materials.
6. Accessories: Each type of anchor, accessory, and miscellaneous support in required finishes.

1.7 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Conservator, Historic Treatment Specialist and Dismantling Specialist.

B. Preconstruction Test Reports: For historic treatment of decorative metal.

1.8 MATERIALS MAINTENANCE SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents, including material, finish, source, and location on building.

B. Molds for Castings: On completion of manufacturing of cast components, deliver one unused mold of each shape and size of component to Project site. Deliver to a location and at a time determined by Owner's Representative, to become property of Owner.

1. Deliver molds carefully packed, protected from dirt, moisture, and breakage and in usable, undamaged condition.

2. Return original casting to Owner's Representative in same condition that it was accepted. Remove all foreign substances such as bond breakers and attachments for casting prior to return.

1.9 QUALITY ASSURANCE

A. All work shall comply with *"The Secretary of the Interior's Standards for the Treatment of Historic Properties"* (1995 Edition).

B. Salvage, storage, restoration and reinstallation of historic items shall comply with the American Institute for Conservation of Historic and Artistic Works "Code of Ethics and Standards of Practice" (Latest Edition).

C. Historic Treatment Specialist (Conservator) Qualifications: See qualifications as specified in Section 01-3591.

D. Dismantling Specialist Qualifications: See qualifications as specified in Section 01-3591.

E. Historic Treatment Program: Part of the HTP will include a written plan for historic treatment of decorative metal, including each phase or process, protection of surrounding materials during operations, and control of runoff during cleaning, paint removal, and other processes. Describe in detail materials, methods, and equipment to be used for each phase of work. Show compliance with indicated methods and procedures related to historic treatment of decorative metal specified in this and other Sections.

F. Mockups: Build mockups to demonstrate aesthetic effects and set quality standards for materials and execution and for fabrication and installation. Prepare mockups so they are inconspicuous or reversible.

1. Locate mockups in locations that enable viewing under same conditions as the completed Work.
2. Cleaning: Prepare an area approximately 2 sq. ft. for each process on each type of metal indicated for cleaning.
3. Cleaning and Waxing Bronze Metalwork: Clean and wax an area approximately 2 sq. ft. of each metal type.
4. Repairing Decorative Metal Finish: Repair finish of one decorative for each type of metal finish indicated to be repaired.
5. Casting Metal Components: Submit patterns, models, or plaster castings made from existing decorative metal for each replacement casting required.
6. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Owner's Representative specifically approves such deviations in writing.
7. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

G. Preinstallation Conference: Conduct conference at Project site.

1. Review methods and procedures related to historic treatment of decorative metal including, but not limited to, the following:

   a. Construction Schedule: Verify availability of materials, personnel, equipment, and facilities needed to make progress and avoid delays.
   b. Materials, material application, sequencing, tolerances, and required clearances.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Pack, deliver, and store decorative metal items in suitable packs, heavy-duty cartons, or wooden crates; surround with sufficient packing material to ensure that products will not be deformed, cracked, or otherwise damaged.

B. Store decorative metal inside a well-ventilated area, away from uncured concrete and masonry and protected from weather, moisture, soiling, abrasion, extreme temperatures, and humidity.

C. Protect strippable protective covering on decorative metal from exposure to sunlight and high humidity, except to the extent necessary for the period of decorative metal installation.

1.11 PROJECT CONDITIONS

A. Weather Limitations: Proceed with historic treatment of decorative metal only when existing and forecasted weather conditions are within the environmental limits set by each manufacturer's written instructions and specified requirements.

1. Provide enclosures as needed if forecasted conditions are at variance with the scheduled work causing a delay in the progress of work and such enclosures could provide acceptable work conditions.

B. Concealed and undocumented historic items, relics, and similar objects encountered during historic treatment remain Owner's property. Carefully dismantle and salvage each item or object.

1. Coordinate with Owner's Conservator, who will establish special procedures for dismantling and salvage.

PART 2 - PRODUCTS

2.1 METAL MATERIALS

A. General: Provide decorative metal materials composed of the alloys, forms, and types that match existing metals and have the ability to receive finishes matching existing finishes unless otherwise indicated. Exposed-to-view surfaces exhibiting imperfections inconsistent with existing materials are unacceptable.

B. Copper Alloys, Bronze: Copper alloy designated below for each form required:

1. Extruded Shapes: ASTM B 455, alloy UNS No. C38500 (extruded architectural bronze, 57 percent copper and 40 percent zinc).
2. Plate, Sheet, Strip, and Bars: ASTM B 36/B 36M, alloy UNS No. C28000 (muntz metal, 60 percent copper and 40 percent zinc).
3. Seamless Pipe: ASTM B 43, alloy UNS No. C23000 (red brass, 85 percent copper and 15 percent zinc).
4. Seamless Tubes: ASTM B 135, alloy UNS No. C23000 (red brass, 85 percent copper and 15 percent zinc).
5. Sand Castings: ASTM B 584, alloy UNS No. C86500 (No. 1 manganese bronze; 58 percent copper, 39 percent zinc, 1 percent manganese, and small amounts of other metals).

C. Copper Alloys, Brass: Copper alloy designated below for each form required:

1. Extruded Shapes: ASTM B 249/B 249M, alloy UNS No. C36000 (free-cutting brass, 60 percent copper, 36 percent zinc, and small amounts of other metals).
2. Plate, Sheet, Strip, and Bars: ASTM B 36/B 36M, alloy UNS No. C26000 (cartridge brass, 70 percent copper and 30 percent zinc).
3. Seamless Tubes: ASTM B 135, alloy UNS No. C26000 (cartridge brass, 70 percent copper and 30 percent zinc).
4. Sand Castings: ASTM B 584, alloy UNS No. C85200 (high-copper yellow brass, 72 percent copper, 24 percent zinc, and small amounts of other metals).

D. Stainless Steel: Grade designated below for each form required:

1. Tubing: ASTM A 554**, Grade MT-316**.
2. Pipe: ASTM A 312/A 312M, **Grade TP316**.
3. Strip, Plate, and Flat Bar: ASTM A 666, **Type 316**.
4. Bars and Shapes: ASTM A 276, **Type 316**.

E. Steel: Standard and grade designated below for each form required:

1. Tubing: Cold formed, ASTM A 500.
2. Steel Plate, Shapes, and Bars: ASTM A 36/A 36M.
3. Steel Bars: ASTM A 29/A 29M, Grade 1010.
4. Steel Sheet: ASTM A 1008/A 1008M, cold-rolled commercial steel sheet; matte finish; suitable for exposed applications.

2.2 CLEANING MATERIALS

A. Manufacturers of Chemical Cleaners: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Misco Products Corporation

2. PMC Specialties Group
3. PROSOCO, Inc.

B. Distilled Water

C. Bronze Corrosion Removal: Passivate corrosion on bronze with Benzotriazole (BTA) “Cobratec-99” PMC Specialties Group.

D. Job-Mixed Detergent Solution: Solution prepared by mixing 2 cups of tetrasodium polyphosphate, 1/2 cup of laundry detergent, 5 quarts of 5 percent sodium hypochlorite bleach, and 15 quarts of hot water for every 5 gal. of solution required.

E. Nonacidic Liquid Chemical Cleaner: Manufacturer's standard mildly alkaline liquid cleaner, formulated for removing organic soiling from ordinary building materials including copper, brass, bronze, aluminum, stainless steel.

F. Abrasive Materials:

1. Abrasive Pads for Copper-Alloy Cleaning: Extra fine bronze wool or plastic (nylon) abrasive pads. Use least abrasive pad necessary being used for the greatest area of the surface.

2. Abrasive for severely caked areas on bronze: Carborundum paper sanding sponge.
3. Abrasives for Ferrous Metal Cleaning: Aluminum oxide paper, emery paper, fine steel wool, steel scrapers, and steel-wire brushes of various sizes.

2.3 PAINT REMOVERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering neutral based environmentally friendly products that may be incorporated into the Work include, but are not limited to, the following:

1. Back to Nature Products Company.
2. Cathedral Stone Products, Inc.
3. Dumond Chemicals, Inc.
4. PROSOCO, Inc.

B. Covered or Skin-Forming Alkaline Paint Remover: Manufacturer's standard covered or skin-forming alkaline formulation for removing paint from metal.

C. Low-Odor, Solvent-Type Paint Remover: Manufacturer's standard low-odor, water-rinsable solvent-type gel formulation, containing no methanol or methylene chloride, for removing paint from metals.

D. Lead Based Paints: All paint on existing metals is to be considered lead-based paints unless tested and shown to be otherwise. Removal of paints shall be abated by a licensed abatement contractor and properly disposed.

2.4 PROTECTIVE COATING MATERIALS

A. Wax Coating of Copper Alloy: Inert, high-melting-point wax or wax blend of carnauba and solvent.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Butcher Company (The); Division of JohnsonDiversey; Butcher's White Diamond Bowling Alley Wax. Or equal.

b. Carnauba/microcrystalline blend shall contain no silicon oils.

2.5 MISCELLANEOUS MATERIALS

A. Welding Electrodes and Filler Metal: Select according to AWS specifications for metal alloy welded; use metal type and alloy as recommended by producer of metal to be welded or filled and as required for color match, strength, and compatibility in fabricated items.

B. Brazing Rods: For copper-alloy components, provide type and alloy as recommended by producer of metal to be brazed and as required for color match, strength, and compatibility in fabricated items.

C. Fasteners: Fasteners of same basic metal as fastened metal unless otherwise indicated. Use metals that are noncorrosive and compatible with each metal joined.

1. Match existing fasteners in material and in type of fastener unless otherwise indicated.
2. Use concealed fasteners for interconnecting decorative metal components and for attaching them to other work unless exposed fasteners are unavoidable or the historic fastening method.
3. For exposed fasteners, match the head type and profile of historic machine screws.
4. Screws shall match/or be compatible with materials being fastened.
5. Finish exposed fasteners to match finish of metal fastened unless otherwise indicated.

D. Anchors: types indicated on Drawings with bolt heads of same basic metal as fastened metal unless otherwise indicated. Use metals that are specified and are noncorrosive and compatible with each metal anchored.

1. Strength: Capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and equal to four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488 conducted by a qualified independent testing agency.

E. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107/C 1107M. Provide grout specifically recommended by manufacturer for exterior applications.

F. Anchoring Cement: Factory-packaged, nonshrink, nonstaining, hydraulic-controlled expansion cement formulation for mixing with water at Project site to create pourable anchoring, patching, and grouting compound.

1. Water-Resistant Product: At all locations, provide formulation that is resistant to erosion from water exposure without needing protection by a sealer or waterproof coating, and that is recommended by manufacturer for exterior use.

G. Sealant Materials:

1. Provide manufacturer's standard chemically curing, elastomeric single-component, nonsag urethane sealant complying with applicable requirements in Section "Joint Sealants."
2. Colors: Provide clear or colors of exposed sealants to custom match colors of metals in which sealant is placed unless otherwise indicated.

H. Liquid Strippable Masking Agent: Manufacturer's standard liquid, film-forming, strippable masking material for protecting glass, metal, and polished stone surfaces from damaging effects of acidic and alkaline cleaners.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. ABR Products, Inc.; Rubber Mask.
b. PROSOCO, Inc.; Sure Klean Strippable Masking.

I. Masking Tape: Nonstaining, nonabsorbent material; compatible with chemical solutions being used and substrate surfaces; and that will easily come off entirely, including adhesive.

J. Miscellaneous Products: Base selection of materials and methods of use on the following, subject to approval of a mockup:

1. Previous effectiveness in performing the work involved.
2. Little possibility of damaging exposed surfaces.
3. Consistency of each application.
4. Uniformity of the resulting overall appearance.
5. Do not use products or tools that could do the following:

a. Remove, alter, or in any way harm the present condition or future preservation of surfaces, including surrounding surfaces not in contract.
b. Leave an unintended residue on surfaces.

2.6 METAL FABRICATION

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Allen Architectural Metals, Inc., New York, Telephone 800-204-3858, www.allenmetals.com
2. Alloy Casting Co., Inc., 151 West Union Street, East Bridgewater, MA 02333, telephone: 508-378-2541, www.alloycastings.com
3. Historical Arts & Casting, Inc., 5580 West Bagley Park Road, West Jordan, UT 84081, telephone: 800-225-1414, www.historicalarts.com
4. Bellagio Pre-Cast: 3216 Island Ave. San Diego, CA 92101, telephone 858-361-3458.

B. Fabricate decorative metal items and components in sizes and profiles to match existing decorative metal, with accurate curves, lines, and angles. Mill joints to a tight, hairline fit. Form assemblies and joints exposed to weather to resist water penetration and retention.

C. Provide rebates, lugs, and brackets necessary to assemble components and to attach to existing work. Drill and tap for required fasteners. Use concealed fasteners where possible; use exposed fasteners to match existing work.

D. Comply with AWS for recommended practices in welding and brazing. Provide welds and brazes behind finished surfaces without distorting or discoloring exposed side. Clean exposed welded and brazed joints of flux, and dress exposed and contact surfaces.

E. Castings: Fabricate castings free of warp, cracks, blowholes, or other defects that impair strength or appearance. Grind, wire brush, sandblast, and buff castings to remove seams, gate marks, casting flash, and other casting marks.

F. Date Identification: Emboss on a concealed, interior surface of the metal body of each new component, in easily read characters, "MADE 2014." Manufacturer's name may also be embossed. For malleable metals, stamp identification with an imprinting tool.

2.7 FINISHES, GENERAL

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.8 COPPER-ALLOY FINISHES

A. General: Prepare metals preserving patina and finish copper-alloy with wax coating as noted in this section.

2.9 IRON FINISHES

A. Repair Primer: Manufacturer's standard, rust-inhibiting, fast-curing, lead- and chromate-free, universal primer, compatible with firmly adhered existing paint and applied finish. Comply with coating manufacturer's written instructions for cleaning, pretreatment, application, and minimum dry-film thickness.

B. Finish Primer: Primer complying with applicable requirements in Section 09 9100 "Painting" for finish painting of primed metal.

2.10 STEEL FINISHES

A. Repair Primer: Manufacturer's standard, rust-inhibiting, fast-curing, lead- and chromate-free, universal primer, compatible with firmly adhered existing paint and applied finish. Comply with coating manufacturer's written instructions for cleaning, pretreatment, application, and minimum dry-film thickness.

B. Finish Primer: Primer complying with applicable requirements in Section 09 9100 "Painting" for finish painting of primed decorative metal.

2.11 STAINLESS-STEEL FINISHES

A. Surface Preparation: Remove foreign materials, contaminants, and labels from surface.

B. Restored Finish: Grind and polish surfaces to produce uniform, directionally textured, polished free of cross scratches. Run grain to match existing metal. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

PART 3 - EXECUTION

3.1 HISTORIC TREATMENT SPECIALIST

A. Historic Treatment Specialist Firms: Contractor’s Conservator is to provide guidance to the contractor in means and methods for metal treatments.

3.2 PREPARATION

A. General: Protect persons, motor vehicles, building site, plants, surrounding surfaces of building being restored, and surrounding buildings from harm resulting from historic treatment of decorative metal.

1. Erect temporary protective covers over walkways and at points of pedestrian and vehicular entrance and exit that must remain in service during course of historic treatment Work.

2. Sequence work in such a way to prevent later work from causing harmful effects to restored finishes.

B. Comply with chemical-product manufacturer's written instructions for protecting building and other surfaces against damage from exposure to its products. Prevent chemical solutions from coming into contact with people, motor vehicles, landscaping, buildings, and other surfaces that could be harmed by such contact.

1. Cover adjacent surfaces with materials that are proven to resist chemical solutions being used unless the solutions will not damage adjacent surfaces. Apply masking agents to comply with manufacturer's written instructions. Do not apply liquid strippable masking agent to painted or porous surfaces. When no longer needed, promptly remove masking to prevent adhesive staining.
2. Keep wall wet below area being treated to prevent streaking from runoff.
3. Do not apply chemical solutions during winds of sufficient force to spread them to unprotected surfaces.
4. Neutralize and collect alkaline and acid wastes for disposal off Owner's property.
5. Dispose of runoff from operations by legal means and in a manner that prevents soil erosion, undermining of paving and foundations, damage to landscaping, and water penetration into building interiors.

3.3 HISTORIC TREATMENT PROCEDURES, GENERAL

A. General: Have historic treatment of decorative metal work directed by a qualified historic treatment specialist (Conservator). Ensure that historic treatment specialist's designated field supervisors are present when decorative metal work begins and during its progress. In treating historic items, disturb them as minimally as possible and as follows.

1. Stabilize decorative metal to reestablish structural integrity and weather resistance while maintaining the existing form of each item.
2. Stop the progress of deterioration and corrosion by removing deteriorated coatings and corrosion and reapplying protective coatings.
3. Preserve the patina of historic metals to the greatest extent possible.
4. Replace or reproduce historic items where indicated or scheduled.
5. Provide protection during disassembly and when transporting assemblies to avoid damaging materials and assemblies.

B. Mechanical Coating Removal: Use only the most gentle mechanical methods, such as scraping and wire brushing, that will not abrade metal substrate. Do not use abrasive methods such as sanding or power tools except as indicated as part of the Historic Treatment Program and approved by Owner's Representative.

C. Repair Decorative Metal Item: Match existing materials and features, retaining as much original material as possible to complete the repair.

1. Unless otherwise indicated, repair decorative metals by patching, piecing-in, splicing, or otherwise reinforcing metals with new metal matching existing metal.
2. Where indicated, repair decorative metal by limited replacement matching existing material.

D. Replace Decorative Metal Component: Where indicated, duplicate and replace items with new metal matching existing metal or replacement metal as specified in the documents.

1. When directed by Conservator or Owner's Representative, replace heavily deteriorated or missing parts or features of decorative metal with compatible materials, using surviving prototypes to create patterns or molds for duplicate replacements.
2. Do not use substitute materials unless otherwise indicated.

E. Repair Finish of Decorative Metal Item: Restore areas of deteriorated or missing finish and blend restored finish with existing, adjacent finish, including integral polished and patinated finishes, plated finishes, and finishes of wood components.

F. Repaint: Prepare interior painted decorative metal by cleaning surface, removing less than firmly adhered existing paint, sanding edges smooth, and priming for painting as specified.

3.4 CLEANING

A. General: Use only those methods indicated for each type of decorative metal. Apply materials to all surfaces, corners, contours, and interstices, to provide a uniform final appearance without streaks. After work is complete, remove protection no longer required. Remove tape and adhesive marks.

1. Brushes: Use brushes that are resistant to chemicals being used. Do not use plastic-bristle brushes if natural-fiber brushes will resist chemicals being used.

2. Follow the means and methods prescribed in the Historic Treatment Program.

B. Water Cleaning: Clean with water applied by low-pressure spray. Supplement with bristle brush. Use small brushes to remove soil from joints and crevices.

C. Detergent Cleaning: Scrub surface with detergent solution and bristle brush until soil is thoroughly dislodged and can be removed by rinsing. Use small brushes to remove soil from joints and crevices. Dip brush in solution often to ensure that adequate fresh detergent is used and that surface remains wet.

1. Rinse with water applied by low-pressure spray to remove detergent solution and soil.
2. Repeat cleaning procedure where required to produce cleaning effect established by mockup.

D. Chemical Cleaning: Apply chemical cleaner to surfaces according to chemical cleaner manufacturer's written instructions unless otherwise indicated.in the Historic Treatment Program. Dilute chemical cleaners with water to produce solutions not exceeding concentration recommended by chemical-cleaner manufacturer.
1. Neutralize chemical residue to a pH of 7 using manufacturer's recommended chemical neutralizer, and rinse where applicable.

2. Rinse with water applied by low-pressure spray to remove chemicals and soil.
3. Do not rinse ferrous metals with water; neutralize chemical cleaner on ferrous metals as recommended by manufacturer. Dry immediately with clean soft cloths. Follow direction of grain in metal.
4. Repeat cleaning procedure where required to produce cleaning effect established by mockup. Do not repeat more than once.

E. Cleaning with Abrasive Pads: Clean surfaces to remove dirt, leaving uniform patina intact, by light rubbing with abrasive pads using specified chemicals and water.

3.5 PAINT REMOVAL

A. General: Use only those methods indicated for each type of decorative metal as prescribed in the Historica Treatment Program. Apply materials to all surfaces, corners, contours, and interstices, to provide a uniform final appearance without streaks. After work is complete, remove protection no longer required. Remove tape and adhesive marks.

B. Paint Removal with Low-Odor, Solvent-Type Paint Remover:

1. Remove loose and peeling paint using water, scrapers, stiff brushes, or a combination of these. Let surface dry thoroughly.
2. Apply thick coating of paint remover to painted decorative metal with natural-fiber cleaning brush, deep-nap roller, or large paintbrush.
3. Allow paint remover to remain on surface for period recommended by manufacturer. Agitate periodically with stiff-fiber brush.
4. Repeat process if necessary to remove all paint.

3.6 PROTECTIVE COATING

A. Protective Hot-Wax Coating: Apply uniform wax coating with brushes to metal substrate that has been preheated to about 175 deg F; buff to produce uniform appearance without runs or other surface imperfections.

3.7 FIELD QUALITY CONTROL

A. Inspectors: Owner will engage a Conservator to perform inspections and prepare test reports. Allow inspectors use of lift devices and scaffolding, as needed, to perform inspections.

B. Notify inspectors in advance of times when lift devices and scaffolding will be relocated. Do not relocate lift devices and scaffolding until inspectors have had reasonable opportunity to inspect work areas at locations of lift devices or scaffolding.

3.8 REMOVAL, REPAIR, AND REINSTALLATION

A. General: Perform removal, dismantling, repair, and reinstallation work as required in Section 01 3591 "Historic Treatment Procedures."

B. Dismantling Specialist will be employed by the Contractor to direct all dismantling operations.

C. Reinstalling Ornamental Metal Assemblies: Reinstall assemblies with protective coverings and safety devices to avoid damage to historic finishes.

D. Installing Sealant at Glazing
   1. Follow means and methods prescribed in the Historic Treatment Program.
   2. Clean and prepare joint surfaces.
   3. Protect restored historic surfaces from spills and overflows of sealant.
   4. Fill sealant joints fully, embed glass for a watertight joint.
   5. Remove all sealants from exposed surfaces of glazing and metal.

E. Installing Sealant at Assemblies:

   1. After metal reinstallation, keep joints to receive sealant dry and free of debris.
   2. Clean and prepare joint surfaces according to Section 07 9200 "Joint Sealants." Prime joint surfaces unless sealant manufacturer recommends against priming. Do not allow primer to spill or migrate onto adjoining surfaces.
   3. Fill sealant joints with specified joint sealant as recommended by sealant manufacturer and according to Section 07 9200 "Joint Sealants" and the following:

      a. Install sealant using only proven installation methods that ensure sealant is deposited in a uniform, continuous ribbon, without gaps or air pockets, and with complete wetting of the joint bond surfaces equally on both sides. Fill joint flush with surrounding metal.
      b. Do not allow sealant to overflow or spill onto adjoining surfaces or to migrate into the voids of adjoining surfaces, particularly rough or sculptural textures. Promptly remove excess and spillage of sealant as the work progresses. Clean adjoining surfaces by means necessary to eliminate evidence of spillage, without damage to adjoining surfaces or finishes, as demonstrated in an approved mockup.

   4. Cure sealant according to Section 07 9200 "Joint Sealants."

3.9 PAINTING STEEL UNCOVERED DURING THE WORK

A. Inspect steel exposed during historic treatment. Where Owner’s Representative determines that the steel is structural or that it cannot be totally removed for other reasons, prepare and paint the steel as follows:

   1. Immediately paint exposed steel with two coats of antirust coating, following coating manufacturer's written instructions and without exceeding manufacturer's recommended rate of application (dry-film thickness per coat).

B. If on inspection and rust removal the thickness of a steel member is found to be reduced by more than 1/8 inch, notify Owner’s Representative before proceeding.

3.10 FINAL INSPECTION

A. Following completion of all work as prescribed in the documents and Historic Treatment Program, inspect all ornamental metal surfaces for damaged finishes. Make repairs as required.

B. Inspect the interior of fountain vault following initiation of water systems and operational fountain for leaks in the area of the ornamental metals. Locate and seal water leaks for a water tight assembly.

END OF SECTION 05 9100

SECTION 06 1600 – EXTERIOR SHEATHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Exterior gypsum sheathing.
2. Roof parapet wall sheathing

B. Related Requirements:

1. Section 07 25 00 "Weather Barriers" for water-resistive barrier applied over wall sheathing.
2. Section 07 54 19 “PVC Roofing” for insulation and/or separation board applied over roof deck.
3. Section 09 29 00 “Gypsum Board” for interior finish panels

1.3 ACTION SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

1.4 QUALITY ASSURANCE

A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.

B. Single Source Responsibility: Obtain each type of board and related joint treatment materials from a single manufacturer.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Stack panels flat with spacers beneath and between each bundle to provide air circulation. Protect sheathing from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 EXTERIOR GYPSUM SHEATHING

A. Glass-Mat Gypsum Wall Sheathing: ASTM C 1177/1177M.

1. Products: Subject to compliance with requirements, provide one of the following:
   a. G-P Gypsum Corporation; Dens-Glass Gold.
   b. CertainTeed Corporation; GlasRoc.

2. Type and Thickness: 1/2 inch (13 mm) or Type X, 5/8 inch (15.9 mm) thick as required for assembly being installed.

2.2 ROOF PARAPET WALL SHEATHING

A. Glass-Mat Siliconized Gypsum Sheathing:

1. Products: Subject to compliance with requirements, provide one of the following:
   a. G-P Gypsum Corporation; Dens-Deck Prime (no known equal)
2. Nominal Thickness: 1/2 inch (13 mm).
3. Size: 48 by 96 inches (1219 by 2438 mm).

2.3 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.

B. Screws for Fastening Sheathing to Cold-Formed Metal Framing: Steel drill screws, in length recommended by sheathing manufacturer for thickness of sheathing to be attached, with organic-polymer or other corrosion-protective coating having a salt-spray resistance of more than 800 hours according to ASTM B 117.
   1. For steel framing from 0.033 to 0.112 inch (0.84 to 2.84 mm) thick, use screws that comply with ASTM C 954.

2.4 SHEATHING JOINT-AND-PENETRATION TREATMENT MATERIALS

A. Sealant for Glass-Mat Gypsum Sheathing: Silicone emulsion sealant complying with ASTM C 834, compatible with sheathing tape and sheathing and recommended by tape and sheathing manufacturers for use with glass-fiber sheathing tape and for covering exposed fasteners.

1. Sheathing Tape: Self-adhering glass-fiber tape, minimum 2 inches (50 mm) wide, 10 by 10 or 10 by 20 threads/inch (390 by 390 or 390 by 780 threads/m), of type recommended by sheathing and tape manufacturers for use with silicone emulsion sealant in sealing joints in glass-mat gypsum sheathing and with a history of successful in-service use.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement. Arrange joints so that pieces do not span between fewer than three support members.

B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.

C. Coordinate sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.

D. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.

E. Coordinate sheathing installation with installation of materials installed over sheathing so sheathing is not exposed to precipitation or left exposed at end of the workday when rain is forecast.

3.2 GYPSUM SHEATHING INSTALLATION

A. Comply with GA-253 and with manufacturer's written instructions.
   1. Fasten gypsum sheathing to cold-formed metal framing with screws.
   2. Install boards with a 3/8-inch (9.5-mm) gap where non-load-bearing construction abuts structural elements.
   3. Install boards with a 1/4-inch (6.4-mm) gap where they abut masonry or similar materials that might retain moisture, to prevent wicking.

B. Apply fasteners so heads bear tightly against face of sheathing, but do not cut into facing.

C. Horizontal Installation: Install sheathing with V-grooved edge down and tongue edge up, gold side toward exterior. Interlock tongue with groove to bring long edges in contact with edges of adjacent boards without forcing. Abut ends of boards over centers of studs, and stagger end joints of adjacent boards not less than one stud spacing. Attach boards at perimeter and within field of board to each steel stud.

   1. Space fasteners approximately 8 inches (200 mm) o.c. and set back a minimum of 3/8 inch (9.5 mm) from edges and ends of boards.
   2. For sheathing under stucco cladding, boards may be initially tacked in place with screws if overlying self-furring metal lath is screw-attached through sheathing to studs immediately after sheathing is installed.

D. Vertical Installation: Install board vertical edges centered over studs. Abut ends and edges of each board with those of adjacent boards. Attach boards at perimeter and within field of board to each stud.

1. Space fasteners approximately 8 inches (200 mm) o.c. and set back a minimum of 3/8 inch (9.5 mm) from edges and ends of boards.
2. For sheathing under stucco cladding, boards may be initially tacked in place with screws if overlying self-furring metal lath is screw-attached through sheathing to studs immediately after sheathing is installed.

E. Seal sheathing joints according to sheathing manufacturer's written instructions.
1. Apply glass-fiber sheathing tape to glass-mat gypsum sheathing joints and apply and trowel silicone emulsion sealant to embed entire face of tape in sealant. Apply sealant to exposed fasteners with a trowel so fasteners are completely covered. Seal other penetrations and openings.

END OF SECTION 06 1600

SECTION 07 1413 - HOT FLUID-APPLIED RUBBERIZED ASPHALT WATERPROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Furnish and install a complete monolithic rubberized-asphalt fiber-reinforced waterproofing assembly with protection layers, flashings, drainage layers, root barrier and other items for below grade vertical walls and planters.
2. Furnish and install a complete monolithic rubberized-asphalt fiber-reinforced waterproofing assembly with protection layers, flashings, drainage layers, and other items for horizontal exterior pedestrian decks with concrete topping slab.
3. Prefabricated drainage composite system for below-grade vertical wall applications and horizontal exterior pedestrian deck applications.
4. Furnish and install a complete monolithic rubberized-asphalt fiber-reinforced waterproofing assembly with protection layers, flashings, drainage layers (where indicated), root barrier, insulation (where indicated) and other items for horizontal decks below vegetated roof assemblies.

B. Related Sections:

1. Section 07 62 00 "Sheet Metal Flashing and Trim" for sheet metal flashings.
2. Section 07 92 00 "Joint Sealants" for joint-sealant materials and installation.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include manufacturer's written instructions for evaluating, preparing, and treating substrate, technical data, and tested physical and performance properties of waterproofing.

B. Shop Drawings: Show locations and extent of waterproofing. Include details for substrate joints and cracks, sheet flashings, penetrations, inside and outside corners, tie-ins to adjoining waterproofing, and other termination conditions.

C. Samples: For the following products in manufacturer's standard sizes unless otherwise indicated:

1. Drainage panels and collection system.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer.

B. Product Test Reports: For waterproofing, based on evaluation of comprehensive tests performed by a qualified testing agency.

C. Field quality-control reports.

D. Warranties: Sample of special warranties.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: A firm that is approved or licensed by manufacturer for installation of waterproofing required for this Project and is eligible to receive special warranties specified.

B. Source Limitations: Obtain waterproofing materials molded-sheet drainage panels from single source from single manufacturer.

C. Preinstallation Conference: Conduct conference at Project site.

1. Review waterproofing requirements including surface preparation, substrate condition and pretreatment, minimum curing period, forecasted weather conditions, special details and sheet flashings, installation procedures, testing and inspection procedures, and protection and repairs.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by waterproofing manufacturer.

B. Remove and replace liquid materials that cannot be applied within their stated shelf life.

C. Protect stored materials from direct sunlight.

1.7 PROJECT CONDITIONS

A. Environmental Limitations: Apply waterproofing within the range of ambient and substrate temperatures recommended by waterproofing manufacturer. Do not apply waterproofing to a damp or wet substrate, or when temperature is below 0 deg F (minus 18 deg C).

1. Do not apply waterproofing in rain, fog, or mist.

B. Maintain adequate ventilation during application and curing of waterproofing materials.

C. When used in conjunction with a waterproofing membrane, the drainage system shall be installed to the waterproofing protection course by methods approved by the waterproofing material manufacturer.

D. Drainage panels shall not be left exposed for longer than recommended by the manufacturer.

1.8 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace waterproofing and sheet flashings that do not comply with requirements or that fail to remain watertight within specified warranty period.

1. Warranty Period: 15 years from date of Substantial Completion.

B. Special Installer's Warranty: Specified form signed by Installer, covering Work of this Section, for warranty period of two years.

PART 2 - PRODUCTS

2.1 WATERPROOFING MEMBRANE

A. Basis-of-Design Product: Subject to compliance with requirements, provide American Hydrotech, Inc.; Monolithic Membrane 6125EV-FR, or comparable product by one of the following:

1. Carlisle Coatings & Waterproofing Inc.; CCW-500R.
2. Tremco Incorporated; Tremproof 150 HRA.

B. Hot Fluid-Applied, Rubberized-Asphalt Waterproofing Membrane: Single component; 100 percent solids; hot fluid-applied, rubberized asphalt.

2.2 FLASHING SHEET MATERIALS

A. Elastomeric Flashing Sheet: 50-mil- (1.3-mm-) minimum, uncured sheet neoprene as follows:

1. Tensile Strength: 1400 psi (9.6 MPa) minimum; ASTM D 412, Die C.
2. Elongation: 300 percent minimum; ASTM D 412.
3. Tear Resistance: 125 psi (860 kPa) minimum; ASTM D 624, Die C.
4. Brittleness: Does not break at minus 30 deg F (34 deg C); ASTM D 2137.

2.3 AUXILIARY MATERIALS

A. Primer: ASTM D 41, asphaltic primer.

B. Elastomeric Sheet: 50-mil- (1.3-mm-) minimum, uncured sheet neoprene as follows:

1. Tensile Strength: 1400 psi (9.6 MPa) minimum; ASTM D 412, Die C.
2. Elongation: 300 percent minimum; ASTM D 412.
3. Tear Resistance: 125 psi (860 kPa) minimum; ASTM D 624, Die C.
4. Brittleness: Does not break at minus 30 deg F (34 deg C); ASTM D 2137.

C. Metal Termination Bars: Manufacturer's standard, predrilled stainless-steel or aluminum termination bars; approximately 1 by 1/8 inch (25 by 3 mm) thick; with anchors.

D. Sealants and Accessories: Manufacturer's recommended sealants and accessories.

E. Reinforcing Fabric: Manufacturer's recommended, spun-bonded polyester fabric.

F. Protection Course: Manufacturer's standard, fiberglass-reinforced rubberized asphalt. American Hydrotech Hydroflex 30 or approved equal.

G. Root Barrier Protection Course (Use at all planters and vegetated roof decks): A 160 mil (4 mm) thick polyester reinforced, modified asphalt sheet with granular surface and root inhibiting additive.

1. American Hydrotech Hydroflex RBII or approved equal.

2.4 MOLDED-SHEET DRAINAGE SYSTEMS

A. Vertical Below Grade Application:

1. Non-woven-Geotextile-Faced, Molded-Sheet Drainage Panel: Manufactured composite subsurface drainage panels consisting of a nonwoven, needle-punched geotextile facing with an apparent opening size not exceeding No. 40 (0.42-mm) sieve, laminated to one side with a polymeric film bonded to the other side of a studded, nonbiodegradable, molded-plastic-sheet drainage core, with a vertical flow rate of 17 gpm/ft. (211 L/min. per m).
   a. American Hydrotech Hydrodrain 400 or approved equal.
2. Prefabricated Drainage Collection System: JDR Enterprises, Inc., J-Drain SWD-12 Modular Drainage System and J-Drain SWD Collection System, or approved equal, including manufacturer’s standard prefabricated end and side outlets, splices, corner fittings, with 4 IN. diameter female connector for connection to 4 IN. diameter piping system and all accessories as recommended by the manufacturer for a complete drainage collection system.

B. Horizontal Below Topping Slab and Horizontal Vegetated Roof Assembly Applications:

1. Non-woven-Geotextile-Faced, Molded-Sheet Drainage Panel: Manufactured composite drainage panels consisting of a non-woven, needle-punched geotextile facing with an apparent opening size not exceeding No. 70 (0.21-mm) sieve, laminated to one side of a polyethylene geonet-type drainage core, with a vertical flow rate of 8.5 gpm/ft. (106 L/min. per m).
   a. American Hydrotech Hydrodrain 300 or approved equal as recommended by membrane manufacturer for horizontal application.

2.5 RIGID BOARD INSULATION

A. Material: Extruded polystyrene rigid board insulation.

1. STYROFOAM® Brand insulation, RoofMate as manufactured by The Dow Chemical Company, or as recommended and approved by roof assembly manufacturer.

B. Insulation shall meet ASTM C-578, Type VI or VII.

C. Minimum compressive strength, ASTM D-1621, 40 psi (276 or 414 kPa) (variance by type of product)

D. Maximum water absorption by volume per ASTM C-272,0.1%

E. Water vapor permeance for 1" product per ASTM E-96, 1.0 perm (max.) (63 ng/Pa/s/m^2)

F. Insulation shall have an R value of 5.0°F ft^2 h/Btu/in. (0.88 K m^2/W) of thickness when tested at 75°F (23.9°C) mean temperature in accordance with ASTM C-518
1. Provide as required to achieve a minimum R-25 value over concrete deck at vegetated roofs.

G. Product shall be free of CFC's

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

1. Verify that concrete has cured and aged for minimum time period recommended by waterproofing manufacturer.
2. Verify that substrate is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D 4263.

B. Flood Testing: Flood test planters and vegetated roof deck area for leaks, according to recommendations in ASTM D 5957, after completing and protecting membrane roofing but before placing overlaying construction or concealing structure below. Install temporary containment assemblies, plug or dam drains, and flood with potable water.

1. Flood to an average depth of 2-1/2 inches (65 mm,) with a minimum depth of 1 inch (25 mm) and a maximum depth of 4 inches (100 mm). Maintain 2 inches (50 mm) of clearance from top of sheet flashings.
2. Flood each area for 48 hours.

C. Proceed with installation only after unsatisfactory conditions have been corrected. The roofing contractor shall not proceed with the installation of the roof membrane assembly until all roof defects have been corrected.

3.2 PREPARATION

A. Clean and prepare substrates according to manufacturer's written instructions. Provide clean, dust-free, and dry substrate for waterproofing application.

B. Mask off adjoining surfaces not receiving waterproofing to prevent spillage and overspray affecting other construction.

C. Remove fins, ridges, and other projections and fill honeycomb, aggregate pockets, and other voids.

3.3 JOINTS, CRACKS, AND TERMINATIONS

A. Prepare and treat substrates to receive waterproofing membrane, including joints and cracks, corners, and penetrations according to manufacturer's written instructions.

1. Rout and fill joints and cracks in substrate. Before filling, remove dust and dirt according to ASTM D 4258.
2. Adhere strip of elastomeric sheet to substrate in a layer of hot rubberized asphalt. Extend elastomeric sheet a minimum of 6 inches (150 mm) on each side of moving joints and cracks or joints and cracks exceeding 1/8 inch (3 mm) thick, and beyond deck drains and penetrations. Apply second layer of hot fluid-applied, rubberized asphalt over elastomeric sheet.
3. Embed strip of reinforcing fabric into a layer of hot rubberized asphalt. Extend reinforcing fabric a minimum of 6 inches (150 mm) on each side of nonmoving joints and cracks not exceeding 1/8 inch (3 mm) thick, and beyond roof drains and penetrations.

    a. Apply second layer of hot fluid-applied, rubberized asphalt over reinforcing fabric.

3.4 FLASHING INSTALLATION

A. Install elastomeric flashing sheets at terminations of waterproofing membrane according to manufacturer's written instructions.

B. Prime substrate with asphalt primer.

C. Install elastomeric flashing sheet and adhere to deck and wall substrates in a layer of hot rubberized asphalt.

D. Install termination bars and mechanically fasten to top of Hydroflex RB in planters at terminations and perimeter of waterproofing.

3.5 MEMBRANE APPLICATION

A. Apply primer, at manufacturer's recommended rate, over prepared substrate and allow to dry.

B. Heat and apply rubberized asphalt according to manufacturer's written instructions.

1. Heat rubberized asphalt in an oil- or air-jacketed melter with mechanical agitator specifically designed for heating rubberized asphalt.

C. Reinforced Membrane: Apply hot rubberized asphalt to substrates and adjoining surfaces indicated. Spread to a thickness of 90 mils (2.3 mm); embed reinforcing fabric, overlapping sheets 2 inches (50 mm); spread another 125-mil- (3.2-mm-) thick layer to provide a uniform, reinforced, seamless membrane 215 mils (5.5 mm) thick.

D. Apply waterproofing over prepared joints and up vertical surfaces to heights indicated or required by manufacturer.

E. Cover waterproofing with protection course with overlapped joints.

F. Root Barrier: (Use as protection at sides and bottom of all planters including vegetated roof assemblies)
1. Embed root barrier into the membrane while it is still hot to ensure a good bond.
2. Overlap adjoining sheet edges 4” and seal laps with a torch.

3.6 MOLDED-SHEET DRAINAGE PANEL INSTALLATION

A. General: Place and secure molded-sheet drainage panels, with geotextile facing away from wall or deck substrate according to manufacturer's written instructions. Use methods that do not penetrate waterproofing. Lap edges and ends of geotextile to maintain continuity. Protect installed molded-sheet drainage panels during subsequent construction.

1. Install protection course, insulation and/or drainage collection system before installing sheet drainage panels.

B. For Vertical Wall Applications: Install prefabricated drainage collection system in a vertical foundation wall to a horizontal footing configuration. Use methods that do not penetrate waterproofing. Install drainage panels in shingle fashion by overlapping the flange of the collection system in the direction of water flow and cover with filter fabric. Cover all terminal edges of the core with the fabric flap by tucking it behind the core. Leaving the filter fabric in place, slide the connector outlet over the horizontal portion of the collection system and wrap with filter fabric. Protect installed molded-sheet drainage panels during subsequent construction.

1. Drainage panel system shall not be left exposed to UV for more than 60 calendar days from installation.

3.7 INSULATION INSTALLATION

A. Install insulation board that is thicker than 2-1/2” in multiple layers to achieve required thickness over root barrier and waterproofed surfaces. Cut and fit to within 3/4 inch (19 mm) of projections and penetrations.

B. On horizontal surfaces, loosely lay insulation units according to manufacturer's written instructions. Stagger end joints and tightly abut insulation units.

3.8 FIELD QUALITY CONTROL

A. Engage a site representative qualified by waterproofing membrane manufacturer to inspect substrate conditions; surface preparation; and application of the membrane, flashings, protection, and drainage components; furnish reports to “Owner’s Representative”.

3.9 CLEANING AND PROTECTION

A. Protect waterproofing from damage and wear during remainder of construction period.

B. Protect installed drainage panels from damage, physical abuse, and other causes. Provide temporary coverings where panels will be subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

C. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 07 1413

SECTION 07 2100 - THERMAL INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Glass-fiber blanket insulation.

B. Related Sections:
1. Division 09 Section(s) "Gypsum Board" for installation in metal-framed assemblies of insulation specified by referencing this Section.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each product.

1.4 QUALITY ASSURANCE

A. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Protect insulation materials from physical damage and from deterioration due to moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

PART 2 - PRODUCTS

2.1 GLASS-FIBER BLANKET INSULATION

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. CertainTeed Corporation.
2. Guardian Building Products, Inc.
3. Johns Manville.
4. Knauf Insulation.
5. Owens Corning.

B. Unfaced, Glass-Fiber Blanket Insulation and Sound Batts: ASTM C 665, Type I; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics.

C. Reinforced-Foil-Faced, Glass-Fiber Blanket Insulation: ASTM C 665, Type III (reflective faced), Class A (faced surface with a flame-spread index of 25 or less); Category 1 (membrane is a vapor barrier), faced with foil scrim, foil-scrim kraft, or foil-scrim polyethylene.

D. R-Value: Minimum R-13 at all exterior walls and R-30 at horizontal surfaces, unless otherwise indicated on drawings.

2.2 INSULATION FASTENERS

A. Adhesively Attached, Spindle-Type Anchors: Plate welded to projecting spindle; capable of holding insulation of specified thickness securely in position indicated with self-locking washer in place.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

    a. AGM Industries, Inc.; Series T TACTOO Insul-Hangers.
    b. Gemco; Spindle Type.

2. Plate: Perforated, galvanized carbon-steel sheet, 0.030 inch (0.762 mm) thick by 2 inches (50 mm) square.
3. Spindle: Copper-coated, low-carbon steel; fully annealed; 0.105 inch (2.67 mm) in diameter; length to suit depth of insulation indicated.

B. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch- (0.41-mm-) thick galvanized-steel sheet, with beveled edge for increased stiffness, sized as required to hold insulation securely in place, but not less than 1-1/2 inches (38 mm) square or in diameter.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

    a. AGM Industries, Inc.; RC150 or SC150.
    b. Gemco; Dome-Cap, R-150 or S-150.

C. Anchor Adhesive: Product with demonstrated capability to bond insulation anchors securely to substrates indicated without damaging insulation, fasteners, and substrates.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

    a. AGM Industries, Inc.; TACTOO Adhesive.
    b. Gemco; Tuff Bond Hanger Adhesive.

PART 3 - EXECUTION

3.1 PREPARATION

A. Clean substrates of substances that are harmful to insulation or vapor retarders, including removing projections capable of puncturing vapor retarders, or that interfere with insulation attachment.

3.2 INSTALLATION, GENERAL

A. Comply with insulation manufacturer's written instructions applicable to products and applications indicated.

B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.

C. Extend insulation to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

D. Provide sizes to fit applications indicated and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units to produce thickness indicated unless multiple layers are otherwise shown or required to make up total thickness.

3.3 INSTALLATION OF INSULATION FOR FRAMED CONSTRUCTION

A. Apply insulation units to substrates by method indicated, complying with manufacturer's written instructions. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.

B. Glass-Fiber Blanket Insulation: Install in cavities formed by framing members according to the following requirements:

1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
3. Maintain 3-inch (76-mm) clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.

4. For metal-framed wall cavities where cavity heights exceed 96 inches (2438 mm), support unfaced blankets mechanically and support faced blankets by taping flanges of insulation to flanges of metal studs.
5. Vapor-Retarder-Faced Blankets: Tape joints and ruptures in vapor-retarder facings, and seal each continuous area of insulation to ensure airtight installation. Install in locations as follows:

    a. Exterior Walls: Set units with facing placed toward exterior of construction.

3.4 PROTECTION

A. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION 07 2100

SECTION 07 2500 - WEATHER-RESISTIVE BARRIER

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes exterior wall, above grade, breathable underlayment. This product may also be called “Weather Resistant Barrier” (WRB) on Drawings.

B. Related Sections:

1. Division 06 Section “Sheathing” for exterior sheathing board.

1.3 REFERENCES

A. AATCC Test Method 127 - Water Resistance: Hydrostatic Pressure Test; 1998.

B. ASTM E 84 – Standard Test Method for Surface Burning Characteristics of Building Materials.

C. ASTM E 96 - Standard Test Methods for Water Vapor Transmission of Materials; Compliant with Procedure B (Water Method) for interior to exterior testing.

1.4 SUBMITTALS

A. Product Data: Include manufacturer's written instructions, technical data, and tested physical and performance properties of breathable underlayment.

B. Shop Drawings: Combine and coordinate this with Shop Drawings for Related Sections noted above Provide 1-1/2” scale drawings (or larger) showing relationship of underlayment to:

1. Framing or blocking members.
2. Girts.
3. Thermal Insulation.
4. Sheathing.
5. All exterior cladding and corner conditions.
6. Door or window frames.
    a. Sill pans.
7. Pipe, Conduit and Duct penetrations.
    a. Include actual manufactured “weather-heads.”

C. Samples:

1. 8-1/2-x-6-inch square of breathable underlayment sheet in each color.
2. Tapes (Single & Double-Sided).
3. Factory fabricated window-opening corners.
4. 12” long section of sill-saver pan.
5. Provide materials and fasteners for mock-ups specified in other sections.

1.5 QUALITY ASSURANCE

A. Underlayment manufacturer shall have an on-going quality control program with inspections by a nationally recognized independent organization and shall be so labeled.

B. Source Limitations: Obtain all breathable underlayment through one source from a single manufacturer.

C. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1. Review requirements for underlayment, including surface preparation specified under other Sections, substrate condition and pretreatment, temporary weather protection, forecasted weather conditions, special details and sheet flashings, installation procedures, testing and inspection procedures, and protection and repairs.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project site in original containers with seals unbroken, wrapped in a polythene sleeve, labeled with manufacturer's name, and product brand name.

B. Store rolls under cover, on a clean, level surface, either flat or upright.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Product:
1. Spun Bonded Polypropylene: Underlayment shall be furnished in standard rolls of 59” high (1-1/2 meters) and 164 feet (50 meters) long.
   a. WrapShield™ by VaproShield™ L.L.C., distributed by W.H. Steele Co., phone (909) 930-0831. www.VaproShield.com
   b. Dupont: Tyvek Commercial Wrap.
   c. Raven Industries Inc, Fortress Pro Weather Protective Barrier.
   d. or approved equal.

2.2 UNDERLAYMENT PHYSICAL PROPERTIES

A. Thickness and Weight: 0.023 inches thick and 5.161 oz./ sq. yd.

B. Boat Test: Pass

C. Air Barrier: ASTM 1677, Type 1 and ASTM E283 @ 75 Pa Less than 0.020 L/sqr. meter

D. Water Vapor Transmission: 50 perms per ASTM E 96-00, Method B (as tested by CNRC).

E. Water Penetration Resistance: “pass” per ATTCC-127.

F. Color:
1. Primary Layer: Orange.
2. Joint Flashing for Ultra Violet Protection: Black

G. Surface Burning Characteristics: ASTM E 84-97A
1. Flame Spread: Class A
2. Smoke Developed: Class A

2.3 AUXILIARY MATERIALS

A. Underlayment Flashing Rolls: VaproFlashing and VaproFlashing Factory Formed Corners for use in wrapping openings, distributed by VaproShield L.L.C.

1. Factory Formed Corners
   a. VaproFlashing Factory Formed Corners 18" x 18", distributed by VaproShield L.L.C
   b. Others as may be approved by Architect.
2. Small Penetration Flashing
   a. As manufactured by Quick-Flash Inc., www.quickflashproducts.com
   b. Others as may be approved by Architect.
3. Window sill pan
   a. SillSaver sill pan, distributed by VaproShield L.L.C.
   b. Others as may be approved by Architect.

B. Tape
1. Single-Sided Tape:
   a. VaproTape (Seam-Seal) for use to secure WrapShield™ to itself and to substrates, distributed by VaproShield L.L.C./Manufactured by Eternabond.
      1) Grey, 2" wide, to be installed in areas where it will not be seen or exposed to direct sunlight.
      2) Grey, 3" wide, to be installed in areas where it will not be seen or exposed to direct sunlight.
      3) Black, 4" wide, to be installed in areas where it will be seen or exposed to direct sunlight.
   b. A-Foil, 4-1/2" wide by 20 mil, UV stable, moisture-resistant, self priming flashing and transition aluminum faced tape to be installed in areas around doors and windows that do not have metal flashing, where adhesion of silicone caulk is required.
   c. Others as may be approved by Architect.
2. Double-Sided Sealing Tape
   a. 1" VaproTape (Double-Sided) for use to seal WrapShield™ to itself and to substrates, distributed by VaproShield L.L.C/Manufactured by Eternabond.
   b. One inch wide butyl rubber tape, subject to approval of the Architect.
   c. Others as may be approved by Architect.

C. Fasteners

1. Fasteners: Minimum No. 12-gage [0.019-inch-shank-diameter (2.11mm)] stainless steel nails having a minimum 3/8-inch diameter (9.5 mm) head, or minimum No. 14 gage [0.083-inch-shank-diameter (2.11 mm)] stainless steel nails having a 1-inch-

diameter (25.4 mm) caps, or minimum No. 16 gage [0.065-inch-leg-diameter (1.65 mm)] stainless steel staples having minimum 7/16-inch (11.1 mm) crowns.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with installer present, for compliance with requirements and other conditions affecting performance.

3.2 SURFACE PREPARATION

A. Clean and prepare substrate according to manufacturer's written recommendations. Provide clean, and dry substrate for breathable underlayment application.

3.3 PENETRATIONS

A. Pipes and Conduit: Install manufactured penetration sleeves sized for the penetration and installed as recommended by the manufacturer.

B. Windows:

1. Secure prefabricated VaproFlashing Factory Formed Corners at windowsill ends. Next, lay strip of breathable underlayment across sill. Secure with tape or mechanical fasteners so that the underlayment used for the wall can be slipped underneath the corners and sill, allowing for a minimum lap of 4 inches.
2. Wrap a strip of breathable underlayment around jambs extending horizontally along walls a minimum of 9 inches.
3. Secure VaproShield Factory Formed Corners at ends of window head. Next, lay strip of breathable underlayment across the opening, extending horizontally beyond the corners a minimum of 6 inches.
    a. Cut underlayment along the leading edge of the header an inch or two beyond each jamb, so that the nailing flange of the window may side up behind the underlayment.

C. Doors:

1. Wrap a strip of breathable underlayment around jambs, extending horizontally along walls a minimum of 9 inches.
    a. Secure VaproShield Factory Formed Corners at ends of door head. Next, lay strip of breathable underlayment across the opening, extending horizontally beyond the corners a minimum of 6 inches.
    b. Cut underlayment along the leading edge of the header, an inch or two beyond each jamb, so that the nailing flange of the door may side up behind the underlayment.

D. Open Joints:
1. At all Open Joints where Panel Joints are further apart than 12”, attach the 4” Black Joint Flashing breathable underlayment with no lettering behind each open joint, to

hide the Orange layer, and to increase the Ultra Violet protection through the Open Joint.

2. At all open joints where the Panel Joints are closer than 12" apart, a second layer of Black WrapShield is to be installed over the primary layer, as a U.V. protecting layer behind the open joints. All open joint applications require a double layer of membrane.

3.4 BREATHABLE UNDERLAYMENT APPLICATION

A. Install membranes in accordance with manufacturer's instructions over exterior sheathing. Secure the underlayment so that the subsurface is protected from weather until cladding can be installed.
   1. First, wrap penetrations as specified and detailed.
   2. Next, starting from the bottom, unroll the underlayment, orange side out, mechanically fastening top and bottom, 2'-0" on center.
   3. Seal against jambs of openings with 1" VaproTape (Double-Sided).
   4. Vertical laps shall be a minimum of 6" with taped joints or 12" without tape. All vertical laps above windows or other openings are to be taped. Horizontal laps do not need tape if they are laped a minimum of 6".
   5. Install aluminum faced tape at transition to all non-compatible materials and as required to provide a compatible backing for silicone sealants.

3.5 FIELD QUALITY CONTROL

A. Owner may engage an independent inspector to observe substrate and installation. Inspector shall provide a written, sign-off log, on all penetrations before the underlayment is placed against them. Architect shall approve form of log before contract with inspection service is approved.

3.6 PROTECTING AND CLEANING

A. Protect installed breathable underlayment from damage due to harmful weather exposures, physical abuse, and other causes.

   1. Repair torn breathable underlayment as follows:
      a. Insert a full height piece of underlayment extending 12 inches horizontally beyond the damage and extend up and under the underlayment above. Mechanically attach underlayment to substrate top and bottom.

B. Remove mud and similar marks with a water scrub. If chemicals have been spilled on underlayment, treat as a tear and repair as stated above.

END OF SECTION 07 2500

SECTION 07 42 13

METAL WALL AND SOFFIT PANELS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Factory-formed, zinc-alloy, metal wall and soffit panel system.

1.2 RELATED SECTIONS

A. Section 092216 – Non-Structural Metal Framing: Secondary support framing supporting metal wall panels.

1.3 REFERENCES

A. ASTM B 32 – Standard Specification for Solder Metal.

B. ASTM D 968 – Standard Test Methods for Abrasion Resistance of Organic Coatings by Falling Abrasive.

C. ASTM D 1970 – Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection.

D. ASTM E 96 – Standard Test Methods for Water Vapor Transmission of Materials.

1.4 SYSTEM DESCRIPTION

A. Provide complete Flatlock metal wall and soffit panel system as indicated, including:
   1. Factory-formed, zinc-alloy, metal wall and soffit panels.
   2. Attachment system components.

B. Thermal Movements:
   1. Provide metal wall and soffit panel system that allows for thermal movements.
   2. Provide clips that resist rotation and avoid shear stress as a result of metal wall and soffit panel system thermal movements.

1.5 SUBMITTALS

A. Product Data: Submit panel manufacturer's product data, including details of construction relative to materials, dimensions of individual components and profiles, finishes, and panel manufacturer's written and published installation instructions and installation guides.

B. Shop Drawings: Submit installer's shop drawings as verified by manufacturer, including plans, elevations, sections, and details, indicating installation layout of metal wall and soffit panel system, with keyed references to termination points. Include the following:
   1. Details of metal wall and soffit panels, including dimensions.
   2. Details for joining and securing metal wall and soffit panel system, including layout of fasteners, clips, and other attachments. Include pattern of seams.
   3. Details of special conditions.

4. Details of connections to adjoining work.
5. Details of required accessory items.
6. Metal wall and soffit panel system.

C. Samples for Verification: Submit panel manufacturer's samples for each type of exposed component required, including:
1. Metal Wall and Soffit Panel System: Minimum 24 inches (600 mm) long by standard panel width, including finished seams. Include fasteners and clips.
2. Trim and Closures: 24" long (600 mm) sample of each type of trim and closure, including fasteners cleats and components.
3. Accessories: 24" (600 mm) long sample of each type of accessory.

D. Qualification Data: Submit qualification data for panel manufacturer and installer to demonstrate capabilities and experience. Refer to AIA A305 Qualification Form as guide for submittal.

E. Warranties: Submit warranties from:
1. Manufacturer.
2. Installer.

1.6 QUALITY ASSURANCE

A. Panel Manufacturer's Qualifications: Manufactured a minimum of 250,000 square feet of metal wall panel systems of similar type to that specified.

B. Installer's Qualifications:
1. Engage an experienced installer who has completed metal wall panel system installation similar in material, design, forming method, and extent to that indicated for this Project and with a record of successful in-service performance.
2. Provide evidence of the field installer's participation in manufacturer's training course.

C. Metal Wall Panel System Standard: Comply with panel manufacturer's written and published instructions.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Delivery:
1. Inspect delivered materials within 5 days from date of delivery. Report damaged materials to panel manufacturer within 5 days.
2. Deliver materials to site in panel manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and panel manufacturer.
3. Deliver materials so as not to be damaged or deformed.
4. Package metal wall panels for protection during transportation and handling.
5. Leave strippable protective UV-resistant film on metal wall panels.

B. Storage and Handling:
1. Store materials in clean areas in accordance with manufacturer's instructions.
2. Unload, store, and erect metal panels in a manner to prevent bending, warping, twisting, and surface damage.

1.8 WARRANTY

A. Warranty Period:

1. Materials: 5 years from date of Substantial Completion. (Provided by the Panel Manufacturer.)
2. Installation: 2 years from date of Substantial Completion. (Provided by the Installer.)

PART 2 PRODUCTS

2.1 MANUFACTURER

A. Metal Wall and Soffit Panel Manufacturer: Umicore Building Products USA, Inc., 3600 Glenwood Ave. Suite 250, Raleigh, NC 27612. Phone (919) 874-7173. Fax (919) 874-7140. Website www.vmzinc-us.com. E-mail info@vmzinc-us.com.

2.2 METAL WALL AND SOFFIT PANELS

A. Metal: "VM ZINC® Flatlock" factory-formed, zinc-alloy, metal wall and soffit panel.
   1. Zinc Alloy: 99.995 percent electrolytic high-grade zinc with alloy additives of copper (0.08 percent to 0.20 percent), titanium (0.07 percent to 0.12 percent), and aluminum (0.015 percent).
   2. Thickness: 0.039 inch (1.00 mm).
   3. Surface Aspect:

      a. Preweathered Zinc: "QUARTZ ZINC". Dark gray zinc with luminance Y between 22 and 25 on exposed side or architect approved equal color management system.

   4. Dimensional Tolerances:
      a. Coverage: Plus or minus 1/8 inch (3 mm).
      b. Flatness: 1/8 inch (3 mm) on 36 inches (914 mm).
      c. Curvature: 1/32" (0.8mm).

B. Metal Wall and Soffit Panels:
   1. Form with flat-lock seam at panel edges and smooth, flat pan.
   2. Field install in sequential order.
   3. Engage lower edge of each panel to upper edge of panel below and engage right side of preceding panel's left side.
   4. Mechanically attach panels to supports using concealed clips engaged in upper and left seams of panels.

2.3 CLIPS AND FASTENERS FOR METAL WALL AND SOFFIT PANELS

A. Clips:
   1. Hot dip galvanized steel.
   2. Pre-punched for attachment into substrate.
   3. Thickness: 0.020" (0.5mm).
   4. Designed to withstand negative load requirements.

B. Fasteners for clip attachment to steel substrate:
   1. #12, hot dip galvanized steel, thread design and length appropriate for substrate.

C. Fasteners for clip attachment to wood substrate:
   1. #12, 300 series stainless steel, thread design and length appropriate for substrate.

D. Exposed Fasteners:
   1. Self tapping screws, bolts, self locking rivets and other suitable fasteners designed to withstand design loads.
   2. Material: 300 series stainless steel.
   3. Heads: Factory applied coating to match color of metal.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with installer present, for compliance with requirements for installation tolerances, metal wall and soffit panel supports, and other conditions affecting performance of work.
   1. Verify that substrate is plumb, sound, dry, smooth, clean, and completely anchored, and that provision has been made for penetrations through metal wall and soffit panels.
   2. Examine primary and secondary wall framing to verify that purlins, angles, channels, and other structural panel support members and anchorages have been installed correctly.
   3. Prepare written report, endorsed by installer, listing conditions detrimental to performance of Work of this section. Submit copy of report to Architect.

B. Examine roughing-in for components and systems penetrating metal wall and soffit panels to verify actual locations of penetrations relative to seam locations of metal wall and soffit panels before wall and soffit panel installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install metal wall and soffit panel in accordance with manufacturer's written and published instructions and installation guides.

B. Install panels in orientation and locations indicated on the Drawings.

C. Install metal wall and soffit panels plumb, level, square, true to line, and within installation tolerances.

D. Panel Installation:
   1. Install metal wall and soffit panels perpendicular to framing, unless otherwise indicated.
   2. Anchor metal wall and soffit panels and other components of the Work securely in place, with provisions for thermal and structural movement.
   3. Do not field-cut metal wall and soffit panels by torch.
   4. Fasten metal wall and soffit panels in accordance with manufacturer's instructions.
   5. Fasten trim around openings and similar elements.
   6. Do not allow construction debris to contaminate metal wall and soffit panels.

G. Fasteners: Use fasteners of type and size (per Manufacturer Recommendations) that will secure components in compliance with design load requirements.

H. Conceal fasteners and expansion provisions, where possible, in exposed work and locate to minimize possibility of leakage.

I. Fasten metal wall and soffit panels to substrate supports with concealed clips at each flat-lock joint at location, spacing, and with fasteners in accordance with manufacturer's instructions.
   1. Install clips to supports with specified fasteners.
   2. Nest flat-lock seams and fasten together by interlocking.

J. Metal Protection: Do not install metal wall and soffit panel system with non-compatible materials.

3.3 TOLERANCES

A. Installation Tolerances:
   1. Maximum Alignment per Panel Variation: 1/8 inch (3 mm).

3.4 CLEANING

A. Clean exposed metal surfaces in accordance with manufacturer's instructions.

B. Remove protective films within 60 days of installation.

C. Clean finished surfaces on completion of metal wall and soffit panel installation, including removing unused fasteners, metal filings, rivet stems, and pieces of flashing.

D. Maintain metal wall and soffit panels in clean condition during construction, removing all film on the same day.

3.5 PROTECTION

A. Protect installed metal wall and soffit panel system as per manufacturer's recommendation to ensure that, except for normal weathering, panel system will be without damage or deterioration at time of Substantial Completion.

END OF SECTION

SECTION 07 5419 - POLYVINYL-CHLORIDE (PVC) ROOFING

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes: Fully adhered feltbacked PVC thermoplastic roofing system complete with insulation (crickets) and separation board, flashings, and accessories for a watertight installation.

B. Related Sections:

1. Division 09 Section “Non-Structural Structural Metal Framing” for roof membrane termination bar backing straps.
2. Division 06 Section “Exterior Sheathing” for roof parapet wall sheathing.
3. Division 07 Section "Sheet Metal Flashing and Trim" for metal roof penetration flashings, flashings, and counterflashings.
4. Division 07 Section "Joint Sealants" for joint sealants, joint fillers, and joint preparation.

1.3 DEFINITIONS

A. Roofing Terminology: See ASTM D 1079 and glossary in NRCA's "The NRCA Roofing and Waterproofing Manual" for definition of terms related to roofing work in this Section.

1.4 PERFORMANCE REQUIREMENTS

A. General Performance: Installed membrane roofing and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Membrane roofing and base flashings shall remain watertight.

B. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by membrane roofing manufacturer based on testing and field experience.

C. Roofing System Design: Provide membrane roofing system that is identical to systems that have been successfully tested by a qualified testing and inspecting agency to resist uplift pressure calculated according to ASCE/SEI 7.

1. Fire/Windstorm Classification: Class 1-990 (Concrete deck) and I-75 (Metal Deck)
2. Hail Resistance: MH.

D. Energy Performance: Provide roofing system with initial solar reflectance not less than 0.70 and emissivity not less than 0.90 when tested according to CRRC-1.

1.5 SUBMITTALS

A. Product Data: For each type of product indicated.

1. List of each primary component to be used in roof system and Manufacturer's current literature for each component.
2. Manufacturer's agreement to guarantee terms including no exclusion for ponding water.
3. Letter from Roofing Manufacturer confirming that the Contractor is an authorized applicator of the specified roof system.
4. Wind rating and UL Class A fire rating.
5. Copy of Membrane Specifications including Physical Property Chart.

B. Shop Drawings: For roofing system. Include plans, elevations, sections, details, and attachments to other work.

1. Base flashings and membrane terminations.
2. Tapered insulation, for crickets.
3. Roof plan showing orientation of membrane roofing and fastening spacing and patterns for mechanically fastened separation board.
4. Insulation fastening patterns for corner, perimeter, and field-of-roof locations.

C. Samples for Verification: For the following products:

1. 6-by-6 inch square of sheet roofing, of color specified, including T-shaped side and end lap seam.
2. 6-by-6 inch square of roof insulation.
3. Walkway pads or rolls.
4. Metal termination bars.
5. 6 inch long edge flashing in color specified.

D. Qualification Data: For qualified Installer and manufacturer.

E. Manufacturer Certificates: Signed by roofing manufacturer certifying that roofing system complies with requirements specified in "Performance Requirements" Article.

1. Submit evidence of compliance with performance requirements.

F. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for components of membrane roofing system.

G. Research/Evaluation Reports: For components of membrane roofing system, from the ICC-ES.

H. Field quality-control reports.

I. Maintenance Data: For roofing system to include in maintenance manuals.

J. Warranties: Sample of special warranties.

1.6 QUALITY ASSURANCE

A. General:

1. Obtain primary roofing materials from single manufacturer. Manufacturer's name shall appear on containers.
2. Provide secondary materials as required by manufacturer of primary materials.
3. Manufacturer's technical representative shall visit Project site to advise applicator of procedures and precautions for installation of roofing materials and upon completion of roofing to verify guarantee/warranty requirements.

B. Owner reserves right to hire an independent roofing consultant to review submittals, procedures, and installation.

C. Installers Qualifications:

1. Approved by manufacturer prior to execution of this Contract, with documented experience on at least 5 projects using submitted roofing system.
2. Foreman of field crew: 5 years minimum experience with roofing system.

D. Certifications: Manufacturer's Certification on manufacturer's letterhead:

1. Certify roof system design; penetration, transition, and perimeter details; and system specifications are appropriate and satisfactory for this particular project.
2. Certify products proposed for use comply with referenced standards; with UL attached.
3. Certify materials ordered and supplied are compatible with each other, suited for locale and purpose intended and shipped in sufficient quantity to ensure proper timely installation.
4. Certify roofing materials have express guarantee of merchantability and fitness for particular purposes of this Project.
5. Certify manufacturer has reviewed Project and will issue guarantee upon successful completion of installation.
6. Certify materials shipped to site meet membrane manufacturer's published performance standards and requirements of this Specification.
7. Membrane manufacturer's approval of insulation type and method of installation.
8. Manufacturer's approval of installer.
9. Manufacturer certification that membrane is within two mils of the specified membrane thickness.
10. Manufacturer certification that membrane contains at least 22 mils of waterproofing polymers.

E. Industry Standards: Conform to NRCA - Roofing and Waterproofing Manual, except where more stringent requirements are indicated or specified.

1.7 PRE-INSTALLATION CONFERENCE

A. Conduct pre-installation conference. Discuss sequence and scheduling of work and interface with other trades. Require attendance of parties directly affecting roofing work.

B. Conduct tour of roof deck and review substrate surfaces to receive roofing and flashings. Report on substrate acceptability, possible problem areas, and recommended remedies.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of Manufacturer and Division 1.

1. Store materials in weather protected environment, clear of ground and moisture.
2. Store membrane rolls lying down on pallets and fully protected from the weather with clean canvas tarpaulins. Unvented polyethylene tarpaulins are not accepted due to the accumulation of moisture beneath tarpaulin in certain weather conditions that may affect membrane weldability.
3. Protect membrane from cuts, tears, punctures, and abrasions.
4. Protect light sensitive insulation from direct sunlight exposure.
5. Store materials (except membrane) between 60 degrees F and 80 degrees F. If exposed to lower temperatures, restore to proper temperature before using.
6. Store flammable materials in cool, dry area away from sparks and open flames. Follow precautions outlined on containers or supplied by material manufacturer/supplier.
7. Do not store materials on roof in such concentrations as to cause deck or structural membranes to be overloaded.

1.9 PROJECT CONDITIONS

A. Environmental Requirements: Proceed with roofing work only when existing and forecasted weather conditions permit work to be performed in accordance with manufacturer’s requirements.

1. Comply with more restrictive of following or manufacturer's written requirements under which products can be applied.
2. Verify substrate is free of water, dew, frost, and ice.
3. Ambient temperature is above 0 degrees F.
4. Open fires and spark producing equipment are not and will not be in application area until vapors have dissipated.
5. Application areas must be well ventilated.

1.10 SEQUENCING

A. Do not install greater amount of insulation than can be covered by membrane in same day. Complete with night seals and appropriate tie-offs.

B. Sequence work to avoid traversing over completed areas in order to continue roofing operations.

C. Phased Installation:

1. Install entire system for each area or designated portion during same day.
2. Phased construction (partial installation of system within designated areas) will not be allowed.

D. Manufacturer is responsible for details and dimensions not shown on Drawings and shall furnish necessary details and field measurements to ensure roofing is covered by guarantee. Coordinate with responsible trades to establish, verify and maintain field dimension and Project conditions.

1.11 WARRANTY

A. Provide no dollar limit (NDL) guarantee for full replacement cost of completed installation signed by manufacturer and applicator guaranteeing against water infiltration and defects of materials and workmanship for period of 15 years from date of Substantial Completion. Warranty shall be non-prorated and shall not exclude ponding water and no time limited shall be assigned for any such ponding water during the guarantee period.

B. Provide material required for warranty including penetrations, terminations, flashings, sealants, roof sheathing board, expansion joints, membrane, insulation, adhesives, and fasteners. Defects include (but are not limited to) unadhered membrane and flashings, moisture blisters, open seams, and weld scuffs.

PART 2 - PRODUCTS

2.1 PRODUCTS

A. Fiberglass Reinforced PVC Thermoplastic Membranes:
1. Standard: ASTM D4434 (latest version), Classification: Type II, Grade I
2. Membrane Type:
a. Thickness: 0.072 inch (72 mils) minimum with 9 oz feltbacking fabricated as part of the membrane sheet (Low Slope Application).
1. Size: 76 inches minimum wide by longest possible sheets as determined by Project conditions.
2. Seams: Hot-air weldable.
3. Non-wicking fiberglass reinforced membrane.
4. Membrane remains pliable, weldable, and watertight throughout its useful life, minimum of warranty period.
5. Color: White to obtain EPA Energy Star rating.
6. Solar Reflectance Values:
a. Energy Star: U.S. Environmental Protection Agency certification, 65 percent or better initially with 50% or better after 3-years, ASTM E903.
b. Emissivity: 0.90 or better when tested per ASTM E408
7. Products and Manufacturers: Subject to compliance with specified requirements, manufacturers' products that may be utilized include, but are not limited to, the following:
a. G410 - Sarnafil Roofing Systems, Cypress, CA.

b. or Architect approved equal.

B. Physical Properties Chart:

Parameters	ASTM Test Method	Minimum ASTM Requirement	Sarnafil Typical Physical Properties
Reinforcing Material	-		Fiberglass
Overall Thickness, min., inches (mm)	D638	0.070 (1.14)	[0.072 inches)]
Tensile Strength, min., psi (MPa)	D638	1500 (10.4)	1600 (11.1)
Elongation at Break, min. (machine x tranverse)	D638	250% / 230%	270% / 250%
Seam strength*, min. (% of tensile strength)	D638	75	80
Retention of Properties After Heat Aging	D3045	-	-
Tensile Strength, min., (% of original)	D638	90	95
Elongation, min., (% of original)	D638	90	90
Tearing Resistance, min., lbf (N)	D1004	10 (45.0)	14 (63.0)
Low Temperature Bend, -40º F (-40º C)	D2136	Pass	Pass
Accelerated Weathering Test (Xenon Arc)	D2565	5,000 Hours	10,000 Hours
Cracking (7x magnification)	-	None	None
Discoloration (by observation)	-	Negligible	Negligible
Crazing (7 x magnification)	-	None	None
Linear Dimensional Change	D1204	0.10 %	0.02%
Weight Change After Immersion in Water	D570	± 3.0%	2.5%
Static Puncture Resistance, 33 lbf (15 kg)	D5602	Pass	Pass
Dynamic Puncture Resistance, 7.3 ft-lbf (10 J)	D5635	Pass	Pass

*Failure occurs through membrane rupture not seam failure.

2.2 RIGID INSULATION BOARD AND SEPARATION BOARD

A. Polyisocyanurate Insulation:

1. Type: ASTM C1289, Class 1, Type II.
2. Zero ozone depletion potential (ODP) from blowing agent.
3. Long Term Thermal Resistance (LTTR) R-value based on ASTM C1303: 6 per inch, regardless of published values.
4. Average System Thermal Resistance: “R” value of 30
5. If greater than 2 inches thick, install insulation in minimum of two layers.
6. Tapered Insulation:
   a. Slope: Minimum 1/2 inch per foot for crickets.
7. Manufacturer: Approved by membrane manufacturer.

B. G-P Gypsum Products Dens-Deck® Separation (Protection) Board: or Architect approved equal.

1. A siliconized gypsum, fire-tested hardboard with glass-mat facers. Provide Dens-Deck a 4 ft x 8 ft board size and in thickness of ¼.

2.3 ACCESSORIES

A. Base Flashing Material: Manufacturer's standard membrane or PVC coated metal system compatible with membrane and covered by guarantee.

B. Sealants, Adhesives, and Primers: As multi-purpose sealant required by membrane manufacturer. Provide FM approved fasteners for attaching insulation and separation board to roof decks.

1. Membrane Adhesive: A water-based adhesive, approved by the manufacturer and FM, used to attach the membrane to horizontal or near-horizontal substrates. Use solvent-based adhesive for attaching base flashings and vertical parapet wall applications.

C. Fasteners and Plates for Attachment of Insulation and Separation Board to Wood Decks:

1. Fastener #15: A #15 corrosion-resistant fastener used with Plates to attach separation boards to roof decks. Fastener #15 has a modified buttress thread, a shank diameter of approximately 0.168 inch (4 mm) and a thread diameter of approximately 0.214 inch (5 mm). The driving head has a diameter of approximately 0.435 inch (11 mm) with a #3 Phillips recess for positive engagement.
2. Plate: Used with various fasteners to attach insulation boards to roof deck. Plate to be a 3 inch square or round, 26 gauge stamping of SAE 1010 steel with an AZ 55 Galvalume coating.
3. Length required for thickness of material and penetrating roof deck by ¾ inch.

D. Wood Nailers: Treated wood nailers shall be installed at the perimeter of the entire roof and around such other roof projections and penetrations as specified on Project Drawings. Thickness of nailers must match the insulation thickness to achieve a smooth transition. Wood nailers shall be treated for fire and rot resistance (wolmanized or osmose treated) and be #2 quality or better lumber. Creosote or asphalt-treated wood is not acceptable. Wood nailers shall conform to Factory Mutual Loss Prevention Data Sheet 1-49. All wood shall have a maximum moisture content of 19% by weight on a dry-weight basis.

E. Sheet Seaming System: Manufacturer's standard hot-air welding apparatus.

F. Other Materials: Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the Architect's approval. Fastener CD-10: A nail-in, corrosion-resistant fastener used with Plate-HD/CD, Stop or Bar to attach insulation or membrane to concrete roof deck. Fastener-CD10 has a shank diameter of 0.215 inch (5.5 mm), a split diameter of 0.265/0.275 inch (6.7/7.0 mm) and a flat head with a 0.435 inch (11 mm) diameter.

G. Clad Edge Metal: A PVC-coated, heat-weldable sheet metal capable of being formed into a variety of shapes and profiles. Clad is a 25 gauge, G90 galvanized metal sheet with a 20 mil (1 mm) unsupported membrane laminated on one side. This item to be supplied by roofing manufacturer. Provide clad metal in EnergySmart White.

1.

H. Termination Bar: An FM-approved, heavy-duty, 14 gauge, galvanized or stainless, roll-formed steel bar used to attach membrane to roof decks or high parapet walls. The formed

steel is pre-punched with holes every 1 inch (25 mm) on center to allow various Fastener spacing options.

I. Low Rise Foam Adhesive: A two component (Part A and B) polyurethane low-rise adhesive for bonding insulation to approved compatible substrates

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions and proceed with work in accordance with manufacturer's instructions and approved shop drawings.

B. Ensure wood blocking has been placed at proper elevations around perimeter of each roof level and at penetrations.

C. Verify work which penetrates deck has been completed.

D. Verify deck is clean and smooth, free of depressions, waves or projections, properly sloped to drains. Verify flutes of steel deck are clean and dry.

E. Verify roof openings and penetrating elements through roof are solidly set, and cant strips, wood blocking, nailing strips, and reglets are in place. Verify deck is properly supported and secured.

F. Do not apply roofing materials to damp, frozen, dirty, dusty, or other deck surface conditions which are unacceptable to manufacturer and applicator. Beginning installation indicates acceptance of substrate.

3.2 PREPARATION

A. Clean substrate of dust, debris, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.

1. New Construction
   a. Steel Deck:
      1) FM approved steel deck - The roof deck shall be 22 gauge (minimum) grade E and shall conform and be installed to meet the latest revision of FM's Loss Prevention Data Sheet 1-28 and the local code's current requirements.
      2) Non-FM approved steel deck - The roof deck shall be 24 gauge (minimum) grade D and shall conform and be installed to the local code's current requirements.

   b. Poured Structural Concrete Deck
      1) The roof deck shall be installed and cured in accordance with industry standards. The surface shall have a smooth and level finish and shall

be free of dust, excess moisture, oil-based curing agents and loose debris. Sharp ridges or other projections above the surface shall be removed before roofing.

c.

B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.

C. Wood Nailers:

1. Install wood nailers, underlayment, membrane, and accessories in accordance with FM, UL, and manufacturer's requirements.
2. Install at roof perimeter and at base of penetrations over 18 inches long or in diameter.
3. Thickness equal to insulation or greater where indicated.

D. Insulation and Separation Board Installation

1. Place insulation in 2-layers with fasteners or adhesives and offset joints in accordance with insulation manufacturer's instructions to achieve FM wind uplift rating.
2. Do not install cracked or broken boards.
3. Cut insulation to fit neatly to perimeter blocking and protrusions through roof.
4. Lay tapered boards to provide minimum 1/2 inch per foot slope drainage at crickets and other areas where structure has not provided slope to drains, gutters or roof edge.
5. Mechanical Attachment (Metal Deck)
   a. FM I-75 Approved Perimeter Fastening Pattern-Insulation panels which fall in the perimeter and corner areas of the building shall be fastened at a minimum rate of six fasteners for every 4 foot x 8 foot insulation panel, or according to the insulation manufacturer's requirements, whichever is more stringent. The perimeter area shall be defined as the strip of the roof around the outside perimeter of the building having a width defined by the least of the following parameters: 1) 10% of the building length; 2) 10% of the building width; 3) 40% of the building height. In any case, the perimeter width shall not be less than 4 feet.
   b. Fasteners are to be installed in accordance with fastener manufacturer's recommendations. Fasteners are to have minimum penetration into structural deck recommended by fastener manufacturer and PVC manufacturer.
   c. Use fastener tools with a depth location as recommended or supplied by fastener manufacturer to ensure proper installation.
   d. Provide pullout tests to verify deck condition and actual pullout values. Provide data to Architect and Owner's Representative.
6. Low Rise Foam Adhered Attachment (Crickets on Structural Concrete Deck)
   a. Apply using a four bead applicator or by hand with a dual component manual applicator over properly installed and prepared substrates in bands 12 in. o.c. Bands are 1/4-1/2 in. wide before foaming. Adhesive will quickly, within 30-45 seconds at 60-80°F, transform from a liquid into low rise foam. Immediately set insulation boards into wet adhesive. Walk insulation boards into place to ensure full embedment. Within 5-12 minutes the boards are securely attached to the

substrate. In warmer weather this process is a little quicker. In colder weather the process is a little slower. On roof slopes greater than 1/2 inch in 12 inches, begin adhering insulation at low point and work upward to avoid slippage. One person should be designated to walk in, trim/slit and if necessary add additional weight for proper securement. Only areas that can be made completely watertight in the same day's operations shall be installed.

3.3 MEMBRANE INSTALLATION

A. General:

1. Do not apply roofing materials to surfaces which are unacceptable to manufacturer and installer.
2. Do not install greater amount of insulation than can be covered by membrane in same day.
3. Sequence work to avoid traversing over completed areas in order to continue roofing operations.
4. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed during same day.
5. Install night cut-off sealer and appropriate tie-offs at end of day's work.

B. Fully Adhered Membrane:

1. Install sheet according to ASTM D5036.
2. Unroll membrane over prepared substrate in approximate final position. Allow to relax.
3. Cut sheets to maximum length possible to minimize seams.
4. Overlap sheets at edges and ends as required by manufacturer.
5. Apply bonding adhesive to substrate and underside of sheet as required by manufacturer. Do not apply adhesive with seam welding area.
6. Apply membrane and expansion joint materials to isolate roof into areas as required. Seal roofing membrane sheet to joint flange, apply sealant to edge or seam.
7. Weld seams with hot air welder of type approved by manufacturer. Prime seams if necessary to achieve proper weld. Ensure that fastener plates and seams are located in accordance with manufacturer's requirements.
8. Shingle joints on sloped substrate in direction of drainage.
9. Eliminate moisture blisters, adhesion "dry spots", or other type voids.
10. Heat-weld membrane to adjoining surfaces.
11. Install perimeter bar at 4' and 8' spacing with cover strip throughout building perimeter only to satisfy 90 mph wind speed warranty requirement.

C. Flashing and Accessories:

1. Install base flashing, terminations, and fascia trim as indicated and required by manufacturer. Use longest pieces practicable.
2. Install base flashing up vertical surfaces minimum 8 inches above edge strip unless otherwise noted. Fasten top of base flashing with devices and at locations and frequency as recommended by manufacturer.
3. Coordinate installation of base flashing with Section 076200 – Sheet Metal Flashing and Trim and Section 092216 Non-Structural Metal Framing for backing

4. Bond base flashing to substrate in accordance with manufacturer's requirements to obtain water tight bond.
5. Take measures to ensure base flashing is not ridging where there is change of direction.
6. Fasten top of base flashing under metal counter-flashing at manufacturer's recommended spacing.
7. Flash penetrations passing through membrane.

D. Hot-Air Welding Of Seam Overlaps

1. General
   a. All seams shall be hot-air welded. Seam overlaps should be 3 inches (75 mm) wide when automatic machine-welding and 4 inches (100 mm) wide when hand-welding, except for certain details.
   b. Welding equipment shall be provided by or approved by the manufacturer. All mechanics intending to use the equipment shall have successfully completed a training course provided by a Technical Representative prior to welding.
   c. All membrane to be welded shall be clean and dry.

2. Hand-Welding: Hand-welded seams shall be completed in two stages. Hot-air welding equipment shall be allowed to warm up for at least one minute prior to welding.
   a. The back edge of the seam shall be welded with a narrow but continuous weld to prevent loss of hot air during the final welding.
   b. The nozzle shall be inserted into the seam at a 45 degree angle to the edge of the membrane. Once the proper welding temperature has been reached and the membrane begins to "flow," the hand roller is positioned perpendicular to the nozzle and pressed lightly. For straight seams, the 1½ inch (40 mm) wide nozzle is recommended for use. For corners and compound connections, the ¾ inch (20 mm) wide nozzle shall be used.

3. Machine Welding
   a. Machine welded seams are achieved by the use of the automatic welding equipment. When using this equipment, the manufacturer's instructions shall be followed and local codes for electric supply, grounding and over current protection observed. Dedicated circuit house power or a dedicated portable generator is recommended. No other equipment shall be operated off the generator.
   b. Metal tracks may be used over the deck membrane and under the machine welder to minimize or eliminate wrinkles.

4. Quality Control of Welded Seams
   a. The Applicator shall check all welded seams for continuity using a rounded screwdriver. Visible evidence that welding is proceeding correctly is smoke during the welding operation, shiny membrane surfaces, and an uninterrupted flow of dark grey material from the underside of the top membrane. On-site evaluation of welded seams shall be made daily by the Applicator to locations as directed by the Owner's Representative or the manufacturer's representative. One inch (25 mm) wide cross-section samples of welded seams shall be taken at least three times a day. Correct welds display failure

from shearing of the membrane prior to separation of the weld. Each test cut shall be patched by the Applicator at no extra cost to the Owner.

3.4 FIELD QUALITY CONTROL

A. Request site attendance of roofing manufacturer technical representative during various stages of installation of roof assembly.

B. Manufacturer's Field Services:

1. Comply with requirements of Division 01.
2. Provide inspection to ascertain specified material and workmanship quality is being maintained and for purposes of guarantee verification.
3. Perform final inspection after roof completion.
4. Field Reports: Submit summary of Project site observations, instructions and monitoring activities.

C. Site Tests and Inspections:

1. Inspect cured seams with probe or similar device to ensure welds are consistent.
2. Correct defective seams.

D. Correct identified defects or irregularities.

3.6 CLEANING

A. Clean as recommended by manufacturer. Do not use materials or methods which may damage membrane, flashing, or surrounding construction.

3.7 TEMPORARY CUT-OFF

A. All flashings shall be installed concurrently with the roof membrane in order to maintain a watertight condition as the work progresses. All temporary waterstops shall be constructed to provide a 100% watertight seal. The stagger of the insulation joints shall be made even by installing partial panels of insulation. The new membrane shall be carried into the waterstop. The waterstop shall be sealed to the deck and/or substrate so that water will not be allowed to travel under the new or existing roofing. The edge of the membrane shall be sealed in a continuous heavy application of sealant as described in Section 2.3.B. When work resumes, the contaminated membrane shall be cut out. All sealant, contaminated membrane, insulation fillers, etc. shall be removed from the work area and properly disposed of off site. None of these materials shall be used in the new work.

B. If inclement weather occurs while a temporary waterstop is in place, the Applicator shall provide the labor necessary to monitor the situation to maintain a watertight condition.

C. If any water is allowed to enter under the newly-completed roofing, the affected area shall be removed and replaced at the Applicator’s expense.

3.8 PROTECTION

A. Provide temporary roof protection as recommended by manufacturer in areas of anticipated roof traffic during remainder of construction.

B. Prevent traversing roof without temporary protection.

C. Remove protection when no longer needed.

END OF SECTION 07 5419

SECTION 07 6200 - SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Manufactured Products:

a. Manufactured reglets and counterflashing.

2. Formed Products:

a. Formed low-slope roof sheet metal fabrications.
b. Formed wall sheet metal fabrications.
c. Formed wall flashing and trim.
d. Formed equipment support flashing.

B. Related Sections:

1. Division 07 Section "PVC Roofing" for installing sheet metal flashing, backing and trim integral with membrane roofing.

1.3 PERFORMANCE REQUIREMENTS

A. General: Sheet metal flashing and trim assemblies as indicated shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.

B. Fabricate and install roof edge flashing and copings capable of resisting the following forces according to recommendations in FMG Loss Prevention Data Sheet 1-49:
1. Wind Zone 1: For velocity pressures of 21 to 30 lbf/sq. ft. (1.00 to 1.44 kPa): 60-lbf/sq. ft. (2.87-kPa) perimeter uplift force, 90-lbf/sq. ft. (4.31-kPa) corner uplift force, and 30-lbf/sq. ft. (1.44-kPa) outward force.

C. Thermal Movements: Provide sheet metal flashing and trim that allows for thermal movements from ambient and surface temperature changes.

1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C) , material surfaces.

D. Water Infiltration: Provide sheet metal flashing and trim that do not allow water infiltration to building interior.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each manufactured product and accessory.

B. Shop Drawings: Show fabrication and installation layouts of sheet metal flashing and trim, including plans, elevations, expansion-joint locations, and keyed details. Distinguish between shop- and field-assembled work. Include the following:

1. Identification of material, thickness, weight, and finish for each item and location in Project.
2. Details for forming sheet metal flashing and trim, including profiles, shapes, seams, and dimensions.
3. Details for joining, supporting, and securing sheet metal flashing and trim, including layout of fasteners, cleats, clips, and other attachments. Include pattern of seams.
4. Details of termination points and assemblies, including fixed points.
5. Details of expansion joints and expansion-joint covers, including showing direction of expansion and contraction.
6. Details of edge conditions, including eaves, ridges, valleys, rakes, crickets, and counterflashings as applicable.
7. Details of special conditions.
8. Details of connections to adjoining work.

C. Samples for Verification: For each type of exposed prefinished sheet metal, including perforated panels, prepared on minimum of 6-by6 inch samples of actual shape and configuration.

D. Qualification Data: For qualified fabricator.

E. Maintenance Data: For sheet metal flashing, trim, and accessories to include in maintenance manuals.

F. Warranty: Sample of special warranty.

1.5 QUALITY ASSURANCE

A. Fabricator Qualifications: Shop that employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.

B. Sheet Metal Flashing and Trim Standard: Comply with SMACNA's "Architectural Sheet Metal Manual" unless more stringent requirements are specified or shown on Drawings.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage. Store sheet metal flashing and trim materials away from uncured concrete and masonry.

B. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to the extent necessary for the period of sheet metal flashing and trim installation.

1.7 WARRANTY

A. When warranties are required, verify with Owner's counsel that special warranties stated in this article are not less than remedies available to Owner under prevailing local laws.

B. Special Warranty on Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.

1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
   a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
   b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
   c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SHEET METALS

A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying a strippable, temporary protective film before shipping.

B. Aluminum Sheet: ASTM B 209 (ASTM B 209M), alloy as standard with manufacturer for finish required, with temper as required to suit forming operations and performance required.

1. Exposed Coil-Coated Finishes:
   a. Three-Coat Fluoropolymer: AAMA 620. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

2. Color: Custom color as selected by Architect from manufacturer's full range.

C. Aluminum: Sheet and brake metal per ASTM B 209 and B 221. 0.040 minimum thickness, unless noted otherwise. All aluminum flashing attached or adjacent to storefront system shall be finished with PVDF coating as specified in Division 08 Section “Aluminum-Framed Entrances And Storefronts”.

D. Stainless-Steel Sheet: ASTM A 240/A 240M or ASTM A 666, Type 304, dead soft, fully annealed.

1. Finish: 4 (polished directional satin.
2. Surface: Smooth, flat

E. Zinc-Tin Alloy-Coated Stainless-Steel Sheet: ASTM A 240/A 240M, Type 304, dead-soft, fully annealed stainless-steel sheet of minimum uncoated thickness indicated; coated on both sides with a zinc-tin alloy (50 percent zinc, 50 percent tin), with factory-applied gray preweathering.

F. Metallic-Coated Steel Sheet: Restricted flatness steel sheet, metallic coated by the hot-dip process and prepainted by the coil-coating process to comply with ASTM A 755/A 755M.

1. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653/A 653M, G90 (Z275) coating designation; structural quality.
2. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A 792/A 792M, Class AZ50 coating designation, Grade 40 (Class AZM150 coating designation, Grade 275); structural quality.
3. Surface: Smooth, flat.
4. Exposed Coil-Coated Finish:
   a. Three-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

5. Color: Custom color as selected by Architect from manufacturer's full range.

2.2 UNDERLAYMENT MATERIALS

A. Felt: ASTM D 226, Type II (No. 30), asphalt-saturated organic felt, nonperforated.

B. Self-Adhering, High-Temperature Sheet: Minimum 30 to 40 mils (0.76 to 1.0 mm) thick, consisting of slip-resisting polyethylene-film top surface laminated to layer of butyl or SBS-modified asphalt adhesive, with release-paper backing; cold applied. Provide primer when recommended by underlayment manufacturer.

1. Thermal Stability: ASTM D 1970; stable after testing at 240 deg F (116 deg C).
2. Low-Temperature Flexibility: ASTM D 1970; passes after testing at minus 20 deg F (29 deg C).
3. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

   a. Carlisle Coatings & Waterproofing Inc.; CCW WIP 300HT.
   b. Grace Construction Products, a unit of W. R. Grace & Co.; Ultra.
   c. Henry Company; Blueskin PE200 HT.
   d. Metal-Fab Manufacturing, LLC; MetShield.
   e. Owens Corning; WeatherLock Metal High Temperature Underlayment.

C. Slip Sheet: Building paper, 3-lb/100 sq. ft. (0.16-kg/sq. m) minimum, rosin sized.

2.3 MISCELLANEOUS MATERIALS

A. General: Provide materials and types of fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and recommended by manufacturer of primary sheet metal or manufactured item unless otherwise indicated.

B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal or manufactured item.

1. Fasteners for Flashing and Trim: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.
    a. Blind Fasteners: High-strength stainless-steel rivets suitable for metal being fastened.

C. Solder:
1. For Stainless Steel: ASTM B 32, Grade Sn60, with an acid flux of type recommended by stainless-steel sheet manufacturer.
2. For Zinc-Tin Alloy-Coated Stainless Steel: ASTM B 32, 100 percent tin.
3. For Zinc-Coated (Galvanized) Steel: ASTM B 32, Grade Sn50, 50 percent tin and 50 percent lead or Grade Sn60, 60 percent tin and 40 percent lead.
4. For Zinc: ASTM B 32, 40 percent tin and 60 percent lead with low antimony, as recommended by manufacturer.

D. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch (13 mm) wide and 1/8 inch (3 mm) thick.

E. Elastomeric Sealant: ASTM C 920, elastomeric polyurethane or silicone polymer sealant; low modulus; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.

F. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.

G. Epoxy Seam Sealer: Two-part, noncorrosive, aluminum seam-cementing compound, recommended by aluminum manufacturer for exterior nonmoving joints, including riveted joints.

H. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D 1187.

I. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required for application.

2.4 MANUFACTURED SHEET METAL FLASHING AND TRIM

A. Reglets: Units of type, material, and profile indicated, formed to provide secure interlocking of separate reglet and counterflashing pieces, and compatible with flashing indicated with factory-mitered and -welded corners and junctions.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:Cheney Flashing Company.
   a. Fry Reglet Corporation.
   b. Heckmann Building Products Inc.
2. Material: Aluminum, 0.024 inch (0.61 mm) thick.
3. Surface-Mounted Type: Provide with slotted holes for fastening to substrate, with neoprene or other suitable weatherproofing washers, and with channel for sealant at top edge.
4. Stucco Type: Provide with upturned fastening flange and extension leg of length to match thickness of applied finish materials.
5. Concrete Type: Provide temporary closure tape to keep reglet free of concrete materials, special fasteners for attaching reglet to concrete forms, and guides to ensure alignment of reglet section ends.
6. Masonry Type: Provide with offset top flange for embedment in masonry mortar joint.
7. Accessories:
   a. Flexible-Flashing Retainer: Provide resilient plastic or rubber accessory to secure flexible flashing in reglet where clearance does not permit use of standard metal counterflashing or where Drawings show reglet without metal counterflashing.
   b. Counterflashing Wind-Restraint Clips: Provide clips to be installed before counterflashing to prevent wind uplift of counterflashing lower edge.

2.5 FABRICATION, GENERAL

A. General: Custom fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, geometry, metal thickness, and other characteristics of item indicated. Fabricate items at the shop to greatest extent possible.

1. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
2. Obtain field measurements for accurate fit before shop fabrication.
3. Form sheet metal flashing and trim without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems.
4. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces exposed to view.

B. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of 1/4 inch in 20 feet (6 mm in 6 m) on slope and location lines

as indicated and within 1/8-inch (3-mm) offset of adjoining faces and of alignment of matching profiles.

C. Sealed Joints: Form nonexpansion but movable joints in metal to accommodate elastomeric sealant.

D. Conceal fasteners and expansion provisions where possible on exposed-to-view sheet metal flashing and trim, unless otherwise indicated

E. Expansion Provisions: Where lapped expansion provisions cannot be used, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with butyl sealant concealed within joints.

F. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.

G. Fabricate cleats and attachment devices of sizes as recommended by SMACNA's "Architectural Sheet Metal Manual" and by FMG Loss Prevention Data Sheet 1-49 for application, but not less than thickness of metal being secured.

H. Seams: Fabricate nonmoving seams with flat-lock seams. Tin edges to be seamed, form seams, and solder.

I. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer**.**

J. Do not use graphite pencils to mark metal surfaces.

2.6 ROOF DRAINAGE SHEET METAL FABRICATIONS

A. Parapet Scuppers: Fabricate scuppers of dimensions required with closure flange trim to exterior, cant or tapered strip into field of roof**.** Fabricate from the following materials:

1. Galvanized Steel: 0.028 inch (0.71 mm) thick.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions and other conditions affecting performance of the Work.

1. Verify compliance with requirements for installation tolerances of substrates.
2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 UNDERLAYMENT INSTALLATION

A. General: Install underlayment as indicated on Drawings or as required for water-tight installation.

B. Self-Adhering Sheet Underlayment: Install self-adhering sheet underlayment, wrinkle free. Apply primer if required by underlayment manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation; use primer rather than nails for installing underlayment at low temperatures. Apply in shingle fashion to shed water, with end laps of not less than 6 inches (150 mm) staggered 24 inches (600 mm) between courses. Overlap side edges not less than 3-1/2 inches (90 mm). Roll laps with roller. Cover underlayment within 14 days.

3.3 INSTALLATION, GENERAL

A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.

1. Install sheet metal flashing and trim true to line and levels indicated. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.
2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
3. Space cleats not more than 12 inches (300 mm) apart. Anchor each cleat with two fasteners. Bend tabs over fasteners.
4. Install exposed sheet metal flashing and trim without excessive oil canning, buckling, and tool marks.
5. Install sealant tape where indicated.
6. Torch cutting of sheet metal flashing and trim is not permitted.
7. Do not use graphite pencils to mark metal surfaces.

B. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by SMACNA.

1. Coat back side of uncoated aluminum and stainless-steel sheet metal flashing and trim with bituminous coating where flashing and trim will contact wood, ferrous metal, or cementitious construction.
2. Underlayment: Where installing metal flashing directly on cementitious or wood substrates, install a course of felt underlayment and cover with a slip sheet or install a course of polyethylene sheet.
3. Bed flanges in thick coat of asphalt roofing cement where required for waterproof performance.

C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet (3 m) with no joints allowed within 24 inches (600 mm) of corner or intersection. Where lapped expansion provisions cannot be used or

would not be sufficiently watertight, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with sealant concealed within joints.

D. Fastener Sizes: Use fasteners of sizes that will penetrate metal decking not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.

E. Seal joints as shown and as required for watertight construction.

1. Where sealant-filled joints are used, embed hooked flanges of joint members not less than 1 inch (25 mm) into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is moderate, between 40 and 70 deg F (4 and 21 deg C), set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F (4 deg C).
2. Prepare joints and apply sealants to comply with requirements in Division 07 Section "Joint Sealants."

F. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-tin edges of sheets to be soldered to a width of 1-1/2 inches (38 mm), except reduce pre-tinning where pre-tinned surface would show in completed Work.

1. Do not solder metallic-coated steel and aluminum sheet.
2. Pre-tinning is not required for zinc-tin alloy-coated stainless steel and zinc-tin alloy-coated copper.
3. Do not use torches for soldering. Heat surfaces to receive solder and flow solder into joint. Fill joint completely. Completely remove flux and spatter from exposed surfaces.
4. Stainless-Steel Soldering: Tin edges of uncoated sheets using solder recommended for stainless steel and acid flux. Promptly remove acid flux residue from metal after tinning and soldering. Comply with solder manufacturer's recommended methods for cleaning and neutralization.
5. Copper Soldering: Tin edges of uncoated copper sheets using solder for copper.

3.4 ROOF FLASHING INSTALLATION

A. General: Install sheet metal flashing and trim to comply with performance requirements and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, set units true to line, and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.

B. Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in FMG Loss Prevention Data Sheet 1-49 for specified wind zone and as indicated. Interlock bottom edge of roof edge flashing with continuous cleat anchored to substrate at 16-inch (400-mm) centers.

C. Copings: Anchor to resist uplift and outward forces according to recommendations in FMG Loss Prevention Data Sheet 1-49 for specified wind zone and as indicated.

1. Interlock exterior bottom edge of coping with continuous cleat anchored to substrate at 16-inch (400-mm) centers.

2. Anchor interior leg of coping with screw fasteners and washers at 18-inch (450-mm) centers.

D. Pipe or Post Counterflashing: Install counterflashing umbrella with close-fitting collar with top edge flared for elastomeric sealant, extending a minimum of 4 inches (100 mm) over base flashing. Install stainless-steel draw band and tighten.

E. Counterflashing: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or receivers and fit tightly to base flashing. Extend counterflashing 4 inches (100 mm) over base flashing. Lap counterflashing joints a minimum of 4 inches (100 mm) and bed with sealant.

F. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Seal with butyl sealant and clamp flashing to pipes that penetrate roof.

3.5 MISCELLANEOUS FLASHING INSTALLATION

A. Overhead-Piping Safety Pans: Suspend pans independent from structure above as indicated on Drawings. Pipe and install drain line to plumbing waste or drainage system.

B. Equipment Support Flashing: Coordinate installation of equipment support flashing with installation of roofing and equipment. Weld or seal flashing with elastomeric sealant to equipment support member.

3.6 ERECTION TOLERANCES

A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 feet (6 mm in 6 m) on slope and location lines as indicated and within 1/8-inch (3-mm) offset of adjoining faces and of alignment of matching profiles.

3.7 CLEANING AND PROTECTION

A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.

B. Clean and neutralize flux materials. Clean off excess solder.

C. Clean off excess sealants.

D. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of installation, remove unused materials and clean finished surfaces. Maintain in a clean condition during construction.

E. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 07 6200

SECTION 07 7180 – MIGRATING CORROSION INHIBITOR

PART 1 - GENERAL

1.1 SUMMARY

A. Provide all materials, equipment, labor, and supervision to apply migrating corrosion inhibitor to all cast stone surfaces.

B. Related Sections:
1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
2. Section 01 3591 – Historic Treatment Procedures
3. Section 04 0140 – Maintenance of Stone
4. Section 04 4911 – Cast Stone Crack Repair

C. Related Documents
1. Drawings and General Provisions of Contract, including General and Supplementary Provisions and other Division 1 Specifications Sections, apply to this Section.
2. Standard Specifications for Public Works Construction (Greenbook) Current Edition.
3. 2012 Standard Specifications for Public Works Construction (Whitebook)
4. The Secretary of the Interior's Standards for the Treatment of Historic Properties (1995 Edition).This document contains *The Standards* which are Federal codified preservation standards.

1.2 QUALITY ASSURANCE

A. Manufacturing qualifications: The manufacturer of the specified product shall be ISO 9001 certified and have in existence a recognized ongoing quality assurance program independently audited on a regular basis.

B. Contractor qualifications: Contractor shall be qualified in the field of concrete repair and protection with a successful track record of 5 years or more. Contractor shall maintain qualified personnel who have received product training by a manufacturer's representative.

C. Install materials in accordance with all safety and weather conditions required by manufacturer or as modified by applicable rules and regulations of local, state and federal authorities having jurisdiction. Consult Material Safety Data Sheets for complete handing recommendations.

D. Manufacturer must be capable of testing on-site for the presence of the corrosion inhibition at the specified depth.

1.3 SUBMITTALS

A. Submit manufacturer‘s literature, to include: Product Data Sheets, and appropriate Material Safety Data Sheets (MSDA).

B. Proof of compliance with the properties specified in Part 2 Performance Criteria.

1.4 DELIVERY, STORAGE, AND HANDLING

A. All materials must be delivered in original, unopened containers with the manufacturer’s name, labels, product identification, and batch numbers. Damaged material must be removed from the site immediately.

B. Store all materials off the ground and protect from rain, freezing or excessive heat until ready for use.

C. Condition the specified product as recommended by the manufacturer.

1.5 SITE CONDITIONS

A. Environmental Conditions: Do not apply material if it is raining or snowing or if such conditions appear to be imminent. Minimum application temperatures 35 degrees F (2 degrees C) and rising.

B. Protection: Precautions should be taken to avoid damage to any surface near the work zone due to mixing and handling of the specified material.

1.6 WARRANTY

A. Provide a written warranty from the manufacturer against defects of materials for a period of five (5) years, beginning with date of substantial completion of the project.

PART 2 - PRODUCTS

2.1 MIGRATING CORROSION INHIBITOR

A. Sika Ferrogard 903, as manufactured by Sika Corporation.

B. Approved equal as demonstrated by site testing of approved mock-up area and laboratory testing of core samples.

2.2 PERFORMANCE CRITERIA

A. Typical Properties of the penetrating corrosion inhibiting impregnation coating:
   1. Viscosity (Brookfield Viscometer, Spindle #1, Speed 100) 15 cps.
   2. Color: Pale Yellow.

3. Density: 1.13 (9.4 lbs./gal.).
4. pH: 11 (+/-1).
5. Flash point: None (water-based).

B. Corrosion testing of penetrating corrosion inhibiting impregnation coating:
1. The material must form a continuous film on the reinforcing steel and displace chlorides ions from the steel surface (X-ray Photon Spectroscopy (XPS) and Secondary Ion Mass Spectroscopy (SIMS)).
2. The material must penetrate for all substrate orientations (horizontal, vertical, overhead) at a rate up to 0.1 to 0.8 inches (2.5 to 20mm) per day, depending on density of cast stone. (Secondary Neutron mass Spectroscopy (SNMS)).
3. The material must have demonstrated the reduction in corrosion currents after treatment as calculated by the Cracked Beam Corrosion Tests of concrete (adapted from ASTM G 109).
4. The material must penetrate up to 3-inches (76 mm) in 28 days. (Secondary Neutron Mass Spectroscopy.)
5. The material must be capable of reducing active corrosion rates by a minimum of 65 percent. This reduction shall be demonstrated by project references and an independent corrosion engineer using linear polarization resistance.

PART 3 - EXECUTION

3.1 PREPARATION

A. Cast stone surfaces must be prepared by low pressure water washing at sufficient volume to remove surface contaminants such as oil, grease, curing membranes, efflorescence, algae, moss, dirt, etc as required in specification section 04 4930. All loose materials and any existing coatings must be removed to provide a clean, sound, dry, and absorbent surface prior to application of the migrating corrosion inhibitor.

B. Allow surfaces to dry for 7 days before application of corrosion inhibitor.

3.2 APPLICATION

A. Apply at a total minimum consumption rate of 200 sf/gallon/coat by brush, roller, or low pressure spray for each coat. A minimum of two coats is required.
1. Apply using roller, brush, or spray application. Best results are usually obtained by low pressure spray application using conventional airless spray system.
2. Between applying the subsequent coats of corrosion inhibitor, allow the previous coats to absorb into the concrete and dry (approximately 2-6 hours minimum, dependent on temperature and humidity).
3. The treated area should be protected from rain or frost for a period of at least 24 hours after application.

B. Adhere to all procedures, limitations and cautions for this product in the manufacturers' current printed technical data sheet and literature.

3.3 CLEANING

A. Rinse walls one week after application using low pressure water washing in sufficient volume to remove all residue and films from the surface. The cleaned surface shall be suitable for application of liquid water repellant as specified elsewhere.

B. Leave finished work and work area in a neat, clean condition without evidence of spillovers onto adjacent areas.

END OF SECTION 07 7180

SECTION 07 7190 – LIQUID WATER REPELLANT COATING

PART 1 - GENERAL

1.1 SUMMARY

A. This Work shall consist of providing the necessary labor, materials, equipment, and supervision to apply the water repellent sealer to all existing cast stone, new architectural precast concrete surfaces, and new glass fiber reinforced concrete at the completion of the repair work described in this Project Manual.

B. Related Sections:
1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
2. Section 01 3591 – Historic Treatment Procedures
3. Section 03 4000 – Precast Architectural Concrete
4. Section 04 0140 – Maintenance of Stone
5. Section 04 4911 – Cast Stone Crack Repair.
6. Section 04 4930 – Masonry Cleaning.
7. Section 07 7180 – Migrating Corrosion Inhibitor.

C. Related Documents
1. Drawings and General Provisions of Contract, including General and Supplementary Provisions and other Division 1 Specifications Sections, apply to this Section.
2. Standard Specifications for Public Works Construction (Greenbook) Current Edition.
3. 2012 Standard Specifications for Public Works Construction (Whitebook)
4. The Secretary of the Interior's Standards for the Treatment of Historic Properties (1995 Edition).This document contains *The Standards* which are Federal codified preservation standards.

1.2 QUALITY ASSURANCE

A. The manufacturer of the water repellent sealer shall have at least five (5) years of experience in the production of the sealer used on this project.

B. The applicator of the water repellent sealer shall have at least five (5) years of experience in the application of the product proposed for installation on this project. Written evidence of this experience shall be provided to the Owner's Representative prior to the start of work on this project. The applicator shall be approved by the manufacturer of the sealer.

C. Preconstruction Compatibility Testing: Coordinate with submitted APC samples to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.

1.3 SUBMITTALS

A. Submit product data and manufacturer's recommendations for protection, surface preparation, and application.

B. Submit sequence of work for application of liquid water repellent to Owner's Representative for approval.

1.4 QUALITY CONTROL

A. The manufacturer of the water repellent sealer shall have at least five (5) years of experience in the production of the sealer used on this project.

B. The applicator of the water repellent sealer shall have at least five (5) years of experience in the application of the product proposed for installation on this project. Written evidence of this experience shall be provided to the Owner's Representative prior to the start of work on this project. The applicator shall be approved by the manufacturer of the sealer.

C. Preconstruction Compatibility Testing: Coordinate with submitted APC samples to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver the sealer to the job site in original, unopened containers provided by the manufacturer with all original labels and seals intact.

B. Store the sealer in a dry protected area with a temperature range of not less than 0 degrees F and not more than 120 degrees F. Provide adequate ventilation away from sources of ignition.

C. Consult the manufacturer for additional instructions and safety precautions.

1.6 SITE CONDITIONS

A. The ambient and surface temperatures shall be between 40 degrees F and 100 degrees F during application of the sealer.

B. No rain predicted for a minimum of four hours after application of the sealer.

C. Winds shall be less than 15 miles per hour at the time of application.

D. All plants and vegetation shall be protected (covered) against damage due to product overspray. The sealer will damage plants and vegetation. The Contractor is responsible for any and all damage caused to vegetation on the project site and on adjacent properties.

E. Do not spray the sealer on or near plastic or specialty-coated glass without adequately protecting those surfaces. Do not spray the sealer onto any window glass on the building.

F. Do not spray or allow overspray of the sealer on asphalt based materials and painted surfaces.

G. The Contractor shall be responsible for any and all damage caused by overspray or run-off of the sealer. It is the responsibility of the Contractor to identify potential problems on the structure and advise the Owner's Representative and the Owner accordingly.

1.7 WARRANTY

A. The manufacturer and the applicator shall provide a written warranty certifying that the sealer, as installed, will retain its water repellent effect on the surface of the cast stone and masonry for a period of ten years from the date of application. Warranty does not cover any loss of water repellent effect due to structural defects and movement, water penetration caused by cracks or joint areas requiring caulking, sealing, or repointing, failure of the building, any damage to the building or contents thereof, or any leakage due to mechanical damage or abuse.

PART 2 - PRODUCTS

2.1 MATERIALS.

A. Silane water repellent: Silane penetrating type water repellent, containing 100 percent solids by weight.
   1. VOC Content: Must meet State of California and City of San Diego regulations for VOC content.
   2. Acceptable Products:
      a. Protectosil CIT, by Degussa Corporation.
      b. Approved equal as demonstrated by approved mock-up application subject one wet season of exposed weathering and to corrosion rate testing and laboratory testing of core samples.
   3. Do not dilute water repellent unless directed to do so in manufacture's specifications

PART 3 - EXECUTION

3.1 PREPARATION

A. Water repellent shall be applied after completion of all facade repairs, application of migrating corrosion inhibitor, and masonry cleaning.

B. All surfaces to receive the sealer shall be dry, clean, and free from dirt, dust, laitance, or any other foreign matter that would block absorption of the water repellent. All clean surfaces shall be allowed to dry for a minimum of (5) five days prior to application of the water repellent sealer. Painted surfaces shall have all paint removed.

C. All newly patched surfaces shall have completed curing a minimum of 21 days prior to application of the sealer.

D. All joint sealants that have been installed as a part of this project and that are subject to possible overspray of the sealer shall have cured at least (7) seven days prior to the application of the sealer.

E. All new architectural precast units shall have completed specified curing for a minimum of 28 days before application of water repellant.

F. Protect adjacent areas that are not designated to receive water repellent.

3.2 APPLICATION OF WATER REPELLENT

A. Apply the water repellant sealer in accordance with the manufacturer's printed instructions.

B. The sealer shall be applied in a flooding application with a low pressure (15 psi maximum) airless sprayer. Spray from the bottom up on vertical surfaces.

C. Apply the sealer at a minimum rate of 125 square feet per gallon or as recommended by manufacturer.

3.3 CLEANUP

A. Clean up all covers and repair all staining or damage caused by application of liquid water repellent.

END OF SECTION 07 7190

SECTION 07 9200 - JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Elastomeric sealants
2. Non-Elastomeric Sealants
3. Butyl Rubber Base Sealants
4. Acoustical joint sealants

B. Related Sections:

1. Division 04 Section "Exterior Stone Cladding" and “Adhered Stone Veneer” for sealing stone joints.
2. Division 08 Section " Aluminum Framed Entrances And Storefronts" for structural and other glazing sealants.
3. Division 08 Section "Glazing" for glazing sealants.
4. Division 09 Section "Gypsum Board" for sealing perimeter joints.
5. Division 09 Section "Tiling" for sealing tile joints.

1.3 SUBMITTALS

A. Product Data: For each joint-sealant product indicated.

B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.

C. Samples for Verification: For each kind and color of joint sealant required, provide Samples with joint sealants in 1/2-inch- (13-mm-) wide joints formed between two 6-inch- (150-mm-) long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.

D. Joint-Sealant Schedule: Include the following information:

1. Joint-sealant application, joint location, and designation.
2. Joint-sealant manufacturer and product name.
3. Joint-sealant formulation.
4. Joint-sealant color.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.

B. Source Limitations: Obtain each kind of joint sealant from single source from single manufacturer.

C. Product Testing: Test joint sealants using a qualified testing agency.

1. Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated.

D. Preconstruction Compatibility and Adhesion Testing: Submit to joint-sealant manufacturers, for testing indicated below, samples of materials that will contact or affect joint sealants.

1. Use ASTM C 1087 or manufacturer's standard test method to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.
2. Submit not fewer than 4 pieces of each type of material, including joint substrates, shims, joint-sealant backings, secondary seals, and miscellaneous materials.
3. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
4. For materials failing tests, obtain joint-sealant manufacturer's written instruction for corrective measures including use of specially formulated primers.

E. Mockups: Install sealant in mockups of assemblies specified in other Sections that are indicated to receive joint sealants specified in this Section. Use materials and installation methods specified in this Section.

1.5 PROJECT CONDITIONS

A. Do not proceed with installation of joint sealants under the following conditions:

1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F (5 deg C).
2. When joint substrates are wet.
3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.6 WARRANTY

A. Special Installer's Warranty: Manufacturer's standard form in which Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.

B. VOC Content of Interior Sealants: Provide sealants and sealant primers for use inside the weatherproofing system that comply with the following limits for VOC content when calculated according to 40 CFR 59, Part 59, Subpart D (EPA Method 24):

1. Architectural Sealants: 250 g/L.
2. Sealant Primers for Nonporous Substrates: 250 g/L.
3. Sealant Primers for Porous Substrates: 775 g/L.

C. Liquid-Applied Joint Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied joint sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.

1. Suitability for Immersion in Liquids. Where sealants are indicated for Use I for joints that will be continuously immersed in liquids, provide products that have undergone testing according to ASTM C 1247. Liquid used for testing sealants is deionized water, unless otherwise indicated.

D. Stain-Test-Response Characteristics: Where sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.

E. Suitability for Contact with Food: Where sealants are indicated for joints that will come in repeated contact with food, provide products that comply with 21 CFR 177.2600.

F. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.2 ELASTOMERIC SEALANTS:

A. Single Component Low Modulus Silicone Sealant: ASTM C920 Type S, Class 50, Use NT, Grade NS; minimum 50% expansion and compaction capability.

1. Provide at exterior locations not exposed to traffic and at exterior side (only) sealant joints at concrete, stone and masonry.
2. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
   a. General Electric Co./GE Silicones SilPruf SCS2000
   b. Dow Corning Corp./791 or 795.
   c. Pecora Corp./895 Architectural Silicone.
   d. Tremco/SpecTrem 2 or 3.

B. Multi-Component Polyurethane Sealant: ASTM C920, Type M, Non-Sag NS, Class 25, Use NT.

1. Provide at interior joints of concrete, stone and masonry walls.
2. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
   a. Pecora Corp./ Dynatrol
   b. Tremco/ Dymeric 240
   c. Sonneborn/ Sonolastic NP-2
   d. Sika/ 2C-NS

C. Multi-Component Polyurethane Sealant: ASTM C920, Type M, Grade P, Class 25, self-leveling; minimum 25% expansion and compaction capability.

1. Provide following at traffic bearing locations, such as paving, concrete and stone flatwork.
2. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:Pecora Corp./NR-200 Urexpan.
   a. Tremco/Vulkem 245.
   b. Sonneborn Division of ChemRex /SL 2

D. Mildew-Resistant Silicone Rubber Sealant: ASTM C920, Type S, Grade NS, Class 25, compounded with fungicide, specifically for mildew resistance and recommended for interior joints in wet areas.

1. Provide at interior joints in wet areas.
2. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
   a. General Electric Co./SCS 1702 Sanitary Sealant.
   b. Dow Corning Corp./786 Bathtub Caulk.
   c. Pecora Corp./863 #345 White.
   d. Tremco/Tremsil 200.

2.3 NON-ELASTOMERIC SEALANTS:

A. Acrylic-Emulsion Sealant: ASTM C834 acrylic or latex-rubber-modified acrylic sealant, permanently flexible, non-staining and non-bleeding; recommended for general interior exposure; compatible with paints.
   1. Provide at general interior applications. Example: Interior concrete to gypsum board.
   2. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
      a. Pecora Corp./AC-20.
      b. Sonolac by Sonneborn Division of ChemRex/Sonolac.
      c. Tremco/Ultrem 1500 or Tremflex 834.

2.4 BUTYL RUBBER BASE SEALANTS:

A. One-Part Butyl Rubber Base Sealant complying with Federal Specification TT-S-001657, Type I and ASTM C 1085.

1. Use: All exterior sheet metal flashing laps and intermediate joints with less than 10% movement.
2. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
   a. Butyl Caulk, by Tremco.
   b. PRC 2000, by Products Research and Chemical Corp.
   c. Sealtight Elastomeric Butyl Caulk, by W. R. Meadows, Inc.
   d. Adco B-100 butyl sealant by Adco Products, Inc.
   e. BC-158, by Pecora.

2.5 ACOUSTICAL SEALANTS:

A. Concealed Acoustical Sealant, non-drying, non-hardening and permanently flexible complying with ASTM D217. This type is not paintable.

1. Use: Provide at all hidden-from-view joint openings and non-exposed areas required to meet sound transmission class values, and as indicated on Drawings.
2. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
   a. Acoustical Sealant, by Tremco.
   b. ADCO BP400 Bedding Sealant by Adco Products, Inc.
   c. SC-170NS butyl sound caulk, by Ohio Sealant, Inc.
   d. BA-98; Pecora Corp.

B. Exposed Acoustical Sealant (that is to be painted): This product available in white and gray only. Product shall comply with ASTM C 834. Use:
1. Provide at all exposed areas and acoustical sealants to be painted, where required to meet sound transmission class values, and as indicated on Drawings.
2. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
   a. SC-175 water base sound sealant, by Ohio Sealant, Inc.
   b. AC-20FTR, by Pecora Corporation.
   c. Sheetrock Acoustical Sealant; USG Co.

2.6 JOINT SEALANT BACKING

A. General: Provide sealant backings of material that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

B. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin), and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

2.7 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

D. Construction Adhesives: Macklanburg/Duncan Co."LockBond"; Chapco (Chicago Adhesive Products Co.) "SafeSet" Type, or approved equal. Type as required to suit substrates.

E. Pipes and conduits penetrating underground or waterproofed walls: Sealant compatible with waterproofing system installed, approved by waterproofing manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining

after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:

a. Concrete.
b. Unglazed surfaces of ceramic tile.
c. Stone

3. Remove laitance and form-release agents from concrete.
4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:

a. Metal.
b. Glass.
c. Porcelain enamel.
d. Glazed surfaces of ceramic tile.

B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

1. Do not leave gaps between ends of sealant backings.
2. Do not stretch, twist, puncture, or tear sealant backings.
3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.

D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:

1. Place sealants so they directly contact and fully wet joint substrates.
2. Completely fill recesses in each joint configuration.
3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

1. Remove excess sealant from surfaces adjacent to joints.
2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
3. Provide concave joint profile per Figure 8A in ASTM C 1193, unless otherwise indicated.

    a. Use masking tape to protect surfaces adjacent to recessed tooled joints.

G. Acoustical Sealant Installation: At sound-rated assemblies and elsewhere as indicated, seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written recommendations.

3.4 FIELD QUALITY CONTROL

A. Field-Adhesion Testing: Field test joint-sealant adhesion to joint substrates as follows:

1. Extent of Testing: Test completed and cured sealant joints as follows:

    a. Perform 10 tests for the first 1000 feet (300 m) of joint length for each kind of sealant and joint substrate.

2. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.

    a. For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.

3. Inspect tested joints and report on the following:

    a. Whether sealants filled joint cavities and are free of voids.
    b. Whether sealant dimensions and configurations comply with specified requirements.
    c. Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. Compare these results to determine

if adhesion passes sealant manufacturer's field-adhesion hand-pull test criteria.

4. Record test results in a field-adhesion-test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant fill, sealant configuration, and sealant dimensions.
5. Repair sealants pulled from test area by applying new sealants following same procedures used originally to seal joints. Ensure that original sealant surfaces are clean and that new sealant contacts original sealant.

B. Evaluation of Field-Adhesion Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

3.5 CLEANING

A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.6 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

END OF SECTION 07 9200

SECTION 08 1113 - HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Standard hollow metal doors and frames.

B. Related Sections:

1. Division 08 Section Door Hardware" for door hardware for hollow metal doors.
2. Division 09 Section "Painting" for field painting of doors and frames.

1.3 DEFINITIONS

A. Minimum Thickness: Minimum thickness of base metal without coatings.

B. Standard Hollow Metal Work: Hollow metal work fabricated according to ANSI/SDI A250.8.

C. Custom Hollow Metal Work: Hollow metal work fabricated according to ANSI/NAAMM-HMMA 861.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, core descriptions, fire-resistance rating, temperature-rise ratings, and finishes.

B. Shop Drawings: Include the following:

1. Elevations of each door design.
2. Details of doors, including vertical and horizontal edge details and metal thicknesses.
3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
4. Locations of reinforcement and preparations for hardware.
5. Details of each different wall opening condition.
6. Details of anchorages, joints, field splices, and connections.
7. Details of accessories.

8. Details of moldings, removable stops, and glazing.
9. Details of conduit and preparations for power, signal, and control systems.

C. Schedule: Provide a schedule of hollow metal work prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with door hardware schedule.

D. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each type of hollow metal door and frame assembly.

1.5 QUALITY ASSURANCE

A. Source Limitations: Obtain hollow metal work from single source from single manufacturer.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver hollow metal work palletized, wrapped, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.

1. Provide additional protection to prevent damage to finish of factory-finished units.

B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.

C. Store hollow metal work under cover at Project site. Place in stacks of five units maximum in a vertical position with heads up, spaced by blocking, on minimum 4-inch- (102-mm-) high wood blocking. Do not store in a manner that traps excess humidity.

1. Provide minimum 1/4-inch (6-mm) space between each stacked door to permit air circulation.

1.7 PROJECT CONDITIONS

A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

1.8 COORDINATION

A. Coordinate installation of anchorages for hollow metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   1. Ceco Door Products; an Assa Abloy Group company.
   2. Curries Company; an Assa Abloy Group company.
   3. Kewanee Corporation (The).
   4. Security Metal Products Corp.
   5. Steelcraft; an Ingersoll-Rand company.
   6. Windsor Republic Doors.

2.2 MATERIALS

A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.

B. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.

C. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.

D. Frame Anchors: ASTM A 591/A 591M, Commercial Steel (CS), 40Z (12G) coating designation; mill phosphatized.

   1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M, hot-dip galvanized according to ASTM A 153/A 153M, Class B.

E. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.

F. Powder-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow metal frames of type indicated.

G. Grout: ASTM C 476, except with a maximum slump of 4 inches (102 mm), as measured according to ASTM C 143/C 143M.

H. Mineral-Fiber Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool with 6- to 12-lb/cu. ft. (96- to 192-kg/cu. m) density; with maximum flame-spread and smoke-development indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.

I. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil (0.4-mm) dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

2.3 STANDARD HOLLOW METAL DOORS

A. General: Provide doors of design indicated, not less than thickness indicated; fabricated with smooth surfaces, without visible joints or seams on exposed faces unless otherwise indicated. Comply with ANSI/SDI A250.8.

1. Design: Flush panel unless otherwise indicated.
2. Core Construction: Manufacturer's standard kraft-paper honeycomb, polystyrene, polyurethane, polyisocyanurate, mineral-board, or vertical steel-stiffener core.
    a. Thermal-Rated (Insulated) Doors: Provide doors fabricated with thermal-resistance value (R-value) of not less than 6.0 deg F x h x sq. ft./Btu (1.057 K x sq. m/W) when tested according to ASTM C 1363.

        1) Locations: Exterior doors.

3. Vertical Edges for Single-Acting Doors: Beveled edge.

    a. Beveled Edge: 1/8 inch in 2 inches (3 mm in 50 mm).

4. Vertical Edges for Double-Acting Doors: Round vertical edges with 2-1/8-inch (54-mm) radius.
5. Top and Bottom Edges: Closed with flush or inverted 0.042-inch- (1.0-mm-) thick, end closures or channels of same material as face sheets.
6. Tolerances: Comply with SDI 117, "Manufacturing Tolerances for Standard Steel Doors and Frames."

B. Exterior Doors: Face sheets fabricated from metallic-coated steel sheet. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:
1. Level 3 and Physical Performance Level A (Extra Heavy Duty), Model 2 (Seamless).
2. Door Face Steel Thickness: Manufacturers Standard Gage (MSG) No. 16.

C. Interior Doors: Face sheets fabricated from cold-rolled steel sheet. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:

1. Level 2 and Physical Performance Level B (Heavy Duty), Model 2 (Seamless).
2. Door Face Steel Thickness: Manufacturers Standard Gage (MSG) No. 18.

D. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.

E. Fabricate concealed stiffeners and hardware reinforcement from either cold- or hot-rolled steel sheet.

2.4 STANDARD HOLLOW METAL FRAMES

A. General: Comply with ANSI/SDI A250.8 and with details indicated for type and profile.

B. Exterior Frames: Fabricated from metallic-coated steel sheet.

1. Fabricate frames with mitered or coped corners.
2. Fabricate frames as full profile welded unless otherwise indicated.
3. Frames for Level 3 Steel Doors: 0.053-inch- (1.3-mm-) thick steel sheet.

C. Interior Frames: Fabricated from cold-rolled steel sheet unless metallic-coated sheet is indicated.

1. Fabricate frames with mitered or coped corners.
2. Fabricate frames as full profile welded unless otherwise indicated.
3. Frames for Level 2 Steel Doors: 0.053-inch- (1.3-mm-) thick steel sheet.

D. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 with reinforcement plates from same material as frames.

2.5 FRAME ANCHORS

A. Jamb Anchors:

1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, not less than 0.042 inch (1.0 mm) thick, with corrugated or perforated straps not less than 2 inches (50 mm) wide by 10 inches (250 mm) long; or wire anchors not less than 0.177 inch (4.5 mm) thick.
2. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch (1.0 mm) thick.
3. Compression Type for Drywall Slip-on Frames: Adjustable compression anchors.
4. Postinstalled Expansion Type for In-Place Concrete or Masonry: Minimum 3/8-inch- (9.5-mm-) diameter bolts with expansion shields or inserts. Provide pipe spacer from frame to wall, with throat reinforcement plate, welded to frame at each anchor location.

B. Floor Anchors: Formed from same material as frames, not less than 0.042 inch (1.0 mm) thick, and as follows:

1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.
2. Separate Topping Concrete Slabs: Adjustable-type anchors with extension clips, allowing not less than 2-inch (50-mm) height adjustment. Terminate bottom of frames at finish floor surface.

2.6 LOUVERS

A. Provide louvers for interior doors, where indicated, that comply with SDI 111C, with blades or baffles formed of 0.020-inch- ((0.5-mm-)) thick, cold-rolled steel sheet set into 0.032-inch- (0.8-mm-) thick steel frame.

1. Sightproof Louver: Stationary louvers constructed with inverted V-shaped or Y-shaped blades.

2.7 ACCESSORIES

A. Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.

B. Ceiling Struts: Minimum 1/4-inch-thick by 1-inch- (6.4-mm-thick by 25.4-mm-) wide steel.

C. Grout Guards: Formed from same material as frames, not less than 0.016 inch (0.4 mm) thick.

2.8 FABRICATION

A. Fabricate hollow metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.

B. Tolerances: Fabricate hollow metal work to tolerances indicated in SDI 117.

C. Hollow Metal Doors:

1. Exterior Doors: Provide weep-hole openings in bottom of exterior doors to permit moisture to escape. Seal joints in top edges of doors against water penetration.
2. Astragals: Provide overlapping astragal on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4 inch (19 mm) beyond edge of door on which astragal is mounted.

D. Hollow Metal Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.

1. Welded Frames: Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and invisible.
2. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
3. Grout Guards: Weld guards to frame at back of hardware mortises in frames to be grouted.
4. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.
5. Jamb Anchors: Provide number and spacing of anchors as follows:
    a. Masonry Type: Locate anchors not more than 18 inches (457 mm) from top and bottom of frame. Space anchors not more than 32 inches (813 mm) o.c. and as follows:
        1) Two anchors per jamb up to 60 inches (1524 mm) high.
        2) Three anchors per jamb from 60 to 90 inches (1524 to 2286 mm) high.
        3) Four anchors per jamb from 90 to 120 inches (2286 to 3048 mm) high.
        4) Four anchors per jamb plus 1 additional anchor per jamb for each 24 inches (610 mm) or fraction thereof above 120 inches (3048 mm) high.

b. Stud-Wall Type: Locate anchors not more than 18 inches (457 mm) from top and bottom of frame. Space anchors not more than 32 inches (813 mm) o.c. and as follows:
   1) Three anchors per jamb up to 60 inches (1524 mm) high.
   2) Four anchors per jamb from 60 to 90 inches (1524 to 2286 mm) high.
   3) Five anchors per jamb from 90 to 96 inches (2286 to 2438 mm) high.
   4) Five anchors per jamb plus 1 additional anchor per jamb for each 24 inches (610 mm) or fraction thereof above 96 inches (2438 mm) high.
   5) Two anchors per head for frames above 42 inches (1066 mm) wide and mounted in metal-stud partitions.

c. Compression Type: Not less than two anchors in each jamb.

d. Postinstalled Expansion Type: Locate anchors not more than 6 inches (152 mm) from top and bottom of frame. Space anchors not more than 26 inches (660 mm) o.c.

6. Door Silencers: Except on weather-stripped doors, drill stops to receive door silencers as follows. Keep holes clear during construction.
   a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
   b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.

E. Fabricate concealed stiffeners, edge channels, and hardware reinforcement from either cold- or hot-rolled steel sheet.

F. Hardware Preparation: Factory prepare hollow metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to the Door Hardware Schedule and templates furnished as specified in Division 08 Section "Door Hardware."

1. Locate hardware as indicated, or if not indicated, according to ANSI/SDI A250.8.
2. Reinforce doors and frames to receive nontemplated, mortised and surface-mounted door hardware.
3. Comply with applicable requirements in ANSI/SDI A250.6 and ANSI/DHI A115 Series specifications for preparation of hollow metal work for hardware.

2.9 STEEL FINISHES

A. Factory-Applied Paint Finish: Manufacturer's standard, complying with ANSI/SDI A250.3 for performance and acceptance criteria.

2.10 Color and Gloss: Match color designation as indicated on drawings.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine roughing-in for embedded and built-in anchors to verify actual locations before frame installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.

B. Prior to installation, adjust and securely brace welded hollow metal frames for squareness, alignment, twist, and plumbness to the following tolerances:

1. Squareness: Plus or minus 1/16 inch (1.6 mm), measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
2. Alignment: Plus or minus 1/16 inch (1.6 mm), measured at jambs on a horizontal line parallel to plane of wall.
3. Twist: Plus or minus 1/16 inch (1.6 mm), measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
4. Plumbness: Plus or minus 1/16 inch (1.6 mm), measured at jambs on a perpendicular line from head to floor.

C. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

3.3 INSTALLATION

A. General: Install hollow metal work plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.

B. Hollow Metal Frames: Install hollow metal frames of size and profile indicated. Comply with ANSI/SDI A250.11.

1. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.

a. At fire-protection-rated openings, install frames according to NFPA 80.
b. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
c. Install door silencers in frames before grouting.
d. Remove temporary braces necessary for installation only after frames have been properly set and secured.
e. Check plumbness, squareness, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
f. Field apply bituminous coating to backs of frames that are filled with grout containing antifreezing agents.

2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with postinstalled expansion anchors.
   a. Floor anchors may be set with powder-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.
3. Metal-Stud Partitions: Solidly pack mineral-fiber insulation behind frames.
4. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout.
5. Concrete Walls: Solidly fill space between frames and concrete with grout. Take precautions, including bracing frames, to ensure that frames are not deformed or damaged by grout forces.
6. In-Place Concrete or Masonry Construction: Secure frames in place with postinstalled expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
7. In-Place Gypsum Board Partitions: Secure frames in place with postinstalled expansion anchors through floor anchors at each jamb. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
8. Ceiling Struts: Extend struts vertically from top of frame at each jamb to overhead structural supports or substrates above frame unless frame is anchored to masonry or to other structural support at each jamb. Bend top of struts to provide flush contact for securing to supporting construction. Provide adjustable wedged or bolted anchorage to frame jamb members.
9. Installation Tolerances: Adjust hollow metal door frames for squareness, alignment, twist, and plumb to the following tolerances:
   a. Squareness: Plus or minus 1/16 inch (1.6 mm), measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
   b. Alignment: Plus or minus 1/16 inch (1.6 mm), measured at jambs on a horizontal line parallel to plane of wall.
   c. Twist: Plus or minus 1/16 inch (1.6 mm), measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
   d. Plumbness: Plus or minus 1/16 inch (1.6 mm), measured at jambs at floor.

C. Hollow Metal Doors: Fit hollow metal doors accurately in frames, within clearances specified below. Shim as necessary.

1. Non-Fire-Rated Standard Steel Doors:

   a. Jambs and Head: 1/8 inch (3 mm) plus or minus 1/16 inch (1.6 mm).

b. Between Edges of Pairs of Doors: 1/8 inch (3 mm) plus or minus 1/16 inch (1.6 mm).
c. Between Bottom of Door and Top of Threshold: Maximum 3/8 inch (9.5 mm).
d. Between Bottom of Door and Top of Finish Floor (No Threshold): Maximum 3/4 inch (19 mm).

2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
3. Smoke-Control Doors: Install doors according to UBC Standard 7-2.

3.4 ADJUSTING AND CLEANING

A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow metal work that is warped, bowed, or otherwise unacceptable.

B. Remove grout and other bonding material from hollow metal work immediately after installation.

C. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.

D. Metallic-Coated Surfaces: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.

END OF SECTION 08 1113

SECTION 08 3113 - ACCESS DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Access doors and frames for walls and ceilings.

1.3 SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details**,** fire ratings, materials, individual components and profiles, and finishes.

B. Shop Drawings:

1. Include plans, elevations, sections, details, and attachments to other work.
2. Detail fabrication and installation of access doors and frames for each type of substrate.

C. Product Schedule: Provide complete access door and frame schedule, including types, locations, sizes, latching or locking provisions, and other data pertinent to installation.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

2.2 ACCESS DOORS AND FRAMES FOR WALLS AND CEILINGS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Access Panel Solutions.
2. Acudor Products, Inc.
3. Alfab, Inc.
4. Babcock-Davis.
5. Cendrex Inc.

6. Elmdor/Stoneman Manufacturing Co.; Div. of Acorn Engineering Co.
7. Jensen Industries; Div. of Broan-Nutone, LLC.
8. J. L. Industries, Inc.; Div. of Activar Construction Products Group.
9. Karp Associates, Inc.
10. Larsen's Manufacturing Company.
11. Maxam Metal Products Limited.
12. Metropolitan Door Industries Corp.
13. MIFAB, Inc.
14. Milcor Inc.
15. Nystrom, Inc.
16. Williams Bros. Corporation of America (The).
17. USF Fabrication

B. Source Limitations: Obtain each type of access door and frame from single source from single manufacturer.

C. Flush Access Doors with Exposed Flanges:

1. Assembly Description: Fabricate door to fit flush to frame. Provide manufacturer's standard-width exposed flange, proportional to door size.
2. Locations: Ceramic tile walls, interior gypsum board or plaster finish walls.
3. Door Size: As required.
4. Stainless-Steel Sheet for Door: Nominal 0.062 inch (1.59 mm), 16 gage.
   a. Finish: No. 4.
5. Frame Material: Same material, thickness, and finish as door thickness, finish.
6. Hinges: Manufacturer's standard.
7. Hardware: Lock.

D. Recessed Access Doors:

1. Assembly Description: Fabricate door in the form of a pan recessed 5/8 inch (16 mm) for gypsum board or plaster infill. Provide frame with gypsum board bead for concealed flange or plaster bead for concealed flange installation.
2. Locations: Gypsum board or plaster finish ceilings.
3. Door Size: As required.
4. Uncoated Steel Sheet for Gypsum Board Infill Door: Nominal 0.060 inch (1.52 mm), 16 gage.
   a. Finish: Factory prime.
5. Metallic-Coated Steel Sheet for Plaster Infill Door: Nominal 0.064 inch (1.63 mm), 16 gage.
   a. Finish: Factory finish.
6. Frame Material: Same material and thickness as door.
7. Hinges: Manufacturer's standard.
8. Hardware: Lock.

E. Exterior Flush Access Doors :
1. Assembly Description: Fabricate door to be weatherproof and fit flush to frame. Provide manufacturer's standard 2-inch- (50-mm-) thick fiberglass insulation and extruded door gaskets. Provide manufacturer's standard-width frame for surface mounting, proportional to door size.
2. Locations: Wall

3. Door Size: As required.
4. Stainless-Steel Sheet for Door: Nominal 0.062 inch (1.59 mm), 16 gage.
   a. Finish: No. 4.
5. Frame Material: Same material, thickness, and finish as door.
6. Hinges: Manufacturer's standard.
7. Hardware: Lock.

F. Hardware:

1. Latch: Cam latch operated by flush key.
2. Lock: Cylinder.

2.3 MATERIALS

A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

B. Rolled-Steel Floor Plate: ASTM A 786/A 786M, rolled from plate complying with ASTM A 36/A 36M or ASTM A 283/A 283M, Grade C or D.

C. Steel Sheet: Uncoated or electrolytic zinc coated, ASTM A 879/A 879M, with cold-rolled steel sheet substrate complying with ASTM A 1008/A 1008M, Commercial Steel (CS), exposed.

D. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.

E. Rolled-Stainless-Steel Floor Plate: ASTM A 793, manufacturer's standard finish.

F. Stainless-Steel Sheet, Strip, Plate, and Flat Bars: ASTM A 666, Type 304. Remove tool and die marks and stretch lines or blend into finish.

G. Aluminum Extrusions: ASTM B 221 (ASTM B 221M), Alloy 6063-T6.

H. Aluminum-Alloy Rolled Tread Plate: ASTM B 632/B 632M, Alloy 6061-T6.

I. Aluminum Sheet: ASTM B 209 (ASTM B 209M), alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with not less than strength and durability properties of Alloy 5005-H15; with minimum sheet thickness according to ANSI H35.2 (ANSI H35.2M).

J. Frame Anchors: Same type as door face.

K. Inserts, Bolts, and Anchor Fasteners: Hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329.

2.4 FABRICATION

A. General: Provide access door and frame assemblies manufactured as integral units ready for installation.

B. Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.

C. Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access doors to types of supports indicated.

1. For concealed flanges with drywall bead, provide edge trim for gypsum board and gypsum base securely attached to perimeter of frames.
2. For concealed flanges with plaster bead for full-bed plaster applications, provide zinc-coated expanded metal lath and exposed casing bead welded to perimeter of frames.
3. Provide mounting holes in frames for attachment of units to metal or wood framing.
4. Provide mounting holes in frame for attachment of masonry anchors.

D. Recessed Access Doors: Form face of panel to provide recess for application of applied finish. Reinforce panel as required to prevent buckling.

1. For recessed doors with plaster infill, provide self-furring expanded metal lath attached to door panel.

E. Latching Mechanisms: Furnish number required to hold doors in flush, smooth plane when closed.

1. For cylinder locks, furnish two keys per lock and key all locks alike.
2. For recessed panel doors, provide access sleeves for each locking device. Furnish plastic grommets and install in holes cut through finish.

2.5 FINISHES

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

D. Steel and Metallic-Coated-Steel Finishes:

1. Factory Prime: Apply manufacturer's standard, fast-curing, lead- and chromate-free, universal primer immediately after surface preparation and pretreatment.
2. Factory Finish: Immediately after cleaning and pretreating, apply manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat, with a minimum dry-film thickness of 1 mil (0.025 mm) for topcoat.

E. Stainless-Steel Finishes:

1. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.
2. Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.

    a. Run grain of directional finishes with long dimension of each piece.
    b. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.
    c. Directional Satin Finish: No. 4.

F. Non Slip Finish

1. SlipNot www.slipnot.com or equal
2. Grade 2- Medium grit
3. Minimum coefficient of friction 0.8 as tested by UL Laboratories. See attached information on SlipNot coatings.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Comply with manufacturer's written instructions for installing access doors and frames.

B. Install doors flush with adjacent finish surfaces or recessed to receive finish material.

3.3 ADJUSTING

A. Adjust doors and hardware, after installation, for proper operation.

B. Remove and replace doors and frames that are warped, bowed, or otherwise damaged.

END OF SECTION 08 3113

SECTION 08 3326 - OVERHEAD COILING GRILLES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes open-curtain overhead coiling grilles.

B. Related Requirements:

1. Division 05 Section "Metal Fabrications" for miscellaneous steel supports, angle-framing of grille opening, corner guards, and bollards.

1.2 ACTION SUBMITTALS

A. Product Data: For each type and size of overhead coiling grille and accessory.

B. Shop Drawings: For each installation and for special components not dimensioned or detailed in manufacturer's product data.

1. Include points of attachment and their corresponding static and dynamic loads imposed on structure.
2. Show locations of controls, locking devices, and other accessories.
3. Include diagrams for power, signal, and control wiring.

C. Samples: For each exposed product and for each color and texture specified.

1.3 CLOSEOUT SUBMITTALS

A. Maintenance data.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer for both installation and maintenance of units required for this Project.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Seismic Performance: Overhead coiling grilles shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

2.2 OPEN-CURTAIN GRILLE ASSEMBLY

A. Open-Curtain Grille: Overhead coiling grille with a curtain having a network of horizontal rods that interconnect with vertical links.
   1. Basis-of-Design Product: Subject to compliance with requirements, provide The Cookson Company Type ACE (Access Controlled Egress) JMG Motor (Gearhead-Vertical) Operated Rolling Grille or comparable product by one of the following:

      a. ACME Rolling Doors.
      b. McKeon Rolling Steel Door Company, Inc.
      c. Overhead Door Corporation.
      d. Raynor.

B. Operation Cycles: Grille components and operators capable of operating for not less than 20,000.

C. Grille Curtain Material: Aluminum.

   1. Rod Spacing: Approximately 2 inches (51 mm) o.c.
   2. Link Spacing: Approximately 9 inches (228 mm) apart in a straight in-line pattern.
   3. Spacers: Metal tubes matching curtain material.

D. Bottom Bar: Continuous tubular shape, fabricated from aluminum extrusion and finished to match grille.

E. Curtain Jamb Guides: Aluminum with exposed finish matching curtain slats. Provide continuous integral wear strips to prevent metal-to-metal contact and to minimize operational noise.

F. Locking Devices: Equip grille with concelaled self locking mechanism. .

G. Electric Grille Operator:

   1. Usage Classification: Standard duty, up to 25 cycles per hour and up to 90 cycles per day .
   2. Motor Exposure: Exterior, wet, and humid.
   3. Emergency Manual Operation: Push-up type.
   4. Obstruction-Detection Device: Automatic photoelectric sensor andelectric sensor edge on bottom bar .
   5. Control Station: Exterior mounted.

H. Grille Finish:

   1. Aluminum Finish: Clear anodized.

2.3 MATERIALS, GENERAL

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.4 GRILLE CURTAIN MATERIALS AND CONSTRUCTION

A. Open-Curtain Grilles: Fabricate metal grille curtain as an open network of horizontal rods, spaced at regular intervals, that are interconnected with vertical links, which are formed and spaced as indicated and are free to rotate on the rods.

B. Bottom Bar: Manufacturer's standard continuous shape unless otherwise indicated, finished to match grille.

1. Astragal: Equip grille bottom bar with a replaceable, adjustable, continuous, compressible gasket of flexible vinyl, rubber, or neoprene as a cushion bumper.
2. Provide motor-operated grilles with combination bottom astragal and sensor edge.

C. Grille Curtain Jamb Guides: Manufacturer's standard shape having curtain groove with return lips or bars to retain curtain. Provide continuous integral wear strips to prevent metal-to-metal contact and to minimize operational noise; with removable stops on guides to prevent overtravel of curtain.

2.5 ACCESSORIES

A. Push/Pull Handles: Equip push-up-operated or emergency-operated grille with lifting handles on each side of grille, finished to match grille.

2.6 LOCKING DEVICES

A. Concealed self locking mechanism: Provide AutoLock manual lifting jamb lock assemblies that will prevent forced opening of a closed grille. Lock mechanism shall not interfere with normal electric operation, fail-safe or emergency response self-opening features.

B. Safety Interlock Switch: Equip power-operated grilles with safety interlock switch to disengage power supply when grille is locked.

2.7 COUNTERBALANCING MECHANISM

A. General: Counterbalance grilles by means of manufacturer's standard mechanism with an adjustable-tension, steel helical torsion spring mounted around a steel shaft and contained in a spring barrel connected to top of curtain with barrel rings. Use grease-sealed bearings or self-lubricating graphite bearings for rotating members.

B. Brackets: Manufacturer's standard mounting brackets of either cast iron or cold-rolled steel plate.

2.8 ELECTRIC GRILLE OPERATORS

A. General: Electric grille operator assembly of size and capacity recommended and provided by grille manufacturer for grille and operation cycles requirement specified, with electric motor and factory-prewired motor controls, starter, gear-reduction unit, solenoid-operated

brake, clutch, control stations, control devices, integral gearing for locking grille, and accessories required for proper operation.

1. Comply with NFPA 70.
2. Control equipment complying with NEMA ICS 1, NEMA ICS 2, and NEMA ICS 6, with NFPA 70 Class 2 control circuit, maximum 24-V ac or dc.

B. Usage Classification: Electric operator and components capable of operating for not less than number of cycles per hour indicated for each grille.

C. Motors: Reversible-type motor with controller (disconnect switch) for motor exposure indicated.

1. Electrical Characteristics:

   a. Phase: Three phase.
   b. Volts: 480 V.
   c. Hertz: 60.

2. Motor Size: Minimum size as indicated. If not indicated, large enough to start, accelerate, and operate grille in either direction from any position, at a speed not less than 8 in./sec. (203 mm/s) and not more than 12 in./sec. (305 mm/s), without exceeding nameplate ratings or service factor.
3. Operating Controls, Controllers (Disconnect Switches), Wiring Devices, and Wiring: Manufacturer's standard unless otherwise indicated.

D. Obstruction-Detection Device: External entrapment protection consisting of indicated automatic safety sensor capable of protecting full width of grille opening. Activation of sensor immediately stops and reverses downward grille travel.

1. Photoelectric Sensor: Manufacturer's standard system designed to detect an obstruction in grille opening without contact between grille and obstruction.

2. Electric Sensor Edge: Automatic safety sensor edge, located within astragal or weather stripping mounted to bottom bar. Contact with sensor activates device. Connect to control circuit using manufacturer's standard take-up reel or self-coiling cable.

E. Control Station: Three-button control station in fixed location with momentary-contact push-button controls labeled "Open" and "Stop" and sustained- or constant-pressure push-button control labeled "Close."
1. Exterior-Mounted Units: Full-guarded, standard-duty, surface-mounted, weatherproof type; NEMA ICS 6, Type 4 enclosure, key operated.

F. Emergency Manual Operation: Equip electrically powered grille with capability for emergency manual operation. Design manual mechanism so required force for grille operation does not exceed 30 lbf (133 N).

G. Emergency Operation Disconnect Device: Equip operator with hand-operated disconnect mechanism for automatically engaging manual operator and releasing brake for emergency manual operation while disconnecting motor without affecting timing of limit switch.

Mount mechanism so it is accessible from floor level. Include interlock device to automatically prevent motor from operating when emergency operator is engaged.

H. Motor Removal: Design operator so motor may be removed without disturbing limit-switch adjustment and without affecting emergency manual operation.

I. Audible and Visual Signals: Audible alarm and visual indicator lights in compliance with regulatory requirements for accessibility.

J. Emergency-Egress Release: Flush, wall-mounted handle mechanism, for accessibility-code-compliant egress feature, not dependent on electric power. The release allows an unlocked grille to partially open without affecting limit switches to permit passage, and it automatically resets motor drive upon return of handle to original position.

K. Self-Opening Mechanism: Automatic release mechanism triggered by local smoke detector, fire alarm or power failure. When activated, the grille self-opens by means of a fail-safe operator to the fully open position without the need for power operation or battery backup systems. When the emergency push-button is reset, and the alarm is cleared and power is restored, the grille will operate normally.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install overhead coiling grilles and operating equipment complete with necessary hardware, anchors, inserts, hangers, and equipment supports, according to manufacturer's written instructions and as specified.

B. Power-Operated Grilles: Install according to UL 325.

C. Adjust hardware and moving parts to function smoothly, so that grilles operate easily, free of warp, twist, or distortion. Lubricate bearings and sliding parts as recommended by manufacturer.

3.2 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain overhead coiling grilles.

END OF SECTION 08 3326

SECTION 08 4113 - ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Exterior storefront framing.
2. Exterior aluminum /glass entrance doors.
3. Exterior all-glass entrance doors.
4. Exterior sliding aluminum framed windows in storefront framing.
5. Transaction Window
6. Spandrel insulation.
7. Jalousie Window.

B. Related Sections:

1. Division 08 Section "Glazing" for glass types.
2. Division 08 Section "Door Hardware" for installation of door hardware.
3. Division 26 Sections for electrical connections including conduit and wiring for controls and operators.

1.3 DEFINITIONS

A. ADA/ABA Accessibility Guidelines: U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disability Act (ADA) and Architectural Barriers Act (ABA) Accessibility Guidelines for Buildings and Facilities."

1.4 PERFORMANCE REQUIREMENTS

A. General Performance: Aluminum-framed systems shall withstand the effects of the following performance requirements without exceeding performance criteria or failure due to defective manufacture, fabrication, installation, or other defects in construction:

1. Movements of supporting structure indicated on Drawings including, but not limited to, story drift and deflection from uniformly distributed and concentrated live loads.
2. Dimensional tolerances of building frame and other adjacent construction.
3. Failure includes the following:

a. Deflection exceeding specified limits.
b. Thermal stresses transferring to building structure.

c. Framing members transferring stresses, including those caused by thermal and structural movements to glazing.
d. Glazing-to-glazing contact.
e. Noise or vibration created by wind and by thermal and structural movements.
f. Loosening or weakening of fasteners, attachments, and other components.
g. Sealant failure.
h. Failure of operating units.

B. Structural Loads:

1. Wind Loads: As indicated on Structural Drawings.
2. Seismic Loads: As indicated on Structural Drawings.

C. Deflection of Framing Members:

1. Deflection Normal to Wall Plane: Limited to edge of glass in a direction perpendicular to glass plane shall not exceed L/175 of the glass edge length for each individual glazing lite or an amount that restricts edge deflection of individual glazing lites to 3/4 inch (19 mm), whichever is less.
2. Deflection Parallel to Glazing Plane: Limited to amount not exceeding that which reduces glazing bite to less than 75 percent of design dimension and that which reduces edge clearance between framing members and glazing or other fixed components directly below them to less than 1/8 inch and clearance between members and operable units directly below them to less than 1/16 inch.

D. Structural-Test Performance: Provide aluminum-framed systems tested according to ASTM E 330 as follows:

1. When tested at positive and negative wind-load design pressures, systems do not evidence deflection exceeding specified limits.
2. When tested at 150 percent of positive and negative wind-load design pressures, systems, including anchorage, do not evidence material failures, structural distress, and permanent deformation of main framing members exceeding 0.2 percent of span.
3. Test Durations: As required by design wind velocity, but not fewer than 10 seconds.

E. Air Infiltration: Provide aluminum-framed systems with maximum air leakage through fixed glazing and framing areas of 0.06 cfm/sq. ft. of fixed wall area when tested according to ASTM E 283 at a minimum static-air-pressure difference of 6.24 lbf/sq. ft.

F. Water Penetration under Static Pressure: Provide aluminum-framed systems that do not evidence water penetration through fixed glazing and framing areas when tested according to ASTM E 331 at a minimum static-air-pressure difference of 20 percent of positive wind-load design pressure, but not less than 8.0 lbf/sq. ft.

1. Maximum Water Leakage: No uncontrolled water penetrating aluminum-framed systems or water appearing on systems' normally exposed interior surfaces from sources other than condensation. Water leakage does not include water controlled by flashing and gutters that is drained to exterior and water that cannot damage adjacent materials or finishes.

G. Delegated Design: Design all-glass entrance door systems, including comprehensive engineering analysis by manufacturer's qualified professional engineer, licensed in the state of California, using performance requirements and design criteria indicated.

H. Thermal Movements: Provide aluminum-framed systems that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

I. Thermal Conductance: Provide aluminum-framed systems with fixed glazing and framing areas having an average U-factor of not more than 0.63 Btu/sq. ft. x h x deg F (3.57 W/sq. m x K) when tested according to AAMA 1503.

J. Structural Sealant: Capable of withstanding tensile and shear stresses imposed by aluminum-framed systems without failing adhesively or cohesively. When tested for preconstruction adhesion and compatibility, cohesive failure of sealant shall occur before adhesive failure.

1. Adhesive failure occurs when sealant pulls away from substrate cleanly, leaving no sealant material behind.
2. Cohesive failure occurs when sealant breaks or tears within itself but does not separate from each substrate because sealant-to-substrate bond strength exceeds sealant's internal strength.

K. Structural-Sealant Joints: Designed to produce tensile or shear stress of less than 20 psi (138 kPa).

1.5 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for aluminum-framed systems.

B. Shop Drawings: For aluminum-framed systems. Include plans, elevations, sections, details, and attachments to other work.

1. Include details of provisions for system expansion and contraction and for drainage of moisture in the system to the exterior.
2. For entrance doors and sliding windows, include hardware schedule and indicate operating hardware types, functions, quantities, and locations.

C. Samples for Verification: For each type of exposed finish required, in manufacturer's standard sizes.

D. Other Action Submittals:

1. Entrance Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of entrance door hardware, as well as procedures and diagrams. Coordinate final entrance door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of entrance door hardware.

E. Delegated Design Submittal: For all-glass entrance door systems, comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified California professional engineer responsible for their preparation.

1. Detailed fabrication and assembly of all-glass door systems.

F. Qualification Data: For qualified Installer and testing agency.

G. Maintenance Data: For aluminum-framed systems to include in maintenance manuals.

H. Warranties: Sample of special warranties.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.

B. Accessible Entrances: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and CBC, Title 24.

C. Source Limitations for Aluminum-Framed Systems: Obtain from single source from single manufacturer.

D. Structural-Sealant Joints: Design reviewed and approved by structural-sealant manufacturer.

E. Welding Qualifications: Qualify procedures and personnel according to AWS D1.2, "Structural Welding Code - Aluminum."

1.7 PROJECT CONDITIONS

A. Field Measurements: Verify actual locations of structural supports for aluminum-framed systems by field measurements before fabrication and indicate measurements on Shop Drawings.

1.8 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of aluminum-framed systems that do not comply with requirements or that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Structural failures including, but not limited to, excessive deflection.
b. Noise or vibration caused by thermal movements.
c. Deterioration of metals**,** metal finishes, and other materials beyond normal weathering.
d. Adhesive or cohesive sealant failures.
e. Water leakage through fixed glazing and framing areas.
f. Failure of operating components.

2. Warranty Period: Two years from date of Substantial Completion.

B. Special Finish Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components on which finishes do not comply with requirements or that fail in materials or workmanship within specified warranty period. Warranty does not include normal weathering.

1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Product: Subject to compliance with requirements, provide Arcadia, Inc., Ti Beam T500 series, or equal product by one of the following:

1. Kawneer North America; an Alcoa company
2. Vistawall Architectural Products; The Vistawall Group; a Bluescope Steel company.
3. Wausau Window and Wall Systems.

2.2 MATERIALS

A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.

1. Sheet and Plate: ASTM B 209 (ASTM B 209M).
2. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221 (ASTM B 221M).
3. Extruded Structural Pipe and Tubes: ASTM B 429.
4. Structural Profiles: ASTM B 308/B 308M.
5. Welding Rods and Bare Electrodes: AWS A5.10/A5.10M.

B. Steel Reinforcement: Manufacturer's standard zinc-rich, corrosion-resistant primer, complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM and prepare surfaces according to applicable SSPC standard.

1. Structural Shapes, Plates, and Bars: ASTM A 36/A 36M.
2. Cold-Rolled Sheet and Strip: ASTM A 1008/A 1008M.
3. Hot-Rolled Sheet and Strip: ASTM A 1011/A 1011M.

2.3 FRAMING SYSTEMS

A. Framing Members: Manufacturer's standard extruded-aluminum framing members of thickness required and reinforced as required to support imposed loads.

1. Nominal Framing Member Size:
   a. Exterior: 2-1/4 inches by 5-1/2 inches, and 2-1/4 inches by 8-1/2 inches.
2. Glazing System: Structural Silicone
3. Glazing Plane: As shown on drawings.
4. Glazing method: Resilient gasket glazed, with provision for replacement of glazing without disassembly of framing. Provide manufacturer's standard metal "filler" strip for units that receive glass less than 1 inch thick at exterior.

B. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.

1. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.
2. Reinforce members as required to receive fastener threads.

C. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts, complying with ASTM A 123/A 123M or ASTM A 153/A 153M.

D. Concealed Flashing: Manufacturer's standard, recommended by manufacturer for joint type.

E. Framing System Gaskets and Sealants: Manufacturer's standard, recommended by manufacturer for joint type.

1. Provide sealants for use inside of the weatherproofing system that have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.4 GLAZING SYSTEMS

A. Glazing: As specified in Division 08 Section "Glazing."

B. Glazing Gaskets: Manufacturer's standard compression types; replaceable, molded or extruded, of profile and hardness required to maintain watertight seal.

C. Spacers and Setting Blocks: Manufacturer's standard elastomeric type.

D. Bond-Breaker Tape: Manufacturer's standard TFE-fluorocarbon or polyethylene material to which sealants will not develop adhesion.

E. Glazing Sealants: For structural-sealant-glazed systems, as recommended by manufacturer for joint type, and as follows:

1. Structural Sealant: ASTM C 1184, single-component neutral-curing silicone formulation that is compatible with system components with which it comes in

contact, specifically formulated and tested for use as structural sealant and approved by a structural-sealant manufacturer for use in aluminum-framed systems indicated.

a. Provide sealants for use inside of the weatherproofing system that have a VOC content of 100 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
b. Color: Black.

2. Weatherseal Sealant: ASTM C 920 for Type S, Grade NS, Class 25, Uses NT, G, A, and O; single-component neutral-curing formulation that is compatible with structural sealant and other system components with which it comes in contact; recommended by structural-sealant, weatherseal-sealant, and aluminum-framed-system manufacturers for this use.

a. Provide sealants for use inside of the weatherproofing system that have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
b. Color: Matching structural sealant.

2.5 ALUMINUM / GLASS ENTRANCE DOORS

A. Entrance Doors: Manufacturer's standard glazed entrance doors for manual-swing operation.

1. Door Construction: 1-3/4-inch overall thickness, with minimum 0.125-inch- thick, extruded-aluminum tubular rail and stile members. Mechanically fasten corners with reinforcing brackets that are deeply penetrated and fillet welded or that incorporate concealed tie rods.
2. Door Design: Medium stile; 3-1/2-inch nominal width.
   a. Accessible Doors: Smooth surfaced for width of door in area within 10 inches (255 mm) above floor or ground plane.
3. Glazing Stops and Gaskets: Beveled, snap-on, extruded-aluminum stops and preformed gaskets.
   a. Provide nonremovable glazing stops on outside of door.

B. Entrance Door Hardware: As specified in Division 08 Section "Door Hardware."

1. Strikes: Provide strike with black-plastic dust box for each latch or lock bolt; fabricated for aluminum framing.
2. Weather Stripping: Manufacturer's standard replaceable components.
   a. Compression Type: Made of ASTM D 2000, molded neoprene, or ASTM D 2287, molded PVC.
   b. Sliding Type: AAMA 701, made of wool, polypropylene, or nylon woven pile with nylon-fabric or aluminum-strip backing.
3. Weather Sweeps: Manufacturer's standard exterior-door bottom sweep with concealed fasteners on mounting strip.

2.6 ALL GLASS ENTRANCE DOOR SYSTEM

A. Basis-of-Design Product: Subject to compliance with requirements, provide C.R. Laurence Co. Blumcraft 150 series with 3 9/16" high top and bottom rails.

B. Glass: ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated surfaces), Type I (transparent), tested for surface and edge compression per ASTM C 1048 and for impact strength per 16 CFR 1201 for Category II materials.

1. Class 1: Clear tempered monolithic, 3/4 inch thick or as required to meet design criteria.
2. Exposed Edges: Machine ground and flat polished.

C. Fitting Configuration:

1. Manual-Swinging: top and bottom rails.

D. Accessory Fittings: Match rail metal and finish.

E. Anchors and Fastenings: Concealed.

F. Entrance Door Hardware: As specified in Division 08 Section "Door Hardware."

1. Weather Stripping: Pile or polyurethane fin type; replaceable without removing all-glass entrance doors from pivots.

2.7 EXTERIOR SLIDING ALUMINUM FRAMED WINDOWS

A. Basis-of-Design Product: Subject to compliance with requirements, Design is based on aluminum (SW) series, sliding service window manufactured by C.R. Laurence Co., Inc. (800) 421-6144 or approved equal.

B. Materials:
1. Frames: Aluminum frame modules shall be constructed of 6063-T5 extruded aluminum. Window glides on top-hung nylon slides. Poly-pile weather stripping and slide locks. Overall frame sizes are to be in accordance with the contract drawings.
2. Finish: Kynar 2-coat PVDF painted finish. Match Architect's sample or as selected by Architect from manufacturer's full range of custom colors including all metallics.
3. Glazing: : ¼" Clear tempered Glass.
4. Options: Laminated Shelf, stainless steel shelf, keyed lock, full bottom track, screens and surround frame. (specify desired options.

2.8 TRANSACTION WINDOW

A. Basis of Design: Design is based on Aluminum Cashier Window, catalog number SCW103N, manufactured by C.R. Laurence Co., Inc. (800) 421-6144.

B. Materials:

C. Frames: Aluminum cashier window frame to be 1.390” x .625” extruded aluminum. Overall frame size to be 30” W x 32”H (Includes 2” H stainless steel shelf).
   1. Finish: Kynar 2-coat PVDF painted finish. Match Architect's sample or as selected by Architect from manufacturer's full range of custom colors including all metallics.
   2. Glazing: ¼” Clear tempered Glass.
   3. Shelf: Provide a shelf not less than 2” thick with recessed deal tray. The shelf is to be the full width of the window and 18” deep centered under the glazing.
   4. Voice Transmission: Communication permitted by 834A no draft speak-thru centered in glazing

2.9 SPANDREL INSULATION

A. High-Density Semi-Rigid Mineral Fiber Board:
   1. Semi-rigid, foil-faced mineral wool fiberboard with water-resistant binders conforming to the following requirements:
      a. ASTM C 612, Type III.
      b. ASTM C 518, thermal conductivity of 'k' = 0.23 btu-in/hrfe at 75°F.
      c. Nominal density of 8Ibs/fe.
      d. ASTM E 84, flame spread 25, smoke developed 5.
      e. Provide sizes to fit specific panel applications. Install foil tape around perimeter of foil-facing to adjacent metal framing to achieve positive vapor barrier.
      f. Thickness to be 2 inches minimum unless indicated otherwise.
      g. At spandrel areas insulation to be black in color towards exterior.
   2. Acceptable products: U.S. Gypsum Co. Thermafiber CW 90 (foil-faced) or J-M Insul-Shield.

2.10 JALOUSIE WINDOW

A. A.Basis of Design: Design is based on Safetyline JX Series.

B. The louvre window shall incorporate the JX Louvre Window by Safetyline Jalousie (1300 68 3350) and manufactured to achieve (insert N Window Rating & N Water Penetration Rating) as required by Australian Standard AS2047.
   1. The louvre window shall be JX by Safetyline Jalousie with 63mm extruded aluminium frame.
   2. The louvre window shall be capable of a maximum width of 1.4 metres.
   3. Each louvre shall be framed on three sides and hinged at the rear edge.
   4. Glass louvres should require at least 200kg pull out to remove the blades.
   5. Weatherproofing shall be provided by EPDM and polyethylene brush gaskets.
   6. Water drainage is to be via the bottom transom.
   7. The louvre window should be fitted with nylon end caps and capable of opening to 80^0 at an interval of 135mm.
   8. Additional Security shall be provided by a 8mm stainless steel rod inserted into the louvre bearer.
   9. The handle mechanism shall be cam driven and capable of locking in at four different positions.
   10. Internal flyscreens should snap into the frame and be easily removed for cleaning.

2.11 ACCESSORY MATERIALS

A. Joint Sealants: For installation at perimeter of aluminum-framed systems, as specified in Division 07 Section "Joint Sealants."

1. Provide sealants for use inside of the weatherproofing system that have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

B. Bituminous Paint: Cold-applied, asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos; formulated for 30-mil (0.762-mm) thickness per coat.

2.12 FABRICATION

A. Form or extrude aluminum shapes before finishing.

B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.

C. Framing Members, General: Fabricate components that, when assembled, have the following characteristics:

1. Profiles that are sharp, straight, and free of defects or deformations.
2. Accurately fitted joints with ends coped or mitered.
3. Means to drain water passing joints, condensation within framing members, and moisture migrating within the system to exterior.
4. Physical and thermal isolation of glazing from framing members.
5. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
6. Provisions for field replacement of glazing from exterior.
7. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.

D. Mechanically Glazed Framing Members: Fabricate for flush glazing without projecting stops.

E. Structural-Sealant-Glazed Framing Members: Include accommodations for using temporary support device to retain glazing in place while structural sealant cures.

F. Entrance Door Frames: Reinforce as required to support loads imposed by door operation and for installing entrance door hardware.

1. At exterior doors, provide compression weather stripping at fixed stops.
2. At interior doors, provide silencers at stops to prevent metal-to-metal contact. Install three silencers on strike jamb of single-door frames and two silencers on head of frames for pairs of doors.

G. All Glass Entrance Doors: Provide holes and cutouts in glass to receive hardware, fittings, and accessory fittings before tempering glass. Do not cut, drill, or make other alterations to glass after tempering.

1. Fully temper glass using horizontal (roller-hearth) process, and fabricate so that when glass is installed, roll-wave distortion is parallel with bottom edge of door or lite.

H. Entrance Door Hardware Installation: Factory install entrance door hardware to the greatest extent possible. Cut, drill, and tap for factory-installed entrance door hardware before applying finishes.

I. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

2.13 ALUMINUM FINISHES

A. High-Performance Organic Finish: PPG Duranar XL or equal. Three-coat fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

1. Color and Gloss: Match Architect's sample or as selected by Architect from manufacturer's full range of custom colors including all metallics.

B. Exposed work shall be free of runs, sags, orange peel, holidays, stains, scratches, gripper marks, or other flaws and undesirable marks. Finishes shall be uniform on all exposed surfaces, including edges. Touch-up damaged areas of coatings where damaged in field. If field damage is extensive, due to handling by building trades, request factory applicator to evaluate field damage, and determine proper field process to be applied by applicator at no cost to Owner. If damaged by applicator, refinish in factory before installation. Installing Contractor to perform inspection prior to installation.

C. Coatings which do not comply with approved coating requirements, or do not match approved samples, shall be stripped and recoated at Contractor's expense.

D. If more than one product is required to be coated for this project, the Contractor shall use a single source approved coating applicator for all products to be coated, to insure consistency.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General:

1. Comply with manufacturer's written instructions.
2. Do not install damaged components.
3. Fit joints to produce hairline joints free of burrs and distortion.
4. Rigidly secure nonmovement joints.
5. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration.
6. Seal joints watertight unless otherwise indicated.

B. Metal Protection:

1. Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or applying sealant or tape, or by installing nonconductive spacers as recommended by manufacturer for this purpose.
2. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

C. Install components to drain water passing joints, condensation occurring within framing members, and moisture migrating within the system to exterior.

D. Set continuous sill members and flashing in full sealant bed as specified in Division 07 Section "Joint Sealants" to produce weathertight installation.

E. Install components plumb and true in alignment with established lines and grades, and without warp or rack.

F. Install glazing as specified in Division 08 Section "Glazing."

1. Structural-Sealant Glazing:

a. Prepare surfaces that will contact structural sealant according to sealant manufacturer's written instructions to ensure compatibility and adhesion. Preparation includes, but is not limited to, cleaning and priming surfaces.
b. Install weatherseal sealant according to Division 07 Section "Joint Sealants" and according to sealant manufacturer's written instructions to produce weatherproof joints. Install joint filler behind sealant as recommended by sealant manufacturer.

G. Entrance Doors: Install doors to produce smooth operation and tight fit at contact points.

1. Exterior Doors: Install to produce weathertight enclosure and tight fit at weather stripping.
2. Field-Installed Entrance Door Hardware: Install surface-mounted entrance door hardware according to entrance door hardware manufacturers' written instructions using concealed fasteners to greatest extent possible.

H. Install perimeter joint sealants as specified in Division 07 Section "Joint Sealants" to produce weathertight installation.

3.3 ERECTION TOLERANCES

A. Install aluminum-framed systems to comply with the following maximum erection tolerances:

1. Location and Plane: Limit variation from true location and plane to 1/8 inch in 12 feet (3 mm in 3.7 m); 1/4 inch (6 mm) over total length.
2. Alignment:

    a. Where surfaces abut in line, limit offset from true alignment to 1/16 inch (1.5 mm).
    b. Where surfaces meet at corners, limit offset from true alignment to 1/32 inch (0.8 mm).

B. Diagonal Measurements: Limit difference between diagonal measurements to 1/8 inch (3 mm).

3.4 ADJUSTING

A. Adjust operating entrance door hardware to function smoothly as recommended by manufacturer.

1. For entrance doors accessible to people with disabilities, adjust closers to operate with a maximum effort of 5 lb of force and to provide a 3-second closer sweep period for doors to move from a 70-degree open position to 3 inches (75 mm) from the latch, measured to the leading door edge.

END OF SECTION 08 4113

SECTION 08 5800 – ALUMINUM SLIDING SERVICE WINDOW

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

1. deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

1.2 SUMMARY

A. This section includes:
   1. Aluminum, heavy-duty commercial sliding service windows as indicated in drawings and in sections.

1.3 SUBMITTALS

A. Product Data: Submit Manufacturer's technical product data substantiating that products comply.
B. Shop drawings: Submit for fabrication and installation of windows. Include details, elevations and installation requirement of finish hardware and cleaning.
C. Certification: Provide printed data in sufficient detail to indicate compliance with the contract documents.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver windows crated to provide protection during transit and job storage
B. Inspect windows upon delivery for damage. Unless minor defects can be made to meet the Architect's specifications and satisfaction, damaged parts should be removed and replaced.
C. Store windows at building site under cover in dry location.

1.04 PROJECT CONDITIONS

A. Field measurements: Check opening by accurate field measurement before fabrication. Show recorded measurements on shop drawings. Coordinate fabrication schedule with construction progress to avoid delay of work.

1.05 WARRANTY

All material and workmanship shall be warranted against defects for a period of one (1) year from the original date of purchase.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURER'S

A. Basis of design: Design is based on aluminum (DW) series, deluxe sliding service window manufactured by **C.R. Laurence Co., Inc. (800) 421-6144**

2.02 MATERIALS

A. Frames: 4" Aluminum frame modules shall be constructed of 6063-T5 extruded aluminum. Replacement and servicing of glass shall be from the clerk side of the window by means of an access panel in the top header and does not require the removal of the frame from the opening. Window glides on top-hung heavy-duty ball bearing slides. Poly-pile weather stripping and self-latching handle. Overall frame sizes are to be in accordance with the contract drawings.

B. Finish: All aluminum to be clear anodized, duranodic bronze, powder or Kynar painted (specify color).

C. Glazing: The glazing is ¼" to ½" in thickness. Options include tempered, wire, laminated, tinted, and insulating glass (specify type of glazing material desired).

D. Options: Laminated Shelf, stainless steel shelf, keyed lock, full bottom track, or burglar bar. (specify desired options).

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install window in accordance with manufacturer's printed instructions and recommendations. Repair damaged units as directed (if approved by the manufacturer and the architect) or replace with new units.

3.02 CLEANING

A. Clean frame and glazing surfaces after installation, complying with requirements contained in the manufacturer's instructions. Remove excess glazing sealant compounds, dirt or other substances.

3.03 PROTECTION

A. Institute protective measures required throughout the remainder of the construction period to ensure that all the windows do not incur any damage or deterioration, other than normal weathering, at the time of acceptance.

END OF SECTION 08 5800

SECTION 08 7100 - DOOR HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes:

1. Door Hardware, including electric hardware.
2. Storefront and entrance door hardware.
3. Gate Hardware.
4. Digital keypad access control devices.
5. Cylinders for doors fabricated with locking hardware.

B. Specific Omissions: Hardware for the following is specified or indicated elsewhere:

1. Windows.
2. Cabinets, including open wall shelving and locks.
3. Signs, except where scheduled.
4. Toilet accessories.
5. Installation.
6. Rough hardware.
7. Wrought iron railing gates and supports.

C. Related Sections:

1. Division 07 Section “Joint Sealants” for exterior threshold sealant.
2. Division 08 Section "Hollow Metal Doors and Frames" for astragals provided as part of labeled fire-rated assemblies and for door silencers provided as part of hollow-metal frames.
3. Division 08 Section "Aluminum-Framed Entrances and Storefronts" for installation of entrance door hardware.

1.3 REFERENCES

A. Use date of standard in effect as of Bid date.

1. American National Standards Institute – ANSI 156.18 – Materials and Finishes.
2. ADA – Americans with Disabilities Act
3. BHMA – Builders Hardware Manufacturers Association
4. DHI – Door and Hardware Institute
5. NFPA – National Fire Protection Association

a. NFPA 80 – Fire Doors and Windows
b. NFPA 101 – Life Safety Code
c. NFPA 105 – Smoke and Draft Control Door Assemblies
d. NFPA 252 – Fire Tests of Door Assemblies

6. UL – Underwriters Laboratories
   a. UL10C – Positive Pressure Fire Tests of Door Assemblies.
   b. UL 305 – Panic Hardware
   c. WHI – Warnock Hersey
8. Incorporated State of California Building Code
9. Local applicable codes
10. SDI – Steel Door Institute
11. CAFDI.org - Certified Association of Fire Door Inspectors.

B. Abbreviations

1. Manufacturers**:** see table at 2.1.A of this section
2. Finishes**:** see 2.7 of this section.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction and installation details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Shop Drawings: Details of electrified door hardware, indicating the following:

1. Wiring Diagrams: For power, signal, and control wiring and including the following:

   a. Details of interface of electrified door hardware and building safety and security systems.
   b. Schematic diagram of systems that interface with electrified door hardware.
   c. Point-to-point wiring.
   d. Risers.
   e. Elevations doors controlled by electrified door hardware.

2. Operation Narrative: Describe the operation of doors controlled by electrified door hardware.

C. Other Action Submittals:

1. Door Hardware Schedule: Prepared by or under the supervision of Installer, detailing fabrication and assembly of door hardware, as well as installation procedures and diagrams. Coordinate final door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
2. Submittal Sequence: Submit door hardware schedule concurrent with submissions of Product Data, Samples, and Shop Drawings. Coordinate submission of door hardware schedule with scheduling requirements of other work to facilitate the fabrication of other work that is critical in Project construction schedule.

3. Format: Use same scheduling sequence and format and use same door numbers as in the Contract Documents.
4. Content: Only submittals printed one sided will be accepted and reviewed. Organize vertically formatted schedule into "Hardware Sets" with index of doors and headings, indicating complete designations of every item required for each door or opening. Include following information:
   a. Type, style, function, size, quantity and finish of hardware items.
   b. Use BHMA Finish codes per ANSI A156.18.
   c. Name, part number and manufacturer of each item.
   d. Fastenings and other pertinent information.
   e. Description of door location using space names and numbers as published in the drawings.
   f. Explanation of abbreviations, symbols, and codes contained in schedule.
   g. Mounting locations for hardware.
   h. Door and frame sizes, materials and degrees of swing.
   i. List of manufacturers used and their nearest representative with address and phone number.
   j. Catalog cuts; Product Data Sheets.
   k. Wiring diagrams.
   l. Manufacturer's technical data and installation instructions for electronic hardware.
   m. Date of jobsite visit.

5. Keying Schedule: Prepared by or under the supervision of Installer, detailing Owner's final keying instructions for locks. Include schematic keying diagram and index each key set to unique door designations that are coordinated with the Contract Documents.

D. Bid and submit manufacturer's updated/improved item if scheduled item is discontinued.

E. Deviations: Highlight, encircle or otherwise identify deviations from "Schedule of Finish Hardware" on submittal with notations clearly designating those portions as deviating from this section.

F. If discrepancy between drawings and scheduled material in this section, bid the more expensive of the two choices, note the discrepancy in the submittal and request direction from Architect for resolution.

G. Substitutions per Division 1. Include product data and indicate benefit to the Project. Furnish operating samples on request.

H. Furnish as-built/as-installed schedule with closeout documents, including keying schedule, wiring diagrams, manufacturers' installation, adjustment and maintenance information, and supplier's final inspection report.

I. Warranty: Special warranty specified in this Section.

1.5 QUALITY ASSURANCE

A. Qualifications:

1. Hardware supplier: direct factory contract supplier who employs a certified architectural hardware consultant (AHC), available at reasonable times during course of work for project hardware consultation to Owner, Architect and Contractor.
    a. Responsible for detailing, scheduling and ordering of finish hardware. Detailing implies that the submitted schedule of hardware is correct and complete for the intended function and performance of the openings.

B. Hardware: Free of defects, blemishes and excessive play. Obtain each kind of hardware (latch and locksets, exit devices, hinges and closers) from one manufacturer.

C. Exit Doors: Operable from inside with single motion without the use of a key or special knowledge or effort.

D. Fire-Rated Openings: NFPA 80 compliant. Hardware UL10C / California State Fire Marshal Standard 12-7-4 (positive pressure) compliant for given type/size opening and degree of label. Provide proper latching hardware, non-flaming door closers, approved-bearing hinges, and resilient seals. Coordinate with wood door section for required intumescent seals. Furnish openings complete.

1. Note: scheduled resilient seals may exceed selected door manufacturer's requirements.
2. See 2.6.E for added information regarding resilient and intumescent seals.

E. Furnish hardware items required to complete the work in accordance with specified performance level and design intent, complying with manufacturers' instructions.

F. Pre-Installation Meetings: Initiate and conduct with supplier, installer and related trades, coordinate materials and techniques, and sequence complex hardware items and systems installation.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Delivery: coordinate delivery to appropriate locations (shop or field).

1. Permanent keys and cores: secured delivery direct to Owner's representative.

B. Acceptance at Site: Items individually packaged in manufacturers' original containers, complete with proper fasteners and related pieces. Clearly mark packages to indicate contents, locations in hardware schedule and door numbers.

C. Storage: Provide securely locked storage area for hardware, protect from moisture, sunlight, paint, chemicals, dust, excessive heat and cold, etc.

1.7 COORDINATION

A. Where exact types of hardware specified are not adaptable to finished shape or size of members requiring hardware, provide suitable types having as nearly as practical the same operation and quality as type specified, subject to Architect's approval.

B. Coordination: Coordinate hardware with other work. Furnish hardware items of proper design for use on doors and frames of the thickness, profile, swing, security and similar requirements indicated, as necessary for proper installation and function, regardless of omissions or conflicts in the information on the Contract Documents. Furnish related trades with the following information:

1. Location of embedded and attached items to concrete.
2. Location of wall-mounted hardware, including wall stops.
3. Location of finish floor materials and floor-mounted hardware.
4. Locations for conduit and raceways as needed for electrical, electronic and electro-pneumatic hardware items. Fire/life-safety system interfacing. Point-to-point wiring diagrams plus riser diagrams to related trades.
5. Manufacturer templates to door and frame fabricators.
6. Coordinate: flush top rails of doors at out-swinging exteriors, and throughout where adhesive-mounted seals occur.
7. At masonry construction, coordinate with the anchoring and hollow metal supplier prior to frame installation by placing a strip of insulation, wood, or foam, on the back of the hollow metal frame behind the rabbet section for continuous hinges, as well as at rim panic hardware strike locations, silencers, coordinators, and door closer arm locations. When the frame is grouted in place, the backing will allow drilling and tapping without dulling or breaking the installer's bits.

C. Check Shop Drawings for doors and entrances to confirm that adequate provisions will be made for proper hardware installation. Do not order hardware until the submittal has been reviewed by the frame and door suppliers for compatibility with their products.

1.8 WARRANTY

A. Part of respective manufacturers' regular terms of sale. Provide manufacturers' written warranties:

1.	Locksets:	Three years
2.	Extra Heavy Duty Cylinder Lock:	Seven years
3.	Exit Devices:	Three years mechanical One year electrical
4.	Closers:	Ten years mechanical Two years electrical
5.	Hinges:	One year
6.	Other Hardware:	Two years

1.9 COMMISSIONING:

A. Conduct these tests prior to request for certificate of substantial completion:

1. With installer present, test door hardware operation with climate control system and stairwell pressurization system both at rest and while in full operation.
2. With installer, access control contractor and electrical contractor present, test electrical, electronic and electro-pneumatic hardware systems for satisfactory operation.

3. With installer and electrical contractor present, test hardware interfaced with fire/life-safety system for proper operation and release.

1.10 REGULATORY REQUIREMENTS:

A. Locate latching hardware between 34” to 44” above the finished floor, per California Building Code, Section 1133B.2.5.2 and Section 1008.1.8.2.

1. Locate panic hardware between 36” to 44” above the finished floor.

B. Adjust doors to open with not more than 5.0 lbs pressure to open at exterior doors and 5.0 lbs at interior doors. As allowed per California Building Code, Section 1133B.2.5, local authority may increase the allowable pressure for fire doors to achieve positive latching, but not to exceed 15 lbs.

C. Adjust door closer sweep periods so that from an open position of 70 degrees, the door will take at least 3 seconds to move to a point 3 inches from the latch, measured to the landing side of the door, per California Building Code Section 1133B.2.5.1

D. Meet California Building Code Sections 1133B.2.1, 1133B.2.5.1 and 1008.1.8.

E. Floor stops: Do not locate in path of travel. Locate no more than 4” from walls.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Listed acceptable alternate manufacturers: Submit for review products with equivalent function and features of scheduled products.

ITEM:	MANUFACTURER:	ACCEPTABLE ALTERNATE:
	(Code)	
Hinges	(IVE) Ives	Bommer
Continuous Hinges	(IVE) Ives	Pemko
Pivots	(IVE) Ives	Rixson
Floor Closers	(RIX) Rixson	Dorma
Key System	(SAR) Sargent.	
Locks	(SCH) Schlage Lock Co.	
Card Locks	(SCH) Schlage CM series	
Exit Devices	(VON) Von Duprin	
	(BLU) Blumcraft	C.R. Laurence
Closers	(LCN) LCN Closers	
Auto Flush Bolts	(IVE) H. B. Ives	DCI
Coordinators	(IVE) H. B. Ives	DCI
Silencers	(IVE) H. B. Ives	Rockwood, Trimco
Push & Pull Plates	(IVE) H. B. Ives	Rockwood, Trimco
Kickplates	(IVE) H. B. Ives	Rockwood, Trimco
Stops & Holders –	(IVE) H. B. Ives	Rockwood, Trimco
Overhead Stops	(GLY) Glynn-Johnson	ABH
Thresholds	(NGP) National Guard Products	Zero, Reese
	(PEM) Pemko	
Seals & Bottoms	(NGP) National Guard Products	Zero, Reese
Key Cabinets	(LUN) Lund	TelKee
Aluminum Door Locks	(ADA) Adams Rite	
Signs	(SBH) Specialized Builders Hardware	
Electric Strikes	(FOL) Folger Adams	

2.2 HINGING METHODS:

A. Drawings typically depict doors at 90 degrees, doors will actually swing to maximum allowable. Use wide-throw conventional or continuous hinges as needed up to 8 inches in width to allow door to stand parallel to wall for true 180-degree opening. Advise architect if 8-inch width is insufficient.

B. Conform to manufacturer's published hinge selection standard for door dimensions, weight and frequency, and to hinge selection as scheduled. Where manufacturer's standard exceeds the scheduled product, furnish the heavier of the two choices, notify Architect of deviation from scheduled hardware.

C. Conventional Hinges: Steel or stainless steel pins and concealed bearings. Hinge open widths minimum, but of sufficient throw to permit maximum door swing.

1. Outswinging exterior doors: non-ferrous with non-removable (NRP) pins and security studs.
2. Non-ferrous material exteriors and at doors subject to corrosive atmospheric conditions.

D. Continuous Hinges:

1. Geared-type aluminum.
   a. Use wide-throw units where needed for maximum degree of swing, advise architect if commonly available hinges are insufficient.
2. Pinned steel/stainless steel type: continuous stainless steel, 0.25-inch diameter stainless-steel hinge pin.
   a. Use engineered application-specific wide-throw units as needed to provide maximum swing degree of swing, advise architect if required width exceeds 8 inches.

E. Pivots: high-strength forged bronze or stainless steel, tilt-on precision bearing and bearing pin.

1. Bottom and intermediate pivots: adjustability of minus 1/16 inch, plus 1/8 inch.

F. Floor Closers: hydraulically controlled, cement case, maximum degree dead stop permitted by trim or adjacent structure. Special pins, floor pans and longer spindles when needed to accommodate floor and jamb conditions.

2.3 LOCKSETS, LATCHSETS, DEADBOLTS:

A. Mortise Locksets and Latchsets: as scheduled.

1. Chassis: cold-rolled steel, handing field-changeable without disassembly.
2. Latchbolts: 3/4 inch throw stainless steel anti-friction type.
3. Lever Trim: through-bolted, accessible design, cast lever or solid extruded bar type levers as scheduled. Filled hollow tube design unacceptable.
   a. Spindles: security design independent breakaway. Breakage of outside lever does not allow access to inside lever's hubworks to gain wrongful entry.
4. Furnish solid cylinder collars with wave springs. Wall of collar to cover rim of mortise cylinder.
5. Thumbturns: accessible design not requiring pinching or twisting motions to operate.
6. Deadbolts: stainless steel 1-inch throw.
7. Electric operation: Manufacturer-installed continuous duty solenoid.
8. Strikes: 16 gage curved steel, bronze or brass with 1 inch deep box construction, lips of sufficient length to clear trim and protect clothing.
9. Scheduled Lock Series and Design: Schlage L series, 17A design.
10. Certifications:
    a. ANSI A156.13, 1994, Grade 1 Operational, Grade 1
    b. ANSI/ASTM F476-84 Grade 31 UL Listed.

2.4 EXIT DEVICES / PANIC HARDWARE

A. General features:

1. Independent lab-tested 1,000,000 cycles.

2. Push-through push-pad design. No exposed push-pad fasteners, no exposed cavities when operated. Return stroke fluid dampeners and rubber bottoming dampeners, plus anti-rattle devices.
3. End caps: impact-resistant, flush-mounted. No raised edges or lips to catch carts or other equipment.
4. No exposed screws to show through glass doors.
5. Non-handed basic device design with center case interchangeable with all functions, no extra parts required to effect change of function.
6. Releasable in normal operation with 15-lb. maximum operating force per California State Fire Marshal Standard 12-10-3, and with 32 lb. maximum pressure under 250-lb. load to the door.
7. Exterior doors scheduled with XP-series devices: Static load force resistance of at least 2000 pounds.
8. Where devices span over door lite frame and the face of the selected lite manufacturer's frame is raised from the face of the door, furnish panic hardware manufacturer's fitted shims or glass-bead kits at no additional cost to the project.
9. Comply with CBC Section 1008.1.9.
10. Panic hardware shall be so mounted (centered between 36" and 44" above finished floor as recommended) that the clear width of the exitway is not less than 32" measured between the face of the door and the opposite stop. CBC Section 1133B.2.2 and Figure 11B-5B.
11. The unlatching force of panic hardware shall not exceed 5 lbs (66.72N), applied in the direction of travel.

2.5 Specific features:

1. Non-Fire Rated Devices: cylinder dogging.
2. Lever Trim: breakaway type, forged brass or bronze escutcheon min .130" thickness, compression spring drive, match lockset lever design.
3. Rod and latch guards with sloped full-width kickplates for doors fitted with surface vertical rod devices with bottom latches.
4. Fire-Labeled Devices: UL label indicating "Fire Exit Hardware". Vertical rod devices less bottom rod (LBR) unless otherwise scheduled.
5. Impact recessed devices: 1-1/4 inch projection when push-pad is depressed. Sloped metal end caps to deflect carts, etc. No pinch points to catch skin between touchbar and door.
6. Delayed Egress Devices: Function achieved within single exit device component, including latch, delayed locking device, request-to-exit switch, nuisance alarm, remote alarm, key switch, indicator lamp, relay, internal horn, door position input, external inhibit input plus fire alarm input. NFPA 101 "Special Locking Arrangement" compliant.
7. Electrically Operated Devices: Single manufacturer source for electric latch retraction devices, electrically controlled trim, power transfers, power supplies, monitoring switches and controls.
8. Removable Mullions: Removable with single turn of building key. Securely reinstalled without need for key. Furnish storage brackets for securely stowing the mullion away from the door when removed.

2.6 CLOSERS

A. Surface Closers:

1. Full rack-and-pinion type cylinder with removable non-ferrous cover and cast iron body. Double heat-treated pinion shaft, single piece forged piston, chrome-silicon steel spring.
2. ISO 2000 certified. Units stamped with date-of-manufacture code.
3. Independent lab-tested 10,000,000 cycles.
4. Non-sized, non-handed, and adjustable. Place closer inside building, stairs, and rooms.
5. Plates, brackets and special templating when needed for interface with particular header, door and wall conditions and neighboring hardware.
6. Adjustable to open with not more than 5.0lbs pressure to open at exterior doors and 5.0lbs at interior doors. As allowed per California Building Code, Section 1133B.2.5, local authority may increase the allowable pressure for fire doors to achieve positive latching, but not to exceed 15lbs.
7. Separate adjusting valves for closing speed, latching speed and backcheck, fourth valve for delayed action where scheduled.
8. Extra-duty arms (EDA) at exterior doors scheduled with parallel arm units.
9. Exterior door closers: tested to 100 hours of ASTM B117 salt spray test, furnish data on request.
10. Exterior doors: seasonal adjustments not required for temperatures from 120 degrees F to -30 degrees F, furnish checking fluid data on request.
11. Non-flaming fluid, will not fuel door or floor covering fires.
12. Pressure Relief Valves (PRV) not permitted.

B. Floor Closers: See 2.2: HINGING METHODS.

C. High Security Closers: Removable heavy gage metal case. Cylinders independent test lab certified to exceed 10,000,000 cycles. Vandal and tamper resistant forged steel arm. Exposed fasteners: pinned TORX type.

1. Advanced Variable Backcheck (AVB): where scheduled, these units commence backcheck at approximately 45 degrees.

D. Overhead Concealed Closers: Power transmitted to door separately from hanging means. Closer spindle does not support the door. Cast iron cylinders with hydraulically checked rack and pinion construction and single piece forged pistons. Separate non-critical sweep and latch speed valves.

1. (2030) concealable in 1-3/4inch x 4inch tube, single-lever arm & track power transmission, concealed-in-track bumpers where scheduled.

E. Low-Energy Door Operators: Comply with ANSI/BHMA 156.19. Pneumatic power-open, hydraulically checked spring power closing. Field-adjustable opening force, opening speed, time-open, closing and latching speeds. Door reopens and timing cycle restores if system reactuated during closing cycle. Locate compressors and exhausts away from door opening.

1. Compressors: sized per manufacturer's specification. Include automatic condensate drainage.
2. Control boxes: Heavy-duty construction, surface-mounted box with hinged door and integral hasp.
3. Actuators: as scheduled.
4. Tubing: generally 1/8" flexible plastic with barbed fittings. Use code-approved copper tubing and fittings at fire-partition penetrations.

2.7 OTHER HARDWARE

A. Automatic Flush Bolts: Low operating force design.

B. Overhead Stops: Non-plastic mechanisms and finished metal end caps. Field-changeable hold-open, friction and stop-only functions.

C. Kick Plates: Four beveled edges, .050 inches minimum thickness, height and width as scheduled. Sheet-metal screws of bronze or stainless steel to match other hardware.

D. Door Stops: Provide stops to protect walls, casework or other hardware.

1. Unless otherwise noted in Hardware Sets, provide floor type with appropriate fasteners. Where floor type cannot be used, provide wall type. If neither can be used, provide overhead type.
2. Locate overhead stops for maximum possible opening. Consult with Owner for furniture locations. Minimum: 90deg stop / 95deg deadstop. Note degree of opening in submittal.

E. Seals: Finished to match adjacent frame color. Resilient seal material: polyurethane, polypropylene, nylon brush, silicone rubber or solid high-grade neoprene as scheduled. Do not furnish vinyl seal material. UL label applied to seals on rated doors. Substitute products: certify that the products equal or exceed specified material's thickness and durability.

1. Proposed substitutions: submit for approval.
2. Solid neoprene: MIL Spec. R6855-CL III, Grade 40.
3. Non-corroding fasteners at in-swinging exterior doors.
4. Sound control openings: Use components tested as a system using nationally accepted standards by independent laboratories. Ensure that the door leafs have the necessary sealed-in-place STC ratings. Fasten applied seals over bead of sealant.
5. Fire-rated Doors, Resilient Seals: UL10C / UBC Standard 7-2 compliant. Coordinate with selected door manufacturers' and selected frame manufacturers' requirements. Where rigid housed resilient seals are scheduled in this section and the selected door manufacturer only requires an adhesive-mounted resilient seal, furnish rigid housed seal at minimum, or both the rigid housed seal plus the adhesive applied seal. Adhesive applied seals alone are deemed insufficient for this project where rigid housed seals are scheduled.
6. Fire-rated Doors, Intumescent Seals: Furnished by selected door manufacturer. Furnish fire-labeled opening assembly complete and in full compliance with UL10C / NFPA 252. Where required, Intumescent seals vary in requirement by door type and door manufacture -- careful coordination required

F. Automatic door bottoms: low operating force units. Doors with automatic door bottoms plus head and jamb seals cannot require more than two pounds operating force to open when closer is disconnected.

G. Thresholds: As scheduled and per details. Comply with CBC Section 1133B.2.4.1. Substitute products: certify that the products equal or exceed specified material's thickness. Proposed substitutions: submit for approval.

1. Exteriors: Seal perimeter to exclude water and vermin. Use sealant complying with requirements in Division 7 "Thermal and Moisture Protection". Non-ferrous 1/4inch fasteners and lead expansion shield anchors, or Red-Head #SFS-1420 (or approved equivalent) Flat Head Sleeve Anchors (SS/FHSL).
2. Fire-rated openings, 90min or less duration: use thresholds to interrupt floor covering material under the door where that material has a critical radiant flux value less than 0.22 watts per square centimeter, per NFPA 253. Use threshold unit as scheduled. If none scheduled, request direction from Architect.
3. Fire-rated openings, 3hour duration: Thresholds, where scheduled, to extend full jamb depth.
4. Acoustic openings: Set units in full bed of Division-7-compliant, leave no air space between threshold and substrate.
5. Plastic plugs with wood or sheet metal screws are not an acceptable substitute for specified fastening methods.
6. Fasteners: Generally, exposed screws to be Phillips or Robertson drive. Pinned TORX drive at high security areas. Flat head sleeve anchors (FHSL) may be slotted drive. Sheet metal and wood screws: full-thread. Sleeve nuts: full length to prevent door compression.

H. Exposed Through-Bolts: Do not use SNB, grommet nuts, sleeve nuts or other such clamping type fasteners, intent is for minimal exposed hardware. Coordinate with wood doors; ensure provision of proper blocking to support wood screws for mounting panic hardware and door closers. Coordinate with metal doors and frames; ensure provision of proper reinforcement to support machine screws for mounting panic hardware and door closers.

I. Silencers: Interior hollow metal frames, 3 for single doors, 4 for pairs of doors. Omit where adhesive mounted seal occurs. Leave no unfilled/uncovered pre-punched silencer holes.

J. Key Control Software: Same manufacturer as key cylinders, supply to Owner.

2.8 FINISH:

A. Generally BHMA 630 Satin Stainless.

1. Areas using BHMA 626 to have push-plates, pulls and protection plates of BHMA 630, Satin Stainless Steel, unless otherwise noted.

B. Door closers: factory powder coated to match other hardware, unless otherwise noted.

C. Aluminum items: match predominant adjacent material. Seals to coordinate with frame color.

2.9 KEYING REQUIREMENTS:

A. Key System**:** Key system by Best to be coordinated with San Diego Parks and Rec Standard, interchangeable core throughout. Utility patent protection to extend at least until 2024. Key blanks available only from factory-direct sources, not available from after-market keyblank manufacturers. For estimate use factory GMK charge. Initiate and conduct meeting(s) with Owner and I-R Security Technologies representatives to determine system keyway(s), keybow styles, structure, stamping, degree of physical security and degree of geographic exclusivity. Furnish Owner's written approval of the system; do not order keys or cylinders without written confirmation of actual requirements from the Owner. Contractor will install permanent cylinders/cores.

1. New factory-registered master key system.
2. Hold Conference with owner to verify keying before ordering locks. San Diego Parks Department requires Best keyways.
3. Construction keying: furnish temporary keyed-alike cores. Remove at substantial completion and install permanent cylinders/cores in Owner's presence. Demonstrate that construction key no longer operates.
4. Temporary cylinders/cores remain supplier's property.
5. Furnish 10 construction keys.
6. Furnish 2 construction control keys.
7. Key Cylinders: furnish 6-pin solid brass construction.

B. Cylinders/cores: keyed at factory of lock manufacturer where permanent records are maintained. Locksets and cylinders same manufacturer.

C. Permanent keys: use secured shipment direct from point of origination to Owner.

1. For estimate: 3 keys per change combination, 5 master keys per group, 5 grand-master keys, 3 control keys.
2. For estimate: VKC stamping plus "Do Not Duplicate".

D. Bitting List: use secured shipment direct from point of origination to Owner at completion.

E. Key Control software: Include one Sitemaster 200 key control system with new key system.

PART 3 - EXECUTION

3.1 ACCEPTABLE INSTALLERS

A. Can read and understand manufacturers' templates, suppliers' hardware schedules and printed installation instructions. Can readily distinguish drywall screws from manufacturers' furnished fasteners. Available to meet with manufacturers' representatives and related trades to discuss installation of hardware.

3.2 PREPARATION:

A. Ensure that walls and frames are square and plumb before hardware installation. Make corrections before commencing hardware installation.

B. Locate hardware per SDI-100 and applicable building, fire, life-safety, accessibility, and security codes.

1. Notify Architect of code conflicts before ordering material.
2. Locate levers, key cylinders, t-turn pieces, touchbar and other operable portions of latching hardware between 34 inches to 44 inches above the finished floor, per CBC Section 1133B.2.5.1 and Section 1008.1.8.2.

C. Overhead stops: before installing, determine proposed locations of furniture items, fixtures, and other items to be protected by the overhead stop's action.

3.3 INSTALLATION

A. Install hardware per manufacturer’s instructions and recommendations. Do not install surface-mounted items until finishes have been completed on substrate. Set units level, plumb and true to line and location. Adjust and reinforce attachment substrate for proper installation and operation. Remove and reinstall or replace work deemed defective by Architect.

1. Gaskets: install jamb-applied gaskets before closers, overhead stops, rim strikes, etc; fasten hardware over and through these seals. Install sweeps across bottoms of doors before astragals, cope sweeps around bottom pivots, trim astragals to tops of sweeps.
2. When hardware is to be attached to existing metal surface and insufficient reinforcement exists, use RivNuts, NutSerts or similar anchoring device for screws.
3. Use manufacturers' fasteners furnished with hardware items, or submit Request for Substitution with Architect.
4. Replace fasteners damaged by power-driven tools.

B. Locate floor stops no more that 4 inches from walls and not within paths of travel. See paragraph 2.2 regarding hinge widths, door should be well clear of point of wall reveal. Point of door contact no closer to the hinge edge than half the door width. Where situation is questionable or difficult, contact Architect for direction.

C. Locate surface mounted door closers on protected room side of opening.

D. Core concrete for exterior door stop anchors. Set anchors in approved non-shrink grout.

E. Locate overhead stops for minimum 90 degrees and maximum allowable degree of swing.

F. Drill pilot holes for fasteners in wood doors and/or frames. Centerpunch hole locations before using self-drilling type screws to prevent skating. Replace screws that are not centered in their holes.

G. Lubricate and adjust existing hardware scheduled to remain. Carefully remove and give to Owner items not scheduled for reuse.

H. Field verify existing conditions and measurements prior to ordering hardware. Fill existing hardware cut outs not being used by the new hardware. Remove existing hardware not being reused.

I. Disable or remove existing floor closers where they exist. If disabled cut or remove spindle.

J. Where existing wall conditions will not allow door to swing using the scheduled hinges, provide wide-throw hinges and if needed extended arms on closers.

K. Provide proper brackets to accommodate the mounting of closers on doors with flush transoms.

3.4 ADJUSTING

A. Adjust and check for proper operation and function. Replace units, which cannot be adjusted to operate freely and smoothly.

1. Hardware damaged by improper installation or adjustment methods: repair or replace to Owner's satisfaction.
2. Adjust doors to fully latch with no more than 1 pound of pressure.
3. Adjust delayed-action closers on fire-rated doors to fully close from fully-opened position in no more than 10 seconds.
4. Adjust door closers per 1.10 this section.

B. Inspection: Use hardware supplier's consultant or consultant's agent. Include supplier's report with closeout documents.

C. Final inspection: Installer to provide letter to Owner that upon completion installer has visited the Project and has accomplished the following:

1. Re-adjust hardware.
2. Evaluate maintenance procedures and recommend changes or additions, and instruct Owner's personnel.
3. Identify items that have deteriorated or failed.
4. Submit written report identifying problems

3.5 DEMONSTRATION:

A. Demonstrate mechanical hardware and electrical, electronic and pneumatic hardware systems, including adjustment and maintenance procedures.

3.6 PROTECTION/CLEANING:

A. Cover installed hardware, protect from paint, cleaning agents, weathering, carts/barrows, etc. Remove covering materials and clean hardware just prior to substantial completion.

B. Clean adjacent wall, frame and door surfaces soiled from installation/reinstallation process.

3.7 SCHEDULE OF FINISH HARDWARE

See door schedule in drawings for hardware set assignments.

HW SET: 01 - NOT USED

1	EA	CONTINUOUS HINGE	112HD (POWER COAT TO MATCH FRAME)	628	IVE
1	EA	HOOKBOLT DEADLOCK	MS1851SW-050 (PROVIDE BACKSET)	628	ADA
2	EA	MORTISE CYLINDER	1E74	626	BST
2	EA	CORE ONLY	23-030	626	SCH
1	EA	PULL/PUSHBAR	9190-0	630	IVE
1	EA	CONCEALED CLOSER	2030 H BUMPER	689	LCN
1	EA	FLOOR STOP	FS441	626	IVE
1			ALL SEALS AND THRESHOLDS BY ALUM DOOR MFGR		B/O

SIGN REQUIRED ABOVE DOOR: "THESE DOORS TO REMAIN UNLOCKED DURING BUSINESS HOURS"

HW SET: 01.1

1	EA	POWER TRANSFER	EPT10	689	FAL
1	EA	CONTINUOUS HINGE	700 EPT	630	IVE
1	EA	MORTISE CYLINDER	1E74	626	BST
1	EA	CORE ONLY	23-030	626	SCH
1	EA	EU STOREROOM LOCK	L9080TEU 17A	630	SCH
1	EA	CONCEALED CLOSER	2030 H BUMPER	689	LCN
1	EA	FLOOR STOP	FS441	626	IVE
1	EA	LOCK GUARD	LG1	600	IVE
1	EA	POWER SUPPLY	PS902		FAL
1			ALL SEALS AND THRESHOLDS BY ALUM DOOR MFGR		B/O

ACCESS CONTROIL, AND FUTURE CARD READERS BY ELECT DIV

HW SET: 01.1A

1	EA	POWER TRANSFER	EPT10	689	FAL
1	EA	CONTINUOUS HINGE	700 EPT	630	IVE
1	EA	MORTISE CYLINDER	1E74	626	BST
1	EA	MORTISE CYLINDER	SDG&E QUAD	626	SCH
1	EA	EU STOREROOM LOCK	L9080TEU 17A	630	SCH
1	EA	CONCEALED CLOSER	2030 H BUMPER	689	LCN
1	EA	FLOOR STOP	FS441	626	IVE
1	EA	LOCK GUARD	LG1	600	IVE
1	EA	POWER SUPPLY	PS902		FAL
1			ALL SEALS AND THRESHOLDS BY ALUM DOOR MFGR		B/O

ACCESS CONTROIL, AND FUTURE CARD READERS BY ELECT DIV
SDG&E ACCESS

HW SET: 02 - NOT USED

1	EA	CONTINUOUS HINGE	700	630	IVE
1	EA	HOOKBOLT DEADLOCK	MS1851SW-050 (PROVIDE BACKSET)	628	ADA
2	EA	MORTISE CYLINDER	1E74	626	BST
2	EA	CORE ONLY	23-030	626	SCH
1	EA	PULL/PUSHBAR	9190-0	630	IVE
1	EA	CONCEALED CLOSER	2030 H BUMPER	689	LCN
1	EA	FLOOR STOP	FS441	626	IVE
1			ALL SEALS AND THRESHOLDS BY ALUM DOOR MFGR		B/O

SIGN REQUIRED ABOVE DOOR: "THESE DOORS TO REMAIN UNLOCKED DURING BUSINESS HOURS"

HW SET: 03

1	EA	CONTINUOUS HINGE	700	630	IVE
1	EA	STOREROOM LOCK	L9080T 17A	630	SCH
1	EA	MORTISE CYLINDER	1E74	626	BST
1	EA	CORE ONLY	23-030	626	SCH
1	EA	SURFACE CLOSER	4041 DEL	689	LCN
1	EA	KICK PLATE	8400-B4E-CS-10" X 2" LDW	654	IVE
1	SET	SEALS	5050B	BRN	NGP
1	EA	DRIP CAP	16A	AL	NGP
1	EA	DOOR SWEEP	C627A	AL	NGP
1	EA	THRESHOLD	882 ADA (1/4" OUTSWING)	AL	NGP

HW SET: 04

1	EA	CONTINUOUS HINGE	700	630	IVE
1	EA	STOREROOM LOCK	L9080T 17A	630	SCH
1	EA	MORTISE CYLINDER	1E74	626	BST
1	EA	CORE ONLY	23-030	626	SCH
1	EA	SURFACE CLOSER	4041 DEL EDA	689	LCN
1	EA	KICK PLATE	8400-B4E-CS-10" X 2" LDW	654	IVE
1	SET	SEALS	5050B	BRN	NGP
1	EA	DOOR SWEEP	C627A	AL	NGP
1	EA	THRESHOLD	882 ADA (1/4" OUTSWING)	AL	NGP

HW SET: 04.1

1	EA	CONTINUOUS HINGE	700	630	IVE
1	EA	STOREROOM LOCK	L9080T 17A LOT	630	SCH
1	EA	MORTISE CYLINDER	1E74	626	BST
1	EA	CORE ONLY	23-030	626	SCH
1	EA	FLUSH PULL	1111C-3	630	TRI

HW SET: 05

1	EA	CONTINUOUS HINGE	700	630	IVE
1	EA	STOREROOM LOCK	L9080T 17A	630	SCH
1	EA	MORTISE CYLINDER	1E74	626	BST
1	EA	CORE ONLY	23-030	626	SCH
1	EA	SURFACE CLOSER	4041 DEL EDA	689	LCN
1	EA	KICK PLATE	8400-B4E-CS-10" X 2" LDW	654	IVE
1	SET	SEALS	5050B	BRN	NGP
1	EA	DOOR SWEEP	C627A	AL	NGP
1	EA	THRESHOLD	882 ADA (1/4" OUTSWING)	AL	NGP

HW SET: 06

3	EA	HINGE	3CB1 4.5 X 4.5	630	IVE
1	EA	STOREROOM LOCK	L9080T 17A	630	SCH
1	EA	MORTISE CYLINDER	1E74	626	BST
1	EA	CORE ONLY	23-030	626	SCH
1	EA	SURFACE CLOSER	4041 DEL	689	LCN
1	EA	KICK PLATE	8400-B4E-CS-10" X 2" LDW	654	IVE
3	EA	SILENCER	SR64	GRY	IVE

HW SET: 07 - NOT USED

2	EA	CONTINUOUS HINGE	700	630	IVE
2	SET	AUTO FLUSH BOLT	FB31P HM DOOR (TOP AND BOTTOM BOLT)	630	IVE
1	EA	DUST PROOF STRIKE	DP1	626	IVE
1	EA	CLASSROOM LOCK	L9070T 17A	630	SCH
1	EA	MORTISE CYLINDER	1E74	626	BST
1	EA	CORE ONLY	23-030	626	SCH
2	EA	SURFACE CLOSER	4041 DEL SHCUSH	689	LCN
2	EA	KICK PLATE	8400-B4E-CS-30" X 1" LDW	654	IVE
1	SET	SEALS	5050B	BRN	NGP
1	EA	DRIP CAP	16A	AL	NGP
1	EA	THRESHOLD	882 ADA (1/4" OUTSWING)	AL	NGP

HW SET: 08

2	EA	CONTINUOUS HINGE	700	630	IVE
1	EA	CHAIN BOLT	0514.00038	600	RIC
1	EA	CANE BOLT	0524.00023	600	RIC
1	EA	STOREROOM LOCK	L9080T 17A	630	SCH
1	EA	MORTISE CYLINDER	1E74	626	BST
1	EA	CORE ONLY	23-030	626	SCH
2	EA	SURFACE CLOSER	4041 DEL SHCUSH	689	LCN
1	SET	SEALS	304NA	CL	NGP
1	EA	DRIP CAP	16A	AL	NGP
2	EA	DOOR SWEEP	C627A	AL	NGP
1	EA	THRESHOLD	882 ADA (1/4" OUTSWING)	AL	NGP

WELD IN LOCK BOX BY DOOR MFG
HINGES ARE SCREWED TO DOOR AND FRAME (DO NOT WELD)
ASTRAGAL BY DOOR MFG

HW SET: 08.1

2	EA	CONTINUOUS HINGE	700	630	IVE
1	EA	CHAIN BOLT	0514.00038	600	RIC
1	EA	CANE BOLT	0524.00023	600	RIC
1	EA	STOREROOM LOCK	L9080T 17A	630	SCH
1	EA	MORTISE CYLINDER	1E74	626	BST
1	EA	CORE ONLY	23-030	626	SCH
2	EA	SURFACE CLOSER	4041 DEL SHCUSH	689	LCN
1	SET	SEALS	304NA	CL	NGP
1	EA	DRIP CAP	16A	AL	NGP
2	EA	DOOR SWEEP	C627A	AL	NGP
1	EA	THRESHOLD	882 ADA (1/4" OUTSWING)	AL	NGP

WELD IN LOCK BOX BY DOOR MFG
HINGES ARE SCREWED TO DOOR AND FRAME (DO NOT WELD)
ASTRAGAL BY DOOR MFG

HW SET: 08.2

2	EA	CONTINUOUS HINGE	700	630	IVE
1	EA	CHAIN BOLT	0514.00038	600	RIC
1	EA	CANE BOLT	0524.00023	600	RIC
1	EA	STOREROOM LOCK	L9080T 17A	630	SCH
1	EA	MORTISE CYLINDER	1E74	626	BST
1	EA	CORE ONLY	23-030	626	SCH
2	EA	SURFACE CLOSER	4041 DEL SHCUSH	689	LCN
1	SET	SEALS	304NA	CL	NGP
1	EA	DRIP CAP	16A	AL	NGP
2	EA	DOOR SWEEP	C627A	AL	NGP
1	EA	THRESHOLD	882 ADA (1/4" OUTSWING)	AL	NGP

WELD IN LOCK BOX BY DOOR MFG
HINGES ARE SCREWED TO DOOR AND FRAME (DO NOT WELD)
ASTRAGAL BY DOOR MFG

HW SET: 09

2	EA	FLOOR CLOSER	DA-28-AHO	626	RIX
4	EA	MORTISE CYLINDER	1E74	626	BST
4	EA	CORE ONLY	23-030	626	SCH
4	SET	PUSH/ PULLS	48LPPS BACK TO BACK 48"	630	CRL
1		PIVOTS/SEALS	BALANCE OF HARDWARE BY DOOR SUPPLIER		B/O
1		BOTTOM DEAD BOLT	LOCKING HARDWARE BY DOOR SUPPLIER		B/O

THRESHOLD BY GLASS DOOR PROVIDOR

THRESHOLD TO COVER FULL WIDTH FO FRAME AND CENTER HUNG FLOOR CLOSER
DOOR SWINGS OUT ONLY
SIGN OVER DOOR "THESE DOORS TO REMAIN UNLOCKED WHILE OCCUPIED"

HW SET: 10

1	EA	CONTINUOUS HINGE	700	630	IVE
1	EA	PRIVACY W/INDICATOR	L9496T 17A L583-363	630	SCH
1	EA	MORTISE CYLINDER	1E74	626	BST
1	EA	CORE ONLY	23-030	626	SCH
1	EA	SURFACE CLOSER	4041 DEL	689	LCN
1	EA	KICK PLATE	8400-B4E-CS-10" X 1" LDW	664	IVE
1	EA	MOP PLATE	8400-B4E-CS-4" X 2" LDW	654	IVE
1	EA	FLOOR STOP	FS441	626	IVE

RESTROOM SIGN BY DIVISION 10

END OF SECTION

SECTION 08 8000 - GLAZING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes glazing for the following products and applications, including those specified in other Sections where glazing requirements are specified by reference to this Section:

1. Windows.
2. Doors.
3. Storefront framing.
4. Glazed entrances.
5. Transaction windows.
6. Skylights.

B. Related Sections:

1. Division 08 Section "Aluminum-Framed Entrances And Storefronts" for glazing sealants and spandrel insulation.

1.3 DEFINITIONS

A. Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.

B. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C 1036.

C. Interspace: Space between lites of an insulating-glass unit.

1.4 PERFORMANCE REQUIREMENTS

A. General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.

B. Delegated Design: Design glass, including comprehensive engineering analysis according to ASTM E 1300 by a qualified professional engineer, using the following design criteria:

1. Design Wind Pressures: Determine design wind pressures applicable to Project according to ASCE/SEI 7, based on heights above grade indicated on Drawings.
   a. Wind Design Data: As indicated on Structural Drawings.
2. Vertical Glazing: For glass surfaces sloped 15 degrees or less from vertical, design glass to resist design wind pressure based on glass type factors for short-duration load.
3. Sloped Glazing: For glass surfaces sloped more than 15 degrees from vertical, design glass to resist each of the following combinations of loads:
   a. Outward design wind pressure minus the weight of the glass. Base design on glass type factors for short-duration load.
   b. Inward design wind pressure plus the weight of the glass plus half of the design snow load. Base design on glass type factors for short-duration load.
   c. Half of the inward design wind pressure plus the weight of the glass plus the design snow load. Base design on glass type factors for long-duration load.
4. Glass Type Factors for Wired, Patterned, and Sandblasted Glass:
   a. Short-Duration Glass Type Factor for Wired Glass: 0.5.
   b. Long-Duration Glass Type Factor for Wired Glass: 0.3.
   c. Short-Duration Glass Type Factor for Patterned Glass: 1.0.
   d. Long-Duration Glass Type Factor for Patterned Glass: 0.6.
   e. Short-Duration Glass Type Factor for Sandblasted Glass: 0.5.
5. Thickness of Patterned Glass: Base design of patterned glass on thickness at thinnest part of the glass.
6. Maximum Lateral Deflection: For glass supported on all four edges, limit center-of-glass deflection at design wind pressure to not more than 1/50 times the short-side length or 1 inch (25 mm), whichever is less.
7. Differential Shading: Design glass to resist thermal stresses induced by differential shading within individual glass lites.

C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.

1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

1.5 SUBMITTALS

A. Product Data: For each glass product and glazing material indicated.

B. Glass Samples: For each type of glass product other than clear monolithic vision glass; 12 inches (300 mm) square.

C. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings and herein.

D. Product Certificates: For glass and glazing products, from manufacturer.

E. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for insulating glass and glazing sealants.

1. For glazing sealants, provide test reports based on testing current sealant formulations within previous 36-month period.

F. Warranties: Sample of special warranties.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications for Insulating-Glass Units with Sputter-Coated, Low-E Coatings: A qualified insulating-glass manufacturer who is approved and certified by coated-glass manufacturer.

B. Source Limitations for Glazing Accessories: Obtain from single source from single manufacturer for each product and installation method.

C. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.

D. Requirements of Regulatory Agencies:

California Building Code (CBC), Title 24, Part 2. Chapter 24. Comply with wind design requirements of Title 24, Part 2, Chapter 16A, Division II.Consumer Product Safety Commission, Safety Standard for Architectural Glazing Materials, 16 CFR 1201. Safety glazing shall comply with ANSI Z97.1 requirements.

E. Grading and Labeling: Grade and label each light stating quality and grade of glass and manufacturer's name and brand designation. Leave labels intact until removal is directed by Architect.

F. Glazier Qualifications: Engage an experienced glazier who has completed glazing similar in material, design, and extent to that indicated for Project with a record of successful in-service performance.

G. Single Source Responsibility for Glass: Obtain glass from one source for each product indicated:

1. Primary glass (ASTM C 1036) of each type and class indicated.
2. Heat treated glass (ASTM C 1048) of each condition indicated; Spandrel glass
3. Solar control low-emissivity glass (ASTM C 1376) of each condition indicated.
4. Insulating glass of each construction indicated.

H. Single Source Responsibility for Glazing Accessories: Obtain glazing accessories from one source for each product and installation method indicated.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Protect glazing materials according to manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

B. Comply with insulating-glass manufacturer's written recommendations for venting and sealing units to avoid hermetic seal ruptures due to altitude change.

1.8 PROJECT CONDITIONS

A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.

1. Do not install glazing sealants when ambient and substrate temperature conditions are outside limits permitted by sealant manufacturer or below 40 deg F (4.4 deg C).

1.9 WARRANTY

A. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer's standard form in which coated-glass manufacturer agrees to replace coated-glass units that deteriorate within specified warranty period. Deterioration of coated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in coating.

B. Manufacturer's Special Warranty on Insulating Glass: Manufacturer's standard form in which insulating-glass manufacturer agrees to replace insulating-glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.

1. Warranty Period: 10 years from date of Substantial Completion.
2. Manufacturer’s Warranty on Simulated Sandblast Frit: Warrant glass with frit against failure, blisters, discoloration, and defects in materials and workmanship for a period of 10 years.

PART 2 - PRODUCTS

2.1 GLASS PRODUCTS, GENERAL

A. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass lites in thicknesses as needed to comply with requirements indicated.

B. Strength: Where float glass is indicated, provide annealed float glass, Kind HS heat-treated float glass, or Kind FT heat-treated float glass as needed to comply with "Performance Requirements" Article. Where heat-strengthened glass is indicated, provide Kind HS heat-treated float glass or Kind FT heat-treated float glass as needed to comply with "Performance Requirements" Article. Where fully tempered glass is indicated, provide Kind FT heat-treated float glass.

C. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:
   1. For insulating-glass units, properties are based on units of thickness indicated for overall unit and for each lite.
   2. U-Factors: Center-of-glazing values, according to NFRC 100 and based on LBL's WINDOW 5.2 computer program, expressed as Btu/sq. ft. x h x deg F (W/sq. m x K).
   3. Solar Heat-Gain Coefficient and Visible Transmittance: Center-of-glazing values, according to NFRC 200 and based on LBL's WINDOW 5.2 computer program.
   4. Visible Reflectance: Center-of-glazing values, according to NFRC 300.

2.2 GLASS PRODUCTS

A. Float Glass: ASTM C 1036, Type I, Quality-Q3, Class I (clear) unless otherwise indicated.

B. Heat-Treated Float Glass: ASTM C 1048; Type I; Quality-Q3; Class I (clear) unless otherwise indicated; of kind and condition indicated.

   1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.
   2. For uncoated glass, comply with requirements for Condition A.
   3. For coated vision glass, comply with requirements for Condition C (other coated glass).

C. Laminated Glass Products: Comply with ASTM C 1172 for kinds of laminated glass indicated and other requirements specified.

   1. Kind of Laminated Glass per ASTM C 1172: Kind LHS (two lites of heat-strengthened Type I glass). Kind LT (two lites of fully tempered Type I glass).
   2. Refer to primary and heat-treated glass requirements relating to properties of glass products comprising laminated glass products.

D. SOLAR CONTROL LOW EMISSIVITY (LOW E) COATING GLASS

   1. Sputter Coated Glass: ASTM C 1376 float glass with metallic coating deposited by vacuum deposition process after manufacture and heat treatment, and complying with other requirements specified.
      a. Edge delete coating of surfaces in contact with insulating glass edge seals.

2.3 INSULATING GLASS

A. Manufacturers: The design for each insulating glass product is based on the named products. Subject to compliance with requirements, provide products by one of the following for insulating glass:

1. Guardian Industries Corp.
2. PPG Industries
3. Viracon
4. Oldcastle.

B. Insulating-Glass Units: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, qualified according to ASTM E 2190, and complying with other requirements specified.

1. Sealing System: Dual seal, with manufacturer's standard primary and secondary.
2. Spacer: Aluminum with black anodic finish.
3. Desiccant: Molecular sieve or silica gel, or blend of both.

C. Glass: Comply with applicable requirements in "Glass Products" Article 2.2 as indicated by designations in "Insulating-Glass" Article 2.3.

2.4 GLAZING GASKETS

A. Dense Compression Gaskets: Molded or extruded gaskets of profile and hardness required to maintain watertight seal.

B. Soft Compression Gaskets: Extruded or molded, closed-cell, integral-skinned EPDM, silicone or thermoplastic polyolefin rubber gaskets complying with ASTM C 509, Type II, black; of profile and hardness required to maintain watertight seal.

1. Application: Use where soft compression gaskets will be compressed by inserting dense compression gaskets on opposite side of glazing or pressure applied by means of pressure-glazing stops on opposite side of glazing.

C. Lock-Strip Gaskets: Neoprene extrusions in size and shape indicated, fabricated into frames with molded corner units and zipper lock-strips, complying with ASTM C 542, black.

2.5 GLAZING SEALANTS

A. General:

1. Compatibility: Provide glazing sealants that are compatible with one another and with other materials they will contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.

2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
3. VOC Content: For sealants used inside of the weatherproofing system, not more than 250 g/L when calculated according to 40 CFR 59, Subpart D.
4. Colors of Exposed Glazing Sealants: Black.

B. Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 100/50, Use NT.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Dow Corning Corporation; 790.
b. GE Advanced Materials - Silicones; SilPruf LM SCS2700.
c. Tremco Incorporated; Spectrem 1.

C. Glazing Sealants for Fire-Rated Glazing Products: Products that are approved by testing agencies that listed and labeled fire-resistant glazing products with which they are used for applications and fire-protection ratings indicated.

2.6 GLAZING TAPES

A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C 1281 and AAMA 800 for products indicated below:

1. AAMA 804.3 tape, where indicated.
2. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
3. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.

B. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; and complying with AAMA 800 for the following types:

1. AAMA 810.1, Type 1, for glazing applications in which tape acts as the primary sealant.
2. AAMA 810.1, Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

2.7 MISCELLANEOUS GLAZING MATERIALS

A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.

B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.

D. Spacers: Elastomeric blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.

E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).

F. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

2.8 FABRICATION OF GLAZING UNITS

A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.

B. Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites to produce square edges with slight chamfers at junctions of edges and faces.

C. Grind smooth and polish exposed glass edges and corners.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:

1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
2. Presence and functioning of weep systems.
3. Minimum required face and edge clearances.
4. Effective sealing between joints of glass-framing members.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

B. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that will leave visible marks in the completed work.

3.3 GLAZING, GENERAL

A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.

B. Adjust glazing channel dimensions as required by Project conditions during installation to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

C. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.

D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.

E. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.

F. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

G. Provide spacers for glass lites where length plus width is larger than 50 inches (1270 mm).

1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
2. Provide 1/8-inch (3-mm) minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.

H. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.

I. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.

J. Set glass lites with proper orientation so that coatings face exterior or interior as specified.

K. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.

L. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

3.4 TAPE GLAZING

A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.

B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.

C. Cover vertical framing joints by applying tapes to heads and sills first and then to jambs. Cover horizontal framing joints by applying tapes to jambs and then to heads and sills.

D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.

E. Do not remove release paper from tape until right before each glazing unit is installed.

F. Center glass lites in openings on setting blocks and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.

3.5 LOCK-STRIP GASKET GLAZING

A. Comply with ASTM C 716 and gasket manufacturer's written instructions. Provide supplementary wet seal and weep system unless otherwise indicated.

3.6 CLEANING AND PROTECTION

A. Protect exterior glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels and clean surfaces.

B. Protect glass from contact with contaminating substances resulting from construction operations. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer.

C. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains; remove as recommended in writing by glass manufacturer.

D. Remove and replace glass that is broken, chipped, cracked, or abraded or that is damaged from natural causes, accidents, and vandalism, during construction period.

E. Wash glass on both exposed surfaces in each area of Project not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

3.7 SCHEDULE OF GLASS TYPES

A. Glass Type GL-1: Low-e-coated, clear insulating glass. Basis of Design: Guardian SunGuard SN68

1. Overall Unit Thickness: 1 inch (25 mm).
2. Thickness of Each Glass Lite: 6.0 mm.
3. Outdoor Lite: Float glass, heat-strengthened float glass or fully tempered float glass where required by manufacturer, or for safety glazing as required by code.
4. Interspace Content: Air.
5. Indoor Lite: Float glass, heat-strengthened float glass or fully tempered float glass where required by manufacturer, or for safety glazing as required by code.
6. Low-E Coating: Sputtered on second surface.
7. Visible Light Transmittance: 69 percent minimum.
8. Winter Nighttime U-Factor: 0.29 maximum.
9. Summer Daytime U-Factor: 0.28 maximum.
10. Solar Heat Gain Coefficient: 0.39 maximum.
11. Shading Coefficient: 0.44
12. Outdoor Visible Light Reflectance: 11%
13. Provide safety glazing labeling.

B. Glass Type GL-2: Architectural glass as manufactured by Pulp Studio, Los Angeles, California, USA (or equal) in sizes indicated on drawings provided. All glass quality to comply with ASTM C 1172 safety standards for laminated glass. Back units with 2” of rigid black insulation where indicated on drawings. Mirror panels and insulation to be provided by Pulp Studio or Equal.

1. Overall Unit Thickness: 1-1/4 inch (25 mm).
2. Thickness of Each Glass Lite: 10 mm front 6.0 mm. back
3. Outdoor Lite: 1/2”, Low Iron, textured, laminated glass. Patterns per schedule
4. Interspace Content: ½” Air.
5. Indoor Lite: ¼”, clear mirrored glass.
6. Visible Light Transmittance: 84 percent minimum.
7. Winter Nighttime U-Factor: 0.47 maximum.
8. Summer Daytime U-Factor: 0.50 maximum.
9. Solar Heat Gain Coefficient: 0.82 maximum.
10. Shading Coefficient: 0.94
11. Outdoor Visible Light Reflectance: 15%
12. Provide safety glazing labeling.

C. Glass Type GL-2(bid alternate): Kiln-formed, clear insulating glass. Basis of Design: Symmetry Series glass provided by Nathan Allen Glass Studios, Vancouver. Back units with 2” of rigid black insulation where indicated on drawings. Mirror panels and insulation to be provided by Nathan Allen or Equal.

1. Overall Unit Thickness: 1 inch (25 mm).
2. Thickness of Each Glass Lite: 6.0 mm.
3. Outdoor Lite: ¼”, Low Iron, fully tempered float glass as required by code.
4. Interspace Content: ½” Air.
5. Indoor Lite: ¼”, clear mirrored glass.
6. Visible Light Transmittance: 84 percent minimum.

7. Winter Nighttime U-Factor: 0.47 maximum.
8. Summer Daytime U-Factor: 0.50 maximum.
9. Solar Heat Gain Coefficient: 0.82 maximum.
10. Shading Coefficient: 0.94
11. Outdoor Visible Light Reflectance: 15%
12. Provide safety glazing labeling.

D.

E. Glass Type GL-3: Clear Fully tempered float glass.

1. Thickness: 12.0 mm, or 19.0 mm as required by design for oversized all-glass entrance doors.
2. Provide safety glazing labeling.

F. Glass Type GL-4: Laminated heat-strengthened float glass. Basis of Design: Guardian SatinDeco acid etch, Clear Laminated HS/HS.

1. Overall Unit Thickness: 14.0 mm.
2. Thickness of Each Glass Lite: 6.0 mm.
3. Outdoor Lite: Clear with acid etch (SatinDeco) on second surface.
4. Indoor Lite: Clear with acid etch (SatinDeco) on third surface.
5. Heat-strengthened float glass for safety glazing as required by code.
6. PVB Interlayer: 0.60 inch (1.50 mm).
7. Provide safety glazing labeling.

G. Glass Type GL-5: Laminated clear polycarbonate glazing.

1. Overall Unit Thickness: 1 1/4.
2. UL Listed Level 3 Armortex Bullet Resistant Laminated Polycarbonate – TP 300.

END OF SECTION 08 8000

SECTION 08 9000 - LOUVERS AND VENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Fixed, extruded-aluminum louvered equipment screens.

B. Related Sections:

1. Section 08 11 13 "Hollow Metal Doors and Frames" for louvers in hollow-metal doors.

1.3 DEFINITIONS

A. Louver Terminology: Definitions of terms for metal louvers contained in AMCA 501 apply to this Section unless otherwise defined in this Section or in referenced standards.

B. Horizontal Louver: Louver with horizontal blades; i.e., the axes of the blades are horizontal.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: For louvers and accessories. Include plans, elevations, sections, details, and attachments to other work. Show frame profiles and blade profiles, angles, and spacing.

1. Show weep paths, gaskets, flashing, sealant, and other means of preventing water intrusion.
2. Show mullion profiles and locations.

C. Samples for Verification: For each type of metal finish required.

1.5 QUALITY ASSURANCE

A. Source Limitations: Obtain louvers and vents from single source from a single manufacturer where indicated to be of same type, design, or factory-applied color finish.

B. Welding: Qualify procedures and personnel according to the following:

1. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum."

C. SMACNA Standard: Comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" for fabrication, construction details, and installation procedures.

1.6 PROJECT CONDITIONS

A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Aluminum Extrusions: ASTM B 221 (ASTM B 221M), Alloy 6063-T5, T-52, or T6.

B. Aluminum Sheet: ASTM B 209 (ASTM B 209M), Alloy 3003 or 5005 with temper as required for forming, or as otherwise recommended by metal producer for required finish.

C. Aluminum Castings: ASTM B 26/B 26M, Alloy 319.

D. Fasteners: Use types and sizes to suit unit installation conditions.

1. Use hex-head or Phillips pan-head screws for exposed fasteners unless otherwise indicated.
2. For fastening aluminum, use aluminum or 300 series stainless-steel fasteners.
3. For color-finished louvers, use fasteners with heads that match color of louvers.

E. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

2.2 FABRICATION, GENERAL

A. Assemble louvers in factory to minimize field splicing and assembly. Disassemble units as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

B. Fabricate frames, including integral sills, to fit in openings of sizes indicated, with allowances made for fabrication and installation tolerances, adjoining material tolerances, and perimeter sealant joints.

C. Include supports, anchorages, and accessories required for complete assembly.

D. Provide vertical mullions of type and at spacings indicated, but not more than recommended by manufacturer, or 72 inches (1830 mm) o.c., whichever is less.

1. Fully Recessed Mullions: Where indicated, provide mullions fully recessed behind louver blades. Where length of louver exceeds fabrication and handling limitations, fabricate with close-fitting blade splices designed to permit expansion and contraction.

2.3 FIXED, EXTRUDED-ALUMINUM LOUVERS

A. Horizontal, Sightproof-Blade Louver

1. Basis-of-Design Product: Subject to compliance with requirements, provide Architectural Louvers; Model V2KS or comparable product by one of the following:
   a. C.R.Laurence Co.
   b. Airolite Company, LLC (The).
   c. Construction Specialties, Inc.
2. Louver Depth: 2 inches (100 mm).
3. Blade Profile: Plain blade with center baffle.
4. Blade Nominal Thickness: Not less than 0.063 inch (1.6 mm).
5. Framing Support Nominal Thickness: Not less than 0.125 inch (3.2 mm)
6. Louver Performance Requirements:
   a. Free Area: Not less than 8.0 sq. ft. (0.74 sq. m) for 48-inch- (1220-mm-) wide by 48-inch- (1220-mm-) high louver assembly.
   b. Horizontal Drag Coefficient: Not greater than 0.66 on a cross sectional profile, allowing for a 34% reduction in wind load imposed horizontally upon supporting structural framing.

2.4 FINISHES, GENERAL

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

2.5 ALUMINUM FINISHES

A. Finish louvers after assembly.

B. High-Performance Organic Finish: 3-coat fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

1. Color and Gloss: Match aluminum storefront color and finish.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and openings, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Coordinate setting drawings, diagrams, templates, instructions, and directions for installation of anchorages that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to Project site.

3.3 INSTALLATION

A. Locate and place louvers and vents level, plumb, and at indicated alignment with adjacent work.

B. Use concealed anchorages where possible. Provide brass or lead washers fitted to screws where required to protect metal surfaces and to make a weathertight connection.

C. Form closely fitted joints with exposed connections accurately located and secured.

D. Provide perimeter reveals and openings of uniform width for sealants and joint fillers, as indicated.

E. Repair finishes damaged by cutting, welding, soldering, and grinding. Restore finishes so no evidence remains of corrective work. Return items that cannot be refinished in the field to the factory, make required alterations, and refinish entire unit or provide new units.

F. Protect unpainted galvanized and nonferrous-metal surfaces that will be in contact with concrete, masonry, or dissimilar metals from corrosion and galvanic action by applying a heavy coating of bituminous paint or by separating surfaces with waterproof gaskets or nonmetallic flashing.

G. Install concealed gaskets, flashings, joint fillers, and insulation as louver installation progresses, where weathertight louver joints are required. Comply with Section 079200 "Joint Sealants" for sealants applied during louver installation.

3.4 ADJUSTING AND CLEANING

A. Clean exposed surfaces of louvers and vents that are not protected by temporary covering, to remove fingerprints and soil during construction period. Do not let soil accumulate during construction period.

B. Before final inspection, clean exposed surfaces with water and a mild soap or detergent not harmful to finishes. Thoroughly rinse surfaces and dry.

C. Restore louvers and vents damaged during installation and construction so no evidence remains of corrective work. If results of restoration are unsuccessful, as determined by Architect, remove damaged units and replace with new units.

1. Touch up minor abrasions in finishes with air-dried coating that matches color and gloss of, and is compatible with, factory-applied finish coating.

END OF SECTION 08 8900

SECTION 09 2216 - NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Non-load-bearing steel framing systems for interior gypsum board assemblies.
2. Suspension systems for interior gypsum ceilings, soffits, and grid systems.

B. Related Requirements:

1. Division 05 Section "Cold-Formed Metal Framing" for exterior and interior load-bearing and exterior non-load-bearing wall studs and ceiling joists.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.4 INFORMATIONAL SUBMITTALS

A. Evaluation Reports: From ICC-ES.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate non-load-bearing steel framing, provide materials and construction identical to those tested in assembly indicated, according to ASTM E 119 by an independent testing agency.

B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated, according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

2.2 FRAMING SYSTEMS

A. Framing Members, General: Comply with ASTM C 754 for conditions indicated.

1. Steel Sheet Components: Comply with ASTM C 645 requirements for metal unless otherwise indicated.
2. Protective Coating: ASTM A 653/A 653M, G60 (Z180), hot-dip galvanized unless otherwise indicated.

B. Studs and Runners: ASTM C 645

1. Steel Studs and Runners:

a. Minimum Base-Metal Thickness: As indicated on Drawings.
b. Depth: As indicated on Drawings.

C. Slip-Type Head Joints: Where indicated, provide one of the following:

1. Single Long-Leg Runner System: ASTM C 645 top runner with 2-inch- (51-mm-) deep flanges in thickness not less than indicated for studs, installed with studs friction fit into top runner and with continuous bridging located within 12 inches (305 mm) of the top of studs to provide lateral bracing.
2. Double-Runner System: ASTM C 645 top runners, inside runner with 2-inch- (51-mm-) deep flanges in thickness not less than indicated for studs and fastened to studs, and outer runner sized to friction fit inside runner.
3. Deflection Track: Steel sheet top runner manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs.

a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
1) Steel Network Inc. (The); VertiClip SLD or VertiTrack VTD Series.
2) Superior Metal Trim; Superior Flex Track System (SFT).

D. Firestop Tracks: Top runner manufactured to allow partition heads to expand and contract with movement of the structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Fire Trak Corp.; Fire Trak System attached to studs with Fire Trak Posi Klip.
b. Metal-Lite, Inc.; The System.

E. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.

1. Minimum Base-Metal Thickness: 16 gage galvanized steel.

F. Cold-Rolled Channel Bridging: Steel, 0.053-inch (1.34-mm) minimum base-metal thickness, with minimum 1/2-inch- (13-mm-) wide flanges.

1. Depth: 1-1/2 inches (38 mm) unless otherwise noted.
2. Clip Angle: Not less than 1-1/2 by 1-1/2 inches (38 by 38 mm), 0.068-inch- (1.72-mm-) thick, galvanized steel.

G. Hat-Shaped, Rigid Furring Channels: ASTM C 645.

1. Minimum Base-Metal Thickness: 0.018 inch (0.45 mm) unless otherwise noted.
2. Depth: As indicated on Drawings.

H. Resilient Furring Channels: 1/2-inch- (13-mm-) deep, steel sheet members designed to reduce sound transmission.

1. Configuration: Asymmetrical or hat shaped.

I. Cold-Rolled Furring Channels: 0.053-inch (1.34-mm) uncoated-steel thickness, with minimum 1/2-inch- (13-mm-) wide flanges.

1. Depth: 3/4 inch (19 mm) unless otherwise noted.
2. Furring Brackets: Adjustable, corrugated-edge type of steel sheet with minimum uncoated-steel thickness of 0.033 inch (0.8 mm).
3. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch- (1.59-mm-) diameter wire, or double strand of 0.048-inch- (1.21-mm-) diameter wire.

J. Z-Shaped Furring: With slotted or nonslotted web, face flange of 1-1/4 inches (32 mm), wall attachment flange of 7/8 inch (22 mm), minimum uncoated-metal thickness of 0.018 inch (0.45 mm), and depth required to fit insulation thickness indicated.

2.3 SUSPENSION SYSTEMS

A. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch- (1.59-mm-) diameter wire, or double strand of 0.048-inch- (1.21-mm-) diameter wire.

B. Hanger Attachments to Concrete:

1. Anchors: Fabricated from corrosion-resistant materials with holes or loops for attaching wire hangers and capable of sustaining, without failure, a load equal to 4 times that imposed by construction as determined by testing according to ASTM E 488 by an independent testing agency.

a. Type: Postinstalled, expansion anchor.

C. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.16 inch (4.12 mm) in diameter.

D. Flat Hangers: Steel sheet, in size indicated on Drawings.

E. Carrying Channels: Cold-rolled, commercial-steel sheet with a base-metal thickness of 0.053 inch (1.34 mm) and minimum 1/2-inch- (13-mm-) wide flanges.

1. Depth: As indicated on Drawings.

F. Furring Channels (Furring Members):

1. Cold-Rolled Channels: 0.053-inch (1.34-mm) uncoated-steel thickness, with minimum 1/2-inch- (13-mm-) wide flanges, 3/4 inch (19 mm) deep.
2. Steel Studs and Runners: ASTM C 645.

a. Minimum Base-Metal Thickness: As indicated on Drawings.
b. Depth: As indicated on Drawings.

3. Hat-Shaped, Rigid Furring Channels: ASTM C 645, 7/8 inch (22 mm) deep.

a. Minimum Base-Metal Thickness: As indicated on Drawings.

4. Resilient Furring Channels: 1/2-inch- (13-mm-) deep members designed to reduce sound transmission.

a. Configuration: Asymmetrical or hat shaped.

G. Grid Suspension System for Gypsum Board Ceilings: ASTM C 645, direct-hung system composed of main beams and cross-furring members that interlock.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Armstrong World Industries, Inc.; Drywall Grid Systems.
b. Chicago Metallic Corporation; Drywall Grid System.
c. USG Corporation; Drywall Suspension System.

2.4 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards.

1. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.

B. Isolation Strip at Exterior Walls: Provide one of the following:

1. Asphalt-Saturated Organic Felt: ASTM D 226, Type I (No. 15 asphalt felt), nonperforated.
2. Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8 inch (3.2 mm) thick, in width to suit steel stud size.

C. Acoustical Gasketing at Studs/Vinyl Foam Tape: Norseal V730 closed-cell PVC foam tape with pressure sensitive adhesive by Norton Performance Plastics, or equal products by Williams Products, Inc. ¼ inch thick unless otherwise indicated.

D. Accessories: Provide all accessories including but not necessarily limited to, tracks, clips, anchors, fastening devices, sound attenuation pencil rods, and resilient clips, and other accessories required for a complete and proper installation, and as recommended by the manufacturer of the steel studs used.

E. Grout: Provide a high quality grade of commercial grout for leveling the floor runner member of steel stud partitions as required. Provide Ardex products, Euclid Chemical, L&M Construction Chemical Products or equal.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Suspended Assemblies: Coordinate installation of suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive hangers at spacing required to support the Work and that hangers will develop their full strength.

1. Furnish concrete inserts and other devices indicated to other trades for installation in advance of time needed for coordination and construction.

3.3 INSTALLATION, GENERAL

A. Installation Standard: ASTM C 754, except comply with framing sizes and spacing indicated.
1. Portland Cement Plaster Assemblies: Also comply with requirements in ASTM C 1063 that apply to framing installation.
2. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing installation.

B. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.

C. Install bracing at terminations in assemblies.

D. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

3.4 INSTALLING FRAMED ASSEMBLIES

A. Install framing system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.

1. Single-Layer Application: 16 inches (406 mm) o.c. unless otherwise indicated.
2. Multilayer Application: 16 inches (406 mm) o.c. unless otherwise indicated.
3. Tile Backing Panels: 16 inches (406 mm) o.c. unless otherwise indicated.

B. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.

C. Install studs so flanges within framing system point in same direction.

D. Install tracks (runners) at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts penetrating partitions above ceiling.

1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.

    a. Install two studs at each jamb unless otherwise indicated.
    b. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch (13-mm) clearance from jamb stud to allow for installation of control joint in finished assembly.
    c. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.

3. Other Framed Openings: Frame openings other than door openings the same as required for door openings unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.
4. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.

    a. Firestop Track: Where indicated, install to maintain continuity of fire-resistance-rated assembly indicated.

5. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.
6. Curved Partitions:

a. Bend track to uniform curve and locate straight lengths so they are tangent to arcs.
b. Begin and end each arc with a stud, and space intermediate studs equally along arcs. On straight lengths of no fewer than two studs at ends of arcs, place studs 6 inches (150 mm) o.c.

E. Direct Furring:

1. Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches (610 mm) o.c.

F. Z-Furring Members:

1. Erect insulation, specified in Division 07 Section "Thermal Insulation," vertically and hold in place with Z-furring members spaced 24 inches (610 mm) o.c.
2. Except at exterior corners, securely attach narrow flanges of furring members to wall with concrete stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches (610 mm) o.c.
3. At exterior corners, attach wide flange of furring members to wall with short flange extending beyond corner; on adjacent wall surface, screw-attach short flange of furring channel to web of attached channel. At interior corners, space second member no more than 12 inches (305 mm) from corner and cut insulation to fit.

G. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch (3 mm) from the plane formed by faces of adjacent framing.

3.5 INSTALLING SUSPENSION SYSTEMS

A. Install suspension system components in sizes and spacings indicated on Drawings, but not less than those required by referenced installation standards for assembly types and other assembly components indicated.

B. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.

C. Suspend hangers from building structure as follows:
1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.
a. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers required to support standard suspension system members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.
a. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced installation standards.
3. Wire Hangers: Secure by looping and wire tying, either directly to structures or to inserts, eye screws, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause hangers to deteriorate or otherwise fail.

4. Flat Hangers: Secure to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices and fasteners that are secure and appropriate for structure and hanger, and in a manner that will not cause hangers to deteriorate or otherwise fail.
5. Do not attach hangers to steel roof deck, unless authorized in writing by Architect.
6. Do not attach hangers to permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.
7. Do not attach hangers to rolled-in hanger tabs of composite steel floor deck.
8. Do not connect or suspend steel framing from ducts, pipes, or conduit.

D. Fire-Resistance-Rated Assemblies: Wire tie furring channels to supports.

E. Seismic Bracing: Sway-brace suspension systems with hangers used for support.

F. Grid Suspension Systems: Attach perimeter wall track or angle where grid suspension systems meet vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.

G. Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

END OF SECTION 09 2216

SECTION 09 2400 - PORTLAND CEMENT PLASTERING

PART 1 - GENERAL

A. General Requirements: In accordance with Division 1 - General and Special Conditions of this Project Manual.

B. Scope: Provide all labor, materials, equipment and services necessary and reasonably incidental to complete exterior and interior Portland cement plaster indicated on Drawings or described herein in accordance with Contract Documents.

1. Provide 3-coat cement plaster at exterior soffits.

2. Related Sections:

a. Non-Structural Metal Framing - Section 09 22 16.

b. Gypsum Board Assemblies – Section 09 29 00.

C. Submittals: In accordance with applicable requirements of Division 1 - General and Special Conditions; submit the following:

1. Provide Product Data for lath, plaster, accessories and other materials proposed for use.

2. Copies of all test reports.

D. Codes and Permits:

1. All work shall meet or exceed the requirements of applicable codes, rules, laws, regulations and local code enforcement officials. Any work not in conformance with codes shall be brought to the attention of Contractor.

2. All work shall conform to latest applicable OSHA requirements and Contractor's Safety Program.

3. Fire Resistance Ratings: Provide materials and construction in compliance with tested assemblies as determined by ASTM, ICBO, FM, UL and other testing and inspecting organizations, or as acceptable to authorities having jurisdiction.

E. Coordination:

1. Subcontractor shall coordinate his work with other trades and with Contractor.

2. Schedules: Coordinate fabrication and/or delivery schedules with construction progress to avoid delay of the work.

3. In case of conflict, the Contractor shall decide the proper location, arrangement or detailing, and any costs in revising or relocating equipment or material shall be at the expense of the Subcontractor responsible for the work, when locations and arrangements are made without the knowledge of the Contractor.

F. Quality Assurance:

1. Reference Standards:

a. Provide fire-resistance ratings identical to assemblies tested for fire-resistance according to ASTM E 119.

b. Metal Lath: ASTM C 1063.

c. Cement Plaster: ASTM C 926.

d. USG Gypsum Construction Handbook

2. Manufacturer's Requirements: Manufactured materials hereinafter specified or shown on the Drawings shall be applied and installed in accordance with manufacturer's directions, recommendations of an association dealing primarily with the materials and in accordance with the specifications and the Drawings. Conflicts shall be resolved in a manner which preserves all manufacturers' warranties.

3. Tolerances: Construct walls, ceilings, and soffits so that finish surface of plaster do not vary more than 1/8 inch in 5 feet in any direction and so that no rate of variation exceeds 1/16 inch per running foot.

4. Field Quality Control: Coordinate and assist Contractor personnel in performing work required by the Contractor's Quality Assurance Plan.

G. Close-Out: The following items must be provided prior to final payment:

1. Warranties: Provide one year written warranty in accordance with Division 1.

PART 2 - PRODUCTS:

A. Metal Lath:

1. Exterior Wall Metal Lath: Self-furring welded or woven wire lath with paperback to comply with Federal Specification UU-B-790, Type I Grade B waterproofed. Established Standard: Key West "Keymesh" Type SFB. Other acceptable manufacturers: Davis Wire, K-Lath, or equal.

2. Soffit and Ceiling Metal Lath: Flat, expanded, copper bearing steel, galvanized, weighing 3.4 lbs. per square yard. Established Standard: Unimast Diamond Mesh Lath. Other acceptable manufacturers: Gold Bond, Amico, Western, or equal.

B. Portland Cement Plaster Materials

1. Base Coat Cements:

a. Portland cement: ASTM C150, Type I.

b. Masonry cement: ASTM C91, Type N.

c. Plastic cement: ASTM C150, Type I or II, except for limitations on insoluble residue, air entrainment, and additions subsequent to calcination and with maximum plasticizing agent content not exceeding 12 percent of total volume.

C. Finish Coat Cements: Material and color as follows:

1. Portland cement: ASTM C150, Type I.

2. Masonry cement: ASTM C91, Type N.

3. Plastic cement: ASTM C150, Type I or II, except for limitations on insoluble residue, air entrainment, and additions subsequent to calcination and with maximum plasticizing agent content not exceeding 12 percent of total volume.

4. Cement color: Provide alternate price for integral color (4 colors and gray).

D. Hydrated Lime: ASTM C206, Type S, pressure hydrated containing not more than 8 percent hydrated oxides.

E. Aggregate: Well grade natural sand, clean, sharp and suitable of plastering. Aggregate shall conform to the following:

1. Sand aggregate for base coats: ASTM C897.

2. Aggregate for finish coats: Manufactured or natural sand, white in color.

F. Fiber for Base Coats: Alkaline-resistant (AR) glass or polypropylene fibers, 1/2 inch long, free of contaminants, manufactured for use in portland cement plaster.

G. Acrylic Admixture: Acrylic liquid admixture.

1. Acceptable manufacturers and products:

a. Thoro System Products, Inc.; Acryl 60.

b. Comparable products of other manufacturers.

H. Bonding agent: Comply with ASTM C 932.

I. Water: Drinkable and free of substances capable of affecting plaster set or of damaging plaster, lath, or accessories.

J. Portland Cement Plaster Accessories:

1. Comply with material provisions of ASTM C1063; coordinate depth of accessories with thicknesses and number of coats required.

2. Accessories: Galvanized steel, unless otherwise indicated, as follows, United States Gypsum Co. unless otherwise indicated.

   a. Casing bead: No. 66 square edge, unless otherwise indicated.

   b. Corner reinforcement: Stockton Wire Products Co. Corneraid, unless otherwise indicated.

   c. Corner bead: No. 1A at external corners.

   d. Inside corner: Cornerite unless otherwise indicated.

   e. Control joints: USG 15 unless otherwise indicated.

   f. Expansion joints: Keene Corp. No. 40 unless otherwise indicated.

   g. Soffit Vent Screeds: Fry Model WPM-75-V-400 (4 inches) for 7/8-inch plaster. Unless otherwise indicated.

K. Portland Cement Plaster Mixes:

1. Scratch and Brown Coat Mixing Ratios: Comply with ASTM C926, except as modified herein. Proportion materials for respective base coats in parts by volume per sum of cementitious materials for aggregates to comply with the following requirements for each method of application and plaster base indicated.

   a. Adjust mix proportions within limits specified to attain workability.

   b. Fiber content: Add fiber to mixes after ingredients have mixed at least 2 minutes. Comply with fiber manufacturer's directions. Reduce aggregate quantities accordingly to maintain workability.

   c. Acrylic admixture: 3 parts water to 1 part acrylic admixture. Use as mixing liquid in mixes where specified.

   d. Scratch coat: 1 part portland cement, 1 part masonry cement, 1-1/2 to 2-1/2 pounds fiber, 4 parts aggregate. Use acrylic mixing liquid.

   e. Brown coat: 1 part portland cement, 1 part masonry cement, 1-1/2 to 2-1/2 pounds fiber, 5 to 6 parts aggregate. Use acrylic mixing liquid.

PART 3 - EXECUTION:

A. Delivery, Storage and Handling:

1. Protect materials from physical damage and from deterioration. Comply with manufacturers written instructions for handling, storing and protecting during installation.

B. Installation - General:

1. Examine substrates for compliance with requirements, installation tolerances, and conditions that affect installation. Correct unsatisfactory conditions before proceeding.

C. Installation of Lathing and Furring General:

1. Standards: Comply with ML/SFA 920, "Guide Specifications for Metal Lathing and Furring," and with requirements of ASTM C 1063.

2. Frame both sides of control joints independently and do not bridge joints with furring and lathing or accessories.

3. Install additional framing, furring, runners, lath, and beads, as required to form openings and frames for other work as indicated. Coordinate support system for proper support of framed work that is not indicated to be supported independently of metal furring and lathing system

D. Wall Lath:

1. Install lath as soon as possible after sheathing or base is in place.

2. Install fasteners at 6 inches on center maximum at all supports. Install fasteners at the furring devices on the lath.

3. Lap lath joints not less than 1 inch and not less than one mesh size at sides and ends. At paper backed wire lath, lap paper-to-paper and wire-to-wire.

4. If joints do not occur over supports, tie sheets securely with not less than 18 gauge wire, at 9 inches, maximum on center at side laps and 6 inches on center, or laced at end laps.

5. Install lath over flanges of control and expansion joints so that lath is discontinuous through the joints.

E. Soffit / Ceiling Lath:

1. Attach lath to wood framing at 6 inches on center at all supports. Overlap lath by 1-inch minimum.

F. Accessories: Comply with referenced lathing and furring installation standards for provision and location of plaster accessories of type indicated. Miter or cope accessories at corners; install with tight joints and in alignment. Attach accessories securely to plaster bases to hold accessories in place and in alignment during plastering. Install accessories of type indicated at following locations:

1. External Corners: Install corner reinforcement at external corners.

2. External Corners: Bend lath around external angles without using cornerbeads or reinforcement.

3. Terminations of Plaster: Install casing beads, unless otherwise indicated.

4. Control Joints: Install at locations indicated or, if not indicated, at locations complying with the following criteria and approved by Architect:

a. Where an expansion or contraction joint occurs in surface of construction directly behind plaster membrane.

b. Distance between Control Joints: Not to exceed 18 feet in either direction or a length-to-width ratio of 2-1/2 to 1.

c. Wall Areas: Not more than 144 sq. ft.

d. Horizontal Surfaces: Not more than 100 sq. ft. in area.

e. Where plaster panel sizes or dimensions change, extend joints full width or height of plaster membrane.

5. Reveal Moldings: Coordinate installation of reveal moldings with other trades where molding is used to make transition to a different material.

G. Cement Plaster: Follow ASTM C 926. Apply plaster in three coats to achieve the following thicknesses:

1. First (scratch) coat: 3/8-inch minimum measured from the face of sheathing.

2. First and second coats (scratch and brown) total: ¾ inch.

3. First, second, and third coat total: 7/8 inch.

4. Moist cure the first coat 48 hours minimum unless the second coat is applied sooner. The second coat may be applied as soon as the first coat is set enough to support the second.

5. Moist cure the second coat 48 hours minimum.

6. Curing and Time Between Coats: Curing shall mean that sufficient moisture shall be retained or intermittently applied as required to the plaster surface to permit the hydration process of the cementitious materials to continue. Use procedures for curing between coats to suit climatic and job conditions.

7. Scratch Coat: Apply bonding agent to all solid flanges of metal accessories to receive plaster before starting application. Apply to completely embed wire or metal reinforcement. Score lightly in a horizontal direction only for three coat systems.

8. Brown Coat: Dampen scratch coat. Apply brown coat. Rod the surface and float to a true, even plane with no variation greater than ¼ inch under ten (10) floor straight edge. Leave brown coat uniformly rough for the finish coat.

9. Stucco Finish Coat: Apply finish plaster and uniformly float to a true even plane. Finish texture: sand finish to match approved mock-ups and samples.

H. Cement Plaster Over Concrete Masonry:

1. First (scratch) coat: 3/8-inch minimum measured from the face of sheathing.

2. First and second coats (scratch and finish) total: 5/8 inch.

3. Apply bonding agent per manufacturer's written instructions for application.

I. Cleaning and Protection: Protect adjacent surfaces during plastering operations by whatever means necessary. Remove plaster from all surfaces not intended to receive it. Wipe all casing beads clean. At completion remove all waste materials.

END OF SECTION 09 2400

SECTION 09 2900 - GYPSUM BOARD

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Interior gypsum board.
2. Tile backing panels.

B. Related Requirements:

1. Division 06 Section "Sheathing" for gypsum sheathing for exterior walls.
2. Division 09 Section "Non-Structural Metal Framing" for non-structural framing and suspension systems that support gypsum board panels.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.4 QUALITY ASSURANCE

A. Single Source Responsibility: Obtain each type of gypsum board and related joint treatment materials from a single manufacturer.

1.5 DELIVERY, STORAGE AND HANDLING

A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

1.6 FIELD CONDITIONS

A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.

B. Do not install paper-faced gypsum panels until installation areas are enclosed and conditioned.

C. Do not install panels that are wet, those that are moisture damaged, and those that are mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.

B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

2.2 GYPSUM BOARD, GENERAL

A. Regional Materials: Gypsum panel products shall be manufactured within 500 miles (800 km) of Project site.

B. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.3 INTERIOR GYPSUM BOARD

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Georgia-Pacific Gypsum LLC.
2. Lafarge North America Inc.
3. National Gypsum Company.
4. USG Corporation.

B. Gypsum Wallboard: ASTM C 1396/C 1396M.

1. Thickness: 5/8 inch (15.9 mm).
2. Long Edges: Tapered.

C. Gypsum Board, Type X: ASTM C 1396/C 1396M.

1. Thickness: 5/8 inch (15.9 mm).
2. Long Edges: Tapered.

D. Gypsum Ceiling Board: ASTM C 1396/C 1396M.

1. Thickness: 5/8 inch (15.9 mm).
2. Long Edges: Tapered.

E. Gypsum Board, Type C: ASTM C 1396/C 1396M. Manufactured to have increased fire-resistive capability.

1. Thickness: 5/8 inch (15.9 mm).
2. Long Edges: Tapered.

F. Moisture- and Mold-Resistant Gypsum Board: ASTM C 1396/C 1396M. With moisture- and mold-resistant core and paper surfaces.

1. Products: Subject to compliance with requirements, provide the following:
   a. Georgia-Pacific Gypsum LLC; DensArmor Plus High Performance ASTM D 3273
2. Core: 5/8 inch (15.9 mm).
3. Long Edges: Tapered.
4. Mold Resistance: ASTM D 3273, score of 10.

2.4 TILE BACKING PANELS

A. Glass-Mat, Water-Resistant Backing Board: ASTM C 1178/C 1178M, with manufacturer's standard edges.

1. Products: Subject to compliance with requirements, provide the following:
   a. Georgia-Pacific Gypsum LLC; DensShield Tile Backer (no known equal).
2. Core: 5/8 inch (15.9 mm).
3. Mold Resistance: ASTM D 3273, score of 10.

2.5 TRIM ACCESSORIES

A. Interior Trim: ASTM C 1047.

1. Material: Galvanized or aluminum-coated steel sheet or rolled zinc.
2. Shapes:

   a. Cornerbead.
   b. Bullnose bead.
   c. LC-Bead: J-shaped; exposed long flange receives joint compound.
   d. L-Bead: L-shaped; exposed long flange receives joint compound.
   e. U-Bead: J-shaped; exposed short flange does not receive joint compound.
   f. Expansion (control) joint.
   g. Curved-Edge Cornerbead: With notched or flexible flanges.

B. Aluminum Trim: Extruded accessories of profiles and dimensions indicated.

1. Manufacturers: Subject to compliance with requirements available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Fry Reglet Corp.
b. Pittcon Industries.

2. Aluminum: Alloy and temper with not less than the strength and durability properties of ASTM B 221 (ASTM B 221M), Alloy 6063-T5.
3. Finish: Class II anodic finish.

2.6 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C 475/C 475M.

B. Joint Tape:

1. Interior Gypsum Board: Paper.
2. Exterior Gypsum Soffit Board: Paper.
3. Glass-Mat Gypsum Sheathing Board: 10-by-10 glass mesh.
4. Tile Backing Panels: As recommended by panel manufacturer.

C. Joint Compound for Interior Gypsum Board: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.

1. Prefilling: At open joints, rounded or beveled panel edges, and damaged surface areas, use setting-type taping compound.
2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping or drying-type, all-purpose compound.
   a. Use setting-type compound for installing paper-faced metal trim accessories.
3. Fill Coat: For second coat, use setting-type, sandable topping or drying-type, all-purpose compound.
4. Finish Coat: For third coat, use setting-type, sandable topping or drying-type, all-purpose compound.
5. Skim Coat: For final coat of Level 5 finish, use setting-type, sandable topping compound or high-build interior coating product designed for application by airless sprayer and to be used instead of skim coat to produce Level 5 finish.

D. Joint Compound for Tile Backing Panels:

1. Glass-Mat, Water-Resistant Backing Panel: As recommended by backing panel manufacturer.

2.7 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.

B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.

1. Laminating adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2. Laminating adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

C. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.

1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch (0.84 to 2.84 mm) thick.
2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.

D. Acoustical Joint Sealant: As specified in Division o7 Section Joint Sealants.

E. Thermal Insulation: As specified in Division 07 Section "Thermal Insulation."

F. Vapor Retarder: As specified in Division 07 Section "Thermal Insulation."

G. Other Materials: Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Architect.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates including welded hollow-metal frames and framing, with Installer present, for compliance with requirements and other conditions affecting performance.

B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 APPLYING AND FINISHING PANELS, GENERAL

A. Comply with ASTM C 840.

B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.

C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch (1.5 mm) of open space between panels. Do not force into place.

D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place

tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.

E. Form control and expansion joints with space between edges of adjoining gypsum panels.

F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc., except in chases braced internally.

1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. (0.7 sq. m) in area.
2. Fit gypsum panels around ducts, pipes, and conduits.
3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch- (6.4- to 9.5-mm-) wide joints to install sealant.

G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, except floors. Provide 1/4- to 1/2-inch- (6.4- to 12.7-mm-) wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.

H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.

I. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written recommendations for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.

J. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

3.3 APPLYING INTERIOR GYPSUM BOARD

A. Single-Layer Application:

1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing unless otherwise indicated.
2. On partitions/walls, apply gypsum panels as required by fire-resistance-rated assembly, and minimize end joints.
   a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
   b. At stairwells and other high walls, install panels horizontally unless otherwise indicated or required by fire-resistance-rated assembly.
3. On Z-furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
4. Fastening Methods: Apply gypsum panels to supports with steel drill screws.

B. Multilayer Application:

1. On ceilings, apply gypsum board indicated for base layers before applying base layers on walls/partitions; apply face layers in same sequence. Apply base layers at right angles to framing members and offset face-layer joints one framing member, 16 inches (400 mm) minimum, from parallel base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly.
2. On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.
3. On Z-furring members, apply base layer vertically (parallel to framing) and face layer either vertically (parallel to framing) or horizontally (perpendicular to framing) with vertical joints offset at least one furring member. Locate edge joints of base layer over furring members.
4. Fastening Methods: Fasten base layers and face layers separately to supports with screws.

C. Laminating to Substrate: Where gypsum panels are indicated as directly adhered to a substrate (other than studs, joists, furring members, or base layer of gypsum board), comply with gypsum board manufacturer's written recommendations and temporarily brace or fasten gypsum panels until fastening adhesive has set.

D. Curved Surfaces:

1. Install panels horizontally (perpendicular to supports) and unbroken, to extent possible, across curved surface plus 12-inch- (300-mm-) long straight sections at ends of curves and tangent to them.
2. For double-layer construction, fasten base layer to studs with screws 16 inches (400 mm) o.c. Center gypsum board face layer over joints in base layer, and fasten to studs with screws spaced 12 inches (300 mm) o.c.

E. Areas Subject To Moisture: Provide moisture & mold resistant gypsum board in all shower areas, immediate areas adjacent showers, shower rooms and other locations as indicated.

3.4 APPLYING TILE BACKING PANELS

A. Glass-Mat, Water-Resistant Backing Panels: Comply with manufacturer's written installation instructions and install at showers and locations indicated to receive tile. Install with 1/4-inch (6.4-mm) gap where panels abut other construction or penetrations.

B. Where tile backing panels abut other types of panels in same plane, shim surfaces to produce a uniform plane across panel surfaces.

3.5 INSTALLING TRIM ACCESSORIES

A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.

B. Control Joints: Install control joints at locations indicated on Drawings, according to ASTM C 840 and in specific locations approved by Architect for visual effect, but no less than 30 FT. spacing on continuous surfaces whether indicated or not.

C. Interior Trim: Install in the following locations:

1. Cornerbead: Use at outside corners, unless otherwise indicated.
2. Bullnose Bead: Use where indicated.
3. LC-Bead: Use at exposed panel edges.
4. L-Bead: Use where indicated.
5. U-Bead: Use at exposed panel edges and where indicated.
6. Curved-Edge Cornerbead: Use at curved openings.

D. Aluminum Trim: Install in locations indicated on Drawings.

3.6 FINISHING GYPSUM BOARD

A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.

B. Prefill open joints, rounded or beveled edges, and damaged surface areas.

C. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.

D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:

1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
2. Level 2: Panels that are substrate for tile and acoustical tile.
3. Level 3: For surfaces receiving heavy wallcoverings where lighting conditions are not critical.
4. Level 4: For surfaces receiving wallcoverings, and paints.
   a. Primer and its application to surfaces are specified in other Division 09 Sections.
5. Level 5: Not used.

E. Glass-Mat Faced Panels: Finish according to manufacturer's written instructions.

3.7 PROTECTION

A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.

B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.

C. Remove and replace panels that are wet, moisture damaged, and mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 09 2900

SECTION 09 3000 - TILING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Ceramic tile.
2. Crack isolation membrane.
3. Metal edge strips.

B. Related Sections:

1. Division 06 Section “Sheathing” for exterior gypsum sheathing.
2. Division 07 Section "Joint Sealants" for sealing of expansion, contraction, control, and isolation joints in tile surfaces.
3. Division 09 Section "Gypsum Board" for glass-mat, water-resistant backer board.

1.3 DEFINITIONS

A. General: Definitions in the ANSI A108 series of tile installation standards and in ANSI A137.1 apply to Work of this Section unless otherwise specified.

B. ANSI A108 Series: ANSI A108.01, ANSI A108.02, ANSI A108.1A, ANSI A108.1B, ANSI A108.1C, ANSI A108.4, ANSI A108.5, ANSI A108.6, ANSI A108.8, ANSI A108.9, ANSI A108.10, ANSI A108.11, ANSI A108.12, ANSI A108.13, ANSI A108.14, ANSI A108.15, ANSI A108.16, and ANSI A108.17, which are contained in "American National Standard Specifications for Installation of Ceramic Tile."

C. Module Size: Actual tile size plus joint width indicated.

D. Face Size: Actual tile size, excluding spacer lugs.

1.4 PERFORMANCE REQUIREMENTS

A. Static Coefficient of Friction: For tile installed on walkway surfaces, provide products with the following values as determined by testing identical products per ASTM C 1028:

1. Level Surfaces: Minimum 0.60 for wet and dry conditions.

1.5 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Show locations of each type of tile and tile pattern. Show widths, details, and locations of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces.

C. Samples for Verification:

1. Full-size units of each type and composition of tile and for each color and finish required.
2. Full-size units of each type of trim and accessory.
3. Metal edge strips in 6-inch (150-mm) lengths.
4. Grout samples for initial selection.

1.6 QUALITY ASSURANCE

A. Source Limitations for Other Products: Obtain each of the following products specified in this Section from a single manufacturer for each product:
1. Crack isolation membrane.
2. Joint sealants.
3. Metal edge strips.

B. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Build 36 square foot minimum mockup of floor tile installation.
2. Build 36 square foot minimum mockup of wall tile installation to include inside and outside corner conditions where occurs.
3. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirements in ANSI A137.1 for labeling tile packages.

B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.

C. Store aggregates where grading and other required characteristics can be maintained and contamination can be avoided.

D. Store liquid materials in unopened containers and protected from freezing.

E. Handle tile that has temporary protective coating on exposed surfaces to prevent coated surfaces from contacting backs or edges of other units. If coating does contact bonding surfaces of tile, remove coating from bonding surfaces before setting tile.

1.8 PROJECT CONDITIONS

A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

1.9 WARRANTY

A. Special Warranty: Provide for correcting failures of waterproofing and shower pan membranes to resist water penetration, except where failures are result of structural failures of building. Hairline cracking of concrete due to temperature or shrinkage is not considered structural failure.

1. Repair and pay for or replace damaged materials and surfaces.
2. Special Warranty Period: Two years.

1.10 EXTRA MATERIALS

A. Furnish extra materials that match and are from same production runs as products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Tile and Trim Units: Furnish quantity of full-size units equal to 3 percent of amount installed for each type, composition, color, pattern, and size indicated.

2. Grout: Furnish quantity of grout equal to 3 percent of amount installed for each type, composition, and color indicated.

PART 2 - PRODUCTS

2.1 PRODUCTS, GENERAL

A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.

1. Provide tile complying with Standard grade requirements unless otherwise indicated.

B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCA installation methods specified in tile installation schedules, and other requirements specified.

C. Factory Blending: For tile exhibiting color variations within ranges, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.

D. Mounting: For factory-mounted tile, provide back- or edge-mounted tile assemblies as standard with manufacturer unless otherwise indicated.

1. Where tile is indicated for installation in wet areas, do not use back- or edge-mounted tile assemblies unless tile manufacturer specifies in writing that this type of mounting is suitable for installation indicated and has a record of successful in-service performance.

2.2 CRACK ISOLATION MEMBRANE

A. General: Manufacturer's standard product**,** selected from the following, which complies with ANSI A118.12 for high performance and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.

B. Fabric-Reinforced, Fluid-Applied Membrane: System consisting of liquid-latex rubber or elastomeric polymer and fabric reinforcement.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Boiardi Products; a QEP company; Elastiment 344 Reinforced Waterproofing and Anti-Fracture/Crack Suppression Membrane.
b. Bonsal American; an Oldcastle company; B 6000 Waterproof Membrane with Glass Fabric.
c. Bostik, Inc.; Hydroment Blacktop 90210.
d. Custom Building Products; 9240 Waterproofing and Anti-Fracture Membrane.
e. Laticrete International, Inc.; Laticrete Blue 92 Anti-Fracture Membrane or 9235 Waterproof Membrane.
f. MAPEI Corporation; Mapelastic L (PRP M19) or Mapelastic HPG with MAPEI Fiberglass Mesh.
g. Mer-Kote Products, Inc.; Hydro-Guard 2000.

C. Urethane Crack Isolation Membrane and Tile-Setting Adhesive: One-part, liquid-applied urethane, with a VOC content of 65 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24), in a consistency suitable for trowel application and intended for use as both waterproofing and tile-setting adhesive in a two-step process.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Bostik, Inc.; Durabond D-200, Hydroment Ultra-Set, or Hydroment Ultra-Set Advanced.

D. Organic Adhesive: ANSI A136.1, Type I, with a VOC content of 65 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
a. Bostik, Inc.
b. C-Cure.

c. Custom Building Products.
d. Laticrete International, Inc.
e. MAPEI Corporation.
f. TEC; a subsidiary of H. B. Fuller Company.

2.3 GROUT MATERIALS

A. Sand-Portland Cement Grout: ANSI A108.10, composed of white or gray cement and white or colored aggregate as required to produce color indicated.

B. Polymer-Modified Tile Grout: ANSI A118.7.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   a. Bostik, Inc.
   b. C-Cure.
   c. Custom Building Products.
   d. Laticrete International, Inc.
   e. MAPEI Corporation.
   f. TEC; a subsidiary of H. B. Fuller Company.

C. Water-Cleanable Epoxy Grout: ANSI A118.3.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   a. Bostik, Inc.
   b. C-Cure.
   c. Custom Building Products.
   d. Laticrete International, Inc.
   e. MAPEI Corporation.
   f. Mer-Kote Products, Inc.
   g. TEC; a subsidiary of H. B. Fuller Company.

2. Provide product capable of withstanding continuous and intermittent exposure to temperatures of up to 140 deg F (60 deg C) and 212 deg F (100 deg C), respectively, and certified by manufacturer for intended use.

2.4 MISCELLANEOUS MATERIALS

A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.

B. Metal Edge Strips: Angle or L-shape, height to match tile and setting-bed thickness, metallic or combination of metal and PVC or neoprene base, designed specifically for flooring applications; stainless-steel, ASTM A 666, 300 Series exposed-edge material.

C. Temporary Protective Coating: Product indicated below that is formulated to protect exposed surfaces of tile against adherence of mortar and grout; compatible with tile, mortar, and grout products; and easily removable after grouting is completed without damaging grout or tile.

1. Grout release in form of manufacturer's standard proprietary liquid coating that is specially formulated and recommended for use as temporary protective coating for tile.

D. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.

E. Grout Sealer: Manufacturer's standard silicone product for sealing grout joints and that does not change color or appearance of grout.

2.5 MIXING MORTARS AND GROUT

A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.

B. Add materials, water, and additives in accurate proportions.

C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile.

1. Verify that substrates for setting tile are firm, dry, clean, free of coatings that are incompatible with tile-setting materials including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.
2. Verify that concrete substrates for tile floors installed with thin-set mortar comply with surface finish requirements in ANSI A108.01 for installations indicated.
    a. Verify that surfaces that received a steel trowel finish have been mechanically scarified.
    b. Verify that protrusions, bumps, and ridges have been removed by sanding or grinding.
3. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed.

4. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Fill cracks, holes, and depressions in concrete substrates for tile floors installed with thin-set mortar with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.

B. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

3.3 TILE INSTALLATION

A. Comply with TCA's "Handbook for Ceramic Tile Installation" for TCA installation methods specified in tile installation schedules. Comply with parts of the ANSI A108 Series "Specifications for Installation of Ceramic Tile" that are referenced in TCA installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used.

B. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.

C. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.

D. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize the use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.

1. For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets so joints between sheets are not apparent in finished work.
2. Where adjoining tiles on floor, base, walls, or trim are specified or indicated to be same size, align joints.
3. Where tiles are specified or indicated to be whole integer multiples of adjoining tiles on floor, base, walls, or trim, align joints unless otherwise indicated.

E. Joint Widths: Unless otherwise indicated, install tile with the following joint widths:

1. Wall Tile: 1/16 inch (1.6 mm).
2. Floor Tile: 1/16 inch (1.6 mm).

F. Lay out tile wainscots to dimensions indicated or to next full tile beyond dimensions indicated.

G. Expansion Joints: Provide expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated. Form joints during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.

1. Where joints occur in concrete substrates, locate joints in tile surfaces directly above them.
2. Prepare joints and apply sealants to comply with requirements in Division 07 Section "Joint Sealants."

H. Metal Edge Strips: Install at locations indicated and where exposed edge of tile flooring meets carpet, wood, or other flooring that finishes flush with top of tile.

I. Grout Sealer: Apply grout sealer to grout joints according to grout-sealer manufacturer's written instructions. As soon as grout sealer has penetrated grout joints, remove excess sealer and sealer from tile faces by wiping with soft cloth.

3.4 TILE BACKING PANEL INSTALLATION

A. Install tile backing panels and treat joints according to ANSI A108.11 and manufacturer's written instructions for type of application indicated.

3.5 CRACK ISOLATION MEMBRANE INSTALLATION

A. Install crack isolation membrane to comply with ANSI A108.17 and manufacturer's written instructions to produce membrane of uniform thickness and bonded securely to substrate.

B. Do not install tile or setting materials over crack isolation membrane until membrane has cured.

3.6 CLEANING AND PROTECTING

A. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.

1. Remove grout residue from tile as soon as possible.
2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.
3. Remove temporary protective coating by method recommended by coating manufacturer and that is acceptable to tile and grout manufacturer. Trap and remove coating to prevent drain clogging.

B. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear. If recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors.

C. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.

D. Before final inspection, remove protective coverings and rinse neutral protective cleaner from tile surfaces.

END OF SECTION 09 3000

SECTION 09 9100 - PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes surface preparation and the application of paint systems on the following substrates:

1. Concrete.
2. Concrete masonry units (CMU).
3. Steel.
4. Galvanized metal.
5. Gypsum board.
6. Insulation covering.

B. Related Requirements:

1. Division 05 Sections for shop priming of metal substrates with primers specified in this Section.
2. Division 05 Section “Architecturally Exposed Structural Steel” for preparation of steel for finishing.
3. Division 08 Sections for factory priming windows and doors with primers specified in this Section.

1.3 DEFINITIONS

A. Gloss Level 1: Not more than 5 units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.

B. Gloss Level 2: Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.

C. Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.

D. Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.

E. Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.

F. Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.

G. Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product. Include preparation requirements and application instructions.

B. Samples for Verification: For each type of paint system and in each color and gloss of topcoat.

1. Submit Samples on rigid backing, 8 inches (200 mm) square.
2. Step coats on Samples to show each coat required for system.
3. Label each coat of each Sample.
4. Label each Sample for location and application area.

C. Product List: For each product indicated, include the following:

1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
2. Printout of current "MPI Approved Products List" for each product category specified in Part 2, with the proposed product highlighted.
3. VOC content.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Paint: Not less than 1 gal. (3.8 L) of each material and color applied.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F (7 deg C).

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

1.7 FIELD CONDITIONS

A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F (10 and 35 deg C).

B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   1. Benjamin Moore & Co.
   2. Dunn-Edwards Corporation.
   3. Envirocoatings Canada Inc.
   4. Frazee Paint.
   5. ICI Paints.
   6. Kelly-Moore Paints.
   7. Parex LaHabra Inc.
   8. PPG Architectural Finishes, Inc.
   9. Pratt & Lambert.
   10. Sherwin-Williams Company (The).
   11. Precision Coatings.

B. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to products listed in other Part 2 articles for the paint category indicated.

2.2 PAINT, GENERAL

A. MPI Standards: Provide products that comply with MPI standards indicated and that are listed in its "MPI Approved Products List."

B. Material Compatibility:

   1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
   2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

C. VOC Content: Products shall comply with VOC limits of authorities having jurisdiction and, for interior paints and coatings applied at Project site, the following VOC limits, exclusive of colorants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

   1. Flat Paints and Coatings: 50 g/L.
   2. Nonflat Paints and Coatings: 150 g/L.
   3. Dry-Fog Coatings: 400 g/L.
   4. Primers, Sealers, and Undercoaters: 200 g/L.
   5. Anticorrosive and Antirust Paints Applied to Ferrous Metals: 250 g/L.
   6. Zinc-Rich Industrial Maintenance Primers: 340 g/L.
   7. Pretreatment Wash Primers: 420 g/L.
   8. Floor Coatings: 100 g/L.

9. Shellacs, Clear: 730 g/L.
10. Shellacs, Pigmented: 550 g/L.

D. Colors: As indicated on the drawings.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:

1. Concrete: 12 percent.
2. Masonry (Clay and CMU): 12 percent.
3. Gypsum Board: 12 percent.
4. Plaster: 12 percent.

C. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.

D. Plaster Substrates: Verify that plaster is fully cured.

E. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.

F. Proceed with coating application only after unsatisfactory conditions have been corrected.

1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Manual" applicable to substrates indicated.

B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.

C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.

D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.

E. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceed that permitted in manufacturer's written instructions.

F. Steel Substrates: Remove rust, loose mill scale, and shop primer, if any. Clean using methods recommended in writing by paint manufacturer.

G. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

H. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

I. Aluminum Substrates: Remove loose surface oxidation.

J. Cotton or Canvas Insulation Covering Substrates: Remove dust, dirt, and other foreign material that might impair bond of paints to substrates.

3.3 APPLICATION

A. Apply paints according to manufacturer's written instructions and to recommendations in "MPI Manual."

1. Use applicators and techniques suited for paint and substrate indicated.
2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.

B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.

C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

E. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:

1. Paint the following work where exposed in occupied spaces and in equipment rooms and that do not have factory-applied final finishes:

a. Equipment, including panelboards.
b. Uninsulated metal piping.
c. Uninsulated plastic piping.
d. Pipe hangers and supports.
e. Metal conduit.
f. Plastic conduit.
g. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
h. Other items as directed by Architect.

2. Paint portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets that are visible from occupied spaces.

3.4 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.5 PAINT SYSTEM SCHEDULE

A. Provide following paint systems for substrates indicated, and as recommended by paint manufacturer used.

B. EXTERIOR SURFACES:

1. Concrete
   1st Coat: Acrylic primer/sealer for concrete or plaster
   100% acrylic finish, sheen as specified. (Use flat at tilt-up exteriors)
2. Galvanized Metal (Except High Performance Enamel specified herein)
   Pretreatment: Etching solution
   1st Coat: Galvanized metal primer
   2nd & 3rd Coats: Industrial alkyd enamel or 100% acrylic enamel, sheen as specified

3. Ferrous Metal (Except High Performance Enamel and Acrylic Polyurethane specified herein)
   1st Coat: Ferrous metal primer (omit if shop-primed)
   2nd & 3rd Coats:: Industrial alkyd enamel or 100% acrylic enamel, sheen as specified
4. Non-Ferrous Metal
   Pretreatment: Etching solution
   1st Coat: Exterior non-ferrous metal primer
   2nd & 3rd Coats: Industrial alkyd enamel or 100% acrylic enamel, sheen as specified
5. Exterior Wood - Latex System:
   Prime Coat: Primer, latex for exterior wood.
   Topcoat: Latex, exterior gloss (Gloss Level 6)
6. Exterior Wood - Stain Finish:
   One Coat: 2610 Woodpride (Semi-transparent Stain); VOC 148
   OR
   Two Coats: 2600 Woodpride (Solid-Body Stain); VOC 139
7. Hardwood (Ipe) – Semi-Transparent Finish (Color as selected by Architect):
   One Coat: Samuel Cabot Australian Timber Oil #9400 or Messmers MHV500 Natural Finish. Treat all surfaces, including concealed areas. Treat cut board ends.
8. Fiber-Cement Siding Board (Eggshell 100% Acrylic):
   1st Coat: 2000 Dulux Pro Acrylic Primer (delete if factory-primed) VOC 100
   2nd Coat: 2200 Dulux Professional; VOC 150

C. INTERIOR SURFACES:

1. Concrete/Plaster/Masonry
   1st Coat: Acrylic primer for concrete/masonry. Heavy-duty block filler at CMU.
   2nd & 3rd Coats: Acrylic copolymer finish, sheen as specified
2. Galvanized Metal
   Pretreatment: Etching solution
   1st Coat: Galvanized metal primer
   2nd & 3rd Coats: 100% acrylic enamel, sheen as specified
3. Metal
   1st Coat: Ferrous metal primer
   2nd & 3rd Coats: 100% acrylic enamel, sheen as specified
4. Gypsum Board
   1st Coat: PVA Sealer, vinyl-acrylic
   2nd & 3rd Coats: Vinyl-acrylic latex enamel, sheen as specified
5. Wood (Opaque Enamel)
   1st Coat: Enamel undercoater, alkyd or acrylic
   2nd & 3rd Coats: 100% acrylic finish, non-blocking, sheen as specified
6. Wood (Stain and Lacquer)
   1st Coat: Wiping Stain
   2nd Coat: Sanding sealer, water-white
   3rd & 4th Coats: Clear Lacquer, sheen as specified

D. HIGH PERFORMANCE ENAMEL: Use at exterior painted galvanized or ferrous gates, fences, handrails and railings, exterior architecturally-exposed structural steel, architectural painted steel deck or perforated panels, and where otherwise indicated on Drawings:

1. Pretreat Galvanized Metal (if needed): ICI Devoe Coatings Devprep 88 H.D. Cleaner
2. 1st Coat: ICI Devoe Coatings Devran DC203 Epoxy Primer
3. 2nd Coat: ICI Devoe Coatings Devthane DC378H Aliphatic Urethane, Semi-Gloss
4. Apply by air spray. Do not brush or roll on.
5. Equivalent Products and Manufacturers: Carbothane 134 VOC by Carboline Company, or Endura-Shield 73 by Tnemec Company.

E. HIGH PERFORMANCE ALIPHATIC POLYURETHANE: Use at painted exterior architecturally-exposed structural steel, architectural painted steel deck or perforated panels, and where otherwise indicated on Drawings:

1. Pretreat Galvanized Metal (if needed): PCI 02150 Metal Conditioner.
2. 1st Coat: PCI DTM 1300 High Build Primer or DTM 30000 Polyurethane primer
3. 2nd Coat: PCI PC3v100 Topcoat Aliphatic Polyurethane, Satin finish
4. Apply by air spray. Do not brush or roll on.

END OF SECTION 09 9100

SECTION 09 9600 - GRAFFITI RESISTANT COATINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes penetrating anti-graffiti coatings for the following vertical and horizontal surfaces:

1. Cast-in-place concrete.
2. Concrete masonry.
3. Stone masonry and veneer.

1.3 PERFORMANCE REQUIREMENTS

A. General Performance: Anti-graffiti coatings shall meet performance requirements indicated without failure due to defective manufacture, fabrication, or installation.
1. Active Content: Organofluorosilane.
2. Solvent: None, water-borne.
3. VOC Content: less than 100 grams per liter.
4. Cleaning Cycles: Non-sacrificial: minimum 8 to 10 cleaning cycles without reapplication.
5. Breathability: Greater than 95% water vapor transmission.
6. Surface Appearance: No appreciable difference compared to non-coated surface.
7. Excellent Ultraviolet light stability.

B. Regulatory Requirements: Products shall comply with State and local regulations concerning AIM (Architectural, Industrial and Maintenance) coatings regarding Volatile Organic Content (VOC).

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.
1. Include manufacturer's printed statement of VOC content. Indicate VOC limits of the product. Submit MSDS highlighting VOC limits.
2. Include manufacturer's installation instructions for each type of substrate and spreading rate for each separate coat.

B. Qualification Data: For qualified Applicator.

C. Product Certificates: From manufacturer.

D. Field quality-control reports.

E. Statement of compliance with Regulatory Requirements.

F. Warranty: Special warranty specified in this Section.

1.5 QUALITY ASSURANCE

A. Applicator Qualifications: An employer of workers trained and licensed by manufacturer. Not less than 3 years experience with systems. Successfully completed not less than 5 comparable scale projects using this system.

B. Manufacturer's Qualifications: Not less than 5 years experience in the actual production of specified products.

1.6 PROJECT CONDITIONS

A. Limitations: Proceed with application only when the following existing and forecasted weather and substrate conditions permit coatings to be applied according to manufacturers' written instructions and warranty requirements:
   1. Maintain ambient temperature above 40 degrees F during and 24 hours after installation.
   2. Do not proceed with application on materials if ice or frost is covering the substrate.
   3. Do not proceed with application if ambient temperature of surface exceeds 100 degree F.
   4. Do not proceed with the application of materials in rainy conditions or if heavy rain is anticipated within 4 hours after application.
   5. Verify compatibility with curing compounds, patching materials, repair mortar, paints, sealants, etc. to be used on masonry surfaces to ensure compatibility with the anti-graffiti coating

1.7 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agree(s) to repair or replace materials that fail to maintain coating effectiveness specified in "Performance Requirements" Article within specified warranty period.

   1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 ANTI-GRAFFITI COATINGS

A. Products: Subject to compliance with requirements, provide the following:
   1. Protectosil Anti-Graffiti, Degussa A&S Division (1-800-828-0919).

PART 3 - EXECUTION

3.1 EXAMINATION

A. Manufacturer’s representative shall examine substrates, areas, and conditions, with Applicator present, for compliance with requirements and conditions affecting performance of the Work and provide written quality control report.

1. Verify that surfaces are clean and dry according to manufacturer's requirements. Check moisture content in three representative locations by method recommended by manufacturer.
2. Inspect for previously applied treatments that may inhibit penetration or performance of coatings.
3. Verify that there is no efflorescence or other removable residues that would be trapped beneath the application of coatings.
4. Verify that required repairs are complete, cured, and dry before applying anti-graffiti coatings.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Cleaning: Before application of water repellent, clean substrate of substances that could impair penetration or performance of product according to water-repellent manufacturer's written instructions and as follows:

1. Remove dirt, oil, graffiti, grease, curing compounds, laitance, and other substances that inhibit penetration or performance of coatings according to ASTM E 1857.

3.3 APPLICATION

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect the substrate before application of anti-graffiti coating and to instruct Applicator on the product and application method to be used.

B. Product shall be applied per manufacturer’s application instructions and recommendations for this specific project.

C. Factory-authorized field representative shall inspect the final application and provide quality control report accepting application. Work that does not conform to specified requirements shall be corrected and/or replaced as directed by the Owners Representative at contractor’s expense without extension of time.

3.4 CLEANING

A. Immediately clean anti-graffiti coatings from adjoining surfaces and surfaces soiled or damaged by coating application as work progresses. Correct damage to work of other trades caused by anti-graffiti coating application, as approved by Architect.

B. Comply with manufacturer's written cleaning instructions.

END OF SECTION 09 9600

SECTION 10 1400 - SIGNAGE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Plaques.

B. Related Sections include the following:

1. Reference Greenbook/Whitebook for temporary Project identification signs and for temporary information and directional signs.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Show fabrication and installation details for signs.

1. Show sign mounting heights, locations of supplementary supports to be provided by others, and accessories.
2. Provide message list, typestyles, graphic elements, including tactile characters and Braille, and layout for each sign.

C. Samples for Initial Selection: Manufacturer's color charts consisting of actual units or sections of units showing the full range of colors available for the following:

1. Aluminum.
2. Acrylic sheet.
3. Polycarbonate sheet.

D. Samples: Submit samples of each sign form and material (except exterior disabled signs) showing finishes, colors, surface textures and qualities of manufacturer and design of each sign component including graphics.

1. Submit full-size sample units: Acceptable units may be installed as part of the work. Submit one character of dimensional metal letters, and one finished plastic room identification sign.

E. Sign Schedule: Use same designations indicated on Drawings.

F. Warranty: Special warranty specified in this Section.

1.4 QUALITY ASSURANCE

A. Source Limitations for Signs: Obtain each sign type indicated from one source from a single manufacturer.

B. Regulatory Requirements: Comply with applicable provisions in CBC Title 24.

1.5 COORDINATION

A. Coordinate placement of anchorage devices with templates for installing signs.

1.6 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of signs that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Deterioration of finishes beyond normal weathering.
b. Deterioration of embedded graphic image colors and sign lamination.

2. Warranty Period: 5 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Aluminum Sheet and Plate: ASTM B 209 (ASTM B 209M), alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with at least the strength and durability properties of Alloy 5005-H32.

B. Acrylic Sheet: ASTM D 4802, Category A-1 (cell-cast sheet), Type UVA (UV absorbing).

C. Polycarbonate Sheet: Of thickness indicated, manufactured by extrusion process, coated on both surfaces with abrasion-resistant coating:

1. Impact Resistance: 16 ft-lbf/in. (854 J/m) per ASTM D 256, Method A.
2. Tensile Strength: 9000 lbf/sq. in. (62 MPa) per ASTM D 638.
3. Flexural Modulus of Elasticity: 340,000 lbf/sq. in. (2345 MPa) per ASTM D 790.
4. Heat Deflection: 265 deg F (129 deg C) at 264 lbf/sq. in. (1.82 MPa) per ASTM D 648.
5. Abrasion Resistance: 1.5 percent maximum haze increase for 100 revolutions of a Taber abraser with a load of 500 g per ASTM D 1044.

D. Applied Vinyl: Die-cut characters from vinyl film of nominal thickness of 3 mils (0.076 mm) with pressure-sensitive adhesive backing, suitable for exterior applications.

2.2 PANEL SIGNS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   1. ASI-Modulex, Inc.
   2. Best Sign Systems Inc.
   3. Mills Manufacturing Company.
   4. Mohawk Sign Systems.

B. Interior Panel Signs: Provide smooth sign panel surfaces constructed to remain flat under installed conditions within a tolerance of plus or minus 1/16 inch (1.5 mm) measured diagonally from corner to corner, complying with the following requirements:
   1. Laminated Sheet: High-pressure engraved stock with contrasting color face laminated to acrylic core as selected by Architect from manufacturer's full range.
      a. NEMA rated self-extinguishing.
   2. Thickness: 1/4 inch.
   3. Edge Condition: Square cut.
   4. Corner Condition: As indicated.
   5. Mounting: Wall mounted with adhesive or two-face tape as recommended by the manufacturer for substrate applied to. Where sign is mounted to glass, provide blank panel on opposite side of glass to conceal double-sided tape from view.
   6. Color: Matte finish with color of characters and symbols contrasting with background. Contrast between character, symbols and their background must be 70% minimum and have a non-glare finish. As selected by Architect from manufacturer's full range.
   7. Permanent Signs in accordance with CBC Title 24, Part 2, Ch. 11B.:
      a. Contracted Grade 2 Braille with rounded or domed dots 1/10 inch (2.54 mm) on centers in each cell with 2/10 inch (5.08 mm) space between cells and with dots raised a minimum of 1/40 inch (0.635 mm) above background with contrasting colors.
      b. Tactile Characters on signs shall be raised 1/32 inch (0.794 mm) minimum and shall be sans serif uppercase characters accompanied by Contracted (Grade 2) Braille.
      c. Tactile Raised Characters shall be a minimum of 5/8 inch (15.9 mm) and a maximum of 2 inches (51 mm) high.
      d. Characters on signs shall have a width-to-height ratio of between 3:5 and 1:1 and a stroke width-to-height ratio of between 1:5 and 1:10. All letters measured must be uppercase. After choosing a typestyle to test, begin by printing letters I, X and O at 1 inch high. Place the template’s 1:1 square over the X or O, whichever is narrower. If the character is not wider than 1 inch, nor narrower than the 3:5 rectangle, the proportions are correct. Use the 1:5 rectangle to determine if the stroke of the I is too broad, and the 1:10 rectangle to see if it is too narrow. If all of the tests are passed, the typestyle is compliant with proportion requirement.
   8. Directional and Informational Signs: Character proportion and height in accordance with CBC, Title 24, Part 2, Ch. 11B.

9. Graphic Content and Style: Comply with requirements indicated and with CBC, Title 24, Part 2, Ch. 11B.
10. Interior Plastic Sign Graphics: Images are subsurface applied onto the acrylic face prior to the application of the background color and lamination of the acrylic base. Sign lettering shall be provided in the sizes, colors and letter styles as shown on the Drawings and sign schedule. All lettering shall be executed in such a manner that all edges and corners of the letterforms are true, clean, correctly spaced, photographically precise, and must accurately reproduce the letter form. Applied copy not acceptable.
11. Provide interior signs as indicated on Drawings, including (but not limited to):
    a. Permanent Room Signs
    b. Toilet Room Signs: Triangular with 12 inch sides, for each MEN; 12 inch round for each WOMEN – interior and exterior as indicated on drawings.
    c. Accessible Building Identification Sign- Exterior.
    d. Accessible Tactile Exit Signs – Interior.

2.3 FABRICATION

A. General: Provide manufacturer's standard signs of configurations indicated.

1. Conceal fasteners if possible; otherwise, locate fasteners where they will be inconspicuous.

2.4 FINISHES, GENERAL

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.

B. Verify that items are sized and located to accommodate signs.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Locate signs and accessories where indicated, using mounting methods of types described and complying with manufacturer's written instructions.

1. Install signs level, plumb, and at heights indicated, with sign surfaces free of distortion and other defects in appearance.
2. Interior Wall Signs: Install signs on walls adjacent to latch side of door where applicable. Where not indicated or possible, such as double doors, install signs on nearest adjacent walls. Locate to allow approach within 3 inches (75 mm) of sign without encountering protruding objects or standing within swing of door.

B. Wall-Mounted Signs: Comply with sign manufacturer's written instructions except where more stringent requirements apply.

1. Two-Face Tape: Mount signs to smooth, nonporous surfaces. Do not use this method for vinyl-covered or rough surfaces.
2. Silicone-Adhesive Mounting: Attach signs to irregular, porous, or vinyl-covered surfaces.
3. Shim Plate Mounting: Provide 1/8-inch- (3-mm-) thick, concealed aluminum shim plates with predrilled and countersunk holes, at locations indicated, and where other mounting methods are not practicable. Attach plate with fasteners and anchors suitable for secure attachment to substrate. Attach panel signs to plate using method specified above.
4. Signs Mounted on Glass: Provide matching opaque plate on opposite side of glass to conceal mounting materials.

3.3 CLEANING AND PROTECTION

A. After installation, clean soiled sign surfaces according to manufacturer's written instructions. Protect signs from damage until acceptance by Owner.

END OF SECTION 10 1400

SECTION 10 2113 - TOILET COMPARTMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Solid Color Reinforced Composite toilet compartments configured as toilet enclosures and urinal screens.

B. Related Sections:

   1. Division 10 Section "Toilet Accessories" for toilet tissue dispensers, grab bars, shelves, and similar accessories.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Verify that plastic products to be incorporated into the Project are labeled in accordance with ASTM D1972. Where products are not labeled, provide product data indicating polymeric information in Operation and Maintenance Manual.

C. Shop Drawings: For compartments. Include plans, elevations, sections, details, and attachments to other work.

   1. Show and dimension all partition locations, panel and door sizes on drawings.
   2. Show locations of cutouts for compartment-mounted accessories.
   3. Show locations of reinforcements for compartment-mounted accessories.
   4. Show locations of centerlines of fixtures.

D. Samples for Verification: For the following products, in manufacturer's standard sizes unless otherwise indicated:

   1. Each type of material, color, and finish required for units, prepared on 6-inch- (152-mm-) square Samples of same thickness and material indicated for Work.
   2. Each type of hardware and accessory.

E. Maintenance Data: For toilet compartments to include in maintenance manuals.

1.4 QUALITY ASSURANCE

A. Comply with requirements in GSA's CID-A-A-60003, "Partitions, Toilets, Complete."

B. Regulatory Requirements: Comply with applicable provisions in CBC Title 24, Part 2, Ch. 11B, for toilet compartments designated as accessible.

1.5 PROJECT CONDITIONS

A. Field Measurements: Verify actual locations of toilet fixtures, walls, columns, ceilings, and other construction contiguous with toilet compartments by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Aluminum Castings: ASTM B 26/B 26M.

B. Aluminum Extrusions: ASTM B 221 (ASTM B 221M).

C. Brass Castings: ASTM B 584.

D. Brass Extrusions: ASTM B 455.

E. Steel Sheet: Commercial steel sheet for exposed applications; mill phosphatized and selected for smoothness.

1. Electrolytically Zinc Coated: ASTM A 879/A 879M, 01Z (03G).
2. Hot-Dip Galvanized: ASTM A 653/A 653M, either hot-dip galvanized or galvannealed.

F. Stainless-Steel Sheet: ASTM A 666, Type 304, stretcher-leveled standard of flatness.

G. Stainless-Steel Castings: ASTM A 743/A 743M.

2.2 SOLID COLOR REINFORCED COMPOSITE UNITS

A. Basis-of-Design Product: Subject to compliance with requirements, provide Bobrick Washroom Equipment, Inc.1092 / 1095 Sierra Series or comparable solid surface product by one of the following:

1. Ultimate Corian System by Shower Shapes
2. WilsonArt Gibraltar or Earthstone Material
3. Privacy Plus Toilet Compartments by Gerali Custom Design Inc..

B. Toilet-Enclosure Style: Overhead braced.

C. Urinal-Screen Style: Wall hung.

D. Door, Panel, Screen, and Pilaster Construction: Solid Color Reinforced Composite panel material composed of dyes, organic material, and polycarbonate/phenolic resins. Edges shall be same color as surface. Provide minimum 3/4-inch- (19-mm-) thick doors and pilasters and minimum 1/2-inch- (13-mm-) thick panels.

E. Pilaster Shoes and Sleeves (Caps): Fabricated from stainless-steel sheet, not less than 0.031-inch (0.79-mm) nominal thickness and 3 inches (76 mm) high, finished to match hardware.

F. Brackets (Fittings):

1. Stirrup Type: Ear or U-brackets, stainless steel.

G. Panel Finish:

1. Color SC01 Golden Khaki.

2.3 ACCESSORIES

A. Hardware and Accessories: Manufacturer's standard design, heavy-duty operating hardware and accessories.

1. Material: Stainless steel.
2. Hinges: Manufacturer's standard paired, self-closing type that can be adjusted to hold doors open at any angle up to 90 degrees.
3. Latch and Keeper: Manufacturer's standard surface-mounted latch unit designed for emergency access and with combination rubber-faced door strike and keeper. Provide units that comply with regulatory requirements for accessibility at compartments designated as accessible with flip-over style or sliding latch.
4. Coat Hook: Manufacturer's standard combination hook and rubber-tipped bumper, sized to prevent in-swinging door from hitting compartment-mounted accessories.
5. Door Bumper: Manufacturer's standard rubber-tipped bumper at out-swinging doors.
6. Door Pull: Manufacturer's standard loop or U-shaped handle immediately below the latch on both sides of the door at compartments designated as accessible that complies with regulatory requirements for accessibility.

B. Anchorages and Fasteners: Manufacturer's standard exposed fasteners of stainless steel, finished to match the items they are securing, with theft-resistant-type heads. Provide sex-type bolts for through-bolt applications. For concealed anchors, use stainless steel, hot-dip galvanized steel, or other rust-resistant, protective-coated steel.

2.4 FABRICATION

A. Overhead-Braced Units: Provide manufacturer's standard corrosion-resistant supports, leveling mechanism, and anchors at pilasters to suit floor conditions. Provide shoes at pilasters to conceal supports and leveling mechanism.

B. Door Size and Swings: Unless otherwise indicated, provide 24-inch- (610-mm-) wide, in-swinging doors for standard toilet compartments and 36-inch- (914-mm-) wide, out-swinging doors with a minimum 34-inch- (813-mm-) wide, clear opening for compartments designated as accessible.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Comply with manufacturer's written installation instructions. Install units rigid, straight, level, and plumb. Secure units in position with manufacturer's recommended anchoring devices.

1. Maximum Clearances:

a. Pilasters and Panels: 1/2 inch (13 mm).
b. Panels and Walls: 1 inch (25 mm).

2. Stirrup Brackets: Secure panels to walls and to pilasters with no fewer than three brackets attached at midpoint and near top and bottom of panel.

a. Locate wall brackets so holes for wall anchors occur in masonry or tile joints.
b. Align brackets at pilasters with brackets at walls.

B. Overhead-Braced Units: Secure pilasters to floor and level, plumb, and tighten. Set pilasters with anchors penetrating not less than 1-3/4 inches (44 mm) into structural floor unless otherwise indicated in manufacturer's written instructions. Secure continuous head rail to each pilaster with no fewer than two fasteners. Hang doors to align tops of doors with tops of panels, and adjust so tops of doors are parallel with overhead brace when doors are in closed position.

C. Urinal Screens: Attach with anchoring devices to suit supporting structure. Set units level and plumb, rigid, and secured to resist lateral impact.

3.2 ADJUSTING

A. Hardware Adjustment: Adjust and lubricate hardware according to hardware manufacturer's written instructions for proper operation. Set hinges on in-swinging non-accessible stall doors to hold doors open approximately 30 degrees from closed position when unlatched. Set hinges on accessible stall doors to return doors to fully closed position (self-closing).

END OF SECTION 10 2113

SECTION 10 2800 - TOILET ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Toilet accessories.
2. Underlavatory guards.
3. Custodial accessories.

B. Owner-Furnished Material: To be determined

C. Related Sections:

1. Division 10 Section “Toilet Compartments” for coordination with cut-outs in partitions.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include the following:

1. Construction details and dimensions.
2. Anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.
3. Material and finish descriptions.
4. Features that will be included for Project.
5. Manufacturer's warranty.

B. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.

1. Identify locations using room designations indicated.
2. Identify products using designations indicated.

C. Maintenance Data: For toilet and bath accessories to include in maintenance manuals.

D. Warranty: Sample of special warranty.

1.4 QUALITY ASSURANCE

A. Source Limitations: For products listed together in the same Part 2 articles, obtain products from single source from single manufacturer.

1.5 COORDINATION

A. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.

B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

1.6 DELIVERY, STORAGE AND HANDLING

A. Do not deliver accessories to site until rooms in which they are to be installed are ready to receive them.

B. Pack accessories individually in a manner to protect accessory and its finish.

1.7 PROTECTION

A. Protect adjacent or adjoining finished surfaces and work from damage during installation of work of this section.

B. Protect accessories from scratches and dents until final acceptance of project by Owner.

1.8 WARRANTY

A. Special Mirror Warranty: Manufacturer's standard form in which manufacturer agrees to replace mirrors that develop visible silver spoilage defects and that fail in materials or workmanship within specified warranty period.

1. Warranty Period: 15 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Provide Toilet, Bath and Janitor Room accessories as listed in schedule on Drawings.

B. Stainless Steel: ASTM A 666, Type 304, 0.031-inch (0.8-mm) minimum nominal thickness unless otherwise indicated.

C. Brass: ASTM B 19, flat products; ASTM B 16/B 16M, rods, shapes, forgings, and flat products with finished edges; or ASTM B 30, castings.

D. Steel Sheet: ASTM A 1008/A 1008M, Designation CS (cold rolled, commercial steel), 0.036-inch (0.9-mm) minimum nominal thickness.

E. Galvanized-Steel Sheet: ASTM A 653/A 653M, with G60 (Z180) hot-dip zinc coating.

F. Galvanized-Steel Mounting Devices: ASTM A 153/A 153M, hot-dip galvanized after fabrication.

G. Fasteners: Screws, bolts, and other devices of same material as accessory unit and tamper-and-theft resistant where exposed, and of galvanized steel where concealed.

H. Chrome Plating: ASTM B 456, Service Condition Number SC 2 (moderate service).

I. Mirrors: ASTM C 1503, Mirror Glazing Quality, clear-glass mirrors, nominal 6.0 mm thick.

J. ABS Plastic: Acrylonitrile-butadiene-styrene resin formulation.

2.2 WASHROOM ACCESSORIES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. American Specialties, Inc.
2. Bobrick Washroom Equipment, Inc.
3. Bradley Corporation.
4. Tubular Specialties Manufacturing, Inc.

2.3 UNDERLAVATORY GUARDS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Plumberex Specialty Products, Inc.
2. Truebro by IPS Corporation.

2.4 CUSTODIAL ACCESSORIES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. American Specialties, Inc.
2. Bobrick Washroom Equipment, Inc.
3. Bradley Corporation.
4. Tubular Specialties Manufacturing, Inc.

2.5 FABRICATION

A. General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.

B. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Owner's representative.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.

1. Toilet accessories required to be accessible shall be mounted at heights according to CBC Section 1115B.
2. Toilet paper and feminine napkin dispensers located on the grab bar side of an accessible toilet room or stall shall not be located closer than 1½ inches clear of the tangent point of the grab bar. Accessories surface mounted above the grab bar will restrict usability.

B. Grab Bars: Install to withstand a downward load of at least 250 lbf (1112 N), when tested according to ASTM F 446.

1. Clearance: 1-1/2 IN. clearance between wall surface and inside face of bar.
2. The grab bar cannot project more than 3 inches into the 48 inch minimum clear space in front of the water closet. CBC Section 1115B.4

3.2 ADJUSTING AND CLEANING

A. Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.

B. Remove temporary labels and protective coatings.

C. Clean and polish exposed surfaces according to manufacturer's written recommendations.

END OF SECTION 10 2800

SECTION 10 4413 - FIRE EXTINGUISHERS, CABINETS AND SPECIALTIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Portable fire extinguishers
2. Fire protection cabinets for portable fire extinguishers.
3. Fire Department Key Box

B. Related Sections:
1. Division 09 painting Sections for field painting fire protection cabinets.
2. Division 10 Section "Signage" for directional signage to out-of-sight fire extinguishers and cabinets.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for fire protection cabinets.

1. Fire Protection Cabinets: Include roughing-in dimensions, details showing mounting methods, relationships of box and trim to surrounding construction, door hardware, cabinet type, trim style, and panel style.

1.4 QUALITY ASSURANCE

A. Provide portable fire extinguishers, cabinets and accessories by one manufacturer, unless otherwise acceptable to Architect.

B. Fire-Rated, Fire Protection Cabinets: Listed and labeled to comply with requirements in ASTM E 814 for fire-resistance rating of walls where they are installed.

C. UL-Listed Products: Provide new portable fire extinguishers which are UL-listed and bear UL "Listing Mark" for type, rating, and classification of extinguisher indicated.

D. Provide portable fire extinguishers complying with CCR, Title 19, Division 1, Chapter 3, Fire Extinguishers.

1. Locate fire extinguishers as required by CCR, Title 19, Division 1, Chapters 1 and 3, and as required by authority having jurisdiction.

E. Provide portable fire extinguisher cabinets that comply with CBC Sections 1117B.6 and 1118B.
1. Operation: Controls and operating mechanisms shall be operable with one hand and shall not require tight grasping, pinching or twisting of the wrist. The force required to activate controls shall be no greater than 5 pounds (22.2 N) of force.

1.5 COORDINATION

A. Coordinate size of fire protection cabinets to ensure that type and capacity of fire extinguishers indicated are accommodated.

B. Coordinate sizes and locations of fire protection cabinets with wall depths.

PART 2 - PRODUCTS

2.1 PORTABLE FIRE EXTINGUISHERS (FE)

A. Fire Extinguishers: Type, size, and capacity for each fire protection cabinet and mounting bracket indicated.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
a. J. L. Industries, Inc.; a division of Activar Construction Products Group.
b. Larsen's Manufacturing Company.
c. Potter Roemer LLC.

B. Multipurpose Dry-Chemical Type FE-1: UL-rated 2A:10B:C, 5 lb. nominal capacity, with monoammonium phosphate-based dry chemical in manufacturer's standard enameled container.

1. Provide one extinguisher in each cabinet (FEC-1).
2. Provide extinguisher with wall mounted bracket where indicated (FE-1)

C. Multipurpose Dry-Chemical Type FE-2: UL-rated 4A:60B:C, 10 lb. nominal capacity, with monoammonium phosphate-based dry chemical in manufacturer's standard enameled container.

1. Provide one extinguisher in each cabinet (FEC-2).
2. Provide extinguisher with wall mounted bracket where indicated (FE-2).

2.2 FIRE PROTECTION CABINET (FEC)

A. Cabinet Type: Suitable for fire extinguisher.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. J. L. Industries, Inc.; a division of Activar Construction Products Group.
b. Larsen's Manufacturing Company.
c. Potter Roemer LLC.

B. Cabinet Construction: Nonrated.

C. Cabinet Material: Steel sheet.

D. Semi-recessed Cabinet: Cabinet box partially recessed in walls of sufficient depth to suit style of trim indicated; with one-piece combination trim and perimeter door frame overlapping surrounding wall surface with exposed trim face and wall return at outer edge (backbend). Provide where walls are of insufficient depth for recessed cabinets but are of sufficient depth to accommodate semi-recessed cabinet installation.

1. Rolled-Edge Trim: 2-1/2-inch (64-mm) backbend depth.

E. Cabinet Trim Material: Same material and finish as door.

F. Door Material: Steel sheet.

G. Door Style: Vertical duo panel with frame.

H. Door Glazing: Tempered float glass (clear).

I. Door Hardware: Manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated.

1. Provide projecting door pull and friction latch.
2. Provide concealed hinge permitting door to open 180 degrees.

J. Accessories:

1. Door Lock: Cam lock that allows door to be opened during emergency by pulling sharply on door handle.
2. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location.
   a. Identify fire extinguisher in fire protection cabinet with the words "FIRE EXTINGUISHER ."
      1) Location: Applied to cabinet door.
      2) Lettering Color: Red.
      3) Orientation: Vertical.

K. Finishes:

1. Manufacturer's standard baked-enamel paint for the following:
   a. Exterior of cabinet, door, and trim except for those surfaces indicated to receive another finish.
   b. Interior of cabinet and door.

2.3 MOUNTING BRACKETS

A. Mounting Brackets: Manufacturer's standard galvanized steel, designed to secure fire extinguisher to wall or structure, of sizes required for types and capacities of fire extinguishers indicated, with plated or red baked-enamel finish.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. J. L. Industries, Inc.; a division of Activar Construction Products Group.
   b. Larsen's Manufacturing Company.
   c. Potter Roemer LLC.

B. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated by Architect.

1. Identify bracket-mounted fire extinguishers with the words "FIRE EXTINGUISHER" in red letter decals applied to mounting surface.

2.4 FABRICATION

A. Fire Protection Cabinets: Provide manufacturer's standard box (tub) with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated.

1. Weld joints and grind smooth.
2. Provide factory-drilled mounting holes.
3. Prepare doors and frames to receive locks.
4. Install door locks at factory.

B. Cabinet Doors: Fabricate doors according to manufacturer's standards, from materials indicated and coordinated with cabinet types and trim styles selected.

1. Fabricate door frames with tubular stiles and rails and hollow-metal design, minimum 1/2 inch (13 mm) thick.
2. Fabricate door frames of one-piece construction with edges flanged.
3. Miter and weld perimeter door frames.

C. Cabinet Trim: Fabricate cabinet trim in one piece with corners mitered, welded, and ground smooth.

2.5 GENERAL FINISH REQUIREMENTS

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces of fire protection cabinets from damage by applying a strippable, temporary protective covering before shipping.

C. Finish fire protection cabinets after assembly.

D. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.6 STEEL FINISHES

A. Surface Preparation: Remove mill scale and rust, if present, from uncoated steel, complying with SSPC-SP 5/NACE No. 1, "White Metal Blast Cleaning.

B. Baked-Enamel or Powder-Coat Finish: Immediately after cleaning and pretreating, apply manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat. Comply with coating manufacturer's written instructions for applying and baking to achieve a minimum dry film thickness of 2 mils (0.05 mm).

1. Color and Gloss: Match Architect’s sample. Semi-gloss.

2.7 FIRE DEPARTMENT KEY BOX

A. Key Box: Provide key box as approved by the local fire authority, locations as indicated on the drawings.

1. Manufacturers: Knox Company
2. Model: 3227 Recessed, heavy duty with lift-off door, including recessed mounting kit. Capacity for up to 10 keys and access cards.
3. Dimensions: 7 inches high x 7 inches wide flange.
4. Padlock: Provide Knox padlock model 3770 for each box.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine walls and partitions for suitable framing depth and blocking where semi-recessed cabinets will be installed.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare recesses for semi-recessed fire protection cabinets as required by type and size of cabinet and trim style.

3.3 INSTALLATION

A. General: Install fire protection cabinets in locations and at mounting heights indicated**.**

1. Locate adjacent clear floor space of 30 IN. x 48 IN. adjacent or overlapping an accessible route, complying with CBC Section 1118B.4 that allows a forward or parallel approach by a person using a wheelchair.
2. The highest operable part of all controls, dispensers and other operable equipment shall be placed within at least one of the following reach ranges:
   a. If the clear floor space allows only forward approach to an object, the maximum high forward reach allowed shall be 48 inches (1219 mm) and the low side reach shall be no less than 15 inches (381 mm) above the floor.
   b. If the clear floor space allows parallel approach by a person in a wheelchair, the maximum high side reach allowed shall be 54 inches (1372 mm) and the low side reach shall be no less than 9 inches (229 mm) above the floor.

B. Fire Protection Cabinets: Fasten cabinets to structure, square and plumb.

3.4 ADJUSTING AND CLEANING

A. Remove temporary protective coverings and strippable films, if any, as fire protection cabinets are installed unless otherwise indicated in manufacturer's written installation instructions.

B. Adjust fire protection cabinet doors to operate easily without binding. Verify that integral locking devices operate properly.

C. On completion of fire protection cabinet installation, clean interior and exterior surfaces as recommended by manufacturer.

D. Touch up marred finishes, or replace fire protection cabinets that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by fire protection cabinet and mounting bracket manufacturers.

E. Replace fire protection cabinets that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 104413

SECTION 12 3661 - SIMULATED STONE COUNTERTOPS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Quartz agglomerate countertops and backsplashes.

1.2 ACTION SUBMITTALS

A. Product Data: For countertop materials.

B. Shop Drawings: For countertops. Show materials, finishes, edge and backsplash profiles, methods of joining, and cutouts for plumbing fixtures.

C. Samples: For each type of material exposed to view.

PART 2 - PRODUCTS

2.1 QUARTZ AGGLOMERATE COUNTERTOPS

A. Countertops: 3/4-inch- (19-mm-) thick, quartz agglomerate with front edge built up with same material.

B. Backsplashes: 1/2-inch- (12.7-mm-) thick, quartz agglomerate.

2.2 COUNTERTOP MATERIALS

A. Particleboard: ANSI A208.1, Grade M-2-Exterior Glue, made with binder containing no urea formaldehyde.

B. Plywood: Exterior softwood plywood complying with DOC PS 1, Grade C-C Plugged, touch sanded.

C. Adhesives: Adhesives shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

D. Quartz Agglomerate: Solid sheets consisting of quartz aggregates bound together with a matrix of filled plastic resin and complying with the "Physical Characteristics of Materials" Article of ANSI SS1.

1. Manufacturer: Basis-of-Design Product: Subject to compliance with requirements, provide Silestone by Cosentino, USA.
2. Colors and Patterns: As selected by Architect from manufacturer's full range.
3. Anti-microbial protection: Microban by Microban International, Inc., integral to sheet.
4. Physical characteristics:
   a. Static coefficient of friction: 1.02 dry, 0.51 wet, tested to ASTM C1028.
   b. Water absorption: Maximum 0.03 percent, tested to ASTM C97.
   c. Compressive strength: Minimum 29,000 psi, tested to ASTM C170.
   d. Bond strength: Minimum 210 psi, tested to ASTM C482.
   e. Modulus of rupture: Minimum 6300 psi, tested to ASTM C99.
   f. Flexural strength: Minimum 5800 psi, tested to ASTM C880.
   g. Breaking strength: Minimum 480 lbf, tested to ASTM C648.
   h. Stain resistance: Not affected by 10 percent hydrochloric acid or 10 percent KOH, tested to ASTM C650.
   i. Thermal shock resistance: Pass 5 cycles, tested to ASTM C484.
   j. Abrasive index: 65-Ha = 25, tested to ASTM C241.
   k. Thermal expansion: 1.670 x 10^{-5} in/in/deg F, tested to ASTM C531.
   l. Deicing resistance: Rating of 0, tested to ASTM C672/C672M.
   m. Freeze/thaw resistance: 0 tiles at 15 cycles, tested to ASTM C1026.
      1) Flame spread rating: Class 1, tested to ASTM E84.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Fasten countertops by screwing through corner blocks of base units into underside of countertop. Align adjacent surfaces and, using adhesive in color to match countertop, form seams to comply with manufacturer's written instructions. Carefully dress joints smooth, remove surface scratches, and clean entire surface.

END OF SECTION 12 3661

SECTION 12 9300- SITE FURNISHINGS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following site furnishings:

1. Bollards.
2. Historic Park Bench.
3. Trash & Recycling Receptacles.
4. Bike Racks.
5. Tree Grates.
6. Trench Drain Grates.
7. Area Drain Grates
8. Plaza Access Hatches.
9. Trellis Vine Grate.
10. Drinking Fountains.
11. Accessible Route Plaques.
12. Paving Markers

B. Related Sections include the following:

1. Drawings and general provisions of the Contract, including Part 1- “General Provisions” of the Greenbook and Whitebook apply to this Section.
2. Division 31 Section “Earthwork” for excavation for installation of concrete footings.
3. Division 03 Section "Cast-in-Place Concrete" for concrete footings.
4. Division 03 Section "Cast-in-Place Concrete" for installation of anchor bolts cast in concrete footings and for formed voids in concrete.
5. Refer to Water Feature Drawings for fountain drain grates and support frames.
6. Division 05 “Metal Fabrications” for materials and fabrication procedures for custom fabricated site furnishings.

1.2 QUALITY ASSURANCE:

A. Manufacturing standards: provide each item of equipment as a complete unit produced by a single manufacturer, including fittings, accessories, frames, bases and anchorage devices.

B. Construction: construct each item and ship to the site in minimum number of sections.

C. Conflicts: Compare manufacturer's shop drawings of all products with the products shown on the Drawings. If conflicts arise between shop drawings and the Drawings, notify Owner’s Representative before proceeding with the Work.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, finishes, field-assembly requirements, and installation details. Provide a minimum of 2 samples each for items requested in Part 2- Products.

B. Product Schedule: For site furnishings. Use same designations indicated on Drawings.

C. Shop Drawings: Submit manufacturer's shop drawings of all products for approval by Owner's Representative prior to fabrication or supplying. Shop Drawings shall include installation and leveling methods for each type of site furnishing, including hardware intended to be utilized. Tree grate shop drawings shall include detailed openings, attachments, hardware etc., for tree lighting and irrigation access. Include drawings and calculations for all items designated as H-20 rated stamped and signed by a licensed structural engineer in the State of California.

D. Maintenance Data: For site furnishings to include in maintenance manuals.

E. Structural Engineer's drawings and calculations for bollards showing footing sizes and reinforcement stamped and signed by a licensed structural engineer in the State of California.

PART 2 - PRODUCTS

2.1 SITE FURNISHINGS

A. Products: Subject to compliance with requirements, provide the following. Tree grates, vine grates, area drain covers and trench drain covers shall all be of like design and from a single manufacturer.

1. Bollards:

a. Removable Bollard

Provide the following:

1. 6 inch dia, flat top, stainless steel removable bollard with lock tab. In ground stainless steel receiver sleeve with insertion stops and integral lock well (3 inches x 5 inches) with padlock. Provide receiver cover with lock tab to cover opening when bollard has been removed. All bollard components to be Type 316 Stainless Steel with #4 brushed finish. Bollard and Receiver sleeve length as indicated on drawings.

b. Fixed Bollard

Provide the following:

1. 6 inch dia, flat top, stainless steel bollard with 12 inch diameter base, predrilled for 5 anchor locations. All bollard components to be Type 316 Stainless Steel with #4 brushed finish. Bollard length and attachment as indicated on drawings.

2. Historic Park Bench:

   a. Manufacturer: Kenneth Lynch & Sons, Oxford, CT, 203 264 2831, or approved equal.
   b. Model: Item 6735B, Central Park Settee with Armrests, 8 ft. length
   c. Finish: Natural Ipe with oiled finish.

3. Trash & Recycling Receptacles:

   a. Historic Park

      1. Manufacturer: Victor Stanley, Inc., Dunkirk, MD, 800 368 257, or approved equal.
      2. Model: SD-42, Litter receptacle and matching recycle container, Standard Tapered Formed Lid.
      3. Color: Black Powdercoat

   b. Horton Plaza

      1. Manufacturer: Landscape Forms, Kalamazoo, MI, Tele: 800 521 2546, or approved equal.
      2. Model: Chase Park, 36 gallon, side opening, litter receptacle and recycle containers.
      3. Color: Metallic Silver Powdercoat
      4. Signage: 5”x7” Landscape Forms Chase Park receptacle signage. Wording on Recycling and Trash Signage to be selected by Owner prior to placement of order.

4. Bike Racks: Provide racks from one of the following with embedment depth as identified on drawings:

   a. Dero - Minneapolis, MN, Tele: 888 337 6729.
      1) Model: Round Rack.
      2) Style: Embedded mount.
      3) Finish: Stainless Steel
      4) Options: Embedment post depth as required.

   b. Creative Pipe – Rancho Mirage, CA, Tele: 800 644 8467
      1) Model: Horseshoe Rack, No. HS-2-E-SS
      2) Finish: Stainless Steel
      3) Options: Embedment post depth as required.

   c. Palmer Group LLC, San Francisco, CA, Tele: 415 333 6428
      1) Model: WCR02-SF-P Stainless
      2) Options: Embedment post depth as required.

5. Tree Grates and Frames: ASTM A 48, Class 25 or better, gray-iron castings and manufacturer provided steel-angle frames. Tree grates of shape, pattern, and size indicated. Provide grates and manufacturer provided frames from one of the following to match installation on adjacent Westfield property:

   a. Iron Age Designs, Burien, WA, Tele: 877-418-3568.

1) Model: Regular Joe, custom sizing.
2) Finish: Ductile Iron with factory applied baked on oil finish.
3) Sizes: 5 ft. square and 8 ft. square, as shown on drawings.
4) Center opening: 18" square typical.
5) Frame:
   a) 8'x8'size: H20 rated.
   b) 5'x5'size: provide the following; one (1) - H20 rated, three (3) - standard framing.
6) Options:
   a) Heel Proof Openings. Bolt down with tamperproof fasteners.
   b) Include grate access for vertical drain pipe locations, irrigation and lighting.
   c) Include light openings sized to accommodate the specified fixtures.
      1. 5 ft. square grates: 2 light opening @180 degrees apart.
      2. 8 ft. square grate: 4 light openings @ 90 degrees apart.

b. Urban Accessories, Tacoma, WA, Tele: 877 487 0488
1) Model: Jamison.
2) Finish: Ductile Iron, standard finish with rust accelerator.
3) Sizes: 5 ft. square and 8 ft. square, as shown on drawings.
4) Center opening: 18" square typical.
5) Frame:
   a) 8'x8'size: H20 rated.
   b) 5'x5'size: provide the following; one (1) - H20 rated, three (3) - standard framing.
6) Options:
   a) Heel Proof Openings. Bolt down with tamperproof fasteners.
   b) Include grate access for vertical drain pipe locations, irrigation and lighting.
   c) Include light openings sized to accommodate the specified fixtures.
      1. 5 ft. square grates: 2 light opening @180 degrees apart.
      2. 8 ft. square grate: 4 light openings @ 90 degrees apart.

c. Iron Smith Inc., Palm Desert, CA, Tele: 800 338 4766
1) Model: Metro.
2) Finish: Cast Iron, with Black Max rust conversion.
3) Sizes: 5 ft. square and 8 ft. square, as shown on drawings.
4) Center opening: 18" square typical.
5) Frame:
   a) 8'x8'size: H20 rated.
   b) 5'x5'size: provide the following; one (1) - H20 rated, three (3) - standard framing.
6) Options:
   a) Heel Proof Openings. Bolt down with tamperproof fasteners.
   b) Include grate access for vertical drain pipe locations, irrigation and lighting.
   c) Include light openings sized to accommodate the specified fixtures.

1. 5 ft. square grates: 2 light opening @180 degrees apart.
2. 8 ft. square grate: 4 light openings @ 90 degrees apart.

6. Decorative Trench Drain Covers for Horton Plaza: ASTM A 48, Class 25 or better, gray-iron castings and H20 rated for all vehicular paving areas. Provide one of the following:

   a. Manufacturer: Iron Age Designs, Burien, WA, Tele: 877-418-3568.
   b. Model: Regular Joe
   c. Sizes: Trench drains: 5 inch width x 19.6 inches long, straight segments.
   d. Finish: Ductile Iron with factory applied baked on oil finish.
      Options:
      1) Heel Proof openings. Bolt down with tamperproof fasteners.

   a. Manufacturer: Urban Accessories, Tacoma, WA, Tele: 877 487 0488
   b. Model: Jamison, custom trench drain grate.
   c. Sizes: Trench drains: 5 inch width x 19.6 inches long, straight segments.
   d. Finish: Ductile Iron, standard finish with rust accelerator.
      Options:
      1) Heel Proof openings. Bolt down with tamperproof fasteners.

   a. Manufacturer: Iron Smith Inc., Palm Desert, CA, Tele: 800 338 4766
   b. Model: Metro, trench drain grate.
   c. Sizes: Trench drains: 5 inch width x 19.6 inches long, straight segments.
   d. Finish: Cast Iron, with Black Max rust conversion.
      Options:
      1) Heel Proof openings. Bolt down with tamperproof fasteners.

7. Decorative Area Drain Covers for Horton Plaza: ASTM A 48, Class 25 or better, gray-iron castings and H20 rated for all vehicular paving areas. Match Area Drain covers on adjacent Westfield project.

   a. Manufacturer: Iron Age Designs, Burien, WA, Tele: 877-418-3568.
   b. Model: Regular Joe, custom area drain grate.
   c. Finish: Ductile Iron with factory applied baked on oil finish.
   d. Sizes: Area Drains: 9 inches x 9 inches.
   e. Options: Heel Proof openings. Bolt down with tamperproof fasteners.

   a. Manufacturer: Urban Accessories, Tacoma, WA, Tele: 877 487 0488
   b. Model: Metro, custom area drain grate.
   c. Finish: Ductile Iron, standard finish with rust accelerator.
   d. Sizes: Area Drains: 9 inches x 9 inches.
   e. Options: Heel proof openings. Bolt down with tamperproof fasteners.

   a. Manufacturer: Iron Smith Inc., Palm Desert, CA, Tele: 800 338 4766
   b. Model: Metro, custom area drain grate.
   c. Finish: Cast Iron, with Black Max rust conversion.
   d. Sizes: Area Drains: 9 inches x 9 inches.
   e. Options: Heel proof openings. Bolt down with tamperproof fasteners.

8. Area Drain Covers for Historic Park:

    a. Manufacturer: Alhambra Foundry Company, LTD., 626-829-4294, or approved equal.
    b. Model: C-22, A-2010 ADA bicycle proof non-traffic grate.
    c. Finish: Cast Iron with painted finish. Color selected by Architect.
    d. Sizes: 8 inch x 8 inch grate with 1 inch height frame.
    e. Options: ADA compliant openings. Bolt down with tamperproof fasteners.

9. Plaza Access Hatches:

    a. Large Hatch (Type 1)
        1) Manufacturer: East Jordan Company, Long Beach, CA, Tele: 562 528 0258 or approved equal.
        2) Size: 35.125” x 29.125”
        3) Special Requirements: Heavy duty galvanized steel smooth plate lid, minimum H-20 vehicular rating with non-slip safety surface. Include 3”x10” access port with spring loaded hinge at lock side of cover. Slam Lock plug, stainless steel hold open arm lockable in 90 degree position, stainless steel pneu-spring opener, heavy duty hinge design and lift handle.
        4) Frame: per manufacturer.

    b. Small Hatch (Type 2)
        1) Manufacturer: East Jordan Company, Long Beach, CA, Tele: 562 528 0258 or approved equal.
        2) Size: 30”x18”.
        3) Special Requirements: Heavy duty galvanized steel smooth plate lid, minimum H-20 vehicular rating with non-slip safety surface. Include 3”x10” access port with spring loaded hinge at lock side of cover. Slam Lock plug, stainless steel hold open arm lockable in 90 degree position, stainless steel pneu-spring opener, heavy duty hinge design and lift handle.
        4) Frame: per manufacturer.

10. Vine Grates for Trellis: ASTM A 48, Class 25 or better, gray-iron castings and manufacturer provided heavy duty steel-angle frames as required. Provide one of the following:

    a. Manufacturer: Iron Age Designs, 877 418 3568, or approved equal.
    b. Model: Regular Joe, custom fabricated size.
    c. Finish: Ductile Iron with factory applied baked on oil finish.
    d. Size: As indicated on drawings.
    e. Frame: Vehicular rated frame, bolt down connections.
    f. Options: Heel Proof openings. Bolt down with tamperproof fasteners.

    a. Manufacturer: Urban Accessories, Tacoma, WA, Tele: 877 487 0488
    b. Model: Jamison, custom fabricated size.
    c. Finish: Ductile Iron, standard finish with rust accelerator.
    d. Size: As indicated on drawings.

e. Frame: Vehicular rated frame, bolt down connections.
f. Options: Heel Proof openings. Bolt down with tamperproof fasteners.

a. Manufacturer: Iron Smith Inc., Palm Desert, CA, Tele: 800 338 4766
b. Model: Metro, custom fabricated size.
c. Finish: Cast Iron, with Black Max rust conversion.
d. Size: As indicated on drawings.
e. Frame: Vehicular rated frame, bolt down connections.
f. Options: Heel Proof openings. Bolt down with tamperproof fasteners.

11. Drinking Fountains: Dual height, ADA Compliant, pedestal drinking fountain. Provide one of the following:

a. Manufacturer: Belson Outdoors, North Aurora, IL, Tele: 800 323 5664.
b. Model: 3300
c. Finish: Powdercoat finish, color to match trash receptacle.
d. Options: Provide color chips for approval.

a. Manufacturer: Haws, Tele: 775 359 4712
b. Model: 3300
c. Finish: Powdercoat finish, color to match trash receptacle.
d. Options: Provide color chips for approval.

a. Manufacturer: Murdock, City of Industry, CA, Tele: 626 333 02543
b. Model: GS M55 Ada Bi Level Pedestal Mount
c. Finish: Powdercoat finish, color to match trash receptacle.
d. Options: Provide color chips for approval.

12. Accessible Route Plaque: Provide the following:

a. Custom Fabricated, cast bronze plaque.
b. Size: 8 5/8 inches square, ½ inch thickness. With two bronze mounting pins welded to back. Refer to drawings for pin size.
c. Finish: polished finish on border, accessibility symbol and directional arrow. Dark antiqued finish background.
d. Options: Provide specified material with finishes applied for approval.

13. Paving Markers

a. Custom Fabricated, Grade 316L Stainless Steel, circular paving marker with anchoring stem welded to back.
b. Size: Surface plate - 2 inches in diameter, ¼ inch thickness. Anchoring Pin – ¾ inch diameter x 1 ½ inch length.
c. Finish: Sandblast finish to achieve a non slip surface.

2.2 ACCESSORIES

A. Anchors, Fasteners, Fittings, and Hardware: Manufacturer's standard, corrosion-resistant-coated or non-corrodible materials; commercial quality; tamperproof, vandal and theft

resistant; concealed, recessed, and capped or plugged. Provide as required for site furnishings' assembly, mounting, and secure attachment.

1. Anchors for Electrical Access Box Over Structure: Attach electrical box to underside of structural slab as indicated on the drawings.
   a. Acceptable fasteners: Hilti KwikBolt TZ – 3/8" diameter with minimum 2" embedment in concrete substrate, ICC # ESR-1967, or approved equal.

B. Non-shrink, Nonmetallic Grout: Premixed, factory-packaged, non-staining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout, recommended in writing by manufacturer, for exterior applications.

C. Ipe Oil: Ipe Oil, Bradenton, Florida. Toll Free: 1-866-427-2547, or approved equal.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for correct and level finished grade, mounting surfaces, installation tolerances, and other conditions affecting performance.

B. Notify the Owner's Representative of any conditions detrimental to the proper and timely completion of the work. Do not proceed with installation until unsatisfactory conditions have been corrected and are acceptable to the installer. Notify Owner's Representative for observation of layout prior to installation.

3.2 INSTALLATION, GENERAL

A. Comply with manufacturer's written installation instructions, unless more stringent requirements are indicated. Complete field assembly of site and street furnishings, where required.

B. Unless otherwise indicated, install site furnishings after landscaping and paving have been completed. Obtain approval of layout location from Owner's Representative prior to installing.

C. Install site furnishings level, plumb, true, and securely anchored at locations indicated on Drawings.

D. Surface mount Historic Park benches at the base of each leg. Anchors shall be epoxy set and sized to meet diameter of the opening in leg base. Provide anchors of sufficient length to embed into concrete subslab to a minimum depth of 2 ½ inches.

E. For installing items requiring concrete footings within concrete, asphalt or gravel paving, install item and footing prior to paving. Allow paving to be placed over top of footing. Where this is not feasible, see subparagraph below.

F. Where anchor bolts are exposed after setting of site furnishing cut tops of bolts flush with nut and grind smooth. Apply matching finish.

G. Apply Ipe Oil to all exposed surfaces of ipe on all benches per manufacturer's recommendations.

3.3 DRAIN GRATE INSTALLATION

A. Drain Grates: Set grate segments flush with adjoining surfaces as shown on Drawings. Embed supporting frames in surrounding concrete as shown on the Drawings. Secure grates to supporting frames with manufacturers vandal-resistant bolts. Drill grates and tap and dye frames as required to accommodate bolts. Provide a minimum of 2 bolts per grate section.

B. See Division 33 Section "Storm Drainage Utilities" for drain housing, piping and conveyance of water to storm drainage system.

3.4 TREE GRATE INSTALLATION

A. Tree Grates: Embed manufacturer provided frame into surrounding paving as shown on the Drawings. Set grate segments flush with adjoining surfaces. Shim from supporting substrate with soil-resistant plastic as required to eliminate rocking. Secure grates to supporting frames with manufacturers vandal-resistant bolts. Drill grates and tap and dye frames as required to accommodate bolts. Provide a minimum of 2 bolts per grate section.

B. Maintain a 3-inch minimum growth radius around base of tree; break away units of casting, if necessary, according to manufacturer's written instructions.

3.5 CLEANING

A. After completing site furnishing installation, inspect components. Remove spots, dirt, and debris. Repair damaged finishes to match original finish or replace component.

END OF SECTION 12 9300

SECTION 13 1201 - WATER FEATURE EXCAVATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Finish and fine grading to bring the surface of the ground to the required grades and elevations as indicated on the Drawings.
2. Subgrade improvements and placing of compacted fills.
3. Excavation and backfill for all water feature structural requirements, including footings, foundations, slabs and balance tank.

B. Related Sections:

1. Division 13, Section 13 1202 “Water Feature Concrete.”
2. Division 13, Section 13 1203 “Water Feature Equipment.”
3. Division 13, Section 13 1204 “Water Feature Mechanical.”
4. Division 13, Section 13 1205 “Water Feature Electrical.”

1.2 REFERENCES

A. Requirements of Regulatory Agencies: Conform with requirements of the General Conditions, and more specifically the following:

1. Comply with California Building Code, latest edition.
2. Comply with applicable construction safety orders, latest edition, Federal and State OSHA.
3. Comply with applicable trench safety provisions, latest edition, Federal and State OSHA.

1.3 QUALITY ASSURANCE

A. Qualifications of Workers:

1. The entity performing the work of this Section shall have been successfully engaged in the respective trade for at least five (5) years immediately prior to commencement of the Work.
2. For actual construction operations, use only trained and experienced workers with a minimum of three (3) years experience with the materials and methods specified.
3. Provide at least one person who shall be present at all times during execution of the work of this Section, with a minimum of five (5) years experience with the type of materials being installed, the referenced standards, and who shall direct all Work performed under this Section.

C. Project/Site Conditions:

1. Be familiar with site and subsurface conditions.
2. Excavation is unclassified and includes excavation to sub-grade elevations indicated or necessary, regardless of character of materials and obstructions encountered.
3. Provisions for mitigation of wet soils due to seepage or rain shall be made during excavation and throughout construction. If wet soils are encountered within the wet play excavations, de-watering shall be provided and the Geotechnical Engineer shall make recommendations for moist soil mitigation.
4. Where slope instability is encountered, all excavations within those areas shall be 1:1 or flatter. Forming of vertical walls may be necessary, and all soil conditions shall be field verified by the Geotechnical Engineer.
5. Contractor shall review the Geotechnical Investigation Report as furnished by the Owner's Representative to determine the suitability of the soils.

D. Adverse Weather Conditions:

1. During the periods when site soil moisture content is substantially in excess of moisture content required for optimum compaction, do not perform fill compaction.
2. When unfavorable weather conditions necessitate interrupting filling and grading operations, prepare areas by compaction of surface and grading to avoid collection of water. Provide adequate temporary drainage to prevent erosion.

1.4 SUBMITTALS

A. Required submittals include: Offsite fill material, if applicable.

B. Submit proof of qualifications as specified in Article 1.3.A of this Section.

1.5 EXCAVATING & TRENCHING, GENERAL REQUIREMENTS

A. All trenches, holes, etc. are to be completely protected using solid barricades, steel plates, and plywood both during construction and during off hours, including night time.

B. Flashing warning light barricades are required on sidewalks, roads, and any other critical areas that require night time protection.

C. Roads, paths and sidewalks shall not be blocked at any time or in any way. Trenching across roads, paths or sidewalks involves special instructions and review of the construction procedure by the Owner's Representative at least three (3) days prior to the Work actually being started.

D. Construction equipment, including all trucks, cars, etc. shall not be parked or driven on roads, paths or sidewalks. Items not allowed on roads, paths or sidewalks include hoses, power cords, ropes, construction materials, dirt and debris, etc.

E. All roads, paths and sidewalks must remain clear and the Contractor shall maintain temporary safe and effective pedestrian access at all times.

F. Drawings show existing major underground utilities using the best information available. The Contractor shall also fully check public works reference drawings prior to excavation. Call local Dig Alert to locate utilities to ensure safety.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Fill Material, General: All material shall be subject to the review and approval of the Geotechnical Engineer.

B. On-site Fill Material: The onsite soils to be used as compacted structural fill should be free of oversized material, significant organic material or construction debris. The geotechnical consultant should approve any imported fill soil prior to placement as fill. Fill soils should be placed in loose lifts not exceeding 8 inches, moisture-conditioned to at least 1 percent above optimum, and compacted per the recommendations of the Geotechnical Report.

PART 3 - EXECUTION

3.1 INSPECTION

A. Verify drawing dimensions and elevations with actual field conditions. Inspect related Work and adjacent surfaces and report discrepancies and conditions which prevent proper execution of the Work to the Owner.

3.2 EXCAVATION

A. Checking Layout: Contractor shall, before commencing the excavation work, check all lines, stakes and levels for dimensions, angles, elevations and grades with the survey.

B. Dimensions: Excavate to proper dimensions as shown, cut square and smooth with firm level bottoms. Prepared excavations shall be approved by Geotechnical Engineer. Excavations shall be free of loose or disturbed materials.

C. Excess Water Control: Keep all excavations free from standing water by pumping, draining or providing proper protection against water intrusion. If soil becomes soft, soggy or saturated, perform additional excavation to firm soil not affected by water.

D. Form Removal: Make all excavations of sufficient size to permit installation and removal of forms and all other required work.

E. Alternate Forming: Sides of structures may be formed by neat excavations where banks will stand without caving. If banks cave, provide forming as required and widen excavation to permit forming, bracing and inspection. Provide forming in conformance with Section 13 1202, “Water Feature Concrete” and all recognized safety standards.

3.3 BACKFILLING

A. Method: After concrete has been placed, forms removed and concrete work approved, backfill the excavations with earth to indicated or required grades. Carry on backfilling simultaneously on each side of walls or grade beams. Remove all rubbish and wood from the excavations before placing backfill.

B. Concrete Protection: Prior to placing any backfill, adequately cure all concrete and provide any bracing required to ensure the stability of the structure. Protect waterproofing and dampproofing against damage in a manner acceptable to the Owner. Remove bracing as backfill operations progress.

C. Material: Use the material from the excavations for backfilling, subject to approval by Geotechnical Engineer. The earth shall be free from debris, large clods or stones.

D. Lifts: Place backfill in eight (8) inch loose layers, bring to optimum moisture content and compact per the recommendations of the Geotechnical Report, sloping down and away from the structures being backfilled.

E. Moisture: Rigidly control the amount of water used to insure optimum moisture conditions for the type of fill material used. Excessive amounts of water causing saturation of earth will not be permitted. Compaction by flooding or jetting is prohibited.

3.4 GRADING

A. Slopes: Grade to finish grades indicated on Drawings, with uniform slopes between all points.

B. Subgrades: Blade to required grade and roll or tamp subgrades for exterior slabs, decks and paving.

3.5 CLEAN-UP

A. Disposal: Haul away rubbish, debris, and rocks from site promptly and dispose of legally. Burning rubbish on site is prohibited.

B. Dust and Noise Abatement: During entire period of construction keep area and material being loaded sprinkled to reduce dust in air and annoyance to premises and surrounding property.

END OF SECTION 13 1201

SECTION 13 1202 - WATER FEATURE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Forming for cast-in-place concrete associated with water features.
2. Reinforcement for cast-in-place concrete associated with water features.
3. Balance tank waterproofing.
4. Historic Fountain precast equipment vault.

B. Related Sections:

1. Division 13, Section 13 1201 “Water Feature Excavation.”
2. Division 13, Section 13 1203 “Water Feature Equipment.”
3. Division 13, Section 13 1204 “Water Feature Mechanical.”
4. Division 13, Section 13 1205 “Water Feature Electrical.”

1.2 QUALITY ASSURANCE

A. Qualifications of Workers:

1. The entity performing the work of this Section shall have been successfully engaged in the respective trade for at least five (5) years immediately prior to commencement of the Work.
2. For actual construction operations, use only trained and experienced workers with a minimum of three (3) years experience with the materials and methods specified.
3. Provide at least one person who shall be present at all times during execution of the work of this Section, with a minimum of five (5) years experience with the type of materials being installed, the referenced standards, and who shall direct all Work performed under this Section.

B. Standards:

1. In addition to complying with the California Building Code (latest edition), comply with all pertinent recommendations contained in "Recommended Practice for Concrete Formwork," Publication ACI 347 of the American Concrete Institute.
2. In addition to complying with California Building Code (latest edition), comply with all pertinent recommendations contained in “Manual of Standard Practice for Detailing Reinforced Concrete Structures,” Publication ACI 315 of the American Concrete Institute.
3. In addition to comply with all local codes and regulations, comply with all pertinent recommendations contained in American Society for Testing and Materials (ASTM); ASTM C 920 “Standard Specification for Elastomeric Joint Sealants.”
4. Where provisions of applicable codes and standards conflict with the requirements of this Section, the more stringent provisions shall govern.

C. Tolerances: Construct all water feature concrete straight, true, plumb and square within a tolerance horizontally of one in 200 and vertically of one in 2000.

1.3 SUBMITTALS

A. Samples and Certificates, Concrete Reinforcement:

1. Provide all data and access required for testing as described in Section 01450 of the Specifications.
2. All material shall bear mill tags with heat number identification. Mill analysis and report shall be made available upon request.
3. Material not so labeled and identifiable may be required by the Owner's Representative to be tested by the testing laboratory selected by the Owner's Representative and at no additional cost to the Owner, in which case random samples will be taken for one series of tests from each 2-1/2 tons or fraction thereof of each size and kind of reinforcing steel.

B. Concrete Mix Design: Provide concrete mix design and concrete batch plant information for each type of concrete to be installed.

C. Submit proof of qualifications as specified in Article 1.2.A of this Section.

1.4 PRODUCT HANDLING

A. Delivery: Deliver materials to the Project Site in the manufacturer's original unopened containers with all labels intact and legible.

B. Storage: Store materials under cover in a manner to prevent damage and contamination, and store only the specified materials at the Project Site.

C. Protection: Use all means necessary to protect the wet play concrete before, during, and after installation and to protect the installed Work specified in other Sections.

D. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the approval of the Owner's Representative.

PART 2 - PRODUCTS

2.1 CONCRETE FORMWORK

A. Form Materials:

1. Form Lumber: All form lumber in contact with exposed concrete shall be new except as allowed for reuse of forms in Part 3 of this Section, and all form lumber shall be one of the following, a combination thereof, or an equal approved in advance by the Owner.

a. "Plyform," Class I or II, bearing the label of the Douglas Fir Plywood Association; "Inner-Seal" Form as manufactured by Louisiana-Pacific, or equal.
b. Douglas Fir-Larch, number two grade, seasoned, surfaced four sides.

2. Form Release Agent: Colorless, non-staining, free from oils; chemically reactive agent that shall not impair bonding of paint or other coatings intended for use.

B. Ties and Spreaders:

1. Type: All form ties shall be a type which do not leave an open hole through the concrete and which permits neat and solid patching at every hole.
2. Design: When forms are removed, all metal reinforcement shall be not less than two (2) inches from the finished concrete surface.
3. Wire Ties and Wood Spreaders: Do not use wire ties or wood spreaders.

C. Alternate Forming Systems: Alternate forming systems may be used subject to the advance approval of the Owner.

2.2 CONCRETE REINFORCEMENT

A. Bars: Bars for reinforcement shall conform to “Specifications for Deformed Billet-Steel Bars for Concrete Reinforcement,” ASTM A-615, Grade 60.

B. Wire Fabric: Wire fabric shall conform to “Specifications for Wire Fabric for Concrete Reinforcement,” ASTM A-185.

C. Tie Wire: Tie wire for reinforcement shall conform to “Specifications for Cold-drawn Steel Wire for Concrete Reinforcement,” ASTM A-82 black annealed 16 gauge tie wire.

2.3 CAST-IN-PLACE CONCRETE

A. Concrete:

1. All concrete, unless otherwise specifically permitted by the Owner, shall be transit-mixed in accordance with ASTM C94. Concrete for water retaining structures that do not receive a waterproofing finish shall contain an integral waterproofing admixture.
2. The control of concrete production shall be under the supervision of a recognized testing agency, selected by the Owner.
3. Quality: All concrete shall have the following minimum compressive strengths at twenty-eight (28) days and shall be proportioned within the following limits:

a. 3,500 psi minimum compressive strength.
b. 1” maximum size aggregate.
c. 6.0 minimum sacks of cement per cubic yard.*
d. 4” maximum slump.

* For estimate only: to be determined by mix design.

4. Cement: All cement shall be Portland Cement conforming to ASTM C-150, Type II, and shall be the product of one manufacturer.
5. Aggregates:

a. Shall conform to “Standard Specifications for Concrete Aggregates,” ASTM C33, except as modified herein.
b. Coarse Aggregate: Clean sound washed gravel or crushed rock. Crushing may constitute not more than 30% of the total coarse aggregate volume. Not more than 5% flat, thin, elongated or laminated material nor more than 1% deleterious material shall be present. 1" aggregate graded from 1/4” to 1”, fineness modulus 6.90 to 7.40. 1-1/2” graded from ½” to 1-1/2”, fineness modulus 7.80 to 8.20.
c. Fine Aggregate: Washed natural sand of hard, strong particles and shall contain not more than 1% of deleterious material, fineness modulus 2.65 to 3.05.

6. Water: Clean, fresh, free from acid, alkali, organic matter or other impurities liable to be detrimental to the concrete (potable).
7. Admixtures: Admixtures shall be used upon approval of the Owner.

a. Air-entraining admixture: Conform to ASTM C260.
b. Water-reducing admixture: Conform to ASTM C494.
c. Waterproofing admixture: Conform to ASTM C494.

B. Construction Joints: Use keyform for slab pour joints. Either preformed galvanized or PVC construction joint forms of a standard manufacturer may be used. Install per manufacturer's recommendations and tool edges of slabs.

C. Waterstops: PVC bulb-type for use between concrete pours / lifts, conforming with ASTM D 570, D 624, and D 638. Provide in configuration(s) as recommended by manufacturer for specific application. Greenstreak, W.R. Meadows, or equal.

D. Curing Materials:

1. Liquid Membrane (covered slab): Chlorinated rubber membrane forming, curing sealing compound conforming to ASTM C309.
2. Liquid Membrane (exposed slab): Clear methyl and butyl methacrylate non-staining, membrane forming, curing-sealing compound conforming to ASTM C309.

E. Cement Grout and Drypack:

1. Cement Grout: Mix 1 part by volume of Portland Cement, 1/2 part by volume of water and fine aggregate enough to make mixture flow under its' own weight.
2. Drypack: Mix 1 part by volume of Portland Cement, 1/2 part by volume of water and fine aggregate enough to make a stiff mix that will mold into a ball. Mix no more than can be used in 30 minutes.

2.4 JOINT SEALANT MATERIALS

A. Caulking: Multipart, non-sag gun grade polyurethane based sealant meeting the requirements of ASTM C920-02, Type S or M, Mamemco International, Pecora, Sika Corp., Sonneborn Building Products, Tremco or approved equal.

B. Primer: Non-staining type, recommended by sealant manufacturer to suit application.

C. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.

D. Sealant Backer Rod: Provide compressible polyethylene or polyurethane backer rod as recommended by the sealant manufacturer.

E. Bond Breaker Tape: Provide polyethylene tape or other plastic tape as recommended by sealant manufacturer, to be applied to sealant-contact surfaces where bond to substrate or joint filler must be avoided for proper performance of sealant.

F. Sand: Cover the surface of the caulking with #30 silica sand.

2.5 BALANCE TANK WATERPROOFING

A. Refer to specifications, section 13 1206 for waterproofing.

2.6 HISTORIC FOUNTAIN PRECAST EQUIPMENT VAULT

A. 8’0” x 20’0” x 9’4” precast vault, furnish complete with 4’0” x 5’0” vault neck, integrated sump, fiberglass access ladder and torsion hinged aluminum slip resistant access cover. Jensen Precast 820 Series Vault with #VN45 vault neck and CAA-4860 access cover, or approved equal. One (1) integrated system required.

2.7 OTHER MATERIALS

A. All other materials, not specifically described but required for proper completion of the work of this Section, shall be as selected by the Contractor subject to the advance review by the Owner.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

A. Inspection:

1. Prior to all Work of this Section, carefully inspect the installed Work of other trades and verify that all such Work is complete to the point where this installation may properly commence.
2. Verify that all Work may be constructed in accordance with all applicable codes and regulations, the referenced standards, and the original design.

B. Discrepancies:

1. In the event of discrepancy, immediately notify the Owner.
2. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.
3. Failure to notify the Owner and give written notice of discrepancies shall constitute acceptance by the Contractor of existing conditions as fit and proper to receive work.

3.2 INSTALLATION OF BALANCE TANK WATERPROOFING

A. Provide two (2) coats of the specified balance tank waterproofing prior to start-up of water feature. Prepare surfaces to receive waterproofing and cure in conformance with manufacturer's recommendations. Provide application method to ensure uniform smooth, dense surface finish. Refer to specifications, section 13 1206 for more detailed information.

3.3 CONCRETE FORMWORK

A. Construction of Forms:

1. General: Construct all required forms to be substantial, sufficiently tight to prevent leakage of concrete paste, and able to withstand excessive deflection when filled with wet concrete.
2. Layout:
    a. Form for all required cast-in-place concrete to the shapes, sizes, lines and dimensions indicated on the Drawings.
    b. Exercise particular care in the layout of forms to avoid necessity for cutting concrete after placement.
    c. Make proper provisions for all openings, offsets, recesses, anchorages, blocking and other features of the Work as shown or required.
    d. Perform all forming required for Work of other trades and do all cutting and repairing of forms required to permit such installation.
    e. Carefully examine the Drawings and Specifications and consult with other trades as required relative to providing for pipe and conduit penetrations, reglets, chases and other items in the forms.
3. Imbedded Items: Set all required steel frames, angles, bolts, inserts and other such items required to be anchored in the concrete prior to concrete being placed.
4. Bracings:
    a. Properly brace and tie the forms together so as to maintain position and shape and to ensure safety to workmen.
    b. Construct all bracing, supporting members and centering of ample size and strength to safely carry, without excessive deflection, all dead and live loads to which they may be subjected.
    c. Properly space the forms apart and securely tie them together, using metal spreader ties that give positive tying and accurate spreading.
5. Wetting: Keep forms sufficiently wetted to prevent joints from opening up before concrete is placed.

B. Plywood Forms:

1. Design: Nail the plywood panels directly to studs and apply in a manner to minimize the number of joints.
2. Joints: Make all panel joints tight butt joints with all edges true and square.

C. Footing Forms:

1. Wood Forms: All footing forms shall be wood unless otherwise specifically approved by the Owner, or as specified in paragraph 3.2(C)(2).
2. Earth Forms:

    a. Side walls for footings may be of earth provided the soil will stand without caving and the sides of the bank are made with a neat cut to the minimum dimensions indicated on the Drawings.
    b. For excavation and backfill of earth forms, conform with applicable provisions of Section 13 1201, “Water Feature Excavation”.

D. Reuse of Forms:

1. Reuse of forms shall be subject to advance approval of the Owner.
2. Except as specifically approved in advance by the Owner, reuse of forms shall in no way delay or change the schedule for placement of concrete from the schedule obtainable if all forms were new.
3. Except as specifically approved in advance by the Owner, reuse of forms shall in no way impart less structural stability to the forms nor less acceptable appearance to finished concrete.

E. Removal of Forms:

1. General:

    a. In general, side forms of footings may be removed seven (7) days after placement of concrete, but time may be extended if deemed necessary by the Owner.
    b. Forms for footings, foundations, grade beams, slabs, walls, and other formed concrete may be removed fourteen (14) days after placement of concrete.
2. Removal:

    a. Use all means necessary to protect workers, passersby, the installed Work of other trades and the complete safety of the structure.
    b. Cut nails and tie wires or form ties off flush, and leave all surfaces smooth and clean.
    c. Remove metal spreader ties on exposed concrete by removing or snapping off inside the wall surface and pointing up and rubbing the resulting pockets to match the surrounding areas.
    d. Flush all holes resulting from the use of spreader ties and sleeve nuts using water, and then solidly pack throughout the wall thickness with cement grout applied under pressure by means of a grouting gun; grout shall be one part Portland Cement to 2-1/2 parts sand; apply grout immediately after removing forms.

3.4 CONCRETE REINFORCEMENT

A. Bending:

1. General:

a. Fabricate all reinforcement in strict accordance with the Drawings.
b. Do not use bars with kinks or bends not shown on the Drawings.
c. Do not bend or straighten steel in a manner that will injure the material. (When opposite end is already encased in concrete.)

2. Design:

a. Bend all bars cold.
b. Make bends for stirrups and ties around a pin having a diameter of not less than two (2) times the minimum thickness of the bar.
c. Make bends for other bars, including hooks, around a pin having a diameter of not less than six (6) times the minimum thickness of the bar.

B. Placing:

1. General: Before the start of concrete placement, accurately place all concrete reinforcement, positively securing and supporting by concrete blocks, metal chairs or spacers, or by metal hangers.
2. Clearance:

a. Preserve clear space between bars of not less than one and one-half (1-1/2) times the nominal diameter of the round bars.
b. In no case let the clear space be less than one and one-half (1-1/2) inches nor less than one and one-third (1-1/3) times the maximum size of the aggregate.
c. Provide the following minimum concrete covering of reinforcement:

1) Concrete deposited against earth: three (3) inches.
2) Concrete below grade deposited against forms: two (2) inches.
3) Concrete elsewhere: As indicated on Drawings or otherwise approved by the Owner.

3. Splicing:

a. Horizontal Bars:

1) Place bars in horizontal members with minimum lap at splices sufficient to develop the strength of the bars.
2) Bars may be wired together at laps except at points of support of the member, at which points preserve clear space described above.
3) Whenever possible, stagger the splices of adjacent bars.
4) Splice sixty (60) bar diameters minimum.

b. Wire Fabric: Make all splices in wire fabric at least one and one-half (1-1/2) meshes wide.
c. Other Splices: Make only those other splices that are indicated on the Drawings or specifically approved by the Owner.

4. Dowels: Place all required steel dowels and securely anchor them into position before concrete is placed.
5. Obstructions: In the event conduits, piping, inserts, sleeves and other items interfere with placing reinforcement as indicated on the Drawings or otherwise required, immediately consult with the Owner and obtain approval of a new procedure prior to placing concrete.

C. Cleaning Reinforcement: Steel reinforcement, at the time concrete is placed around it, shall be free from rust scale, loose mill scale, oil, paint and all other coatings which will destroy or reduce the bond between steel and concrete.

3.5 CAST-IN-PLACE CONCRETE

A. Conveying and Placing Concrete:

1. Before placing concrete, mixing and conveying equipment shall be well cleaned, and the forms and space to be occupied by concrete shall be thoroughly cleaned and wetted. Ground water shall be removed until the completion of the work.
2. No concrete shall be placed in any unit of work until all formwork has been completely constructed, all reinforcement has been secured in place, all items to be built into concrete are in place, and form ties at construction joints tightened.
3. Concrete shall be conveyed from mixer to place of final deposit in such a way to prevent the separation or loss of ingredients. It shall be placed as nearly as practicable in its' final position to avoid rehandling or flowing. Concrete shall not be dropped freely where reinforcing bars will cause segregation, nor shall it be dropped freely more than six (6) feet. Use tremies, spouts and dump boxes in deep sections. Vibrators are not acceptable for facilitating concrete transport.
4. Concrete shall be tamped and spaded to insure proper compaction into all parts of forms and around reinforcement. A mechanical vibrator shall be used to thoroughly compact the concrete. Vibration must be by direct action in the concrete and not against forms or reinforcement.

B. Construction Joints / Expansion Joints: Construction joints and expansion joints shall be provided at locations and in the manner shown on the Drawings. Use PVC bulb-type waterstops appropriate for design condition between all concrete pours / lifts to avoid cold joints. Waterstops shall be placed in such a way to protect reinforcing steel from rust and oxidation.

C. Slab Finishes: Concrete slabs shall be compacted and screeded uniformly to grades shown. Push large aggregates below the surface with a screen tamper, screed and bull float. As soon as the surface becomes workable, it shall be wood floated, then finished as indicated on the Drawings to a uniform smooth, true surface in a neat and workmanlike manner. Carefully coordinate slab finish requirements with other trades to insure concrete finish is appropriate substrate for final finish material.

D. Protection and Curing:

1. Concrete shall be protected from injurious action of the elements and defacement of any nature during construction.
2. All forms must be kept wet to prevent drying out of the concrete.
3. All concrete surfaces including footings must be kept wet for at least seven (7) days after concrete is placed.
4. Apply the appropriate curing materials, as specified in 2.3 of this Section, immediately after finishing slabs. Application shall be as specified by the manufacturer.

E. Form Removal:

1. Take care in removing forms so that surfaces are not marred or gouged and that corners are true, sharp and unbroken.
2. No steel spreaders, ties or other metal shall project from or be visible on any concrete surfaces.

F. Defective Work:

1. Cut out, remove and replace, or repair to the satisfaction of the Owner, concrete not meeting minimum strength, not formed as indicated, not true, plumb or level, not to required elevations, containing cracks detrimental to performance or appearance, containing shavings, debris or with honeycombs or voids.
2. Promptly perform work required to repair, patch, replace, render properly cleaned surfaces (by sandblasting if necessary) or otherwise make good any defective concrete, at Contractor's expense, including all expense of additional inspection, tests, or supervision made necessary as a result of defective concrete.

3.6 EXPANSION JOINTS

A. Temperatures: Do not install sealants when air temperature is less than 40°F.

B. Tooling: Tool exposed joints to a slightly concave surface using slicking materials recommended by the manufacturer. The tooling procedure shall press sealant against the sides of the joint. No materials shall be left “feathered” out or smeared on the abutting materials. Completed joints shall have a uniform professional appearance.

C. Joint Construction: Sealant joint width, thickness and cross-sectional profile to be constructed in strict accordance with the sealant manufacturer’s recommendations.

D. Sand: At the appropriate time cover the sealant with sand to provide a sanded finish.

3.7 CLEAN-UP

A. Upon completion of the Work of this Section, immediately remove all water feature concrete materials, debris and rubbish occasioned by this Work to the approval of the Owner.

END OF SECTION 13 1202

SECTION 13 1203 - WATER FEATURE EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Water Feature equipment items required for this Work as indicated on the Drawings and specified herein.
2. Start up and operation instructions to the Owner for both the water feature and mechanical equipment. Balancing water feature water chemistry until such time that the Owner takes occupancy of the project.

B. Related Sections:

1. Division 13, Section 13 1201 “Water Feature Excavation.”
2. Division 13, Section 13 1202 “Water Feature Cast-in-Place Concrete.”
4. Division 13, Section 13 1204 “Water Feature Mechanical.”
5. Division 13, Section 13 1205 “Water Feature Electrical.”

1.2 QUALITY ASSURANCE

A. Qualifications of Workers:

1. The entity performing the work of this Section shall have been successfully engaged in the respective trade for at least five (5) years immediately prior to commencement of the Work.
2. For actual construction operations, use only trained and experienced workers with a minimum of three (3) years experience with the materials and methods specified.
3. Provide at least one person who shall be present at all times during execution of the work of this Section, with a minimum of five (5) years experience with the type of materials being installed, the referenced standards, and who shall direct all Work performed under this Section.

B. All equipment supplied or work performed shall comply with regulations governing public water feature areas as contained within State and Local Codes.

1.3 SUBMITTALS

A. Required submittals include:

1. Water Feature Fittings as specified in Article 2.1 of this Section.
2. Water Feature Mechanical Equipment as specified in Article 2.2 of this Section.

B. Submit proof of qualifications as specified in Article 1.2.A of this Section.

C. The equipment shown on the drawings represent the first listed items in the technical specifications. The Contractor shall be responsible for all required field coordination and installation of any approved equal product to provide a fully working and warranted system. The Contractor shall submit detailed shop drawings for any products used other than the first listed specified items. Contractor provided shop drawings shall include details and quality equal to the original plans and construction documents. The Contractor shall provide any and all required engineering including but not limited to structural and anchorage requirements for any proposed equipment other than the first listed specified equipment. The Contractor is responsible to provide a factory certified representative to start-up and provide on-site training for all water feature mechanical equipment provided.

1.4 PRODUCT HANDLING

A. Protection: Use all means necessary to protect water feature equipment items before, during and after installation and to protect the installed work specified in other Sections.

B. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the approval of the Owner's Representative.

PART 2 - PRODUCTS

2.1 WATER FEATURE FITTINGS

A. Historic Fountain Anti-Vortex Plate: Cast bronze plate with natural finish and heavy duty FRP sump with integral waterstop, 4" inlet connection. Crystal Fountains #DSA400, Fountain People #R-83-4, or approved equal. Six (6) required.

B. Historic Fountain Diverter Plate: Cast bronze plate with natural finish and heavy duty FRP sump with integral waterstop, 4" inlet connection. Crystal Fountains #IFA400, Fountain People #R-83-4, or approved equal. Two (2) required.

C. Historic Fountain Water Level Controller: Remote pool filler and overflow with PVC enclosure and cast bronze access cover; 1-1/4" equalizer connection to fountain basin, 1-1/2" connection to storm water overflow drain and 1/2" connection to cold water supply. Crystal Fountains #ESD, PEM #1293-1, or approved equal. One (1) required.

D. Historic Fountain Floor Drain: 2" line size cast bronze body with natural finish, integral waterstop flange with grounding screw, and removable threaded bronze plug. Crystal Fountains #DPB200, Fountain People #FFD-200, or approved equal. One (1) required.

E. Historic Fountain Spray Jet: Customized narrow fan jet with laminar flow, 2" line size, 50 GPM @ 35' T.D.H. Furnish complete with 2" directional swivel union and waterstop / no leak flange. Crystal Fountains #NGA200, PEM #504-1620 / 507-2270, or approved equal. Eight (8) required.

F Historic Fountain Wet / Dry Light- Upper Dome: Yoke-mounted wet / dry light with 22 watt monochromatic LED lamp. Furnish complete with cord lengths as required to reach

junction boxes. Crystal Fountains #LED060, Hydrel #4640, or approved equal. Forty-eight (48) required.

G. Historic Fountain Wet / Dry Light- Lower Dome: Knuckle-mounted wet / dry light with 22 watt RGB LED lamp. Furnish complete with cord lengths as required to reach junction boxes. Crystal Fountains #LED060, Hydrel #4640, or approved equal. Thirty-six (36) required.

H. Historic Fountain Junction Boxes: Cast bronze box with integral grounding lugs, and silicone gasket. Furnish complete with potting compound and cord seals as required for number of penetrations. Crystal Fountains #EBN208, Hydrel #JB1719, or approved equal. Fifteen (15) required.

I. Interactive Fountain Aerator Jets (Within Grating): 1/2" diameter, 15 GPM flow rate at 43 Ft. T.D.H.; Furnish complete with internal solenoid valve and LED light. Crystal Fountains #LED182, Imperial #AX-50, or approved equal. Forty (40) required.

J. Interactive Fountain Aerator Jets (Within Paving): 1/2" diameter, 15 GPM flow rate at 43 Ft. T.D.H.; Furnish complete with internal solenoid valve and LED light. Crystal Fountains #LED186, Imperial #AX-50, or approved equal. Six (6) required.

K. Interactive Fountain Aerator Jets Discharge Filter: 6" line size; install on discharge side of aerator jets booster pump. Crystal Fountains #AFI600, or approved equal.

L. Interactive Fountain Leaper Jets: 10 GPM flow rate at 10 Ft. T.D.H.; custom LED leaper with niche and custom stainless steel cover. Crystal Fountains #LED141, Oase Rainbow Star #DMX/01, or approved equal. Six (6) required.

M. Interactive Fountain Leaper Jets Discharge Filter: 240 square foot cartridge filter; rated at 90 GPM @ .375 GPM / SF of filter area; furnish complete with required fittings, valves and influent / effluent pressure gauges; install on discharge side of leaper jets booster pump. Pentair Clean and Clear Plus #CCP240, or approved equal. One (1) required.

N. Interactive Fountain Pop Jets: 2 GPM flow rate at 92 Ft. T.D.H.; Furnish complete with piping, fittings, and solenoid valve as required for interactive control. Crystal Fountains #NPN029, Fountain Supply Co. #.125PPJT, or approved equal. Seven (7) required.

O. Interactive Fountain Pop Jets Discharge Filter: 3" line size; install on discharge side of pop jets booster pump. Crystal Fountains #AFI300, or approved equal.

P. Interactive Fountain Fog Jets: 0.045 GPM flow rate at 1,000 PSI; Furnish complete with UNC adapter, nylon tubing and three-way tee as required for complete installation. Fogco #95036/92923/92990/92704, Crystal Fountains, or approved equal. Six (6) required.

Q. Interactive Fountain Balance Tank Suction Frame & Grate (12"x12"): Lawson Aquatics #MLD-FGD-1212, or approved equal. Two (2) required. Contractor shall provide to the Owner a Certificate of Compliance, signed by a licensed design professional, for main drain sump(s) and frame(s) and grate(s), as required by the Virginia Graeme Baker Act.

2.2 WATER FEATURE EQUIPMENT

A. Historic Fountain Circulation Pump: End suction centrifugal pump with integral pump strainer; 1 HP, 208/230 volt, 3 phase, 3,450 RPM; rated at 76 GPM @ 60 Ft. T.D.H. Pentair Whisperflow #WFK-4, or approved equal. One (1) required.

B. Historic Fountain Upper Dome Booster Pump: End suction centrifugal pump with integral pump strainer; 3 HP, 208/230 volt, 3 phase, 3,450 RPM; rated at 143 GPM @ 60 Ft. T.D.H. Pentair Whisperflow #WFK-12, or approved equal. One (1) required.

C. Historic Fountain Variable Frequency Drive- Upper Dome Booster Pump: Furnish complete with soft start, real-time clock, off-hour flow management capability, overload trip protection and deep / flow sensor kit. Pentair Commercial Accu Drive XS #AD030-4603-N12-FB / 97014-4204KIT, SPCS Smart Pump Control System, or approved equal. One (1) required.

D. Historic Fountain Spray Jets Booster Pump: End suction centrifugal pump, 4” x 5” x 12” including separate 6” x 5” pump strainer with acrylic lid and two (2) stainless steel strainer baskets (Mer-made series FO, or approved equal); furnish fuse coat epoxy on all wetted surfaces; 5 HP, 208 volt, 3 phase, 1,150 RPM, TEFC premium efficiency motor (84% motor efficiency); rated at 400 GPM @ 40 Ft. T.D.H. Paco Type LC #4012A, Aurora, or approved equal. One (1) required.

E. Historic Fountain Variable Frequency Drive- Spray Jets Booster Pump: Furnish complete with soft start, real-time clock, off-hour flow management capability, overload trip protection and deep / flow sensor kit. Pentair Commercial Accu Drive XS #AD050-4603-N12-FB / 97016-4206KIT, SPCS Smart Pump Control System, or approved equal. One (1) required.

F. Historic Fountain Filter: 500 square foot cartridge filter, rated at 130 GPM @ 0.26 GPM / SF of filter area; furnish complete with required fittings, valves and influent / effluent pressure gauges. Pentair System 3, or approved equal. One (1) required. Provide two (2) cartridges.

G. Historic Fountain Ozone System: Corona discharge ozone generator, rated at 1.3 grams per hour output; furnish complete with air preparation, anti-siphon injector assembly pipe manifold, tubing, fittings and valves as required for complete installation. Clear Water Tech #CD-10 / APX610, or approved equal. One (1) required.

H. Historic Fountain Flowmeter: Pitot-tube type, 2-1/2” line size with flow range of 30-150 GPM. C.W. Cox Short-Piro Flowgauge, or approved equal. One (1) required.

I. Historic Fountain Mechanical Vault Sump Pump: Float activated submersible pump; 1/4 HP, 115 volt, single phase. Hydromatic #W25, or approved equal. One (1) required.

J. Historic Fountain Mechanical Vault Light Fixture: 4’-0” wall mounted fluorescent light fixture with matte white opal acrylic finish and two (2) 32 watt T8 lamps. Lithonia #WC232120SI, or approved equal. One (1) required.

K. Interactive Fountain Circulation Pump: End suction centrifugal pump with integral pump strainer; 3HP, 230 volt, 3 phase, 3,450 RPM; rated at 143 GPM at 60 Ft. T.D.H.;

electrically interconnect with interactive fountain booster pumps, field verify motor voltage prior to ordering. Pentair Whisperflo #WFK-12, or approved equal. One (1) required.

L. Interactive Fountain Aerator Jets Booster Pump: End suction centrifugal pump with integral pump strainer; 15 HP, 460 volt, 3 phase, rated at 690 GPM at 60 Ft. T.D.H.; electrically interconnect with interactive fountain booster circulation pump, file verify voltage prior to ordering. Pentair EQ Series #EQK-1500, or approved equal. Furnish complete with a Pentair Acu-Drive XS #AD200-2303-N12 variable frequency drive with NEMA 12 enclosure. One (1) integrated system required.

M. Interactive Fountain Leaper Jets Booster Pump: End suction centrifugal pump with integral pump strainer; 3 HP, 208-230 volt, single phase, rated at 90 GPM at 60 Ft. T.D.H.; electrically interconnect with interactive fountain circulation pump, field verify motor voltage prior to ordering. Pentair Intelliflo #VS+SVRS, or approved equal. One (1) required.

N. Interactive Fountain Pop Jets Booster Pump: End suction centrifugal pump with integral pump strainer; 3 HP, 208-230 volt, single phase, rated at 90 GPM at 60 Ft. T.D.H.; electrically interconnect with interactive fountain circulation pump, field verify motor voltage prior to ordering. Pentair Intelliflo #VS+SVRS, or approved equal. One (1) required.

O. Interactive Fountain Filter: Hi-rate permanent media filters with 9.60 sq. ft. of filter area rated at 144 GPM at 15 GPM/sq. ft. Furnish complete with 3” pre-manufactured influent / effluent automatic multi-port, 3” backwash manifold, piping, valves, influent / effluent gauges and seismic anchorage. Nemato #NFS-42-1-096-T, or approved equal. Two (2) required.

P. Interactive Fountain Chlorine Feed / Storage System: Peristaltic liquid feed pump; 50 GPD at 25 PSI flow rate fed from dual contained 53 gallon carboys seismically anchored to wall, furnish complete with FRP shelf brackets for feed pump and hard pipe to point of injection. Provide spare carboy container. Stenner #45M-5, or approved equal. One (1) integrated system required.

Q. Interactive Fountain Acid Feed / Storage System: Peristaltic liquid feed pump: 10 GPD at 100 PSI flow rate fed from dual contained 53 gallon carboys seismically anchored to wall, furnish complete with FRP shelf brackets for feed pump and hard pipe to point of injection. Provide spare carboy container. Stenner #45M-10, or approved equal. One (1) integrated system required.

R. Interactive Fountain Aerator Jets UV System: 1,300 GPM validated for outdoor/capacity, 8” flanged connection in-line UV sterilizer with control panel; 19.3 amp at 208 volt single phase. Provide floor mounting on 4” housekeeping pad. Provide installation and piping per manufacturer’s recommendations including piping bypass, strainer and valving. Delta UV #EM 1300 EL, or approved equal. One (1) integrated system required.

S. Interactive Fountain Leaper Jets UV System: 300 GPM validated for outdoor/capacity, 6” flanged connection in-line UV sterilizer with control panel, 4.81 amp at 208 volt single phase. Provide floor mounting on 4” housekeeping pad. Provide installation and piping per manufacturer’s recommendations including piping bypass, strainer and valving. Delta UV #EM 300 EL, or approved equal. One (1) integrated system required.

T. Interactive Fountain Pop Jets UV System: 300 GPM validated for outdoor/capacity, 6" flanged connection in-line UV sterilizer with control panel, 4.81 amp at 208 volt single phase. Provide floor mounting on 4" housekeeping pad. Provide installation and piping per manufacturers recommendations including piping bypass, strainer and valving. Delta UV #EM 300 EL, or approved equal. One (1) integrated system required.

U. Interactive Fountain Water Chemistry Controller: Automated water chemistry controller with auto-probe rinse. Coordinate with other trades as required to provide one (1) dedicated Ethernet line. BECS System 3 or approved equal. One (1) required.

V. Interactive Fountain Flow Meter: Pitot-tube type, 3" line size with flow range of 20-240 GPM. C.W. Cox Short-Piro Flowgauge, or approved equal. One (1) required.

W. Interactive Fountain Fog Jets Pump / Control System: High pressure pump; 1/2 HP, 203volt, rated at 0.5 GPM at 1,000 PSI. Wall mounted in 26" x 16" x 12" service box, electrically interconnected with interactive fountain circulation pump, field verify motor voltage prior to ordering. Provide one (1) 5 micron sediment and two (2) isonet cartridges for integrated filtration system. Water for fog system to be from a potable domestic water source. FOGCO #5050216, or approved equal. One (1) integrated system required.

X. Interactive Fountain Controller: DMX controller as required for independent control of all fountain jet effects / solenoid valves, LED RGB color change lighting for fountain jets, program sequencing, and fountain activation. Contractor shall submit complete shop drawings and control schematics. Water Play 'Command Center,' Rain Drop 'Rain Brain,' or approved equal. One (1) integrated system required.

Y. Interactive Fountain Leaper Jets Cartridge Filter: 500 square foot cartridge filter, rated at 130 GPM @ 0.26 GPM / SF of filter area; furnish complete with required fittings, valves and influent / effluent pressure gauges. Pentair System 3, or approved equal. One (1) required. Provide four (4) cartridges.

Z. Interactive Fountain Cartridge Cleaning Station: 90 gallon open top total drain bottom tank equipped with 12" tall stand flat and 1" drain port on bottom of each tank, teed to bell receptor stand pipe. Snyder Industries #5800000N-L, or approved equal. Furnish complete with Snyder Industries #169000N-L, or approved equal. Three (3) integrated systems required.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

A. Inspection:

1. Prior to installing the items of this Section, carefully inspect the installed Work of other trades and verify that all such Work is complete to the point where this installation may properly commence.
2. Verify that the water feature equipment items may be installed in strict accordance with original design, pertinent codes and regulations, and the manufacturers' recommendations.

B. Discrepancies:

1. In the event of discrepancy, immediately notify the Owner.
2. Do not proceed with installation in areas of discrepancy until all such discrepancies are fully resolved.
3. Failure to notify the Owner and give written notice of discrepancies shall constitute acceptance by the Installer of existing conditions as fit and proper to receive its Work.

3.2 INSTALLATION

A. Supply and install items of water feature equipment in strict accordance with applicable codes and regulations, the original design, and the manufacturer's published recommendations, anchoring firmly and securely for long life under hard use.

B. Coordinate with other trades to insure all imbedded items are set plumb and flush.

C. All mechanical equipment shall be braced and/or anchored to resist horizontal force acting in any direction using the criteria shown on the Drawings.

3.3 EQUIPMENT ACTIVATION

A. Start Up:

1. Retain a qualified chemistry consultant, familiar with the operation and maintenance of aquatic facilities, to supervise and properly balance the water feature water chemistry.
2. Demonstrate to the Owner's Representative and to all appropriate officials (including State of California) that all systems are fully operational and that calcium hardness, total alkalinity, chlorine residual and pH levels are within the specified limits.
3. Standards: Contractor shall furnish labor and chemicals as required to condition the water properly to the following specifications:

a.	Calcium Hardness:	150-300 ppm
b.	Total Alkalinity:	100-125 ppm
c.	Chlorine residual:	2.0-5.0 ppm
d.	pH	7.4-7.6

B. All water chemistry and filtration mechanical equipment shall be operational upon filling of the balance tank. All required chemicals shall be in supply at start-up.

C. Start up and provide qualified personnel to operate the water feature mechanical equipment for a period not less than fourteen (14) days after the water feature systems are placed in operation, or until the Owner takes occupancy of the facility or letter of substantial completion. During this time, Contractor shall instruct and supervise the Owner's personnel in the various operating and maintenance techniques involved. Contractor shall insure that the water feature filtration equipment is continuously running during the initial fourteen (14) day period. Contractor shall be responsible for supply of chemicals during this not less than fourteen (14) day period and at the time of turnover to Owner, chemical storage tanks shall be full. Owner's personnel shall be fully trained and capable of

assuming water feature maintenance tasks; training may begin prior to Owner taking occupancy.

3.4 CLEAN-UP

A. Upon completion of water feature equipment, remove all debris, materials and equipment occasioned by this Work to the approval of the Owner.

END OF SECTION 13 1204

SECTION 13 1204 - WATER FEATURE MECHANICAL

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:

1. Water Feature mechanical piping as indicated on the Drawings for circulation and filtration systems, chemical control systems, booster pump systems and appurtenances.
2. Domestic water system from points of connection within water feature mechanical equipment room to make-up water system.
3. Filter backwash piping to point of connection with backwash receptor as required.

B. Related Sections:

1. Division 13, Section 13 1201 “Water Feature Excavation.”
2. Division 13, Section 13 1202 “Water Feature Cast-in-Place Concrete.”
4. Division 13, Section 13 1203 “Water Feature Equipment.”
5. Division 13, Section 13 1205 “Water Feature Electrical.”

1.2 QUALITY ASSURANCE

A. Qualifications of Workers:

1. The entity performing the work of this Section shall have been successfully engaged in the respective trade for at least five (5) years immediately prior to commencement of the Work.
2. For actual construction operations, use only trained and experienced workers with a minimum of three (3) years experience with the materials and methods specified.
3. Provide at least one person who shall be present at all times during execution of the work of this Section, with a minimum of five (5) years experience with the type of materials being installed, the referenced standards, and who shall direct all Work performed under this Section.

B. Standards:

1. All equipment supplied or work performed shall comply with regulations governing public wet play areas.
2. Work shall be performed in accordance with the applicable editions of all National, State and local codes, laws, regulations and ordinances, including the following:

    a. American National Standards Institute (ANSI).
    b. American Society for Testing Materials (ASTM).
    c. American Waterworks Association (AWWA).
    d. American Welding Society (AWS).

3. Do not construe anything in the Drawings or Specifications to permit Work not conforming to these requirements.

1.3 SUBMITTALS

A. Required submittals include:

1. Pipe and Fittings as specified in Article 2.2 of this Section.
2. Valves as specified in Article 2.3 of this Section.
3. Pressure / Vacuum Gauges as specified in Article 2.4 of this Section.
4. Pipe Hangers and Supports as specified in Article 2.5 of this Section.
5. Sleeves and Waterstops as specified in Article 2.6 of this Section.

B. Submit proof of qualifications as specified in Article 1.2.A of this Section.

1.4 PRODUCT HANDLING

A. Delivery: Deliver all materials to the Project Site in the manufacturer’s original unopened containers with all labels intact and legible.

B. Storage: Store all materials under cover in a manner to prevent damage and contamination, and store only the specified materials at the Project site.

C. Protection: Use all means necessary to protect swimming pool mechanical items before, during and after installation and to protect the installed Work specified in other Sections.

D. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the approval of the Owner’s Representative and at no additional cost to the Owner.

1.5 JOB CONDITIONS

A. Cooperate with entities performing Work specified in other Sections to so that no conflict of new construction or occupied space may occur. Should any installation Work be done without such craft coordination, that Work so installed shall be removed and re-installed.

PART 2 - PRODUCTS

2.1 PRODUCT QUALITY

A. Materials and equipment shall be new, of the best quality for the purpose intended, and shall be clearly marked with the manufacturer's name and nameplate data or stamp and rating. As far as practicable, materials and equipment shall be of one manufacturer.

2.2 PIPE AND FITTINGS

A. PVC Schedule 40: Type 1, normal impact, NSF approved for solvent welding applications, ASTM Specification D-1785, color shall be white. Dura, Lasco, or equal.

B. PVC Schedule 80: Type 1, normal impact, NSF approved for solvent welding applications, ASTM Specification D-1785, color shall be gray. Dura, Lasco, or equal.

C. Copper Tubing: ASTM Specification B-88, hard drawn, with ANSI Standard B16.22 wrot copper fittings.

2.3 VALVES

A. Ball Valves:

1. For pool system: True-Union design, PTFE seat material with FPM or FKM Double O-ring stem seals, locking handle, NSF certified. PVC schedule 80 body for below grade installation. CPVC Schedule 80 body for above grade installation. Furnish ball valves on all pipe diameters 2½" or less with a rating of at least 200psi at 73°F. Asahi Pool-Pro, Nibco, or Georg Fischer.
2. For copper pipe system: 3-piece full-port Bronze body valve with Teflon seat, 'Apollo', 'Nibco' or approved equal.

B. Butterfly Valves:

1. Epoxy coated cast or ductile iron body, 316 stainless steel disc and stem, viton seat material, furnish hand wheel/gear operators on all valves 8" and larger. DeZurick, Keystone, or Asahi Pool Pro.
2. PVC body, PVC disc and EPDM construction suitable for chlorinated water applications. Stem shall be of 316 stainless steel and non-wetted. Valves shall be self-gasketed design with a convex sealing arrangement. Valves 1-1/2" – 10" shall be rated to 150 psi and 12" valves shall be rated to 100 psi at 70°F. Asahi Pool-Pro, no known equal.

C. Check Valves: Wafer-type, epoxy coated cast or ductile iron body, 316 stainless steel plates and shaft, viton seat material. Centerline, Metraflex, or equal.

D. RP Backflow Preventer: Febco #835-B for 2" and smaller; #825 for 2-1/2" and larger. Febco, Watts, or equal.

E. Make-up Water Control: Cla-Val make-up water control valve with bronze body, bronze trim, globe pattern and Buna-N rubber seals suitable for a wet pit installation. Water level float control materials to consist of bronze/brass with stainless steel wetted parts and Buna-N rubber seals. System to include: 100-01 Hytrol valve, CF1-C1KX float control, X46A flow clean strainers, and copper tubing with brass fittings. Float linkage and float rod shall be PVC and brass. Base plate shall be 316 stainless steel. The plastic float shall be provided with 8' PVC rod and stops and a brass counter weight. Provide model #124-01 AKX available KSI (714) 754-4044, 1" line size.

2.4 PRESSURE / VACUUM GAUGES

A. Furnish and install pressure and vacuum gauges on the discharge and suction sides of all pumps. 4-1/2" dial, bottom connection, chrome ring and shut-off cock and snubber. Ranges shall be selected to indicate between mid-point and two-thirds of maximum range under design conditions. Marsh, Trerice, or equal.

2.5 PIPE HANGERS AND SUPPORTS

A. General:

1. The requirements of this Section relates to various requirements of the Agreement, General and Supplementary Conditions, Specifications, Drawings, and modifying documents which are part of the Construction Contract. Responsibility for coordination of all such applicable requirements will be that of the Contractor.

B. Description:

1. This section provides guidelines and limitations for the support of all water feature mechanical piping and for the seismic bracing of such items.
2. Design and install all support and bracing systems as required for the water feature systems. Provide for attachment to portions of the building structure capable of bearing the loads imposed. Design these systems to not overstress the building structure.

C. Quality Assurance:

1. Design and install all support systems to comply with the requirements of the 2007 California Building Code, Chapter 16A.
2. Seismic bracing is to be designed by a professional engineer licensed in the State of California.
3. For the seismic bracing of mechanical and plumbing systems, refer to “Guidelines for Seismic Restraints of Mechanical Systems and Plumbing Piping Systems” by Sheet Metal and Air conditioning Contractors National Association, Inc., (SMACNA) for guidelines.

D. Submittals:

1. Submit shop drawings for all substructures and attachment methods.
2. Submit proposed alternative methods of attachment for review and approval by the Architects, prior to deviating from the requirements given below.
3. For all pipe hangers and support systems, submit structural calculations and details which include all resultant forces applied to the building structure and are prepared and signed by the Contractor’s licensed California professional engineer. Calculations will be reviewed for compliance with design criteria, not for arithmetic.

E. Materials:

1. Use Kin-Line, Grinnel, or approved equal.
2. Support all pipelines individually with hangers, each branch having at least one hanger. Lateral brace as noted and required.

3. Support piping near floor with steel stanchions welded to end plates secured to pipe and floor.
4. Support vertical piping at each floor level. Install coupling in piping at each support. Coupling shall rest on and transmit load to support. Isolate copper from steel supports ith vinyl electrician's tape around pipe and coupling.
5. Use Stoneman "Trisolator," Unistrut, or approved equal, isolators at each hanger and other support points on bare copper tubing system.
6. For PVC pipe, space hangers four (4) feet apart for pipe sizes 1" and under, five (5) feet apart for pipe sizes 1-1/4" to 2", and six (6) feet apart for pipe sizes over 2". Space hangers for horizontal pipes at a maximum of six (6) feet for copper 2" and smaller and for steel 1-1/4" and smaller; ten (10) feet for copper 2-1/2" and larger and for steel 1-1/2" and larger.
7. Size hanger rods, screws, bolts, nuts, etc., according to manufacturer's sizing charts.
8. Trapeze hangers may be used for parallel lines.
9. Use galvanized or cadmium plated hangers, attachments, rods, nuts, bolts, and other accessories in pool mechanical room, high humidity areas, or where exposed to weather. Hot dip galvanize all items which are not factory furnished. Plating for hinged movements must be done at the factory.
10. Lateral Bracing: To prevent swaying of the piping systems, provide angle iron bracing and anchor into wall or overhead framing. Piping shall be braced or anchored in such a way as to resist a horizontal force of 50% of its operating weight in any direction.
11. Do not use wire or other makeshift devices for hangers.
12. Furnish all substructures and fasteners required to comply with the limitations given below. Use material as specified in the various sections and as appropriate to their use.

F. Guidelines & Limitations:

1. Each Contractor will coordinate the load requirements from all subcontractors so that no combination of loads overstresses the building structure or exceed the limitations given below.
2. Concrete Structure:

    a. Support all loads hung from concrete structure with cast-in-place inserts, unless drilled-in anchors are specifically approved in writing prior to placing the concrete.
    b. Concrete anchors must not penetrate into reinforcing bars. Where the anchors boring indicates the presence of reinforcing bar, patch hole with an epoxy type grout and relocate anchor 12 diameters away.
    c. Individual expansion anchors cannot support any loads greater than 300 pounds or manufacturer’s specified load capacity without approval.
3. Steel Structure:

    a. Hang no more than 20 pounds per metal deck rib in any span.
    b. At beams, hang all beam loads greater than 40 pounds concentric to beam, not off the flanges.
    c. Attached no loads to the beams or girders greater than the following without specific approval from the architect.
    d. Roof beams and girders: 300 pound point load or 600 pound total load for a single span.

G. Seismic Bracing:

1. Design and install seismic bracing to not ground out vibration and sound isolation systems.
2. All items of mechanical and electrical equipment 60” or more in height are to be seismically braced whether such bracing is shown or not.

2.6 SLEEVES AND WATERSTOPS

A. Provide sleeves where work of this Section passes through fire rated partitions, floors and ceilings, concrete slabs or exterior of structure. Caulk clearance space using sealant appropriate for application in conformance with manufacturer's recommendations and Title 24 of California Code of Regulations. 3m, Dow Corning, or equal. In lieu of sleeves and caulking, "Link Seal" products may be used.

B. Provide prefabricated waterstops as indicated on the Drawings at all pipe penetrations through structures containing stored water (i.e., water feature structures, balance tanks, etc.) to insure leak-proof seals.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

A. Inspection:

1. Prior to Work of this Section, carefully inspect the installed Work of other trades and verify that such work is complete to the point where this installation may properly commence.
2. Verify that items of this Section may be installed in accordance with the original design and referenced standards.

B. Discrepancies:

1. In the event of discrepancy, immediately notify the Owner.
2. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.
3. Failure to notify the Owner and give written notice of discrepancies shall constitute acceptance by the Contractor of existing conditions as fit and proper to receive his work.

3.2 ABBREVIATIONS AND SYMBOLS

A. Abbreviations and symbols on the Drawings are those most commonly used. Obtain clarification from the Owner on any questionable items before bid.

3.3 GENERAL PIPING REQUIREMENTS

A. Size any section of pipe for which size is not indicated or any intermediate section erroneously shown undersized the same size as the largest pipe connecting to it. Sizes listed are nominal.

B. Cut pipe accurately to job measurements and install without springing or forcing, true to line and grade, generally square with building and/or structures and adequately supported to prevent undue stress on pipe, fittings and accessories.

C. Make changes of direction with manufactured fittings. Street ells, bushings, reducing flanges, close nipples or bending of pipe is not allowed.

D. Use great care to install piping in accordance with best practice. Plastic pipe shall be "snaked" in trenches to allow for thermal expansion.

E. All above grade, below grade and buried or imbedded PVC shall be installed using solvent weld fittings. Also, each and every fitting and pipe end shall be prepared with solvent primer. Fittings shall be joined individually and with enough time between assembly of adjacent joints to allow them to seal solidly. After joining, an even ring of primer must be visible around the entire fitting. If any fittings are installed without visible primer, the fitting shall be removed and discarded and piping recut, rechamfered, and joint made up again using a new fitting. All procedures, methods and techniques used to make up solvent weld joints shall be in strict accordance with manufacturer's recommendations.

F. Arrange pipe and hangers to allow for expansion, contraction and structural settlement. No pipe shall contact structure except penetrations as shown on the Drawings.

G. Provide dielectric connections between copper and dissimilar metals. In copper systems, threaded piping including connections to equipment shall be brass pipe and fittings. Install dielectric connections in vertical sections of piping only.

H. Run pipe full size through shut-off valves, balancing valves, etc. Change pipe size within three (3) pipe diameters of final connection to control valves, fixtures and other equipment.

I. Provide unions or flanges at connections to equipment, on service side of valves and elsewhere as required to facilitate ease of maintenance.

J. Locate equipment shut-off valves as close to equipment as possible maintaining easy valve access.

K. Make all connections between domestic water systems and equipment or face piping with approved backflow prevention devices as required.

L. All PVC pipe exposed to direct sunlight shall be painted with two coats of Exterior Acrylic Semi-gloss Paint, Sherwin Williams or equal. Color to be selected by the Architect. Prior to painting the PVC pipes, the exterior of all PVC pipes shall be wiped with Methyl Ethyl Ketone, or an approved equal, to remove the glaze from the pipes.

M. All suction piping must run either level or uphill from the main drain sump, through the balance tank (if applicable) and then to the circulation pump.

3.4 TRENCH EXCAVATION AND BACKFILL

A. Excavation:

1. Excavate and backfill trenches as required for the Work of this Section. Conform with all applicable codes.
2. The Contractor shall perform all excavation of every description and of whatever materials encountered, to the depths indicated on the Drawings or as necessary. The Contractor shall dispose of the excavated materials not required or suitable for backfill as directed, and shall perform such grading as may be necessary to prevent surface water from flowing into the trenches. The Contractor shall provide adequate equipment for the removal of storm or subsurface waters which may accumulate in the excavated areas.

B. Trenching:

1. Excavate trenches to lines and grades as indicated on the Drawings and with banks as nearly vertical as practicable.
2. Bottoms of trenches shall be accurately graded to provide uniform bearing on undisturbed soil for the entire length of each section of pipe.
3. The width of the trench at and below the top of the pipe shall be such that the clear space between the barrel of the pipe and the trench wall shall not exceed 8” on either side of the pipe. The width of trench above the top of pipe may be wider if necessary.
4. Over-depth excavations shall be filled with tamped sand to required grades.
5. Excavations of five (5) feet or more in depth shall be shored or supported in conformance with rules, and regulations of State and Federal Governments. Shoring shall be constructed, maintained and removed in a manner to prevent caving of the excavation walls or other load on the pipe.

C. Backfilling:

1. Material for backfilling of pipes shall be approved granular material less than two (2) inches in diameter obtained from the excavation, sand or an approved import fill. No material of a perishable, spongy or otherwise unsuitable nature shall be used as backfill.
2. Backfilling of pipe trenches shall commence immediately after installation and testing to preclude damage to the installed pipe. Backfill around pipe shall be carefully placed so as not to displace or damage the pipe, and shall be carried up symmetrically on each side of the pipe to one foot above the top of the pipe. The material shall be carefully compacted or consolidated before additional backfill is placed.
3. Backfill above an elevation of one foot above the top of pipe in conformance with requirements of Section 13 1201. Material for balance of backfill shall be approved granular material less than six (6) inches in diameter taken from the excavation.
4. Unless otherwise indicated on the Drawings, all piping shall have a minimum of eighteen (18) inches of cover.

3.5 GENERAL EQUIPMENT REQUIREMENTS

A. Position equipment to result in good appearance and easy access to all components for maintenance and repairs.

B. Install piping, flues, breeching and ducts so that they do not interfere with equipment access.

C. Install level, secure and out of moisture. Provide shims, anchors, support straps, angles, grouted bases, or other items as required to accomplish proper installation.

D. All screws, nuts, bolts and washers shall be galvanized, cadmium plated or stainless steel. After fabrication, hot-dip galvanize unfinished ferrous items for outdoor, below grade or other use subject to moisture.

E. Extend 1/2” Schedule 40 black steel pipe lubrication tubes from all hard to reach locations to front of equipment or to access points. Terminate with proper type of lubrication fitting.

3.6 VALVES AND STRAINERS

A. If no shut-off is indicated, provide ball valves at inlet connections and balance valves at outlet connections to fixtures and equipment. Provide proper valve trim for service intended.

B. Use no solder end valves unless noted otherwise; provide adapters in copper tubing systems.

C. Locate valves with stems above horizontal plane of pipe. In general, locate valves within six (6) feet of floor, out from under equipment, in accessible locations with adequate clearance around hand wheels or levers for easy operation.

D. Provide all valves, cocks and strainers, full pipe size unless indicated otherwise.

E. Provide hand wheel operators on all valves 6” and larger, under 6” lever operators may be used.

F. Provide tool operated valve with stainless steel shaft extension and 'on deck' tool operation for surge chamber butterfly isolation valve.

3.7 IDENTIFICATION OF PIPING

A. Identify each valve by a numbered brass tag with hole and brass chain mounted on valve stem or handle. Tag to be a minimum of 1-1/2” in diameter and numbers at least 1/4” high stamped into tag.

B. Install an identification chart in a plastic or glass framed enclosure which schematically illustrates the proper operation of all piping systems and indicates number and location of all valves and control devices within the system.

C. All piping within the mechanical and chemical rooms shall be clearly labeled indicating flow direction, piping identification in coordination with 3.7 B.

3.8 TESTS

A. Perform tests in presence of Owner with no pressure loss or noticeable leaks.

B. Do not include valves and equipment in tests. Include connection to previously tested sections if systems are tested in sections.

C. Perform tests as follows:

System	Test Pressure	Test Medium	Duration
Wet Play Piping	50 psig	Water*	4 hours
Domestic Water	150 psig	Water*	4 hours

*Never test PVC pipe or fittings with air or other gases, always use water.

3.9 PIPE MATERIAL APPLICATION

A. PVC Schedule 40: Below grade water feature piping and domestic water piping up to 12" line size; use standard solvent weld fittings.

B. PVC Schedule 80: Above grade water feature piping up to 12" line size; use solvent weld Schedule 80 or epoxy coated cast iron fittings.

C. Type L Hard Copper: Above grade domestic water piping.

3.10 CUTTING AND DRILLING

A. Cutting or drilling necessary for installation of Work of this Section shall be done only with approval of the Owner.

3.11 CLOSING-IN OF UNINSPECTED WORK

A. Do not cover or enclose Work before testing and inspection. Re-open Work prematurely closed and restore all Work damaged.

3.12 QUIETNESS

A. Quietness is a requirement. Eliminate noise, other than that caused by specified equipment operating at optimum conditions, as directed by the Owner.

3.13 FLUSHING OF LINES

A. Flush or blow out pipes free from foreign substances before installing valves, stops or making final connections. Clean piping systems of dirt and dust prior to initial start-up.

B. Prior to filling the water feature(s), the water feature mechanical systems shall be flushed using the water feature circulation pump(s). Circulate water through the mechanical system until the effluent water from the water feature return heads runs clean.

3.14 CLEAN-UP

A. After all Work has been tested and approved, the Contractor shall thoroughly clean all parts of the equipment installations, including all water feature pipe and fittings in the water feature mechanical room(s). Exposed parts shall be cleaned of cement, plaster and other materials and all grease and oil spots removed with solvent.

B. The Contractor shall remove debris from the Project site. Cartons, boxes, packing crates and excess materials not used, occasioned by this work shall be disposed of to the satisfaction of the Owner.

C. If the above requirements of clean-up are not performed to the satisfaction of the Owner, the Owner reserves the right to order the work done, the cost of which shall be borne by the Contractor.

END OF SECTION 13 1204

SECTION 13 1205 - WATER FEATURE ELECTRICAL

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. A complete and operable system of service equipment, switchboards, panelboards, conduits, switches, time clocks and wiring for power and lighting, motor control centers.
2. Junction and/or pull boxes, conduits, disconnects, starters, contactors, wiring and connection of all motors and mechanical equipment, including connection and wiring of line voltage controls associated with the mechanical systems.
3. Complete grounding system as required and shown on the Drawings.
4. Adjusting and preliminary operation of the completed electrical system as described in Article 3.6, A of this Section.
5. Cleaning of all completed Work and installation adjustment of all trim and decorative items.

B. Related Sections:

1. Division 13, Section 13 1201 “Water Feature Excavation.”
2. Division 13, Section 13 1202 “Water Feature Cast-in-Place Concrete.”
4. Division 13, Section 13 1204 “Water Feature Mechanical.”
5. Division 13, Section 13 1205 “Water Feature Electrical.”

1.2 QUALITY ASSURANCE

A. Qualifications of Workers:

1. The entity performing the work of this Section shall have been successfully engaged in the respective trade for at least five (5) years immediately prior to commencement of the Work.
2. For actual construction operations, use only trained and experienced workers with a minimum of three (3) years experience with the materials and methods specified.
3. Provide at least one person who shall be present at all times during execution of the work of this Section, with a minimum of five (5) years experience with the type of materials being installed, the referenced standards, and who shall direct all Work performed under this Section.

B. Ordinances and Codes: Materials and construction shall conform with all applicable code requirements, including:

1. California Electrical Code; Electrical Safety Orders of the State of California; Department of Industrial Relations; regulations of the State Fire Marshal; rules and regulations of the Board of Underwriters of the Pacific.

C. Verification of Conditions:

1. The locations shown on the Drawings are diagrammatic only and the exact finish location of equipment and materials cannot be indicated. Therefore, locations of all Work and equipment shall be verified to avoid interferences, preserve head room and keep openings and passageways clear. Changes shall be made in locations of equipment and materials which may be necessary to accomplish these purposes.

D. Preliminary Operations and Testing:

1. Motor driven equipment shall be tested for correct rotation and completion of all connections.

1.3 SUBMITTALS AND SUBSTITUTIONS

A. Provide submittals in conformance with the requirements of Section 01330.

B. Required submittals include:

1. Conduit and Fittings as specified in Article 2.2 of this Section.
2. Panelboards as specified in Article 2.6 of this Section.
3. Circuit Breakers as specified in Article 2.7 of this Section.
4. Motor Starters as specified in Article 2.10 and 2.11 of this Section.
5. Fuses as specified in Article 2.13 of this Section.
6. Time Clocks as specified in Article 2.14 of this Section.
7. Ground Fault Circuit Interrupters as specified in Article 2.15 of this Section.

C. Submit proof of qualifications as specified in Article 1.2.A of this Section.

1.4 PRODUCT HANDLING

A. Delivery: Deliver all materials to the Project Site in the manufacturer's original unopened containers with all labels intact and legible.

B. Storage: Store all materials under cover in a manner to prevent damage and contamination, and store only the specified materials at the Project site.

C. Protection: Use all means necessary to protect wet play electrical materials before, during, and after installation and to protect the installed Work specified in other Sections.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Materials shall be new, in unbroken packages and bear the U.L. label of approval.

B. Equipment of one type shall be by same manufacturer. One type of equipment for classifications such as:

1. Switchboards, panels, buss duct, disconnect switches and allied items.
2. Conduit.
3. Wire.
4. Conduit fittings.
5. Fixtures of the same general type.
6. Wiring devices.

2.2 CONDUIT AND FITTINGS

A. Conduit within or under buildings or where exposed outdoors shall be rigid threaded, hot dipped, galvanized, or U.L. approved plastic except where noted otherwise on the Drawings. Metallic conduit shall be of the same metal between outlets or terminals.

B. Use flexible metallic conduit only for short connections of motors and where specifically called for on Drawings. Maximum length shall be 40". Use only liquid tight flexible metal conduit. Install an unbroken #12 AWG insulated copper grounding conductor in each liquid tight flexible conduit with permanent connection at motor junction box and service panel ground.

C. Protect, before installation, metallic conduit runs in all slabs laid on grade or in contact with the earth or exposed in damp locations, with two (2) heavy coats of asphaltum rust-resisting compound.

D. Encase conduits 2-1/2" or larger run underground, outside, or under buildings, in concrete envelopes a minimum of 3" thick, except as indicated otherwise on Drawings or stubouts. Conduits 2” and smaller laid 18" below finish surface in soil.

E. Low voltage runs underground outside buildings, 1-1/4" or smaller, may be G.I. or sherardized steel conduit, with machine applied wrapping equal to double wrap or Scotch-Wrap #50 tape, half lapped and quadrupled at joints in lieu of concrete encasement.

F. Service conduits through foundations or concrete members shall run through metal sleeves with adequate clearances for full movement of the conduit. Do not run conduits through footings.

G. Secure conduits run exposed on surfaces with one hole heavy-duty straps or fasten with matching fittings to inserts or trapezes, parallel to building walls and ceilings.

H. Cap all conduit or duct stub-outs with standard factory caps; except cap threaded steel conduit with B.I. water pipe caps in outdoor locations.

I. Use conduit fittings as manufactured by Crouse-Hinds Company, Appleton Electric Co., or equal.

J. Employ U.L. liquid tight fittings for use with liquid tight flexible metal conduit.

K. Use unions as manufactured by Appleton, O-Z/Gedney, or equal. The use of running threads will not be permitted.

L. Exposed conduit in chemical rooms shall be rigid NEMA 3R Type suitable for installation in corrosive atmospheres.

2.3 GROUNDING

A. Bond together and ground to a common ground at a single point all metallic conduit, piping systems, pool reinforcing steel, metal parts of ladders, lifeguard stands, handrails and their supports and the like. The bonding conductor shall not be smaller than #8 copper.

2.4 WIRING CONNECTIONS

A. Make connections without strain on conductors, allowing the conductors to take a natural position after connections or taps are made. Include all strand of wire in making the connection.

B. Make connections for wiring by one of the following means:

1. Make all taps or connections to conductors with compression type connectors except those smaller than #8 B&S gauge may have soldered connections. Solderless connections for #10 AWG or smaller may be used and shall be "Scotchlok", Buchanan, or equal. For #8 AWG or larger, they shall be T&B "LockTite", Burndy "Versitaps", or equal.
2. All cable or conductor terminal lugs shall be Burndy "Quicklug", Ilsco, or equal. Two piece stamped lugs and solder lugs will not be approved.
3. Paint taped splices in damp or outdoor locations with two (2) coats of insulating paint.
4. Tag all branch circuit wires with circuit number at the panelboard and at each point of use with linen or plastic tags.

2.5 CONDUCTORS

A. Description: Single conductor insulated wire.

B. Conductor: copper.

C. Insulation Voltage Rating: 600 volts.

D. Insulation: CEC; Stranded wire, Type THHN/THWN or XHHW insulation for feeders and branch circuits #8 AWG and larger solid wire, Type THHN/THWN or XHHW insulation for feeders and branch circuits #10 AWG and smaller.

E. Select one type and use for entire installation, except as indicated for special purpose.

F. For conductors installed in areas subjected to temperatures exceeding 140 degrees F., including terminating in incandescent lighting fixtures and installed through or into housing containing ballasts, provide Type THHN.

G. For conductors installed in exposed conduit outside of buildings and conduit within or just under roofing material, provide Type XHHW.

H. Control Circuits for Mechanical Equipment: Use 600 volt Underwriters' type THWN conductors except where subject to abnormally high temperatures such as on or near boilers. Under these conditions, use Type XHHW.

I. Conductor insulation shall be color coded to indicate phase leg, voltage and use.

J. Conductor insulation type, size and U.L. approval shall be printed with permanent white paint on conductor insulation, continually repeating.

K. Minimum Size of Conductors: #12 AWG copper, unless otherwise indicated.

L. Conductors shall be new and shall have been manufactured within 12 months of the date of delivery to the site and continuously stored where protected from the sun, heat or weather.

M. Deliver conductor to the site in their original cable reels or in their original unbroken packages.

N. Provide conductor packages and cable reels plainly marked or tagged with U.L. labels, AWG size, voltage rating, insulation type, type of stranding, manufacturer's name, trade name and month and year when manufactured.

2.6 CONDUCTOR INDENTIFICATION

A. All secondary branch circuit conductors (No. 10 AWG & smaller) throughout the project shall be provided with color coded insulation as follows:

208Y/120V	Phase	480Y/277
Black	A	Brown
Red	B	Orange
Blue	C	Yellow
White	Neutral	Gray
Green	Ground	Green

2.7 MOTOR WIRING

A. Make final connections to motors with the required AWG (Minimum #12), Flamenol machine tool wire, 19 strand. Control wiring for equipment shall be Flamenol machine tool wire, 19 strand of required AWG. Provide junction boxes at each item of equipment to change from standard building wiring to machine tool wire.

B. Phase motors as proper in direction of rotation.

2.8 PANELBOARDS

A. Panelboards shall be flush or surface mounting as indicated with circuit breakers as shown on panel schedule, hinged lockable doors, index card holders and proper bussing.

B. Where indicated on the drawings, panelboards shall be furnished with subfeed breakers and/or lugs, split bussing, contractors, time switches, relays, etc., as required.

C. All panelboards shall be keyed alike.

D. All panelboards shall be finished with one coat of zinc chromate and coat of primer sealer after a thorough cleaning where exposed to public view (e.g., corridors, covered passages, offices, etc.) and gray in switchboard, janitor's heater and storage rooms. Prime coated panelboard shall be painted to match surroundings after installation. Panelboards shall be fabricated of sheet steel of the following minimum gauges: Doors and trim #12; enclosure - code gauge steel.

E. Furnish all panelboards and terminal cabinets with Yale 46515 flush locks and LL806 keys except where indicated otherwise herein. Fasten the trim to panel boards and terminal cabinet by means of concealed, bolted or screwed fasteners accessible only when the door is open.

F. Panelboards 208/120 volt, three phase, 4 wire, S/N or 120/240 volt, single phase, 3 wire, S/N.

Panelboard types as manufactured by:

1. General Electric or I.T.E.- Type NLAB
2. Square D- Type NQOB\
3. Westinghouse- Type B10B

G. Panelboards for 480/277 volt, three panes, 4 wire, S/N.

Panelboard types as manufactured by:

1. General Electric- Type AE
2. Square D- Type NEHB
3. Westinghouse- Type Pow-R-Line 2

H. Panelboard for bussing sizes thru 400 amp shall be 20" wide surface mounted type. Recess mounted type shall have a 20" wide (maximum) recess metal enclosure with trim plate cover extending 1" on all sides of enclosure. Depth shall be 5-3/4" nominal. Height of panel as required for devices.

I. Provide 6" additional gutter space in all panels where double lugs are required, or where cable size exceeds bus size. Minimum bottom gutter space shall be 6" high. 12" additional gutter space may be required for aluminum feeders where used.

J. Panelboards shown on the drawings with relays, time clocks or other control devices shall have a separate metal barriered compartment mounted above panel with separate hinged locking door to match panelboard. Provide mounting sub-base in cabinet for control devices and wiring terminal strips.

K. Panelboard shall have a circuit index card holder removable type, with clear plastic cover. Index card shall have numbers imprinted to match circuit breaker numbers.

2.9 CIRCUIT BREAKERS

A. Breakers shall have a minimum short circuit interrupting rating of 10,000A symmetrical for panelboard voltage thru 240 volt and 14000A for panelboards thru 600 volts or as specified on the drawings. In no case shall the interrupting rating be less than the bus withstand rating unless noted otherwise on the drawings.

B. Circuit breakers as manufactured by the following companies only are acceptable:

1. General Electric Company
2. Square D Company
3. Westinghouse Company

C. Circuit breakers shall be arranged in the panels so that the breakers of the proper trip settings and numbers correspond to the numbering in the panel schedules on the drawings. Circuit numbers of breakers shall be black-on-white micarta tabs or other previously approved method. Circuit number tabs which can readily be changed from front of panel will not be accepted. Circuit number tabs shall not be attached to or be a part of the breaker.

D. Where two or three pole breakers occur in the panels, they shall be common trip units. Single pole breakers with tie-bar between handles will not be accepted.

E. All circuit breakers shall be padlockable in the "off" position. Locking facilities shall be riveted or mechanically attached to the circuit breaker (submit sample for approval). Other means of attachment shall not be accepted without prior written approval of the Owner.

F. Where branch circuit breakers supply the power to motors and signal systems, the breakers shall be furnished with lockout clips, mounted in the "on" position. The breakers shall be able to trip automatically with lockout clips in place.

G. Panelboard circuit breakers shall be bolt-on type.

2.10 BUSSING

A. Bussing shall be rectangular cross section copper, or full length silver or tin-plated aluminum.

B. Bussing shall be braces to withstand symmetrical short circuit ratings as follows or as noted on drawings. In no case shall bus short circuit bracing be less than specified circuit breakers.

C. Each panelboard shall be equipped with a ground bus secured to the interior of the enclosure. The bus shall have a separate lug for each ground conductor. No more than one conductor shall be installed per lug.

2.11 TERMINAL CABINETS

A. Terminal cabinets shall be fabricated of code gauge sheet steel for flush mounting (except where noted a surface) of size indicated on the drawings, and complete with hinged lockable doors and the number of 2-way screw terminals required for termination of all conductors. Terminal cabinet locks to operated by same key used for panelboards. The

trim to terminal cabinets shall be fastened by means of concealed bolted or screwed fasteners accessible behind door to terminal cabinets. Terminal cabinets shall have 5/8" plywood backing. Cabinets shall be finished with one coat of zinc chromate and one coat of primer sealer after a thorough cleaning where exposed to public view Prime coated cabinets shall be painted to match surroundings after installation.

B. Provide engraved nameplate on each cabinet indicating its designation and system (i.e., Water Feature - Panel 'WF').

2.12 MOTOR CONTROL INDIVIDUAL STARTERS

A. Manual Motor Starters:

1. Provide flush or surface mounting manual motor starters with number of poles and size of thermal overload heaters as required for the motor being controlled (equipped with overload heaters, one for each motor lead). Back boxes shall be supplied with all flush mounting starters whether they are toggle type requiring only a 4" square outlet box or the larger type requiring a special box and cover designed to accept the particular unit.
2. Unless otherwise noted on the drawings, all manual starters for single phase motors, smaller than 1 h.p., shall be the compact toggle type. Manual starters for all single phase motors, 1 to 5 h.p., and all three phase motors up to 5 h.p. shall be the heavy duty type.
3. Where manual motor starter is shown with pilot light, the pilot light shall be installed in a separate outlet box adjacent to the starter outlet, and engraved nameplate in indicate function of pilot light.
4. The following motor starters as manufactured by:

Manufacturer	Single Phase 1HP and Below	Others
General Electric	CR 101	Class CR 1062
Square D Company	Class 2510, Type A	Class 2510, Type B & C
Westinghouse	Type MS	Type A100

B. Individual Magnetic Motor Starters:

1. Magnetic motor starters shall be A.C. line voltage, across-the-line units in NEMA Type I enclosure, unless other types of enclosures are indicated.
2. All starters located outside of a building whether or not indicated shall be W.P. (weatherproof), and all starters noted W.P. shall be furnished in NEMA type 4 cast or stainless steel enclosures.
3. Starter shall be horsepower rated for the motor controlled, and shall be equipped with properly sized overload elements. Every pole shall be with overload element.
4. Verify the exact motor current and voltage characteristics with the Contractor supplying the motor before installation of a starter.
5. Each starter shall be equipped with "Hand-Off-Auto" switch or stop-start pushbutton as required.
6. Coils shall be designed to operate on voltage indicated on control diagrams and have built-in-under the voltage release for coil circuit to drop motor starter off the line when the line voltage drops below normal operating voltage.
7. The coil control circuit shall be independently fused, sized to protect coil.

8. Starters to be equipped with running pilot light indication with a "Push-to-Test" feature.
9. Magnetic starters shall have a minimum of two auxiliary contacts. Additional auxiliary contacts shall be provided as required to comply with the requirements of the wiring diagrams on the electrical and mechanical drawings and the description of the function in the Mechanical Section of the Specifications.
10. Minimum starter size shall be NEMA size I unless indicated otherwise.
11. The following types of magnetic motor starters as manufactured by:

Manufacturer	Type
General Electric	Class CR 106
Square D Company	Class 8536
Westinghouse	Type A200 (Size 4 Max.) or Class II-200 (Sizes 5-8)

2.13 INDIVIDUAL COMBINATION MOTOR STARTERS

A. Combination starter shall incorporate fused disconnect switch and individual magnetic motor starter in a common enclosure. Combination starters shall be mounted in general purpose enclosures unless otherwise indicated on the plans. Starters shall comply with NEMA standards, size and horsepower as indicated on drawings General Electric, Square D, Westinghouse or I.T.E.

B. The disconnect handle used on combination starters shall control the disconnect device with the door opened or closed. The disconnect handle shall be clearly marked as to whether the disconnect device is "ON" or "OFF", and shall include a two-color handle grip, the black side visible in the "OFF" position indicating a safe condition, and the red side visible in the "ON" position indicating an unsafe or danger condition.

C. All starters used in combination starters shall be manufactured in accordance with the latest published NEMA standards, sizes, and horsepower ratings. These starters shall be furnished with three melting alloy type thermal overload relays.

D. Thermal units shall be of one-piece construction and interchangeable. The starter shall be inoperative if a thermal unit is removed.

2.14 MOTOR CONTROL INTERLOCKS AND CONTROL DEVICES

A. Refer to mechanical and plumbing drawings and specifications and provide all control devices including time switches, relays and interconnection of starters of required.

B. Mount all relays and time switches in a separate compartment in motor control center unless otherwise indicated.

C. Whether shown on mechanical and plumbing drawings or control center schedules or not, where motors are controlled by external devices (i.e., thermostats, relays, float or pressure switches, etc.) or interlocked with other motors, each motor starter to be equipped with a "Hand-Off-Auto" selector switch in starter cover. Other starters equipped with a "Start'Stop" pushbutton station in starter cover.

2.15 FUSES

A. Fuses shall be dual element, current limiting type, U.L. Class RK5 unless otherwise indicated on the drawings. Provide one spare set of fuses of each size and type in each motor control center.

2.16 TIME CLOCKS

A. Time clocks shall be provided for all underwater lighting systems and water feature circulation pumps not controlled by filter microprocessors.

B. Contacts shall have a minimum rating of 40 amperes at 277V.

C. Timing motor shall be heavy duty synchronous, self starting, high torque type, and shall be rated at 120, 208, 240, 277 volt 60 Hz.

D. Motor shall operate normally at temperature range of -60 degrees Fahrenheit to +120 degrees Fahrenheit.

E. Dial shall be 3" diameter, clearly calibrated with day/night zones and 24 hour rotation, with gear to provide one revolution yearly which automatically varies the on/off settings each day according to seasonal changes. Day and month of the year shall show clearly through calendar window on the dial.

F. Time clocks shall be equipped with 7-spoke omitting wheel marked with days of the week.

G. Time clocks shall be housed in a flush enclosure where supply circuits emanate from a flush mounted panelboard and surface enclosure when supply circuits are from a surface mounted panel.

H. Acceptable manufacturers are Tork, Paragon, or equal.

2.17 GROUND FAULT CIRCUIT INTERRUPTERS

A. Minimum rating shall be 20 amperes, 125V, 5 milliampere trip setting, Class A per UL943.

B. Manufacturer to be Crouse-Hinds, Leviton, or equal.

2.18 BOXES

A. Boxes shall be of the size required by ordinances or larger, and of pressed galvanized code gauge steel where concealed or exposed on ceilings. Exposed boxes on walls below 7'6" shall be cast steel similar to "FA" condulets.

B. Outlets to be surface where wiring is exposed and flush in areas where conduit is concealed.

C. Provide surface outlets with proper galvanized steel surface cover. Box and cover shall be deep enough to provide at least 1/4" clearance between back of device and back of box.

Where box contains more than one device, use proper gang box with proper cover. Surface outlet boxes shall be of the threaded hub type wherever below 8'0".

D. Provide exposed junction boxes with proper flat blank galvanized cover. If necessary for cable installation, additional pull boxes or junction boxes may be installed in accessible locations.

E. Where pull boxes larger than outlet boxes are required, galvanized code gauge sheet steel boxes may be used with covers attached by brass machine screws. Boxes exposed to the weather shall be approved for the purpose, and conduit entrances shall be on the bottom made by means of an interchangeable hub with gasket and adapter nut. Pull boxes not shown on Drawings may be added only after approval of size and location is obtained.

F. For outlets exposed to weather or where noted, cast outlet boxes shall be Crouse-Hinds, Appleton, or equal. Boxes shall have proper number and size hubs. Device plates, covers, adapters and boxes shall be as manufactured by Crouse-Hinds, Appleton, or equal.

G. Exposed junction boxes, outlet boxes and pull boxes for pool chemical rooms shall be NEMA 3R type suitable for corrosive atmosphere, non-metallic.

2.19 IDENTIFICATION MARKINGS

A. Plainly mark all motor and electrical appliance control equipment indicating the equipment controlled with engraved metal tags.

B. Provide laminated plastic nameplates on panelboards on the outside of the door at the top indicating panel designation and feeder source.

C. Provide laminated plastic nameplates on distribution switchboards and motor control centers at the top center indicating panel designation and feeder source.

D. Identify each distribution switchboard and motor control center circuit breaker with a laminated plastic nameplate indicating its' use.

E. Type panelboard directories on the forms provided with the equipment, indicating the use of each branch circuit breaker.

F. Fasten all laminated plastic nameplates to surfaces with two (2) or more screws.

PART 3 - EXECUTION

3.1 INSPECTION

A. Verify conditions at the Project site before submitting bid. Be responsible for providing all necessary wiring for the new electrical systems. Wherever wiring is being disrupted due to remodeling or changes, reconnect existing and provide new wiring circuits to accomplish a fully operable system at no additional cost to the Owner.

3.2 COORDINATION

A. The Drawings are essentially diagrammatic and indicate the desired location, size, routes, connection points, etc., and are to followed as closely as possible. Proper judgment must be exercised in executing the Work so as to provide the best possible installation in the available space and to overcome difficulties, limitations or interference wherever encountered. Be responsible for the correct placement of this Work, the proper location and connection in relation to Work of other trades, for determining the exact location of all conduits, outlets and equipment, and for installing the conduits in such a manner as to conform to the structure, avoid obstruction, preserve headroom and keep openings and passageways clear. Particular attention is directed to the close coordination required on exposed Work. Locations shown on Architectural or Mechanical Drawings if different than those shown on Electrical Drawings should be communicated to the Owner in writing for clarification.

3.3 INSTALLATION

A. Trenching and Backfill: Conform with all applicable codes. Provide minimum cover as required by Code.

B. Conduit Installation:

1. Conduit and metallic raceway systems shall be mechanically and electrically continuous from sources of current to all outlets in a manner to provide a continuous grounding path. Close ends of conduit during construction to prevent entrance of dirt or moisture.
2. Securely fasten conduit to the building construction within three feet of each outlet and within every ten feet thereafter. Secure it to boxes, cabinets, pull boxes, terminals with two locknuts and ends equipped with bushings or a terminal fitting. Cut square with ends carefully reamed.
3. Make bends or elbows so that the conduit will not be injured or flattened.
4. Use insulated metallic bushings in all places where bushings are required.
5. Run exposed conduits level or plumb and parallel to the construction members of the building. No cutting across or diagonal runs will be permitted. Neatly surmount structural obstructions encountered on conduit runs by the use of fittings or pull boxes.
6. Identify feeder conduits by stamped metal tags secured to exposed section of conduit in main or sub-panels.
7. Make up all threaded conduit joints gas and watertight with conductive sealer except conduit above ground in dry indoor locations.
8. Rigidly support all boxes independently of the conduit system.

C. Connections to Equipment:

1. Fully connect, in an approved manner, all electrical outlets, apparatus, motors, equipment, fixtures, wiring devices and appliances whether they are installed under the Electrical Contract or not, which require electrical connections, to the corresponding electrical system outlet.
2. Where the Work of this Section requires connections to be made to equipment that is furnished and set-in-place under other Sections, obtain such roughing-in dimensions

from the manufacturer or supplier of each item as required and assume full responsibility for the installation of the connections thereto.

3.4 ADJUSTMENT AND CLEAN-UP

A. Preliminary Operation: Should the Owner deem it necessary to operate the electrical installation or any part thereof prior to Substantial Completion of the Work, consent to such preliminary operation and supervise conduction of same. Subcontractor shall pay all costs occasioned by such operation. Preliminary operation shall not be construed as an acceptance of any Work installed under this Contract.

B. Clean-up: Upon completion of the Work of this Section, immediately remove all water feature electrical materials, debris and rubbish occasioned by this Work to the approval of the Owner.

END OF SECTION 13 1205

SECTION 13 1206 – WATER FEATURE WATERPROOFING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Furnish all labor, materials, tools and equipment as necessary to perform Cement Waterproofing on new and existing structures as shown on drawings and as specified in this section.

B. Related Sections:

1. Division 03, Section 03 3000 “Cast-in-Place Concrete.”
2. Division 13, Section 13 1202 “Water Feature Concrete.”
3. Drawings and general provisions of the Contract, including Part 1 – “General Provisions” of the Greenbook and Whitebook apply to this section.

1.2 QUALITY ASSURANCE

A. Qualifications of Workers:

1. The entity performing the work of this Section shall have been successfully engaged in the respective trade for at least five (5) years immediately prior to commencement of the Work.
2. For actual construction operations, use only trained and experienced workers with a minimum of three (3) years experience with the materials and methods specified.
3. Provide at least one person who shall be present at all times during execution of the work of this Section, with a minimum of five (5) years experience with the type of materials being installed, the referenced standards, and who shall direct all Work performed under this Section.

B. Standards:

1. ASTM C 39/C 39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens; 1999.
2. ASTM C 109 - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars.
3. ASTM C 267 - Standard Test Methods for Chemical Resistance of Mortars, Grouts, and Monolithic Surfacings and Polymer Concretes; 1997.
4. ASTM C 321 - Standard Test Method for Bond Strength of Chemical-Resistant Mortars.
5. ASTM C 348 - Standard Test Method for Flexural Strength of Hydraulic Cement Mortars.
6. ASTM E 96 - Standard Test Method for Water Vapor Transmission of Materials.
7. ASTM E 329 - Standard Specification for Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction; 1998a.

8. COE CRD-C 48 - Standard Test Method for Water Permeability of Concrete; 1992.
9. NSF 61 - Drinking Water System Components - Health Effects; 2000a.

1.3 SUBMITTALS

A. Submit proof of qualifications as specified in Article 1.2.A of this Section.

B. Product Data: Manufacturer’s printed data sheet, for specified products.

C. Test Reports: Certified test reports showing compliance with specified performance characteristics and physical properties.

1. Testing Agency: Independent laboratory meeting the requirements of ASTM E 329 and certified by the United States Bureau of Standards.

D. Certificates: Product certificates signed by manufacturer certifying that:

1. Materials comply with specified performance characteristics and physical requirements.
2. Installer is qualified and approved by manufacturer.

E. Manufacturer’s installation instructions.

F. Manufacturer's report on field inspection of substrates, prior to installation.

G. Executed warranties.

1.4 PRODUCT HANDLING

A. Deliver and store in a dry area between 40ºF (5ºC) and 90ºF (32ºC). Handle and protect from freezing and direct sun light in accordance with manufacturer's instructions.

B. Deliver materials in manufacturer's unopened containers, fully identified with brand, type, grade, class and all other qualifying information. Provide Material Safety Data Sheets for each product.

C. Take necessary precautions to keep products clean, dry and free of damage.

1.5 SYSTEM REQUIREMENTS

A. Coordinate waterproofing installation with other trades.

B. Provide materials and accessories in timely manner so as not to delay Work.

1.6 PROJECT CONDITIONS

A. Maintain surfaces to be waterproofed and surrounding air temperature at not less than 40ºF (5ºC). Apply only when temperatures are steady or rising.

B. Do not apply materials to frozen or frost-filled surfaces.

C. Exercise caution when temperatures exceed 90ºF (32ºC).

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Approved Manufacturers:

1. AQUAFIN, Inc. 505 Blue Ball Road, #160. Elkton, MD, 21921. Phone (800) 394-1410, or (410) 392-2300, Fax (410) 392-2324; e-mail info@aquafin.net.

2. Xypex Chemical Corporation; 13731 Mayfield Place, Richmond, BC V6V 2G9. ASD. Tel: (800) 961-4477 or (604) 273-5265. Fax: (604) 270-0451. E-mail: info@xypex.com. www.xypex.com.

3. Hycrete, Inc., 462 Barell Avenue, Carlstadt, New Jersey, 07072, telephone (201) 386-8110, website www.hycrete.com.

B. Requests for substitutions will be considered only if submitted to the architect/engineer in writing and must include substantiation of product performance, 10 days prior to the original bid date.

2.2 MATERIALS

A. Waterproofing Material - Cement Waterproofing: Cementitious, two-component, acrylic emulsion based, highly flexible, crack bridging waterproof membrane barrier against positive water pressure, with the following characteristics:

1. Product: AQUAFIN-2K/M, Hycrete or Xypex two coat crystalline waterproofing
2. Color: Gray, unless otherwise noted on the drawings
3. Dry Component-A: Precise blend of cementitious material
4. Liquid Component-B: White acrylic emulsion and admixtures
5. Working Time: Approximately 45 minutes
6. Shore A Hardness: > 90
7. Bond/Adhesion: (ASTM C-321) 215 psi (1.5 MPa) @ 28 days
8. Tear Resistance: 190 psi (1.3 MPa) at 68oF (20oC)
9. Elongation: (%) 60 (gray); 40 (white) at 68oF (20oC)
10. Elongation: (mils) 40 (gray); 25 (white)
11. Crack bridging capacity: (inch) 1/16 (gray) (1.5 mm)
12. Vapor Permeability: (US Perms) 1.2 (ASTM E-96)
13. Waterproofing: (CRD C 48-92) Withstands 200 psi = 460 feet (14 bar = 140 m) hydrostatic pressure (positive side) at 3/32 (2.4 mm) thickness.
14. Penetration: At least 2 inches (50 mm) penetration of crystal-forming material, evidenced by scanning electron microscope photographs.

15. Chemical Resistance: No detrimental effects when tested using 4000 psi (27.6 MPa) compressive strength concrete in accordance with ASTM C 267 using hydrochloric acid (pH of 3.5), brake fluid, transformer oil, ethylene glycol, toluene, and caustic soda as test mediums for duration of 84 days each; minimum of 14 percent increase in concrete compressive strength when tested in accordance with ASTM C 39/C 39M.
16. Potable Water Contact Approval: NSF certification for use on structures holding potable water, based on testing in accordance with NSF 61.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine all construction substrates and conditions under which waterproofing materials are to be installed. Do not proceed with the waterproofing application until unsatisfactory conditions are corrected.

3.2 PREPARATION

A. Protect adjacent surfaces not designated to receive waterproofing.

B. Substrate preparation:

1. Remove oil, grease, dirt, loose particles, remains of form oils, water repellents, rust or other coatings by high-pressure water blasting (>3000 psi), wet or dry sand blasting, or other mechanical means to produce surfaces suitable for application of waterproofing.

2. Follow manufacturer's instructions to clean and prepare surfaces and seal cracks and joints.

3. Voids in concrete substrates: 1/4-inch (6 mm) diameter and larger, pre-treat with a cementitious mortar. Less than 1/4-inch (6 mm) diameter can be filled with a scratch coat of two-component waterproofing material.

C. Rinse surfaces to be waterproofed (excluding drywall or similar) with clean water to saturated surface dry (SSD) condition, with no standing water on horizontal surfaces.

3.3 INSTALLATION

A. Mix two-component waterproofing material in proportions recommended by manufacturer.

B. Taping:

1. Apply two-component waterproofing material by brush in a six to seven inch (15 – 18 cm) wide strip coat centered over all joints, cracks, penetrations and changes of plane to be taped.

2. While this coat is still wet, unroll joint sealing tape into the coating and apply a coat of two-component waterproofing material over the tape, smoothing out wrinkles and fish mouths.

C. Positive Side Waterproofing:

1. Apply two-component waterproofing material in quantities as per manufacturer's specifications and recommendations:
   a. Apply at 60 mils or 1/16” (1.5 mm) total thickness for water levels up to 2-feet (0.60 m).
   b. Apply at 90 mils (2.4 mm) total thickness for water depth greater than 2-feet (>0.60 m).

D. Application considerations:

1. Apply, using stainless steel trowel, tampico brush, short nap roller, or appropriate compressed-air spray equipment.
2. If needed, such as in zones posed to movement or cracking, plaza decks, the waterproofing material can be additionally reinforced with a reinforcing mesh (supplied by waterproofing manufacturer), embedded between two waterproofing layers.
3. Apply only when surface and ambient temperatures are 40oF (5oC) and rising. At high temperatures i.e. 86oF (30oC) and above) protect application from direct sun and wind to prevent premature surface drying and shrinkage cracks. Apply material in two coats minimum.
4. Application thickness should not exceed 1/8-inch (120 mils (3 mm)).
5. Do not bridge cracks greater than 1/16-inch (1.5 mm).
6. Bridge dynamic cracks or joints with elastomeric joint sealing tape, as supplied by waterproofing manufacturer.
7. Do not overcoat waterproofing material with solvent-based materials.
8. Prime and protect alkali sensitive metals such as copper, aluminum, galvanized or zinc treated metal before over-coating with waterproofing material. Follow manufacturer’s recommendations for primer material.

3.4 CURING

A. Follow manufacturer's general instructions for curing and hardening of waterproofing material. Do not use water for curing. Waterproofing material is self-curing.

B. Protect surfaces from rain, frost and premature dehydration.

3.5 ACCEPTANCE

A. Remove left over materials and any foreign material resulting from the work from the site.

B. Clean adjacent surfaces and materials occasioned by this Work to the approval of the Owner.

END OF SECTION 13 1202

SECTION 13 1207 - WATER FEATURE TRENCH GRATE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Plaza water feature trench grates and frames as shown on drawings and as specified herein.

2. Metal support frames for stone paving at water feature jets.

B. Related Sections:

1. Division 13, Section 13 1201 “Water Feature Excavation.”
2. Division 13, Section 13 1202 “Water Feature Cast-in-Place Concrete.”
4. Division 13, Section 13 1203 “Water Feature Equipment.”
5. Division 13, Section 13 1206 “Water Feature Waterproofing.”

1.2 QUALITY ASSURANCE

A. Qualifications of Workers:

1. The entity performing the work of this Section shall have been successfully engaged in the respective trade for at least five (5) years immediately prior to commencement of the Work.
2. For actual construction operations, use only trained and experienced workers with a minimum of three (3) years experience with the materials and methods specified.
3. Provide at least one person who shall be present at all times during execution of the work of this Section, with a minimum of five (5) years experience with the type of materials being installed, the referenced standards, and who shall direct all Work performed under this Section.

1.3 SUBMITTALS AND SUBSTITUTIONS

A. Required submittals include:

1. Trench grates and frames.

B. Submit proof of qualifications as specified in Article 1.2.A of this Section.

C. Provide shop drawings as outlined on the drawings.

1.4 PRODUCT HANDLING

A. Delivery: Deliver all materials to the Project Site in the manufacturer's original unopened containers with all labels intact and legible.

B. Storage: Store all materials under cover in a manner to prevent damage and contamination, and store only the specified materials at the Project site.

C. Protection: Use all means necessary to protect trench grate materials before, during, and after installation and to protect the installed Work specified in other Sections.

PART 2 - PRODUCTS

2.1 TRENCH GRATES AND FRAMES

A. Manufacturer: trench grates and frames shall be as supplied by IRONSMITH,INC., Palm Desert, CA, (800) 338-4766, or approved equal.

B. Trench grates and frames shall be ADA complaint with heel-proof openings and rated for H-20 vehicular loading requirements.

C. Trench grate material shall be Stainless Steel, type 316 (ASTM A 666). All trench grate castings shall be manufactured true to pattern and component parts, and shall fit together in a satisfactory manner. The castings shall be of uniform pattern and quality, free from blowholes, hard spots, shrinkage, distortion or other defects. Castings shall be cleaned by shot blasting.

D. Finish: Grates shall have sandblast finish to achieve slip resistant surface.

E. Trench grate frames shall be shop fabricated from steel angle per installation details as shown on plans.

F. Frames shall be Stainless Steel, type 316 to match trench grates.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Do not begin installation until site is properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

A. Install materials and systems in proper relation with adjacent construction and with uniform appearance. Coordinate with work of other sections. All openings shall be a maximum of ¼" unless indicated otherwise on the drawings.

3.4 TRENCH GRATES

A. Install stainless steel angle frame in accordance with details specified on plans and manufacturer's recommendations. Maintain flush and leveled with surrounding paving surface, maintain flush and leveled at all times.

B. Install grates after danger of damage from construction traffic is past.

C. If needed, grind pads on underside of trench grates to level and prevent grate rattle or rocking.

3.5 ADJUSTMENT AND CLEAN-UP

A. Protect installed product until completion of project.

B. Clean-up: Upon completion of the Work of this Section, immediately remove all water feature trench grate materials, debris and rubbish occasioned by this Work to the approval of the Owner.

END OF SECTION 13 1207

SECTION 220500 - COMMON WORK RESULTS FOR PLUMBING

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Product Data.

PART 2 - PRODUCTS

2.1 SLEEVES

A. Mechanical Sleeve Seals: Modular rubber sealing element unit, designed for field assembly, to fill annular space between pipe and sleeve.

B. Galvanized-Steel Sheet: 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint.

C. Steel Pipe: ASTM A 53, Type E, Grade B, Schedule 40, galvanized, plain ends.

D. PVC Pipe: ASTM D 1785, Schedule 40.

2.2 GROUT

A. Description: ASTM C 1107, Grade B, nonshrink and nonmetallic, dry hydraulic-cement grout.

2.3 HANGERS AND SUPPORTS

A. Hanger and Pipe Attachments: Factory fabricated with galvanized coatings; nonmetallic coated for hangers in direct contact with copper tubing.

B. Powder-Actuated Fasteners: Threaded-steel stud, with pull-out and shear capacities appropriate for supported loads and building materials where used.

C. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel, with pull-out and shear capacities appropriate for supported loads and building materials where used.

2.4 VIBRATION ISOLATION AND SEISMIC CONTROL DEVICES

A.

B. Seismic Restraints:

1. Resilient Isolation Washers and Bushings: One-piece, molded, oil- and water-resistant neoprene, with a flat washer face.
2. Channel Support System: MFMA-4, shop- or field-fabricated support assembly made of slotted steel channels with accessories for attachment to braced component at one end and to building structure at the other end and other matching components and with corrosion-resistant coating; and rated in tension, compression, and torsion forces.
3. Restraining Cables: Galvanized-steel cables with end connections made of steel assemblies that swivel to final installation angle and use two clamping bolts for cable engagement.
4. Postinstalled Anchors: Torque-controlled expansion anchors; seismic-rated, zinc-plated carbon steel for interior applications and stainless steel for exterior locations. Provide anchor bolts with strength four times the load imposed as tested according to ASTM E 488.

2.5 PRESSURE GAGES AND TEST PLUGS

A. Pressure Gages: Direct-mounting, indicating-dial type complying with ASME B40.100. Dry metal case, minimum 2-1/2-inch diameter with red pointer on white face, and plastic window. Minimum accuracy 3 percent of middle half of range. Range two times operating pressure.

B. Test Plug: Corrosion-resistant brass or stainless-steel body with two self-sealing rubber core inserts and gasketed and threaded cap, with extended stem for units to be installed in insulated piping. Minimum pressure and temperature rating 500 psig at 200 deg F.

PART 3 - EXECUTION

3.1 MOTOR INSTALLATION

A. Anchor motor assembly to base, adjustable rails, or other support, arranged and sized according to manufacturer's written instructions.

3.2 GENERAL PIPING INSTALLATIONS

A. Install piping free of sags and bends.

B. Install fittings for changes in direction and branch connections.

C. Install sleeves for pipes passing through concrete and masonry walls, gypsum board partitions, and concrete floor and roof slabs.

D. Exterior Wall, Pipe Penetrations: Mechanical sleeve seals installed in steel or cast-iron pipes for wall sleeves.

E. Install unions at final connection to each piece of equipment.

F. Install dielectric unions and flanges to connect piping materials of dissimilar metals in gas piping.

G. Install dielectric coupling and nipple fittings to connect piping materials of dissimilar metals in water piping.

3.3 GENERAL EQUIPMENT INSTALLATIONS

A. Install equipment to allow maximum possible headroom unless specific mounting heights are not indicated.

B. Install equipment level and plumb, parallel and perpendicular to other building systems and components, unless otherwise indicated.

C. Install mechanical equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.

D. Install equipment to allow right of way for piping installed at required slope.

3.4 BASES, SUPPORTS, AND ANCHORAGES

A. Anchor equipment to concrete base according to equipment manufacturer's written instructions and according to seismic codes at Project.

1. Construct concrete bases of dimensions indicated, but not less than 4 inches larger in both directions than supported unit.
2. Install dowel rods on 18-inch centers around the full perimeter of the base to connect concrete base to concrete floor.
3. Install epoxy-coated anchor bolts for supported equipment that extend through concrete base, and anchor into structural concrete floor.
4. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
5. Use 3000-psi, 28-day compressive-strength concrete and reinforcement as specified in Division 03 Section "Cast-in-Place Concrete"

B. Mix and install grout for fire-suppression equipment base bearing surfaces, pump and other equipment base plates, and anchors. Place grout, completely filling equipment bases.

3.5 HANGERS AND SUPPORTS

A. Comply with MSS SP-69 and MSS SP-89. Install building attachments within concrete or to structural steel.

B. Install hangers and supports to allow controlled thermal and seismic movement of piping systems.

C. Install powder-actuated fasteners and mechanical-expansion anchors in concrete after concrete is cured. Do not use in lightweight concrete or in slabs less than 4 inches thick.

D. Load Distribution: Install hangers and supports so piping live and dead loading and stresses from movement will not be transmitted to connected equipment.

E. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Specification Sections, install the following types:

1. Adjustable Steel Clevis Hangers (MSS Type 1): For suspension of noninsulated or insulated stationary pipes, NPS 1/2 to NPS 30.
2. Pipe Hangers (MSS Type 5): For suspension of pipes, NPS 1/2 to NPS 4, to allow off-center closure for hanger installation before pipe erection.
3. Adjustable Steel Band Hangers (MSS Type 7): For suspension of noninsulated stationary pipes, NPS 1/2 to NPS 8.
4. Adjustable Band Hangers (MSS Type 9): For suspension of noninsulated stationary pipes, NPS 1/2 to NPS 8.
5. Adjustable Swivel-Ring Band Hangers (MSS Type 10): For suspension of noninsulated stationary pipes, NPS 1/2 to NPS 2.

F. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Specification Sections, install the following types:

1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers, NPS 3/4 to NPS 20.
2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers, NPS 3/4 to NPS 20, if longer ends are required for riser clamps.

3.6 VIBRATION ISOLATION AND SEISMIC CONTROL DEVICE INSTALLATION

A. Adjust vibration isolators to allow free movement of equipment limited by restraints.

B. Install resilient bolt isolation washers and bushings on equipment anchor bolts.

C. Install cables so they do not bend across sharp edges of adjacent equipment or building structure.

END OF SECTION 220500

SECTION 220523 - GENERAL-DUTY VALVES FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Product Data.

B. NSF Compliance: NSF 61 for valve materials for potable-water service.

PART 2 - PRODUCTS

2.1 GENERAL-DUTY VALVES

A. Valve Sizes: Same as upstream piping unless otherwise indicated.

B. Valves in Insulated Piping: With 2-inch stem extensions.

C. End Connections: Threads shall comply with ANSI B1.20.1. Flanges shall comply with ANSI B16.1 for cast-iron valves and with ANSI B16.24 for bronze valves. Solder-joint connections shall comply with ANSI B16.18.

D. Two-Piece, Copper-Alloy Ball Valves: Bronze body with full-port, chrome-plated bronze ball; PTFE seats; and 600-psig minimum CWP rating and blowout-proof stem.

E. Bronze, Swing Check Valves: Class 125, bronze body with bronze disc and seat.

F. Bronze Globe Valves: Class 125, bronze body with bronze disc and union-ring bonnet.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Use ball valves for shutoff duty; globe and ball for throttling duty.

B. Locate valves for easy access and provide separate support where necessary.

C. Install valves for each fixture and item of equipment.

D. Install three-valve bypass around each pressure-reducing valve using throttling-type valves.

E. Install valves in horizontal piping with stem at or above center of pipe.

F. Install valves in a position to allow full stem movement.

G. Install check valves for proper direction of flow in horizontal position with hinge pin level.

END OF SECTION 220523

SECTION 220700 - PLUMBING INSULATION

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Product Data.

B. Quality Assurance: Labeled with maximum flame-spread index of 25 and maximum smoke-developed index of 50 according to ASTM E 84.

PART 2 - PRODUCTS

2.1 INSULATION MATERIALS

A. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.

B. Flexible Elastomeric: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type I for tubular materials and Type II for sheet materials.

C. Mineral-Fiber Blanket Insulation: Comply with ASTM C 553, Type II and ASTM C 1290, Type I.

D. Mineral-Fiber, Preformed Pipe Insulation: Comply with ASTM C 547, Type I, Grade A, with factory-applied ASJ.

E. Mineral-Fiber Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.

F. Vapor-Barrier Mastic: Water based; suitable for indoor and outdoor use on below ambient services.

G. Factory-Applied Jackets: When factory-applied jackets are indicated, comply with the following:

1. ASJ: White, kraft-paper, fiberglass-reinforced scrim with aluminum-foil backing; complying with ASTM C 1136, Type I.

H. ASJ Tape: White vapor-retarder tape matching factory-applied jacket with acrylic adhesive, complying with ASTM C 1136.

PART 3 - EXECUTION

3.1 PIPE INSULATION INSTALLATION

A. Comply with requirements of the Midwest Insulation Contractors Association's "National Commercial & Industrial Insulation Standards" for insulation installation on pipes and equipment.

B. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.

C. Insulation Installation at Fire-Rated Wall, Partition, and Floor Penetrations: Install insulation continuously through penetrations. Seal penetrations.

D. Mineral-Fiber Insulation Installation:

1. Insulation Installation on Straight Pipes and Tubes: Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.
2. For insulation with factory-applied jackets on above ambient surfaces, secure laps with outward clinched staples at 6 inches o.c.
3. For insulation with factory-applied jackets on below ambient surfaces, do not staple longitudinal tabs but secure tabs with additional adhesive as recommended by insulation material manufacturer and seal with vapor-barrier mastic and flashing sealant.

E. Interior Piping System Applications: Insulate the following piping systems:

1. Domestic hot water.
2. Recirculated domestic hot water.
3. Exposed water supplies and sanitary drains of fixtures for people with disabilities.

F. Do not apply insulation to the following systems, materials, and equipment:

1. Flexible connectors.
2. Sanitary drainage and vent piping.
3. Drainage piping located in crawlspaces unless otherwise indicated.
4. Chrome-plated pipes and fittings, except for plumbing fixtures for people with disabilities.
5. Piping specialties, including air chambers, unions, strainers, check valves, plug valves, and flow regulators.

3.2 INDOOR PIPING INSULATION SCHEDULE

A. Unless otherwise indicated, do not install insulation on the following:

1. Drainage piping located in crawlspaces.
2. Underground piping.
3. Chrome-plated pipes and fittings unless there is a potential for personnel injury.

B. Domestic Hot and Recirculated Hot Water:

1. NPS 1-1/4 and Smaller: Insulation shall be the following:

a. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1 inch thick.

2. NPS 1-1/2 and Larger: Insulation shall be the following:

a. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1 inch thick.

C. Exposed Sanitary Drains, Domestic Water, Domestic Hot Water, and Stops for Plumbing Fixtures for People with Disabilities:

1. All Pipe Sizes: Insulation shall be the following:

a. Flexible Elastomeric: 1/2 inch thick.

END OF SECTION 220700

SECTION 221116 - DOMESTIC WATER PIPING

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Comply with NSF 14 for plastic, potable domestic water piping and components. Include marking "NSF-pw" on piping.

B. Comply with NSF 61 for potable domestic water piping and components.

PART 2 - PRODUCTS

2.1 PIPE AND FITTINGS

A. Hard Copper Tubing: ASTM B 88, Types L , water tube, drawn temper with wrought-copper, solder-joint fittings. Furnish wrought-copper fittings if indicated.

1. Copper Unions: Cast-copper-alloy, hexagonal-stock body, with ball-and-socket, metal-to-metal seating surfaces and solder-joint or threaded ends.
2. Joining Materials: Use ASTM B 813, water-flushable, lead-free flux; ASTM B 32, lead-free-alloy solder.

B. Soft Copper Tubing: ASTM B 88, Types K and L, water tube, annealed temper with copper pressure fittings, cast-copper-alloy or wrought-copper, solder-joint fittings. Furnish wrought-copper fittings if indicated.

1. Joining Materials: Use ASTM B 813, water-flushable, lead-free flux; ASTM B 32, lead-free-alloy solder.

C. Special-Duty Valves:

1. Comply with requirements in Division 22 Section "General-Duty Valves for Plumbing Piping" for general-duty metal valves.
2. Comply with requirements in Division 22 Section "Domestic Water Piping Specialties" for balancing valves, drain valves, backflow preventers, and vacuum breakers.

D. Transition Fittings: Manufactured piping coupling or specified piping system fitting. Same size as pipes to be joined and pressure rating at least equal to pipes to be joined.

E. Flexible Connectors: Stainless-steel, corrugated-metal tubing with wire-braid covering. Working-pressure rating a minimum of 200 psig.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with requirements in Division 22 Section "Common Work Results for Plumbing" for basic piping installation requirements.

B. Install wall penetration system at each service pipe penetration through foundation wall. Make installation watertight. Comply with requirements in Division 22 Section "Common Work Results for Plumbing" for wall penetration systems.

C. Install shutoff valve, hose-end drain valve, strainer, pressure gage, and test tee with valve, inside the building at each domestic water service entrance. Comply with requirements in Division 22 Section "Common Work Results for Plumbing" for pressure gages and Division 22 Section "Domestic Water Piping Specialties" for drain valves and strainers.

D. Install domestic water piping with 0.25 percent slope downward toward drain for horizontal piping and plumb for vertical piping.

E. Rough-in domestic water piping for water-meter installation according to utility company's requirements.

F. Comply with requirements in Division 22 Section "Common Work Results for Plumbing" for basic piping joint construction.

1. Soldered Joints: Comply with procedures in ASTM B 828 unless otherwise indicated.

G. Comply with requirements in Division 22 Section "Common Work Results for Plumbing" for pipe hanger and support devices.

H. Support vertical piping at each floor.

I. Install flexible connectors in suction and discharge piping connections to each domestic water pump.

3.2 INSPECTING AND CLEANING

A. Inspect and test piping systems as follows:

1. Fill domestic water piping. Check components to determine that they are not air bound and that piping is full of water.
2. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired.

B. Clean and disinfect potable domestic water piping by filling system with water/chlorine solution with at least 50 ppm of chlorine. Isolate with valves and allow to stand for 24 hours. Flush system with clean, potable water until 4 ppm (maximum) chlorine is in water coming from system after the standing time.

3.3 PIPING SCHEDULE

A. Underground, Service Entrance Piping: Soft copper tubing.

B. Aboveground Distribution Piping: Type L, hard copper tubing.

3.4 VALVE SCHEDULE

A. Drawings indicate valve types to be used. Where specific valve types are not indicated, the following requirements apply:

1. Shutoff Duty: Use bronze ball valves for all piping.
2. Throttling Duty: Use bronze ball or globe valves for all piping. Hot-Water-Piping, Balancing Duty: Memory-stop balancing valves.
3. Drain Duty: Hose-end drain valves.

B. Install ball valves close to main on each branch and riser serving two or more plumbing fixtures or equipment connections and where indicated.

C. Install ball valves on inlet to each plumbing equipment item, on each supply to each plumbing fixture not having stops on supplies, and elsewhere as indicated.

D. Install drain valve at base of each riser, at low points of horizontal runs, and where required to drain water distribution piping system.

E. Install swing check valve on discharge side of each pump and elsewhere as indicated.

F. Install ball valves in each hot-water circulating loop and discharge side of each pump.

END OF SECTION 221116

SECTION 221119 - DOMESTIC WATER PIPING SPECIALTIES

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Product Data.

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS

A. Pipe-Applied, Atmospheric Vacuum Breakers: ASSE 1001, with floating disc and atmospheric vent.

B. Hose Connection Vacuum Breakers: ASSE 1011, rough bronze, with nonremovable and manual drain features and garden-hose threaded connection.

C. Reduced-Pressure-Principle Backflow Preventers: ASSE 1013.

D. Water Regulators: ASSE 1003.

E. Balancing Valves: MSS SP-110 for two-piece, copper-alloy ball valves, with memory stop.

F. Thermostatic Mixing Valves: Manually adjustable, bronze body. Include check stop and union on hot- and cold-water-supply inlets.

G. Hose Bibbs: Bronze body in rough-bronze finish, with removable composition disc, threaded or soldered inlet, garden-hose threaded outlet, and loose-key handle.

H. Wall Hydrant: ASME A112.21.3M, recessed, nonfreeze, automatic draining, antibackflow type, with key operator and threaded inlet, garden-hose threaded outlet, and rough-bronze finish.

I. Ball-Valve-Type, Hose-End Drain Valves: MSS SP-110, with garden-hose thread complying with ASME B1.20.7 and cap with brass chain.

J. Stop-and-Waste Drain Valves: MSS SP-110 for ball valves or MSS SP-80 for gate valves.

K. Water Hammer Arrester: Bellows or piston type with pressurized cushioning chamber.

L. Strainers: Y-pattern, bronze body, 125-psig minimum steam working pressure.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install backflow preventers at each water-supply connection to mechanical equipment and where required by authorities having jurisdiction.

B. Install hose bibbs with integral or field-installed vacuum breaker.

END OF SECTION 221119

SECTION 221316 - SANITARY WASTE AND VENT PIPING

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Minimum Pressure Requirement for Soil, Waste, and Vent: 10-foot head of water.

B. Comply with NSF 14, "Plastic Piping Components and Related Materials," for plastic piping components.

PART 2 - PRODUCTS

2.1 PIPES AND FITTINGS

A. Copper Drainage Tube and Fittings: ASTM B 306, Type DWV drawn temper with wrought-copper, Type DWV drainage fittings.

B. Hubless Cast-Iron Soil Pipe and Fittings: ASTM A 888 or CISPI 301, with ASTM C 1277 shielded couplings.

C. PVC Plastic, DWV Pipe and Fittings: ASTM D 2665, Schedule 40, plain ends with PVC socket-type, DWV pipe fittings.

PART 3 - EXECUTION

3.1 PIPING INSTALLATION

A. Comply with requirements in Division 22 Section "Common Work Results for Plumbing" for basic piping installation requirements.

B. Install cast-iron soil piping according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook," Chapter IV, "Installation of Cast Iron Soil Pipe and Fittings."

C. Install wall penetration system at each pipe penetration through foundation wall. Make installation watertight. Comply with requirements in Division 22 Section "Common Work Results for Plumbing" for wall penetration systems.

1. Sleeves are not required for cast-iron soil piping passing through concrete slabs-on-grade if slab is without membrane waterproofing.

D. Make changes in direction for soil and waste drainage and vent piping using appropriate branches, bends, and long-sweep bends. Sanitary tees and short-sweep 1/4 bends may be used on vertical stacks if change in direction of flow is from horizontal to vertical. Use long-turn, double Y-branch and 1/8-bend fittings if 2 fixtures are installed back to back or side by side

with common drain pipe. Straight tees, elbows, and crosses may be used on vent lines. Do not change direction of flow more than 90 degrees. Use proper size of standard increasers and reducers if pipes of different sizes are connected. Reducing size of drainage piping in direction of flow is prohibited.

E. Lay buried building drainage piping beginning at low point of each system. Install true to grades and alignment indicated, with unbroken continuity of invert. Place hub ends of piping upstream. Install required gaskets according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements. Maintain swab in piping and pull past each joint as completed.

F. Install soil and waste drainage and vent piping at the following minimum slopes, unless otherwise indicated:

1. Building Sanitary Drain: 2 percent downward in direction of flow for piping NPS 3 and smaller; 1 percent downward in direction of flow for piping NPS 4 and larger.
2. Horizontal Sanitary Drainage Piping: 2 percent downward in direction of flow.
3. Vent Piping: 1 percent down toward vertical fixture vent or toward vent stack.

G. Install PVC soil and waste drainage and vent piping according to ASTM D 2665.

H. Install underground PVC soil and waste drainage piping according to ASTM D 2321.

I. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.

J. Comply with requirements in Division 22 Section "Common Work Results for Plumbing" for basic piping joint construction.

K. Soldered Joints: Use ASTM B 813, water-flushable, lead-free flux; ASTM B 32, lead-free-alloy solder; and ASTM B 828 procedure unless otherwise indicated.

L. Comply with requirements in Division 22 Section "Common Work Results for Plumbing" for pipe hanger and support devices.

3.2 PIPE SCHEDULE

A. Aboveground Applications: Hubless, cast-iron soil pipe and fittings and Copper drainage tube and fittings with soldered joints.

B. Belowground Applications: PVC plastic, DWV pipe and drainage-pattern fittings with cemented joints.

END OF SECTION 221316

SECTION 221319 - SANITARY WASTE PIPING SPECIALTIES

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Product Data.

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS

A. Horizontal, Cast-Iron Backwater Valves: ASME A112.14.1, gray-iron body with bronze seat.

1. Extension: ASTM A 74, Service class; full-size, cast-iron, soil-pipe extension to field-installed cleanout at floor; replaces backwater valve cover.

B. PVC Backwater Valves: Horizontal type; with PVC body, PVC removable cover, and PVC swing check valve.

C. Cleanouts, :

1. Application: Floor cleanout.
2. Body or Ferrule: Cast iron.
3. Clamping Device: Required.
4. Outlet Connection: Inside calk.
5. Closure: Brass plug with straight threads and gasket.
6. Adjustable Housing Material: Cast iron.
7. Frame and Cover Material and Finish: Nickel-bronze, copper alloy.
8. Frame and Cover Shape: Round.
9. Top-Loading Classification: Heavy Duty.

D. Floor Drains, :

1. Products:
2. Standard: ASME A112.3.1.
3. Pattern: Floor drain.
4. Body Material: Gray iron.
5. Seepage Flange: Required.
6. Clamping Device: Required.
7. Outlet: Bottom.
8. Exposed Surfaces and Interior Lining: Not required.
9. Sediment Bucket: Not required.
10. Top or Strainer Material: Nickel bronze.
11. Top of Body and Strainer Finish: Nickel bronze.
12. Top Shape: Round.

13. Top-Loading Classification: Medium Duty.
14. Funnel: Not required.
15. Inlet Fitting: Not required.
16. Trap Material: Not required.
17. Trap Pattern: Standard P-trap.
18. Trap Features: Trap seal primer valve drain connection.

E. Grease Removal Devices: ASME A112.14.3 (Type C)], for automatic intercepting and removal of fats, oils, and greases from food-preparation or processing wastewater.

1. Products:

a. Schier Products.

b. Green Turtle Technologies.

~~a.~~c. Thermaco, Inc.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install backwater valves in building drain piping (as required). Install cleanouts at grade and extend to where building sanitary drains connect to building sanitary sewers.

B. Install floor drains at low points of surface areas to be drained. Set grates of drains flush with finished floor unless otherwise indicated.

1. Install floor-drain flashing collar or flange so no leakage occurs between drain and adjoining flooring. Maintain integrity of waterproof membranes where penetrated.
2. Install individual traps for floor drains connected to sanitary building drain, unless otherwise indicated.

C. Install roof flashing assemblies on sanitary stack vents and vent stacks that extend through roof.

D. Install air-gap fittings on draining-type backflow preventers and on indirect-waste piping discharge into sanitary drainage system.

E. Install grease interceptor in according with manufactures written installation instructions and authorities having jurisdiction.

END OF SECTION 221319

SECTION 221413 - FACILITY STORM DRAINAGE PIPING

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Summary: This Section includes storm drainage piping inside the building.

B. Minimum Pressure Requirement for Storm Drainage: 10-foot head of water.

C. Comply with NSF 14, "Plastic Piping Components and Related Materials," for plastic piping components.

PART 2 - PRODUCTS

2.1 PIPES AND FITTINGS

A. Copper Drainage Tube and Fittings: ASTM B 306, Type DWV drawn temper with ASME B16.29, wrought-copper, solder-joint fittings.

B. Hubless Cast-Iron Soil Pipe and Fittings: ASTM A 888 or CISPI 301 with ASTM C 1277 shielded couplings.

C. PVC Plastic, DWV Pipe and Fittings: ASTM D 2665, Schedule 40, with PVC socket type fittings made to ASTM D 3311, drain, waste, and vent patterns.

PART 3 - EXECUTION

3.1 PIPING INSTALLATION

A. Comply with requirements in Division 22 Section "Common Work Results for Plumbing" for basic piping installation requirements.

B. Install cast-iron soil piping according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook," Chapter IV, "Installation of Cast Iron Soil Pipe and Fittings."

C. Install wall penetration system at each pipe penetration through foundation wall. Make installation watertight. Comply with requirements in Division 22 Section "Common Work Results for Plumbing" for wall penetration systems.

1. Sleeves are not required for cast-iron soil piping passing through concrete slabs-on-grade if slab is without membrane waterproofing.

D. Make changes in direction for storm drainage piping using appropriate branches, bends, and long-sweep bends. Do not change direction of flow more than 90 degrees. Use proper size of

standard increasers and reducers if pipes of different sizes are connected. Reducing size of drainage piping in direction of flow is prohibited.

E. Lay buried building storm drainage piping beginning at low point of each system. Install true to grades and alignment indicated, with unbroken continuity of invert. Place hub ends of piping upstream. Install required gaskets according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements. Maintain swab in piping and pull past each joint as completed.

F. Install storm drainage piping at the following minimum slopes, unless otherwise indicated:

1. Building Storm Drain: 1 percent downward in direction of flow for piping NPS 3 and smaller; 1 percent downward in direction of flow for piping NPS 4 and larger.
2. Horizontal Storm-Drainage Piping: 2 percent downward in direction of flow.

G. Install PVC storm drainage piping according to ASTM D 2665.

H. Install underground PVC storm drainage piping according to ASTM D 2321.

I. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.

J. Comply with requirements in Division 22 Section "Common Work Results for Plumbing" for basic piping joint construction.

K. Soldered Joints: Use ASTM B 813, water-flushable, lead-free flux; ASTM B 32, lead-free-alloy solder; and ASTM B 828 procedure, unless otherwise indicated.

L. Comply with requirements in Division 22 Section "Common Work Results for Plumbing" for pipe hanger and support devices.

3.2 INSPECTION

A. Inspections shall be per Greenbook/Whitebook Standard Specifications.

3.3 PIPE SCHEDULE

A. Aboveground Applications: Hubless, cast-iron soil pipe and fittingsand Copper drainage tube and fittings with soldered joints.

B. Belowground Applications: PVC plastic, DWV pipe and fittings with solvent-cemented joints.

END OF SECTION 221413

SECTION 221423 - STORM DRAINAGE PIPING SPECIALTIES

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Product Data.

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS

A. Roof Drains, :

1. Products:
2. Standard: ASME A112.6.4.
3. Type: General purpose roof drain.
4. Body Material: Cast iron.
5. Flange: Anchor with weep holes.
6. Outlet: Bottom.
7. Dome Material: Cast iron.
8. Features and Accessories: combination flashing ring and gravel stop, underdeck clamp and sump receiver.

B. Cleanouts, :

1. Standard: ASME A112.36.2M.
2. Application: Floor cleanout or Wall cleanout.
3. Body or Ferrule Material: Cast iron.
4. Clamping Device: Not required.
5. Outlet Connection: Inside calk.
6. Closure: Brass plug with straight threads and gasket .
7. Adjustable Housing Material: Cast iron with threads.
8. Frame and Cover Material and Finish: Nickel-bronze, copper alloy.
9. Frame and Cover Shape: Round.
10. Top-Loading Classification: Medium Duty.

C. Roof Flashing Assemblies :

1. Description: Manufactured assembly made of 6.0-lb/sq. ft., 0.0938-inch- thick, lead flashing collar and skirt extending at least 8 inches from pipe, with galvanized-steel boot reinforcement and counterflashing fitting.

D. Downspout Boots:

1. Description: ASTM A 74, Service class, hub-and-spigot, cast-iron soil pipe.

2. Size: Same as or larger than connected downspout.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install cleanouts at grade and extend to where building sanitary drains connect to building sanitary sewers.

B. Install floor drains at low pints of surface areas and where indicated. Set tops of drains flush with finished floor.

1. Trap drains connected to sanitary building drain.
2. Install drain flashing collar or flange so no leakage occurs between drain and adjoining flooring. Maintain integrity of waterproof membranes.

C. Install roof drains at low points of roof areas according to roof membrane manufacturer's written installation instructions.

1. Install roof-drain flashing collar or flange so no leakage occurs between drain and adjoining roofing. Maintain integrity of waterproof membranes where penetrated.

END OF SECTION 221423

SECTION 223300 - ELECTRIC DOMESTIC WATER HEATERS

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Product Data.

B. Comply with requirements of applicable NSF, AWWA, or FDA and EPA regulatory standards for tasteless and odorless, potable-water-tank linings.

C. Comply with performance efficiencies prescribed in ASHRAE 90.2, "Energy Efficient Design of New Low-Rise Residential Buildings."

D. Warranties: Submit a written warranty executed by manufacturer agreeing to repair or replace water heaters that fail in materials or workmanship within five years from date of Substantial Completion. Failures include, but are not limited to, tanks and elements.

PART 2 - PRODUCTS

2.1 WATER HEATERS, GENERAL

A. Insulation: Suitable for operating temperature and required insulating value. Include insulation material that surrounds entire tank except connections and controls.

B. Anode Rods: Factory installed, magnesium.

C. Combination Temperature and Pressure Relief Valve: ASME rated and stamped and complying with ASME PTC 25.3. Include relieving capacity at least as great as heat input and pressure setting less than water heater working-pressure rating. Select relief valve with sensing element that extends into tank.

D. Drain Valve: Factory or field installed.

2.2 ELECTRIC WATER HEATERS

A. Products:

B. Household, Storage, Electric Water Heaters: UL 174, 30-gal. capacity; steel with 150-psig working-pressure rating. Two electric, screw-in, immersion-type heating elements with adjustable thermostat for each element and wiring arrangement for ~~non~~simultaneous operation with maximum 30-A circuit.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install temperature and pressure relief valves and extend to closest floor drain.

B. Install vacuum relief valves in cold-water-inlet piping.

C. Install shutoff valves and unions at hot- and cold-water piping connections.

D. Make piping connections with dielectric fittings where dissimilar piping materials are joined.

E. Electrically ground units according to authorities having jurisdiction.

END OF SECTION 223300

SECTION 224000 - PLUMBING FIXTURES

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Product Data for each type of plumbing fixture, including trim, fittings, accessories, appliances, appurtenances, equipment, and supports.

B. Regulatory Requirements: Comply with requirements in ICC A117.1, "Accessible and Usable Buildings and Facilities"; Public Law 90-480, "Architectural Barriers Act"; and Public Law 101-336, "Americans with Disabilities Act"; for plumbing fixtures for people with disabilities.

C. Regulatory Requirements: Comply with requirements in Public Law 102-486, "Energy Policy Act," about water flow and consumption rates for plumbing fixtures.

D. NSF Standard: Comply with NSF 61, "Drinking Water System Components - Health Effects," for fixture materials that will be in contact with potable water.

PART 2 - PRODUCTS

2.1 WATER CLOSET

A. Vitreous-China Water Closet: Elongated, siphon-jet type, floor-mounted, floor outlet with flushometer valve.

1. Design Consumption: 1.28 gal./flush.

B. Toilet Seat: Elongated, solid plastic open front without cover with bumpers and hardware, Commercial, Heavy-Duty class.

C. Flushometer Valve: Brass body, brass or copper pipe or tubing inlet with wall flange and tailpiece with spud, screwdriver check stop, and vacuum breaker. Polished, chrome-plated, exposed metal parts. Consumption: 1.28 gal./flush.

2.2 URINAL

A. Vitreous-China Urinal: Accessible, wall-mounting, back-outlet, siphon-jet type.

1. Design Consumption: 0.125 gal./flush.

B. Flushometer Valve: Cast-brass body, brass or copper pipe or tubing inlet with wall flange and tailpiece with spud, screwdriver check stop, and vacuum breaker. Polished, chrome-plated, exposed metal parts. Consumption: 0.125 gal./flush.

C. Fixture Support: Type II, with hanger and bearing plates. Include rectangular steel uprights with feet.

2.3 LAVATORY

A. Vitreous-China Lavatory: Accessible, Counter mounting, self-rimming.

B. Faucets: ASME A112.18.1; solid brass.

1. Type: Center set with inlets on 4-inch centers.
2. Finish: Polished chrome-plate.
3. Handle(s): Self-closing, push button.
4. Maximum Flow Rate: 0.5 gpm.

C. Drain: Grid strainer with NPS 1-1/4 offset waste.

D. Trap: Chrome-plated, tubular brass with slip-joint inlet and wall flange.

E. Supply and Drain Insulation: Soft-plastic covering; removable at stops.

F. Fixture Support: Concealed arm for wall-mounting, lavatory-type fixture. Include rectangular steel uprights and feet.

2.4 SERVICE SINK

A. Enameled, Cast-Iron, Service Sink: Floor-mounting type, 28” by 28” by 9”.

B. Faucet: Widespread, solid brass, with supplies on 8-inch centers. Wall braced spout with integral vacuum breaker, pail hook, and hose-thread outlet.

C. Mounting: Floor.

D. Rim Guard: Manufacturer's standard.

E. Drain: NPS 3 with grid strainer.

F. Mop Rack: As required.

PART 3 - EXECUTION

3.1 INSTALLATIONS

A. Install fitting insulation kits on fixtures for people with disabilities.

B. Install fixtures with flanges and gasket seals.

C. Install flushometer valves for accessible water closets and urinals with handle mounted on wide side of compartment. Install other actuators in locations that are easy for people with disabilities to reach.

D. Fasten wall-hanging plumbing fixtures securely to supports attached to building substrate when supports are specified, and to building wall construction where no support is indicated.

E. Fasten floor-mounted fixtures to substrate. Fasten fixtures having holes for securing fixture to wall construction, to reinforcement built into walls.

F. Fasten wall-mounted fittings to reinforcement built into walls.

G. Fasten counter-mounting plumbing fixtures to casework.

H. Secure supplies to supports or substrate within pipe space behind fixture.

I. Set mop basins in leveling bed of cement grout.

J. Install individual supply inlets, supply stops, supply risers, and tubular brass traps with cleanouts at fixture.

K. Install water-supply stop valves in accessible locations.

L. Install traps on fixture outlets. Omit traps on fixtures having integral traps. Omit traps on indirect wastes unless otherwise indicated.

M. Install escutcheons at wall, floor, and ceiling penetrations in exposed, finished locations and within cabinets and millwork. Use deep-pattern escutcheons where required to conceal protruding pipe fittings.

N. Seal joints between fixtures and walls, floors, and counters using sanitary-type, one-part, mildew-resistant, silicone sealant. Match sealant color to fixture color.

O. Install piping connections between plumbing fixtures and piping systems and plumbing equipment. Install insulation on supplies and drains of fixtures for people with disabilities.

P. Ground equipment.

END OF SECTION 224000

SECTION 230500 - COMMON WORK RESULTS FOR HVAC

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Product Data.

PART 2 - PRODUCTS

2.1 SLEEVES

A. Mechanical Sleeve Seals: Modular rubber sealing element unit, designed for field assembly, to fill annular space between pipe and sleeve.

B. Galvanized-Steel Sheet: 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint.

C. Steel Pipe: ASTM A 53, Type E, Grade B, Schedule 40, galvanized, plain ends.

D. PVC Pipe: ASTM D 1785, Schedule 40.

2.2 GROUT

A. Description: ASTM C 1107, Grade B, nonshrink and nonmetallic, dry hydraulic-cement grout.

2.3 MOTORS

A. Motor Characteristics:

1. Motors 3/4 HP and Larger: Three phase.
2. Motors Smaller Than 3/4 HP: Single phase.
3. Frequency Rating: 60 Hz.
4. Voltage Rating: NEMA standard voltage for circuit voltage to which motor is connected.
5. Service Factor: 1.15 for open dripproof motors; 1.0 for totally enclosed motors.
6. Duty: Continuous duty at ambient temperature of 105 deg F and at altitude of 3300 feet above sea level.
7. Capacity and Torque Characteristics: Sufficient to start, accelerate, and operate connected loads at designated speeds, at installed altitude and environment, with indicated operating sequence, and without exceeding nameplate ratings or considering service factor.
8. Enclosure: Unless otherwise indicated, open dripproof.
9. Motors Used with Variable-Frequency Controllers: Ratings, characteristics, and features coordinated with and approved by controller manufacturer.

2.4 HANGERS AND SUPPORTS

A. Hanger and Pipe Attachments: Factory fabricated with galvanized coatings; nonmetallic coated for hangers in direct contact with copper tubing.

B. Powder-Actuated Fasteners: Threaded-steel stud, with pull-out and shear capacities appropriate for supported loads and building materials where used.

C. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel, with pull-out and shear capacities appropriate for supported loads and building materials where used.

2.5 VIBRATION ISOLATION AND SEISMIC CONTROL DEVICES

A. Vibration Supports:

1. Pads: Arranged in single or multiple layers of oil- and water-resistant, neoprene of sufficient stiffness for uniform loading over pad area, molded with a nonslip pattern and galvanized-steel baseplates, and factory cut to sizes that match supported equipment.
2. Restrained Mounts: Double-deflection type, with molded, oil-resistant fiberglass, rubber or neoprene isolator elements with factory-drilled, encapsulated top plate and baseplate. Provide isolator with minimum 1-inch static deflection.

B. Vibration Hangers:

1. Elastomeric Hangers: Double-deflection type, with molded, oil-resistant rubber or neoprene isolator elements bonded to steel housings with threaded connections for hanger rods. Provide isolator with minimum 0.5-inch static deflection.
2. Spring Hangers: Combination coil-spring and elastomeric-insert hanger with spring and insert in compression. Provide isolator with minimum 1-inch static deflection.

C. Seismic Restraints:

1. Resilient Isolation Washers and Bushings: One-piece, molded, oil- and water-resistant neoprene, with a flat washer face.
2. Channel Support System: MFMA-4, shop- or field-fabricated support assembly made of slotted steel channels with accessories for attachment to braced component at one end and to building structure at the other end and other matching components and with corrosion-resistant coating; and rated in tension, compression, and torsion forces.
3. Restraining Cables: Galvanized-steel cables with end connections made of steel assemblies that swivel to final installation angle and use two clamping bolts for cable engagement.
4. Post-Installed Anchors: Torque-controlled expansion anchors, seismic rated, zinc-plated carbon steel for interior applications and stainless steel for exterior locations. Provide anchor bolts with strength four times the load imposed as tested according to ASTM E 488.

2.6 PRESSURE GAGES AND TEST PLUGS

A. Pressure Gages: Direct-mounting, indicating-dial type complying with ASME B40.100. Dry metal case, minimum 2-1/2-inch diameter with red pointer on white face, and plastic window. Minimum accuracy 3 percent of middle half of range. Range two times operating pressure.

B. Test Plug: Corrosion-resistant brass or stainless-steel body with two self-sealing rubber core inserts and gasketed and threaded cap, with extended stem for units to be installed in insulated piping. Minimum pressure and temperature rating of 500 psig at 200 deg F.

PART 3 - EXECUTION

3.1 MOTOR INSTALLATION

A. Anchor motor assembly to base, adjustable rails, or other support, arranged and sized according to manufacturer's written instructions.

3.2 GENERAL PIPING INSTALLATIONS

A. Install piping free of sags and bends.

B. Install fittings for changes in direction and branch connections.

C. Install sleeves for pipes passing through concrete walls, and concrete floor and roof slabs.

D. Exterior Wall, Pipe Penetrations: Mechanical sleeve seals installed in steel or cast-iron pipes for wall sleeves.

E. Install unions at final connection to each piece of equipment.

F. Install dielectric unions and flanges to connect piping materials of dissimilar metals in gas piping.

G. Install dielectric coupling and nipple fittings to connect piping materials of dissimilar metals in water piping.

3.3 GENERAL EQUIPMENT INSTALLATIONS

A. Install equipment to allow maximum possible headroom unless specific mounting heights are not indicated.

B. Install equipment level and plumb, parallel and perpendicular to other building systems and components, unless otherwise indicated.

C. Install mechanical equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.

D. Install equipment to allow right of way for piping installed at required slope.

3.4 HANGERS AND SUPPORTS

A. Comply with MSS SP-69 and MSS SP-89. Install building attachments within concrete or to structural steel.

B. Install hangers and supports to allow controlled thermal and seismic movement of piping systems.

C. Install powder-actuated fasteners and mechanical-expansion anchors in concrete after concrete is cured. Do not use in lightweight concrete or in slabs less than 4 inches thick.

D. Load Distribution: Install hangers and supports so piping live and dead loading and stresses from movement will not be transmitted to connected equipment.

E. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Specification Sections, install the following types:

1. Adjustable Steel Clevis Hangers (MSS Type 1): For suspension of noninsulated or insulated stationary pipes, NPS 1/2 to NPS 30.
2. Pipe Hangers (MSS Type 5): For suspension of pipes, NPS 1/2 to NPS 4, to allow off-center closure for hanger installation before pipe erection.
3. Adjustable Steel Band Hangers (MSS Type 7): For suspension of noninsulated stationary pipes, NPS 1/2 to NPS 8.
4. Adjustable Band Hangers (MSS Type 9): For suspension of noninsulated stationary pipes, NPS 1/2 to NPS 8.
5. Adjustable Swivel-Ring Band Hangers (MSS Type 10): For suspension of noninsulated stationary pipes, NPS 1/2 to NPS 2.

F. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Specification Sections, install the following types:

1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers, NPS 3/4 to NPS 20.
2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers, NPS 3/4 to NPS 20, if longer ends are required for riser clamps.

3.5 VIBRATION ISOLATION AND SEISMIC CONTROL DEVICE INSTALLATION

A. Adjust vibration isolators to allow free movement of equipment limited by restraints.

B. Install resilient bolt isolation washers and bushings on equipment anchor bolts.

C. Install cables so they do not bend across sharp edges of adjacent equipment or building structure.

END OF SECTION 230500

SECTION 230593 - TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Certified TAB reports.

B. TAB Firm Qualifications: AABC or NEBB certified.

C. TAB Report Forms: Standard TAB contractor's forms approved by Architect.

D. Perform TAB after leakage and pressure tests on air distribution systems have been satisfactorily completed.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine the Contract Documents to become familiar with Project requirements and to discover conditions in systems' designs that may preclude proper TAB of systems and equipment.

B. Examine the approved submittals for HVAC systems and equipment.

C. Examine systems for installed balancing devices, balancing valves and fittings, and manual volume dampers. Verify that locations of these balancing devices are accessible.

D. Examine system and equipment installations and verify that field quality-control testing, cleaning, and adjusting specified in individual Sections have been performed.

E. Examine HVAC equipment and filters and verify that bearings are greased, belts are aligned and tight, and equipment with functioning controls is ready for operation.

F. Examine automatic temperature system components to verify the following:

1. Dampers, valves, and other controlled devices are operated by the intended controller.
2. Dampers and valves are in the position indicated by the controller.
3. Integrity of dampers and valves for free and full operation and for tightness of fully closed and fully open positions.
4. Automatic modulating and shutoff valves, including two-way valves and three-way mixing and diverting valves, are properly connected.
5. Thermostats are located to avoid adverse effects of sunlight, drafts, and cold walls.
6. Sensors are located to sense only the intended conditions.
7. Sequence of operation for control modes is according to the Contract Documents.

8. Controller set points are set at indicated values.
9. Interlocked systems are operating.
10. Changeover from heating to cooling mode occurs according to indicated values.

G. Report deficiencies discovered before and during performance of test and balance procedures.

3.2 GENERAL PROCEDURES FOR TESTING AND BALANCING

A. Perform testing and balancing procedures on each system according to the procedures contained in AABC's "National Standards for Total System Balance" or NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems" and in this Section.

B. Cut insulation, ducts, pipes, and equipment cabinets for installation of test probes to the minimum extent necessary for TAB procedures. After testing and balancing, patch probe holes in ducts with same material and thickness as used to construct ducts. Install and join new insulation that matches removed materials. Restore insulation, coverings, vapor barrier, and finish.

C. Mark equipment and balancing devices, including damper-control positions, valve position indicators, fan-speed-control levers, and similar controls and devices, with paint or other suitable, permanent identification material to show final settings.

D. Take and report testing and balancing measurements in inch-pound (IP) units.

3.3 GENERAL PROCEDURES FOR BALANCING AIR SYSTEMS

A. Prepare schematic diagrams of systems' "as-built" duct layouts.

B. Determine the best locations in main and branch ducts for accurate duct airflow measurements.

C. Verify that motor starters are equipped with properly sized thermal protection.

D. Check for airflow blockages.

E. Check condensate drains for proper connections and functioning.

F. Check for proper sealing of air-handling unit components.

G. Check for proper sealing of air duct system.

3.4 TOLERANCES

A. Set HVAC system airflow and water flow rates within the following tolerances:

1. Supply, Return, and Exhaust Fans and Equipment with Fans: Plus or minus 10 percent.
2. Air Outlets and Inlets: Plus or minus 10 percent.

END OF SECTION 230593

SECTION 232300 - REFRIGERANT PIPING

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Comply with ASME B31.5, "Refrigerant Piping," and with ASHRAE 15, "Safety Code for Mechanical Refrigeration."

PART 2 - PRODUCTS

2.1 TUBES AND FITTINGS

A. Copper Tube: ASTM B 280, Type ACR.

B. Wrought-Copper Fittings: ASME B16.22.

C. Solder Filler Metals: ASTM B 32. Use 95-5 tin antimony or alloy HB solder to join copper socket fittings on copper pipe.

D. Brazing Filler Metals: AWS A5.8.

2.2 VALVES

A. Thermostatic Expansion Valve: Comply with ARI 750; forged brass or steel body, stainless-steel internal parts, copper tubing filled with refrigerant charge for 40 deg F suction temperature; 700-psig working pressure, and 240 deg F operating temperature.

B. Solenoid Valves: Comply with ARI 760; 240 deg F temperature rating, 400-psig working pressure, 240 deg F operating temperature; and 24-V normally closed holding coil.

2.3 REFRIGERANT PIPING SPECIALTIES

A. Strainers: Welded steel with corrosion-resistant coating and 100-mesh stainless-steel screen with socket ends; 500-psig working pressure and 275 deg F working temperature.

B. Moisture/Liquid Indicators: 500-psig operating pressure, 240 deg F operating temperature; with replaceable, polished, optical viewing window and color-coded moisture indicator.

C. Filter Dryers: 500-psig operating pressure; 240 deg F operating temperature; with replaceable core kit, gaskets, and filter-dryer cartridge.

D. Mufflers: Welded steel with corrosion-resistant coating and socket ends; 500-psig operating pressure; 240 deg F operating temperature.

E. Refrigerant: ASHRAE 34, R-410A.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with requirements in Division 23 Section "Common Work Results for HVAC" for basic piping installation requirements.

B. Install wall penetration system at each pipe penetration through foundation wall. Make installation watertight. Comply with requirements in Division 23 Section "Common Work Results for HVAC" for wall penetration systems.

C. Install refrigerant piping and charge with refrigerant according to ASHRAE 15.

D. Belowground, install copper tubing in PVC conduit. Vent conduit outdoors.

E. Slope refrigerant piping as follows:

1. Install horizontal hot-gas discharge piping with a uniform slope downward away from compressor.
2. Install horizontal suction lines with a uniform slope downward to compressor.
3. Install traps and double risers to entrain oil in vertical runs.
4. Liquid lines may be installed level.

F. Install solenoid valves upstream from each thermostatic expansion valve. Install solenoid valves in horizontal lines with coil at top.

G. Install thermostatic expansion valves as close as possible to distributors on evaporator coils.

H. Install moisture/liquid indicators in liquid line at the inlet of the thermostatic expansion valve or at the inlet of the evaporator coil capillary tube.

I. Install strainers upstream from and adjacent to solenoid valves, thermostatic expansion valves, and compressors unless they are furnished as an integral assembly for device being protected:

J. Install piping as short and direct as possible, with a minimum number of joints, elbows, and fittings.

3.2 PIPING APPLICATIONS FOR REFRIGERANT R-410A

A. Suction Lines: Copper, Type ACR, annealed- or drawn-temper tubing and wrought-copper fittings with brazed joints.

B. Hot-Gas and Liquid Lines: Copper, Type ACR, annealed- or drawn-temper tubing and wrought-copper fittings with brazed joints.

END OF SECTION 232300

SECTION 233100 - HVAC DUCTS AND CASINGS

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Product Data for fire and smoke dampers and Shop Drawings detailing duct layout and including locations and types of duct accessories, duct sizes, transitions, radius and vaned elbows, special supports details, and inlets and outlet types and locations.

B. Comply with NFPA 90A, "Installation of Air Conditioning and Ventilating Systems," and with NFPA 90B, "Installation of Warm Air Heating and Air Conditioning Systems."

C. Comply with NFPA 96 for ducts connected to commercial kitchen hoods.

D. Comply with UL 181 for ducts and closures.

PART 2 - PRODUCTS

2.1 DUCTS

A. Galvanized-Steel Sheet: ASTM A 653/A 653M, with G60 hot-dip galvanized coating.

B. Joint and Seam Tape, and Sealant: Comply with UL 181A.

C. Rectangular Metal Duct Fabrication: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

D. Fibrous-Glass Liner: Comply with NFPA 90A or NFPA 90B and with NAIMA AH124.

1. Thickness: 1-1/2 inches.
2. Airstream surface coated with an antimicrobial erosion-resistant coating.
3. Liner Adhesive: Comply with NFPA 90A or NFPA 90B and with ASTM C 916.
4. Mechanical Fasteners: Galvanized steel suitable for adhesive attachment, mechanical attachment, or welding attachment.

2.2 ACCESSORIES

A. Volume Dampers and Control Dampers: Single-blade and multiple opposed-blade dampers, standard leakage rating, and suitable for horizontal or vertical applications; factory fabricated and complete with required hardware and accessories.

B. Fire Dampers: Rated and labeled according to UL 555 by an NRTL; factory fabricated and complete with required hardware and accessories.

C. Ceiling Fire Dampers: Labeled according to UL 555C by an NRTL and complying with construction details for tested floor- and roof-ceiling assemblies as indicated in UL's "Fire Resistance Directory." Provide factory-fabricated units complete with required hardware and accessories.

D. Smoke Dampers: Labeled according to UL 555S by an NRTL. Combination fire and smoke dampers shall also be rated and labeled according to UL 555. Provide factory-fabricated units complete with required hardware and accessories.

E. Flexible Connectors: Flame-retarded or noncombustible fabrics, coatings, and adhesives complying with UL 181, Class 1.

F. Flexible Ducts: Spiral-wound steel spring with flameproof vinyl sheathing complying with UL 181, Class 1.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install ducts according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" unless otherwise indicated.

B. Seal ducts to the following seal classes according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible":

1. Outdoor, Supply-Air Ducts: Seal Class A.
2. Outdoor, Exhaust Ducts: Seal Class C.
3. Outdoor, Return-Air Ducts: Seal Class C.
4. Unconditioned Space, Supply-Air Ducts in Pressure Classes 2-Inch wg and Lower: Seal Class B.
5. Unconditioned Space, Supply-Air Ducts in Pressure Classes Higher Than 2-Inch wg: Seal Class A.
6. Unconditioned Space, Exhaust Ducts: Seal Class C.
7. Unconditioned Space, Return-Air Ducts: Seal Class B.
8. Conditioned Space, Supply-Air Ducts in Pressure Classes 2-Inch wg and Lower: Seal Class C.
9. Conditioned Space, Supply-Air Ducts in Pressure Classes Higher Than 2-Inch wg: Seal Class B.
10. Conditioned Space, Exhaust Ducts: Seal Class B.
11. Conditioned Space, Return-Air Ducts: Seal Class C.

C. Conceal ducts from view in finished and occupied spaces.

D. Avoid passing through electrical equipment spaces and enclosures.

E. Support ducts to comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Ch. 4, "Hangers and Supports."

F. Install duct accessories according to applicable details in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for metal ducts and in NAIMA AH116, "Fibrous Glass Duct Construction Standards," for fibrous-glass ducts.

G. Install volume and control dampers in lined duct with methods to avoid damage to liner and to avoid erosion of duct liner.

H. Install fire and smoke dampers according to UL listing.

I. Install fusible links in fire dampers.

J. Clean new duct systems before testing, adjusting, and balancing.

3.2 TESTING, ADJUSTING, AND BALANCING

A. Balance airflow within distribution systems, including submains, branches, and terminals to indicated quantities.

END OF SECTION 233100

SECTION 233423 - HVAC POWER VENTILATORS

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Product Data.

B. Products shall be licensed to use the AMCA-Certified Ratings Seal.

C. Power ventilators shall comply with UL 705.

D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

PART 2 - PRODUCTS

2.1 CEILING-MOUNTING OR IN-LINE CENTRIFUGAL VENTILATORS

A. Basis-of-Design Product: Product indicated on Drawings or comparable product by one of the following:

1. Loren Cook
2. Greenheck
3. Broan

B. Housing: Steel, lined with acoustical insulation.

C. Fan Wheel: Centrifugal wheels directly mounted on motor shaft. Fan shrouds, motor, and fan wheel shall be removable for service.

D. Grille: Aluminum, louvered or egg-crate grille with flange on intake and thumbscrew attachment to fan housing.

E. Electrical Requirements: Junction box for electrical connection on housing and receptacle for motor plug-in.

F. Accessories:

1. Variable-Speed Controller: Solid-state control to reduce speed from 100 to less than 50 percent.
2. Manual Starter Switch: Single-pole rocker switch assembly with cover and pilot light.
3. Motion Sensor: Motion detector with adjustable shutoff timer.
4. Filter: Washable aluminum to fit between fan and grille.
5. Isolation: Rubber-in-shear vibration isolators.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Ceiling-Mounted Units: Suspend units from structure using steel wire or metal straps.

END OF SECTION 233423

SECTION 233713 - DIFFUSERS, REGISTERS, AND GRILLES

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Product Data and color charts for factory finishes.

PART 2 - PRODUCTS

2.1 OUTLETS AND INLETS

A. Diffusers:

1. Products:

a. See schedule on drawings.

2. Material: Aluminum.
3. Finish: Baked enamel, white
4. Mounting: Surface with beveled frame

B. Wall and Ceiling Registers:

1. Products:

a. See schedule on drawings.

2. Material: Aluminum.
3. Finish: Baked enamel, white
4. Mounting: Countersunk screw.

C. Wall and Ceiling Grilles:

1. Products:

a. See schedule on drawings.

2. Material: Aluminum.
3. Finish: Baked enamel, white.
4. Mounting: Countersunk screw.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install diffusers, registers, and grilles level and plumb.

B. Ceiling-Mounted Outlets and Inlets: Drawings indicate general arrangement of ducts, fittings, and accessories. Make final locations where indicated, as much as practical. For units installed in lay-in ceiling panels, locate units in the center of panel unless otherwise indicated. Where architectural features or other items conflict with installation, notify Architect for a determination of final location.

C. After installation, adjust diffusers, registers, and grilles to air patterns indicated, or as directed, before starting air balancing.

END OF SECTION 233713

SECTION 238126 - SPLIT-SYSTEM AIR-CONDITIONERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes split-system air-conditioning units consisting of separate evaporator-fan and compressor-condenser components. Units are designed for exposed or concealed mounting, and may be connected to ducts.

1.3 SUBMITTALS

A. Product Data: Include rated capacities, furnished specialties, and accessories for each type of product indicated. Include performance data in terms of capacities, outlet velocities, static pressures, sound power characteristics, motor requirements, and electrical characteristics.

B. Shop Drawings: Diagram power, signal, and control wiring.

C. Field quality-control test reports.

D. Operation and Maintenance Data: For split-system air-conditioning units to include in emergency, operation, and maintenance manuals.

E. Warranty: Special warranty specified in this Section.

1.4 QUALITY ASSURANCE

A. Product Options: Drawings indicate size, profiles, and dimensional requirements of split-system units and are based on the specific system indicated.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Energy-Efficiency Ratio: Equal to or greater than prescribed by ASHRAE 90.1, "Energy Efficient Design of New Buildings except Low-Rise Residential Buildings."

D. Coefficient of Performance: Equal to or greater than prescribed by ASHRAE 90.1, "Energy Efficient Design of New Buildings except Low-Rise Residential Buildings."

E. Units shall be designed to operate with HCFC-free refrigerants.

1.5 COORDINATION

A. Coordinate size, location, and connection details with roof curbs, equipment supports, and roof penetrations.

1.6 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of split-system air-conditioning units that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion on compressors and coils, and one year on parts.

1.7 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Filters: One set of filters for each unit.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Carrier Air Conditioning; Div. of Carrier Corporation.
2. Trane Company (The); Unitary Products Group.
3. York International Corp.

2.2 EXPOSED EVAPORATOR-FAN COMPONENTS

A. Chassis: Galvanized steel with flanged edges, removable panels for servicing, and insulation on back of panel.

1. Insulation: Faced, glass-fiber duct liner.
2. Drain Pans: Galvanized steel, with connection for drain; insulated.
3. Ductless unit with finished enclosure exposed in room, adjustable deflection supply grille, return grille and wall mount or suspended support brackets.

B. Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins, complying with ARI 210/240, and with thermal-expansion valve.

C. Fan: Forward-curved, double-width wheel of galvanized steel; directly connected to motor.

D. Fan Motors

1. Special Motor Features: Multi-tapped, variable speed with internal thermal protection and permanent lubrication.

E. Disposable Filters: 1 inch thick, in fiberboard frames.

F. Wiring Terminations: Connect motor to chassis wiring with plug connection.

2.3 AIR-COOLED, COMPRESSOR-CONDENSER COMPONENTS

A. Casing: Steel, finished with baked enamel in color selected by Architect, with removable panels for access to controls, weep holes for water drainage, and mounting holes in base. Provide brass service valves, fittings, and gage ports on exterior of casing.

B. Compressor: Hermetically sealed with crankcase heater and mounted on vibration isolation. Compressor motor shall have thermal- and current-sensitive overload devices, start capacitor, relay, and contactor.

1. Compressor Type: Reciprocating.
2. Two-speed compressor motor with manual-reset high-pressure switch and automatic-reset low-pressure switch.
3. Refrigerant Charge: R-410a or 407c.

C. Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins, complying with ARI 210/240, and with liquid subcooler.

D. Fan: Aluminum-propeller type, directly connected to motor.

E. Motor: Permanently lubricated, with integral thermal-overload protection.

F. Low Ambient Kit: Permits operation down to 45 deg F.

2.4 ACCESSORIES

A. Refrigerant Line Kits: Soft-annealed copper suction and liquid lines factory cleaned, dried, pressurized, and sealed; factory-insulated suction line with flared fittings at both ends.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install units level and plumb.

B. Install evaporator-fan components using manufacturer's standard mounting devices securely fastened to building structure.

C. Install roof-mounting compressor-condenser components on equipment supports. Anchor units to supports with removable, cadmium-plated fasteners.

D. Install seismic restraints.

E. Install compressor-condenser components on restrained, spring isolators with a minimum static deflection of 1 inch.

F. Install and connect precharged refrigerant tubing to component's quick-connect fittings. Install tubing to allow access to unit.

3.2 CONNECTIONS

A. Piping installation requirements are specified in other Division 23 sections. Drawings indicate general arrangement of piping, fittings and specialties.

B. Install piping adjacent to unit to allow service and maintenance.

C. Ground equipment according to Division 26.

D. Electrical Connections: Comply with requirements in Division 26 Sections for power wiring, switches, and motor controls.

3.3 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust field-assembled components and equipment installation, including connections, and to assist in field testing. Report results in writing.

B. Perform the following field tests and inspections and prepare test reports:

1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
2. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

C. Remove and replace malfunctioning units and retest as specified above.

3.4 STARTUP SERVICE

A. Engage a factory-authorized service representative to perform startup service.

1. Complete installation and startup checks according to manufacturer's written instructions.

3.5 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain units.

END OF SECTION 233713

SECTION 26 05 11
REQUIREMENTS FOR ELECTRICAL INSTALLATIONS

PART 1 - GENERAL

1.1 DESCRIPTION

A. This section applies to all sections of Division 26.

B. Furnish and install electrical wiring, systems, equipment and accessories in accordance with the specifications and drawings. Capacities and ratings of motors, transformers, cable, switchboards, switchgear, panelboards, and other items and arrangements for the specified items are shown on drawings.

C. Electrical service entrance equipment (arrangements for temporary and permanent connections to the utility's system) shall conform to the utility's requirements. Coordinate fuses, circuit breakers and relays with the utility's system, and obtain utility approval for sizes and settings of these devices.

D. Wiring ampacities specified or shown on the drawings are based on copper conductors, with the conduit and raceways accordingly sized. Aluminum conductors are prohibited.

E. Commissioning of site Lighting, including illumination fixtures housed in Luminaria structures. Coordinate programming with WF Consultant controller system.

1.2 MINIMUM REQUIREMENTS

A. References to the International Building Code (IBC), National Electrical Code (NEC), Underwriters Laboratories, Inc. (UL) and National Fire Protection Association (NFPA) are minimum installation requirement standards.

B. Drawings and other specification sections shall govern in those instances where requirements are greater than those specified in the above standards.

1.3 TEST STANDARDS

A. All materials and equipment shall be listed, labeled or certified by a nationally recognized testing laboratory to meet Underwriters Laboratories, Inc., standards where test standards have been established. Equipment and materials which are not covered by UL Standards will be accepted provided equipment and material is listed, labeled, certified or otherwise determined to meet safety requirements of a nationally recognized testing laboratory. Equipment of a class which no nationally recognized testing laboratory accepts, certifies, lists, labels, or determines to be safe, will be considered if inspected or tested in accordance with national industrial standards, such as

NEMA, or ANSI. Evidence of compliance shall include certified test reports and definitive shop drawings.

B. Definitions:

1. Listed; Equipment, materials, or services included in a list published by an organization that is acceptable to the authority having jurisdiction and concerned with evaluation of products or services, that maintains periodic inspection of production or listed equipment or materials or periodic evaluation of services, and whose listing states that the equipment, material, or services either meets appropriate designated standards or has been tested and found suitable for a specified purpose.
2. Labeled; Equipment or materials to which has been attached a label, symbol, or other identifying mark of an organization that is acceptable to the authority having jurisdiction and concerned with product evaluation, that maintains periodic inspection of production of labeled equipment or materials, and by whose labeling the manufacturer indicates compliance with appropriate standards or performance in a specified manner.
3. Certified; equipment or product which:
    a. Has been tested and found by a nationally recognized testing laboratory to meet nationally recognized standards or to be safe for use in a specified manner.
    b. Production of equipment or product is periodically inspected by a nationally recognized testing laboratory.
    c. Bears a label, tag, or other record of certification.
4. Nationally recognized testing laboratory; laboratory which is approved, in accordance with OSHA regulations, by the Secretary of Labor.

1.4 QUALIFICATIONS (PRODUCTS AND SERVICES)

A. Manufacturers Qualifications: The manufacturer shall regularly and presently produce, as one of the manufacturer's principal products, the equipment and material specified for this project, and shall have manufactured the item for at least three years.

B. Product Qualification:

1. Manufacturer's product shall have been in satisfactory operation, on three installations of similar size and type as this project, for approximately three years.
2. The Government reserves the right to require the Contractor to submit a list of installations where the products have been in operation before approval.

C. Service Qualifications: There shall be a permanent service organization maintained or trained by the manufacturer which will render satisfactory service to this installation within eight hours of receipt of notification that service is needed. Submit name and address of service organizations.

1.5 APPLICABLE PUBLICATIONS

Applicable publications listed in all Sections of Division are the latest issue, unless otherwise noted.

1.6 MANUFACTURED PRODUCTS

A. Materials and equipment furnished shall be of current production by manufacturers regularly engaged in the manufacture of such items, for which replacement parts shall be available.

B. When more than one unit of the same class or type of equipment is required, such units shall be the product of a single manufacturer.

C. Equipment Assemblies and Components:

1. Components of an assembled unit need not be products of the same manufacturer.
2. Manufacturers of equipment assemblies, which include components made by others, shall assume complete responsibility for the final assembled unit.
3. Components shall be compatible with each other and with the total assembly for the intended service.
4. Constituent parts which are similar shall be the product of a single manufacturer.

D. Factory wiring shall be identified on the equipment being furnished and on all wiring diagrams.

E. When Factory Testing Is Specified:

1. The Government shall have the option of witnessing factory tests. The contractor shall notify the Resident Engineer a minimum of 15 working days prior to the manufacturers making the factory tests.
2. Four copies of certified test reports containing all test data shall be furnished to the Resident Engineer prior to final inspection and not more than 90 days after completion of the tests.
3. When equipment fails to meet factory test and re-inspection is required, the contractor shall be liable for all additional expenses, including expenses of the Government.

1.7 EQUIPMENT REQUIREMENTS

Where variations from the contract requirements are requested, in accordance with section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES, the connecting work and related components shall include, but not be limited to additions or changes to branch circuits, circuit protective devices, conduits, wire, feeders, controls, panels and installation methods.

1.8 EQUIPMENT PROTECTION

A. Equipment and materials shall be protected during shipment and storage against physical damage, vermin, dirt, corrosive substances, fumes, moisture, cold and rain.

1. Store equipment indoors in clean dry space with uniform temperature to prevent condensation. Equipment shall include but not be limited to switchgear, switchboards, panelboards, transformers, motor controllers, uninterruptible power systems, enclosures, controllers, circuit protective devices, cables, wire, light fixtures, electronic equipment, and accessories.
2. During installation, equipment shall be protected against entry of foreign matter; and be vacuum-cleaned both inside and outside before testing and operating. Compressed air shall not be used to clean equipment. Remove loose packing and flammable materials from inside equipment.
3. Damaged equipment shall be, as determined by the Resident Engineer, placed in first class operating condition or be returned to the source of supply for repair or replacement.
4. Painted surfaces shall be protected with factory installed removable heavy kraft paper, sheet vinyl or equal.
5. Damaged paint on equipment and materials shall be refinished with the same quality of paint and workmanship as used by the manufacturer so repaired areas are not obvious.

1.9 WORK PERFORMANCE

A. All electrical work must comply with the requirements of NFPA 70 (NEC), NFPA 70B, NFPA 70E, OSHA Part 1910 subpart J, OSHA Part 1910 subpart S and OSHA Part 1910 subpart K in addition to other references required by contract.

B. Job site safety and worker safety is the responsibility of the contractor.

C. Electrical work shall be accomplished with all affected circuits or equipment de-energized. When an electrical outage cannot be accomplished in this manner for the required work, the following requirements are mandatory:

1. Electricians must use full protective equipment (i.e., certified and tested insulating material to cover exposed energized electrical components, certified and tested insulated tools, etc.) while working on energized systems in accordance with NFPA 70E.
2. Electricians must wear personal protective equipment while working on energized systems in accordance with NFPA 70E.

3. Before initiating any work, a job specific work plan must be developed by the contractor with a peer review conducted and documented by the Resident Engineer. The work plan must include procedures to be used on and near the live electrical equipment, barriers to be installed, safety equipment to be used and exit pathways.
4. Work on energized circuits or equipment cannot begin until prior written approval is obtained from the Resident Engineer.

D. For work on existing stations, arrange, phase and perform work to assure electrical service for other buildings at all times. Refer to article OPERATIONS AND STORAGE AREAS under Section 01 00 00, GENERAL REQUIREMENTS.

E. New work shall be installed and connected to existing work neatly, safely and professionally. Disturbed or damaged work shall be replaced or repaired to its prior conditions as required by Section 01 00 00, GENERAL REQUIREMENTS.

F. Coordinate location of equipment and conduit with other trades to minimize interferences.

1.10 EQUIPMENT INSTALLATION AND REQUIREMENTS

A. Equipment location shall be as close as practical to locations shown on the drawings.

B. Working spaces shall not be less than specified in the NEC for all voltages specified.

C. Inaccessible Equipment:

1. Where the Government determines that the Contractor has installed equipment not conveniently accessible for operation and maintenance, the equipment shall be removed and reinstalled as directed at no additional cost to the Government.
2. "Conveniently accessible" is defined as being capable of being reached quickly for operation, maintenance, or inspections without the use of ladders, or without climbing or crawling under or over obstacles such as, but not limited to, motors, pumps, belt guards, transformers, piping, ductwork, conduit and raceways.

1.11 EQUIPMENT IDENTIFICATION

A. In addition to the requirements of the NEC, install an identification sign which clearly indicates information required for use and maintenance of items such as panelboards, cabinets, motor controllers (starters), safety switches, separately enclosed circuit breakers, individual breakers and controllers in switchboards, switchgear and motor control assemblies, control devices and other significant equipment.

B. Nameplates for Normal Power System equipment shall be laminated black phenolic resin with a white core with engraved lettering. Lettering shall be a minimum of 1/2 inch high. Nameplates

shall indicate equipment designation, rated bus amperage, voltage, number of phases and number of wires. Secure nameplates with screws.

1.12 SUBMITTALS

A. Submit in accordance with Part 1 – "General Provisions" of the Greenbook and Whitebook.

B. The Government's approval shall be obtained for all equipment and material before delivery to the job site. Delivery, storage or installation of equipment or material which has not had prior approval will not be permitted at the job site.

C. All submittals shall include adequate descriptive literature, catalog cuts, shop drawings and other data necessary for the Government to ascertain that the proposed equipment and materials comply with specification requirements. Catalog cuts submitted for approval shall be legible and clearly identify equipment being submitted.

D. Submittals for individual systems and equipment assemblies which consist of more than one item or component shall be made for the system or assembly as a whole. Partial submittals will not be considered for approval.

1. Mark the submittals, "SUBMITTED UNDER SECTION_____".
2. Submittals shall be marked to show specification reference including the section and paragraph numbers.
3. Submit each section separately.

E. The submittals shall include the following:

1. Information that confirms compliance with contract requirements. Include the manufacturer's name, model or catalog numbers, catalog information, technical data sheets, shop drawings, pictures, nameplate data and test reports as required.
2. Submittals are required for all equipment anchors and supports. Submittals shall include weights, dimensions, center of gravity, standard connections, manufacturer's recommendations and behavior problems (e.g., vibration, thermal expansion,) associated with equipment or piping so that the proposed installation can be properly reviewed. Include sufficient fabrication information so that appropriate mounting and securing provisions may be designed and/or attached to the equipment.
3. Parts list which shall include those replacement parts recommended by the equipment manufacturer.

F. Manuals: Submit accordance with Section 01 00 00, GENERAL REQUIREMENTS.

1. Maintenance and Operation Manuals: Submit as required for systems and equipment specified in the technical sections. Furnish four copies, bound in hardback binders,

(manufacturer's standard binders) or an approved equivalent. Furnish one complete manual as specified in the technical section but in no case later than prior to performance of systems or equipment test, and furnish the remaining manuals prior to contract completion.

2. Inscribe the following identification on the cover: the words "MAINTENANCE AND OPERATION MANUAL," the name and location of the system, equipment, building, name of Contractor, and contract number. Include in the manual the names, addresses, and telephone numbers of each subcontractor installing the system or equipment and the local representatives for the system or equipment.
3. Provide a "Table of Contents" and assemble the manual to conform to the table of contents, with tab sheets placed before instructions covering the subject. The instructions shall be legible and easily read, with large sheets of drawings folded in.
4. The manuals shall include:
    a. Internal and interconnecting wiring and control diagrams with data to explain detailed operation and control of the equipment.
    b. A control sequence describing start-up, operation, and shutdown.
    c. Description of the function of each principal item of equipment.
    d. Installation instructions.
    e. Safety precautions for operation and maintenance.
    f. Diagrams and illustrations.
    g. Periodic maintenance and testing procedures and frequencies, including replacement parts numbers and replacement frequencies.
    h. Performance data.
    i. Pictorial "exploded" parts list with part numbers. Emphasis shall be placed on the use of special tools and instruments. The list shall indicate sources of supply, recommended spare parts, and name of servicing organization.
    j. List of factory approved or qualified permanent servicing organizations for equipment repair and periodic testing and maintenance, including addresses and factory certification qualifications.

G. Approvals will be based on complete submission of manuals together with shop drawings.

H. After approval and prior to installation, furnish the Resident Engineer with one sample of each of the following:

1. A 12 inch length of each type and size of wire and cable along with the tag from the coils of reels from which the samples were taken.
2. Each type of conduit coupling, bushing and termination fitting.
3. Conduit hangers, clamps and supports.
4. Duct sealing compound.
5. Each type of receptacle, toggle switch, occupancy sensor, outlet box, manual motor starter, device wall plate, engraved nameplate, wire and cable splicing and terminating material, and branch circuit single pole molded case circuit breaker.

1.13 SINGULAR NUMBER

Where any device or part of equipment is referred to in these specifications in the singular number (e.g., "the switch"), this reference shall be deemed to apply to as many such devices as are required to complete the installation as shown on the drawings.

1.14 ADVANCED PROGRAMMING

A. Factory trained personnel (Programmer), familiar with the installed system(s), shall be provided for the purposes of executing programming services to meet specified requirements. The Programmer will work in close conjunction with, the ETC Factory Certified System's Commissioning Technician, the Audio Visual Technician, and the Gilderfluke, Musical Show, with the water feature functions, Programmer Technician. The ETC Factory Certified System's Commissioning Technician shall be providing Turn-On services. Programming services and Turn-On services may, or may not, occur concurrently depending on project specifics.

B. The Programmer, at the direction of the Lighting Consultant and/or Owner's Representative, will adjust all programmable components of the lighting and control system to meet the design intent of the project.

C. The Programmer will be factory trained and will hold current certification for all furnished control systems. Re-certification for Programmers will be required at least every five (5) years.

D. Advanced Programming Services will be priced on a per-day basis and will be estimated and quoted for a complete project. Additional time will be charged at a quoted day-rate.

E. The [Electrical/General] Contractor (not the Programmer) will be required to provide any and all equipment required for the execution of Advanced Programming – including, but not limited to, temporary programming consoles and monitors, tables and chairs, site access and necessary support personnel, which will be specified by the Programmer at the time the schedule for Programming Service is determined..

1.15 LIGHTING CONTROLS INTEGRATOR (LCI) REQUIREMENTS:

A. The provider of the system herein described shall be acknowledged in business as a Lighting Controls Integration Company, hereafter referred to as LCI.

B. The LCI company shall employ full time Systems Integrators and Project Managers with experience in completing work of similar or greater size and scope.

C. The LCI shall be a lighting system contractor who regularly engages in the furnishing, installation and servicing of systems of similar nature, size, scope and complexity to that contemplated by this specification. The contractor shall have done so for a period of not less than twenty years preceding the bid date.

D. The LCI shall be an authorized dealer for all equipment and systems required under this specification.

E. The contractor shall have maintained for the five years preceding the bid date, a suitably staffed and equipped service organization which has continuously offered maintenance and repair services for the systems being provided.

F. The LCI shall have on staff at least two full-time manufacturer-certified field service technicians and have technical support and assistance accessible 24 hours a day, seven days a week.

G. The contractor shall maintain for the duration of this contract all required business and professional licenses and insurance.

H. The contractor shall have on staff a factory trained field service agent, capable of system testing, commissioning and troubleshooting the system being provided.

I. The contractor shall have on staff a qualified and competent engineer capable of designing systems of the nature, size, scope and complexity to that contemplated by this specification.

J. The contractor shall demonstrate to the satisfaction of the owner, through submittals presented in accordance with the project timetable, that the contractor meets all the above qualifications.

L. Requirements for Approval: Lighting Controls Integrators seeking acceptance must submit the following information ten days prior to bid date. Failure to submit any of the required information will automatically disqualify the contractor from consideration of approval.

1. Listing of 10 equivalent installations including:

a. Name, address, and current telephone number of Owner.

b. Name, address, and current telephone number of Architect or theater consultant associated with the installation.

c. Scope of work of the installation including all sub-contractors and manufacturers.

2. Brief written description of the LCI's operation, including facilities, departments and key personnel.

3. Biographical information of the Project Manager and integration team members who will be assigned to this project should the contractor be successful.

4. A full and complete financial statement sufficient to determine financial viability.

M. A list of all sub-contractors who the LCI proposes to use including their qualifications to perform the work.

1.16 ACCEPTANCE CHECKS AND TESTS

The contractor shall furnish the instruments, materials and labor for field tests.

1.17 TRAINING

A. Training shall be provided for the particular equipment or system as required in each associated specification.

B. A training schedule shall be developed and submitted by the contractor and approved by the Resident Engineer at least 30 days prior to the planned training.

End of Section 26 05 11

SECTION 26 05 21
LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES
(600 VOLTS AND BELOW)

PART 1 - GENERAL

1.1 DESCRIPTION

This section specifies the furnishing, installation, and connection of the low voltage power and lighting wiring.

1.2 RELATED WORK

A. General electrical requirements that are common to more than one section in Division 26: Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS.

B. Conduits for cables and wiring: Section 26 05 33, RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS.

C. Requirements for personnel safety and to provide a low impedance path for possible ground fault currents: Section 26 05 26, GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS.

1.3 SUBMITTALS

A. In accordance with Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS, furnish the following:

1. Manufacturer's Literature and Data: Showing each cable type and rating.
2. Certificates: Two weeks prior to final inspection, deliver to the Resident Engineer four copies of the certification that the material is in accordance with the drawings and specifications and has been properly installed.

1.4 APPLICABLE PUBLICATIONS

A. Publications listed below (including amendments, addenda, revisions, supplements and errata) form a part of this specification to the extent referenced. Publications are reference in the text by the basic designation only.

B. American Society of Testing Material (ASTM):

D2301-04 ..... Standard Specification for Vinyl Chloride Plastic Pressure Sensitive Electrical Insulating Tape

C. Federal Specifications (Fed. Spec.):

A-A-59544-00 ..... Cable and Wire, Electrical (Power, Fixed Installation)

D. National Fire Protection Association (NFPA):

70-05 ..... National Electrical Code (NEC)

E. Underwriters Laboratories, Inc. (UL):

44-02 ..... Thermoset-Insulated Wires and Cables

83-03 ..... Thermoplastic-Insulated Wires and Cables

467-01 ..... Electrical Grounding and Bonding Equipment

486A-01 ..... Wire Connectors and Soldering Lugs for Use with Copper Conductors

486C-02 ..... Splicing Wire Connectors

486D-02 ..... Insulated Wire Connector Systems for Underground Use or in Damp or Wet Locations

486E-00 ..... Equipment Wiring Terminals for Use with Aluminum and/or Copper Conductors

493-01 ..... Thermoplastic-Insulated Underground Feeder and Branch Circuit Cable

514B-02 ..... Fittings for Cable and Conduit

1479-03 ..... Fire Tests of Through-Penetration Fire Stops

PART 2 - PRODUCTS

2.1 CABLE AND WIRE (POWER AND LIGHTING)

A. Cable and Wire shall be in accordance with Fed. Spec. A-A-59544, except as hereinafter specified.

B. Single Conductor:

1. Shall be annealed copper.
2. Shall be stranded for sizes No. 8 AWG and larger, solid for sizes No. 10 AWG and smaller.
3. Shall be minimum size No. 12 AWG, except where smaller sizes are allowed herein.

C. Insulation:

1. THW, XHHW, or dual rated THHN-THWN shall be in accordance with UL 44, and 83.
2. Direct burial: UF or USE shall be in accordance with UL 493.
3. Isolated power system wiring: Type XHHW with a dielectric constant of 3.5 or less.

D. Color Code:

1. Secondary service, feeder and branch circuit conductors shall be color coded as follows:

208/120 volt	Phase	480/277 volt
Black	A	Brown
Red	B	Orange

Blue	C	Yellow
White	Neutral	Gray *
* or white with colored (other than green) tracer.		

a. The lighting circuit “switch legs” and 3-way switch “traveling wires” shall have color coding unique and distinct (i.e. pink and purple) from the color coding indicated above. The unique color codes shall be solid and in accordance with the NEC. Field coordinate for a final color coding with the Resident Engineer.

2. Use solid color compound or solid color coating for No. 12 AWG and No. 10 AWG branch circuit conductors and neutral sizes.
3. Phase conductors No. 8 AWG and larger shall be color-coded using one of the following methods:
   a. Solid color compound or solid color coating.
   b. Stripes, bands, or hash marks of color specified above.
   c. Color as specified using 19 mm (3/4 inch) wide tape. Apply tape in half overlapping turns for a minimum of 75 mm (three inches) for terminal points, and in junction boxes, pull boxes, troughs, manholes, and handholes. Apply the last two laps of tape with no tension to prevent possible unwinding. Where cable markings are covered by tape, apply tags to cable stating size and insulation type.
4. For modifications and additions to existing wiring systems, color coding shall conform to the existing wiring system.
5. Color code for isolated power system wiring shall be in accordance with the NEC.

2.2 SPLICES AND JOINTS

A. In accordance with UL 486A, C, D, E and NEC.

B. Branch circuits (No. 10 AWG and smaller):
   1. Connectors: Solderless, screw-on, reusable pressure cable type, 600 volt, 105 degree C with integral insulation, approved for copper and aluminum conductors.
   2. The integral insulator shall have a skirt to completely cover the stripped wires.
   3. The number, size, and combination of conductors, as listed on the manufacturers packaging shall be strictly complied with.

C. Feeder Circuits:
   1. Connectors shall be indent, hex screw, or bolt clamp-type of high conductivity and corrosion-resistant material.

2. Field installed compression connectors for cable sizes 250 kcmil and larger shall have not less than two clamping elements or compression indents per wire.
3. Insulate splices and joints with materials approved for the particular use, location, voltage, and temperature. Insulate with not less than that of the conductor level that is being joined.
4. Plastic electrical insulating tape: ASTM D2304 shall apply, flame retardant, cold and weather resistant.

2.3 CONTROL WIRING

A. Unless otherwise specified in other sections of these specifications, control wiring shall be as specified for power and lighting wiring, except the minimum size shall be not less than No. 14 AWG.

B. Control wiring shall be large enough so that the voltage drop under inrush conditions does not adversely affect operation of the controls.

2.4 WIRE LUBRICATING COMPOUND

A. Suitable for the wire insulation and conduit it is used with, and shall not harden or become adhesive.

B. Shall not be used on wire for isolated type electrical power systems.

2.5 WARNING TAPE

A. The tape shall be standard, 76 mm (3 inch) wide, 4-Mil polyethylene type.

B. The tape shall be red with black letters indicating “CAUTION BURIED ELECTRIC LINE BELOW”.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Install in accordance with the NEC, and as specified.

B. Install all wiring in raceway systems, except where direct burial or HCF Type AC cables are used.

C. Splice cables and wires only in outlet boxes, junction boxes, pull boxes, manholes, or handholes.

D. Wires of different systems (i.e. 120V, 277V) shall not be installed in the same conduit or junction box system.

E. Install cable supports for all vertical feeders in accordance with the NEC. Provide split wedge type which firmly clamps each individual cable and tightens due to cable weight.

F. For panelboards, cabinets, wireways, switches, and equipment assemblies, neatly form, train, and tie the cables in individual circuits.

G. Seal cable and wire entering a building from underground, between the wire and conduit where the cable exits the conduit, with a non-hardening approved compound.

H. Wire Pulling:

1. Provide installation equipment that will prevent the cutting or abrasion of insulation during pulling of cables.
2. Use ropes made of nonmetallic material for pulling feeders.
3. Attach pulling lines for feeders by means of either woven basket grips or pulling eyes attached directly to the conductors, as approved by the Resident Engineer.
4. Pull in multiple cables together in a single conduit.

I. No more than (3) single-phase branch circuits shall be installed in any one conduit.

J. The wires shall be derated in accordance with NEC Article 310. Neutral wires, under conditions defined by the NEC, shall be considered current-carrying conductors.

3.2 SPLICE INSTALLATION

A. Splices and terminations shall be mechanically and electrically secure.

B. Where the Government determines that unsatisfactory splices or terminations have been installed, remove the devices and install approved devices at no additional cost to the Government.

3.3 CONTROL AND SIGNAL WIRING INSTALLATION

A. Unless otherwise specified in other sections, install wiring and connect to equipment/devices to perform the required functions as shown and specified.

B. Except where otherwise required, install a separate power supply circuit for each system so that malfunctions in any system will not affect other systems.

C. Where separate power supply circuits are not shown, connect the systems to the nearest panelboards of suitable voltages, which are intended to supply such systems and have suitable spare circuit breakers or space for installation.

D. Install a red warning indicator on the handle of the branch circuit breaker for the power supply circuit for each system to prevent accidental de-energizing of the systems.

E. System voltages shall be 120 volts or lower where shown on the drawings or as required by the NEC.

3.4 CONTROL AND SIGNAL SYSTEM IDENTIFICATION

A. Install a permanent wire marker on each wire at each termination.

B. Identifying numbers and letters on the wire markers shall correspond to those on the wiring diagrams used for installing the systems.

C. Wire markers shall retain their markings after cleaning.

D. In each manhole and handhole, install embossed brass tags to identify the system served and function.

3.5 FEEDER IDENTIFICATION

A. In each interior pullbox and junction box, install metal tags on each circuit cables and wires to clearly designate their circuit identification and voltage.

B. In each manhole and handhole, provide tags of the embossed brass type, showing the cable type and voltage rating. Attach the tags to the cables with slip-free plastic cable lacing units.

3.6 FIELD TESTING

A. Feeders and branch circuits shall have their insulation tested after installation and before connection to utilization devices such as fixtures, motors, or appliances.

B. Tests shall be performed by megger and conductors shall test free from short-circuits and grounds.

C. Test conductor phase-to-phase and phase-to-ground.

D. The Contractor shall furnish the instruments, materials, and labor for these tests.

End of Section 26 05 21

SECTION 26 05 26
GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 DESCRIPTION

A. This section specifies general grounding and bonding requirements of electrical equipment operations and to provide a low impedance path for possible ground fault currents.

B. "Grounding electrode system" refers to all electrodes required by NEC, as well as including made, supplementary, lightning protection system grounding electrodes.

C. The terms "connect" and "bond" are used interchangeably in this specification and have the same meaning.

1.2 RELATED WORK

A. Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS: General electrical requirements and items that are common to more than one section of Division 26.

B. Section 26 05 21, LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES (600 VOLTS AND BELOW): Low Voltage power and lighting wiring.

1.3 SUBMITTALS

A. Submit in accordance with Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS.

B. Shop Drawings:

1. Sufficient information, clearly presented, shall be included to determine compliance with drawings and specifications.
2. Include the location of system grounding electrode connections and the routing of aboveground and underground grounding electrode conductors.

C. Test Reports: Provide certified test reports of ground resistance.

D. Certifications: Two weeks prior to final inspection, submit four copies of the following to the Resident Engineer:

1. Certification that the materials and installation is in accordance with the drawings and specifications.
2. Certification, by the Contractor, that the complete installation has been properly installed and tested.

1.4 APPLICABLE PUBLICATIONS

Publications listed below (including amendments, addenda, revisions, supplements, and errata) form a part of this specification to the extent referenced. Publications are referenced in the text by the basic designation only.

A. American Society for Testing and Materials (ASTM):
   B1-2001 .....Standard Specification for Hard-Drawn Copper Wire
   B8-2004 .....Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft
B. Institute of Electrical and Electronics Engineers, Inc. (IEEE):
   81-1983 .....IEEE Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System
C. National Fire Protection Association (NFPA):
   70-2005 .....National Electrical Code (NEC)
   99-2005 .....Health Care Facilities
D. Underwriters Laboratories, Inc. (UL):
   44-2005 .....Thermoset-Insulated Wires and Cables
   83-2003 .....Thermoplastic-Insulated Wires and Cables
   467-2004 .....Grounding and Bonding Equipment
   486A-486B-2003 .....Wire Connectors

PART 2 - PRODUCTS

2.1 GROUNDING AND BONDING CONDUCTORS

A. Equipment grounding conductors shall be UL 83 insulated stranded copper, except that sizes 6 mm² (10 AWG) and smaller shall be solid copper. Insulation color shall be continuous green for all equipment grounding conductors, except that wire sizes 25 mm² (4 AWG) and larger shall be permitted to be identified per NEC.
B. Bonding conductors shall be ASTM B8 bare stranded copper, except that sizes 6 mm² (10 AWG) and smaller shall be ASTM B1 solid bare copper wire.
C. Isolated Power System: Type XHHW-2 insulation with a dielectric constant of 3.5 or less.
D. Electrical System Grounding: Conductor sizes shall not be less than what is shown on the drawings and not less than required by the NEC, whichever is greater.

2.2 GROUND RODS

A. Copper clad steel, 3/4-inch diameter by 10 feet long, conforming to UL 467.
B. Quantity of rods shall be as required to obtain the specified ground resistance.

2.3 SPLICES AND TERMINATION COMPONENTS

Components shall meet or exceed UL 467 and be clearly marked with the manufacturer, catalog number, and permitted conductor size(s).

2.4 GROUND CONNECTIONS

A. Below Grade: Exothermic-welded type connectors.

B. Above Grade:

1. Bonding Jumpers: compression type connectors, using zinc-plated fasteners and external tooth lockwashers.
2. Ground Busbars: Two-hole compression type lugs using tin-plated copper or copper alloy bolts and nuts.
3. Rack and Cabinet Ground Bars: one-hole compression-type lugs using zinc-plated or copper alloy fasteners.

2.5 EQUIPMENT RACK AND CABINET GROUND BARS

Provide solid copper ground bars designed for mounting on the framework of open or cabinet-enclosed equipment racks with minimum dimensions of 4 mm thick by 19 mm wide (3/8 inch x ¾ inch).

2.6 GROUND TERMINAL BLOCKS

At any equipment mounting location (e.g. backboards and hinged cover enclosures) where rack-type ground bars cannot be mounted, provide screw lug-type terminal blocks.

2.7 SPLICE CASE GROUND ACCESSORIES

Splice case grounding and bonding accessories shall be supplied by the splice case manufacturer when available. Otherwise, use 16 mm² (6 AWG) insulated ground wire with shield bonding connectors.

PART 3 - EXECUTION

3.1 GENERAL

A. Ground in accordance with the NEC, as shown on drawings, and as hereinafter specified.

B. System Grounding:

1. Secondary service neutrals: Ground at the supply side of the secondary disconnecting means and at the related transformers.
2. Separately derived systems (transformers downstream from the service entrance): Ground the secondary neutral.

C. Equipment Grounding: Metallic structures (including ductwork and building steel), enclosures, raceways, junction boxes, outlet boxes, cabinets, machine frames, and other conductive items in close proximity with electrical circuits shall be bonded and grounded.

3.2 INACCESSIBLE GROUNDING CONNECTIONS

Make grounding connections, which are buried or otherwise normally inaccessible (except connections for which periodic testing access is required) by exothermic weld.

3.3 SECONDARY EQUIPMENT AND CIRCUITS

A. Main Bonding Jumper: Bond the secondary service neutral to the ground bus in the service equipment.

B. Metallic Piping, Building Steel, and Supplemental Electrode(s):

1. Provide a grounding electrode conductor sized per NEC between the service equipment ground bus and all metallic water and gas pipe systems, building steel, and supplemental or made electrodes. Jumper insulating joints in the metallic piping. All connections to electrodes shall be made with fittings that conform to UL 467.
2. Provide a supplemental ground electrode and bond to the grounding electrode system.

C. Service Disconnect (Separate Individual Enclosure): Provide a ground bar bolted to the enclosure with lugs for connecting the various grounding conductors.

D. Switchgear, Switchboards, Unit Substations, and Motor Control Centers:

1. Connect the various feeder equipment grounding conductors to the ground bus in the enclosure with suitable pressure connectors.
2. For service entrance equipment, connect the grounding electrode conductor to the ground bus.
3. Connect metallic conduits, which terminate without mechanical connection to the housing, by grounding bushings and grounding conductor to the equipment ground bus.

E. Transformers:

1. Exterior: Exterior transformers supplying interior service equipment shall have the neutral grounded at the transformer secondary. Provide a grounding electrode at the transformer.
2. Separately derived systems (transformers downstream from service equipment): Ground the secondary neutral at the transformer. Provide a grounding electrode conductor from the transformer to the nearest component of the grounding electrode system.

F. Conduit Systems:

1. Ground all metallic conduit systems. All metallic conduit systems shall contain an equipment grounding conductor.
2. Non-metallic conduit systems shall contain an equipment grounding conductor, except that non-metallic feeder conduits which carry a grounded conductor from exterior transformers to interior or building-mounted service entrance equipment need not contain an equipment grounding conductor.

3. Conduit containing only a grounding conductor, and which is provided for mechanical protection of the conductor, shall be bonded to that conductor at the entrance and exit from the conduit.

G. Feeders and Branch Circuits: Install equipment grounding conductors with all feeders and power and lighting branch circuits.

H. Boxes, Cabinets, Enclosures, and Panelboards:
   1. Bond the equipment grounding conductor to each pullbox, junction box, outlet box, device box, cabinets, and other enclosures through which the conductor passes (except for special grounding systems for intensive care units and other critical units shown).
   2. Provide lugs in each box and enclosure for equipment grounding conductor termination.
   3. Provide ground bars in panelboards, bolted to the housing, with sufficient lugs to terminate the equipment grounding conductors.

I. Motors and Starters: Provide lugs in motor terminal box and starter housing or motor control center compartment to terminate equipment grounding conductors.

J. Receptacles shall not be grounded through their mounting screws. Ground with a jumper from the receptacle green ground terminal to the device box ground screw and the branch circuit equipment grounding conductor.

K. Ground lighting fixtures to the equipment grounding conductor of the wiring system when the green ground is provided; otherwise, ground the fixtures through the conduit systems. Fixtures connected with flexible conduit shall have a green ground wire included with the power wires from the fixture through the flexible conduit to the first outlet box.

L. Fixed electrical appliances and equipment shall be provided with a ground lug for termination of the equipment grounding conductor.

M. Panelboard Bonding: The equipment grounding terminal buses of the normal and essential branch circuit panelboards serving the same individual patient vicinity shall be bonded together with an insulated continuous copper conductor not less than 16 mm^2 (10 AWG). These conductors shall be installed in rigid metal conduit.

3.4 CORROSION INHIBITORS

When making ground and ground bonding connections, apply a corrosion inhibitor to all contact surfaces. Use corrosion inhibitor appropriate for protecting a connection between the metals used.

3.5 CONDUCTIVE PIPING

A. Bond all conductive piping systems, interior and exterior, to the building to the grounding electrode system. Bonding connections shall be made as close as practical to the equipment ground bus.

3.6 ELECTRICAL ROOM GROUNDING

Building Earth Ground Busbars: Provide ground busbar hardware at each electrical room and connect to pigtail extensions of the building grounding ring.

3.7 WIREWAY GROUNDING

A. Ground and Bond Metallic Wireway Systems as follows:

1. Bond the metallic structures of wireway to provide 100 percent electrical continuity throughout the wireway system by connecting a 16 mm² (6 AWG) bonding jumper at all intermediate metallic enclosures and across all section junctions.
2. Install insulated 16 mm² (6 AWG) bonding jumpers between the wireway system bonded as required in paragraph 1 above, and the closest building ground at each end and approximately every 50 feet.
3. Use insulated 16 mm² (6 AWG) bonding jumpers to ground or bond metallic wireway at each end at all intermediate metallic enclosures and cross all section junctions.
4. Use insulated 16 mm² (6 AWG) bonding jumpers to ground cable tray to column-mounted building ground plates (pads) at each end and approximately every 15 meters.

3.8 GROUND RESISTANCE

A. Grounding system resistance to ground shall not exceed 5 ohms. Make necessary modifications or additions to the grounding electrode system for compliance without additional cost to the Government. Final tests shall assure that this requirement is met.

B. Resistance of the grounding electrode system shall be measured using a four-terminal fall-of-potential method as defined in IEEE 81. Ground resistance measurements shall be made before the electrical distribution system is energized and shall be made in normally dry conditions not less than 48 hours after the last rainfall. Resistance measurements of separate grounding electrode systems shall be made before the systems are bonded together below grade. The combined resistance of separate systems may be used to meet the required resistance, but the specified number of electrodes must still be provided.

C. Services at power company interface points shall comply with the power company ground resistance requirements.

D. Below-grade connections shall be visually inspected by the Resident Engineer prior to backfilling. The Contractor shall notify the Resident Engineer 24 hours before the connections are ready for inspection.

3.9 GROUND ROD INSTALLATION

A. Drive each rod vertically in the earth, not less than 10 feet in depth.

B. Where permanently concealed ground connections are required, make the connections by the exothermic process to form solid metal joints. Make accessible ground connections with mechanical pressure type ground connectors.

C. Where rock prevents the driving of vertical ground rods, install angled ground rods or grounding electrodes in horizontal trenches to achieve the specified resistance.

End of Section 26 05 26

SECTION 26 05 33
RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 DESCRIPTION

A. This section specifies the furnishing, installation, and connection of conduit, fittings, and boxes to form complete, coordinated, grounded raceway systems. Raceways are required for all wiring unless shown or specified otherwise.

B. Definitions: The term conduit, as used in this specification, shall mean any or all of the raceway types specified.

1.2 RELATED WORK

A. General electrical requirements and items that is common to more than one section of Division 26: Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS.

B. Requirements for personnel safety and to provide a low impedance path for possible ground fault currents: Section 26 05 26, GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS.

1.3 SUBMITTALS

In accordance with Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS, furnish the following:

A. Shop Drawings:

1. Size and location of main feeders;
2. Size and location of panels and pull boxes
3. Layout of required conduit penetrations through structural elements.
4. The specific item proposed and its area of application shall be identified on the catalog cuts.

B. Certification: Prior to final inspection, deliver to the Resident Engineer four copies of the certification that the material is in accordance with the drawings and specifications and has been properly installed.

1.4 APPLICABLE PUBLICATIONS

A. Publications listed below (including amendments, addenda, revisions, supplements and errata) form a part of this specification to the extent referenced. Publications are referenced in the text by the basic designation only.

B. National Fire Protection Association (NFPA):

70-05 .....National Electrical Code (NEC)

C. Underwriters Laboratories, Inc. (UL):

1-03 ..... Flexible Metal Conduit
5-01 ..... Surface Metal Raceway and Fittings
6-03 ..... Rigid Metal Conduit
50-03 ..... Enclosures for Electrical Equipment
360-03 ..... Liquid-Tight Flexible Steel Conduit
467-01 ..... Grounding and Bonding Equipment
514A-01 ..... Metallic Outlet Boxes
514B-02 ..... Fittings for Cable and Conduit
514C-05 ..... Nonmetallic Outlet Boxes, Flush-Device Boxes and Covers
651-02 ..... Schedule 40 and 80 Rigid PVC Conduit
651A-03 ..... Type EB and A Rigid PVC Conduit and HDPE Conduit
797-03 ..... Electrical Metallic Tubing
1242-00 ..... Intermediate Metal Conduit

D. National Electrical Manufacturers Association (NEMA):
TC-3-04 ..... PVC Fittings for Use with Rigid PVC Conduit and Tubing
FB1-03 ..... Fittings, Cast Metal Boxes and Conduit Bodies for Conduit, Electrical Metallic Tubing and Cable

PART 2 - PRODUCTS

2.1 MATERIAL

A. Conduit Size: In accordance with the NEC, but not less than 1/2 inch unless otherwise shown. Where permitted by the NEC, 1/2 inch flexible conduit may be used for tap connections to recessed lighting fixtures.

B. Conduit:
1. Rigid galvanized steel: Shall Conform to UL 6, ANSI C80.1.
2. Rigid aluminum: Shall Conform to UL 6A, ANSI C80.5.
3. Rigid intermediate steel conduit (IMC): Shall Conform to UL 1242, ANSI C80.6.
4. Electrical metallic tubing (EMT): Shall Conform to UL 797, ANSI C80.3. Maximum size not to exceed 4 inch and shall be permitted only with cable rated 600 volts or less.
5. Flexible galvanized steel conduit: Shall Conform to UL 1.
6. Liquid-tight flexible metal conduit: Shall Conform to UL 360.
7. Direct burial plastic conduit: Shall conform to UL 651 and UL 651A, heavy wall PVC or high density polyethylene (PE).
8. Surface metal raceway: Shall Conform to UL 5.

C. Conduit Fittings:

1. Rigid steel and IMC conduit fittings:
    a. Fittings shall meet the requirements of UL 514B and ANSI/ NEMA FB1.
    a. Standard threaded couplings, locknuts, bushings, and elbows: Only steel or malleable iron materials are acceptable. Integral retractable type IMC couplings are also acceptable.
    b. Locknuts: Bonding type with sharp edges for digging into the metal wall of an enclosure.
    c. Bushings: Metallic insulating type, consisting of an insulating insert molded or locked into the metallic body of the fitting. Bushings made entirely of metal or nonmetallic material are not permitted.
    d. Erickson (union-type) and set screw type couplings: Approved for use in concrete are permitted for use to complete a conduit run where conduit is installed in concrete. Use set screws of case hardened steel with hex head and cup point to firmly seat in conduit wall for positive ground. Tightening of set screws with pliers is prohibited.
    e. Sealing fittings: Threaded cast iron type. Use continuous drain type sealing fittings to prevent passage of water vapor. In concealed work, install fittings in flush steel boxes with blank cover plates having the same finishes as that of other electrical plates in the room.
2. Rigid aluminum conduit fittings:
    a. Standard threaded couplings, locknuts, bushings, and elbows: Malleable iron, steel or aluminum alloy materials; Zinc or cadmium plate iron or steel fittings. Aluminum fittings containing more than 0.4 percent copper are prohibited.
    b. Locknuts and bushings: As specified for rigid steel and IMC conduit.
    c. Set screw fittings: Not permitted for use with aluminum conduit.
3. Electrical metallic tubing fittings:
    a. Fittings shall meet the requirements of UL 514B and ANSI/ NEMA FB1.
    b. Only steel or malleable iron materials are acceptable.
    c. Couplings and connectors: Concrete tight and rain tight, with connectors having insulated throats. Use gland and ring compression type couplings and connectors for conduit sizes 50 mm (2 inches) and smaller. Use set screw type couplings with four set screws each for conduit sizes over 50 mm (2 inches). Use set screws of case-hardened steel with hex head and cup point to firmly seat in wall of conduit for positive grounding.
    d. Indent type connectors or couplings are prohibited.

e. Die-cast or pressure-cast zinc-alloy fittings or fittings made of "pot metal" are prohibited.

4. Flexible steel conduit fittings:
   a. Conform to UL 514B. Only steel or malleable iron materials are acceptable.
   b. Clamp type, with insulated throat.
5. Liquid-tight flexible metal conduit fittings:
   a. Fittings shall meet the requirements of UL 514B and ANSI/ NEMA FB1.
   b. Only steel or malleable iron materials are acceptable.
   c. Fittings must incorporate a threaded grounding cone, a steel or plastic compression ring, and a gland for tightening. Connectors shall have insulated throats.
6. Direct burial plastic conduit fittings:
   a. Fittings shall meet the requirements of UL 514C and NEMA TC3.
   b. As recommended by the conduit manufacturer.
7. Surface metal raceway fittings: As recommended by the raceway manufacturer.
8. Expansion and deflection couplings:
   a. Conform to UL 467 and UL 514B.
   b. Accommodate, 19 mm (0.75 inch) deflection, expansion, or contraction in any direction, and allow 30 degree angular deflections.
   c. Include internal flexible metal braid sized to guarantee conduit ground continuity and fault currents in accordance with UL 467, and the NEC code tables for ground conductors.
   d. Jacket: Flexible, corrosion-resistant, watertight, moisture and heat resistant molded rubber material with stainless steel jacket clamps.

D. Conduit Supports:
1. Parts and hardware: Zinc-coat or provide equivalent corrosion protection.
2. Individual Conduit Hangers: Designed for the purpose, having a pre-assembled closure bolt and nut, and provisions for receiving a hanger rod.
3. Multiple conduit (trapeze) hangers: Not less than 38 mm by 38 mm (1-1/2 by 1-1/2 inch), 12 gage steel, cold formed, lipped channels; with not less than 9 mm (3/8 inch) diameter steel hanger rods.
4. Solid Masonry and Concrete Anchors: Self-drilling expansion shields, or machine bolt expansion.

E. Outlet, Junction, and Pull Boxes:
1. UL-50 and UL-514A.

2. Cast metal where required by the NEC or shown, and equipped with rustproof boxes.
3. Sheet metal boxes: Galvanized steel, except where otherwise shown.
4. Flush mounted wall or ceiling boxes shall be installed with raised covers so that front face of raised cover is flush with the wall. Surface mounted wall or ceiling boxes shall be installed with surface style flat or raised covers.

F. Wireways: Equip with hinged covers, except where removable covers are shown.

G. Warning Tape: Standard, 4-Mil polyethylene 76 mm (3 inch) wide tape non-detectable type, red with black letters, and imprinted with “CAUTION BURIED ELECTRIC LINE BELOW”.

PART 3 - EXECUTION

3.1 PENETRATIONS

A. Cutting or Holes:

1. Locate holes in advance where they are proposed in the structural sections such as ribs or beams. Obtain the approval of the Resident Engineer prior to drilling through structural sections.
2. Cut holes through concrete and masonry in new and existing structures with a diamond core drill or concrete saw. Pneumatic hammer, impact electric, hand or manual hammer type drills are not allowed, except where permitted by the Resident Engineer as required by limited working space.

B. Fire Stop: Where conduits, wireways, and other electrical raceways pass through fire partitions, fire walls, smoke partitions, or floors, install a fire stop that provides an effective barrier against the spread of fire, smoke and gases as specified in Section 07 84 00, FIRESTOPPING, with rock wool fiber or silicone foam sealant only. Completely fill and seal clearances between raceways and openings with the fire stop material.

C. Waterproofing: At floor, exterior wall, and roof conduit penetrations, completely seal clearances around the conduit and make watertight as specified in Section 07 92 00, JOINT SEALANTS.

3.2 INSTALLATION, GENERAL

A. In accordance with UL, NEC, as shown, and as hereinafter specified.

B. Essential (Emergency) raceway systems shall be entirely independent of other raceway systems, except where specifically "accepted" by NEC Article 517.

C. Install conduit as follows:

1. In complete runs before pulling in cables or wires.

2. Flattened, dented, or deformed conduit is not permitted. Remove and replace the damaged conduits with new undamaged material.
3. Assure conduit installation does not encroach into the ceiling height head room, walkways, or doorways.
4. Cut square with a hacksaw, ream, remove burrs, and draw up tight.
5. Mechanically and electrically continuous.
6. Independently support conduit at 8’0” on center. Do not use other supports i.e., (suspended ceilings, suspended ceiling supporting members, lighting fixtures, conduits, mechanical piping, or mechanical ducts).
7. Support within 300 mm (1 foot) of changes of direction, and within 300 mm (1 foot) of each enclosure to which connected.
8. Close ends of empty conduit with plugs or caps at the rough-in stage to prevent entry of debris, until wires are pulled in.
9. Conduit installations under fume and vent hoods are prohibited.
10. Secure conduits to cabinets, junction boxes, pull boxes and outlet boxes with bonding type locknuts. For rigid and IMC conduit installations, provide a locknut on the inside of the enclosure, made up wrench tight. Do not make conduit connections to junction box covers.
11. Flashing of penetrations of the roof membrane is specified in Section 07 60 00, FLASHING AND SHEET METAL.
12. Do not use aluminum conduits in wet locations.
13. Unless otherwise indicated on the drawings or specified herein, all conduits shall be installed concealed within finished walls, floors and ceilings.

D. Conduit Bends:
   1. Make bends with standard conduit bending machines.
   2. Conduit hickey may be used for slight offsets, and for straightening stubbed out conduits.
   3. Bending of conduits with a pipe tee or vise is prohibited.

E. Layout and Homeruns:
   1. Install conduit with wiring, including homeruns, as shown.
   2. Deviations: Make only where necessary to avoid interferences and only after drawings showing the proposed deviations have been submitted approved by the Resident Engineer.

3.3 CONCEALED WORK INSTALLATION

A. In Concrete:

1. Conduit: Rigid steel, IMC or EMT. Do not install EMT in concrete slabs that are in contact with soil, gravel or vapor barriers.
2. Align and run conduit in direct lines.
3. Install conduit through concrete beams only when the following occurs:
   a. Where shown on the structural drawings.
   b. As approved by the Resident Engineer prior to construction, and after submittal of drawing showing location, size, and position of each penetration.
4. Installation of conduit in concrete that is less than 75 mm (3 inches) thick is prohibited.
   a. Conduit outside diameter larger than 1/3 of the slab thickness is prohibited.
   b. Space between conduits in slabs: Approximately six conduit diameters apart, except one conduit diameter at conduit crossings.
   c. Install conduits approximately in the center of the slab so that there will be a minimum of 19 mm (3/4 inch) of concrete around the conduits.
5. Make couplings and connections watertight. Use thread compounds that are UL approved conductive type to insure low resistance ground continuity through the conduits. Tightening set screws with pliers is prohibited.

B. Furred or Suspended Ceilings and in Walls:
1. Conduit for conductors above 600 volts:
   a. Rigid steel or rigid aluminum.
   b. Aluminum conduit mixed indiscriminately with other types in the same system is prohibited.
2. Conduit for conductors 600 volts and below:
   a. Rigid steel, IMC, rigid aluminum, or EMT. Different type conduits mixed indiscriminately in the same system is prohibited.
3. Align and run conduit parallel or perpendicular to the building lines.
4. Connect recessed lighting fixtures to conduit runs with maximum 1800 mm (six feet) of flexible metal conduit extending from a junction box to the fixture.
5. Tightening set screws with pliers is prohibited.

3.4 EXPOSED WORK INSTALLATION

A. Unless otherwise indicated on the drawings, exposed conduit is only permitted in mechanical and electrical rooms.

B. Conduit for conductors above 600 volts:
1. Rigid steel or rigid aluminum.

2. Aluminum conduit mixed indiscriminately with other types in the same system is prohibited.

C. Conduit for Conductors 600 volts and below:
   1. Rigid steel, IMC, rigid aluminum, or EMT. Different type of conduits mixed indiscriminately in the system is prohibited.

D. Align and run conduit parallel or perpendicular to the building lines.

E. Install horizontal runs close to the ceiling or beams and secure with conduit straps.

F. Support horizontal or vertical runs at not over 2400 mm (eight foot) intervals.

G. Surface metal raceways: Use only where shown.

H. Painting:
   1. Paint exposed conduit as specified in Section 09 91 00, PAINTING.
   2. Paint all conduits containing cables rated over 600 volts safety orange. Refer to Section 09 91 00, PAINTING for preparation, paint type, and exact color. In addition, paint legends, using 50 mm (two inch) high black numerals and letters, showing the cable voltage rating. Provide legends where conduits pass through walls and floors and at maximum 6000 mm (20 foot) intervals in between.

3.5 DIRECT BURIAL INSTALLATION

A. Exterior routing of Lighting Systems and Other Branch circuits (600 Volt and Less, and 1500 mm (5 feet) from the buildings):
   1. Conduit: Thick wall PVC or high density PE, unless otherwise shown.
   2. Mark conduit at uniform intervals to show the kind of material, direct burial type, and the UL approval label.
   3. Install conduit fittings and terminations as recommended by the conduit manufacturer.
   4. Tops of conduits shall be as follows unless otherwise shown:
      a. Not less than 600 mm (24 inches) below finished grade.
      b. Not less than 750 mm (30 inches) below road and other paved surfaces.
   5. Work with extreme care near existing ducts, conduits, cables, and other utilities to avoid damaging them.
   6. Excavation for conduit bedding and back-filling of trenches is specified in Section 31 20 00, EARTH MOVING.
      a. Cut the trenches neatly and uniformly.
      b. Do not kink the conduits.
   7. Seal conduits, including spare conduits, at building entrances and at outdoor terminations for equipment with a suitable compound that prevents the entrance of moisture and gases.

8. Where metal conduit is shown, install threaded heavy wall rigid steel galvanized conduit or type A20 rigid steel galvanized conduit coated with .5 mm (20 mil) bonded PVC, or rigid steel or IMC, PVC coated or standard coated with bituminous asphaltic compound.
9. Warning tape shall be continuously placed 300 mm (12 inches) above conduits or electric lines.

B. Exterior routing of lighting systems and other branch circuits (600 volts and less-under buildings slab on grade to 1500 mm (5 feet) from the building):

1. Pre-coated rigid galvanized steel conduit in accordance with the requirements of Section 26 05 41, UNDERGROUND ELECTRICAL CONSTRUCTION.

3.6 HAZARDOUS LOCATIONS

A. Use rigid steel conduit only, notwithstanding requirements otherwise specified in this or other sections of these specifications.

B. Install UL approved sealing fittings, that prevent passage of explosive vapors, in hazardous areas equipped with explosive proof lighting fixtures, switches, and receptacles, as required by the NEC.

3.7 WET OR DAMP LOCATIONS

A. Unless otherwise shown, use conduits of rigid steel or IMC.

B. Provide sealing fittings, to prevent passage of water vapor, where conduits pass from warm to cold locations, i.e., (refrigerated spaces, constant temperature rooms, air conditioned spaces building exterior walls, roofs) or similar spaces.

C. Unless otherwise shown, use rigid steel or IMC conduit within 1500 mm (5 feet) of the exterior and below concrete building slabs in contact with soil, gravel, or vapor barriers. Conduit shall include an outer factory coating of .5 mm (20 mil) bonded PVC or field coat with asphaltum before installation. After installation, completely coat damaged areas of coating.

3.8 MOTORS AND VIBRATING EQUIPMENT

A. Use flexible metal conduit for connections to motors and other electrical equipment subject to movement, vibration, misalignment, cramped quarters, or noise transmission.

B. Provide liquid-tight flexible metal conduit for installation in exterior locations, moisture or humidity laden atmosphere, corrosive atmosphere, water or spray wash-down operations, inside (air stream) of HVAC units, and locations subject to seepage or dripping of oil, grease or water. Provide a green ground wire with flexible metal conduit.

3.9 EXPANSION JOINTS

A. Conduits 75 mm (3 inches) and larger, that are secured to the building structure on opposite sides of a building expansion joint, require expansion and deflection couplings. Install the couplings in accordance with the manufacturer's recommendations.

B. Provide conduits smaller than 75 mm (3 inches) with junction boxes on both sides of the expansion joint. Connect conduits to junction boxes with sufficient slack of flexible conduit to produce 125 mm (5 inch) vertical drop midway between the ends. Flexible conduit shall have a copper green ground bonding jumper installed. In lieu of this flexible conduit, expansion and deflection couplings as specified above for 375 mm (15 inches) and larger conduits are acceptable.

C. Install expansion and deflection couplings where shown.

D. Seismic Areas: In seismic areas, provide conduits rigidly secured to the building structure on opposite sides of a building expansion joint with junction boxes on both sides of the joint. Connect conduits to junction boxes with 375 mm (15 inches) of slack flexible conduit. Flexible conduit shall have a copper green ground bonding jumper installed.

3.10 CONDUIT SUPPORTS, INSTALLATION

A. Safe working load shall not exceed 1/4 of proof test load of fastening devices.

B. Use pipe straps or individual conduit hangers for supporting individual conduits. Maximum distance between supports is 2.5 m (8 foot) on center.

C. Support multiple conduit runs with trapeze hangers. Use trapeze hangers that are designed to support a load equal to or greater than the sum of the weights of the conduits, wires, hanger itself, and 90 kg (200 pounds). Attach each conduit with U-bolts or other approved fasteners.

D. Support conduit independently of junction boxes, pull boxes, fixtures, suspended ceiling T-bars, angle supports, and similar items.

E. Fasteners and Supports in Solid Masonry and Concrete:

1. New Construction: Use steel or malleable iron concrete inserts set in place prior to placing the concrete.
2. Existing Construction:
    a. Steel expansion anchors not less than 6 mm (1/4 inch) bolt size and not less than 28 mm (1-1/8 inch) embedment.
    b. Power set fasteners not less than 6 mm (1/4 inch) diameter with depth of penetration not less than 75 mm (3 inches).
    c. Use vibration and shock resistant anchors and fasteners for attaching to concrete ceilings.

F. Hollow Masonry: Toggle bolts are permitted.

G. Bolts supported only by plaster or gypsum wallboard are not acceptable.

H. Metal Structures: Use machine screw fasteners or other devices specifically designed and approved for the application.

I. Attachment by wood plugs, rawl plug, plastic, lead or soft metal anchors, or wood blocking and bolts supported only by plaster is prohibited.

J. Chain, wire, or perforated strap shall not be used to support or fasten conduit.

K. Spring steel type supports or fasteners are prohibited for all uses except: Horizontal and vertical supports/fasteners within walls.

L. Vertical Supports: Vertical conduit runs shall have riser clamps and supports in accordance with the NEC and as shown. Provide supports for cable and wire with fittings that include internal wedges and retaining collars.

3.11 BOX INSTALLATION

A. Boxes for Concealed Conduits:

1. Flush mounted.
2. Provide raised covers for boxes to suit the wall or ceiling, construction and finish.

B. In addition to boxes shown, install additional boxes where needed to prevent damage to cables and wires during pulling in operations.

C. Remove only knockouts as required and plug unused openings. Use threaded plugs for cast metal boxes and snap-in metal covers for sheet metal boxes.

D. Outlet boxes in the same wall mounted back-to-back are prohibited. A minimum 600 mm (24 inch), center-to-center lateral spacing shall be maintained between boxes.)

E. Minimum size of outlet boxes for ground fault interrupter (GFI) receptacles is 100 mm (4 inches) square by 55 mm (2-1/8 inches) deep, with device covers for the wall material and thickness involved.

F. Stencil or install phenolic nameplates on covers of the boxes identified on riser diagrams; for example "SIG-FA JB No. 1".

G. On all Branch Circuit junction box covers, identify the circuits with black marker.

End of Section 26 05 33

SECTION 26 05 41
UNDERGROUND ELECTRICAL CONSTRUCTION

PART 1 - GENERAL

1.1 DESCRIPTION

A. This section specifies the furnishing, installation and connection of manholes, handholes and ducts to form a complete underground raceway system.

B. “Duct” and “conduit”, and “rigid metal conduit” and “rigid steel conduit are used interchangeably in this specification and have the same meaning.

1.2 RELATED WORK

A. Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS: General electrical requirements and items that are common to more than one section of Division 26.

B. Section 26 05 33, RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS: Conduits, fittings and boxes for raceway systems.

C. Section 26 05 26, GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS: Requirements for personnel safety and to provide a low impedance path for possible ground fault currents.

1.3 SUBMITTALS

A. Submit in accordance with Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS.

B. Shop Drawings:

1. Sufficient information, clearly presented, shall be included to determine compliance with drawings and specifications.
2. Include handholes, duct materials, and hardware. Proposed deviations from details on the drawings shall be clearly marked on the submittals.

If necessary to locate handholes at locations other than shown on the drawings, show the proposed locations accurately on scaled site drawings, and submit four copies to the Resident Engineer for approval prior to construction.

3. Precast manholes and handholes: Submit plans on elevation showing openings, pulling irons cable supports, sump and other details. Also, submit detail drawings and design calculations for approval prior to installation. Submittal shall bear the seal of a registered structural engineer.

C. Certifications: Two weeks prior to final inspection, submit four copies of the following to the Resident Engineer:

1. Certification that the materials are in accordance with the drawings and specifications.
2. Certification, by the Contractor, that the complete installation has been properly installed and tested.

1.4 APPLICABLE PUBLICATIONS

Publications listed below (including amendments, addenda, revisions, supplements, and errata) form a part of this specification to the extent referenced. Publications are referenced in the text by the basic designation only.

A. American Concrete Institute (ACI):
   Building Code Requirements for Structural Concrete
   318/318M-2005 ..... Building Code Requirements for Structural Concrete & Commentary
   SP-66-04 ..... ACI Detailing Manual
B. American Society for Testing and Materials (ASTM):
   C478/C478M 2006(b)..... Standard Specification for Precast Reinforced Concrete Manhole Sections
   C990 REV A 2003 ..... Standard Specification for joints concrete pipe, Manholes and Precast Box using performed flexible Joint sealants.
C. Institute of Electrical and Electronic Engineers (IEEE):
   C2-2002 ..... National Electrical Safety Code
D. National Electrical Manufacturers Association (NEMA):
   RNI 2005 ..... Polyvinyl Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit
   TC 2 2003 ..... Electrical Polyvinyl Chloride (PVC) Tubing And Conduit
   TC 3-2004 ..... PVC Fittings for Use With Rigid PVC Conduit And Tubing
   TC 6 & 8 2003 ..... PVC Plastic Utilities Duct For Underground Installations
   TC 9-2004 ..... Fittings For PVC Plastic Utilities Duct For Underground Installation
E. National Fire Protection Association (NFPA):
   70 2005 ..... National Electrical Code (NEC)
F. Underwriters Laboratories, Inc. (UL):
   6-2004 ..... Electrical Rigid Metal Conduit-Steel
   467-2004 ..... Standard for Grounding and Bonding Equipment
   651-2005 ..... Standard for Schedule 40 and 80 Rigid PVC Conduit and Fittings
   651A-2003..... Type EB and A Rigid PVC Conduit and HDPE Conduit, (RTRC)
   651B-2002..... Continuous Length HDPE Conduit
G. U.S. General Services Administration (GSA):
   A-A-60005-1998..... Frames, Covers, Gratings, Steps, Sump and Catch Basin, Manhole
   SS-S-210A-1981 ..... Sealing Compound, Preformed Plastic for Expansion joints And Pipe Joints

PART 2 - PRODUCTS

2.1 CONCRETE HANDHOLES AND HARDWARE

A. Reinforced Concrete: ACI 318, 20MPA (3000 psi) minimum 28-day compressive strength.
B. Reinforcing Steel: Number 4 minimum.
C. Handhole Hardware:
   1. Frames and covers configuration as shown on the drawings. Cast the words “Electric” and “Telephone” in the top face of the power and telephone handhole covers respectively.

2. Pulling irons, 22 mm (7/8-inch) diameter galvanized steel bar with exposed triangular shaped opening.
3. Cable supports are not required.

D. Ground Rod Sleeve: Provide a 75 mm (3 inches) PVC sleeve in handhole floors so that a driven ground rod may be installed.

2.2 DUCTS:

A. Number and sizes shall be as shown on drawings.

B. Ducts (direct burial):

1. Plastic duct:
   a. NEMA TC2 and TC3
   b. UL 651, 651A and 651B, Schedule 40.
   c. Duct shall be suitable for use with 75 degree C rated conductors.
2. Rigid metal conduit, PVC-coated: UL6 and NEMA RN1 galvanized rigid steel, threaded type, coated with PVC sheath bonded to the galvanized exterior surface, nominal 1 mm (0.040 inch) thick.

2.3 GROUNDING

A. Rods: Per Section 26 05 26, GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS and UL 467

B. Ground Wire: Stranded bare copper 16 mm² (6 AWG) minimum.

2.4 WARNING TAPE:

Standard 4-mil polyethylene 76 mm (3 inch) wide tape, non-detectable type, red with black letters, imprinted with “CAUTION BURIED ELECTRIC CABLE BELOW”.

2.5 PULL ROPE:

Plastic with 890N (200 pound) minimum tensile strength.

PART 3 - EXECUTION

3.1 HANDHOLE CONSTRUCTION AND INSTALLATION

A. General Requirements:

1. Locate handholes at the approximate locations shown on the drawings with due consideration given to the location of other utilities, grades, and paving.
2. Steel reinforcing concrete cover, not less than 50 mm (2 inches) thick for exterior surfaces, 38 mm (1 1/2 inches) thick for interior surfaces, and 25 mm (1 inch) thick for the bottom surfaces of the top slabs.
3. Walls, floors, and top:
   a. Construct monolithic walls and floors with window openings in walls for ducts.
4. Duct terminations: Provide windows at duct bank terminations and fill with concrete after duct placement. Terminations shall be sealed watertight.
5. Pulling irons:

a. Provide pulling irons opposite each duct entrance.
b. Cast pulling irons in the walls opposite duct windows approximately 152mm (6 inches) above the top of the window.

3.2 TRENCHING

A. Work with extreme care near existing ducts, conduits, cables, and other utilities to avoid damaging them.
B. Cut the trenches neatly and uniformly.
C. Conduits to be installed under existing paved areas, roads, and railroad tracks that are not to be disturbed shall be jacked into place. Conduits shall be PVC-coated rigid metal.

3.3 DUCT INSTALLATION

A. General Requirements:
1. Ducts shall be in accordance with the NEC and IEEE C2, as shown on the drawings, and as specified.
2. Slope ducts to drain towards handholes, and away from building and equipment entrances. Pitch not less than 100 mm (4 inches) in 30 M (100 feet).
3. Underground conduit stub-ups and sweeps to equipment inside of buildings shall be PVC-coated galvanized rigid steel, and shall extend a minimum of 1500 mm (5 feet) outside of building foundation.
4. Stub-ups, sweeps, and risers to equipment mounted on outdoor concrete slabs shall be PVC-coated galvanized rigid steel, and shall extend a minimum of 1500 mm (5 feet) away from edge of slab.
5. Install insulated grounding bushings on the terminations.
6. PVC-coated rigid steel conduits shall be coupled to the ducts with suitable adapters, and the whole encased with 75 mm (3 inches) of concrete.
7. PVC coated rigid steel conduit turns of direction for all duct lines shall have minimum 1200 mm (4 feet) radius in the horizontal and vertical directions. PVC conduit sweeps for all duct lines shall have a minimum 12000 mm (40 feet) radius in the horizontal and 1200 mm (4 feet) in the vertical directions. Where a 12000 mm (40 feet) radius is not possible, horizontal turns of direction shall be rigid steel.
8. All multiple conduit runs shall have conduit spacers. Spacers shall securely support and maintain uniform spacing of the duct assembly a minimum of 75 mm (3 inches) above bottom of trench during the concrete pour. Spacer spacing shall not exceed 1500 mm (5 feet).
9. Duct lines shall be installed no less than 300 mm (12 inches) from other utility systems, such as water, sewer, and chilled water.
10. Clearances between individual ducts:
a. For like services, not less than 75 mm (3 inches).
b. For power and signal services, not less than 150 mm (6 inches).

c. Provide plastic spacers to maintain clearances.
d. Provide nonferrous tie wires to prevent displacement of the ducts during pouring of concrete. Tie wires shall not act as substitute for spacers.

11. Couple the ducts with proper couplings. Stagger couplings in rows and layers to insure maximum strength and rigidity of the duct bank.
12. Keep ducts clean of earth, sand, or gravel during construction, and seal with tapered plugs upon completion of each portion of the work.

B. Direct Burial Duct and Conduits:
1. Install direct burial ducts and conduits only where shown on the drawings. Provide direct burial ducts only for low voltage systems.
2. Join and terminate ducts and conduits with fittings recommended by conduit manufacturer.
3. Direct burial ducts and conduits are prohibited under railroad tracks.
4. Tops of ducts and conduits shall be:
a. Not less than 600 mm (24 inches) and not less than shown on the drawings, below finished grade.
b. Not less than 750 mm (30 inches) and not less than shown on the drawings, below roads and other paved surfaces.
5. Do not kink the ducts or conduits.

C. Direct Burial Duct and Conduit Identification: Place continuous strip of warning tape approximately 300 mm (12 inches) above ducts or conduits before backfilling trenches. Warning tape shall be preprinted with proper identification.

D. Spare Ducts and Conduits: Where spare ducts are shown, they shall have a nylon pull rope installed. They shall be capped at each end and labeled as to location of the other end.

E. Duct and Conduit Cleaning:
1. Upon completion of the duct bank installation or installation of direct buried ducts, a standard flexible mandrel shall be pulled through each duct to loosen particles of earth, sand, or foreign material left in the line. The mandrel shall be not less than 3600 mm (12 inches) long, and shall have a diameter not less than 13 mm (1/2 inch) less than the inside diameter of the duct. A brush with stiff bristles shall then be pulled through each duct to remove the loosened particles. The diameter of the brush shall be the same as, or slightly larger than the diameter of the duct.
2. Mandrel pulls shall be witnessed by the Resident Engineer.

F. Duct and Conduit Sealing: Seal the ducts and conduits at building entrances, and at outdoor terminations for equipment, with a suitable non-hardening compound to prevent the entrance of moisture and gases.

G. Connections to Existing Ducts: Where connections to existing duct banks are indicated, excavate around the duct banks as necessary. Cut off the duct banks and remove loose concrete from the

conduits before installing new concrete-encased ducts. Provide a reinforced concrete collar, poured monolithically with the new duct bank, to take the shear at the joint of the duct banks.

H. Partially Completed Duct Banks: During construction wherever a construction joint is necessary in a duct bank, prevent debris such as mud and dirt from entering ducts by providing suitable conduit plugs. Fit concrete envelope of a partially completed duct bank with reinforcing steel extending a minimum of 600 mm (2 feet) back into the envelope and a minimum of 600 mm (2 feet) beyond the end of the envelope. Provide one No. 4 bar in each corner, 75 mm (3 inches) from the edge of the envelope. Secure corner bars with two No. 3 ties, spaced approximately 300 mm (1 foot) apart. Restrain reinforcing assembly from moving during pouring of concrete.

End of Section 26 05 41

SECTION 26 09 23
LIGHTING CONTROLS

PART 1 - GENERAL

1.1 DESCRIPTION

This section specifies the furnishing, installation and connection of the lighting controls.

1.2 RELATED WORK

A. Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS: General requirements that are common to more than one section of Division 26.

B. Section 26 05 21, LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES (600 VOLTS AND BELOW): Cables and wiring.

C. Section 26 05 26, GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS: Requirements for personnel safety and to provide a low impedance path to ground for possible ground fault currents.

D. Section 24 26 16, PANELBOARDS: panelboard enclosure and interior bussing used for lighting control panels.

E. Section 26 27 26, WIRING DEVICES: Wiring devices used for control of the lighting systems.

1.3 QUALITY ASSURANCE

Refer to Paragraph, QUALIFICATIONS, in Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS.

1.4 SUBMITTALS

A. In accordance with Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS, submit the following:

B. Product Data: For each type of lighting control, submit the following information.

1. Manufacturer’s catalog data.
2. Wiring schematic and connection diagram.
3. Installation details.

C. Manuals:

1. Submit, simultaneously with the shop drawings companion copies of complete maintenance and operating manuals including technical data sheets, and information for ordering replacement parts.
2. Two weeks prior to the final inspection, submit four copies of the final updated maintenance and operating manuals, including any changes, to the Resident Engineer.

D. Certifications:

1. Two weeks prior to final inspection, submit four copies of the following certifications to the Resident Engineer:
   a. Certification by the Contractor that the equipment has been properly installed, adjusted, and tested.

1.5 APPLICABLE PUBLICATIONS

A. Publications listed below (including amendments, addenda, revisions, supplements, and errata) form a part of this specification to the extent referenced. Publications are referenced in the text by designation only.

B. Green Seal (GS):

GC-12.....Occupancy Sensors

C. Illuminating Engineering Society of North America (IESNA):

IESNA LM-48 ..... Guide for Calibration of Photoelectric Control Devices

D. National Electrical Manufacturer's Association (NEMA)

C136.10.....American National Standard for Roadway Lighting Equipment-Locking-Type Photocontrol Devices and Mating Receptacles - Physical and Electrical Interchangeability and Testing

ICS-1 .....Standard for Industrial Control and Systems General Requirements

ICS-2..... .....Standard for Industrial Control and Systems: Controllers, Contractors, and Overload Relays Rated Not More than 2000 Volts AC or 750 Volts DC: Part 8 - Disconnect Devices for Use in Industrial Control Equipment

ICS-6 .....Standard for Industrial Controls and Systems Enclosures

E. Underwriters Laboratories, Inc. (UL):

20.....Standard for General-Use Snap Switches

773.....Standard for Plug-In Locking Type Photocontrols for Use with Area Lighting

773A .....Nonindustrial Photoelectric Switches for Lighting Control

98.....Enclosed and Dead-Front Switches

917.....Clock Operated Switches

PART 2 - PRODUCTS

2.1 ELECTRONIC TIME SWITCHES

A. Electronic, solid-state programmable units with alphanumeric display; complying with UL 917.

1. Contact Configuration: SPST

2. Contact Rating: 20-A ballast load, 120/240-V ac.

3. Astronomical Clock: Capable of switching a load on at sunset and off at sunrise, and automatically changing the settings each day in accordance with seasonal changes of sunset and sunrise. Additionally, it shall be programmable to a fixed on/off weekly schedule.

4. Battery Backup: For schedules and time clock.

2.2 OUTDOOR PHOTOELECTRIC SWITCHES

A. Solid state, with SPST dry contacts rated for 1800 VA tungsten or 1000 VA inductive, complying with UL 773A.

1. Light-Level Monitoring Range: 1.5 to 10 fc [16.14 to 108 lx], with adjustable turn-on and turn-off levels.

2. Time Delay: 15-second minimum.

3. Surge Protection: Metal-oxide varistor.

4. Mounting: Twist lock, with base-and-stem mounting or stem-and-swivel mounting accessories as required.

2.3 TIMER SWITCHES

A. Digital switches with backlit LCD display, 120/277 volt rated, fitting as a replacement for standard wall switches.

1. Compatibility: Compatible with all ballasts.
2. Warning: Audible warning to sound during the last minute of "on" operation.
3. Time-out: Adjustable from 5 minutes to 12 hours.
4. Faceplate: Refer to wall plate material and color requirements for toggle switches, as specified in Section 26 27 26, WIRING DEVICES.

2.4 INDOOR OCCUPANCY SENSORS

A. Wall- or ceiling-mounting, solid-state units with a power supply and relay unit, suitable for the environmental conditions in which installed.

1. Operation: Unless otherwise indicated, turn lights on when covered area is occupied and off when unoccupied; with a 1 to 15 minute adjustable time delay for turning lights off.
2. Sensor Output: Contacts rated to operate the connected relay. Sensor shall be powered from the relay unit.
3. Relay Unit: Dry contacts rated for 20A ballast load at 120V and 277V, for 13A tungsten at 120V, and for 1 hp at 120V.
4. Mounting:
    a. Sensor: Suitable for mounting in any position on a standard outlet box.
    b. Time-Delay and Sensitivity Adjustments: Recessed and concealed behind hinged door.
5. Indicator: LED, to show when motion is being detected during testing and normal operation of the sensor.
6. Bypass Switch: Override the on function in case of sensor failure.
7. Manual/automatic selector switch.
8. Automatic Light-Level Sensor: Adjustable from 2 to 200 fc [21.5 to 2152 lx]; keep lighting off when selected lighting level is present.

9. Faceplate for Wall-Switch Replacement Type: Refer to wall plate material and color requirements for toggle switches, as specified in Section 26 27 26, WIRING DEVICES.

B. Dual-technology Type: Ceiling mounting; combination PIR and ultrasonic detection methods, field-selectable.

1. Sensitivity Adjustment: Separate for each sensing technology.
2. Detector Sensitivity: Detect occurrences of 6-inch [150mm] minimum movement of any portion of a human body that presents a target of not less than 36 sq. in. [232 sq. cm], and detect a person of average size and weight moving not less than 12 inches [305 mm] in either a horizontal or a vertical manner at an approximate speed of 12 inches/s [305 mm/s].
3. Detection Coverage: as scheduled on drawings.

2.5 LIGHTING CONTROL PANEL – RELAY TYPE

A. Controller: Comply with UL 508; programmable, solid-state, astronomic 365-day control unit with non-volatile memory, mounted in preassembled relay panel with low-voltage-controlled, latching-type, single-pole lighting circuit relays. Controller shall be capable of receiving inputs from sensors and other sources, and capable of timed overrides and/or blink-warning on a per-circuit basis. Where indicated, a limited number of digital or analog, low-voltage control-circuit outputs shall be supported by control unit and circuit boards associated with relays.

B. Cabinet: Steel with hinged, locking door. Barriers separate low-voltage and line-voltage components.

C. Directory: Identifies each relay as to load controlled.

D. Control Power Supply: Transformer and full-wave rectifier with filtered dc output.

E. Single-Pole Relays: Mechanically held unless otherwise indicated; split-coil, momentary-pulsed type, rated 20 A, 125-V ac for tungsten filaments and 20 A, 277-V ac for ballasts, 50,000 cycles at rated capacity.

PART 3 - EXECUTION

3.1 INSTALLATION:

A. Installation shall be in accordance with the NEC, manufacturer's instructions and as shown on the drawings or specified.

B. Aim outdoor photocell switch according to manufacturer's recommendations. Set adjustable window slide for 1 footcandle photocell turn-on.

C. Aiming for wall-mounted and ceiling-mounted motion sensor switches shall be per manufacturer’s recommendations.

D. Locate light level sensors as indicated and in accordance with the manufacturer's recommendations. Adjust sensor for the scheduled light level at the typical work plane for that area.

E. Label time switches and contactors with a unique designation.

3.2 ACCEPTANCE CHECKS AND TESTS

A. Perform in accordance with the manufacturer's recommendations.

B. Upon completion of installation, conduct an operating test to show that equipment operates in accordance with requirements of this section.

C. Test for full range of dimming ballast and dimming controls capability. Observe for visually detectable flicker over full dimming range.

D. Test occupancy sensors for proper operation. Observe for light control over entire area being covered.

E. Program lighting control panels per schedule on drawings.

F. Upon completion of the installation, the system shall be commissioned by the manufacturer’s factory-authorized technician who will verify all adjustments and sensor placements.

3.3 FOLLOW-UP VERIFICATION

Upon completion of acceptance checks and tests, the Contractor shall show by demonstration in service that the lighting control devices are in good operating condition and properly performing the intended function.

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SECTION 26 24 11
DISTRIBUTION SWITCHBOARDS

PART 1 - GENERAL

1.1 DESCRIPTION

This section specifies the furnishing, installation, and connection of the distribution switchboards.

1.2 RELATED WORK

A. Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS: General electrical requirements and items that are common to more than one section of Division 26.
B. Section 26 05 21, LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES (600 VOLTS AND BELOW): Cables and wiring.
C. Section 26 05 26, GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS: Requirements for Personnel Safety and to provide a low impedance path for possible fault currents.
D. Section 26 05 33, RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS: Conduit and outlet boxes.

1.3 QUALITY ASSURANCE

Refer to Paragraph, QUALIFICATIONS, in Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS.

1.4 FACTORY TESTS

A. Distribution switchboards shall be thoroughly tested at the factory to assure that there are no electrical or mechanical defects. Tests shall be conducted as per NEMA PB 2 and UL 891. Factory tests shall be certified.
B. The following additional tests shall be performed:
    1. Verify that circuit breaker sizes and types correspond to drawings and coordination study.
    2. Verify tightness of bolted electrical connections by calibrated torque-wrench method in accordance with manufacturer's published data.
    3. Exercise all active components.
    4. Perform a dielectric withstand voltage test on each bus section, each phase-to-ground with phases not under test grounded, in accordance with manufacturer's published data.
    5. Perform insulation-resistance tests on control wiring with respect to ground. Applied potential shall be 500 volts dc for 300-volt rated cable and 1000 volts dc for 600-volt rated cable, or as required if solid-state components or control devices cannot tolerate the applied voltage.
    6. If applicable, verify correct function of control transfer relays located in the switchboard with multiple control power sources.

8. Perform phasing checks on double-ended or dual-source switchboards to insure correct bus phasing from each source.

C. Furnish four (4) copies of certified manufacturer's factory test reports to the Resident Engineer prior to shipment of the switchboards to ensure that the switchboards have been successfully tested as specified.

1.5 SUBMITTALS

Submit in accordance with Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS:

A. Shop Drawings:
   1. Sufficient information, clearly presented, shall be included to determine compliance with drawings and specifications.
   2. Include electrical ratings, dimensions, mounting details, materials, required clearances, terminations, weight, temperature rise, wiring and connection diagrams, plan, front, side, and rear elevations, sectional views, bus work, circuit breaker frame sizes, trip and short-circuit rating, long-time, short-time, instantaneous and ground fault settings, coordinated breaker and fuse curves, accessories, and device nameplate data.
   3. Show the size, ampere-rating, number of bars per phase and neutral in each bus run (horizontal and vertical), bus spacing, equipment ground bus, and bus material.

B. Manuals:
   1. Submit, simultaneously with the shop drawings, companion copies of complete maintenance and operating manuals including technical data sheets, wiring diagrams, and information for ordering replacement parts.
      a. Wiring diagrams shall have their terminals identified to facilitate installation, maintenance, and operation.
      b. Wiring diagrams shall indicate internal wiring for each item of equipment and the interconnection between the items of equipment.
      c. Provide a clear and concise description of operation, which gives, in detail, the information required to properly operate the equipment.
      d. Approvals will be based on complete submissions of manuals together with shop drawings.
   2. Two weeks prior to final inspection, deliver four copies of the final updated maintenance and operating manuals to the Resident Engineer.
      a. The manuals shall be updated to include any information necessitated by shop drawing approval.
      b. Complete "As Installed" wiring and schematic diagrams shall be included which show all items of equipment and their interconnecting wiring.
      c. Show all terminal identification.

d. Include information for testing, repair, trouble shooting, assembly, disassembly, and recommended maintenance intervals.
e. Provide a replacement parts list with current prices. Include a list of recommended spare parts, tools, and instruments for testing and maintenance purposes.
f. Furnish manuals in loose-leaf binder or manufacturer's standard binder.

C. Certifications:
1. Two weeks prior to final inspection, submit four copies of the following to the Resident Engineer:
a. Certification by the Contractor that the assemblies have been properly installed, adjusted and tested, including circuit breakers settings.
b. Certified copies of all of the factory design and production tests, field test data sheets and reports for the assemblies.

1.6 APPLICABLE PUBLICATIONS

Publications listed below (including amendments, addenda, revisions, supplements and errata) form a part of this specification to the extent referenced. Publications are referenced in the text by basic designation only.

A. Institute of Engineering and Electronic Engineers (IEEE):
C37.13.....Low Voltage AC Power Circuit Breakers Used in Enclosures
C57.13.....Instrument Transformers
C62.41.....Surge Voltage in Low Voltage AC Power Circuits
C62.45.....Surge Testing for Equipment connected to Low-Voltage AC Power Circuits

B. National Electrical Manufacturer's Association (NEMA):
PB-2 .....Dead-Front Distribution Switchboards.
PB-2.1 .....Instructions for Proper Handling, Installation, Operation, and Maintenance of Switchboards
AB-1 .....Molded Case Circuit Breakers, Molded Case Switches and Circuit Breaker Enclosures

C. National Fire Protection Association (NFPA):
70 .....National Electrical Code (NEC)

D. Underwriters Laboratories, Inc. (UL):
67 .....Panelboards
489 .....Molded Case Circuit Breakers and Circuit Breakers Enclosures
891 .....Dead-Front Switchboards
1283 .....Electromagnetic Interference Filters
1449 .....Transient Voltage Surge Suppressors

PART 2 - PRODUCTS

2.1 GENERAL

A. Switchboards shall be in accordance with UL, NEMA, NEC, IEEE, and as shown on the drawings.

B. Switchboards shall be provided complete, ready for operation including, but not limited to housing, buses, circuit breakers, instruments and related transformers, fuses, and wiring.

C. Switchboard dimensions shall not exceed the dimensions shown on the drawings.

D. Manufacturer's nameplate shall include complete ratings of switchboard in addition to the date of manufacture.

2.2 BASIC ARRANGEMENT

A. Type I: Switchboard shall be front accessible with the following features:

1. Device mounting:
    a. Main breaker: Individually mounted and compartmented or group mounted with feeder breakers.
    b. Feeder breakers: Group mounted.
2. Section alignment: As shown on the drawings.
3. Accessibility:
    a. Main section line and load terminals: Front and side.
    b. Distribution section line and load terminals: Front.
    c. Through bus connections: Front and end.
4. Bolted line and load connections.
5. Full height wiring gutter covers for access to wiring terminals.
6. Short Circuit Current Rating: 42,000 amperes rms symmetrical, minimum, or as shown on the drawings, whichever is higher**.**

2.3 HOUSING

A. Provide a completely enclosed, free standing, steel enclosure not less than the gage required by the ANSI and UL standards. The enclosure is to consist of the required number of vertical sections bolted together to form one metal enclosed rigid switchboard. The sides, top and rear shall be covered with removable screw on sheet steel plates.

B. Provide ventilating louvers where required to limit the temperature rise of current carrying parts. All openings shall be protected against entrance of falling dirt, water, or foreign matter.

C. Enclosure shall be thoroughly cleaned, phosphate treated, and primed with rust-inhibiting paint. Final finish coat to be the manufacturers standard gray. Provide a quart of finish paint for touch-up purposes.

2.4 BUSES

A. General: Buses shall be arranged for 3 phase, 4 wire distribution. Main phase buses (through bus), full size neutral bus, and ground bus shall be full capacity the entire length of the switchboard. Provide for future extensions by means of bolt holes or other approved method. Brace the bus to withstand the available short circuit current at the particular location and as shown on the drawings. No magnetic material shall be used between buses to form a magnetic loop.

B. Material and Size: Buses and connections shall be hard drawn copper of 98 percent conductivity. Bus temperature rise shall not exceed 65 degrees C (149 degrees F). Section busing shall be sized based on UL and NEMA Switchboard Standards.

C. Bus Connections: All contact surfaces shall be copper. Provide a minimum of two plated bolts per splice. Where physical bus size permits only one bolt, provide a means other than friction to prevent turning, twisting or bending. Torque bolts to the manufacturer's recommended values.

D. Neutral Bus: Provide bare or plated bus and mount on insulated bus supports. Provide neutral disconnect link to permit isolation of neutral bus from the common ground bus and service entrance conductors.

E. Ground Bus: Provide an uninsulated 6 mm by 50 mm (1/4 inch by 2 inch) copper equipment ground bus bar sized per UL 891 the length of the switchboard and secure at each section.

2.5 NAMEPLATES AND MIMIC BUS

A. Nameplates: For Normal Power system, provide laminated black phenolic resin with white core with 1/2 inch engraved lettered nameplates next to each circuit breaker. For Essential Electrical System, provide laminated red phenolic resin with white core with 1/2 inch engraved lettered nameplates next to each circuit breaker. Nameplates shall indicate equipment served, spaces, or spares in accordance with one line diagram shown on drawings. Nameplates shall be mounted with plated screws on front of breakers or on equipment enclosure next to breakers. Mounting nameplates only with adhesive is not acceptable.

B. Mimic Bus: Provide an approved mimic bus on front of each switchboard assembly. Color shall be black for the Normal Power system and red for the Essential Electrical System, either factory-painted plastic or metal strips. Plastic tape shall not be used. Use symbols similar to one line diagram shown on drawings. Plastic or metal strips shall be mounted with plated screws.

2.6 PROVISION FOR FUTURE

Where "provision for", "future", or "space" is noted on drawings, the space shall be equipped with bus connections to the future overcurrent device with suitable insulation and bracing to maintain proper short circuit rating and physical clearance. Provide buses for the ampere rating as shown for the future device.

2.7 BREAKER REMOVAL EQUIPMENT

Where draw out circuit breakers are provided, furnish a portable elevating carriage or switchboard permanent top mounted device for installation and removal of the breakers.

2.8 CONTROL WIRING

Control wiring shall be 600 volt class B stranded SIS. Install all control wiring complete at the factory adequately bundled and protected. Wiring across hinges and between shipping units shall be Class C stranded. Size in accordance with NEC. Provide control circuit fuses.

2.9 MAIN CIRCUIT BREAKERS

A. Type I Switchboard: Provide UL listed and labeled molded case circuit breakers in accordance with NEC and as shown on the drawings. Circuit breakers shall be the solid state adjustable trip type.
   1. Trip units shall have field adjustable tripping characteristics as follows:
      a. Ampere setting (continuous).
      b. Long time band.
      c. Short time trip point.
      d. Short time delay.
      e. Instantaneous trip point.
      f. Ground fault trip point.
      g. Ground fault trip delay.
   2. Trip settings shall be as indicated on the drawings. Final settings shall be as shown on the electrical system protective device study.
   3. Breakers, which have same rating, shall be interchangeable with each other.

2.10 FEEDER CIRCUIT BREAKERS

A. Provide UL listed and labeled molded case circuit breakers, in accordance with the NEC, as shown on the drawings, and as herein specified.
B. Non-adjustable Trip Molded Case Circuit Breakers:
   1. Molded case circuit breakers shall have automatic, trip free, non-adjustable, inverse time, and instantaneous magnetic trips for 100 ampere frame size or less. Magnetic trip shall be adjustable from 3X to 10X for breakers with 600 ampere frame size and higher. Factory setting shall be LOW unless otherwise noted.
   2. Breaker features shall be as follows:
      a. A rugged, integral housing of molded insulating material.
      b. Silver alloy contacts.
      c. Arc quenchers and phase barriers for each pole.

d. Quick-make, quick-break, operating mechanisms.
e. A trip element for each pole, thermal magnetic type with long time delay and instantaneous characteristics, a common trip bar for all poles and a single operator.
f. Electrically and mechanically trip free.
g. An operating handle which indicates ON, TRIPPED and OFF positions.
h. Line and load connections shall be bolted.
i. Interrupting rating shall not be less than the maximum short circuit current available at the line.
j. An overload on one pole of a multipole breaker shall automatically cause all the poles of the breaker to open.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install the switchboard in accordance with the NEC, as shown on the drawings, and as recommended by the manufacturer.
B. Anchor switchboard to the slab with plated 1/2 inch minimum anchor bolts, or as recommended by the manufacturer.
B. In seismic areas, switchboard shall be adequately anchored and braced to withstand the seismic zone IV forces at the location where installed.
C. Interior Location. Mount switchboard on concrete slab. Unless otherwise indicated, the slab shall be at least 4 inches thick. The top of the concrete slab shall be approximately 4 inches above finished floor. Edges above floor shall have 1/2 inch chamfer. The slab shall be of adequate size to project at least 8 inches beyond the equipment. Provide conduit turnups and cable entrance space required by the equipment to be mounted. Seal voids around conduit openings in slab with water- and oil-resistant caulking or sealant. Cut off and bush conduits 3 inches above slab surface. Concrete work shall be as specified in Section 03 30 00, CAST-IN-PLACE CONCRETE.

3.2 ACCEPTANCE CHECKS AND TESTS

A. Perform in accordance with the manufacturer's recommendations. Include the following visual and mechanical inspections and electrical tests:
1. Visual and Mechanical Inspection
a. Compare equipment nameplate data with specifications and approved shop drawings.
b. Inspect physical, electrical, and mechanical condition.
c. Confirm correct application of manufacturer's recommended lubricants.
d. Verify appropriate anchorage, required area clearances, and correct alignment.
e. Verify that circuit breaker sizes and types correspond to approved shop drawings.

f. Verifying tightness of accessible bolted electrical connections by calibrated torque-wrench method, or performing thermographic survey after energization.
g. Confirm correct operation and sequencing of electrical and mechanical interlock systems.
h. Clean switchboard.
i. Inspect insulators for evidence of physical damage or contaminated surfaces.
j. Verify correct shutter installation and operation.
k. Exercise all active components.
l. Verify the correct operation of all sensing devices, alarms, and indicating devices.
m. If applicable, verify that vents are clear.
n. If applicable, inspect control power transformers.

2. Electrical Tests
   a. Perform insulation-resistance tests on each bus section.
   b. Perform overpotential tests.
   c. Perform insulation-resistance test on control wiring; do not perform this test on wiring connected to solid-state components.
   d. Perform phasing check on double-ended switchboard to ensure correct bus phasing from each source.

3.3 FOLLOW-UP VERIFICATION

Upon completion of acceptance checks, settings, and tests, the Contractor shall show by demonstration in service that the switchboard is in good operating condition and properly performing the intended function. Circuit breakers shall be tripped by operation of each protective device.

3.4 INSTRUCTION

Furnish the services of a factory certified instructor for one 4 hour period for instructing personnel in the operation and maintenance of the switchboard and related equipment on the date requested by the Resident Engineer.

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SECTION 26 24 16
PANELBOARDS

PART 1 - GENERAL

1.1 DESCRIPTION

This section specifies the furnishing, installation and connection of panelboards.

1.2 RELATED WORK

A. Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS: General electrical requirements and items that are common to more than one Section of Division 26.

B. Section 26 05 33, RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS: Conduits and outlet boxes.

C. Section 26 05 21, LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES (600 VOLTS AND BELOW): Cables and wiring.

D. Section 26 05 26, GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS: Requirements for personnel safety and to provide a low impedance path for possible ground fault currents.

1.3 SUBMITTALS

A. Submit in accordance with Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS.

B. Shop Drawings:

1. Sufficient information, clearly presented, shall be included to determine compliance with drawings and specifications.
2. Include electrical ratings, dimensions, mounting details, materials, wiring diagrams accessories and weights of equipment. Complete nameplate data including manufacturer’s name and catalog number.

C. Certification: Two weeks prior to final inspection, submit four copies of the following to the Resident Engineer:

1. Certification that the material is in accordance with the drawings and specifications has been properly installed, and that the loads are balanced.

1.4 APPLICABLE PUBLICATIONS

Publications listed below (including amendments, addenda, revisions, supplements and errata) form a part of this specification to the extent referenced. Publications are referenced in the text by the basic designation only.

A. National Electrical Manufacturers Association (NEMA):

PB-1-2006 .....Panelboards

AB-1-2002 .....Molded Case Circuit Breakers, Molded Case Switches and Circuit Breaker Enclosures

B. National Fire Protection Association (NFPA):

70-2005 .....National Electrical Code (NEC)

70E-2004.....Standard for Electrical Life Safety in the Workplace

C. Underwriters Laboratories, Inc. (UL):

50-2003 .....Enclosures for Electrical Equipment

67-2003 .....Panel boards

489-2006 .....Molded Case Circuit Breakers and Circuit Breaker Enclosures

PART 2 - PRODUCTS

2.1 PANELBOARDS

A. Panelboards shall be in accordance with UL, NEMA, NEC, and as shown on the drawings.

B. Panelboards shall be standard manufactured products. All components of the panelboards shall be the product and assembly of the same manufacturer. All similar units of all panelboards to be of the same manufacturer.

C. All panelboards shall be hinged “door in door” type with:

1. Interior hinged door with hand operated latch or latches as required to provide access to circuit breaker operating handles only, not to energized ports.
2. Outer hinged door shall be securely mounted to the panelboard box with factory bolts, screws, clips or other fasteners requiring a tool for entry, hand operated latches are not acceptable.
3. Push inner and outer doors shall open left to right.

D. All panelboards shall be completely factory assembled with molded case circuit breakers. Include one-piece removable, inner dead front cover independent of the panelboard cover.

E. Panelboards shall have main breaker or main lugs, bus size, voltage, phase, top or bottom feed, and flush or surface mounting as scheduled on the drawings.

F. Panelboards shall conform to NEMA PB-1, NEMA AB-1 and UL 67 and have the following features:

1. Nonreduced size copper or aluminum bus bars, complete with current ratings as shown on the panel schedules connection straps bolted together and rigidly supported on molded insulators.
2. Bus bar connections to the branch circuit breakers shall be the “distributed phase” or “phase sequence” type. Single-phase, three-wire panelboard busing shall be such that when any two adjacent single-pole breakers are connected to opposite phases, two-pole breakers can be installed in any location. Three-phase, four-wire busing shall be such that when any three adjacent single-pole breakers are individually connected to each of the three different phases, two-or three-pole breakers can be installed at any location. Current-carrying parts of the bus assembly shall be plated. Mains ratings shall be as shown.
3. Mechanical lugs furnished with panelboards shall be cast, stamped or machined metal alloys of sizes suitable for the conductors indicated to be connected thereto.
4. Neutral bus shall be 100% rated, mounted on insulated supports.
5. Grounding bus bar equipped with screws or lugs for the connection of grounding wires.
6. Buses braced for the available short circuit current, but not less than 22,000 amperes symmetrical for 120/208 volt and 120/240 volt panelboards, and 14,000 amperes symmetrical for 277/480-volt panelboards.
7. Branch circuit panels shall have buses fabricated for bolt-on type circuit breakers.
8. Protective devices shall be designed so that they can be easily replaced.
9. Where designated on panel schedule "spaces", include all necessary bussing, device support and connections. Provide blank cover for each space.
10. In two section panelboards, the main bus in each section shall be full size. The first section shall be furnished with subfeed lugs on the line side of main lugs only, or through-feed lugs for main breaker type panels, and with cable connections to the second section. Panelboard sections with tapped bus or crossover bus are not acceptable.
11. Series rated panelboards are not permitted.

2.2 CABINETS AND TRIMS

A. Cabinets:

1. Provide galvanized steel cabinets to house panelboards. Cabinets for outdoor panels shall be factory primed and suitably treated with a corrosion-resisting paint finish meeting UL 50 and UL 67.
2. Cabinet enclosure shall not have ventilating openings.
3. Cabinets for panelboards may be of one-piece formed steel or of formed sheet steel with end and side panels welded, riveted, or bolted as required.

2.3 MOLDED CASE CIRCUIT BREAKERS FOR PANELBOARDS

A. Breakers shall be UL 489 listed and labeled, in accordance with the NEC, as shown on the drawings, and as specified.

B. Circuit breakers in panelboards shall be bolt on type on phase bus bar or branch circuit bar.

1. Molded case circuit breakers for lighting and appliance branch circuit panelboards shall have minimum interrupting rating as indicated but not less than:
   a. 120/208 Volt Panelboard: 22,000 amperes symmetrical.
   b. 120/240 Volt Panelboard: 22,000 amperes symmetrical.
   c. 277/480 Volt Panelboard: 14,000 amperes symmetrical.
2. Molded case circuit breakers shall have automatic, trip free, non-adjustable, inverse time, and instantaneous magnetic trips for 100-ampere frame or less. Magnetic trip shall be adjustable from 3X to 10X for breakers with 600 ampere frames and higher.

C. Breaker features shall be as follows:

1. A rugged, integral housing of molded insulating material.
2. Silver alloy contacts.
3. Arc quenchers and phase barriers for each pole.
4. Quick-make, quick-break, operating mechanisms.
5. A trip element for each pole, thermal magnetic type with long time delay and instantaneous characteristics, a common trip bar for all poles and a single operator.
6. Electrically and mechanically trip free.
7. An operating handle which indicates ON, TRIPPED, and OFF positions.
   a. Line connections shall be bolted.

b. Interrupting rating shall not be less than the maximum short circuit current available at the line terminals as indicated on the drawings.

8. An overload on one pole of a multipole breaker shall automatically cause all the poles of the breaker to open.
9. Shunt trips shall be provided where indicated

2.4 SEPARATELY ENCLOSED MOLDED CASE CIRCUIT BREAKERS

A. Where separately enclosed molded case circuit breakers are shown on the drawings, provide circuit breakers in accordance with the applicable requirements of those specified for panelboards.

B. Enclosures are to be of the NEMA types shown on the drawings. Where the types are not shown, they are to be the NEMA type most suitable for the environmental conditions where the breakers are being installed.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Installation shall be in accordance with the Manufacturer's instructions, the NEC, as shown on the drawings, and as specified.

B. Locate panelboards so that the present and future conduits can be conveniently connected. Coordinate the sizes of cabinets with designated closet space.

C. Install a typewritten schedule of circuits in each panelboard after being submitted to and approved by the Resident Engineer. Schedules, after approval, shall be typed on the panel directory cards and installed in the appropriate panelboards, incorporating all applicable contract changes pertaining to that schedule. Include the room numbers and items served on the cards.

D. Mount the panelboard fully aligned and such that the maximum height of the top circuit breaker above finished floor shall not exceed 1980 mm (78 inches). For panelboards that are too high, mount panelboard so that the bottom of the cabinets will not be less than 150 mm (6 inches) above the finished floor.

E. For panelboards located in areas accessible to the public, paint the exposed surfaces of the trims, doors, and boxes with finishes to match surrounding surfaces after the panelboards have been installed.

F. Directory-card information shall be typewritten to indicate outlets, lights, devices, and equipment controlled and final room numbers served by each circuit and shall be mounted in holders behind protective covering.

G. Where new panels are to be installed in existing backboxes, backboxes shall have rust and scale removed from inside. Paint inside of backboxes with rust preventive paint before the new panel interior is installed. Provide new trim and doors for these panels. Covers shall fit tight to the box with no gaps between the cover and the box.

I. Provide ARC flash identification per NFPA 70E.

End of Section 26 24 16

SECTION 26 27 26
WIRING DEVICES

PART 1 - GENERAL

1.1 DESCRIPTION

This section specifies the furnishing, installation and connection of wiring devices.

1.2 RELATED WORK

A. Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS: General electrical requirements that are common to more than one section of Division 26.

B. Section 26 05 33, RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS: Conduits and outlets boxes.

C. Section 26 05 21, LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES (600 VOLTS AND BELOW): Cables and wiring.

D. Section 26 05 26, GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS: Requirements for personnel safety and to provide a low impedance path to ground for possible ground fault currents.

1.3 QUALITY ASSURANCE

Refer to Paragraph, QUALIFICATIONS, in Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS.

1.4 SUBMITTALS

A. In accordance with Section 2-5.3 “SUBMITTALS”, Green Book Standard.

B. Shop Drawings:

1. Sufficient information, clearly presented, shall be included to determine compliance with drawings and specifications.
2. Include electrical ratings, dimensions, mounting details, construction materials, grade and termination information.

C. Manuals: Two weeks prior to final inspection, deliver four copies of the following to the Resident Engineer: Technical data sheets and information for ordering replacement units.

D. Certifications: Two weeks prior to final inspection, submit four copies of the following to the Resident Engineer: Certification by the Contractor that the devices comply with the drawings and specifications, and have been properly installed, aligned, and tested.

1.5 APPLICABLE PUBLICATIONS

A. Publications listed below (including amendments, addenda, revisions, supplements and errata) form a part of this specification to the extent referenced. Publications are referenced in the text by basic designation only.

B. National Fire Protection Association (NFPA):

70 .....National Electrical Code (NEC)

C. National Electrical Manufacturers Association (NEMA):

WD 1.....General Color Requirements for Wiring Devices

WD 6 .....Wiring Devices – Dimensional Requirements

D. Underwriter's Laboratories, Inc. (UL):

5 .....Surface Metal Raceways and Fittings

20 .....General-Use Snap Switches

231 .....Power Outlets

467 .....Grounding and Bonding Equipment

498 .....Attachment Plugs and Receptacles

943 .....Ground-Fault Circuit-Interrupters

PART 2 - PRODUCTS

2.1 RECEPTACLES

A. General: All receptacles shall be listed by Underwriters Laboratories, Inc., and conform to NEMA WD 6.

1. Mounting straps shall be plated steel, with break-off plaster ears and shall include a self-grounding feature. Terminal screws shall be brass, brass plated or a copper alloy metal.
2. Receptacles shall have provisions for back wiring with separate metal clamp type terminals (four min.) and side wiring from four captively held binding screws.

B. Duplex Receptacles: Hospital-grade, single phase, 20 ampere, 120 volts, 2-pole, 3-wire, and conform to the NEMA 5-20R configuration in NEMA WD 6. The duplex type shall have break-off feature for two-circuit operation. The ungrounded pole of each receptacle shall be provided with a separate terminal.

1. Bodies shall be ivory in color.
2. Switched duplex receptacles shall be wired so that only the top receptacle is switched. The remaining receptacle shall be unswitched.
3. Ground Fault Interrupter Duplex Receptacles: Shall be an integral unit, hospital-grade, suitable for mounting in a standard outlet box.
    a. Ground fault interrupter shall be consist of a differential current transformer, solid state sensing circuitry and a circuit interrupter switch. Device shall have nominal sensitivity to ground leakage current of five milliamperes and shall function to interrupt the current supply for any value of ground leakage current above five milliamperes (+ or – 1

milliamp) on the load side of the device. Device shall have a minimum nominal tripping time of 1/30th of a second.

b. Ground Fault Interrupter Duplex Receptacles (not hospital-grade) shall be the same as ground fault interrupter hospital-grade receptacles except for the “hospital-grade” listing.

4. Safety Type Duplex Receptacles:
   a. Bodies shall be gray in color.
      1) Shall permit current to flow only while a standard plug is in the proper position in the receptacle.
      2) Screws exposed while the wall plates are in place shall be the tamperproof type.
6. Duplex Receptacles (not hospital grade): Shall be the same as hospital grade duplex receptacles except for the "hospital grade" listing and as follows.
   a. Bodies shall be brown phenolic compound supported by a plated steel mounting strap having plaster ears.

C. Receptacles; 20, 30 and 50 ampere, 250 volts: Shall be complete with appropriate cord grip plug. Devices shall meet UL 231.

D. Weatherproof Receptacles: Shall consist of a duplex receptacle, mounted in box with a gasketed, weatherproof, cast metal cover plate and cap over each receptacle opening. The cap shall be permanently attached to the cover plate by a spring-hinged flap. The weatherproof integrity shall not be affected when heavy duty specification or hospital grade attachment plug caps are inserted. Cover plates on outlet boxes mounted flush in the wall shall be gasketed to the wall in a watertight manner.

2.2 TOGGLE SWITCHES

A. Toggle Switches: Shall be totally enclosed tumbler type with bodies of phenolic compound. Toggle handles shall be ivory in color unless otherwise specified. The rocker type switch is not acceptable and will not be approved.
   1. Shall be single unit toggle, butt contact, quiet AC type, heavy-duty general-purpose use with an integral self grounding mounting strap with break-off plasters ears and provisions for back wiring with separate metal wiring clamps and side wiring with captively held binding screws.
   2. Ratings:
      a. 120 volt circuits: 20 amperes at 120-277 volts AC.

2.3 WALL PLATES

A. Wall plates for switches and receptacles shall be type smooth nylon. Oversize plates are not acceptable.

B. Color shall be ivory unless otherwise specified.

C. Standard NEMA design, so that products of different manufacturers will be interchangeable. Dimensions for openings in wall plates shall be accordance with NEMA WD 6.

D. For receptacles or switches mounted adjacent to each other, wall plates shall be common for each group of receptacles or switches.

E. Wall plates for data, telephone or other communication outlets shall be as specified in the associated specification.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Installation shall be in accordance with the NEC and as shown as on the drawings.

B. Ground terminal of each receptacle shall be bonded to the outlet box with an approved green bonding jumper, and also connected to the green equipment grounding conductor.

C. Outlet boxes for light switches shall be mounted on the strike side of doors.

D. Provide barriers in multigang outlet boxes to separate systems of different voltages, Normal Power and Emergency Power systems, and in compliance with the NEC.

E. Coordinate with other work, including painting, electrical boxes and wiring installations, as necessary to interface installation of wiring devices with other work. Coordinate the electrical work with the work of other trades to ensure that wiring device flush outlets are positioned with box openings aligned with the face of the surrounding finish material. Pay special attention to installations in cabinet work, and in connection with laboratory equipment.

F. Exact field locations of floors, walls, partitions, doors, windows, and equipment may vary from locations shown on the drawings. Prior to locating sleeves, boxes and chases for roughing-in of conduit and equipment, the Contractor shall coordinate exact field location of the above items with other trades. In addition, check for exact direction of door swings so that local switches are properly located on the strike side.

G. Install wall switches 48 inches above floor, OFF position down.

H. Install wall dimmers 48 inches above floor; derate ganged dimmers as instructed by manufacturer; do not use common neutral.

I. Install convenience receptacles 18 inches above floor, and 6 inches above counter backsplash or workbenches. Install specific-use receptacles at heights shown on the drawings.

J. Label device plates with a permanent adhesive label listing panel and circuit feeding the wiring device.

K. Test wiring devices for damaged conductors, high circuit resistance, poor connections, inadequate fault current path, defective devices, or similar problems using a portable receptacle tester.

Correct circuit conditions, remove malfunctioning units and replace with new, and retest as specified above.

L. Test GFCI devices for tripping values specified in UL 1436 and UL 943.

End of Section 26 27 26

SECTION 26 29 21
DISCONNECT SWITCHES

PART 1 - GENERAL

1.1 DESCRIPTION

This section specifies the furnishing, installation and connection of low voltage disconnect switches.

1.2 RELATED WORK

A. General electrical requirements and items that is common to more than one section of Division 26: Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS.
B. Conduits for cables and wiring: Section 26 05 33, RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS.
C. Cables and wiring: Section 26 05 21, LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES (600 VOLTS AND BELOW.
D. Requirements for personnel safety and to provide a low impedance path for possible ground faults: Section 26 05 26, GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS.

1.3 SUBMITTALS

A. Submit in accordance with Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS.
B. Shop Drawings:
    1. Include sufficient information, clearly presented to determine compliance with drawings and specifications.
    2. Include electrical ratings, dimensions, mounting details, materials, enclosure types, fuse type and class.
    3. Show the specific switch and fuse proposed for each specific piece of equipment or circuit.
C. Manuals:
    1. Provide complete maintenance and operating manuals for disconnect switches, including technical data sheets, wiring diagrams, and information for ordering replacement parts. Deliver four copies to the Resident Engineer two weeks prior to final inspection.

2. Identify terminals on wiring diagrams to facilitate maintenance and operation.
3. Wiring diagrams shall indicate internal wiring and any interlocking.

D. Certification: Two weeks prior to final inspection, deliver to the Resident Engineer four copies of the certification that the equipment has been properly installed, adjusted, and tested.

1.4 APPLICABLE PUBLICATIONS

A. Publications listed below (including amendments, addenda, revisions, supplements and errata) form a part of this specification to the extent referenced. Publications are referenced in the text by the basic designation only.

B. National Electrical Manufacturers Association (NEMA):
KS l-01 ..... Enclosed and Miscellaneous Distribution Equipment Switches (600 Volts Maximum)

C. National Fire Protection Association (NFPA):
70-05..... National Electrical Code (NEC)

D. Underwriters Laboratories, Inc. (UL):
98-98..... Enclosed and Dead-Front Switches
198C-89 ..... High-Interrupting-Capacity Fuses, Current Limiting Types
198E-94..... Class R Fuses
977-99..... Fused Power-Circuit Devices

PART 2 - PRODUCTS

2.1 LOW VOLTAGE FUSIBLE SWITCHES RATED 600 AMPERES AND LESS

A. Shall be quick-make, quick-break type in accordance with UL 98, NEMA KS 1 and NEC.

B. Shall have a minimum duty rating, NEMA classification General Duty (GD) for 240 volts and NEMA classification Heavy Duty (HD) for 277/480 volts.

C. Shall be horsepower rated.

D. Shall have the following features:
1. Switch mechanism shall be the quick-make, quick-break type.
2. Copper blades, visible in the OFF position.
3. An arc chute for each pole.
4. External operating handle shall indicate ON and OFF position and shall have lock-open padlocking provisions.

5. Mechanical interlock shall permit opening of the door only when the switch is in the OFF position, defeatable by a special tool to permit inspection.
6. Fuse holders for the sizes and types of fuses specified.
7. Solid neutral for each switch being installed in a circuit which includes a neutral conductor.
8. Ground Lugs: One for each ground conductor.
9. Enclosures:
    a. Shall be the NEMA types shown on the drawings for the switches.
    b. Where the types of switch enclosures are not shown, they shall be the NEMA types which are most suitable for the environmental conditions where the switches are being installed. Unless otherwise indicated on the plans, all outdoor switches shall be NEMA 3R.
    c. Shall be finished with manufacturer's standard gray baked enamel paint over pretreated steel (for the type of enclosure required).

2.2 LOW VOLTAGE UNFUSED SWITCHES RATED 600 AMPERES AND LESS

Shall be the same as Low Voltage Fusible Switches Rated 600 Amperes and Less, but no fuses.

2.3 LOW VOLTAGE FUSIBLE SWITCHES RATED OVER 600 AMPERES TO 1200 AMPERES

Shall be the same as Low Voltage Fusible Switches Rated 600 Amperes and Less, except for the minimum duty rating which shall be NEMA classification Heavy Duty (HD). These switches shall also be horsepower rated.

2.4 IDENTIFICATION SIGNS

A. Install nameplate identification signs on each disconnect switch to identify the equipment controlled.
B. Nameplates shall be laminated black phenolic resin with a white core, with engraved lettering, a minimum of 6 mm (1/4-inch) high. Secure nameplates with screws.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install disconnect switches in accordance with the NEC and as shown on the drawings.
B. Fusible disconnect switches shall be furnished complete with fuses.

3.2 SPARE PARTS

Two weeks prior to the final inspection, furnish one complete set of spare fuses for each fusible disconnect switch installed on the project. Deliver the spare fuses to the ~~//~~ Resident Engineer.

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SECTION 26 51 00
INTERIOR LIGHTING

PART 1 - GENERAL

1.1 DESCRIPTION:

This section specifies the furnishing, installation and connection of the interior lighting systems.

1.2 RELATED WORK

A. Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS: General requirements that are common to more than one section of Division 26.

B. Section 26 05 21, LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES (600 VOLTS AND BELOW): Cables and wiring.

C. Section 26 05 26, GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS: Requirements for personnel safety and to provide a low impedance path to ground for possible ground fault currents.

D. Section 26 27 26, WIRING DEVICES: Wiring devices used for control of the lighting systems.

1.3 QUALITY ASSURANCE

Refer to Paragraph, QUALIFICATIONS, in Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS.

1.4 SUBMITTALS

A. In accordance with Section 2-5.3, “SUBMITTALS”, Green Book Standard.

B. Product Data: For each type of lighting fixture (luminaire) designated on the LIGHTING FIXTURE SCHEDULE, arranged in order of fixture designation, submit the following information.

1. Material and construction details include information on housing, optics system and lens/diffuser.
2. Physical dimensions and description.
3. Wiring schematic and connection diagram.
4. Installation details.
5. Energy efficiency data.
6. Photometric data based on laboratory tests complying with IESNA Lighting Measurements, testing and calculation guides.
7. Lamp data including lumen output (initial and mean), color rendition index (CRI), rated life (hours) and color temperature (degrees Kelvin).
8. Ballast data including ballast type, starting method, ambient temperature, ballast factor, sound rating, system watts and total harmonic distortion (THD).

C. Manuals:

1. Submit, simultaneously with the shop drawings companion copies of complete maintenance and operating manuals including technical data sheets, and information for ordering replacement parts.

2. Two weeks prior to the final inspection, submit four copies of the final updated maintenance and operating manuals, including any changes, to the Resident Engineer.

D. Certifications:

1. Two weeks prior to final inspection, submit four copies of the following certifications to the Resident Engineer:
   a. Certification by the Contractor that the equipment has been properly installed, adjusted, and tested.

1.5 APPLICABLE PUBLICATIONS

A. Publications listed below (including amendments, addenda, revisions, supplements, and errata) form a part of this specification to the extent referenced. Publications are referenced in the text by designation only.

B. Institute of Electrical and Electronic Engineers (IEEE):

C62.41-91 .....Guide on the Surge Environment in Low Voltage (1000V and less) AC Power Circuits

C. National Fire Protection Association (NFPA):

70 .....National Electrical Code (NEC)

101 .....Life Safety Code

D. National Electrical Manufacturer's Association (NEMA):

C82.1-97 .....Ballasts for Fluorescent Lamps - Specifications

C82.2-02 .....Method of Measurement of Fluorescent Lamp Ballasts

C82.4-02 .....Ballasts for High-Intensity-Discharge and Low-Pressure Sodium Lamps

C82.11-02 .....High Frequency Fluorescent Lamp Ballasts

E. Underwriters Laboratories, Inc. (UL):

496-96 .....Edison-Base Lampholders

542-99 .....Lampholders, Starters, and Starter Holders for Fluorescent Lamps

844-95 .....Electric Lighting Fixtures for Use in Hazardous (Classified) Locations

924-95 .....Emergency Lighting and Power Equipment

935-01 .....Fluorescent-Lamp Ballasts

1029-94 .....High-Intensity-Discharge Lamp Ballasts

1029A-06.....Ignitors and Related Auxiliaries for HID Lamp Ballasts

1598-00 .....Luminaires

1574-04.....Standard for Track Lighting Systems

2108-04.....Standard for Low-Voltage Lighting Systems

8750-08.....Light Emitting Diode (LED) Light Sources for Use in Lighting Products

F. Federal Communications Commission (FCC):

Code of Federal Regulations (CFR), Title 47, Part 18

PART 2 - PRODUCTS

2.1 LIGHTING FIXTURES (LUMINAIRES)

A. Shall be in accordance with NFPA 70 and UL 1598, as shown on drawings, and as specified.

B. Sheet Metal:

1. Shall be formed to prevent warping and sagging. Housing, trim and lens frame shall be true, straight (unless intentionally curved) and parallel to each other as designed.
2. Wireways and fittings shall be free of burrs and sharp edges and shall accommodate internal and branch circuit wiring without damage to the wiring.
3. When installed, any exposed fixture housing surface, trim frame, door frame and lens frame shall be free of light leaks; lens doors shall close in a light tight manner.
4. Hinged door closure frames shall operate smoothly without binding when the fixture is in the installed position, latches shall function easily by finger action without the use of tools.

C. Ballasts shall be serviceable while the fixture is in its normally installed position, and shall not be mounted to removable reflectors or wireway covers unless so specified.

D. Lamp Sockets:

1. Fluorescent: Lampholder contacts shall be the biting edge type or phosphorous-bronze with silver flash contact surface type and shall conform to the applicable requirements of UL 542. Lamp holders for bi-pin lamps shall be of the telescoping compression type, or of the single slot entry type requiring a one-quarter turn of the lamp after insertion.
2. High Intensity Discharge (H.I.D.): Shall have porcelain enclosures.

E. Recessed fixtures mounted in an insulated ceiling shall be listed for use in insulated ceilings.

F. Mechanical Safety: Lighting fixture closures (lens doors, trim frame, hinged housings, etc.) shall be retained in a secure manner by captive screws, chains, captive hinges or fasteners such that they cannot be accidentally dislodged during normal operation or routine maintenance.

G. Metal Finishes:

1. The manufacturer shall apply standard finish (unless otherwise specified) over a corrosion resistant primer, after cleaning to free the metal surfaces of rust, grease, dirt and other deposits. Edges of pre-finished sheet metal exposed during forming, stamping or shearing processes shall

be finished in a similar corrosion resistant manner to match the adjacent surface(s). Fixture finish shall be free of stains or evidence of rusting, blistering, or flaking, and shall be applied after fabrication.

2. Interior light reflecting finishes shall be white with not less than 85 percent reflectances, except where otherwise shown on the drawing.
3. Exterior finishes shall be as shown on the drawings.

H. Lighting fixtures shall have a specific means for grounding metallic wireways and housings to an equipment grounding conductor.

I. Light Transmitting Components for Fluorescent Fixtures:

1. Shall be 100 percent virgin acrylic.
2. Flat lens panels shall have not less than 1/8 inch of average thickness. The average thickness shall be determined by adding the maximum thickness to the minimum unpenetrated thickness and dividing the sum by 2.
3. Unless otherwise specified, lenses, diffusers and louvers shall be retained firmly in a metal frame by clips or clamping ring in such a manner as to allow expansion and contraction of the lens without distortion or cracking.

J. Lighting fixtures in hazardous areas shall be suitable for installation in Class and Group areas as defined in NFPA 70, and shall comply with UL 844.

K. Compact fluorescent fixtures shall be manufactured specifically for compact fluorescent lamps with ballast integral to the fixture. Assemblies designed to retrofit incandescent fixtures are prohibited except when specifically indicated for renovation of existing fixtures (not the lamp). Fixtures shall be designed for lamps as specified.

2.2 BALLASTS

A. Linear Fluorescent Lamp Ballasts: Multi-voltage (120 – 277V) electronic instant-start or rapid-start type, complying with UL 935 and with ANSI C 82.11, designed for type and quantity of lamps indicated. Ballast shall be designed for full light output unless dimmer or bi-level control is indicated; including the following features:

1. Lamp end-of-life detection and shutdown circuit (T5 lamps only).
2. Automatic lamp starting after lamp replacement.
3. Sound Rating: Class A.
4. Total Harmonic Distortion Rating: 10 percent or less.
5. Transient Voltage Protection: IEEE C62.41.1 and IEEE C62.41.2, Category A or better.
6. Operating Frequency: 20 kHz or higher.
7. Lamp Current Crest Factor: 1.7 or less.

8. Ballast Factor: 0.87 or higher unless otherwise indicated.
9. Power Factor: 0.98 or higher.
10. Interference: Comply with 47 CFT 18, Ch.1, Subpart C, for limitations on electromagnetic and radio-frequency interference for non-consumer equipment.
11. To facilitate multi-level lamp switching, lamps within fixture shall be wired with the outermost lamp at both sides of the fixture on the same ballast, the next inward pair on another ballast and so on to the innermost lamp (or pair of lamps). Within a given room, each switch shall uniformly control the same corresponding lamp (or lamp pairs) in all fixture units that are being controlled.
12. Where three-lamp fixtures are indicated, unless switching arrangements dictate otherwise, utilize a common two-lamp ballast to operate the center lamp in pairs of adjacent units that are mounted in a continuous row. The ballast fixture and slave-lamp fixture shall be factory wired with leads or plug devices to facilitate this circuiting. Individually mounted fixtures and the odd fixture in a row shall utilize a single-lamp ballast for operation of the center lamp.
13. Dimming ballasts shall be as per above, except dimmable from 100% to 5% of rated lamp lumens.

B. Compact Fluorescent Lamp Ballasts: Multi-voltage (120 – 277V), electronic-programmed rapid-start type, complying with UL 935 and with ANSI C 82.11, designed for type and quantity of lamps indicated. Ballast shall be designed for full light output unless dimmer or bi-level control is indicated; including the following features:
   1. Lamp end-of-life detection and shutdown circuit.
   2. Automatic lamp starting after lamp replacement.
   3. Sound Rating: Class A.
   4. Total Harmonic Distortion Rating: 10 percent or less.
   5. Transient Voltage Protection: IEEE C62.41.1 and IEEE C62.41.2, Category A or better.
   6. Operating Frequency: 20 kHz or higher.
   7. Lamp Current Crest Factor: 1.7 or less.
   8. Ballast Factor: 0.95 or higher unless otherwise indicated.
   9. Power Factor: 0.98 or higher.
   10. Interference: Comply with 47 CFR 18, Ch. 1, Subpart C, for limitations on electromagnetic and radio-frequency interference for non-consumer equipment.
   11. Dimming ballasts shall be as per above, except dimmable from 100% to 5 % of rated lamp lumens.

C. Ballasts for high intensity discharge fixtures: Multi-tap voltage (120- 480v) electromagnetic ballast for high intensity discharge lamps. Comply with ANSI C82.4 and UL 1029. Include the following features unless otherwise indicated:
   1. Ballast Circuit: Constant-wattage autotransformer or regulating high-power-factor type.
   2. Minimum Starting Temperature: Minus 22 deg F (Minus 30 deg C) for single-lamp ballasts.
   3. Rated Ambient Operating Temperature: 104 deg F (40 deg C).
   4. Open-circuit operation that will not reduce average life.
   5. Low-Noise Ballasts: Manufacturers' standard epoxy-encapsulated models designed to minimize audible fixture noise.

D. Electronic ballast for high intensity discharge metal-halide lamps shall include the following features unless otherwise indicated:
   1. Minimum Starting Temperature: Minus 20 deg F (Minus 29 deg C) for single-lamp ballasts.
   2. Rated Ambient Operating Temperature: 130 deg F (54 deg C).
   3. Lamp end-of-life detection and shutdown circuit.
   4. Sound Rating: Class A.
   5. Total Harmonic Distortion Rating: 20 percent or less.
   6. Transient Voltage Protection: IEEE C62.41.1 and IEEE C62.41.2, Category A or better.
   7. Lamp Current Crest Factor: 1.5 or less.
   8. Power Factor: 0.90 or higher.
   9. Interference: Comply with 47 CFR 18, Ch. 1, Subpart C, for limitations on electromagnetic and radio-frequency interference for non-consumer equipment.
   10. Protection: Class P thermal cut.

2.3 FLUORESCENT EMERGENCY BALLAST

A. Self-contained, modular, battery-inverter unit, factory mounted within lighting fixture body and compatible with ballast. Comply with UL 924.
   1. Emergency Connection: Operate one fluorescent lamp(s) continuously at an output of 1100 lumens each. Connect unswitched circuit to battery-inverter unit and switched circuit to fixture ballast.
   2. Test Push Button and Indicator Light: Visible and accessible without opening fixture or entering ceiling space.

a. Push Button: Push-to-test type, in unit housing, simulates loss of normal power and demonstrates unit operability.
b. Indicator Light: LED indicates normal power on. Normal glow indicates trickle charge; bright glow indicates charging at end of discharge cycle.

3. Battery: Sealed, maintenance-free, nickel-cadmium type.
4. Charger: Fully automatic, solid-state, constant-current type with sealed power transfer relay.
5. Integral Self-Test: Automatically initiates test of unit emergency operation at required intervals. Test failure is annunciated by an integral audible alarm and a flashing LED.

2.4 EMERGENCY LIGHTING UNIT

A. Complete, self-contained unit with batteries, battery charger, one or more local or remote lamp heads with lamps, under-voltage relay, and test switch. Comply with UL 924.
1. Enclosure: Shall be impact-resistant thermoplastic, which will protect components from dust, moisture, and oxidizing fumes from the battery. Enclosure shall be suitable for the environmental conditions in which installed.
2. Lamp Heads: Horizontally and vertically adjustable, mounted on the face of the unit, except where otherwise indicated.
3. Lamps: Shall be sealed-beam MR-16 halogen, rated not less than 12-watts at the specified DC voltage.
4. Battery: Shall be maintenance-free nickel-cadmium. Minimum normal life shall be 10 years.
5. Battery Charger: Dry-type full-wave rectifier with charging rates to maintain the battery in fully-charged condition during normal operation, and to automatically recharge the battery within 12 hours following a 1-1/2 hour continuous discharge.
6. Integral Self-Test: Automatically initiates test of unit emergency operation at required intervals. Test failure is annunciated by an integral audible alarm and a flashing LED.

2.5 LAMPS

A. Linear and U-shaped T5 and T8 Fluorescent Lamps:
1. Rapid start fluorescent lamps shall comply with ANSI C78.1; and instant-start lamps shall comply with ANSI C78.3.
2. Chromacity of fluorescent lamps shall comply with ANSI C78.376.
3. Except as indicated below, lamps shall be low-mercury energy saving type, have a color temperature between 3500° and 4100°K, a Color Rendering Index (CRI) of greater than 70, average rated life of 20,000 hours, and be suitable for use with dimming ballasts, unless otherwise indicated. Low mercury lamps shall have passed the EPA Toxicity Characteristic Leachate

Procedure (TCLP) for mercury by using the lamp sample preparation procedure described in NEMA LL

a. Other areas as on the drawings.

B. Compact Fluorescent Lamps:

1. T4, CRI 80 (minimum), color temperature 3500 K, and suitable for use with dimming ballasts, unless otherwise indicated.

C. Long Twin-Tube Fluorescent Lamps:

1. T5, CRI 80 (minimum), color temperature between 3500° and 4100°K, 20,000 hours average rated life.

D. High Intensity Discharge Lamps:

1. High-Pressure Sodium Lamps: ANSI C78.42, CRI 21 (minimum), color temperature 1900°K, and average rated life of 24,000 hours, minimum.
2. Pulse-Start, Metal-Halide Lamps: Minimum CRI 65, and color temperature 4000°K.
3. Ceramic, Pulse-Start, Metal-Halide Lamps: CRI 80 (minimum), and color temperature 4000°K.

2.6 EXIT LIGHT FIXTURES

A. Exit light fixtures shall meet applicable requirements of NFPA 101 and UL 924.

B. Housing and Canopy:

1. Shall be made of die-cast aluminum.
2. Optional steel housing shall be a minimum 20 gauge thick or equivalent strength aluminum.
3. Steel housing shall have baked enamel over corrosion resistant, matte black or ivory white primer.

C. Door frame shall be cast or extruded aluminum, and hinged with latch.

D. Finish shall be satin or fine-grain brushed aluminum.

E. There shall be no radioactive material used in the fixtures.

F. Fixtures:

1. Maximum fixture wattage shall be 1 watt or less.

2. Inscription panels shall be cast or stamped aluminum a minimum of 0.090 inch thick, stenciled with 6 inch high letters, baked with red color stable plastic or fiberglass. Lamps shall be luminous Light Emitting Diodes (LED) mounted in center of letters on red color stable plastic or fiberglass. The LED shall be rated minimum 25 years life.

3. Double-Faced Fixtures: Provide double-faced fixtures where required or as shown on drawings.

4. Directional Arrows: Provide directional arrows as part of the inscription panel where required or as shown on drawings. Directional arrows shall be the "chevron-type" of similar size and width as the letters and meet the requirements of NFPA 101.

G. Voltages: Refer to Lighting Fixture Schedule.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Installation shall be in accordance with the NEC, manufacturer's instructions and as shown on the drawings or specified.

B. Align, mount and level the lighting fixtures uniformly.

C. Fluorescent bed light fixtures shall be attached to the studs in the walls. Attachment to gypsum board only is not acceptable.

D. Lighting Fixture Supports:

1. Shall provide support for all of the fixtures. Supports may be anchored to channels of the ceiling construction, to the structural slab or to structural members within a partition, or above a suspended ceiling.
2. Shall maintain the fixture positions after cleaning and relamping.
3. Shall support the lighting fixtures without causing the ceiling or partition to deflect.
4. Hardware for recessed lighting fixtures:
    a. All fixture mounting devices connecting fixtures to the ceiling system or building structure shall have a capacity for a horizontal force of 100 percent of the fixture weight and a vertical force of 400 percent of the fixture weight.
    b. Mounting devices shall clamp the fixture to the ceiling system structure (main grid runners or fixture framing cross runners) at four points in such a manner as to resist spreading of these supporting members. Each support point device shall utilize a screw or approved hardware to "lock" the fixture housing to the ceiling system, restraining the fixture from movement in any direction relative to the ceiling. The screw (size No. 10 minimum) or approved hardware shall pass through the ceiling member (T-bar, channel or spline), or it may extend over the inside of the flange of the channel (or spline) that faces away from the fixture, in a manner that prevents any fixture movement.
    c. In addition to the above, the following is required for fixtures exceeding 20 pounds in weight.
        1) Where fixtures mounted in ASTM Standard C635-69 "Intermediate" and "Heavy Duty" ceilings and weigh between 20 pounds and 56 pounds provide two 12 gauge safety hangers hung slack between diagonal corners of the fixture and the building structure.
        2) Where fixtures weigh over 56 pounds they shall be independently supported from the building structure by approved hangers. Two-way angular bracing of hangers shall be provided to prevent lateral motion.

d. Where ceiling cross runners are installed for support of lighting fixtures, they must have a carrying capacity equal to that of the main ceiling runners and be rigidly secured to the main runners.

5. Surface mounted lighting fixtures:
   a. Fixtures shall be bolted against the ceiling independent of the outlet box at four points spaced near the corners of each unit. The bolts (or stud-clips) shall be minimum 1/4-20 bolt, secured to main ceiling runners and/or secured to cross runners. Non-turning studs may be attached to the main ceiling runners and cross runners with special non-friction clip devices designed for the purpose, provided they bolt through the runner, or are also secured to the building structure by 12 gauge safety hangers. Studs or bolts securing fixtures weighing in excess of 56 pounds shall be supported directly from the building structure.
   b. Where ceiling cross runners are installed for support of lighting fixtures they must have a carrying capacity equal to that of the main ceiling runners and be rigidly secured to the main runners.
   c. Fixtures less than 15 pounds in weight and occupying less than two square feet of ceiling area may, (when designed for the purpose) be supported directly from the outlet box when all the following conditions are met.
      1) Screws attaching the fixture to the outlet box pass through round holes (not key-hole slots) in the fixture body.
      2) The outlet box is attached to a main ceiling runner (or cross runner) with approved hardware.
      3) The outlet box is supported vertically from the building structure.
   d. Fixtures mounted in open construction shall be secured directly to the building structure with approved bolting and clamping devices.
6. Single or double pendant-mounted lighting fixtures:
   a. Each stem shall be supported by an approved outlet box, mounted swivel joint and canopy which holds the stem captive and provides spring load (or approved equivalent) dampening of fixture oscillations. Outlet box shall be supported vertically from the building structure.
7. Outlet boxes for support of lighting fixtures (where permitted) shall be secured directly to the building structure with approved devices or supported vertically in a hung ceiling from the building structure with a nine gauge wire hanger, and be secured by an approved device to a main ceiling runner or cross runner to prevent any horizontal movement relative to the ceiling.

E. Furnish and install the specified lamps for all lighting fixtures installed under this project.

F. Coordinate between the electrical and ceiling trades to ascertain that approved lighting fixtures are furnished in the proper sizes and installed with the proper devices (hangers, clips, trim frames, flanges), to match the ceiling system being installed.

G. Bond lighting fixtures and metal accessories to the grounding system as specified in Section 26 05 26, GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS.

H. Exercise electronic dimming ballasts over full range of dimming capability by operating the control devices(s) in the presence of the Resident Engineer. Observe for visually detectable flicker over full dimming range.

I. Burn-in all lamps that require specific aging period to operate properly, prior to occupancy by Government. Burn-in period to be 40 hours minimum, unless a lesser period is specifically recommended by lamp manufacturer. Burn-in fluorescent and compact fluorescent lamps intended to be dimmed, for at least 100 hours at full voltage. Replace any lamps and ballasts which fail during burn-in.

J. At completion of project, relamp/reballast fixtures which have failed lamps/ballasts. Clean fixtures, lenses, diffusers and louvers that have accumulated dust/dirt/fingerprints during construction. Replace damaged lenses, diffusers and louvers with new.

End of Section 26 51 00

SECTION 26 56 00
EXTERIOR LIGHTING

PART 1 - GENERAL

1.1 DESCRIPTION

This section specifies the furnishing, installation, and connection of exterior luminaries, controls, poles and supports.

1.2 RELATED WORK

A. Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS: General electrical requirements and items that are common to more than one section of Division 26.

B. Section 26 05 33, RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS: Conduits, fittings, and boxes for raceway systems.

E. Section 26 05 21, LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES (600 VOLTS AND BELOW): Low voltage power and lighting wiring.

F. Section 26 05 41, UNDERGROUND ELECTRICAL CONSTRUCTION: Underground handholes and conduits.

G. Section 26 05 26, GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS: Requirements for personnel safety and to provide a low impedance path for possible ground fault currents.

1.3 SUBMITTALS

A. Submit in accordance with Section 2-5.3 “SUBMITTALS”, Green Book Standard.

B. Shop Drawings:

1. Sufficient information, clearly presented, shall be included to determine compliance with drawings and specifications.
2. Include electrical ratings, dimensions, mounting, details, materials, required clearances, terminations, wiring and connection diagrams, photometric data, ballasts, poles, luminaries, lamps and controls.

C. Manuals: Two weeks prior to final inspection, submit four copies of operating and maintenance manuals to the Resident Engineer. Include technical data sheets, wiring and connection diagrams, and information for ordering replacement parts.

D. Certifications: Two weeks prior to final inspection, submit four copies of the following to the Resident Engineer:

1. Certification that the materials are in accordance with the drawings and specifications.
2. Certification, by the Contractor, that the complete installation has been properly installed and tested.

1.4 APPLICABLE PUBLICATIONS

Publications listed below (including amendments, addenda, revisions, supplements and errata) form a part of this specification to the extent referenced. Publications are referenced in the text by the basic designation only.

A. American National Standards Institute (ANSI):
   C81.61-2005 .....Electrical Lamp Bases

B. Illuminating Engineering Society of North America (IESNA)
   HB-9-2000 .....Lighting Handbook
   RP-8-2000 (R-2005) .....Roadway Lighting

C. National Electrical Manufacturers Association (NEMA):
   C78.41-2001 .....Electric Lamps – Guidelines for Low-Pressure Sodium Lamps
   C78.42-2004 .....Electric Lamps – Guidelines for High-Pressure Sodium Lamps
   C78.43-2005 .....Electric Lamps – Single-Ended Metal-Halide Lamps
   C78.1381-1998 .....(R 1997) Electric Lamps – 70-Watt M85 Metal-Halide Lamps
   C82.4-2002 .....Ballasts for High-Intensity-Discharge and Low-Pressure Sodium Lamps (Multiple-Supply Type)
   C136.17-2005 .....Roadway Lighting Equipment – Enclosed Side-Mounted Luminaries for Horizontal-Burning High-Intensity-Discharge Lamps
   ICS 2-2005 .....Industrial Control and Systems Controllers, Contactors and Overload Relays Rated 600 Volts
   ICS 6-2001 .....Industrial Control and Systems Enclosures

D. National Fire Protection Association (NFPA):
   70-2005 .....National Electrical Code (NEC)

E. Underwriters Laboratories, Inc. (UL):
   496-2004 .....Edison-Base Lamp holders
   773-1995 .....Plug-in, Locking Type Photo controls, for Use with Area Lighting
   773A-2006 .....Non-industrial Photoelectric Switches for Lighting Control
   1029-1994 .....High-Intensity-Discharge Lamp Ballasts
   1598-2004 .....Luminaries

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT

Materials and equipment shall be in accordance with NEC, UL, ANSI, and as shown on the drawings and specified.

2.2 LUMINAIRES

A. UL 1598 and NEMA C136.17. Luminaries shall be weatherproof, heavy duty, outdoor types designed for efficient light utilization, adequate dissipation of lamp and ballast heat and safe cleaning and relamping.

B. IESNA HB-9 and RP-8 light distribution pattern types shall be as shown on the drawings.

C. Incorporate ballasts in the luminaire housing except where otherwise shown on the drawings.

D. Lenses shall be frame-mounted heat-resistant, borosilicate glass, prismatic refractors. Attach the frame to the luminaire housing by hinges or chain. Use heat and aging resistant resilient gaskets to seal and cushion lenses and refractors in luminary doors.

E. Lamp sockets for high intensity discharge (H.I.D) fixture shall have locking type porcelain enclosures in conformance to the applicable requirements of ANSI C81.61 and UL 496.

F. Pre-wire internal components to terminal strips at the factory.

G. Bracket mounted luminaries shall have leveling provisions and clamp type adjustable slip-fitters with locking screws.

H. Materials shall be rustproof. Latches and fittings shall be non-ferrous metal.

I. IESNA Cutoff Category: cutoff

2.3 LAMPS

A. Install the proper lamps in every luminaire installed

B. Lamps to be general-service, outdoor lighting types.

C. High-Pressure Sodium (HPS) Lamps: NEMA C78.42, wattage as indicated. Lamps shall have average rated life of 16,000 hours minimum for 35 watt lamps and 24,000 hours minimum for all higher wattages.

D. Metal-Halide Lamps: NEMA C78.43 or NEMA C78.1381

E. Mercury vapor lamps shall not be used.

2.4 HIGH INTENSITY DISCHARGE BALLASTS

A. For low voltage systems, the ballasts shall be the high efficiency, high power factor, copper-wound constant wattage type and shall meet the requirements of UL 1029 and NEMA C82.4.

1. Ballasts shall operate the discharge lamp of the type, wattage, and voltage shown on the drawings.

2. Ballasts shall have individual overcurrent protection (inline fuse holder) as recommended by the ballast manufacturer.
3. Ballasts shall be capable of providing reliable starting of the lamps at minus 30 degrees C.
4. Open-circuit operation shall not reduce the average life.

2.5 CONTROLS

A. Each Lighting System:

1. Shall be controlled by one of the following methods as shown for each system on the drawings:
   a. A photocell to act as the pilot device. The photocell shall be the type which fails safe to the closed position meeting UL 773 or 773A.
   b. A time clock to act as the pilot device.
   c. A combination, photocell-time clock to act as dual pilot devices connected in series. The photocell shall provide the "on" function at dusk and the time clock(s) shall control specific circuit "off" functions during dark hours.
   d. A time clock to act as the pilot device for a circuit (or circuits) when luminaries are individually photocell controlled.
   e. The pilot devices shall control the power circuit through the contactor or relay as shown on the drawings.
2. Mount and connect photocells and time clocks as shown on the drawings.
3. Photocells shall have the following features:
   a. Quick-response, cadmium-sulfide type.
   b. A 15 to 30 second, built-in time delay to prevent response to momentary lightning flashes, car headlights or cloud movements.
   c. Energizes the system when the north sky light decreases to approximately 1.5 footcandles, and maintains the system energized until the north sky light increases to approximately 3 to 5 foot candles.
4. Time clocks shall have the following features:
   a. A 24-hour astronomic dial, motor-driven.
   b. A spring-actuated, reserve power mechanism for operating the timer during electrical power failures and that automatically winds the spring when the electrical power is restored.
5. The arrangement and method of control and the control devices shall be as shown on the drawings.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install lighting in accordance with the NEC, as shown on the drawings, and in accordance with manufacturer's recommendations.

B. Photocell Switch Aiming: Aim switch according to manufacturer's recommendations.

3.2 GROUNDING

Ground noncurrent-carrying parts of equipment including metal poles, luminaries, mounting arms, brackets, and metallic enclosures as specified in Section 26 05 26, GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS. Where copper grounding conductor is connected to a metal other than copper, provide specially treated or lined connectors suitable and listed for this purpose.

End of Section 26 56 00

SECTION 27 4116 – AUDIO SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 WORK INCLUDED

A. Verify design and engineering, supply, and install complete turnkey audio systems. Furnish all equipment and materials, whether specifically mentioned herein or not, to ensure a complete and operating system. NIC (not-in-contract) and OFE (owner furnished equipment) equipment and materials are included in this requirement.

B. Submit all shop drawings and information showing system(s) installation and wiring. Provide (or subcontract for) on-site installation and wiring, provide ongoing supervision and coordination during implementation.

C. Implement initial adjustment of system(s) as herein prescribed. AV Contractor to provide all test equipment for system checkout and acceptance tests.

D. Provide setup programming and commissioning of all equipment whether specifically mentioned herein or not, for optimum audible performance and functionally.

E. Provide on-the-job training in the operation and maintenance of system(s) for personnel designated by the Owner.

F. Provide equipment manuals, user manuals and as-built drawing documentation.

1.3 NOT IN CONTRACT (NIC)

A. Certain equipment and materials shall be furnished and installed by others. Unless otherwise shown in this bid specification, or on related drawings, these shall include:

1. All conduits, wire ways, connection boxes, pull boxes, junction boxes, and outlet boxes permanently installed in walls, floors and ceilings.
2. All room lighting fixtures, dimmers, and power receptacle outlets and interconnecting wiring for these circuits.
3. All electrical breaker panels required to power audio equipment.
4. All structural work, wall openings, platforms, railings, stairs, fire prevention and safety devices, rough and finished trim, painting and patching, drapes, acoustical treatments, heating, ventilating and air conditioning systems.

1.4 REFERENCES

A. Codes: Work shall be performed in accordance with applicable requirements of governing codes, rules and regulations including the following minimum standards, whether statutory or not:

1. Uniform Building Code (UBC)
2. National Electric Code (NEC)

3. National Fire Protection Association (NFPA)
4. City, and other local codes and requirements

B. Standards: Equipment and materials specified shall conform to the current edition of the following standards where applicable:

1. UL Underwriters' Laboratories
2. NEMA National Electrical Manufacturer's Association
3. ANSI American National Standards Institute
4. SMPTE Society of Motion Picture and Television Engineers
5. EIA Electronic Industries Association
6. ISO International Standards Organization

1.5 SHOP DRAWINGS SUBMITTALS

A. Before fabrication, submit for review any custom designs and technical literature regarding system(s). These designs include, but are not limited to:

1. All panels, plates, and designation strips, including details relating to terminology, engraving, finish and color
2. All custom designed control panels, support bases and shelves.
3. Schematic drawings on all custom circuitry.
4. All custom made furniture including lecterns, cabinets, counter and etc.
5. All non-standard equipment modifications
    a. Before assembly and installation, submit to the Owner’s selected representative(s) for review:
        1. Wire run sheets or field wiring drawings
        2. Equipment modification drawings
        3. Final schematic drawings of any custom circuitry, including receptacle pin numbers and all component callouts.

1.6 QUALITY ASSURANCE

A. Contractor qualifications: Shall be a firm with five years’ experience in the fabrication, assembly, and installation of audio systems of similar magnitude and quality, as specified for this project. All Contractors and Subcontractors shall hold licenses required by the State of California for all work performed.

B. Outline the general scope of past projects, normal staffing levels, and licensing status of shop, limited energy or other, as well as field installation personnel.

C. List a minimum of three (3) projects of similar scope successfully completed, indicating the location, type of system installed, total contract amount, date completed, and include persons telephone number to contact.

D. Submit confirmation of current state or local contracting licenses, as required to perform the work under this section.

E. AV contractor must show proof of training or experience installing and programming Biamp audio DSP products, to match the requirements of the system specified. When noting experience provide list of projects where systems were installed.

F. AV Contractor must be an authorized reseller of all equipment detailed in this specification, for example Bose, Biamp, AMX etc.

1.7 SUBCONTRACT INFORMATION

A. Identify subcontractors and their responsibilities, qualifications and licenses.

B. Because of the complexity of audio systems, the supervision of such subcontracted work cannot be intermittent. Provide continuous full time on-site supervision of subcontractors during the installation.

1.8 KEY PERSONNEL

A. Provide experience, license information, if relevant, and contact information on the project manager, field installation supervisor and other relevant personnel who will be assigned to the project.

B. Must employ at least one full-time InfoCOMM Certified Technology Specialist (CTS) for project coordination or project management, Design (CTS-D) designer and Installer (CTS-I) to oversee the project communication, design drawings and installation.

C. Must employ at least one full-time AMX certified programmer, BOSE modeler certified designer and BIAMP certified programmer.

1.9 PERMITS

A. It is the responsibility of AV Contractor to obtain all necessary permits and adhere to licensing requirements for completion of the work described herein.

1.10 SERVICE CONTRACT

A. The A/V contractor/supplier shall provide maintenance and service for a period of one year after the acceptance of the project or during the warranty of the system, whichever comes first.

PART 2 - PRODUCTS

2.1 SYSTEMS DESCRIPTION

A. AUDIO SYSTEM

1. The audio system is designed for an approximately 2000 square foot outdoor space that will supply background audio and overall sound reinforcement and for small events for sound reproduction. Sound will be reproduced from a pole mounted loudspeaker cluster located at the foreground of the amphitheater space. The cluster shall be engineered to provide coverage to the amphitheater seating area and the gathering area immediately in front of the seating area.

2. There shall be four additional speaker zones in the north and south pavilion areas. These four additional zones shall function as a second speaker system for the purpose of broadcasting background music during general purpose times.
3. The two speaker systems shall be able to be used separately from each other as well as combined.
4. The head end system containing the rack system and necessary electronics (amplifiers, DSP, sources and control system) shall be located in the north storage area.
5. Audio sources shall include an auxiliary audio input, a show audio input and a CD player to play music and content to the various outdoor weatherproof speakers. Additionally (4) wireless microphones will be available for use in the amphitheater space. The microphone antennae will be located on the poles in the plaza per the A/V drawings.
6. The system shall be operated via the use of a specialized AV system controller. Users can make selections via a rack mounted LCD touch panel. The touch panel can be removed from the rack mounted docking station for authorized users to carry out into the plaza space and will interface with the system controller via the area wireless network. The system controller will allow the following functions: Power on/off, volume up/down, source selection and source transport control. Connections to the lighting system will be provided (one RS-232 serial connection and four contact closures) to allow lighting pre-sets to be activated via the AV system controller.

2.2 EQUIPMENT LIST

The following equipment lists outline the intended products and quantities per area. The equipment list may not capture all items required. AV integrators responding to this bid specification must include itemized pricing with all equipment for completely designed and functional systems. All additional equipment, devices, adapters, rack hardware, ID Labels, etc. to complete the systems must be included in the materials bid amount.

The specified brand and model numbers for all equipment is integral to the system design. Equipment substitutions are not allowed. The equipment list provided is for equipment only and does not include hardware, wiring, connectors, conduit etc. for installation.

A. Audio System:

Item	QTY	Manufacturer	Model	Description	Price
				AUDIO	
1.00	1	Bose	LT9402 WR	Mid/High Loudspeaker	$ -
2.00	1	Bose	LT9702 WR	Mid/High Loudspeaker	$ -
3.00	1	Bose	MB24 WR	Bass loudspeaker	$ -
4.00	26	Bose	DS 16SE	Surface Mounted Loudspeaker (Black)	$ -
5.00	26	Bose	323208-0110	Speaker Mounting Bracket (Black)	$ -
6.00	3	Bose	360p II	Environmental In-Ground Speaker	$ -
7.00	1	Bose	PM8500N	PowerMatch Amplifier	$ -
8.00	3	ATM Fly-Ware	Pole-Star Custom	Speaker Pole Mount	$ -
9.00	1	Biamp	AudiaFlex NC	Digital Audio Platform	$ -

10.00	6	Biamp	IP-2	Mic/Line Input Cards	$ -
11.00	2	Biamp	OP-2E	Mic/Line Output Cards	$ -
12.00	1	Tascam	CD-200i	CD Player with iPod / iPhone Dock	$ -
13.00	1	PanelCrafters	Custom Panel	Aux input / Record Out Panel	$ -
14.00	1	Middle Atlantic	SS	Sliding Shelf	$ -
15.00	4	Shure	ULXD24/SM58	Handheld Wireless System	$ -
16.00	4	Shure	SB900	Rachargeable Battery	$ -
17.00	1	Shure	SBC800	8 Battery Charging Station	$ -
18.00	1	Shure	UA844SWB	Antenna Distribution System 470-952 MHz	$ -
19.00	2	Shure	UA870USTV	UHF Active Directional Antenna 470-698 MHz	$ -
20.00	2	Custom	Custom	Wireless Mic antenna Pole Mount	$ -
21.00	4	Atlas Sound	SMS5B	10" Stackable Mic Stand	$ -
22.00	1	Middle Atlantic	D4	4 RU Drawer with Cable Grommet and non-slip mat	$ -
23.00	2	Sabine	FBX2410-U	Dual Feedback Exterminator, 24-bit Dual Channel-Pro	
				EQUIPMENT RACK	$ -
24.00	1	Middle Atlantic	DWR-35-26	35 RU Wall Mount Equipment Rack	$ -
25.00	1	Middle Atlantic	DWR-FK26	Rack Fan Kit	$ -
26.00	1	Middle Atlantic	TEMP-DEC	Rack Mount Temperature Display	$ -
27.00	1	Surgex	SX1115-RT	15 amp 8-outlet Surge Eliminator / Power Conditioner	$ -
28.00	2	Surgex	SA20	20 AMP Surge Eliminator / Power Conditioner	$ -
29.00	1	Surgex	SA-B	Mounting Bracket	
				CONTROL	$ -
30.00	1	AMX	NI-2100	Integrated Controller	$ -
31.00	1	AMX	MVP-5150	5.2" Modero Wi-Fi Touchpanel	$ -
32.00	1	AMX	MVP-WCS-52-GB	Wall Docking / Charging Station	$ -
33.00	1	AMX	DAS-MET-6SRC-WH	6-Source Audio Keypad	$ -
34.00	1	PanelCrafters	Custom Panel		
				Equipment Total	$ -
				Freight Total	$ -
				Field / Installation Services	$ -
				Design Services	$ -
				Project Management	$ -
				Programming	$ -
				Miscellaneous Project Costs	$ -
				Sub Contracting	$ -
				Total Price	$ -

PART 3 - EXECUTION

3.1 GENERAL

A. Installation shall include delivery, unloading, assembly, setting in place, or fastening to walls, floors, ceiling, counters, or other structures where required. It shall also include interfacing interconnecting wiring of system components, equipment alignment, adjustment, and all other work, if not expressly required herein, which is necessary to complete.

B. Equipment delivery and storage: AV contractor shall provide all shipping to site and all storage requirements. AV contractor shall make appropriate arrangements and coordinate with authorized personnel at job site for proper acceptance, handling, protection and storage of equipment deliveries.

C. Installation shall be in accordance with, but not limited to, these specifications and drawings. Installation shall be performed in accordance with the applicable standards, requirements and recommendations of national and local authorities having jurisdiction.

D. If an installation practice, which is contrary to these specifications or drawings, a written request for modification shall be made to the Owner's selected representative(s). Modifications shall not commence without written approval from the Owner's selected representative(s).

E. During installation, and up to date of final acceptance, the AV contractor shall be under obligation to protect finished and unfinished work against damage and loss. In the event of such damage or loss, the AV contractor shall replace or repair such work at no additional cost.

F. Field cooperation: Cooperate at all times and to the fullest extent, with trades doing work in the building, to the end that lost time, work stoppages, interference, and inefficiencies do not occur.

G. Examination: Verify that electrical requirements including junction boxes, floor boxes, ceiling loudspeaker enclosures, available conduit and power circuits and receptacles are in place as shown on the drawings.

H. AUDIO SYSTEMS

1. The digital audio mixer and amplifier system will require the manufacturer's specific software for setup. The AV Contractor is responsible for the audio mixing system programming setup and systems programming commissioning. The AV Contractor must utilize this software and functionality to obtain the highest audio quality and system performance possible.

    a. AV Contractor awarded the project shall review switching, mixing, and control requirements of the audio mixer unit with client's appointed representative(s). Submit electronic audio matrix setup files for approval.

2. The AV Contractor shall provide a computer model of the loudspeaker coverage for the main plaza system for approval before installation of the loudspeakers. The loudspeaker cluster shall be installed and calibrated as per the data generated in the computer model.

I. CONTROL SYSTEM

1. AV Contractor to provide the control programming including the touch screen layouts as approved by the Owner's selected representative(s). Programming to be loaded and tested by AV Contractor.

2. AV Contractor is to work with the other trades in providing a method of executing a show and providing show controls for the audio system (pre-sets, all stop, etc.) from the touch screen. The show will be a coordinated effort between additional programming elements (lights, fountains, Gilderfluke, Mosaic, etc.) and a collaborative effort between each programming discipline is required for a coordinated sound, fountain and light show. The AV Contractor will be responsible for no more than ten pre-set configurations.
3. IP Address assigned by Owner; A/V contractor is responsible for all IP address programming and set up for all control systems.
4. AV contractor must be factory certified by AMX for programming and setup of the control system and its components.

J. EQUIPMENT MOUNTING SYSTEM

1. AV contractor is responsible for providing the correct quantity of blank rack panels to cover all unfilled openings.

3.2 PHYSICAL INSTALLATION

A. EQUIPMENT

1. All equipment shall be firmly secured in place unless requirements of portability dictate otherwise.
2. Fastenings and supports shall be adequate to support their loads with a safety factor multiplier of at least three.
3. All boxes, equipment, etc. shall be secured plumb and square.
4. During installation of equipment and cable, consideration shall be given not only to operational efficiency, but also to overall aesthetic factors.

B. LABELING

1. Wall panels and floor box panels: Shall be 1/8" thick brushed aluminum material with lettering engraved. Anodized finish and lettering color to be approved by the Owner’s selected representative(s).
2. Equipment labels: Remove all manufacturer labels and logos from equipment where possible. This is to deter vandalism and theft.

C. CABLE INSTALLATION

1. All cables pulled through conduit will need to be pulled in first, and then terminated with the cable-end connector.
2. All inter-rack cabling shall be neatly strapped, dressed, and adequately supported.
3. Wiring to be point-to-point and free of splices. Terminal blocks are not to be used with the following exceptions:
    a. Power wiring between the remotely power devices and the power supplies in the equipment rack.

4. All cables, regardless of length, shall be marked with typed wrap-a-round number or letter cable markers at both ends. There shall be no unmarked cables at any place in the system. Marking codes used on cables shall correspond to codes shown on drawings and run sheets.

5. All cables shall be grouped according to the signals they carry. In order to reduce signal contamination, separate groups shall be formed for the following cables:

   a. Power cables.

   b. Control cables.

   c. Audio cables carrying signals less than minus 20 dBm.

   d. Audio cables carrying signals between minus 20 dBm and plus 30 dBm.

   e. Audio cables carrying signals above plus 30 dBm.

   f. Broadband RF cables.

6. As a general practice, all power cables, control cables and high level cables shall be run on the left side of an equipment rack as viewed from the rear. All other cables shall be run on the right side of an equipment rack, as viewed from the rear. Unless otherwise called for in these specifications and drawings, use the following cables, or their approved equals, in these systems:

   a. Belden 9451: Audio cable

   b. Belden 5140F1: Outdoor rated speaker cable (Main cluster)

   c. Belden 5240F1: Outdoor rated speaker cable (N & S Pavilion)

   d. Belden 8723: Control cable

   e. Belden 82723: Plenum rated control cable

7. Cut cables to the length dictated by the run and service loop at each end. For equipment mounted in drawers or on sliders, provide the interconnecting cables with a service loop of appropriate length. All cable runs will be continuous, free of splices and junctions unless otherwise specified.

D. RECEPTACLE PLATE CONNECTORS

1. Unless otherwise detailed herein, use the following types of panel receptacles on connection boxes, panels, plates, and wire ways:

   a. Microphone: XLR-3 (female) type.

   b. Audio input/output (line level): RCA

   c. Wired remote control XLR-4 (female) type

2. Receptacle Plate Designation: Clearly engrave wall mounted receptacle plates with alphanumeric identification of input type (i.e., mic, line, speaker, etc.).

3.3 PERFORMANCE STANDARDS

A. All audio equipment implemented must meet a uniform performance standard. The manuals supplied with the equipment dictate these standards as well as the standards set forth in this section. AV contractors familiarizing themselves with the equipment installed will attain all performance standards. It is the sole responsibility of the AV contractor to read all manufacturer supplied manuals for proper install, setup, and operation. If the AV contractor is in need of further clarification of equipment operation or setup it is their responsibility to contact the manufacturer directly.

B. It is the sole responsibility of AV contractor to commission, balance, align, and adjust the entire audio system for optimal performance prior to final client acceptance. Final client acceptance will not be scheduled if the audio systems have not been fully commissioned and tested by the AV contractor in advance.

C. To achieve optimal performance standards the AV contractor will need to make use of the proper test equipment. This is a list of the minimal test equipment needed for proper system commissioning:

1. Voltmeter
2. Sound pressure meter
3. Spectrum analyzer/real time analyzer
4. Pink noise generator
5. 1K Hz tone oscillator
    a. Microphone level
    b. Audio line level
6. Oscilloscope
7. Waveform vectorscope
8. Any and all necessary test cables, probes and jumpers.

D. Unless restricted by the published specifications of a particular piece of equipment, meet the following performance standards with each system, where applicable:

1. AUDIO SIGNAL
    a. Signal-to-Noise Ratio (including cross talk): 55 dB minimum
    b. Total harmonic distortion: 0.1 percent maximum from 20 Hz to 20,000 Hz
    c. Frequency response: plus or minus 1.0 dB, 20 Hz to 20,000 Hz
2. AUDIO REPRODUCTION
    a. Signal-to-noise ratio (including cross talk): 55 dB minimum
    b. Total harmonic distortion: 1 percent maximum from 30 Hz to 15,000 Hz.
3. AUDIO SYSTEM
    a. Measure DC resistance of all microphone and other input lines with each conductor pair and each conductor/shield pair open and shorted.

Measure DC resistance of each conductor referenced to building ground to affirm an open circuit. Correct any shorts, erroneous opens, or unusual resistance.

b. Terminate all loudspeaker lines, and set all tone controls for zero boost or cut. Balance output levels of amplifier channels powering each circuit while gently driving the amplifier inputs

c. Set the audio system gain structure. Calibrate the 1k Hz oscillator for .775 mVolts. Connect the 1k Hz oscillator to an audio inputs and measure at the output of each device in line for .775 mVolts. Adjustment of input gain, trim and channel level will need to be set to be able obtain these settings. Measurement can be done using a voltameter. Audio inputs are located at wall, floor, and table panels.

- Connect sine wave generator to each amplifier powering distributed loudspeaker systems in turn. Drive each amplifier with 1 kHz sine wave and adjust amplifiers to produce 90 dB acoustic outputs from Loudspeaker System. Sweep sine wave generator from 50 Hz to 5 kHz and listen carefully for buzzes, rattles or objectionable distortions. Correct problem if necessary.

d. Record ambient sound level within each space area with sound level meter set for slow, un-weighted response.

e. Set real time frequency spectrum analyzer for un-weighted and slow response and for 1/3 octave and 1 dB per vertical increment display. Drive each system with pink noise to produce an acoustic output equal to 20 dB above that measured for ambient noise. Walk each area to determine three representative positions for measurements of frequency response with measuring microphone connected to real-time frequency analyzer.

f. Record frequency response within each loudspeaker coverage area with real time analyzer set as above.

g. Place a typical microphone four feet above the floor at various locations within the plaza. Measure acoustic output of each system with a person speaking one foot from microphone as a signal source and with sound level meter set for un-weighted and slow response. Record maximum sound pressure levels before feedback.

h. Record nominal settings of all controls after entire system has been balanced. All mixers and amplifiers with external channel level knobs must be marked to note correct level settings.

4. REMOTE CONTROL SYSTEM

a. Coordinate with electrical contractor in order to ensure proper AV interface between line voltage and low voltage units.

b. Verify seamless functionality of all remote operations.

c. Fail-safe: No operation or sequence of operations shall cause the control system to become inoperable or interfere with further procession, report operations or execution of commands to the Owner for correction.

3.4 CLEANUP AND REPAIR

A. During and upon completion of work, the contractor shall remove all refuse and rubbish from and about the job site premises. Relevant areas and equipment will be left clean and in an operational state. Contractor shall be responsible for repairing any damage caused to premises by installation activities, at no cost to the Owner.

3.5 OWNER TRAINING

A. The contractor shall provide on the job training for personnel designated by the Owner's selected representative(s), in the operation and maintenance of system(s). Training shall take place after the final acceptance tests and system(s) are 100% operational.

B. Test equipment shall be provided by AV contractor and be available during systems training.

C. Training shall be scheduled for two (2) sessions, consisting of one (1) hours each. The first training shall be at the project completion, with the follow up training scheduled 2 months after project close.

PART 4 CONTRACT CLOSE-OUT

4.1 CLOSE-OUT PROCEDURES

A. Submit completion sign off to the owner's selected representative(s).

4.2 FINAL CLEANING

A. Execute final cleaning prior to final completion review.

B. Repair items damaged during installation to the satisfaction of the owner's selected representative(s).

4.3 ADJUSTING

A. Adjust operating products and equipment as recommended by manufacturer and specification section to ensure proper operation.

4.4 PROJECT RECORD DOCUMENTS

A. The project record documents shall consist of the following:

1. Contract documents
2. Reviewed shop drawings, product data, and samples

B. Maintain record documents on-site throughout the construction period, one set of the project record documents and record actual revisions to the work on these documents.

C. Project manual: Legibly mark, cloud and flag to record at each project manual section changes and a description of actual products installed, including the following:

1. Manufacturer's name and product model and number.
2. Product substitutions or alternates utilized.
3. Changes made by addenda and change order.

D. Record documents and shop drawings: Legibly mark, cloud and flag each item to record actual construction including:

1. Field changes of dimensions and detail.
2. Details not on original contract drawings.

E. QUICK START GUIDES: Provide a Quick Start Guide for system operation.

1. The quick start guides shall be a 1 page (front and back if necessary) laminated guide to the AV systems per room.
2. Laminate all quick start guides. Provide two (2) copies at the rack location and include in the electronic deliverables.
3. The quick start guides will give a step by step procedure on how to operate the basics for each system. I.e. System On, source selection, volume controls, turning systems off.
4. The quick start guides will use screen captures or photos of the control points required to perform the functions described.

F. CD ROM ELECTRONIC COPY OF DOCUMENTS:

1. The AV Contractor will provide a CD Rom disk of all owner manuals, training manuals, audio mixer programming, as built drawings and any other project close out documents.

G. Two (2) complete sets of as built system drawings shall be submitted to the Owner selected representative(s) for the client in paper form and AutoCAD release 2011 or newer. These drawings shall show every device installed, its circuit location, and equipment rack location. Wiring diagrams will show all wiring identifications.

H. Documentation shall be delivered to the Owner selected representative(s) before project closeout.

1. The warranty section shall provide warranty statements per manufacturer of all equipment provided.

I. Prior to contract closeout, deliver record documents to the Owner selected representative(s):

1. One set reproducible of all project drawings. Using the services of a professional draftsperson, legibly mark the reproducible with record changes and as-built construction.
2. Two sets of prints made from reviewed and corrected as built reproducible.

4.5 WARRANTIES

A. Warranty statement: Submit a statement of warranty on entire system and on individual pieces of equipment. System and equipment warranty shall be for a minimum of one year from date of system acceptance by the owner.

B. All manufacturers' equipment warranties shall be started in the owner's name and shall commence from date of system acceptance. For modified equipment, the manufacturer's warranty is normally voided. In such cases, AV contractor shall provide the owner with a warranty equivalent to that of the original manufacturer.

C. Execute and assemble warranties and maintenance contracts from each of the respective manufacturers.

D. Provide signed copies of the above documents include a table of contents. Assemble each set in a ring binder.

E. Submit within ten days after date of substantial completion and prior to final application and certificate for payment.

4.6 SUBSTANTIAL COMPLETION

A. AV Contractor system checkout: Before scheduling acceptance tests, contractor shall perform a full system checkout. The AV contractor shall furnish all required test equipment and shall perform all work necessary to determine or modify performance of the system to meet all requirements of this specification. This work shall include the following:

1. Test all audio systems for compliance with the performance standards.
2. Check all control functions, from all controlling devices to all controlled devices, for proper operation.
3. Adjust, balance and align all equipment for optimum quality and to meet manufacturer's published specifications. Establish and mark normal settings for all level controls, and record these settings in the Systems operation and maintenance manual.
4. Maintain documentation of all performance tests for reference by the owner during system acceptance tests.

B. When the AV contractor considers the work is substantially complete, they shall submit to the Owner's selected representative(s):

1. A written notice that the work or designated portion hereof is substantially complete.
2. A list of items to be completed or corrected.

C. Within a reasonable time after receipt of such notice the Owner's selected representative(s) will make an inspection and acceptance to determine the status of completion.

D. System acceptance testing: Do not perform until the system checkout is complete. The Owner's representative(s) will supervise the acceptance test.

1. In the event further adjustment is necessary, or defective equipment must be repaired or replaced, tests may be suspended or continued at the option of the

owners representative(s). The AV contractor shall be responsible for any cost incurred to the owner due to rescheduling.

a. A physical inventory shall be taken of all equipment and serial numbers on site and shall be compared to equipment lists in contract documents. The operation and performance of all equipment, connections, and systems shall be demonstrated.

2. In the event further adjustment is necessary, or defective equipment must be repaired or replaced, tests may be suspended or continued at the option of the AV consultant. The AV contractor shall be responsible for any cost incurred to the owner due to rescheduling.

E. Should the Owner's selected representative(s) determine that the work is not substantially complete:

1. The Owner's selected representative(s) will promptly notify the contractor in writing, giving the reasons therefore.

2. Contractor shall remedy the deficiencies in the work, and send a second written notice of substantial completion to the Owner's selected representative(s).

3. The Owner's selected representative(s) will re-inspect the work.

4.7 FINAL INSPECTION - ACCEPTANCE TESTING

A. GENERAL

1. When Contractor considers the work is complete, he shall submit written certification that:

B. Contract documents have been reviewed.

1. Work has been inspected for compliance with contract documents.

2. Work has been completed in compliance with contract documents.

3. Work is completed and ready for final inspection.

C. The AV contractor will schedule the final acceptance with the client's representative(s).

D. AV contractor will need to produce and have available an AV punch list for noting testing, client concerns or system problems to be rectified. At the end of the final inspection the AV contractor will need to deliver a copy of the punch list to the client's representative(s) and the general contractor.

E. AV contractor will need to provide the proper test equipment for a complete check out of the room. This is a list of the necessary test equipment needed for final acceptance:

1. Sound Pressure Meter

2. Pink Noise Generator

3. 1K Hz Tone Oscillator

a. Microphone Level

b. Audio Line Level

5. Source Devices

a. Microphone

b. CD Player or iPod

6. Audio Video Software

a. Any and all necessary test cables, probes and jumpers.

F. Verification of construction and installation documentation against the completed system:

1. Wire numbers

a. Cable type

b. Equipment serial numbers

c. Accurate rack layouts

d. Ceiling speaker location

e. Non-installed deliverables

- Wireless microphones

2. Review the installation of the system for workmanship and quality. Compare the workmanship with the Physical Installation requirements in this documentation.

G. AUDIO SYSTEM

1. Verify all speakers are functioning. Connect a pink noise generator into any of the audio inputs in the system and raise the room volume to a level that reads about 80dB on the sound pressure. Holding the sound pressure meter 4’ above the floor measure each speaker. Each speaker in the system should read the same on the meter.

2. Connect a CD player to each of the audio inputs. Test each input with a manufactured CD with a prerecorded 1K HZ tone. Make note that the audio levels are equally balanced for every audio input. Use a sound pressure meter when testing each input to verify levels are equal. After testing levels play a CD with a full range musical audio track and listen for sound quality at different volume levels. Verify proper wiring of stereo audio left and right channels.

3. Connect a microphone level 1k HZ tone generator to each of the microphone inputs. Make note that the audio levels are equally balanced for every microphone input. Use a sound pressure meter when testing each input to verify levels are equal. After testing levels connect a microphone to each of the inputs and test vocal intelligibility while speaking into the microphone.

4. Test wireless microphones quality. Bring the PA volume to an acceptable volume level within the plaza. Speak into the microphone will walking through the plaza. During this test listen for any static, interference, feedback and vocal intelligibility. First test each wireless microphone individually then with help

from others, test all simultaneously. Have the wireless lapel microphone worn correctly when testing.

5. If there are any adjustments necessary they are to be added to the AV punch list.

END OF SECTION 27 4116

SECTION 281000-SECURITY CAMERA SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Request for Proposal, including General and Supplementary Conditions and other Specification Sections and Appendixes, apply to this Section.

1.2 SUMMARY

A. This document includes specifications for or relating to:

1. Conduits and Innerduct
2. Fiber Optic Cabling and Accessories
3. Network Switches
4. Communication Rooms
5. Unshielded Twisted Pair Cabling and Accessories
6. Signal Cable
7. Equipment Enclosures
8. Cameras
9. Access Control
10. CCTV Systems

1.3 REFERENCES

A. TIE/EIA-598 - Optical Fiber Cable Color Coding

B. ANSI/TWEIA 568-B.1 – Commercial Building Telecommunications Wiring Standards, General Requirements

C. ANSI/TWEIA 568-B.2 - Commercial Building Telecommunications Wiring Standards, Balanced Twisted Pair Cabling Components.

D. ANSI/TWEIA 568-B.3 - Commercial Building Telecommunications Wiring Standards, Optical Fiber Cabling Components standards.

E. ANSI/TWEIA 568-B.3 .1 - Additional Transmission Performance Specifications for *50/125* um Optical fiber Cables.

F. ANSI/TIA/EIA 569 – Commercial Building Telecommunications Pathways and Spaces.

G. ANSI/TIA/EIA 606-A - Administration Standards for Telecommunications Infrastructures.

H. ANSI/TIA/EIA Joint Standard - 607-A - Commercial Building Grounding and Bonding requirements for Telecommunications.

I. ANSI/TIA/EIA 526-7 - Measurement of Optical power Loss of Installed Single-mode Fiber Cable Plant (Method A).

J. ANSI/TIA/EIA 526-14-A - Measurement of Optical power Loss of Installed Multi-mode Fiber Cable Plant.

K. ANSI/TIA/EIA 758 – Customer Owned Outside Plant Telecommunications Cabling Standard.

L. ANSI/TIA/EIA 758-1 - Customer Owned Outside Plant Te1ecommunications Cabling Standard.

M. Building Industry consulting services International (BICSI) Distribution Methods Manual (TDMM).

N. Building Industry consulting services International (BICSI) Customer Owned Outside Design Manual.

O. National Electrical Manufacturers Associations (NEMA).

P. National Fire Protection association (NFPA) 72, National Electrical Code (NEC).

Q. All applicable ANSI, ASTM, UL, IEEE and FCC Standards.

1.4 SUBMITTALS

A. All products that are identified as deliverables (including, but not limited to documents, data analyses, databases, maps, graphics, images, design drawings, and Geographic Information System [GIS] data) shall be provided in electronic and printed formats in accordance with the project delivery schedule and at no extra cost or expense.

B. Unless otherwise specified in the specification, the owner shall have no license restrictions, and the owner may use the electronic files/data for purposes it deems appropriate.

C. Product Data: Include manufacturer's technical data for each model indicated, including rated capacities; dimensions; required clearances; shipping, installed, and operating weights; furnished specialties; accessories; and installation and startup instructions.

D. Shop Drawings: Detail equipment assemblies and indicated dimensions, weights, loadings, required clearances, method of field assembly, component, attachments to other work; and location and size of each field connection. Detail mounting, securing, and flashing of roof curb to roof structure. Indicate coordinating requirements with roof membrane system.

E. Wiring Diagrams:

1. Detail wiring for power, signal, and control systems and differentiate between manufacturer- installed and field-installed wiring.
2. Detail locations of cables and the appropriate cable numbers.
3. Wiring diagrams should be on going during the course of the project so that other contractors can perform staged work in conjunction with the wiring contractor.

F. Provide a schedule of materials list with quantities and manufactures indicated for all materials installed in the project.

G. Project Record Drawings

1. The contractor shall deliver three (3) sets of as-built drawings to the owner within four (4) weeks of completion of the project. A set of as-built drawings shall be provided to the owner in digital form (floppy disk or CD-ROM) and utilizing software that is acceptable to the owner. The contractor shall deliver to the owner within six (6) weeks of completion of the project.

H. Where equipment and materials have industry certification, label, or standards (i.e., NEMA-National Electrical Manufacturer's Assn.), this equipment shall be labeled as certified or complying with the standards.

I. Manufacturers Material Specification sheets are required for all installation materials used in this bid, this material is to be included with the proposal.

J. Provide conduit / Innerduct tube cable system block diagram including interconnection and numbering of all cabling.

K. Show Patch Panel numbering for all patch panels.

L. Show bundled optical fiber cable numbering and labeling.

M. Provide fabrication drawings for any proposed custom-built equipment.

N. Bundled Fiber Optics Testing shall be submitted to the engineer and copies to the Owner's Representative.

1. Submit manufacturer's test reports for each reel of fiber bundle provided prior to installation.
2. Submit Contractors on-reel test results at 850 and 1300 nm for multi-mode and 1310 and 1550 nm for Single-mode.
3. Submit Contractor's test results after bundled fiber terminations are installed.
4. Submit soft copy of bundled fiber optic cable OTDR test results on compact disc (CD). Test results shall be included in comma separated variable (CSV) format wherever possible. Provide proprietary software on the CD to enable viewing of the soft-copy test results.

O. Cable Test Results as specified

P. Course outlines for each of the end user training programs. The course outlines shall include the course duration, and a brief description of the subject matter.

Q. Warranties: Special warranties specified the requirements or specifications. Manufacturer warranty applies.

R. Review files. In additions to native file format deliveries, Contractor shall provide ALL report, map, graphic, and drawing deliverables in Adobe Acrobat PDF files. The PDF files shall accurately represent the completed hard copy document in terms of color pages, page

sizes, etc. These files shall be fully integrated files in proper page order, with graphics, tables, attachments, etc. inserted in their proper location in the document (or connected using the Link function). PDF files exceeding 10 pages in length shall use internal hyperlinks (in Table of Contents) and/or use Acrobat's Bookmark features to enable easy navigation throughout the file.

S. Media. Delivery method for Terminal contract deliverables shall be specified and approved by Project Manager, and will be one of the following (in general order of preference):

1. CD-ROM (for deliverables 1-600 megabytes [MB])
2. DVD-ROM (for deliverables exceeding 600 MB)
3. Via email to Project Manager (for deliverables less than 15 MB, or time critical)
4. USB-2 Portable Hard Drive
5. Posted to Contractor's Secure FTP or Web Site.

1.5 IDENTIFICATION AND LABELING PRODUCTS

A. PRODUCTS

1. Labeling and identification products must comply with TIA/EIA-606-A, Class 2.
2. Cable Labels: Self-adhesive vinyl or vinyl-cloth wrap around tape markers, machine printed with alphanumeric cable designations.
3. Labels must be able to withstand the environment they will be exposed to without fading or failing.

B. IDENTIFICATION *I* LABELING

1. Labeling shall conform to ANSI/TIA/EIA-606 (A) standards, Class 2.
2. Use labels on face of data patch panels. Provide facility assignment records in a protective cover at each telecommunications closet or enclosure location that is specific to the facilities terminated therein.
3. Labels shall be machine-printed. Hand-lettered labels shall not be acceptable.
4. Length of cable will be included as part of the label
5. Where a cable passes through a telecommunication closet but is not terminated in that closet, the cable shall have an additional label approximately five (5) feet above floor height.
6. 1.7.B.6 Conduit shall be additionally labeled at twenty (20) foot interval along its length.

1.6 QUALITY ASSURANCE

A. Complete Quality Assurance requirements.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Protect equipment during transit, storage, and handling to prevent damage, theft, soiling, and misalignment. Coordinate with the owner for secure storage or equipment and materials.

B. Do not store equipment where conditions fall outside manufacture's recommendations for environmental conditions.

C. Follow manufacturer's recommended procedures for storage of materials & equipment.

D. Do not install damaged equipment; remove from site and replace damaged equipment with new equipment.

1.8 TESTING

A. Preinstallation Conference: Conduct conference at Project site prior to initiating testing.

B. Contractor is responsible to ensure that all equipment and cables are in proper working order in accordance to the manufacturer's specifications and the requirements of these specifications.

C. Contractor shall provide all test and reception gear required proving performance, as outlined, and all costs of test and documentation will be borne by Contractor.

D. The Owner must be notified prior to all testing should they choose to be present during the testing procedure.

1.9 COORDINATION

A. Coordinate installation of roof curbs, equipment supports, roof penetrations and roof flashing with the Owner. Field verify built conditions which interface with equipment locations prior to fabrication of system components.

B. Coordinate equipment, interface and power requirements with appropriate contractor prior to development of submittals or purchase of equipment.

C. Coordinate location of field equipment with appropriate contractors prior to installation to insure devices, conduit and power are properly located and schedules are met.

D. The installer of the equipment is responsible for the configuration, programming, start-up, and testing of that product to meet the sequence of operation described in this proposal and at the pre-bidders meeting.

1.10 WARRANTY

A. General Warranty: The special warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract

Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.

B. All equipment furnished under, this contract shall be warranted for period of twelve (12) months from the date of final Owner acceptance of the system.

1. Respond to service requests on-site, if required.
2. Replace or repair defective components as required.

C. Submit a statement, at notice to proceed, of any Contractor warranties in addition to the manufacturer's stated and supplied warranties. Submit at closeout signed copies of the Contractor provided warranties that are in addition to manufacturer's stated and supplied warranties.

D. Fiber Optic Cable and Patch Panels

1. Contractor shall supply in writing a one (1) year warranty against defects in workmanship or materials on the installed fiber optic materials. Warranty will begin at the time the notice of completion is filed.

E. Network Switches and associated equipment

1. Contractor shall supply in writing a one (1) year warranty against defects in workmanship or materials on the installed switch equipment. Warranty will begin on the time the notice of completion is filed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Provide products of manufacturers as named in individual articles and equipment lists.

B. Where no manufacturer is specified, provide products of manufacturers in compliance with requirements.

2.2 EQUIPMENT STANDARDS

A. Material and equipment shall be new, and conform to grade, quality, and standards specified.

B. Equipment and materials of the same type shall be a product of the same manufacturer throughout.

C. All electrical materials and equipment installed shall be approved by Underwriters Laboratories, Inc. (UL) and shall bear the UL label.

D. All like equipment and components shall be products of a single manufacturer except otherwise approved in advance.

2.3 CONDUIT

A. Conduit shall not be installed through tenant space unless conduit is specifically for that tenant.

B. Interior Conduit shall be EMT.

C. Exterior conduit shall be IMT.

D. Conduit Bends
1. All conduit bends should be no less than 10 times the diameter of the pipe in their radius or the minimum bend radius as specified per manufacturers installation specifications.
2. Minimum bend radius is to be maintained at all times.

E. Pull Boxes

1. A pull box shall be placed in a conduit run where:

a. The length is over 200 feet.
b. There are more than three (3) 90-degree bends (270 degrees).
c. If there is a reverse bend in the run.

2. Pull boxes shall not be used for splicing cable.
3. Pull boxes shall be placed in a straight section of conduit and not used in lieu of a bend. The corresponding conduit ends should be aligned with each other.
4. Conduit fittings shall not be used in place of pull boxes.

F. Conduit shall be reamed to eliminate sharp edges and terminated with UL approved insulated end bushings.

G. Conduit shall include a pull string secured at each end that measures at least the total length of the conduit and provide for future pulling of Innerduct.

H. All electrical power conduits shall be sized and installed in accordance with electrical code.

2.4 CABLE MANUFACTURERS AND CABLE TYPES

A. CCTV Data/Power (POE) Cables– shall be plenum rated.
1. Each cable shall have the manufacturer recommended number of conductors and be sized to the manufacturer recommended gauge for the distance of each device location.
2. Communications Backbone – Shall be plenum rated CAT6 cable.

a. If distances for backbone are too long for copper or bandwidth needs cannot be met with CAT6 cable then fiber cable shall be installed.

B. Fiber Cable Manufacturers approved for CCTV signal and communications backbone shall be of either Commscope or Corning make.

1. Fiber shall be plenum rated and multimode 50 micron.

2.5 EQUIPMENT ENCLOSURES

A. Equipment enclosures shall be 19" wide EIA standard equipment enclosures.

B. Unless otherwise specified, all equipment enclosures shall have a common key lock that opens all equipment enclosures installed for this project. If a common key is not available for all enclosure types, please indicate so.

C. Wall mount enclosures shall be:

1. Middle Atlantic Products DWR series 19" wall mount rack, part # DWR-18-32 (413038).

D. Middle Atlantic Products VFD-18 (Vented front door)

E. Floor mount enclosures shall be Middle Atlantic WMRK-4242-SVR (Server Rack)

1. Each floor mount enclosure shall come complete with one vertical power bar mounted to the back of rack on the right hand side.

    a. Each power bar is to have 8 outlets.
    b. The power cord must reach the receptacle.
    c. The power bars are to have 6 foot cords.
    d. The power bars are **not** to have reset breakers or an on/off switch.

F. All wall mount and floor mount equipment enclosures must be equipped with an appropriate number and type or horizontal and vertical wire management modules, both front and rear, with strain relief brackets to insure proper bend radius and strain relief is maintained for all data and power cables.

G. Cooling fans shall be installed in equipment enclosures installed in rooms without environmental controls.

2.6 POWER PROTECTION DEVICES

A. Each cabinet shall have a rack mount UPS device installed.

1. UPS device shall be capable of sustaining power to all equipment install within the cabinet for at least 15 minutes.
2. UPS device shall be capable on notifying power loss or failure through the network.
3. UPS device shall also serve to insure clean power to all devices installed within the cabinet and help to eliminate issues caused by “brown outs”.

2.7 CAMERAS

A. Refer to Design Drawings and Material list for specifications

2.8 ACCESS CONTROL

A. For Future Use

2.9 RACK MOUNT MONITORS

A. Not Applicable

2.10 NETWORK EQUIPMENT (DEVICES)

A. Cisco

1. Cisco- WS-C3560G-24TS-S Catalyst 3560 24 10/100/1000T + 4 SFP Standard Image.
2. Cisco- GLC-SX-MM= GE SFP, LC connector SX transceiver.

2.11 NETWORK CAMERA SYSTEM

A. Video Security System

1. DVTel LAT6.2()-ELITE

B. The IP Video Security System network

1. See approved network gear on equipment list attached as addendum A.
2. Equipment types and counts shall be provided by contractor to give a fully functioning network
3. Equipment shall be sized to allow for 25% growth.

C. DVTel Video Security Workstation shall be utilized to provide a fully functioning system.

1. All workstation computers shall meet minimum requirements to run a DVTel workstation.

D. Network Video Recorders (NVR)

1. DVTel Network Video Recorders shall be used.

2.12 WORKSTATIONS

A. Workstations shall meet or exceed manufacturer's recommended specifications.

B. DVTel Workstation SSC-WKS-HGH-DM – Latitude NVMS Client WS

C. iSOC Client Workstation (High End) with dual monitor support (dual DVI-D connectors). Includes OS optimization for iSOC application. iSOC software purchased separately

2.13 SERVERS

A. Servers shall meet or exceed manufacturer's recommended specifications and be sized to accommodate system growth.

B. DVTel Server SSC-SRV-VHGH-0T – Latitude NVMS Server

C. iSOC Latitude Server (Very High End) with mirrored OS drives and no internal storage. Includes OS optimization for iSOC application. iSOC software purchased separately

2.14 INTERCOMS

A. For Future Use

PART 3 - EXECUTION

3.1 CONDUIT AND CABLE PULLING

A. GENERAL

1. All cable pulling shall be done in accordance with cable recommended procedures and ANSI/IEEE C2 standards. Manufacturer's recommendations shall be a part of the cable submittal.
2. Recommended pulling tensions and minimum bending radius shall be exceeded. Any tube cable bent or kinked to a radius less than recommended shall not be installed.
3. Pulling lubricant shall be used to ease pulling tensions. Lubricant shall be of a type that is non- injurious to the cable material used. Lubricant shall not harden or become adhesive with age.
4. Avoid abrasion and other damage to cables during installation.
5. Pull cables simultaneously where more than one is being installed in the same raceway.
6. Use pulling means, including fish tape, cable, rope, and basket weave wire/cable grips that will not damage media or raceway.
7. Horizontal and Riser cabling and conduit / raceway shall be independently supports as per the National Electrical Code. Cable and conduit / raceway suspended above an open ceiling shall not rest on the ceiling, ceiling tiles, ceiling support system, lighting fixtures or other building system supports, and shall be supported from roof structure at 4' to 6' intervals.
8. All vertical and horizontal sleeves to be installed with compression connectors and threaded plastic bushings.
9. All floor and wall cores shall be sleeved and fire stopped to meet all applicable local and national codes. All vertical sleeves/conduits to have a 1" curb.
10. It is the responsibility of the contractor to ensure conduit size and cable distances do not degrade, or render inoperable the equipment connected to said cables.
11. Install cables and conduit / raceway parallel and perpendicular to surfaces structural members and follow surface contours where possible. Diagonal runs will not be accepted.

12. Cables shall not be installed in close proximity to fixtures or equipment that may cause RFI or EMI.
13. Cables, wire, and conduit / raceway shall not be attached to conduit, pipes, ceiling grid / hanger wire, light fixture hangers, HVAC ductwork, etc.

B. 3.1.B CONDUIT / INNERDUCT

1. Conduit / Innerduct Preparation.

   a. All ducts and conduits intended for use as a pathway will be blown out with compressed air or brushed out to remove dirt, water, and other residue prior to cable and innerduct installation.

2. Conduit

   a. Do not bend cable in handling or installation to smaller radii than minimums recommended by the manufacturers. Minimum radius bend allowed is 2" for all UTP and fiber optic cabling. Check with raceway supplier for appropriate fittings. For conduits 2" and less bend radius shall be 6x the internal diameter of the conduit, and for 2 ½ inches and more the bend shall 10x the internal diameter.
   b. Conduit shall be run concealed except in certain approved locations.
   c. Conduit shall be secured both horizontally and vertically against movement. Listed mechanical fasteners shall be used. Tie wire may only be used for securing horizontal conduit runs within stud walls.
   d. Outlet boxes, junction and pull boxes, etc., shall be installed so as not to interfere with any piping, fixtures or equipment. All boxes shall be fully accessible.
   e. Exposed conduits shall be grouped in neat parallel lines, properly supported, following the lines of the building structure as closely as possible and as directed.
   f. Conduit installation shall be such that conduits are not abraded, scraped, flattened, dented and the interior diameter is not effectively reduced. Install conduit in such a way that condensation or water cannot be trapped.
   g. Perforated strap iron or plumbers tape shall not be used for hanging conduit or boxes. Use standard pipe hangers with rings and rods for all conduits suspended from ceilings. Standard 16.5 gauge Ty Wire is acceptable with prior approval but only when tied per ironworkers tie.
   h. Runs of one conduit suspended shall be on rings with rod hangers with self-drilling; approved methods. Runs of more than one conduit suspended, shall be on a strut trapeze support with clamps. Trapeze supports shall be 1-5/8" x 1-5/8" strut channel supported by minimum 3/8” rods. Strut clamps shall be of the nut and bolt type, minimum 300 lb. static load limit.
   i. Drive-it straps are not acceptable. Plastic sleeve, lead anchor, rawl plugs or power driver anchors are not acceptable.
   j. When using all thread or bolts they must be backed on both sides with washers, lock-washers and nuts. (Floating unistrut / conduit straps etc. are not acceptable).
   k. Electrical metallic conduits shall not touch any plumbing pipe. Were unavoidable, approved insulation shall be used.
   l. Roof blocks shall support any rooftop conduit.

3.2 SECURITY CCTV AND ACCESS CONTROL

A. Commission the CCTV System

1. Perform system programming, testing, and verifying the operation of the entire system, including establishing PTZ camera tours on, alarm acknowledgement procedures and configuring software interfaces.
2. Program pre-sets on the PTZ's for alarm call-up.

3.3 CAMERAS

A. Exterior 180 Degrees Cameras

1. Install on rooftop/parapet based mounting arms.
2. Cisco switches provides power over Ethernet (POE) to each camera use POE extender if cable run is more the 330ft. from MDF cabinet.

B. Exterior Fixed Cameras

1. Cisco switches provides power over Ethernet (POE) to each camera use POE extender if cable run is more the 330ft. from MDF cabinet.

C. Interior Fixed Cameras

1. Recess within the ceiling areas if required.
2. Position to capture specified field of view without obstructions.

3.4 NETWORK CAMERA SYSTEM

A. Video signals from cameras in the system shall be home run to the closest respective video termination room MDF or in a secured rack and connected to the network and recorded on a network video recorder.

3.5 LABELING

A. Refer to Sections 1.7.B Identification and Labeling.

3.6 TESTING

A. Refer to Sections 1.10 Testing.

PART 4 - MISCELLANEOUS

4.1 Horton Plaza Equipment list

	SOFTWARE, LICENSES			
LAT-C-BSL	Latitude NVMS Classic System – Base System License for Classic Network Video Management Software with a single primary directory, for up to 70 Channels. Includes five users and two Keyboard connection licenses			1
LAT-C-CHAN	One (1) Classic Channel connection license for a single connection from a encoder, IP camera, analog monitor or Mento			4
LAT-C-CHAN-4I	One (1) Classic Channel connection license for a single 4-imager panoramic type camera			2
	SERVERS, STORAGE, WORKSTATIONS			
SSC-SRV-VHGH-0T	iSOC Latitude Server (Very High End) with mirrored OS drives and no internal storage. Includes OS optimization for iSOC application.			1
SSC-WKS-HGH-DM	iSOC Client Workstation (High End) with dual monitor support (dual DVI-D connectors). Includes OS optimization for iSOC application.			1
SSC-MON-20INW	Single (1) 20” Widescreen Flat Panel Monitor with Height Adjustable Stand, for iSOC client and server			2
SSC-DAS30-18T	Direct Attached Storage 12 Drive Chassis with 18TB Raw (15TB Usable, 14TB Actual) RAID-5 configured (Host Bus Adapter for the Latitude Server shall be included).			1
	HARDWARE- Encoders/ Decoders, Cameras			
AV2155DN	AV2155DN - Arecont Vision H.264/MJPEG, 4-10mm 2.1 Mpixel Day/Night Network(IP)Vandal Dome Camera			2
AV5105DN	AV5105DN - Arecont Vision H.264/MJPEG, 4-10mm 5.0 Mpixel Day/Night Network(IP)			3
AV8185DN	Arecont AV8185DN 8 Megapixel H.264/MJPEG Day/Night 6400x1200, 4x8mm MP Lens, 180° Panoramic IP-camera			2
	CAMERA LENSES, CAMERA MOUNTS, Camera Power Supply			

MPL8-16	Arecont MPL8-16 8-16mm, 1/2",f 1.6, CS-mount, IR Corrected, 26.0" - 50" FOV			3
HSG2	Arecont HSG2 Outdoor Vandal Proof Housing			3
HSG-PMA	HSG Pole Mount Adapter			3
HSG2-WMT2	Wall Mount for HSG2			3
MD-WMT2	Wall Mount For Mega Dome Series (AV2155DN)			1
MD-FMA	Flush Mount For Mega Dome Series (AV2155DN)			1
SV-WMT	Indoor/Outdoor wall mount for AV8185DN			2
MD-PMA	Pole Mount Adapter			2
	NETWORK DEVICES			
Cisco- WS-C3560G-24PS-S	Catalyst 3560 24 10/100/1000T PoE + 4 SFP + Standard Image.			1
Cisco- GLC-SX-MM=	GE SFP, LC connector SX transceiver.			2
CON-SNT-3560GPS	SMARTNET 8X5XNBD Cat 3560 24 10/100/1000T PoE + 4 SF.			1
	UNINTERRUPTED POWER SUPPLYS			
SMART3000RM2U	UPS SMART PRO 3000VA RT 4 x NEMA 5-15R, 4 x NEMA 5-15/20R			2
	WALL MOUNT RACKS/ SERVER RACKS/ MONITOR MOUNTS			
Middle Atlantic WMRK-4242-SVR	Middle Atlantic server rack			1
Middle Atlantic-VSA-244	Middle Atlantic Telescoping Shelf 27"-44"D			2

4.2 CCTV System Performance Requirements

A. Cameras' positioning Recommendations

1. Best effort will be made to capture every person's face, including emergency exits, pavilions and blind corridors. Horizontal and vertical angles should be minimized to get a clear picture of the face. Horizontal angles should be approximately 35º and vertical angle should be approximately 30º. Interior cameras should be mounted 8ft. from the ground when possible. Exceptions due to architecture need to be brought to the attention of the owner and an alternate solution will be discussed.
2. Best efforts shall be made to capture every vehicle's license plate. License plates will be captured at the time a vehicle is entering/exiting the property to obtain a clear, legible image of the license plate number that may then be used for tracking or identification purposes by the authorities. Horizontal and vertical angles should be

approximately 25º. The camera should be positioned in accordance with the drawings.

3. Family Restrooms, when applicable, must be covered to capture the face of individuals entering and exiting the facility.
4. Restroom exits must be covered to capture the face of individuals entering and exiting the facility.

B. Camera Recommendations

1. Type of camera and manufacturer must be approved by Owner prior to installation and no later than during the camera site survey walk. Please refer to the Approved Camera Part list.
2. Only color cameras will be used.
3. At the close of the project, every camera must be signed off and approved by the Owner
4. All cameras installed must be a minimum 480 TV lines or better, 24 Volts AC, AVF (auto iris, Vari- focal mechanism). See Approved Camera Part spreadsheet for acceptable cameras.
5. Camera's mounts and domes must be approved by Owner prior to installation, and no later than during the camera site survey walk
6. 4.2.B.6 Pan-tilt-zoom (PTZ) cameras must cover the requested area with good resolution. PTZ Cameras will have minimum 25x optical zoom or better.
7. 4.2.B.7 Wireless cameras are only an option if no hardwire solutions are available, following Owner and integrator verification. The ultimate preference is for cameras to be hardwired to an encoder. Cost of wireless cameras must be reviewed and approved by Owner.
8. 4.2.B.8 At the close of the project, every camera must be signed off and approved by the Owner's representative from an aesthetic standpoint in the center; clean installations, concealed wiring etc., representative from a security functionality standpoint; field of view, clarity of image, steadiness of image, proper lighting definition, accepted recording rates etc.

C. Recording Recommendations

1. Every camera in the property must be recorded 24 hours a day.
2. Type of equipment, recording media and manufacturer must be approved by Owner prior to installation.
3. A UPS backup should be installed to link the cameras, encoders, MDF and client server to stabilize the system in the case of power fluctuations or outages. The guidelines are 1 UPS per MDF for 15 minutes.
4. Recording rate will be 4 or more frames per second unless otherwise approved by the Owner.
5. Recording procedures, configuration and equipment must allow for automatic 30-day storage for all cameras without the assistance of a professional. (No swapping of internal hard drives, etc.)

D. Installation Recommendations

1. All wires must be run 12 feet above ground to avoid any potential contact, damage or confusion with Shopping Center occupants wire and cabling. If this can not be accomplished due to site constraints the conflicted areas should be brought to the

Owner's representatives attention immediately so that an alternate solution can be derived.
2. All cables and equipment must be UL approved.
3. Outdoor camera housing must be waterproof.

E. Interface

1. The system must allow remote connection.
2. The system must allow playback of video currently on the storage media
3. The system must allow remote users to view cameras without affecting the security dispatcher's view. (Except when taking control over a PTZ camera)
4. Network layout/design and single line drawings are provided.
5. The bandwidth requirements are a minimum of 768 upload & download speed.
6. Network equipment will be listed in the project material list.
7. Computer systems for both the clients and servers will be listed in the project material list.

F. Training

1. The following personnel must be trained:

   a. The Owner will supply the list of trainees prior to the training sessions

2. The installer will provide two full training sessions (16 hours) to the list of trainees before the acceptance of the system by the Owner.
3. The installer will provide one more training session (remotely over the phone) during the first one year upon request from the Owner.
4. All the equipment materials (hardware and software specifications, procedures (Training Manuals for DVTel) and manufacturer paperwork related to the equipment will be formatted and bound in a comprehensive Operations and Maintenance Manual to be submitted for approval.

G. Recommended Maintenance and Service

1. The installer will maintain the system under the warranty period using manufacturer recommend maintenance guidelines.

4.3 Typical Backbone Design Diagram (INSERT)

A. See drawing SEC-2.0.

4.4 Internet Protocol Configuration Sheet (Insert included and computer file available)

A. Not applicable.

SECTION 31 00 00 - EARTHWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Geotechnical Investigation – Rehabilitation of Historic Park and construction of new urban plaza at Horton Plaza, prepared by URS, dated January 20, 2011 Project No. 27661138.10000, and all subsequent addenda thereto.

C. Standard Specifications for Public Works Construction and City of San Diego Supplement to the "Whitebook," (Current City adopted Editions)

D. San Diego Area Regional Standard Drawings (latest edition)

1.2 SUMMARY

A. This Section includes the following:
1. Preparing subgrades for slabs-on-grade, walks, pavements, lawns, and plantings.
2. Excavating and backfilling for buildings and structures.
3. Capillary barrier course for floor slabs-on-grade.
4. Subbase course for concrete walks and pavements.
5. Subbase course for asphalt paving.
6. Excavating and backfilling trenches within building lines.
7. Excavating and backfilling trenches for buried mechanical and electrical utilities and pits for buried utility structures.

1.3 DEFINITIONS

A. Backfill: Soil materials used to fill an excavation.
1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
2. Final Backfill: Backfill placed over initial backfill to fill a trench.

B. Base Course: Layer placed between the subbase course and paving.

C. Bedding Course: Layer placed over the excavated subgrade in a trench before laying pipe.

D. Borrow: Satisfactory soil imported from off-site for use as fill or backfill.

E. Capillary barrier: Layer supporting floor slab-on-grade used to minimize capillary flow of pore water.

F. Excavation: Removal of material encountered above subgrade elevations.
1. Remedial Excavation: Over excavation beneath building pads, retaining walls, paving and flatwork as described in this section and as recommended by the Geotechnical Engineer.

2. Additional Excavation: Excavation below subgrade or limits of remedial grading elevations as directed by the owner's representative. Any additional excavation and replacement material will be paid for according to the Contract provisions.
3. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated dimensions without direction by the owner's representative. Unauthorized excavation, as well as remedial work directed by the owner's representative, shall be without additional compensation.

G. Fill: Soil materials used to raise existing grades.

H. Rock: Rock material in beds, ledges, unstratified masses, and conglomerate deposits and boulders of rock material exceeding 1 cu. yd. for bulk excavation or 3/4 cu. yd. for footing, trench, and pit excavation that cannot be removed by rock excavating equipment equivalent to the following in size and performance ratings, without systematic drilling, ram hammering, ripping, or blasting, when permitted:
1. Excavation of Footings, Trenches, and Pits: Late-model, track-mounted hydraulic excavator; equipped with a 42-inch- wide, short-tip-radius rock bucket; rated at not less than 120-hp flywheel power with bucket-curling force of not less than 25,000 lbf and stick-crowd force of not less than 18,700 lbf; measured according to SAE J-1179.
2. Bulk Excavation: Late-model, track-mounted loader; rated at not less than 210-hp flywheel power and developing a minimum of 45,000-lbf breakout force; measured according to SAE J-732.

I. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

J. Subbase Course: Layer placed between the subgrade and base course for asphalt paving, or layer placed between the subgrade and a concrete pavement or walk.

K. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below subbase, drainage fill, or topsoil materials.

L. Utilities include on-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

M. Engineered Soil: Soil material to be utilized in bio-retention areas.

1.4 QUALITY ASSURANCE

A. Geotechnical Testing Agency: Soil and material testing for subgrade, base, and paving materials will be provided by the owner through URS.

1.5 PROJECT CONDITIONS

A. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted in writing by Architect and then only after arranging to provide temporary utility services according to requirements indicated:
1. Notify Owner not less than three days in advance of proposed utility interruptions.
2. Do not proceed with utility interruptions without Owner's written permission.

3. Contact utility-locator service for area where Project is located before excavating.

B. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies to shut off services if lines are active.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.

B. Satisfactory Soils: Excavated soils generated from cut operations at the site are suitable for use as engineered fill in structural areas provided they do not contain deleterious matter, organic material, or rocks/ cementations larger than 6 inches in maximum dimension. Organic material (such as roots greater than one inch in diameter) and other debris should be removed and not incorporated into structural fill.

C. Import fill material should be primarily granular with a "very low" or "low" expansion potential (CBC Expansion Index less than 50), have a Plasticity Index less than 15, be free of organic material and construction debris, and not contain rock larger than 6 inches in greatest dimension.

D. Backfill and Fill: Satisfactory soil materials as specified in the Geotechnical Investigation.

E. Bedding: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; except with 100 percent passing a 1-inch sieve and not more than 8 percent passing a No. 200 sieve. Pea gravel bedding shall be 3/8 inch.

F. Engineered Soil: Engineered soils shall consist of a mixture of sand (40%), compost (20-30%), and top soil (30-40%) with a minimum infiltration rate of 0.5" per hour and adequate nutrient content to meet plant growth requirements.

2.2 ACCESSORIES

A. Warning Tape: Acid- and alkali-resistant polyethylene film warning tape manufactured for marking and identifying underground utilities, 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility; colored as follows:

B. Detectable Warning Tape: Acid- and alkali-resistant polyethylene film warning tape manufactured for marking and identifying underground utilities, minimum 6 inches wide and 4 mils thick, continuously inscribed with a description of utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored as follows:
1. Red: Electric.
2. Yellow: Gas, oil, steam, and dangerous materials.
3. Orange: Telephone and other communications.
4. Blue: Water systems.
5. Green: Sewer systems.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

B. Provide erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

C. A pre-construction conference with the owner, contractor, civil engineer, soils engineering, and testing firm shall be held at the site prior to the beginning of grading operations to discuss special soil handling requirements.

D. That portion of the project site under the former Robinson's-May building has been rough graded for erosion control purposes and compacted to 90% relative compaction. Existing site grades are illustrated in the construction documents. The southern pavilion pad and the northeast pavilion pad have been constructed and compacted to 90% compaction.

3.2 DEWATERING

A. Prevent surface water, storm water, and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.

B. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.
   1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.
   2. Install a dewatering system to keep subgrades dry and convey ground water away from excavations. Maintain until dewatering is no longer required.

3.3 EXCAVATION, GENERAL

A. Unclassified Excavation: Excavation to subgrade elevations regardless of the character of surface and subsurface conditions encountered, including rock, soil materials, and obstructions.
   1. Unclassified Excavation includes the excavation to subgrade of all pavements, structures, landscaping, and the excavation and removal of unsatisfactory materials as indentified in the geotechnical investigation.
   2. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.

3.4 EXCAVATION FOR STRUCTURES

A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 0.1 feet. Extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.

1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.
2. Excavation for Underground Tanks, Basins, and Mechanical or Electrical Utility Structures: Excavate to elevations and dimensions indicated within a tolerance of plus or minus 1 inch. Do not disturb bottom of excavations intended for bearing surface.

3.5 EXCAVATION FOR WALKS AND PAVEMENTS

A. Excavate surfaces under walks and pavements to indicated cross sections, elevations, and grades.

3.6 EXCAVATION FOR UTILITY TRENCHES

A. Excavate trenches to indicated gradients, lines, depths, and elevations.

B. Excavate trenches to uniform widths to provide a working clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit, unless otherwise indicated.
   1. Clearance: 12 inches on each side of pipe or conduit.
   2. Clearance: As indicated.

C. Trench Bottoms: Excavate trenches 6 inches deeper than bottom of pipe elevation to allow for bedding course. Hand excavate for bell of pipe.
   1. Excavate trenches 10 inches deeper in rock or other unyielding bearing material to allow for foundation rock layer.

3.7 APPROVAL OF SUBGRADE

A. Notify Testing Agency when excavations have reached required subgrade.

B. If Testing Agency determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.
   1. Additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.

C. Proof roll subgrade with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof roll wet or saturated subgrades.

D. Reconstruct subgrades damaged by rain, accumulated water, or construction activities, as directed by Testing Agency.

3.8 UNAUTHORIZED EXCAVATION

A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill may be used when approved by Architect.
   1. Fill unauthorized excavations under other construction or utility pipe as directed by owner.

3.9 STORAGE OF SOIL MATERIALS

A. Stockpile borrow materials and satisfactory excavated soil materials. Stockpile soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
   1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.10 BACKFILL

A. Place and compact backfill in excavations promptly, but not before completing the following:
   1. Construction below finish grade including, where applicable, dampproofing and waterproofing.
   2. Surveying locations of underground utilities for record documents.
   3. Inspecting and testing underground utilities.
   4. Removing concrete formwork.
   5. Removing trash and debris.
   6. Removing temporary shoring and bracing, and sheeting.
   7. Installing permanent or temporary horizontal bracing on horizontally supported walls.

3.11 UTILITY TRENCH BACKFILL

A. Place and compact 6 inch bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.
   1. Provide crushed rock bedding for sanitary and storm sewer piping.

B. Backfill trenches excavated under footings and within 18 inches of bottom of footings; with concrete to elevation of bottom of footings.

C. Provide 4-inch- thick, concrete-base slab support for piping or conduit less than 30 inches below surface of roadways. After installing and testing, completely encase piping or conduit in a minimum of 4 inches of concrete before backfilling or placing roadway subbase.

D. Place and compact initial backfill of crushed rock, free of particles larger than 3/4 inch, to a height of 12 inches over the utility pipe or conduit.
   1. Carefully compact material under pipe haunches and bring backfill evenly up on both sides and along the full length of utility piping or conduit to avoid damage or displacement of utility system.

E. Coordinate backfilling with utilities testing.

F. Fill voids with approved backfill materials while shoring and bracing, and as sheeting is removed.

G. Place and compact final backfill of satisfactory soil material to final subgrade.

H. Install warning tape directly above utilities, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

3.12 FILL

A. Preparation: Remove vegetation, topsoil, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface before placing fills.

B. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.

C. Place and compact satisfactory fill material in layers to required elevations.

3.13 MOISTURE CONTROL

A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill layer before compaction to within 2 percent of optimum moisture content.
   1. Do not place backfill or fill material on surfaces that are muddy.
   2. Remove and replace, or scarify and air-dry, otherwise satisfactory soil material that is too wet to compact to the specified dry unit weight.

3.14 COMPACTION OF BACKFILLS AND FILLS

A. Place backfill and fill materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.

B. Place backfill and fill materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.

C. Compact soil to at least 90 percent of the maximum dry density determined in general accordance with ASTM D1557. The upper 12 inches of pavement subgrade should be compacted to at least 95 percent relative compaction.

D. The use of water jetting or jetting equipment for compaction is strictly prohibited unless it's authorized in writing by the Owner's Representative

3.15 GRADING

A. General: Uniformly grade areas to a smooth surface, free from irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
   1. Provide a smooth transition between adjacent existing grades and new grades.
   2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.

B. Site Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:
   1. Lawn or Unpaved Areas: Plus or minus 0.1 feet.
   2. Walks: Plus or minus 0.1 feet.
   3. Pavements: Plus or minus 0.05 feet.

C. Grading inside Building Lines: Finish subgrade to a tolerance of 1/2 inch when tested with a 10-foot straightedge.

3.16 SUBBASE COURSES

A. Under pavements and walks, place subbase course on prepared subgrade and as follows:
   1. Compact subbase course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 95 percent of maximum density according to ASTM D 1557.
   2. When thickness of compacted subbase course is 6 inches or less, place materials in a single layer.
   3. When thickness of compacted subbase course exceeds 6 inches, place materials in equal layers, with no layer more than 6 inches thick or less than 3 inches thick when compacted.

3.17 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent geotechnical engineering testing agency to perform field quality-control testing.

B. Allow testing agency to observe and test subgrades and each fill or backfill layer. Proceed with subsequent earthwork only after test results for previously completed work comply with requirements.

C. Do not backfill utility trenches until the as-built location and elevation of each utility is surveyed and recorded and until the utility lines have been inspected and satisfactorily tested.

D. Footing Subgrade: Foundation bearing soils should be observed by the geotechnical consultant prior to placing concrete.

E. Testing agency will test compaction of soils in place according to ASTM D 1556, ASTM D 2167, ASTM D 2922, and ASTM D 2937, as applicable. Tests will be performed at the following locations and frequencies:
   1. Paved and Building Slab Areas: At subgrade and at each compacted fill and backfill layer, at least one test for every 1000 sq. ft. or less of paved area or building slab, but in no case fewer than three tests.
   2. Foundation Wall Backfill: At each compacted backfill layer, at least one test for each 50 feet or less of wall length, but no fewer than two tests.
   3. Trench Backfill: At each compacted initial and final backfill layer, at least one test for each 50 feet or less of trench length, but no fewer than two tests.

F. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil to depth required; recompact and retest until specified compaction is obtained.

3.18 PROTECTION

A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.
   1. Scarify or remove and replace soil material to depth as directed by owner's representative; reshape and recompact.

C. Where settling occurs before Project warranty period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.
   1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to the greatest extent possible.

3.19 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Disposal: Remove surplus satisfactory soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off Owner's property.

3.20 REMEDIAL EARTHWORK

A. Over-excavate all soils within the building pad areas as recommended by the Geotechnical Engineer. Structural building pad areas should be considered as areas extending a minimum of 5 feet horizontally beyond the outside dimensions of buildings, including footings and overhangs carrying structural loads.

B. Over-excavate compressible soils beneath the proposed retaining walls as recommended by the Geotechnical Engineer.

C. Over-excavate compressible soils beneath the proposed exterior flatwork and pavement areas as recommended by the Geotechnical Engineer.

D. Geotechnical Consultant should observe all over-excavation bottoms prior to backfilling. Perform any additional over-excavation as recommended by the Geotechnical Engineer.

E. Fill remedial excavations with satisfactory soils. Compact fill to at least 90 percent relative compaction based on ASTM D1557.

END OF SECTION

SECTION 33 10 00 – WATER UTILITIES

PART 1- GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. SSPWC -- Standard Specifications for Public Works Construction and City of San Diego Supplement to the "Whitebook," (Current City adopted Editions)

C. San Diego Area Regional Standard Drawings (latest edition)

D. City of San Diego approved water materials list

1.2 SUMMARY

A. This Section includes piping and specialties for potable-water and fire-protection water service outside the building.

B. Related sections include the following:
1. Section 31 00 00, Earthwork

1.3 SYSTEM PERFORMANCE REQUIREMENTS

A. Minimum Working Pressures: The following are minimum pressure requirements for piping and specialties, unless otherwise indicated:
1. Potable-Water Service: 150 psig.
2. Fire-Protection Water Service: 200 psig.

1.4 SUBMITTALS

A. Product Data: For the following:
1. Backflow preventers.
2. Pipe and fittings.
3. Valves.
4. Fire hydrants.
5. Fire department connections.

B. Record Drawings: At Project closeout of installed water-service piping.

C. Test Reports: As specified in "Field Quality Control" Article in Part 3.

D. Purging and Disinfecting Reports: As specified in "Cleaning" Article in Part 3.

E. Maintenance Data: For specialties to include in the maintenance manuals specified in Division 1. Include data for the following:
1. Backflow preventers.
2. Valves.
3. Fire hydrants.

1.5 QUALITY ASSURANCE

A. Comply with requirements of utility supplying water. Include tapping of water mains and backflow prevention.

B. All meter and regulator stations shall be installed above ground.

C. Separate meters shall be provided for domestic, fire and landscape water

D. Comply with standards of authorities having jurisdiction for potable water-service piping. Include materials, installation, testing, and disinfection.

E. Comply with NSF 61, "Drinking Water System Components--Health Effects," for materials for potable water.

F. Comply with standards of authorities having jurisdiction for fire-protection water-service piping. Include materials, hose threads, installation, and testing.

G. Comply with NFPA 24, "Installation of Private Fire Service Mains and Their Appurtenances," for materials, installations, tests, flushing, and valve and hydrant supervision.

H. Comply with 2001"California Electrical Code," (CEC) for electrical connections between wiring and electrically operated devices.

I. Provide listing/approval stamp, label, or other marking on piping and specialties made to specified standards.

J. Listing and Labeling: Provide electrically operated specialties and devices specified in this Section that are listed and labeled.
   1. The Terms "Listed" and "Labeled": As defined in CEC, Article 100.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Preparation for Transport: Prepare valves, including fire hydrants, according to the following:
   1. Ensure that valves are dry and internally protected against rust and corrosion.
   2. Protect valves against damage to threaded ends and flange faces.
   3. Set valves in best position for handling. Set valves closed to prevent rattling.

B. During Storage: Use precautions for valves, including fire hydrants, according to the following:
   1. Do not remove end protectors, unless necessary for inspection; then reinstall for storage.
   2. Protect from weather. Store indoors and maintain temperature higher than ambient dew-point temperature. Support off the ground or pavement in watertight enclosures when outdoor storage is necessary.

C. Handling: Use sling to handle valves and fire hydrants whose size requires handling by crane or lift. Rig valves to avoid damage to exposed valve parts. Do not use handwheels or stems as lifting or rigging points.

D. Deliver piping with factory-applied end-caps. Maintain end-caps through shipping, storage, and handling to prevent pipe-end damage and to prevent entrance of dirt, debris, and moisture.

E. Protect stored piping from moisture and dirt. Elevate above grade. Do not exceed structural capacity of floor when storing inside.

F. Protect flanges, fittings, and specialties from moisture and dirt.

G. Store plastic piping protected from direct sunlight. Support to prevent sagging and bending.

1.7 PROJECT CONDITIONS

A. Verify existing utility locations. Contact utility-locating service for area where Project is located.

B. Verify that water-service piping may be installed to comply with original design and referenced standards.

C. Verify system pressure and size according to lowest pressure and regulate to highest pressure.

1.8 SEQUENCING AND SCHEDULING

A. Coordinate connection to water main with utility company.

B. Coordinate with other utility work.

C. Coordinate with site concrete construction.

PART 2- PRODUCTS

2.1 PIPES AND TUBES

A. General: Applications of the following pipe and tube materials are indicated in Part 3 "Piping Applications" Article.

B. Copper Tube: ASTM B 88, seamless water tube, annealed temper.

C. Ductile-Iron, Mechanical-Joint Pipe: AWWA C151, with cement-mortar lining and seal coat according to AWWA C104. Include gland, rubber gasket, and bolts and nuts according to AWWA C111.

D. PVC Plastic Pipe: ASTM D 1785, with marking "NSF-pw" according to NSF 14.

E. PVC Plastic, Fire-Service Pipe: UL 1285 and AWWA C900. Include elastomeric seal according to ASTM F 477.

2.2 PIPE AND TUBE FITTINGS

A. General: Applications of the following pipe and tube fitting materials are indicated in Part 3 "Piping Applications" Article.

B. Copper Fittings: ASME B16.22; wrought-copper, solder-joint pressure type.

C. Cast-Copper-Alloy Flanges: ASME B16.24, Class 150 or 300, as required for system operating pressure.

D. Ductile-Iron, Mechanical-Joint Fittings: AWWA C110, ductile-iron or cast-iron; or AWWA C153, ductile-iron, compact type. Include cement-mortar lining and seal coat according to AWWA C104 and glands, rubber gaskets, and bolts and nuts according to AWWA C111.

E. Ductile-Iron, Grooved-End Fittings: ASTM A 47, malleable-iron; or ASTM A 536, ductile-iron casting complying with AWWA-pipe size, with grooved ends. Include cement-mortar lining and seal coat according to AWWA C104 or epoxy, interior coating according to AWWA C550. Include keyed couplings according to AWWA C606.

F. Ductile-Iron, Flanged Fittings: AWWA C110, with cement-mortar lining and seal coat according to AWWA C104 or epoxy, interior coating according to AWWA C550. Include gaskets and bolts and nuts.

G. Cast-Iron Flanged Fittings: ASME B16.1, Class 125, unless otherwise indicated.

H. Ductile-Iron Fittings for PVC Pipe: AWWA C110, ductile-iron or cast-iron; or AWWA C153, ductile-iron, compact type; push-on- or mechanical-joint type. Include dimensions matching PVC pipe, cement-mortar lining and seal coat according to AWWA C104, and rubber compression gaskets according to AWWA C111.

2.3 JOINING MATERIALS

A. General: Applications of the following piping joining materials are indicated in Part 3 "Piping Applications" Article.

B. Ductile-Iron Piping: The following materials apply:
   1. Mechanical Joints: AWWA C111 ductile-iron or gray-iron glands, high-strength steel bolts and nuts, and rubber gaskets.
   2. Flanged Joints: AWWA C115 ductile-iron or gray-iron pipe flanges, rubber gaskets, and high-strength steel or brass bolts and nuts.
      a. Gaskets: Rubber, flat face, 1/8 inch thick, unless otherwise indicated; and full-face or ring type, unless otherwise indicated.
      b. Flange Bolts and Nuts: ASME B18.2.1, carbon steel or brass, unless otherwise indicated.
   3. Keyed Couplings: AWWA C606, consisting of ASTM A 536 ductile-iron housing with enamel finish, with synthetic-rubber gasket with central-cavity, pressure-responsive design, with carbon-steel bolts and nuts to secure grooved pipe and fittings and gasket suitable for hot water, unless otherwise indicated.

C. Brazing Filler Metals: AWS A5.8, BCuP Series.

D. Solder Filler Metal: ASTM B 32, Alloy Sn95, Alloy Sn94, or Alloy E, with 0.10 percent maximum lead content.

E. Pipe Couplings: Iron-body sleeve assembly, fabricated to match OD of pipes to be joined.
   1. Sleeve: ASTM A 126, Class B, gray iron.
   2. Followers: ASTM A 47, malleable iron; or ASTM A 536, ductile iron.
   3. Gaskets: Rubber.
   4. Bolts and Nuts: AWWA C111.
   5. Finish: Enamel paint.

F. Coatings: Grease, Never-Sieze, or equivalent for application to all nuts and bolts.
1. Encasement: Fittings shall be wrapped with minimum 6 mil polyvinyl sheathing.

2.4 PIPING SPECIALTIES

A. Dielectric Fittings: Assembly or fitting with insulating material isolating joined dissimilar metals to prevent galvanic action and corrosion.
1. Description: Combination of copper alloy and ferrous; threaded, solder, plain, and weld-neck end types and matching piping system materials.
2. Dielectric Unions: Factory-fabricated union assembly, designed for 250-psig minimum working pressure at 180 deg F. Include insulating material isolating dissimilar metals and ends with inside threads according to ASME B1.20.1.
3. Dielectric Flanges: Factory-fabricated companion-flange assembly, for 150- or 300-psig minimum pressure to suit system pressures.
4. Dielectric-Flange Insulation Kits: Field-assembled companion-flange assembly, full-face or ring type. Components include neoprene or phenolic gasket, phenolic or polyethylene bolt sleeves, phenolic washers, and steel backing washers.
a. Provide separate companion flanges and steel bolts and nuts for 150- or 300-psig minimum working pressure to suit system pressures.
5. Dielectric Couplings: Galvanized-steel couplings with inert and noncorrosive thermoplastic lining, with threaded ends and 300-psig minimum working pressure at 225 deg F.
6. Dielectric Nipples: Electroplated steel nipples with inert and noncorrosive thermoplastic lining, with combination of plain, threaded, or grooved end types and 300-psig working pressure at 225 deg F.

2.5 PE ENCASEMENT

A. PE Encasement for Ductile-Iron Piping: ASTM A 674 or AWWA C105, PE film, 0.008-inch minimum thickness, tube or sheet.

2.6 VALVES

A. Nonrising-Stem, Metal-Seated Gate Valves, 3-Inch NPS and Larger: AWWA C500, gray- or ductile-iron body and bonnet; with cast-iron or bronze, double-disc gate, bronze gate rings, bronze stem, and stem nut. Include 200-psig minimum working-pressure design; interior coating according to AWWA C550; and mechanical-joint ends, unless otherwise indicated.

B. Nonrising-Stem, Resilient-Seated Gate Valves, 3-Inch NPS and Larger: AWWA C509, gray- or ductile-iron body and bonnet; with bronze or gray- or ductile-iron gate, resilient seats, bronze stem, and stem nut. Include 200-psig minimum working-pressure design, interior coating according to AWWA C550, and push-on- or mechanical-joint ends.

C. Nonrising-Stem, High-Pressure, Resilient-Seated Gate Valves, 3-Inch NPS and Larger: AWWA C509, ductile-iron body and bonnet; with bronze or ductile-iron gate, resilient seats, bronze stem, and stem nut. Include 250-psig minimum working-pressure design, interior coating according to AWWA C550, and push-on- or mechanical-joint ends.

D. Nonrising-Stem Gate Valves, 4-Inch NPS and Larger: UL 262, FM approved, iron body and bonnet with flange for indicator post, bronze seating material, inside screw, 175-psig working pressure, and mechanical-joint ends. Provide with flanged ends for pit installation.

E. Rising-Stem Gate Valves, 3-Inch NPS and Larger: AWWA C500, cast-iron double disc, bronze disc and seat rings, cast-iron or ductile-iron body and bonnet, OS&Y, bronze stem, 200-psig working pressure, and flanged ends.

F. Rising-Stem Gate Valves, 3-Inch NPS and Larger: AWWA C509, resilient seated; cast-iron or ductile-iron body and bonnet, OS&Y, bronze stem, 200-psig working pressure, and flanged ends.

G. Rising-Stem Gate Valves, 2-1/2-Inch NPS and Larger: UL 262, FM approved, iron body and bonnet, bronze seating material, OS&Y, 175-psig working pressure, and flanged ends.

H. Rising-Stem Gate Valves, 2-Inch NPS and Smaller: UL 262, FM approved, bronze body and bonnet, OS&Y, bronze stem, 175-psig working pressure, with threaded ends.

I. Nonrising-Stem Gate Valves, 2-Inch NPS and Smaller: MSS SP-80; body and screw bonnet of ASTM B 62 cast bronze; with Class 125 threaded ends, solid wedge, nonrising copper-silicon-alloy stem, brass packing gland, PTFE-impregnated packing, and malleable-iron handwheel.

J. Valve Boxes: Cast-iron box with top section and cover with lettering "WATER," bottom section with base of size to fit over valve and barrel approximately 5 inches in diameter, and adjustable cast-iron extension of length required for depth of bury of valve.
   1. Provide steel tee-handle operating wrench with each valve box. Include tee handle with one pointed end, stem of length to operate valve, and socket-fitting valve-operating nut.

K. Indicator Posts: UL 789, FM-approved, vertical-type, cast-iron body with operating wrench, extension rod, and adjustable cast-iron barrel of length required for depth of bury of valve.

L. Curb Stops: Bronze body, ground-key plug or ball, and wide tee head, with inlet and outlet to match service piping material.

M. Service Boxes for Curb Stops: Cast-iron box with telescoping top section of length required for depth of bury of valve. Include cover with lettering "WATER," and bottom section with base of size to fit over curb-stop and barrel approximately 3 inches in diameter.
   1. Provide steel tee-handle shutoff rod with each service box. Include tee handle with one pointed end, stem of length to operate curb stop, and slotted end fitting curb-stop head.

N. Tapping Sleeve and Tapping Valve: Complete assembly, including tapping sleeve, tapping valve, and bolts and nuts. Use sleeve and valve compatible with tapping machine.

O. Service Clamps and Corporation Stops: Complete assembly, including service clamp, corporation stop, and bolts and nuts. Include service clamp and stop compatible with drilling machine.
   1. Service Clamp: Cast iron or ductile iron with gasket and AWWA C800 threaded outlet for corporation stop, and threaded end straps.
   2. Corporation Stops: Full-port bronze body and ground-key plug, with AWWA C800 threaded inlet and outlet matching service piping material.
   3. Manifold: Copper with 2 to 4 inlets as required, with ends matching corporation stops and outlet matching service piping.

P. Check Valves: AWWA C508, with 175-psig working-pressure rating. Include interior coating according to AWWA C550.

2.7 SPECIALTY VALVES

A. Pressure-Regulating Valves: Automatic, pilot-operated, cast-iron body with interior coating according to AWWA C550. Include 250-psig working-pressure design, bronze pressure-reducing pilot valve and tubing, and means for discharge pressure adjustment.

B. Flow-Regulating Valves: Automatic, pilot-operated, cast-iron body with interior coating according to AWWA C550. Include 250-psig working-pressure design, bronze pressure-reducing pilot valve and tubing, and means for flow adjustment.

C. Air-Release Valve: AWWA C512, hydromechanical device to automatically release accumulated air. Include 300-psig working-pressure design.

D. Air/Vacuum Valve: AWWA C512, direct-acting, float-operated, hydromechanical device with large orifice to automatically release accumulated air or to admit air during filling of piping. Include 300-psig working-pressure design.

E. Combination Air Valves: AWWA C512, float-operated, hydromechanical device to automatically release accumulated air or to admit air. Include 300-psig working-pressure design.

2.8 WATER METERS

A. Description: Comply with City of San Diego Water Department requirements.

2.9 WATER-METER BOXES

A. Description: Polymer Concrete. Include lettering "WATER METER" in cover; and slotted, open-bottom base section of length to fit over service piping.

2.10 PITS

A. Description: Precast, reinforced-concrete pit, designed for A-16 load designation according to ASTM C 857, and made according to ASTM C 858.

B. Ladder: ASTM A 36, steel or polyethylene-encased steel steps.

C. Manhole: ASTM A 536, Grade 60-40-18, ductile-iron, 24-inch- minimum-diameter traffic frame and cover.
1. Weight and Dimensions: Not smaller than 24-inch diameter, unless otherwise indicated.

D. Drain: ASME A112.21.1M, cast-iron area drain, of size indicated. Include body anchor flange, light-duty cast-iron grate, bottom outlet, and integral or field-installed bronze ball or clapper-type backwater valve.

2.11 FREESTANDING FIRE HYDRANTS

A. General: Comply with City of San Diego Fire Department requirements where they exceed the following requirements.

B. Description: Cast-iron body, compression-type valve, opening against pressure and closing with pressure, 6-inch mechanical-joint inlet, and 200-psig minimum working-pressure design.

C. Outlet Threads: NFPA 1963, with external hose thread used by local fire department. Include cast-iron caps with steel chains.

D. Exterior Finish: Red alkyd-gloss enamel paint, unless otherwise indicated.

2.12 FIRE DEPARTMENT CONNECTIONS

A. Exposed, Freestanding, Fire Department Connections: UL 405, cast-brass body, with thread inlets according to NFPA 1963 and matching local fire department hose threads, and threaded bottom outlet. Include lugged caps, gaskets, and chains; lugged swivel connection and drop clapper for each hose-connection inlet; 18-inch- high brass sleeve; and round escutcheon plate.

2.13 DETECTOR CHECK VALVES

A. Detector Check Valve: UL 312, FM-approved detector check, iron body, corrosion-resistant clapper ring and seat ring material, 175-psig working pressure, flanged ends, with connections for bypass and installation of water meter.

2.14 BACKFLOW PREVENTERS

A. General: Manufactured backflow preventers, of size indicated for maximum flow rate and maximum pressure loss indicated. Comply with requirements of the San Diego City Water Department.

B. 2-Inch NPS and Smaller: Bronze body with threaded ends.

C. 2-1/2-Inch NPS and Larger: Bronze, cast-iron, steel, or stainless-steel body with flanged ends.

D. Interior Lining: AWWA C550, epoxy coating for backflow preventers with cast-iron or steel body.

E. Interior Components: Corrosion-resistant materials.

F. Strainer on inlet if strainer is indicated.

G. Hose-Connection Vacuum Breakers: ASSE 1011, nickel plated, with nonremovable and manual drain features, and ASME B1.20.7, 3/4-11.5NH threads for garden hose on outlet. Units attached to rough-bronze-finish hose connections may be rough bronze.

2.15 ANCHORAGES

A. Clamps, Straps, and Washers: ASTM A 506, steel.

B. Rods: ASTM A 575, steel.

C. Rod Couplings: ASTM A 197, malleable iron.

D. Bolts: ASTM A 307, steel.

E. Cast-Iron Washers: ASTM A 126, gray iron.

F. Concrete Reaction Backing: Portland cement concrete mix, 3000 psig.
1. Cement: ASTM C 150, Type I.
2. Fine Aggregate: ASTM C 33, sand.
3. Coarse Aggregate: ASTM C 33, crushed gravel.
4. Water: Potable.

2.16 ALARM DEVICES

A. Description: UL 753, FM approved, of types and sizes to mate and match piping and equipment. Provide devices that are compatible with the fire alarm system.

B. Water-Flow Indicators: Vane-type water-flow detector, rated for 250-psig working pressure; designed for horizontal or vertical installation; with 2 SPDT circuit switches to provide isolated alarm and auxiliary contacts, 7 A 125 V, ac and 0.25 A 24 V, dc; complete with factory-set, field-adjustable retard element to prevent false signals and tamperproof cover that sends signal when cover is removed.

C. Supervisory Switches: SPDT, designed to signal valve in other than full open position.

2.17 IDENTIFICATION

A. Refer to Division 2 Section "Earthwork" for underground warning tape materials.

B. Arrange for warning tapes made of solid blue film with continuously printed black-letter caption "CAUTION--WATER LINE BURIED BELOW."

C. Arrange for detectable warning tapes made of solid blue film with metallic core and continuously printed black-letter caption "CAUTION--WATER LINE BURIED BELOW."

D. Nonmetallic Piping Label: Engraved, plastic-laminate label at least 1 by 3 inches, with caption "CAUTION--THIS STRUCTURE HAS NONMETALLIC WATER-SERVICE PIPING," for installation on main electrical meter panel.

PART 3- EXECUTION

3.1 EARTHWORK

A. Excavating, trenching, and backfilling are specified in 31 00 00 “Earthwork.”

B. Install piping a minimum of 30 inches below rough grade, except shut-off valves 3 inches and smaller shall be brought up into meter boxes 6 inches below grade.

3.2 PIPING APPLICATIONS

A. General: Use pipe, fittings, and joining methods for piping systems according to the following applications:

B. Transition couplings and special fittings with pressure ratings at least equal to piping pressure rating may be used in applications below, unless otherwise indicated.

C. Do not use flanges or keyed couplings for underground piping.

1. Exception: Piping in boxes and structures, but not buried, may be joined with flanges or keyed couplings instead of joints indicated.

D. Flanges, keyed couplings, and special fittings may be used on aboveground piping.

E. Potable Water-Service Piping: Use the following:
1. 3/4- to 3-Inch NPS: Copper tube, Type L; copper fittings; and soldered joints.
2. 4-Inch NPS: Ductile-iron, mechanical-joint pipe; ductile-iron, mechanical-joint fittings; and mechanical joints.
3. NPS 4: PVC, AWWA Class 200 pipe; PVC, AWWA Class 200 fabricated
4. 6-Inch NPS: Ductile-iron, mechanical-joint pipe; ductile-iron, mechanical-joint fittings; and mechanical joints.
5. 8-Inch NPS: Ductile-iron, mechanical-joint pipe; ductile-iron, mechanical-joint fittings; and mechanical joints.

F. Fire-Protection Water-Service Piping: Use the following:
1. 4- to 8-Inch NPS: Ductile-iron, mechanical-joint pipe; ductile-iron, mechanical-joint fittings; and mechanical joints.
2. 4- to 8-Inch NPS: PVC plastic, C900 Class 200, fire-service pipe; ductile-iron fittings for PVC plastic pipe; and gasketed joints.
3. 10- and 12-Inch NPS: Ductile-iron, mechanical-joint pipe; ductile-iron, mechanical-joint fittings; and mechanical joints.
4. 10- and 12-Inch NPS: PVC plastic, C900 Class 200, fire-service pipe; ductile-iron fittings for PVC plastic pipe; and gasketed joints.

3.3 JOINT CONSTRUCTION

A. Ductile-Iron Piping, Gasketed Joints: According to AWWA C600.

B. Ductile-Iron Piping, Gasketed Joints for Fire-Service Piping: According to UL 194 and AWWA C600.

C. Flanged Joints: Align flanges and install gaskets. Assemble joints by sequencing bolt tightening. Use lubricant on bolt threads.

D. Threaded Joints: Thread pipes with tapered pipe threads according to ASME B1.20.1, apply tape or joint compound, and apply wrench to fitting and valve ends into which pipes are being threaded.

E. Copper Tubing, Soldered Joints: According to AWS's "Soldering Manual," Chapter "The Soldering of Pipe and Tube."

F. PVC Piping, Gasketed Joints: Use joining materials according to AWWA C900. Construct joints with elastomeric seals and lubricant according to ASTM D 2774 or ASTM D 3139 and pipe manufacturer's written instructions.

G. Dissimilar Materials Piping Joints: Use adapters compatible with both piping materials, OD, and system working pressure. Refer to "Piping Systems - Common Requirements" Article below for joining piping of dissimilar metals.

3.4 PIPING SYSTEMS - COMMON REQUIREMENTS

A. General Locations and Arrangements: Drawings indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and

calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated, unless deviations to layout are approved on Coordination Drawings.

B. Install components with pressure rating equal to or greater than system operating pressure.

C. Install piping free of sags and bends except as required to avoid gravity utilities installations and site footing and site construction. Installer shall verify depth of piping with all other utilities crossings and site construction to adjust piping depth as required.

D. Locate groups of pipes parallel to each other, spaced to permit valve servicing.

E. Install fittings for changes in direction and branch connections.

F. Piping Connections: Unless otherwise indicated, make piping connections as specified below:
1. Install unions, in piping 2-inch NPS and smaller, adjacent to each valve and at final connection to each piece of equipment with 2-inch NPS or smaller threaded pipe connection.
2. Install flanges, in piping 2-1/2-inch NPS and larger, adjacent to flanged valves and at final connection to each piece of equipment with flanged pipe connection.
3. Install dielectric fittings to connect piping of dissimilar metals.

G. Fitting Protection: Wrap all metal fittings with polyvinyl sheathing. Coat all bolts and nuts with grease or Never Sieze.

3.5 SERVICE ENTRANCE PIPING

A. Extend water-service piping and connect to water-supply source and building water piping systems at outside face of building wall in locations and pipe sizes indicated.
1. Terminate water-service piping at building wall until building water piping systems are installed. Terminate piping with caps, plugs, or flanges as required for piping material. Make connections to building water piping systems when those systems are installed.

B. Install underground piping with restrained joints at horizontal and vertical changes in direction. Use restrained-joint piping, thrust blocks, anchors, tie-rods and clamps, and other supports.

3.6 PIPING INSTALLATION

A. Water-Main Connection: Tap water main with size and in location as indicated according to requirements of water utility.

B. Comply with NFPA 24 for fire-protection water-service piping materials and installation.

C. Install ductile-iron piping according to AWWA C600.
1. Encase piping with PE film according to ASTM A 674 or AWWA C105.

D. Install copper tube and fittings according to CDA's "Copper Tube Handbook."

E. Install AWWA PVC plastic pipe according to AWWA M23 and ASTM F 645.

F. Bury piping with depth of cover over top at least 30 inches. Install piping free of sags and bends except as required to avoid gravity utilities installations and site footing and site construction. Installer shall verify depth of piping with all other utilities crossings and site construction to adjust piping depth as required.

3.7 ANCHORAGE INSTALLATION

A. Install anchorages for tees, plugs and caps, bends, crosses, valves, and hydrant branches. Include anchorages for the following piping systems:
   1. Gasketed-Joint, Ductile-Iron, Potable-Water Piping: According to AWWA C600.
   2. Gasketed-Joint, PVC Potable-Water Piping: According to AWWA M23.
   3. Fire-Service Piping: According to NFPA 24.

B. Install thrust blocks and anchorage Blocks in accordance with San Diego Regional Standard Drawings and in accordance with the project plans.

C. Apply full coat of asphalt or other acceptable corrosion-retarding material to surfaces of installed ferrous anchorage devices.

3.8 VALVE INSTALLATION

A. General Application: Use mechanical-joint-end valves for 3-inch NPS and larger underground installation. Use threaded- and flanged-end valves for installation in pits. Use nonrising-stem UL/FM gate valves for installation with indicator posts. Use full-port bronze corporation stops and ball valves, with ends compatible with piping, for 2-1/2 inch NPS and smaller installation.
   1. 3-piece valves are not allowed underground.

B. AWWA-Type Gate Valves: Comply with AWWA C600. Install underground valves with stem pointing up and with cast-iron valve box.

C. UL/FM-Type Gate Valves: Comply with NFPA 24. Install underground valves and valves in pits with stem pointing up and with vertical cast-iron indicator post.

D. Bronze Corporation Stops and Curb Stops: Comply with manufacturer's written instructions. Install underground curb stops with head pointed up and with cast-iron curb box.

3.9 FIRE HYDRANT INSTALLATION

A. General: Install each fire hydrant with separate gate valve in supply pipe, anchor with restrained joints or thrust blocks, and support in upright position.

3.10 WATER-METER INSTALLATION

A. Install water meters, piping, and specialties according to utility company's written requirements.

3.11 PIT CONSTRUCTION AND INSTALLATION

A. Construct pits of cast-in-place concrete pits, with manhole frame and cover, ladder, and drain. Include sleeves with waterproof mechanical sleeve seals for pipe entry and exit.

B. Install precast concrete pits according to ASTM C 891.

C. Connect area drain outlet to storm drainage piping.

3.12 DETECTOR CHECK VALVE INSTALLATION

A. Install detector check valves in pits for proper direction of flow. Install bypass with water meter, gate valves on each side of meter, and check valve downstream from meter.

B. Support detector check valves, meters, shutoff valves, and piping on concrete piers.

3.13 BACKFLOW PREVENTER INSTALLATION

A. Install backflow preventers of type, size, and capacity indicated. Include valves and test cocks. Install according to plumbing and health department authorities having jurisdiction.

B. Do not install reduced-pressure-principle type in pit.

C. Do not install bypass around backflow preventer.

D. Support backflow preventers, valves, and piping on concrete piers.

3.14 ALARM DEVICE INSTALLATION

A. General: Comply with NFPA 24 for devices and methods of valve supervision.

3.15 IDENTIFICATION INSTALLATION

A. Install continuous plastic underground warning tape during back-filling of trench for underground water-service piping. Locate 12 inches below finished grade, directly over piping.

B. Attach nonmetallic piping label permanently to main electrical meter panel.

3.16 FIELD QUALITY CONTROL

A. Piping Tests: Conduct piping tests before joints are covered and after thrust blocks have hardened sufficiently. Fill pipeline 24 hours before testing and apply test pressure to stabilize system. Use only potable water.

B. Hydrostatic Tests: Test at not less than 1-1/2 times working pressure (150 psig minimum) for 2 hours.
   1. Increase pressure in 50-psig increments and inspect each joint between increments. Hold at test pressure for one hour; decrease to 0 psig. Slowly increase again to test pressure and hold for one more hour. No perceptible leakage shall be observed. Remake leaking joints with new materials and repeat test until leakage is within above limits.
   2. Flush piping per NFPA 24 after installation and immediately prior to connecting to automatic fire sprinkler system.

C. Prepare reports for testing activities.

3.17 CLEANING

A. Clean and disinfect water distribution piping as follows:

1. Purge new water distribution piping systems and parts of existing systems that have been altered, extended, or repaired before use.
2. For fire water, use purging and disinfecting procedure prescribed by authorities having jurisdiction or, if method is not prescribed by that authority, use procedure described in NFPA 24 for flushing of piping. Flush piping system with clean, potable water until dirty water does not appear at points of outlet.
    a. For potable water, use purging and disinfecting procedure prescribed by authorities having jurisdiction or, if method is not prescribed by authorities, use procedure described in AWWA C651

B. Prepare reports for purging and disinfecting activities.

END OF SECTION 33 10 00

SECTION 32 1313 – CONCRETE PAVING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes exterior cement concrete pavement for the following:
   1. Ramps.
   2. Curbs and gutters.
   3. Historic Park Colored Concrete

B. Related Sections include the following:

   1. Drawings and General Provisions of the Contract, including Part 1- “General Provisions” of the Greenbook and Whitebook apply to this Section.
   2. Division 31 Section “Earthwork” for subgrade preparation, grading, base course, and subbase course.
   3. Division 03 Section "Cast-in-Place Concrete" for concrete bases, pedestals, walls, wall substrates, and footings.
   4. Division 32 Section “Unit Paving” for Historic Park Pavers.
   5. Division 32 Section “Stone Paving” for stone paving.
   6. Division 07 Section “ Joint Sealants” for Quality Assurance procedures for sealants.
   7. Greenbook/Whitebook 2012, section 303 for ramps, curbs and gutters in the ROW.

1.2 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, fly ash and other Pozzolans, and ground granulated blast-furnace slag.

1.3 SUBMITTALS

A. Product Data: For each type of manufactured material and product indicated. Include color samples, manufacturer, product name and formulation for initial selection.

B. Provide samples for verification for each product selected.

C. Design Mixtures: For each concrete pavement mixture. Include alternate mixture designs when characteristics of materials, project conditions, weather, test results, or other circumstances warrant adjustments.

D. Shop Drawings: Include details of steel reinforcement placement including material, grade, bar schedules, spacing, bent bar diagrams, arrangement, and supports. Provide plans and details for each paving section.

E. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
F. Field quality-control test reports.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Manufacturer of ready-mixed concrete products who complies with ASTM C 94 requirements for production facilities and equipment.

1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

B. ACI Publications: Comply with ACI 301, "Specification for Structural Concrete," unless modified by requirements in the Contract Documents.

C. Standard Specifications: Perform concrete paving Work in compliance with Section 73 and Section 90 of the latest edition of the State of California, Business and Transportation Agency, Department of Transportation (CALTRANS), and as modified by the City of San Diego -Standard Construction Specifications. In case of conflict between the Standard Specifications and these specifications, these specifications shall govern. Comply with the more stringent of the specifications.

D. Concrete Testing Service: Owner will engage a qualified testing agency to perform material evaluation tests and to design concrete mixtures.

E. Mockups: Cast mockups of full-size sections of each application of tinted concrete used in the Historic Park to demonstrate typical joints, surface finishes; including DG dusting, board form finish, texture, color, sealant installation, sealer application and standard of workmanship.

1. Build mockups in the location and of the size indicated or, if not indicated, as directed by Owner's Representative.
2. Notify Owner's Representative seven days in advance of dates and times when mockups will be constructed.
3. Obtain approval of mockups from Owner's Representative before starting construction.
4. Maintain approved mockups during construction in an undisturbed condition as a standard for judging the completed pavement.
5. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
6. Preinstallation Conference for Historic Park Concrete Work: Conduct a preinstallation conference at Project site before starting formwork. Record discussions and agreements and furnish a copy to each participant.
   a. Attendees: Representatives of authorities having jurisdiction, Owner, Owner’s Representative, consultants, and other concerned entities. Notify participants at least three working days before convening conference.
   b. Agenda: Review plans and discuss design intent.

F. Formwork Observation: Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed. Notify Owner's Representative 48 hours minimum prior to placing concrete that formwork is in place and ready for observation. Do not proceed with concrete placement prior to obtaining Owner's Representative's approval that formwork meets the lines and grades intended on the Drawings. Concrete placed without the Owner's Representative's approval of formwork shall be removed and replaced at no additional cost to the Owner.

1.5 PROJECT CONDITIONS

A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities. Provide barricades, cones and signs required for driveway closures and detours, as required by the City of San Diego and all agencies having jurisdiction.

PART 2 - PRODUCTS

2.1 FORMS

A. Form Materials: Plywood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight, smooth exposed surfaces. Provide appropriate form liner material to shape the reveal patterns where indicated on the Drawings.

B. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

2.2 STEEL REINFORCEMENT

A. Plain-Steel Welded Wire Fabric: ASTM A 185, fabricated from as-drawn steel wire into flat sheets.

B. Deformed-Steel Welded Wire Reinforcement: ASTM A 497, flat sheet.

C. Reinforcing and Tie Bars: ASTM A 615/A , Grade 60; deformed.

D. Steel Bar Mats: ASTM A 184; with ASTM A 615, Grade 60, deformed bars; assembled with clips.

E. Plain Steel Wire: ASTM A 82, as drawn.

F. Deformed-Steel Wire: ASTM A 496.

G. Joint Dowel Bars: Plain steel bars, ASTM A 615, Grade 60. Cut bars true to length with ends square and free of burrs.

H. Joint Dowel Plates: Steel load plates, ASTM A36, ASTM A615 or A108-03 grade 1018, with high density ABS plastic pocket former. Load plate size: 3/8-inch thick by 4 ½ inches x 4 ½ inches.

I. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars, welded wire reinforcement, and dowels in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete of greater compressive strength than concrete.

J. Slip Dowel Sleeves: Proprietary plastic sleeve consisting of a polypropylene plastic sleeve and a reusable base.

2.3 CONCRETE MATERIALS

A. Cementitious Material: Use one of the following cementitious materials, of the same type, brand, and source throughout the Project:

1. Portland Cement: ASTM C 150, Type I or II, low alkali. Supplement with the following:

a. Fly Ash: ASTM C 618, Class F.
b. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.

B. Normal-Weight Aggregates: ASTM C 33, Class 4M coarse aggregate, uniformly graded. Provide aggregates from a single source.
1. Maximum Coarse-Aggregate Size: Not exceeding 1 inch nominal.
2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement, when tested in accordance with ASTM C 1260.

C. Water: ASTM C 94.

D. Air-Entraining Admixture: ASTM C 260.

E. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material. Use of admixtures shall be approved before use. Do not use calcium chloride or admixtures containing calcium chloride.

1. Water-Reducing Admixture: ASTM C 494, Type A.
2. High-Range, Water-Reducing Admixture: ASTM C 494, Type F.

2.4 RELATED MATERIALS

A. Expansion Joint Filler Strips: Closed-cell polyethylene foam backing, with removable joint cap, for joints wider than 1/4-inch. Comply with ASTM D 3575.

B. Joint Primer: Material recommended by the joint sealant manufacturer where required for adhesion of sealant to joint substrates, as determined from preconstruction joint sealant substrate tests and fields tests. Comply with ASTM C 920, Type S, Grade P, Class 25.

C. Backer Rod: Non-gassing, reticulated closed-cell polyethylene rod designed for use with cold-applied joint sealants where joint depth exceeds manufacturer's recommended depth for joint sealant. Comply with ASTM C 1330, Type C. Size as required for joint design.

D. Joint Sealant: Non priming, single-component, polyurethane sealant. Comply with ASTM C 920, Type S, Grade NS, Class 50. Color to be selected by Owner's Representative from available color palette.

E. Silica Sand: Spherical, round or sub-angular quartz sand, No. 70 mesh, or equal provide a range of colors for selection.

F. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.

G. Curing Compounds for Non-Colored Cement Concrete: Clear, ASTM C 309, non-staining, VOC Compliant.

H. Curing Compounds for Colored Cement Concrete: Clear, Waterborne, Membrane-Forming Curing and Sealing Compound, ASTM C 1315, Type 1, Class A, VOC Compliant, Low Sheen, specifically manufactured for use with colored concrete.

I. Clear Acrylic Sealer: Manufacturer's standard waterborne, membrane-forming, medium to low-gloss, acrylic copolymer emulsion solution, specifically manufactured for colored concrete, containing not less than 15 percent solids by volume, non-yellowing, VOC Compliant and UV resistant.

2.5 COLOR MATERIALS

A. Color Pigment for use in all exposed concrete in Historic Park: ASTM C 979, colored water-reducing admixtures; color stable, free of carbon black, nonfading, and resistant to lime and other alkalis.
   1. Manufacturer: Davis Colors or approved equal.
   2. Color: San Diego Buff, No. 5237.

2.6 CONCRETE MIXTURES

A. Prepare design mixtures, proportioned according to ACI 301, for each type and strength of normal-weight concrete determined by either laboratory trial mixes or field experience.

   1. Use a qualified independent testing agency for preparing and reporting proposed concrete mixture designs for the trial batch method.

B. Proportion mixtures to provide normal-weight concrete with the following properties:

1. Compressive Strength (28 Days): 3500 psi.
2. Maximum Water-Cementitious Materials Ratio at Point of Placement: 0.45
3. Slump Limit: 4 to 4-1/2 inches without Water-Reducing Admixtures; 5 inches with Water-Reducing Admixtures.

    a. Slump Limit for Concrete Containing High-Range Water-Reducing Admixture: When a high-range water-reducing admixture is used, the maximum limit may be increased an additional 2 inches.

C. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having an air content of 4 to 6 percent.

D. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.

E. Chemical Admixtures: Use admixtures according to manufacturer's written instructions.

1. Use water-reducing admixture and/or high-range, water-reducing admixture in concrete, as required, for placement and workability.
2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.

F. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement according to ACI 301 requirements as follows:

1. Fly Ash or Pozzolans: 20 percent.
2. Ground Granulated Blast-Furnace Slag: 50 percent.

G. Integral Color Admixture: Add colored water-reducing admixture to Historic Park concrete mixture according to manufacturer's written instructions and to result in hardened concrete color consistent with approved mockup.

2.7 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, and mix concrete materials and concrete according to ASTM C 94. Furnish batch certificates for each batch discharged and used in the Work.

1. When air temperature is between 85 and 90 degrees Fahrenheit reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 degrees Fahrenheit, reduce mixing and delivery time to 60 minutes.

B. Project-Site Mixing: Comply with requirements and measure, batch, and mix concrete materials and concrete according to ASTM C 94. Mix concrete materials in appropriate drum-type batch machine mixer.

1. For concrete mixes of 1 cubic yard or smaller, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released.
2. For concrete mixes larger than 1 cubic yard, increase mixing time by 15 seconds for each additional 1 cubic yard.

C. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mixture type, mixing time, quantity, and amount of water added.

D. Integral Colored Concrete Admixture for Historic Park Concrete: Add coloring agent to mix according to manufacturer's written instructions.
1. Color admixture may not exceed 10 percent of the concrete design mix.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine exposed subgrades and subbase surfaces for compliance with requirements for dimensional, grading, and elevation tolerances.

B. Proceed with concrete placement operations only after nonconforming conditions have been corrected.

3.2 PREPARATION

A. Proof-roll prepared subbase surface to check for unstable areas and verify need for additional compaction. Proceed with pavement only after nonconforming conditions have been corrected and subgrade is ready to receive pavement.

B. Remove loose material from compacted subbase surface immediately before placing concrete.

3.3 EDGE FORMS AND SCREED CONSTRUCTION

A. Formwork: Design, construct, erect, shore, brace, and maintain formwork according to ACI 301.

B. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides for pavement to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.

C. Clean forms after each use and coat with form-release agent to ensure separation from concrete without damage.

3.4 STEEL REINFORCEMENT

A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.

B. Clean reinforcement of loose rust and mill scale, earth, ice, or other bond-reducing materials.

C. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement. Maintain minimum cover to reinforcement.

D. Install fabricated bar mats in lengths as long as practicable. Handle units to keep them flat and free of distortions. Straighten bends, kinks, and other irregularities, or replace units as required before placement. Set mats for a minimum 2-inch overlap of adjacent mats.

3.5 JOINTS

A. General: Form construction, isolation, and contraction joints and tool edgings true to line with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline, unless otherwise indicated.

B. Construction Joints: Set construction joints at side and end terminations of pavement and at locations where pavement operations are stopped for more than 1/2-hour unless pavement terminates at isolation joints.

1. Doweled Construction Joints: Install dowel plates at construction joints/cold joints in concrete paving. Install pocket former and dowel plate per manufacturer’s printed instructions. Use templates for locating pocket former at the correct position for specified concrete thickness.

2. Continue steel reinforcement across construction joints, unless otherwise indicated.
3. Butt Joints: Use bonding agent at joint locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
4. Doweled Joints: Install dowel bars where new concrete paving meets existing concrete paving unless indicated otherwise. Drill and epoxy one-half of bar into existing paving. Lubricate, asphalt-coat, or provide proprietary plastic sleeve per manufacturer’s directions, on the half of dowel length embedded in new concrete to prevent concrete bonding to that side of joint.

C. Isolation Joints: Form isolation (expansion) joints of preformed joint-filler strips abutting building slabs, walls, catch basins, manholes, inlets, light pole bases, structures, walks, other fixed objects, and where indicated on the Drawings.

1. Doweled Isolation Joints: Install dowel plates and support assemblies at isolation joints in concrete paving as indicated on the Drawings. Provide proprietary plastic pocket former per manufacturer’s directions, on one-half of dowel length to prevent concrete bonding to one side of joint.
2. Locate isolation joints at intervals of 30 feet maximum, unless otherwise indicated on the Drawings.

3. Extend joint fillers full width and depth of joint.
4. Terminate joint filler flush with top of paving for joint fillers having removable joint cap. Terminate joint filler 1/2 joint width below top of paving for joint fillers without removable joint cap.
5. Furnish joint fillers in one-piece lengths. Where more than one length is required, lace or clip joint-filler sections together.
6. Protect top edge of joint filler during concrete placement with metal, plastic, or other temporary preformed cap. Remove protective cap after concrete has been placed on both sides of joint.
7. Allow concrete to cure minimum of 28 days.
8. Remove joint filler cap; clean and prime concrete surfaces to receive sealant per manufacturer's recommendations.
9. If joint filler depth from top of paving exceeds 3/8 inch, install backer rod prior to installing joint sealant. Backer rod to be 25 percent wider than joint width. Sealant depth to be 1/2 width of joint, not to exceed 3/8 inch, whichever is smaller. Install backer rod and sealant per manufacturer's recommendations.
10. Fill void with sealant to match concrete color unless indicated otherwise, and top with silica sand while still wet.
11. Protect sealant from pedestrian and vehicular traffic until cured.
12. Clean excess sealant from paved surfaces.

D. Contraction Joints: Form weakened-plane contraction joints, sectioning concrete into areas as indicated on the Drawings. Construct contraction joints for a depth equal to at least 1/4 of the concrete thickness, at intervals of 10 feet maximum, unless otherwise indicated on the Drawings, and as follows:

1. Score Joints: Form score joints after initial floating by grooving and finishing each edge of joint with grooving tool to a 1/4 inch radius. Repeat grooving of score joints after applying surface finishes. Eliminate groover marks on concrete surfaces. Remove "shiner" bands where concrete surface will be exposed.

E. Joints in Curbs and Gutters: Space contraction joints in curbs and gutters at maximum 10-foot intervals with isolation joints at maximum 30-foot intervals or as shown on the Drawings. Isolation joints shall be struck vertically and full depth. Align joints in concrete curbs with joints in finish paving.

F. Edging: Tool exposed edges of ramps and joints in concrete after initial floating with an edging tool to a 1/2 inch radius. Tool edges of concrete paving to a 1/4 inch radius where adjacent to other paving. Repeat tooling of edges after applying surface finishes. Eliminate tool marks on concrete surfaces. No "shiner" bands.

3.6 CONCRETE PLACEMENT

A. Inspection: Before placing concrete, inspect and complete formwork installation, steel reinforcement, and items to be embedded or cast in. Notify other trades to permit installation of their work.

B. No concrete shall be placed or finished in the rain. It shall be the Contractor's responsibility to schedule his operations such that concrete will not be placed or finished in the rain.

C. Remove snow, ice, or frost from subbase surface and reinforcement before placing concrete. Do not place concrete on frozen surfaces.

D. Moisten subbase to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.

E. Comply with ACI 301 requirements for measuring, mixing, transporting, and placing concrete.

F. Do not add water to concrete during delivery, at Project site, or during placement.

G. Do not add water to fresh concrete after testing.

H. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.

I. Consolidate concrete according to ACI 301 by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping.

1. Consolidate concrete along face of forms and adjacent to transverse joints with an internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Use only square-faced shovels for hand spreading and consolidation. Consolidate with care to prevent dislocating reinforcement, dowels, and joint devices.

J. Place concrete pavement in two operations; strike off initial pour for entire width of placement and to the required depth below finish surface. Lay welded wire fabric or fabricated bar mats immediately in final position. Place top layer of concrete, strike off, and screed.

1. Remove and replace concrete that has been placed for more than 15 minutes without being covered by top layer, or use bonding agent if approved by Owner's Representative.

K. Screed pavement surfaces with a straightedge and strike off. Commence initial floating using bull floats or darbies to impart an open textured and uniform surface plane before excess moisture or bleed water appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading surface treatments.

L. When adjoining concrete pavements are placed in separate pours, do not operate equipment on concrete until pavement has attained 85 percent of its 28-day compressive strength.

M. Cold-Weather Placement: Comply with ACI 306R-10 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

1. When air temperature has fallen to or is expected to fall below 40 degrees Fahrenheit, uniformly heat water and aggregates before mixing to

obtain a concrete mixture temperature of not less than 50 degrees Fahrenheit and not more than 80 degrees Fahrenheit at point of placement.
2. Do not use frozen materials or materials containing ice or snow.
3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mix designs.

N. Hot-Weather Placement: Comply with ACI 305R-10 and as follows when hot-weather conditions exist:

1. Cool ingredients before mixing to maintain concrete temperature below 90 degrees Fahrenheit at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
2. Cover steel reinforcement with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
3. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

3.7 CONCRETE FINISHING

A. General: Wetting of concrete surfaces during screeding, initial floating, or finishing operations is prohibited.

B. Float Finish: Begin the second floating operation when bleed-water sheen has disappeared and the concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats, or by hand floating if area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots, and fill low spots. Refloat surface immediately to uniform granular texture.

C. Concrete Finish: After final floating, apply a hand-trowel finish followed by the broom finish below to concrete unless indicated otherwise on the Drawings.
1. Medium Textured Broom Finish: Draw a medium stiff bristle broom across float-finished concrete surface perpendicular to line of traffic to provide a uniform, medium-line texture perpendicular to line of traffic.

3.8 INTEGRALLY COLORED CONCRETE FINISHES (for use in Historic Park)

A. Mow Strips: Apply Decomposed Granite Dusting to the top of mow strips in the Historic Park, finish to match approved mock up sample.

B. Planter Plinths: provide a 4” wide board formed finish.

C. Curbing and Fountain Basin: Trowel Finish.

D. Mountable Curb and Walking Surfaces: Medium to Fine textured Broom Finish.

3.9 CONCRETE PROTECTION AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

B. Comply with ACI 306R-10 for cold-weather protection; and ACI 305R-10 for hot-weather protection.

C. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq.-ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

D. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.

E. Curing Methods: Cure concrete by moisture curing, moisture-retaining-cover curing, curing compound, or a combination of these as follows:

1. Moist Curing: Keep surfaces continuously moist for not less than seven days with the following materials:

   a. Water.
   b. Continuous water-fog spray.
   c. Absorptive cover, water saturated and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.

2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

3. Curing Compound: Apply curing compound immediately after final finishing . Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas that have been subjected to heavy rainfall within three hours after application. Maintain continuity of coating and repair damage during curing period.

   a. Cure integrally colored concrete with a low sheen, clear, curing compound approved for use on colored concrete.

3.10 SEALER

A. Clear Acrylic Sealer: Apply uniformly in two coats in continuous operations according to manufacturer's written instructions. Allow first coat to dry before applying second coat, at 90-degrees to the direction of the first coat using same application methods and rates.

1. Begin sealing dry surface no sooner than 21 days after concrete placement.

3.11 PAVEMENT TOLERANCES

A. Comply with tolerances of ACI 117 for ramps as follows:

1. Elevation: 1/4 inch.
2. Thickness: Plus 3/8 inch, minus 1/4 inch.
3. Surface: Gap below 10-foot long, unleveled straightedge not to exceed 1/4 inch.
4. Lateral Alignment and Spacing of Tie Bars and Dowels: 1 inch.
5. Vertical Alignment of Tie Bars and Dowels: 1/4 inch.
6. Alignment of Tie-Bar End Relative to Line Perpendicular to Pavement Edge: 1/2 inch.
7. Alignment of Dowel-Bar End Relative to Line Perpendicular to Pavement Edge: Length of dowel 1/4 inch per 12 inches.
8. Joint Spacing: 3 inches.
9. Contraction Joint Depth: Plus 1/4 inch, no minus.
10. Joint Width: Plus 1/8 inch, no minus.

3.12 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Testing Services: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:

1. Testing Frequency: Obtain at least 1 composite sample for each 100 cu. yd. or fraction thereof of each concrete mix placed each day.

    a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.

2. Slump: ASTM C 143; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mix. Perform additional tests when concrete consistency appears to change.
3. Air Content: ASTM C 231, pressure method; one test for each composite sample, but not less than one test for each day's pour of each concrete mix.
4. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 degrees Fahrenheit and below and when 80 degrees Fahrenheit and above, and one test for each composite sample.
5. Compression Test Specimens: ASTM C 31; cast and laboratory cure one set of three standard cylinder specimens for each composite sample.
6. Compressive-Strength Tests: ASTM C 39; test 1 specimen at 7 days and 2 specimens at 28 days.

    a. A compressive-strength test shall be the average compressive strength from 2 specimens obtained from same composite sample and tested at 28 days.

C. Strength of each concrete mix will be satisfactory if average of any 3 consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.

D. Test results shall be reported in writing to Owner's Representative, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7-day and 28-day tests.

E. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Owner's Representative but will not be used as sole basis for approval or rejection of concrete.

F. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Owner's Representative.

G. Remove and replace concrete where test results indicate that it does not comply with specified requirements at no additional cost to the Owner.

H. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements at no additional cost to the Owner.

3.13 REPAIRS AND PROTECTION

A. Remove and replace concrete that is broken, damaged, or defective or that does not comply with requirements in this Section at no additional cost to the Owner.

B. Drill test cores, where directed by Owner's Representative, when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory concrete areas with portland cement concrete bonded with epoxy adhesive.

C. Protect concrete from damage. Exclude traffic from pavement for at least 14 days after placement. When construction traffic is permitted, maintain pavement as clean as possible by removing surface stains and spillage of materials as they occur.

D. Maintain concrete pavement free of stains, discoloration, dirt, and other foreign material. Sweep concrete pavement not more than two days before date scheduled for Substantial Completion inspections.

3.14 CLEANING

A. Remove all excess material, debris, and equipment from site upon completion of work in this Section. Keep work area clean and in an orderly condition during the course of the Work.

B. Do not dispose of waste concrete or wash out materials on the site unless otherwise directed by the Owner's Representative. Areas to be paved may be acceptable for concrete truck wash areas only as approved by the Owner's Representative.

END OF SECTION 32 1313

SECTION 32 1400 - UNIT PAVING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Tactile Warning Tiles.
2. Terracotta unit pavers set in mortar setting bed.

B. Related Sections include the following:

1. Drawings and General Provisions of the Contract, including Part 1- "General Provisions" of the Greenbook and Whitebook apply to this Section.
2. Division 31 Section "Earthwork" for preparing subgrades and base course under unit pavers.
3. Division 3 Section "Cast-in-Place Concrete" for concrete bases under unit pavers.
4. Division 32 Section "Concrete Paving" for cast-in-place concrete curbs and bands serving as edge restraints for unit pavers.
5. Division 32 Section "Stone Paving" for stone paving.
6. Division 07 Section "Joint Sealants" for Quality Assurance procedures for sealants used with Unit Paving.
7. Greenbook/Whitebook Sections 201 "Concrete, Mortar and Related Materials" and 303 "Concrete and Masonry Construction" for curb ramps.

1.2 SUBMITTALS

A. Product Data: For the following:

1. Tactile Warning Tiles.
2. Historic Park Pavers.
3. Expansion joints, all components.
4. Paver sealer.
5. Epoxy Adhesive.

B. Samples for Verification:

1. Submit three product samples of full-size units of each type of unit paver indicated in sets for each color, texture, and pattern specified, showing the full range of variations expected in these characteristics.
2. Grout Samples for Initial Selection: Submit manufacturer's color charts showing the full range of colors for selection by Owner's Representative.
3. Joint Sealant Samples for Initial Selection: Submit Manufacturer's full range of colors for selection by Owner's Representative.

4. Grout Samples for Verification: Submit three 4 inch long product samples of the colored grout selected by Owner's Representative installed between unit pavers or as required to show the full range of colors to be expected in the finish work.
5. Joint Sealant Sample for Verification: Submit three 4 inch long product samples of the colored grout selected by Owner's Representative installed between unit pavers or as required to show the full range of colors to be expected in the finish work.
6. Expansion Joint Filler Material: Submit one 12 inch length.
7. Backer Rod Material: Submit one 12 inch length.

C. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

D. Compatibility and Adhesion Test Reports: From latex-additive manufacturer indicating the following:

1. Mortar and grout containing latex additives have been tested with pavers for compatibility and adhesion.
2. Interpretation of test results relative to mortar and grout performance and written recommendations for installation practices needed for adhesion.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer with at least 5 years experience, who has successfully completed a minimum of 10 unit paver installations similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

B. Source Limitations: Obtain each type of unit paver, joint material, and setting material from one source with resources to provide materials and products of consistent quality in appearance and physical properties.

C. Pre-construction Coordination: Review installation procedures and coordinate paving work with other work affected by the unit paving work. Prior to beginning construction, coordinate critical dimensions of pavers with flatwork, so that there is minimal paver cutting required. Field verify that layout shown on Drawings coincides with paver critical dimensions by constructing mockup as described below. Submit evidence to Owner's Representative that this coordination work has been completed.

D. Mockups: Before installing unit pavers, build mockups for each form and pattern of unit pavers required to verify selections made under sample submittals and to demonstrate aesthetic effects and qualities of materials and execution. Build mockups to comply with the following requirements, using materials indicated for the completed Work, including same base construction, edging, special features for expansion joints, and contiguous work as indicated:

1. Build mockups of the Historic Park Pavers in the location as directed by Owner's Representative and of approximately 4 by 4 foot size with all joint types in place including one expansion joint.

2. Build mockups in advance of concrete forms being laid out or constructed, so that the critical dimensions of the unit paving work may be coordinated with the surrounding flatwork.
3. Notify Owner's Representative seven days in advance of dates and times when mockups will be constructed.
4. Demonstrate the proposed range of aesthetic effects and workmanship.
5. Obtain Owner's Representative approval of mockups before starting unit paver installation.
6. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
7. Demolish and remove mock-ups when directed.
8. For materials failing tests, obtain mortar and grout manufacturer's written instructions for corrective measures, including the use of alternative materials to obtain optimum bond and prevent staining.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Protect unit pavers and aggregate during storage and construction against soiling or contamination from earth and other materials.

1. Cover pavers with plastic or use other packaging materials that will prevent rust marks from steel strapping.

B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

C. Store liquids in tightly closed containers protected from freezing.

1.5 PROJECT CONDITIONS

A. Cold-Weather Protection: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen subgrade or setting beds. Remove and replace unit paver work damaged by frost or freezing.

B. Weather Limitations for Mortar and Grout: Comply with the following requirements:

1. Cold-Weather Requirements: Protect unit paver work against freezing when atmospheric temperature is 40 degrees Fahrenheit and falling. Heat materials to provide mortar and grout temperatures between 40 and 120 degrees Fahrenheit. Provide the following protection for completed portions of work for 24 hours after installation when the mean daily air temperature is as indicated: below 40 degrees Fahrenheit, cover with weather-resistant membrane; below 25 degrees Fahrenheit, cover with insulating blankets; below 20 degrees Fahrenheit, provide enclosure and temporary heat to maintain temperature above 32 degrees Fahrenheit.
2. Hot-Weather Requirements: Protect unit paver work when temperature and humidity conditions produce excessive evaporation of setting beds and grout. Provide artificial shade and windbreaks and use cooled materials as required. Do

not apply mortar to substrates with temperatures of 100 degrees Fahrenheit and higher.

a. When ambient temperature exceeds 100 or 90 degrees Fahrenheit with a wind velocity greater than 8 mph, set pavers within 1 minute of spreading setting-bed mortar.

PART 2 - PRODUCTS

2.1 PAVERS

A. Tactile Warning Paving:

1. Detectable Warning Tile: City of San Diego Standard.

a. Manufacturer: Advantage Tactile Systems, Buffalo, NY, or approved equal.
b. Product: Stainless Steel Cast in Place Detectable Warning Surface Tiles
c. Size: 12 inches x 12 inches
d. Color: Yellow

2.2 UNIT PAVERS

A. Historic Park Pavers:

1. Pavers with chips and cracks will not be acceptable. Color and natural imperfections allowable shall not exceed the approved sample.

2. Paver Product Information: Provide the following product or approved equal.
a. Manufacturer: Western Quarry
b. Style: Monrovia
c. Size: Custom 7 ¾” square , minimum 5/8” thickness.
d. Color: 2/2011 Light Malibu Red.

B. Temporary Protective Coating: Precoat exposed surfaces of pavers with a continuous film of a temporary protective coating that is compatible with the paver material, mortar, and grout products and can be removed without damaging grout and the paver surface. Do not coat unexposed paver and concrete surfaces.

2.3 ACCESSORIES

A. Job-Built Concrete Edge Restraints: Comply with requirements in Division 3 Section "Concrete Paving " for normal-weight, air-entrained, ready-mixed concrete requirements , and indicated in the Drawings.

B. Expansion Joint Material: Closed-cell polyethylene joint filler designed for use in cold joints, construction joints, or isolation joints wider than 1/4 inch. Comply with ASTM D 1056, Grade 2A1.

C. Backer Rod: Non-gassing, reticulated closed-cell polyethylene rod designed for use with cold-applied joint sealants. Comply with ASTM C 1330. Size as required for joint design.

D. Joint Sealant: Two component, self-leveling, slope-grade elastomeric polyurethane sealant for horizontal joints with plus or minus 25 percent movement capability. Comply with ASTM C 920, Type M, Grade P, Class 25; FS TT-S-00227E, Type I, Class A. Color to be selected by Owner's Representative from full color palette.

E. Sealant Primer: Material recommended by the joint sealant manufacturer where required for adhesion of sealant to joint substrates, as determined from preconstruction joint sealant substrate tests and fields tests.

F. Joint Cleaner: Non-corrosive and non-staining type recommended by sealant manufacturer and compatible with joint forming materials.

G. Bond Breaker: 15 pound asphalt impregnated felt.

1. Comply with ASTM D266-97A.
2. Cut into 9 inch wide strips.
3. Install centered over expansion joints and contraction joints in concrete slab.

H. Welded Wire Fabric Sheets: Hot-dip galvanized, welded, 12 gauge diameter wire; 2-by-2-inch mesh; comply with ASTM A 123, ASTM A 185 and ASTM A 82 except for minimum wire size.

I. Epoxy Adhesive for attachment of pavers to Utility Access Hatches: ASTM C 881, two-component material suitable for use on dry or damp surfaces. Provide material "Type," "Grade," and "Class" to suit project requirements.

2.4 PAVER SEALER

1. A silane/siloxane water-borne emulsion, VOC compliant, colorless, non-yellowing, non-glossy, penetrating sealer for use on the specified type of pavers.

2.5 MORTAR SETTING-BED MATERIALS

A. Portland Cement: ASTM C 150, Type I or II.

B. Sand: ASTM C 144.

C. Latex Additive: Acrylic-resin or styrene-butadiene-rubber water emulsion serving as replacement for part or all of gauging water, of type specifically recommended by latex additive manufacturer for use with field-mixed portland mortar bed, and not containing a retarder. Weather, frost, shock resistant complying with ANSI A118.4.

D. Water: Potable.

2.6 GROUT MATERIALS

A. Sand-Portland Cement Grout: ANSI A108.10, composed of white or gray cement, unfading mineral pigments and white or colored sand as required to produce required color.

1. Latex Additive: Manufacturer's standard acrylic-resin or styrene-butadiene-rubber water emulsion, serving as replacement for part or all of gaging water, of type specifically recommended by latex-additive manufacturer for use with field-mixed sand-portland cement grout.

B. Grout Color: As selected by Architect from manufacturer's full range.

1. Custom Building Products" Haystack", No 380

2. MAPEI Corporation –Tel 1-888-876-2734 www.mapei.com

3. TEC Products – Emser International Tel 858-455-6390 www.tecspecialty.com

2.7 MORTAR AND GROUT MIXES

A. General: Comply with referenced standards and with manufacturer's written instructions for mix proportions, mixing equipment, mixer speeds, mixing containers, mixing times, and other procedures needed to produce setting-bed and joint materials of uniform quality and with optimum performance characteristics. Discard mortars when they have reached their initial set.

B. Mortar-Bed Bond Coat: Mix neat cement or cement and sand with water to a creamy consistency.

1. For latex-modified portland cement setting-bed mortar, substitute latex admixture for part or all of water per directions of latex-additive manufacturer.

C. Latex-Modified, Portland Cement Setting-Bed Mortar (Thin-set): One-step, high strength, polymer fortified thin set mortar for exterior installation. Weather, frost, shock resistant complying with ANSI 118.4 and ANSI 118.11.

D. Latex-Modified Portland Cement Slurry Bond Coat: One-step, high strength, polymer fortified mortar for exterior installation. Weather, frost, shock resistant complying with ANSI 118.11.

E. Latex-Modified Portland Cement Grout: Sanded grout mixed with a polymer fortified admixture for exterior use. Stain resistant and color consistent. Proportion of sanded grout to admixture to comply with written instructions of latex-additive manufacturer. Complying with ANSI A118.6.

1. Pigmented Grout: Select and proportion pigments with other ingredients to produce color required. Do not exceed pigment-to-cement ratio of 1:10, by weight.
2. Colored-Aggregate Grout: Produce color required by combining colored sand with portland cement of selected color.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas indicated to receive paving, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.

1. Proceed with installation only after unsatisfactory conditions have been corrected.

B. Verify that concrete base is sloped for drainage and is free of standing water, dust, oil, grease, paint, wax, curing compounds, primer, sealers, form release agents, or any deleterious substances and debris which may prevent or reduce bonding. Conduct moisture tests to verify that concrete surfaces are completely cured, free from hydrostatic pressure and having a moisture content of less than 5 percent.

C. Verify that grout materials can be cleaned from pavers, or provide coating to pavers to facilitate removal of grout materials.

3.2 PREPARATION

A. Remove substances, from concrete substrates, that could impair mortar bond, including curing and sealing compounds, form oil, and laitance.

B. Clean concrete substrates to remove dirt, dust, debris, and loose particles. This may require mechanical grinding and scarifying of the surface.

C. Neutralize any trace of strong acid or alkali from the substrate prior to mortar application.

D. Remove substances, protrusions and fins from concrete acting as edge restraints that could impair tight joints.

3.3 INSTALLATION, GENERAL

A. Do not use unit pavers with chips, cracks, and voids, which exceed the tolerances listed under Part 2 - Products. Do not use unit pavers outside the approved color range or unit pavers with discolorations and other defects that might be visible or cause staining in finished work. Perform work in accordance with Tile Council of America (TCA) 101-07, if a discrepancy exists, this Unit Paver specification shall take precedence.

B. Pavers shall be clean and free of foreign materials prior to installation. Clean mortar-set pavers of laitance.

C. Mix pavers from several pallets or cubes, as they are placed, to produce uniform blend of colors and textures.

D. Cut unit pavers with motor-driven masonry saw equipment to provide clean, sharp, unchipped edges. Cut units to provide pattern indicated and to fit adjoining work neatly. Use full units without cutting where possible. Where cutting is required, use the largest size unit possible. Avoid the use of pieces smaller than 3 inches, or joint spaces greater than 7/16 inch.
   1. Block splitter may be not used. Hammer cutting is not acceptable.

E. Exercise care in handling coated pavers to prevent coated surfaces from contacting backs or edges of other units. Remove coating from bonding surfaces before setting pavers.

F. Joint Pattern: As indicated on Drawings. Path widths to be composed of whole, uncut pavers unless otherwise indicated. Pavers are to be cut to fit at intersections and when abutting walls and thresholds.

G. Tolerances: do not exceed 1/16 inch unit-to-unit offset from flush (lippage) or 1/8 inch in 10 feet from level, or indicated slope, for finished surface of paving.

H. Expansion and Control Joints: Provide for sealant-filled joints at locations and of widths indicated. Provide joint filler and backer rod for sealant-filled joints where indicated. Install joint filler before setting pavers.

3.4 MORTAR SETTING-BED APPLICATIONS

A. Saturate concrete subbase with clean water several hours before placing setting bed. Remove surface water about one hour before placing setting bed.

B. Apply cement-paste bond coat over surface of concrete subbase about 15 minutes before placing setting bed. Limit area of bond coat to avoid its drying out before placing setting bed. Do not exceed 1/16-inch thickness for bond coat.

C. Place reinforcing wire over concrete base, lapped at joints by at least one full mesh and supported so mesh becomes embedded in the middle of setting bed. Spread and screed setting bed to uniform thickness at subgrade elevations required for accurate setting of pavers to finished grades indicated. Hold edges of mesh back from vertical surfaces approximately 1/2 inch. Cut fabric at expansion joints.

D. Mix and place only that amount of mortar bed that can be covered with pavers before initial set. Cut back, bevel edge, remove, and discard setting-bed material that has reached initial set before placing pavers.

E. Wet pavers before laying if the initial rate of absorption exceeds 30 g/30 sq. in. per minute when tested per ASTM C 67. Allow units to absorb water so they are damp but not wet at time of laying.

F. Place pavers before initial set of cement occurs. Immediately before placing pavers on setting bed, apply uniform 1/16-inch-thick, slurry bond coat to bed and to back of each paver with a flat trowel.

G. Tamp or beat pavers with a wooden block or rubber mallet to obtain full contact with setting bed and to bring finished surfaces within indicated tolerances. Set each paver in a

single operation before initial set of mortar; do not return to areas already set and disturb pavers for purposes of realigning finished surfaces or adjusting joints.

H. Spaced Joint Widths: 7/8 inch joints unless indicated otherwise, with variations not exceeding plus or minus 1/16 inch.

I. Grout joints as soon as possible after initial set of setting bed.
   1. For concrete pavers with grouted joints, apply paver sealer to the top surface of pavers, avoiding any application of sealer into joints to be grouted. Allow sealer to dry completely before grouting joints.
   2. Force grout into joints, taking care not to smear grout on adjoining surfaces.
   3. Clean pavers as grouting progresses by dry brushing or rubbing with dry burlap to remove smears before tooling joints.
   4. Tool exposed joints slightly concave, or as directed by Owner's Representative, when thumbprint hard, using a jointer larger than joint thickness, unless otherwise indicated.
   5. If tooling squeezes grout from joints, remove excess grout and smears by dry brushing or rubbing with dry burlap and tool joints again to produce a uniform appearance.

J. Cure grout by maintaining in a damp condition for seven days, unless otherwise recommended by grout or liquid-latex manufacturer.

3.5 ADA DETECTABLE WARNING TILE INSTALLATION

A. Follow manufacturer's printed instruction for installation of tiles. The factory-installed sheeting must remain in place during the entire installation process.

B. Place and finish the concrete true to line and grade prior to the tile placement. Place the tile true and square to the curb edge as indicated.

C. Individual tiles may be bolted together using 1/4-inch hardware to ensure that adjacent tiles are flush to each other during the installation process. Tape or caulk underside of bolted butt joint to prevent concrete from rising between adjacent tiles during installation.

D. When preparing to set the tile, do not remove freshly placed concrete in the area to accept the tile. Set the tile directly into freshly placed concrete.

E. Ensure that the tile is flush with adjacent concrete surfaces and true to line and grade indicated.

F. Provide a 3/8 inch radius edge around the perimeter concrete where it meets the tile.

G. After the concrete has cured, remove the protective plastic wrap completely from the tile.

3.6 REPAIRING, POINTING, AND CLEANING

A. Remove and replace unit pavers that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units (color, spacing and elevation) as intended at

no additional cost to the Owner. Provide new units to match adjoining units and install in same manner as original units, with same joint treatment and with no evidence of replacement at no additional cost to the Owner.

B. Pointing: During tooling of joints, enlarge voids or holes and completely fill with grout. Point up joints at sealant joints to provide a neat, uniform appearance, properly prepared for sealant application.

C. Cleaning: Remove excess grout from exposed paver surfaces; wash and scrub clean per manufacturer's written instructions.

3.7 PAVER AND JOINT SEALER

A. After pavers are thoroughly cleaned and expansion joint backer rod and sealant has been installed, apply paver sealer to the tops of pavers and grout joints.
   1. Allow pavers to air dry completely after cleaning, prior to sealing.
   2. Test seal one paver for compatibility with sealer and for approval by Owner's Representative.
   3. Upon approval by Owner's Representative, seal concrete pavers with concrete sealer per manufacturer's written instructions.
   4. After sealer is applied, protect area from traffic for 24 hours.

END OF SECTION 32 1400

SECTION 32 1440 – STONE PAVING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Stone pavers set in mortar setting bed.
2. Stone at seating terraces set in mortar setting bed.
3. Stone at stairs set in mortar bed.

B. Related Sections include the following:
1. Drawings and general provisions of the Contract, including Part 1- “General Provisions” of the Greenbook and Whitebook apply to this Section.
2. Division 32 Section “Concrete Paving” for joint types, expansion joint filler, backer rod and joint sealant.
3. Division 03 Section "Cast in Place Concrete" for concrete slabs under stone pavers.
4. Division 04 Section “Adhered Stone Veneer” for mortared stone wall cladding.
5. Division 04 Section “Exterior Stone Cladding” for stone panels mechanically anchored to concrete substrate.
6. Division 07 Section “Joint Sealants” for sealants, compatibility and adhesion testing and procedures for their use with stone paving.

1.2 SUBMITTALS

A. Product Data: For the following:

1. Stone pavers.
2. Stone at seating terraces.
3. Stone at stairs.
4. Mortar materials.
5. Grout materials.
6. Expansion Joint Material including backer rod and sealant.
7. Sealer.
8. Epoxy Adhesive

B. Samples for Verification: The following stone shall be submitted to show the color, texture, and pattern specified, showing the full range of variations expected in the completed work for pavers, risers, treads and seat terraces.
1. A minimum of three (3) for each stone type specified.
    a. Paver samples shall be 12 inches x 12 inches in size. Submit one sample showing each finish type. Apply the specified sealer to one half of each sample.
    b. Riser samples shall be a minimum of 5 inches in length and full scale height and depth and shall include warning grooves with a range of light gray to black lithichrome paint.
    c. Tread samples shall be 12 inches x 12 inches in size.

C. Coefficient of Friction Test Reports: Provide test reports for each specified stone type and finish to be used for paving in pedestrian and vehicular areas of the site, for stair treads and risers and for seat terrace seating surfaces and risers. All finishes must meet a minimum .8 Coefficient of Friction in areas which may be wet at any time.

D. Shop Drawings: **Provide all shop drawings in English and with all dimensioning in Standard (not metric) units of measurement.** Indicate fabrication and installation details for stone including layout, dimensions, thicknesses, jointing, anchors, and connections with other work.

E. Grout Samples for Initial Selection: Submit manufacturer's color charts showing the full range of colors for selection by the Architect.

F. Grout Samples for Verification: Submit three (3) four inch long product samples of the colored grout selected by Architect installed between stone pavers or as required to show the full range of colors to be expected in the finish work.

G. Compatibility and Adhesion Test Reports: From latex-additive manufacturer indicating the following:

1. Mortar and grout containing latex additives have been tested with pavers and slabs for compatibility and adhesion.
2. Interpretation of test results relative to mortar and grout performance and written recommendations for installation practices needed for adhesion.

H. Certification: Submit a letter of certification from the stone fabricator, stating the material being furnished is the specified material and there are sufficient reserves available to supply the project and furnish replacements as needed.

1. Provide track record for stone including quarry name and location.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer with a minimum of 12 years successful in-service performance. The installer shall have completed a minimum of 10 stone paving installations similar in material, design, and extent to that indicated for this Project and whose work has resulted in a construction record of successful in-service performance. Past work must include a minimum of three (3) projects with stone in a water feature setting.

B. Source Limitations: Obtain each type of stone paver, joint material, and setting material from one source with resources to provide materials and products of consistent quality in appearance and physical properties.

C. Preconstruction Compatibility and Adhesion Testing: Submit to latex-additive manufacturer, for testing indicated below, samples of paving materials that will contact or affect mortar and grout that contain latex additives.

1. Use manufacturer's standard test methods to determine whether mortar and grout materials are required to obtain optimum adhesion with, and will be nonstaining to installed pavers and other materials constituting paver installation.

2. Submit a sufficient number of pavers and other materials involved in installation to allow comprehensive testing.
3. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
4. For materials failing tests, obtain mortar and grout manufacturer's written instructions for corrective measures, including the use of alternative materials to obtain optimum bond and prevent staining.

D. Mockups: Before installing stone, build mockups of the size indicated below, on the project site, for each form and pattern of stone pavers, stone stairs, and seating terrace to verify selections made under sample submittals and to demonstrate aesthetic effects and qualities of materials and execution. Build mockups to comply with the following requirements, using materials indicated for the completed Work, including same base construction, special features for expansion joints, grouted joints with colored grout, sealer application and contiguous work as indicated.

1. Provide mockups in a location as directed by Owner's Representative for each of the following:
   a. Construct a 12 foot x 12 foot mockup of the Fine Grain paving pattern.
   b. Construct a 24 foot x 24 foot mockup of the Course Grain paving pattern.
   c. Construct a six (6) foot length of the stone seating terrace including a minimum of two (2) risers and two (2) seating surfaces. Include warning groove detail.
   d. Construct a six (6) foot length of a stone stair including a minimum of two (2) risers and two (2) treads. Include warning groove detail.
2. Notify Owner's Representative seven days in advance of dates and times when mockups will be constructed.
3. Demonstrate the proposed range of aesthetic effects and workmanship.
4. Obtain Owner's Representative approval of mockups before starting stone paving installation.
5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
6. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Protect all stone and aggregate during storage and construction against soiling or contamination from earth and other materials.

1. Cover stone with plastic or use other packaging materials that will prevent rust marks from steel strapping.

B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

1.5 PROJECT CONDITIONS

A. Cold-Weather Protection: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen subgrade or setting beds. Remove and replace stone paver work damaged by frost or freezing.

B. Hot Weather Protection: In hot weather, masonry shall be protected to prevent excessive evaporation of setting beds and grout. Artificial shade, wind breaks and cooled materials shall be used as required.

C. Weather Limitations for Mortar and Grout: Comply with the following requirements:

1. Maintain ambient temperatures between 50-100 degrees Fahrenheit during installation and for minimum 7 days after completion. Verify substrate, ambient and material at least 37 degrees Fahrenheit for installation of Latex-modified mortars. Maintain surface between 60 to 90 degrees Fahrenheit during installation of epoxy grouts. Protect mortars and grouts until cured to prevent premature evaporation of moisture.

PART 2 - PRODUCTS

2.1 STONE GENERAL

A. Stone fabrication shall include the following:
1. An additional 5% of total stone paver quantity for each specified paver type.
2. An additional 4 pavers each for the specified Fountain Jet and Nozzle paver sizes.

2.2 STONE FOR PAVING

A. Stone thickness for use in Vehicular areas identified on the drawings shall be three (3) inch thickness, in Pedestrian Areas stone thickness shall be two (2) inches. Stone for attachment to utility access covers shall be ¾" thickness and be contiguous with the surrounding pattern unless indicated otherwise.

B. Stone Supplier: Provide stone from one of the following:
1. Nelson Architectural Inc., Happy Valley, OR, Tele: 971 255 0962.
2. Arris Stoneworks, Seattle, WA, Tele: 206 370 0000.
3. Yellow Mountain Stoneworks, Seattle, WA, Tele: 206 267 5696.

C. Stone Strength shall meet the following minimum criteria:

1. Tiger Yellow Granite, or approved equal.
   a. Density: 177 lbs/cf
   b. Absorption: 0.49%
   c. Compressive Strength: 13,202 psi
   d. Flexural Strength: 2,429 psi
   e. Hardness: HS89
   f. Color: Combination of Whites, creams, and golds with minimal black.

D. Face dimensions of paving stone shall be no smaller than 1 1/2 inches in any single dimension.

E. Stone Types:

1. Stone Type 1A:
   a. Style: Pattern Cut with indicated finish on top and saw-cut edges, to match Architect's sample.
   b. Finish: Lychee
   c. Size: 8-5/8" x 11-5/8".
   d. Thickness: 3 inch.
   e. Color: Tiger Yellow Granite
   f. Location: Course Grain paving areas.

2. Stone Type 1B:
   a. Style: Pattern Cut with indicated finish on top and saw-cut edges, to match Architect's sample.
   b. Finish: Adze (Direction of finish shall be perpendicular to long dimension)
   c. Size: 4-1/8" x 11-5/8"
   d. Thickness: 3 inch
   e. Color: Tiger Yellow Granite
   f. Location: Course Grain paving areas.

3. Stone Type 1C:
   a. Style: Pattern Cut with indicated finish on top and saw-cut edges, to match Architect's sample.
   b. Finish: Lychee
   c. Sizes: 4-1/8" x 11-5/8"
   d. Thickness: 3 inch
   e. Color: Tiger Yellow Granite
   f. Location: Course Grain paving areas

4. Stone Type 1D & 1D-T:
   a. Style: Pattern Cut with indicated finish on top and saw-cut edges, to match Architect's sample.
   b. Finish: Lychee
   c. Sizes: 8-5/8" x 17-5/8"
   d. Thickness: Type 1D: 3 inches, Type 1D-T: 2 inches.
   e. Color: Tiger Yellow Granite
   f. Location: Fine Grain paving areas

5. Stone Type 2A:
   a. Style: Pattern Cut with indicated finish on top and saw-cut edges, to match Architect's sample.
   b. Finish: Bladestalk (Direction of finish shall be perpendicular to long dimension)
   c. Sizes: 4-1/8" x 11-5/8"
   d. Thickness: 3 inches
   e. Color: Tiger Yellow Granite
   f. Location: Course Grain paving areas

6. Stone Type 2B & 2B-T:
   a. Style: Pattern Cut with indicated finish on top and saw-cut edges, to match Architect's sample.

b. Finish: Bladestalk (Direction of finish shall be perpendicular to long dimension)
c. Sizes: 5-5/8" x 17-5/8"
d. Thickness: Type 2B: 3 inches, Type 2B-T: 2 inches.
e. Color: Tiger Yellow Granite
f. Location: Fine Grain paving areas

2.3 STONE FOR STEPS AND SEAT TERRACES

A. Stone Strength shall meet the following minimum criteria:

1. Density: 177 lbs/cf
2. Absorption: 0.49%
3. Compressive Strength: 13,202 psi
4. Flexural Strength: 2,429 psi
5. Hardness: HS89

B. Stone Supplier: Provide stone from one of the following:

1. Nelson Architectural Inc., Happy Valley, OR, Tele: 503 810 9898.
2. Arris Stoneworks, Seattle, WA, Tele: 206 370 0000.
3. Yellow Mountain Stoneworks, Seattle, WA, Tele: 206 267 5696.

C. Stone Types:

1. Stone Stair Treads and Seat Terrace seating surface:
   a. Style: Pattern Cut with indicated finish on top with saw-cut edges to match Architect's sample.
   b. Finish: Lychee
   c. Size: As shown
   d. Thickness: 2 inches
   e. Color: Tiger Yellow Granite
   f. Pattern: As Shown
2. Risers for Stone Stairs and Seat Terrace:
   a. Style: Pattern Cut with indicated finish on exposed surfaces and saw-cut back and bottom, to match Architect's sample.
   b. Finish: Lychee
   c. Size: As shown
   d. Thickness: 3-5/8 inches
   e. Color: Tiger Yellow Granite
   f. Pattern: As Shown
   g. Apply lithichrome paint of approved color to the bottom and vertical sides of all warning grooves.

2.4 STONE FOR FOUNTAIN JETS AND NOZZLES

A. Stone Strength shall meet the following minimum criteria:

1. Density: 177 lbs/cf
2. Absorption: 0.49%
3. Compressive Strength: 13,202 psi

4. Flexural Strength: 2,429 psi
5. Hardness: HS89

B. Stone Supplier: Provide stone from one of the following:

1. Nelson Architectural Inc., Happy Valley, OR, Tele: 503 810 9898.
2. Arris Stoneworks, Seattle, WA, Tele: 206 370 0000.
3. Yellow Mountain Stoneworks, Seattle, WA, Tele: 206 267 5696.

C. Stone Types:

1. Stone at fountain jets and nozzles:
   a. Style: Pattern Cut with indicated finish on top with saw-cut edges to match Architect's sample.
   b. Finish: Lychee
   c. Sizes:
      1) Aerated jets, pop jets and fog nozzles: 17-5/8" x 17-5/8"
      2) Leaper jets: 26-5/8" x 29-5/8"
   d. Thickness: 3 inches
   e. Color: Tiger Yellow Granite
   f. Pattern: As Shown

2.5 SETTING and GROUT MATERIALS

A. Cementitious Material:

1. Portland cement shall be ASTM-C 150, Type I of natural color or white, as required to produce the required color of mortar or grout.

B. Latex Additive Manufacturer, provide mortar and grout products by one of the following:

1. Laticrete International, Inc.
2. Custom Building Products.
3. TEC Specialty Construction Brands, Inc.

C. Slurry Bond Coat: One-step, high strength, polymer fortified thin set mortar for exterior installation, meeting ANSI A118.4 and ANSI A118.11.

D. Thick-set Mortar Leveling Bed: One step, high strength, polymer fortified mortar bed for exterior installation, meeting ASTM C270.

E. Thin-set (Paver Bond Coat) Mortar Bed: One-step, high strength, polymer fortified thin set mortar for exterior installation, meeting ANSI A118.4 and ANSI A118.11.

F. Substitutions: For approval of other Manufacturers and Products, a substitution request shall be submitted prior to the Bid date.

1. Mortar and Grout materials and additives shall be compatible and from one manufacturer.

G. Aggregate for Mortar and Grout: ASTM C 144, graded to comply with latex-additive manufacturer's requirements.

H. Grout Materials:

1. Latex-Modified Portland Cement Grout: One-step, latex modified, high performance grout for exterior installation. Stain resistant and color consistent. Meeting ANSI A118.6. Color to be selected by Architect.

I. The mortar and grout shall meet ANSI 118.7 and be weather, frost, shock and chemical resistant and meet the following requirements:

1. Thick-set mortar bed:
   a. Compressive strength, 4000-5000 psi.
   b. Flexural strength, 1100-1200 psi.
2. Thin-set paver bed bond strength, 500 psi.

J. All materials shall be delivered to the job site in the original containers with the manufacturer’s identification on each package.

K. Mortar and Grout Mixes General: Comply with referenced standards and with manufacturers' written instructions for mix proportions, mixing equipment, mixer speeds, mixing containers, mixing times, and other procedures needed to produce setting-bed and joint materials of uniform quality and with optimum performance characteristics. Discard mortars and grout when they have reached their initial set. Mortar and Grouts used for Water Feature applications shall be formulated to be high strength, minimum shrinkage, chemically resistant and have very low water absorption.

L. Slurry Bond Coat: Mix bond coat to a consistency similar to that of thick cream, consisting of material indicated as “Slurry Bond Coat” in paragraph 2.5 “Setting and Grout Materials” of this specification.

M. Thin-set (Paver Bond Coat) Mortar Bed: Proportion and mix for setting bed to comply with directions of latex-additive manufacturer and as necessary to produce stiff mixture with a moist surface when bed is ready to receive pavers.

N. Latex-Modified Portland Cement Grout: Mix in proportion and concentration recommended by latex-additive manufacturer. For vertical installation include and mix in non-sag additive per manufacturer’s instructions.

2.6 GROUT COLORS AND TEXTURES

A. Colors and Textures: As selected by Architect from manufacturer's full range.

2.7 ACCESSORIES

A. Bond Breaker (Concrete Slab): 15 pound asphalt impregnated felt.

1. Comply with ASTM 15
2. Cut into 18 inch wide strips.
3. Install centered over contraction joints in concrete slab.

B. Spacers: Resilient plastic, non-staining to stone, sized to suit joint thicknesses.

C. Sealants for use with Stone Paving: Refer to Division 07 – Section "Joint Sealants".

D. Stone and Grout Sealer: Colorless, non-film forming, non-peeling, slip and stain-resistant, VOC compliant, breathable sealer that does not affect color or physical properties of stone surfaces. Suitable for exterior application and as recommended by stone producer for application indicated. Product must meet performance requirements without failure due to defective manufacture, fabrication or installation and maintain performance for a minimum of 8 to 10 cleaning cycles without reapplication.
   1. Product Warranty: manufacturer's warranty in which manufacturer agrees to repair or replace materials that fail to maintain coating effectiveness and the qualities identified herein for the specified warranty period.
   2. Warranty Period: Five years from date of Substantial Completion.

E. Reinforcing Wire Fabric: Galvanized, welded wire fabric, 2 by 2 inches by 0.108-inch (12 gauge) diameter; comply with ASTM A 185 and ASTM A 82 except for minimum wire size.

F. Epoxy Adhesive for attachment of stone to Utility Access Hatches: ASTM C 881, two-component material suitable for use on dry or damp surfaces. Provide material "Type," "Grade," and "Class" to suit project requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas indicated to receive paving, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

B. Verify that concrete base is sloped for drainage and is free of standing water, dust, oil, grease, paint, wax, curing compounds, primer, sealers, form release agents, or any deleterious substances and debris which may prevent or reduce bonding. Conduct moisture tests to verify that concrete surfaces are completely cured, free from hydrostatic pressure and having a moisture content of less than 5%.

3.2 PREPARATION

A. Vacuum clean concrete substrates to remove dirt, dust, debris, and loose particles.

A. Remove substances, from concrete substrates, that could impair mortar bond, including curing and sealing compounds, form oil, and laitance. This may require mechanical grinding and scarifying of the surface. Neutralize any trace of strong acid or alkali from the substrate prior to mortar application.

3.3 INSTALLATION, GENERAL

A. Do not use stone with chips, cracks, voids, discolorations, and other defects that might be visible or cause staining in finished work.

B. **NOTE:** The stone paving has been designed to be a seamless and contiguous pattern covering the Horton Plaza, the Westfield Site Improvements and Public Improvements which surround the Historic Park. All three sites share a common point of origin at the center of the Horton Plaza site for stone paving layout. Whole paver units should be used to span the junctures between individual projects to maintain pattern continuity.

C. Joint Pattern: As shown in Drawings. Install stone in 24 foot square or 12 foot square segments with special attention to changes in the pattern as indicated on drawings.

D. Mix stone pavers from several pallets or cubes, as they are placed, to produce uniform blend of colors and textures.

E. Cut stone pavers with motor-driven masonry saw equipment to provide clean, sharp, unchipped edges. Cut to provide pattern indicated and to fit adjoining work neatly. Use full units without cutting where possible. Hammer cutting is not acceptable.

1. Thickness of Stone Paving, stone risers and stone treads: As indicated in this section.
2. Ease cut stone edges.
3. Cut stone to produce uniform joints to widths and in locations as indicated.
4. Clean sawed backs of stones to remove rust stains and iron particles.

F. Tolerances: do not exceed 1/16-inch paver to paver offset from flush (lippage) or 1/8 inch in 24 inches and 1/4 inch in 10 feet from level, or indicated slope, for finished surface of paving. All surfaces shall be free of standing water, i.e. no“bird baths”.

G. Isolation and Control Joints: Provide for sealant-filled joints at locations and of widths indicated. Provide joint filler and backer rod for sealant-filled joints where indicated. Install joint filler before setting pavers.

1. Install isolation joints at all vertical surfaces including building walls and foundations, site walls, curbs and where new paving abuts existing unless indicated otherwise.

H. Provide seating terraces and stairs made of stone as indicated. Install stone seating terraces before installing adjacent pavers.

3.4 MORTAR SETTING-BED APPLICATIONS

A. Saturate concrete subbase with clean water several hours before placing setting bed. Remove surface water about one hour before placing setting bed.

B. Apply cement-paste bond coat over surface of concrete subbase about 15 minutes before placing setting bed. Limit area of bond coat to avoid its drying out before placing setting bed. Do not exceed 1/16-inch thickness for bond coat.

1. Place reinforcing wire fabric over concrete, lapped at joints by at least one full mesh and supported so mesh becomes embedded in middle of setting bed. Hold edges back from vertical surfaces approximately 1/2 inch.

C. Apply mortar bed over bond coat immediately after applying bond coat. Spread and screed setting bed to uniform thickness at subgrade elevations required for accurate setting of pavers to finished grades indicated.

D. Mix and place only that amount of mortar bed that can be covered with pavers before initial set. Cut back, bevel edge, remove, and discard setting-bed material that have reached initial set before placing pavers.

E. Place pavers before initial set of cement occurs. Immediately before placing pavers on setting bed, apply uniform 1/16-inch- thick, slurry bond coat to bed or to back of each paver with a flat trowel.

F. Tamp or beat pavers with a wooden block or rubber mallet to obtain full contact with setting bed and to bring finished surfaces within indicated tolerances. Set each paver in a single operation before initial set of mortar; do not return to areas already set and disturb pavers for purposes of realigning finished surfaces or adjusting joints.

G. Rake out joints to depth required to receive grout as units are set.

H. Spaced Joint Widths: Provide 3/8 inch nominal joint width unless indicated otherwise, with variations not exceeding plus or minus 1/16 inch

3.5 STONE TERRACE SEATING INSTALLATION

A. Install stone terrace seating to comply with paragraph 3.4 "Mortar Setting Bed Applications" of this specification.

3.6 STONE INSTALLATION AT WATER FEATURE JETS

A. Install stone as indicated on water feature jet details. Jets shall be in place prior to paving installation.

B. Core drill stone pavers at water jet locations. Maintain tolerances indicated on stone shop drawings.

C. Apply joint sealant specified for Use I per the manufacturer’s recommendations after stone installation. Refer to Division 07 – Section “Joint Sealants”.

3.7 GROUTING OF STONE PAVING

A. Grout stone joints to comply with ANSI A108.10 and manufacturer's written instructions.

B. Grout joints as soon as possible after initial set of setting bed. Force grout into joints, taking care not to smear grout on adjoining stone and other surfaces. After initial set of grout, finish joints by tooling to produce a slightly concave polished joint, free of drying cracks.

C. Cure grout by maintaining in a damp condition for seven days except as otherwise recommended by latex-additive manufacturer.

3.8 JOINT SEALANT APPLICATION

A. Prepare joints and apply sealants of the type and at locations indicated to comply with applicable requirements in Division 07 – Section "Joint Sealants".

3.9 ADJUSTING AND CLEANING

A. Remove and replace stone paving and flooring of the following description:

1. Broken, chipped, stained, or otherwise damaged stone. Stone may be repaired if methods and results are approved by Owner's Representative.
2. Defective joints.
3. Stone paving and joints not matching approved samples and mockups.
4. Stone paving not complying with other requirements indicated.

B. Replace in a manner that results in stone paving matching approved samples and mockups, complying with other requirements, and showing no evidence of replacement.

C. In-Progress Cleaning: Clean stone paving, steps and terraces as work progresses. Remove mortar fins and smears before tooling joints.

D. Clean stone paving, steps and terraces after setting and grouting are complete. Use procedures recommended by stone fabricator for types of application.

3.10 PROTECTION

A. Prohibit traffic from installed stone for a minimum of 72 hours.

B. Protect stone paving, stairs and terraces during construction with non staining kraft paper. Where adjoining areas require construction work access, cover stone surfaces with a minimum of 3/4-inch untreated plywood over non staining kraft paper.

3.11 REPAIR, POINTING, CLEANING, AND PROTECTION

A. Remove and replace stone pavers, stairs or terraces that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units as intended. Provide new full sized units to match adjoining units and install in same manner as original units, with same joint treatment and with no evidence of replacement.

B. Pointing: During tooling of joints, enlarge voids or holes and completely fill with mortar or grout. Point up joints at sealant joints to provide a neat, uniform appearance, properly prepared for sealant application.

C. Cleaning: Remove excess grout from exposed surfaces of stone; wash and scrub clean.

3.12 PAVER AND GROUT SEALER

A. After pavers are thoroughly cleaned and joint sealant has been installed apply sealer to the tops of pavers, stone stair treads and risers, seat terrace risers, seat surfaces and grout joints. Apply sealer only after grout and mortar beds have fully set, do not apply to wet conditions.

1. Verify surfaces are clean, dry and free of efflorescence or other residues which could be trapped beneath coating application. Follow sealer manufacturer's recommendations for cleaning and preparation of the masonry surfaces prior to sealer application.
2. Apply sealer according to manufacturer's written instructions.
3. After sealer is applied, protect area from traffic for a minimum of 24 hours.

END OF SECTION 32 1440

SECTION 32 91 13 - STRUCTURAL SOIL (LOAD BEARING SOIL)

PART 1 - DESCRIPTION AND SPECIFICATION

1.1 GENERAL

A. The work of this section consists of all structural soil work and related items as indicated on the drawings or as specified herein.

1.2 REFERENCES AND STANDARDS

A. The following references are used herein and shall mean:

ASTM: American Society of Testing Materials
USDA: United States Department of Agriculture
AASHTO: American Association of State Highway and Transportation Officials
Standard Specifications: Regional or Municipal Standard Specifications Documentation for the location of proposed usage
AOAC: Association of Official Agricultural Chemists

1.3 SAMPLES AND SUBMITTALS

A. At least 30 days prior to ordering materials, the installing contractor shall submit to the engineer representative samples, certificates, manufacturer's literature and test results for materials specified below. No materials shall be ordered until the required samples, certificates, manufacturer's literature, producer's current license and test results have been reviewed and approved by the landscape architect and/or engineer. The engineer reserves the right to reject any material that does not meet structural soil specifications. Delivered materials shall closely match the approved samples.

B. Submit $^{1}/_{2}$ cubic foot representative sample of clay loam, one cubic foot representative sample of crushed stone, and one cubic foot representative sample of structural soil mix for approval. In the event of multiple source fields for clay loam, submit a minimum of one set of samples per source field or stockpile. The samples of all clay loam, crushed stone, and structural soil shall be submitted to the engineer as a record of the soil color and texture.

C. Submit soil test analysis reports for sample of clay loam from an independent soil-testing laboratory. The testing laboratory for particle size and chemical analysis may include a public agricultural extension service agency.

1. Submit a mechanical analysis of the clay loam sample and particle size analysis including the following gradient of mineral content:

USDA Designation	Size in mm.
Gravel	+2 mm
Sand	0.05 – 2 mm
Silt	0.002-0.05 mm
Clay	minus 0.002 mm

Sieve analysis shall be performed and compared to USDA Soil Classification System.

Sieve analysis shall be done by a combined hydrometer and wet sieving using sodium hexametaphosphate as a dispersant in compliance with ASTM D422 after destruction of organic matter by hydrogen peroxide.

2. Submit a chemical analysis, performed in accordance with current AOAC Standards, including the following:
   a. pH and buffer pH.
   b. Percent organic matter as determined by the loss of ignition of oven dried samples. Test samples shall be oven dried to a constant weight at a temperature of 230 degrees F, plus or minus 9 degrees.
   c. Analysis for nutrient levels by parts per million.
   d. Soluble salt by electrical conductivity of a 1:2 soil/water sample measured in Millimho per cm.
   e. Cation Exchange Capacity (CEC).
   f. Carbon/Nitrogen Ratio.

D. Submit one cubic foot sample of crushed stone which will be used in production of structural soil.

1. Provide particle size analysis:

USDA Designation	Size in mm.
3”	+76 mm
$2^1/_2$”	63-76 mm
2”	50-63 mm
$1^1/_2$”	37-50 mm
1”	25-37 mm
¾”	19-25 mm
Fine gravel	2-19 mm

2. Provide the manufacturers analysis of the loose and rodded unit weight
3. Losses from LA Abrasion tests- not to exceed 40%
4. Minimum 90% with 2 or more fractured faces
5. Percent pore space analysis

E. At the engineer’s discretion, the sample of structural soil may be tested for the following:

1. Compaction in accordance with ASTM D698/AASHTO T99 without removing oversize aggregate
2. California Bearing Ratio in accordance with ASTM D1883- soaked CBR shall equal or exceed a value of 50
3. Measured dry-weight percentage of stone in the mixture

F. The approved structural soil sample shall be the standard.

G. Any deviation from the specified crushed stone and clay loam specifications shall be approved by landscape architect/engineer.

1.4 DELIVERY, STORAGE AND HANDLING

A. Delivered structural soil shall be at or near optimum compaction moisture content as determined by AASHTO T 99 (ASTM D 698) and should not be placed in frozen, wet or muddy sites.

B. Protect structural soil from exposure to excess water and from erosion at all times. Do not store structural soil unprotected. Do not allow excess water to enter site prior to compaction. If water is introduced into the structural soil after grading, allow water to drain to optimum compaction moisture content.

1.5 EXAMINATION OF CONDITIONS

A. All areas to receive structural soil shall be inspected by the installing contractor before starting work and all defects such as incorrect grading, compaction, and inadequate drainage shall be reported to the engineer prior to beginning this work.

1.6 QUALITY ASSURANCE

A. Qualifications of installing contractor: The work of this section should be performed by a contracting firm which has a minimum of five years experience. Proof of this experience shall be submitted as per paragraph, SAMPLES and SUBMITTALS, of this section.

PART 2 - MATERIALS

2.1 CLAY LOAM

A. Soil shall be a “loam” with a minimum clay content of 20% or a “clay loam” based on the “USDA classification system” as determined by mechanical analysis (ASTM D-422) and it shall be of uniform composition, without admixture of subsoil. It shall be free of stones, lumps, plants and their roots, debris and other extraneous matter. It shall not contain toxic substances harmful to plant growth. Clay loam shall contain not less than 2% or more than 5% organic matter as determined by the loss on ignition of oven-dried samples. Test samples shall be oven-dried to a constant weight at a temperature of 230 degrees F., plus or minus 9 degrees.

B. Mechanical analysis for the loam or clay loam shall be as follows:

Textural Class	% of Total Weight
Gravel	less than 5%
Sand	20-45%
Silt	20-50%
Clay	20-40%

C. Chemical analysis: Meet, or be amended to meet the following criteria:

1. pH between 5.5 to 6.5
2. Percent organic matter 2% - 5% by dry weight
3. Adequate nutrient levels
4. Soluble salt less than 1.0 mmho/cm
5. Cation Exchange Capacity (CEC) greater than 10

6. Carbon/Nitrogen ratio less than 33:1

D. Loam or clay loam shall not come from USDA - classified prime farmland.

2.2 FERTILIZER

A. Should nutrient analysis suggest that the loam or clay loam need additional nutrients, it shall be amended by structural soil producer.

2.3 SULFUR

A. Sulfur shall be a commercial granular, 96% pure sulfur, with material and analysis appearing on the labeled container.

B. Sulfur used to lower pH shall be a ferrous sulfate formulation.

C. Application rates shall be dependent on soil test results.

2.4 LIME

A. Agricultural lime containing a minimum of 85% carbonates.

B. Application rates shall be dependent on soil test results.

2.5 CRUSHED STONE

A. The size of the crushed stone shall be 0.75 inches to 1.5 inches allowing for up to 10% being greater than 1.5 inches, and up to 10% less than 0.75 inches.

B. Acceptable aggregate dimensions will not exceed 2.5:1.0 for any two dimensions.

C. Minimum 90% with two or more fractured faces.

D. Results of Aggregate Soundness Loss test shall not exceed 18%.

E. Losses from LA Abrasion tests shall not exceed 40%.

2.6 HYDROGEL

A. Hydrogel shall be a coated potassium propenoate-propenamide copolymer.

2.7 WATER

A. The installing contractor shall be responsible to furnish his own supply of water, free of impurities, to the site.

2.8 STRUCTURAL SOIL

A. A uniformly blended urban tree mixture of crushed stone, clay loam and hydrogel tackifier, mixed in the following proportion:

Material	Unit of Weight

specified crushed Stone	100 units dry weight
specified clay loam	20 – 25 units (to achieve minimum CBR of 50)
Hydrogel tackifier	0.035 units dry weight
moisture	ASTM D698/AASHTO T-99 optimum moisture

PART 3 - PRODUCTION AND INSTALLATION GUIDELINES

3.1 STRUCTURAL SOIL MIXING AND QUALITY CONTROL TESTING

A. All structural soil mixing shall be performed at the licensed producer's yard using appropriate soil measuring, mixing and shredding equipment of sufficient capacity and capability to assure proper quality control and consistent mix ratios. No mixing of structural soil at the project site shall be permitted.

Maintain adequate moisture content during the mixing process. Soils and mix components shall easily shred and break down without clumping. Soil clods shall easily break down into a fine crumbly texture. Soils shall not be overly wet or dry. The licensed producer shall measure and monitor the amount of soil moisture at the mixing site periodically during the mixing process.

B. Raw materials shall be mixed off-site, only at the licensed producer's facility, on a flat asphalt or concrete paved surface to avoid soil contamination.

C. Should the independent laboratory test results of the clay loam reveal a need to amend it, to meet specifications, the amending materials should be added to the clay loam following the rates and recommendations of the soil test.

3.2 UNDERGROUND UTILITIES AND SUBSURFACE CONDITIONS

A. The installing contractor shall notify the engineer of any subsurface conditions which will affect the contractor's ability to install the structural soil.

B. The installing contractor shall locate and confirm the location of all underground utility lines and structures prior to the start of any excavation.

C. The installing contractor shall repair any underground utilities or foundations damaged during the progress of this work.

3.3 SITE PREPARATION

A. Do not proceed with the installation of the structural soil material until all walls, curb footings and utility work in the area have been installed. For site elements dependent on structural soil for foundation support, postpone installation of such elements until immediately after the installation of structural soil.

B. Install subsurface drain lines as shown on the plan drawings prior to installation of structural soil material.

C. Excavate and compact the proposed subgrade to depths, slopes and widths as shown on the drawings. Maintain all required angles of repose of the adjacent materials as shown on the drawings. Do not over excavate compacted subgrades of adjacent pavement or structures.

D. Confirm that the subgrade is at the proper elevation and compacted as required. Subgrade elevations shall slope parallel to the finished grade and/or toward the subsurface drain lines as shown on the drawings.

E. Clear the excavation of all construction debris, trash, rubble and any foreign material. In the event that fuels, oils, concrete washout silts or other material harmful to plants have been spilled into the subgrade material, excavate the soil sufficiently to remove the harmful material. Fill any over excavation with approved fill and compact to the required subgrade compaction.

F. Do not proceed with the installation of structural soil until all utility work in the area has been installed. All subsurface drainage systems shall be operational prior to installation of structural soil.

G. Protect adjacent walls, walks and utilities from damage. Use ½" plywood and/or plastic sheeting as directed to cover existing concrete, metal and masonry work and other items as directed during the progress of the work.

1. Clean up all trash and any soil or dirt spilled on any paved surface at the end of each working day.

2. Any damage to the paving or architectural work caused by the installing contractor shall be repaired, as directed by the engineer.

H. Maintain all silt and sediment control devices required by applicable regulations. Provide adequate methods to assure that trucks and other equipment do not track soil from the site onto adjacent property and the public right of way.

3.4 INSTALLATION OF STRUCTURAL SOIL MATERIAL

A. Install structural soil in 6 inch lifts and compact each lift.

B. Compact all materials to at least 95% Proctor Density from a standard compaction curve AASHTO T 99 (ASTM D 698). No compaction shall occur when moisture content exceeds maximum as listed herein. Delay compaction if moisture content exceeds maximum allowable and protect structural soil during delays in compaction with plastic or plywood as directed by the engineer.

C. Bring structural soil to finished grades as shown on the drawings. Immediately protect the structural soil from contamination by toxic materials, trash, debris, water containing cement, clay, silt or materials that will alter the particle size distribution of the mix with plastic or plywood as directed by the engineer.

D. The engineer may periodically check the material being delivered, prior to installation for color and texture consistency with the approved sample provided by the installing contractor as part of the submittal for structural soil. If the engineer determines that the delivered structural soil varies significantly from the approved samples, the engineer shall contact the licensed producer.

E. Engineer shall ensure that the delivered structural soil was produced by the approved structural soil licensee by inspecting weight tickets showing source of material.

F. Structural soil should not be stockpiled long-term. Any structural soil not installed immediately should be protected by a tarp or other waterproof covering.

3.5 FINE GRADING

A. After the initial placement and rough grading of the structural soil but prior to the start of fine grading, the installing contractor shall request review of the rough grading by the engineer. The installing contractor shall set sufficient grade stakes for checking the finished grades.

B. Adjust the finish grades to meet field conditions as directed.

Provide smooth transitions between slopes of different gradients and direction.
Fill all dips with structural soil and remove any bumps in the overall plane of the slope.

a. The tolerance for dips and bumps in structural soil areas shall be a 3" deviation from the plane in 10'.

All fine grading shall be inspected and approved by the engineer prior to the installation of other items to be placed on the structural soil.

C. The engineer will inspect the work upon the request of the installing contractor. Request for inspection shall be received by the engineer at least 10 days before the anticipated date of inspection.

3.6 ACCEPTANCE STANDARDS

A. The engineer will inspect the work upon the request of the installing contractor. Request for inspection shall be received by the engineer at least 10 days before the anticipated date of inspection.

3.7 CLEAN-UP

A. Upon completion of the structural soil installation operations, clean areas within the contract limits. Remove all excess fills, soils and mix stockpiles and legally dispose of all waste materials, trash and debris. Remove all tools and equipment and provide a clean, clear site. Sweep, do not wash, all paving and other exposed surfaces of dirt and mud until the paving has been installed over the structural soil material. Do no washing until finished materials covering structural soil material are in place.

END OF SECTION

SECTION 33 10 00 – WATER UTILITIES

PART 1- GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. SSPWC -- Standard Specifications for Public Works Construction and City of San Diego Supplement to the "Whitebook," (Current City adopted Editions)

C. San Diego Area Regional Standard Drawings (latest edition)

D. City of San Diego approved water materials list

1.2 SUMMARY

A. This Section includes piping and specialties for potable-water and fire-protection water service outside the building.

B. Related sections include the following:
1. Section 31 00 00, Earthwork

1.3 SYSTEM PERFORMANCE REQUIREMENTS

A. Minimum Working Pressures: The following are minimum pressure requirements for piping and specialties, unless otherwise indicated:
1. Potable-Water Service: 150 psig.
2. Fire-Protection Water Service: 200 psig.

1.4 SUBMITTALS

A. Product Data: For the following:
1. Backflow preventers.
2. Pipe and fittings.
3. Valves.
4. Fire hydrants.
5. Fire department connections.

B. Record Drawings: At Project closeout of installed water-service piping.

C. Test Reports: As specified in "Field Quality Control" Article in Part 3.

D. Purging and Disinfecting Reports: As specified in "Cleaning" Article in Part 3.

E. Maintenance Data: For specialties to include in the maintenance manuals specified in Division 1. Include data for the following:
1. Backflow preventers.
2. Valves.
3. Fire hydrants.

1.5 QUALITY ASSURANCE

A. Comply with requirements of utility supplying water. Include tapping of water mains and backflow prevention.

B. All meter and regulator stations shall be installed above ground.

C. Separate meters shall be provided for domestic, fire and landscape water

D. Comply with standards of authorities having jurisdiction for potable water-service piping. Include materials, installation, testing, and disinfection.

E. Comply with NSF 61, "Drinking Water System Components--Health Effects," for materials for potable water.

F. Comply with standards of authorities having jurisdiction for fire-protection water-service piping. Include materials, hose threads, installation, and testing.

G. Comply with NFPA 24, "Installation of Private Fire Service Mains and Their Appurtenances," for materials, installations, tests, flushing, and valve and hydrant supervision.

H. Comply with 2001"California Electrical Code," (CEC) for electrical connections between wiring and electrically operated devices.

I. Provide listing/approval stamp, label, or other marking on piping and specialties made to specified standards.

J. Listing and Labeling: Provide electrically operated specialties and devices specified in this Section that are listed and labeled.
   1. The Terms "Listed" and "Labeled": As defined in CEC, Article 100.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Preparation for Transport: Prepare valves, including fire hydrants, according to the following:
   1. Ensure that valves are dry and internally protected against rust and corrosion.
   2. Protect valves against damage to threaded ends and flange faces.
   3. Set valves in best position for handling. Set valves closed to prevent rattling.

B. During Storage: Use precautions for valves, including fire hydrants, according to the following:
   1. Do not remove end protectors, unless necessary for inspection; then reinstall for storage.
   2. Protect from weather. Store indoors and maintain temperature higher than ambient dew-point temperature. Support off the ground or pavement in watertight enclosures when outdoor storage is necessary.

C. Handling: Use sling to handle valves and fire hydrants whose size requires handling by crane or lift. Rig valves to avoid damage to exposed valve parts. Do not use handwheels or stems as lifting or rigging points.

D. Deliver piping with factory-applied end-caps. Maintain end-caps through shipping, storage, and handling to prevent pipe-end damage and to prevent entrance of dirt, debris, and moisture.

E. Protect stored piping from moisture and dirt. Elevate above grade. Do not exceed structural capacity of floor when storing inside.

F. Protect flanges, fittings, and specialties from moisture and dirt.

G. Store plastic piping protected from direct sunlight. Support to prevent sagging and bending.

1.7 PROJECT CONDITIONS

A. Verify existing utility locations. Contact utility-locating service for area where Project is located.

B. Verify that water-service piping may be installed to comply with original design and referenced standards.

C. Verify system pressure and size according to lowest pressure and regulate to highest pressure.

1.8 SEQUENCING AND SCHEDULING

A. Coordinate connection to water main with utility company.

B. Coordinate with other utility work.

C. Coordinate with site concrete construction.

PART 2- PRODUCTS

2.1 PIPES AND TUBES

A. General: Applications of the following pipe and tube materials are indicated in Part 3 "Piping Applications" Article.

B. Copper Tube: ASTM B 88, seamless water tube, annealed temper.

C. Ductile-Iron, Mechanical-Joint Pipe: AWWA C151, with cement-mortar lining and seal coat according to AWWA C104. Include gland, rubber gasket, and bolts and nuts according to AWWA C111.

D. PVC Plastic Pipe: ASTM D 1785, with marking "NSF-pw" according to NSF 14.

E. PVC Plastic, Fire-Service Pipe: UL 1285 and AWWA C900. Include elastomeric seal according to ASTM F 477.

2.2 PIPE AND TUBE FITTINGS

A. General: Applications of the following pipe and tube fitting materials are indicated in Part 3 "Piping Applications" Article.

B. Copper Fittings: ASME B16.22; wrought-copper, solder-joint pressure type.

C. Cast-Copper-Alloy Flanges: ASME B16.24, Class 150 or 300, as required for system operating pressure.

D. Ductile-Iron, Mechanical-Joint Fittings: AWWA C110, ductile-iron or cast-iron; or AWWA C153, ductile-iron, compact type. Include cement-mortar lining and seal coat according to AWWA C104 and glands, rubber gaskets, and bolts and nuts according to AWWA C111.

E. Ductile-Iron, Grooved-End Fittings: ASTM A 47, malleable-iron; or ASTM A 536, ductile-iron casting complying with AWWA-pipe size, with grooved ends. Include cement-mortar lining and seal coat according to AWWA C104 or epoxy, interior coating according to AWWA C550. Include keyed couplings according to AWWA C606.

F. Ductile-Iron, Flanged Fittings: AWWA C110, with cement-mortar lining and seal coat according to AWWA C104 or epoxy, interior coating according to AWWA C550. Include gaskets and bolts and nuts.

G. Cast-Iron Flanged Fittings: ASME B16.1, Class 125, unless otherwise indicated.

H. Ductile-Iron Fittings for PVC Pipe: AWWA C110, ductile-iron or cast-iron; or AWWA C153, ductile-iron, compact type; push-on- or mechanical-joint type. Include dimensions matching PVC pipe, cement-mortar lining and seal coat according to AWWA C104, and rubber compression gaskets according to AWWA C111.

2.3 JOINING MATERIALS

A. General: Applications of the following piping joining materials are indicated in Part 3 "Piping Applications" Article.

B. Ductile-Iron Piping: The following materials apply:
   1. Mechanical Joints: AWWA C111 ductile-iron or gray-iron glands, high-strength steel bolts and nuts, and rubber gaskets.
   2. Flanged Joints: AWWA C115 ductile-iron or gray-iron pipe flanges, rubber gaskets, and high-strength steel or brass bolts and nuts.
      a. Gaskets: Rubber, flat face, 1/8 inch thick, unless otherwise indicated; and full-face or ring type, unless otherwise indicated.
      b. Flange Bolts and Nuts: ASME B18.2.1, carbon steel or brass, unless otherwise indicated.
   3. Keyed Couplings: AWWA C606, consisting of ASTM A 536 ductile-iron housing with enamel finish, with synthetic-rubber gasket with central-cavity, pressure-responsive design, with carbon-steel bolts and nuts to secure grooved pipe and fittings and gasket suitable for hot water, unless otherwise indicated.

C. Brazing Filler Metals: AWS A5.8, BCuP Series.

D. Solder Filler Metal: ASTM B 32, Alloy Sn95, Alloy Sn94, or Alloy E, with 0.10 percent maximum lead content.

E. Pipe Couplings: Iron-body sleeve assembly, fabricated to match OD of pipes to be joined.
   1. Sleeve: ASTM A 126, Class B, gray iron.
   2. Followers: ASTM A 47, malleable iron; or ASTM A 536, ductile iron.
   3. Gaskets: Rubber.
   4. Bolts and Nuts: AWWA C111.
   5. Finish: Enamel paint.

F. Coatings: Grease, Never-Sieze, or equivalent for application to all nuts and bolts.
   1. Encasement: Fittings shall be wrapped with minimum 6 mil polyvinyl sheathing.

2.4 PIPING SPECIALTIES

A. Dielectric Fittings: Assembly or fitting with insulating material isolating joined dissimilar metals to prevent galvanic action and corrosion.
   1. Description: Combination of copper alloy and ferrous; threaded, solder, plain, and weld-neck end types and matching piping system materials.
   2. Dielectric Unions: Factory-fabricated union assembly, designed for 250-psig minimum working pressure at 180 deg F. Include insulating material isolating dissimilar metals and ends with inside threads according to ASME B1.20.1.
   3. Dielectric Flanges: Factory-fabricated companion-flange assembly, for 150- or 300-psig minimum pressure to suit system pressures.
   4. Dielectric-Flange Insulation Kits: Field-assembled companion-flange assembly, full-face or ring type. Components include neoprene or phenolic gasket, phenolic or polyethylene bolt sleeves, phenolic washers, and steel backing washers.
      a. Provide separate companion flanges and steel bolts and nuts for 150- or 300-psig minimum working pressure to suit system pressures.
   5. Dielectric Couplings: Galvanized-steel couplings with inert and noncorrosive thermoplastic lining, with threaded ends and 300-psig minimum working pressure at 225 deg F.
   6. Dielectric Nipples: Electroplated steel nipples with inert and noncorrosive thermoplastic lining, with combination of plain, threaded, or grooved end types and 300-psig working pressure at 225 deg F.

2.5 PE ENCASEMENT

A. PE Encasement for Ductile-Iron Piping: ASTM A 674 or AWWA C105, PE film, 0.008-inch minimum thickness, tube or sheet.

2.6 VALVES

A. Nonrising-Stem, Metal-Seated Gate Valves, 3-Inch NPS and Larger: AWWA C500, gray- or ductile-iron body and bonnet; with cast-iron or bronze, double-disc gate, bronze gate rings, bronze stem, and stem nut. Include 200-psig minimum working-pressure design; interior coating according to AWWA C550; and mechanical-joint ends, unless otherwise indicated.

B. Nonrising-Stem, Resilient-Seated Gate Valves, 3-Inch NPS and Larger: AWWA C509, gray- or ductile-iron body and bonnet; with bronze or gray- or ductile-iron gate, resilient seats, bronze stem, and stem nut. Include 200-psig minimum working-pressure design, interior coating according to AWWA C550, and push-on- or mechanical-joint ends.

C. Nonrising-Stem, High-Pressure, Resilient-Seated Gate Valves, 3-Inch NPS and Larger: AWWA C509, ductile-iron body and bonnet; with bronze or ductile-iron gate, resilient seats, bronze stem, and stem nut. Include 250-psig minimum working-pressure design, interior coating according to AWWA C550, and push-on- or mechanical-joint ends.

D. Nonrising-Stem Gate Valves, 4-Inch NPS and Larger: UL 262, FM approved, iron body and bonnet with flange for indicator post, bronze seating material, inside screw, 175-psig working pressure, and mechanical-joint ends. Provide with flanged ends for pit installation.

E. Rising-Stem Gate Valves, 3-Inch NPS and Larger: AWWA C500, cast-iron double disc, bronze disc and seat rings, cast-iron or ductile-iron body and bonnet, OS&Y, bronze stem, 200-psig working pressure, and flanged ends.

F. Rising-Stem Gate Valves, 3-Inch NPS and Larger: AWWA C509, resilient seated; cast-iron or ductile-iron body and bonnet, OS&Y, bronze stem, 200-psig working pressure, and flanged ends.

G. Rising-Stem Gate Valves, 2-1/2-Inch NPS and Larger: UL 262, FM approved, iron body and bonnet, bronze seating material, OS&Y, 175-psig working pressure, and flanged ends.

H. Rising-Stem Gate Valves, 2-Inch NPS and Smaller: UL 262, FM approved, bronze body and bonnet, OS&Y, bronze stem, 175-psig working pressure, with threaded ends.

I. Nonrising-Stem Gate Valves, 2-Inch NPS and Smaller: MSS SP-80; body and screw bonnet of ASTM B 62 cast bronze; with Class 125 threaded ends, solid wedge, nonrising copper-silicon-alloy stem, brass packing gland, PTFE-impregnated packing, and malleable-iron handwheel.

J. Valve Boxes: Cast-iron box with top section and cover with lettering "WATER," bottom section with base of size to fit over valve and barrel approximately 5 inches in diameter, and adjustable cast-iron extension of length required for depth of bury of valve.
   1. Provide steel tee-handle operating wrench with each valve box. Include tee handle with one pointed end, stem of length to operate valve, and socket-fitting valve-operating nut.

K. Indicator Posts: UL 789, FM-approved, vertical-type, cast-iron body with operating wrench, extension rod, and adjustable cast-iron barrel of length required for depth of bury of valve.

L. Curb Stops: Bronze body, ground-key plug or ball, and wide tee head, with inlet and outlet to match service piping material.

M. Service Boxes for Curb Stops: Cast-iron box with telescoping top section of length required for depth of bury of valve. Include cover with lettering "WATER," and bottom section with base of size to fit over curb-stop and barrel approximately 3 inches in diameter.
   1. Provide steel tee-handle shutoff rod with each service box. Include tee handle with one pointed end, stem of length to operate curb stop, and slotted end fitting curb-stop head.

N. Tapping Sleeve and Tapping Valve: Complete assembly, including tapping sleeve, tapping valve, and bolts and nuts. Use sleeve and valve compatible with tapping machine.

O. Service Clamps and Corporation Stops: Complete assembly, including service clamp, corporation stop, and bolts and nuts. Include service clamp and stop compatible with drilling machine.
   1. Service Clamp: Cast iron or ductile iron with gasket and AWWA C800 threaded outlet for corporation stop, and threaded end straps.
   2. Corporation Stops: Full-port bronze body and ground-key plug, with AWWA C800 threaded inlet and outlet matching service piping material.
   3. Manifold: Copper with 2 to 4 inlets as required, with ends matching corporation stops and outlet matching service piping.

P. Check Valves: AWWA C508, with 175-psig working-pressure rating. Include interior coating according to AWWA C550.

2.7 SPECIALTY VALVES

A. Pressure-Regulating Valves: Automatic, pilot-operated, cast-iron body with interior coating according to AWWA C550. Include 250-psig working-pressure design, bronze pressure-reducing pilot valve and tubing, and means for discharge pressure adjustment.

B. Flow-Regulating Valves: Automatic, pilot-operated, cast-iron body with interior coating according to AWWA C550. Include 250-psig working-pressure design, bronze pressure-reducing pilot valve and tubing, and means for flow adjustment.

C. Air-Release Valve: AWWA C512, hydromechanical device to automatically release accumulated air. Include 300-psig working-pressure design.

D. Air/Vacuum Valve: AWWA C512, direct-acting, float-operated, hydromechanical device with large orifice to automatically release accumulated air or to admit air during filling of piping. Include 300-psig working-pressure design.

E. Combination Air Valves: AWWA C512, float-operated, hydromechanical device to automatically release accumulated air or to admit air. Include 300-psig working-pressure design.

2.8 WATER METERS

A. Description: Comply with City of San Diego Water Department requirements.

2.9 WATER-METER BOXES

A. Description: Polymer Concrete. Include lettering "WATER METER" in cover; and slotted, open-bottom base section of length to fit over service piping.

2.10 PITS

A. Description: Precast, reinforced-concrete pit, designed for A-16 load designation according to ASTM C 857, and made according to ASTM C 858.

B. Ladder: ASTM A 36, steel or polyethylene-encased steel steps.

C. Manhole: ASTM A 536, Grade 60-40-18, ductile-iron, 24-inch- minimum-diameter traffic frame and cover.
1. Weight and Dimensions: Not smaller than 24-inch diameter, unless otherwise indicated.

D. Drain: ASME A112.21.1M, cast-iron area drain, of size indicated. Include body anchor flange, light-duty cast-iron grate, bottom outlet, and integral or field-installed bronze ball or clapper-type backwater valve.

2.11 FREESTANDING FIRE HYDRANTS

A. General: Comply with City of San Diego Fire Department requirements where they exceed the following requirements.

B. Description: Cast-iron body, compression-type valve, opening against pressure and closing with pressure, 6-inch mechanical-joint inlet, and 200-psig minimum working-pressure design.

C. Outlet Threads: NFPA 1963, with external hose thread used by local fire department. Include cast-iron caps with steel chains.

D. Exterior Finish: Red alkyd-gloss enamel paint, unless otherwise indicated.

2.12 FIRE DEPARTMENT CONNECTIONS

A. Exposed, Freestanding, Fire Department Connections: UL 405, cast-brass body, with thread inlets according to NFPA 1963 and matching local fire department hose threads, and threaded bottom outlet. Include lugged caps, gaskets, and chains; lugged swivel connection and drop clapper for each hose-connection inlet; 18-inch- high brass sleeve; and round escutcheon plate.

2.13 DETECTOR CHECK VALVES

A. Detector Check Valve: UL 312, FM-approved detector check, iron body, corrosion-resistant clapper ring and seat ring material, 175-psig working pressure, flanged ends, with connections for bypass and installation of water meter.

2.14 BACKFLOW PREVENTERS

A. General: Manufactured backflow preventers, of size indicated for maximum flow rate and maximum pressure loss indicated. Comply with requirements of the San Diego City Water Department.

B. 2-Inch NPS and Smaller: Bronze body with threaded ends.

C. 2-1/2-Inch NPS and Larger: Bronze, cast-iron, steel, or stainless-steel body with flanged ends.

D. Interior Lining: AWWA C550, epoxy coating for backflow preventers with cast-iron or steel body.

E. Interior Components: Corrosion-resistant materials.

F. Strainer on inlet if strainer is indicated.

G. Hose-Connection Vacuum Breakers: ASSE 1011, nickel plated, with nonremovable and manual drain features, and ASME B1.20.7, 3/4-11.5NH threads for garden hose on outlet. Units attached to rough-bronze-finish hose connections may be rough bronze.

2.15 ANCHORAGES

A. Clamps, Straps, and Washers: ASTM A 506, steel.

B. Rods: ASTM A 575, steel.

C. Rod Couplings: ASTM A 197, malleable iron.

D. Bolts: ASTM A 307, steel.

E. Cast-Iron Washers: ASTM A 126, gray iron.

F. Concrete Reaction Backing: Portland cement concrete mix, 3000 psig.
1. Cement: ASTM C 150, Type I.
2. Fine Aggregate: ASTM C 33, sand.
3. Coarse Aggregate: ASTM C 33, crushed gravel.
4. Water: Potable.

2.16 ALARM DEVICES

A. Description: UL 753, FM approved, of types and sizes to mate and match piping and equipment. Provide devices that are compatible with the fire alarm system.

B. Water-Flow Indicators: Vane-type water-flow detector, rated for 250-psig working pressure; designed for horizontal or vertical installation; with 2 SPDT circuit switches to provide isolated alarm and auxiliary contacts, 7 A 125 V, ac and 0.25 A 24 V, dc; complete with factory-set, field-adjustable retard element to prevent false signals and tamperproof cover that sends signal when cover is removed.

C. Supervisory Switches: SPDT, designed to signal valve in other than full open position.

2.17 IDENTIFICATION

A. Refer to Division 2 Section "Earthwork" for underground warning tape materials.

B. Arrange for warning tapes made of solid blue film with continuously printed black-letter caption "CAUTION--WATER LINE BURIED BELOW."

C. Arrange for detectable warning tapes made of solid blue film with metallic core and continuously printed black-letter caption "CAUTION--WATER LINE BURIED BELOW."

D. Nonmetallic Piping Label: Engraved, plastic-laminate label at least 1 by 3 inches, with caption "CAUTION--THIS STRUCTURE HAS NONMETALLIC WATER-SERVICE PIPING," for installation on main electrical meter panel.

PART 3- EXECUTION

3.1 EARTHWORK

A. Excavating, trenching, and backfilling are specified in 31 00 00 “Earthwork.”

B. Install piping a minimum of 30 inches below rough grade, except shut-off valves 3 inches and smaller shall be brought up into meter boxes 6 inches below grade.

3.2 PIPING APPLICATIONS

A. General: Use pipe, fittings, and joining methods for piping systems according to the following applications:

B. Transition couplings and special fittings with pressure ratings at least equal to piping pressure rating may be used in applications below, unless otherwise indicated.

C. Do not use flanges or keyed couplings for underground piping.

1. Exception: Piping in boxes and structures, but not buried, may be joined with flanges or keyed couplings instead of joints indicated.

D. Flanges, keyed couplings, and special fittings may be used on aboveground piping.

E. Potable Water-Service Piping: Use the following:
1. 3/4- to 3-Inch NPS: Copper tube, Type L; copper fittings; and soldered joints.
2. 4-Inch NPS: Ductile-iron, mechanical-joint pipe; ductile-iron, mechanical-joint fittings; and mechanical joints.
3. NPS 4: PVC, AWWA Class 200 pipe; PVC, AWWA Class 200 fabricated
4. 6-Inch NPS: Ductile-iron, mechanical-joint pipe; ductile-iron, mechanical-joint fittings; and mechanical joints.
5. 8-Inch NPS: Ductile-iron, mechanical-joint pipe; ductile-iron, mechanical-joint fittings; and mechanical joints.

F. Fire-Protection Water-Service Piping: Use the following:
1. 4- to 8-Inch NPS: Ductile-iron, mechanical-joint pipe; ductile-iron, mechanical-joint fittings; and mechanical joints.
2. 4- to 8-Inch NPS: PVC plastic, C900 Class 200, fire-service pipe; ductile-iron fittings for PVC plastic pipe; and gasketed joints.
3. 10- and 12-Inch NPS: Ductile-iron, mechanical-joint pipe; ductile-iron, mechanical-joint fittings; and mechanical joints.
4. 10- and 12-Inch NPS: PVC plastic, C900 Class 200, fire-service pipe; ductile-iron fittings for PVC plastic pipe; and gasketed joints.

3.3 JOINT CONSTRUCTION

A. Ductile-Iron Piping, Gasketed Joints: According to AWWA C600.

B. Ductile-Iron Piping, Gasketed Joints for Fire-Service Piping: According to UL 194 and AWWA C600.

C. Flanged Joints: Align flanges and install gaskets. Assemble joints by sequencing bolt tightening. Use lubricant on bolt threads.

D. Threaded Joints: Thread pipes with tapered pipe threads according to ASME B1.20.1, apply tape or joint compound, and apply wrench to fitting and valve ends into which pipes are being threaded.

E. Copper Tubing, Soldered Joints: According to AWS's "Soldering Manual," Chapter "The Soldering of Pipe and Tube."

F. PVC Piping, Gasketed Joints: Use joining materials according to AWWA C900. Construct joints with elastomeric seals and lubricant according to ASTM D 2774 or ASTM D 3139 and pipe manufacturer's written instructions.

G. Dissimilar Materials Piping Joints: Use adapters compatible with both piping materials, OD, and system working pressure. Refer to "Piping Systems - Common Requirements" Article below for joining piping of dissimilar metals.

3.4 PIPING SYSTEMS - COMMON REQUIREMENTS

A. General Locations and Arrangements: Drawings indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and

calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated, unless deviations to layout are approved on Coordination Drawings.

B. Install components with pressure rating equal to or greater than system operating pressure.

C. Install piping free of sags and bends except as required to avoid gravity utilities installations and site footing and site construction. Installer shall verify depth of piping with all other utilities crossings and site construction to adjust piping depth as required.

D. Locate groups of pipes parallel to each other, spaced to permit valve servicing.

E. Install fittings for changes in direction and branch connections.

F. Piping Connections: Unless otherwise indicated, make piping connections as specified below:
1. Install unions, in piping 2-inch NPS and smaller, adjacent to each valve and at final connection to each piece of equipment with 2-inch NPS or smaller threaded pipe connection.
2. Install flanges, in piping 2-1/2-inch NPS and larger, adjacent to flanged valves and at final connection to each piece of equipment with flanged pipe connection.
3. Install dielectric fittings to connect piping of dissimilar metals.

G. Fitting Protection: Wrap all metal fittings with polyvinyl sheathing. Coat all bolts and nuts with grease or Never Sieze.

3.5 SERVICE ENTRANCE PIPING

A. Extend water-service piping and connect to water-supply source and building water piping systems at outside face of building wall in locations and pipe sizes indicated.
1. Terminate water-service piping at building wall until building water piping systems are installed. Terminate piping with caps, plugs, or flanges as required for piping material. Make connections to building water piping systems when those systems are installed.

B. Install underground piping with restrained joints at horizontal and vertical changes in direction. Use restrained-joint piping, thrust blocks, anchors, tie-rods and clamps, and other supports.

3.6 PIPING INSTALLATION

A. Water-Main Connection: Tap water main with size and in location as indicated according to requirements of water utility.

B. Comply with NFPA 24 for fire-protection water-service piping materials and installation.

C. Install ductile-iron piping according to AWWA C600.
1. Encase piping with PE film according to ASTM A 674 or AWWA C105.

D. Install copper tube and fittings according to CDA's "Copper Tube Handbook."

E. Install AWWA PVC plastic pipe according to AWWA M23 and ASTM F 645.

F. Bury piping with depth of cover over top at least 30 inches. Install piping free of sags and bends except as required to avoid gravity utilities installations and site footing and site construction. Installer shall verify depth of piping with all other utilities crossings and site construction to adjust piping depth as required.

3.7 ANCHORAGE INSTALLATION

A. Install anchorages for tees, plugs and caps, bends, crosses, valves, and hydrant branches. Include anchorages for the following piping systems:
   1. Gasketed-Joint, Ductile-Iron, Potable-Water Piping: According to AWWA C600.
   2. Gasketed-Joint, PVC Potable-Water Piping: According to AWWA M23.
   3. Fire-Service Piping: According to NFPA 24.

B. Install thrust blocks and anchorage Blocks in accordance with San Diego Regional Standard Drawings and in accordance with the project plans.

C. Apply full coat of asphalt or other acceptable corrosion-retarding material to surfaces of installed ferrous anchorage devices.

3.8 VALVE INSTALLATION

A. General Application: Use mechanical-joint-end valves for 3-inch NPS and larger underground installation. Use threaded- and flanged-end valves for installation in pits. Use nonrising-stem UL/FM gate valves for installation with indicator posts. Use full-port bronze corporation stops and ball valves, with ends compatible with piping, for 2-1/2 inch NPS and smaller installation.
   1. 3-piece valves are not allowed underground.

B. AWWA-Type Gate Valves: Comply with AWWA C600. Install underground valves with stem pointing up and with cast-iron valve box.

C. UL/FM-Type Gate Valves: Comply with NFPA 24. Install underground valves and valves in pits with stem pointing up and with vertical cast-iron indicator post.

D. Bronze Corporation Stops and Curb Stops: Comply with manufacturer's written instructions. Install underground curb stops with head pointed up and with cast-iron curb box.

3.9 FIRE HYDRANT INSTALLATION

A. General: Install each fire hydrant with separate gate valve in supply pipe, anchor with restrained joints or thrust blocks, and support in upright position.

3.10 WATER-METER INSTALLATION

A. Install water meters, piping, and specialties according to utility company's written requirements.

3.11 PIT CONSTRUCTION AND INSTALLATION

A. Construct pits of cast-in-place concrete pits, with manhole frame and cover, ladder, and drain. Include sleeves with waterproof mechanical sleeve seals for pipe entry and exit.

B. Install precast concrete pits according to ASTM C 891.

C. Connect area drain outlet to storm drainage piping.

3.12 DETECTOR CHECK VALVE INSTALLATION

A. Install detector check valves in pits for proper direction of flow. Install bypass with water meter, gate valves on each side of meter, and check valve downstream from meter.

B. Support detector check valves, meters, shutoff valves, and piping on concrete piers.

3.13 BACKFLOW PREVENTER INSTALLATION

A. Install backflow preventers of type, size, and capacity indicated. Include valves and test cocks. Install according to plumbing and health department authorities having jurisdiction.

B. Do not install reduced-pressure-principle type in pit.

C. Do not install bypass around backflow preventer.

D. Support backflow preventers, valves, and piping on concrete piers.

3.14 ALARM DEVICE INSTALLATION

A. General: Comply with NFPA 24 for devices and methods of valve supervision.

3.15 IDENTIFICATION INSTALLATION

A. Install continuous plastic underground warning tape during back-filling of trench for underground water-service piping. Locate 12 inches below finished grade, directly over piping.

B. Attach nonmetallic piping label permanently to main electrical meter panel.

3.16 FIELD QUALITY CONTROL

A. Piping Tests: Conduct piping tests before joints are covered and after thrust blocks have hardened sufficiently. Fill pipeline 24 hours before testing and apply test pressure to stabilize system. Use only potable water.

B. Hydrostatic Tests: Test at not less than 1-1/2 times working pressure (150 psig minimum) for 2 hours.
   1. Increase pressure in 50-psig increments and inspect each joint between increments. Hold at test pressure for one hour; decrease to 0 psig. Slowly increase again to test pressure and hold for one more hour. No perceptible leakage shall be observed. Remake leaking joints with new materials and repeat test until leakage is within above limits.
   2. Flush piping per NFPA 24 after installation and immediately prior to connecting to automatic fire sprinkler system.

C. Prepare reports for testing activities.

3.17 CLEANING

A. Clean and disinfect water distribution piping as follows:

1. Purge new water distribution piping systems and parts of existing systems that have been altered, extended, or repaired before use.
2. For fire water, use purging and disinfecting procedure prescribed by authorities having jurisdiction or, if method is not prescribed by that authority, use procedure described in NFPA 24 for flushing of piping. Flush piping system with clean, potable water until dirty water does not appear at points of outlet.
    a. For potable water, use purging and disinfecting procedure prescribed by authorities having jurisdiction or, if method is not prescribed by authorities, use procedure described in AWWA C651

B. Prepare reports for purging and disinfecting activities.

END OF SECTION 33 10 00

SECTION 33 30 00 - SANITARY SEWERAGE UTILITIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Standard Specifications for Public Works Construction and City of San Diego Supplement to the "Whitebook," (Current City adopted Editions)

C. San Diego Area Regional Standard Drawings (latest edition)

1.2 SUMMARY

A. This Section includes the sanitary sewerage system.

B. Related sections include the following:
1. Section 31 00 00, Earthwork

1.3 SUBMITTALS

A. Product Data: For sewerage system materials and products.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Protect pipe, pipe fittings, and seals from dirt and damage.

B. Handle precast concrete manholes and other structures according to manufacturer's written rigging instructions.

1.5 PROJECT CONDITIONS

A. Locate existing structures and piping to be closed and abandoned.

B. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
1. Notify Owner not less than three days in advance of proposed utility interruptions.
2. Do not proceed with utility interruptions without Owner's written permission.

PART 2 - PRODUCTS

2.1 PIPES AND FITTINGS

A. Hubless Cast-Iron Soil Pipe and Fittings: CISPI 301 or ASTM A 888, gray iron, for coupling joints.
1. Stainless-Steel, Heavy-Duty Couplings: ASTM C 1277; clamp assembly with housing fabricated from stainless steel complying with ASTM A 666, Type 304; and rubber sealing gasket complying with ASTM C 564. Include housings 3 inches wide in NPS 1-1/2 to NPS 4 and 4 inches wide in NPS 5 to NPS 10.

B. PVC Sewer Pipe and Fittings: According to the following:
   1. PVC Sewer Pipe and Fittings, NPS 15 and Smaller: ASTM D 3034, SDR 35, for solvent-cemented or gasketed joints.
      a. Gaskets: ASTM F 477, elastomeric seals.
   2. PVC Sewer Pipe and Fittings, NPS 18 and Larger: ASTM F 679, T-1 wall thickness, bell and spigot for gasketed joints.
      a. Gaskets: ASTM F 477, elastomeric seals.

2.2 SPECIAL PIPE COUPLINGS AND FITTINGS

A. Provide couplings and adapters to make joints between different pipe materials and between different sizes of pipe with standard manufactured adapters and fittings intended for that purpose.

2.3 PE FILM, PIPE ENCASEMENT

A. ASTM A 674 or AWWA C105; PE film, tube, or sheet; 8-mil thickness.

2.4 MANHOLES

A. Normal-Traffic Precast Concrete Manholes: ASTM C 478, precast, reinforced concrete, of depth indicated, with provision for rubber gasketed joints.
   1. Diameter: 48 inches minimum, unless otherwise indicated.
   2. Ballast: Increase thickness of precast concrete sections or add concrete to base section, as required to prevent flotation.
   3. Base Section: 6-inch minimum thickness for floor slab and 4-inch minimum thickness for walls and base riser section, and having separate base slab or base section with integral floor.
   4. Riser Sections: 4-inch minimum thickness, and lengths to provide depth indicated.
   5. Top Section: Eccentric-cone type, unless concentric-cone or flat-slab-top type is indicated. Top of cone of size that matches grade rings.
   6. Gaskets: ASTM C 443, rubber.
   7. Grade Rings: Include two or three reinforced-concrete rings, of 6- to 9-inch total thickness, that match 24-inch- diameter frame and cover.
   8. Steps: Fiberglass, individual steps or ladder. Include width that allows worker to place both feet on one step and is designed to prevent lateral slippage off step. Cast or anchor into base, riser, and top section sidewalls with steps at 12- to 16-inch intervals. Omit steps for manholes less than 60 inches deep.
   9. Pipe Connectors: ASTM C 923, resilient, of size required, for each pipe connecting to base section.

B. Manhole Frames and Covers: ASTM A 536, Grade 60-40-18, ductile-iron castings designed for heavy-duty service. Include 24-inch ID by 7- to 9-inch riser with 4-inch minimum width flange, and 26-inch- diameter cover. Include indented top design with lettering " SEWER" cast into cover.

C. Manhole Cover Inserts: Manufactured, plastic form, of size to fit between manhole frame and cover and designed to prevent stormwater inflow. Include handle for removal and gasket for gastight sealing.

2.5 CONCRETE

A. General: Cast-in-place concrete according to ACI 318, ACI 350R, and the following:

1. Cement: ASTM C 150, Type II.
2. Fine Aggregate: ASTM C 33, sand.
3. Coarse Aggregate: ASTM C 33, crushed gravel.
4. Water: Potable.

B. Portland Cement Design Mix: 4000 psi minimum, with 0.45 maximum water-cementitious materials ratio.
   1. Reinforcement Fabric: ASTM A 185, steel, welded wire fabric, plain.
   2. Reinforcement Bars: ASTM A 615/A 615M, Grade 60, deformed steel.

2.6 CLEANOUTS

A. Gray-Iron Cleanouts: ASME A112.36.2M, round, gray-iron housing with clamping device and round, secured, scoriated, gray-iron cover. Include gray-iron ferrule with inside calk or spigot connection and countersunk, tapered-thread, brass closure plug. Use units with top-loading classifications according to the following applications:
   1. Medium Duty: In un-paved foot-traffic areas.
   2. Heavy Duty: In on-site paved areas.
   3. Extra-Heavy Duty: In roads.
   4. Sewer Pipe Fitting and Riser to Cleanout: ASTM A 74, Service class, cast-iron soil pipe and fittings.

B. PVC Cleanouts: PVC body with PVC threaded plug. Include PVC sewer pipe fitting and riser to cleanout of same material as sewer piping.

PART 3 - EXECUTION

3.1 POTHOLING

Contractor shall pothole and locate proposed horizontal and vertical connection points to existing sewer system. Contractor shall provide necessary traffic control for potholing. In the event adjustments to sewer alignment are required to meet the existing conditions, notify the engineer of work immediately prior to commencing layout or construction of the sewer system. All potholing results shall be provided to the owner 5 working days in advance of sewer construction to allow for adjustment to storm drain alignment.

3.2 EARTHWORK

A. Excavating, trenching, and backfilling are specified in Division 2 Section “Earthwork.”

3.3 IDENTIFICATION

A. Arrange for installing green warning tapes directly over piping and at outside edges of underground structures.
   1. Use detectable warning tape over nonferrous piping and over edges of underground structures.
   2. Use detectable warning tape over ferrous piping.

3.4 PIPING APPLICATIONS

A. General: Include watertight joints.

B. Refer to Part 2 of this Section for detailed specifications for pipe and fitting products listed below. Use pipe, fittings, and joining methods according to applications indicated.

C. Gravity-Flow Piping: Use the following:
1. Hubless cast-iron soil pipe and fittings, couplings, and coupled joints.
2. PVC sewer pipe and fittings, solvent-cemented joints, or gaskets and gasketed joints.
3. Use only cast-iron pipe and fittings where sewer is placed in same trench as water piping.

3.5 INSTALLATION, GENERAL

A. Prior to survey layout, trenching, sawcutting paving, or installation of sewer pipeline, contractor to pothole and locate proposed horizontal and vertical connection points to existing sewer. In the event adjustments to sewer alignment are required to meet the existing conditions, notify the engineer of work immediately prior to commencing layout or construction of the sewer system. All potholing results shall be provided to the owner 5 working days in advance of sewer construction to allow for adjustment to the alignment.

B. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground sanitary sewerage piping. Location and arrangement of piping layout take design considerations into account. Install piping as indicated, to extent practical.

C. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for using lubricants, cements, and other installation requirements. Maintain swab or drag in line, and pull past each joint as it is completed.

D. Use manholes for changes in direction, unless fittings are indicated. Use fittings for branch connections, unless direct tap into existing sewer is indicated.

E. Use proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited.

F. Install gravity-flow piping and connect to building's sanitary drains, of sizes and in locations indicated. Terminate piping as indicated.
1. Install piping pitched down in direction of flow, at minimum slope of 2 percent, unless otherwise indicated.
2. Install piping with 36-inch minimum cover, unless otherwise indicated.

3.6 PIPE JOINT CONSTRUCTION AND INSTALLATION

A. General: Join and install pipe and fittings according to installations indicated.

B. Hubless Cast-Iron Soil Pipe and Fittings: With heavy-duty-type couplings according to CISPI 310, CISPI's "Cast Iron Soil Pipe and Fittings Handbook," and coupling manufacturer's written instructions.
1. Install PE film, pipe encasement over hubless cast-iron soil pipe and fittings according to ASTM A 674 or AWWA 105.

C. PVC Sewer Pipe and Fittings: As follows:

1. Join pipe and gasketed fittings with gaskets according to ASTM D 2321.
2. Join profile sewer pipe fittings with gaskets according to ASTM D 2321 and manufacturer's written instructions.
3. Install according to ASTM D 2321.

D. Join piping made of different materials or dimensions with couplings made for this application. Use couplings that are compatible with and that fit both systems' materials and dimensions.

E. Install with top surfaces of components, except piping, flush with finished surface.

3.7 MANHOLE INSTALLATION

A. General: Install manholes, complete with appurtenances and accessories indicated.

B. Form continuous concrete channels and benches between inlets and outlet.

C. Set tops of frames and covers flush with finished surface of manholes that occur in pavements. Set tops 3 inches above finished surface elsewhere, unless otherwise indicated.

D. Install precast concrete manhole sections with gaskets according to ASTM C 891.

3.8 CONCRETE PLACEMENT

A. Place cast-in-place concrete according to ACI 318 and ACI 350R.

3.9 CLEANOUT INSTALLATION

A. Install riser extension from sewer pipe to cleanout at grade. Use commercially manufactured 45^0 wye and 45^0 bend fittings in sewer pipes and risers for cleanouts. Install piping so cleanouts open in direction of flow in sewer pipe.

B. Extend risers a minimum of 1.5 feet above subgrade and cap.

3.10 TAP CONNECTIONS

A. Make connections to existing piping and underground structures so finished Work complies as nearly as practical with requirements specified for new Work.

B. Use commercially manufactured wye fittings for piping branch connections. Remove section of existing pipe; install wye fitting into existing piping; and encase entire wye fitting, plus 6-inch overlap, with not less than 6 inches of concrete with 28-day compressive strength of 3000 psi.

C. Make branch connections from side into existing piping, NPS 21 or larger, or to underground structures by cutting opening into existing unit large enough to allow 3 inches of concrete to be packed around entering connection. Cut end of connection pipe passing through pipe or structure wall to conform to shape of and be flush with inside wall, unless otherwise indicated. On outside of pipe or structure wall, encase entering connection in 6 inches of concrete for minimum length of 12 inches to provide additional support of collar from connection to undisturbed ground.
1. Use concrete that will attain minimum 28-day compressive strength of 3000 psi, unless otherwise indicated.

2. Use epoxy-bonding compound as interface between new and existing concrete and piping materials.

D. Protect existing piping and structures to prevent concrete or debris from entering while making tap connections. Remove debris or other extraneous material that may accumulate.

3.11 CLOSING ABANDONED SANITARY SEWERAGE SYSTEMS

A. Abandoned Piping: Close open ends of abandoned underground piping indicated to remain in place. Include closures strong enough to withstand hydrostatic and earth pressures that may result after ends of abandoned piping have been closed. Use either procedure below:
   1. Close open ends of piping with at least 8-inch- thick, brick masonry bulkheads.
   2. Close open ends of piping with threaded metal caps, plastic plugs, or other acceptable methods suitable for size and type of material being closed. Do not use wood plugs.

B. Abandoned Structures: Excavate around structure as required and use one procedure below:
   1. Remove structure and close open ends of remaining piping.
   2. Remove top of structure down to at least 36 inches below final grade. Fill to within 12 inches of top with stone, rubble, gravel, or compacted dirt. Fill to top with concrete.
   3. Backfill to grade according to Division 31 Section "Earthwork."

3.12 FIELD QUALITY CONTROL

A. Clear interior of piping and structures of dirt and superfluous material as work progresses. Maintain swab or drag in piping, and pull past each joint as it is completed.
   1. Place plug in end of incomplete piping at end of day and when work stops.
   2. Flush piping between manholes and other structures to remove collected debris, if required by authorities having jurisdiction.

B. Video-tape the interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches of backfill is in place, and again at completion of Project. Video-tape in the presence of the inspector.
   1. Defects requiring correction include the following:
      a. Alignment: Less than full diameter of inside of pipe is visible between structures.
      b. Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of size not less than 92.5 percent of piping diameter.
      c. Crushed, broken, cracked, or otherwise damaged piping.
      d. Infiltration: Water leakage into piping.
      e. Exfiltration: Water leakage from or around piping.
   2. Replace defective piping using new materials, and repeat inspections until defects are within allowances specified.
   3. Reinspect and repeat procedure until results are satisfactory.

C. Test new piping systems, and parts of existing systems that have been altered, extended, or repaired, for leaks and defects.
   1. Do not enclose, cover, or put into service before inspection and approval.
   2. Test completed piping systems according to authorities having jurisdiction.

3. Schedule tests and inspections by authorities having jurisdiction with at least 24 hours' advance notice.

END OF SECTION

SECTION 33 40 00 – STORM DRAINAGE UTILITIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Standard Specifications for Public Works Construction and City of San Diego Supplement (SSPWC) to the "Whitebook," (Current City adopted Editions)

C. San Diego Area Regional Standard Drawings (latest edition)

1.2 SUMMARY

A. This Section includes storm drainage.

B. Related Sections include the following:
1. Section 31 00 00, Earthwork

1.3 PERFORMANCE REQUIREMENTS

A. Gravity-Flow, Nonpressure-Piping Pressure Ratings: At least equal to system test pressure.

1.4 SUBMITTALS

A. Product Data: For the following:
1. Drop inlets
2. Cleanouts and drains.
3. Pipe and fittings.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Do not store plastic structures, pipe, and fittings in direct sunlight.

B. Protect pipe, pipe fittings, and seals from dirt and damage.

C. Handle precast concrete manholes and other structures according to manufacturer's written rigging instructions.

1.6 PROJECT CONDITIONS

A. Site Information: Verify existing utility locations.

B. Locate existing structures and piping to be closed and abandoned.

C. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
1. Notify Owner not less than three days in advance of proposed utility interruptions.
2. Do not proceed with utility interruptions without Owner's written permission.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Drop inlets, grates and frames:
      a. Christy Concrete Products.
      b. Oldcastle Precast Group.
      c. Utility Vault Co.
      d. Jansen Precast, Fontana CA.
      e. US Concrete Precast Group (San Diego Precast)
      f. Brooks Products
      g. Santa Rosa Cast Products company

2.2 PIPING MATERIALS

A. Refer to Part 3 "Piping Applications" Article for applications of pipe and fitting materials.

B. PVC Sewer Pipe and Fittings: According to the following:
   1. PVC Sewer Pipe and Fittings, NPS 15 and Smaller: ASTM D 3034, SDR 35, for solvent-cemented or gasketed joints.
      a. Gaskets: ASTM F 477, elastomeric seals.
   2. PVC Sewer Pipe and Fittings, NPS 18 and Larger: ASTM F 679, T-1 wall thickness, bell and spigot for gasketed joints.
      a. Gaskets: ASTM F 477, elastomeric seals.

C. Reinforced-Concrete Storm Drainage Pipe and Fittings: Use water tight-joints. ASTM C 76, Class III, Wall B, for gasketed joints.
   1. Gaskets: ASTM C 443, rubber.

D. High Density Polyethylene Pipe (DHPE)
   1. HDPE pipe will not be used for storm drainage systems on this project.

2.3 SPECIAL PIPE COUPLINGS AND FITTINGS

A. Sleeve-Type Pipe Couplings: ASTM C 1173, rubber or elastomeric sleeve and band assembly fabricated to mate with OD of pipes to be joined, for nonpressure joints.
   1. Sleeve Material for Concrete Pipe: ASTM C 443, rubber.
   2. Sleeve Material for Plastic Pipe: ASTM F 477, elastomeric seal.
   3. Sleeve Material for Dissimilar Pipe: Compatible with pipe materials being joined.

B. Bushing-Type Pipe Couplings: ASTM C 1173, rubber or elastomeric bushing fabricated to mate with OD of smaller pipe and ID of adjoining larger pipe, for nonpressure joints.
   1. Material for Concrete Pipe: ASTM C 443, rubber.
   2. Material for Plastic Pipe: ASTM F 477, elastomeric seal.
   3. Material for Dissimilar Pipe: Compatible with pipe materials being joined..

2.4 MANHOLES

A. Normal-Traffic Precast Concrete Manholes: ASTM C 478, precast, reinforced concrete, of depth indicated, with provision for rubber gasketed joints.

1. Diameter: 48 inches minimum, unless otherwise indicated.
2. Ballast: Increase thickness of precast concrete sections or add concrete to base section, as required to prevent flotation.
3. Base Section: 6-inch minimum thickness for floor slab and 4-inch minimum thickness for walls and base riser section, and having separate base slab or base section with integral floor.
4. Riser Sections: 4-inch minimum thickness, and lengths to provide depth indicated.
5. Top Section: Eccentric-cone type, unless concentric-cone or flat-slab-top type is indicated. Top of cone of size that matches grade rings.
6. Gaskets: ASTM C 443, rubber.
7. Grade Rings: Include two or three reinforced-concrete rings, of 6- to 9-inch total thickness, that match 24-inch- diameter frame and cover.
8. Steps: ASTM C 478, individual steps or ladder. Omit steps for manholes less than 60 inches deep.
9. Pipe Connectors: ASTM C 923, resilient, of size required, for each pipe connecting to base section.

B. Heavy-Traffic Precast Concrete Manholes: ASTM C 913; designed according to ASTM C 890 for A-16, heavy-traffic, structural loading; of depth, shape, and dimensions indicated, with provision for rubber gasketed joints.
1. Ballast: Increase thickness of one or more precast concrete sections or add concrete to structure, as required to prevent flotation.
2. Gaskets: Rubber.
3. Grade Rings: Include two or three reinforced-concrete rings, of 6- to 9-inch total thickness, that match 24-inch- diameter frame and cover.
4. Steps: Manufactured from deformed, 1/2-inch steel reinforcement rod complying with ASTM A 615/A 615M and encased in polypropylene complying with ASTM D 4101. Include pattern designed to prevent lateral slippage off step. Cast or anchor into sidewalls with steps at 12- to 16-inch intervals. Omit steps for manholes less than 60 inches deep.
5. Pipe Connectors: ASTM C 923, resilient, of size required, for each pipe connecting to base section.

C. Manhole Frames and Covers: ASTM A 536, Grade 60-40-18, ductile-iron castings designed for heavy-duty service. Include 24-inch ID by 7- to 9-inch riser with 4-inch minimum width flange, and 26-inch- diameter cover. Include indented top design with lettering "STORM DRAIN" cast into cover.

2.5 STORMWATER INLETS

A. Type G Catch Basins: Made of materials and dimensions according to SSPWC.

B. Curb Inlets: Made with vertical curb opening, of materials and dimensions according to SSPWC.

C. Gutter Inlets: Made with horizontal gutter opening, of materials and dimensions according to SSPWC. Include heavy-duty frames and grates.

D. Combination Inlets: Made with vertical curb and horizontal gutter openings, of materials and dimensions according to SSPWC. Include heavy-duty frames and grates.

E. Frames and Grates: Heavy-duty frames and grates according to SSPWC.

2.6 DROP INLETS

A. Precast catch basins: Precast concrete catch basins with inside dimensions and depth as shown on plans and a minimum wall thickness of 5 inches.

B. Frames and grates: Welded steel, hot dipped galvanized after fabrication per ASTM A-123. All grates shall be bicycle proof.

2.7 CLEANOUTS

A. Type A cleanouts: Per SSPWC.

B. Gray-Iron Pipe Cleanouts: ASME A112.36.2M, round, gray-iron housing with clamping device and round, secured, scoriated, gray-iron cover. Include gray-iron ferrule with inside calk or spigot connection and countersunk, tapered-thread, brass closure plug. Use units with top-loading classifications according to the following applications:
1. Medium Duty: In un-paved foot-traffic areas.
2. Heavy Duty: In on-site paved areas.
3. Extra-Heavy Duty: In roads.
4. Sewer Pipe Fitting and Riser to Cleanout: ASTM A 74, Service class, cast-iron soil pipe and fittings.

C. PVC Pipe Cleanouts: PVC body with PVC threaded plug. Include PVC sewer pipe fitting and riser to cleanout of same material as sewer piping.

2.8 CONCRETE

A. General: Cast-in-place concrete according to ACI 318, ACI 350R, and the following:
1. Cement: ASTM C 150, Type II.
2. Fine Aggregate: ASTM C 33, sand.
3. Coarse Aggregate: ASTM C 33, crushed gravel.
4. Water: Potable.

B. Portland Cement Design Mix: 3000 psi minimum, with 0.45 maximum water-cementitious ratio.
1. Reinforcement Fabric: ASTM A 185, steel, welded wire fabric, plain.
2. Reinforcement Bars: ASTM A 615/A 615M, Grade 60, deformed steel.

C. Structure Channels and Benches: Factory or field formed from concrete. Portland cement design mix, 3000 psi minimum, with 0.45 maximum water-cementitious ratio.

1. Include channels and benches in manholes.

a. Channels: Concrete invert, formed to same width as connected piping, with height of vertical sides to three-fourths of pipe diameter. Form curved channels with smooth, uniform radius and slope.
I. Invert Slope: 1 percent through manhole.
II. Invert Slope: 2 percent through manhole.
III. Invert Slope: None.

b. Benches: Concrete, sloped to drain into channel.
I. Slope: 8 percent.
II. Slope: 4 percent.

2. Include channels in catch basins.

a. Channels: Concrete invert, formed to same width as connected piping, with height of vertical sides to three-fourths of pipe diameter. Form curved channels with smooth, uniform radius and slope.
   I. Invert Slope: 1 percent through catch basin.
   II. Invert Slope: 2 percent through catch basin.
   III. Invert Slope: None.

D. Ballast and Pipe Supports: Portland cement design mix, 3000 psi minimum, with 0.58 maximum water-cementitious ratio.
   1. Reinforcement Fabric: ASTM A 185, steel, welded wire fabric, plain.
   2. Reinforcement Bars: ASTM A 615/A 615M, Grade 60, deformed steel.

2.9 PROTECTIVE COATINGS

A. Description: One- or two-coat, coal-tar epoxy; 15-mil minimum thickness, unless otherwise indicated; factory or field applied to the following surfaces:
   1. Concrete Manholes: On exterior surface.
   2. Catch Basins: On exterior surface.

2.10 DRAINS

A. Area Drains: See site furnishing section for information on the square are drains.

PART 3 - EXECUTION

3.1 POTHOLING

A. Contractor shall pothole and locate proposed horizontal and vertical connection points to existing storm drain. Contractor shall provide necessary traffic control for potholing. In the event adjustments to storm drainage alignment are required to meet the existing conditions, notify the engineer of work immediately prior to commencing layout or construction of the storm drainage system. All potholing results shall be provided to the owner 5 working days in advance of storm drainage construction to allow for adjustment to storm drain alignment.

3.2 EARTHWORK

A. Excavating, trenching, and backfilling are specified in Division 31 Section “Earthwork.”

3.3 IDENTIFICATION

A. Materials and their installation are specified in Division 31 Section "Earthwork." Arrange for installing green warning tapes directly over piping and at outside edges of underground structures.
   1. Use warning tape or detectable warning tape over ferrous piping.
   2. Use detectable warning tape over nonferrous piping and over edges of underground structures.

3.4 PIPING APPLICATIONS

A. Refer to Part 2 of this Section for detailed specifications for pipe and fitting products listed below. Use pipe, fittings, and joining methods according to applications indicated.

B. Gravity-Flow Piping: Use the following:

1. Hub-and-spigot, Extra-Heavy class, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
2. Hub-and-spigot, Service class, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
3. Ductile-iron sewer pipe; standard-pattern, ductile-iron fittings; gaskets; and gasketed joints.
4. Corrugated-steel pipe and fittings, connecting bands, and banded joints.
5. PVC sewer pipe and fittings, gaskets and gasketed joints.
6. Reinforced-concrete sewer pipe and fittings, gaskets, and gasketed joints.

3.5 SPECIAL PIPE COUPLING AND FITTING APPLICATIONS

A. Special Pipe Couplings: Use where required to join piping and no other appropriate method is specified. Do not use instead of specified joining methods.
   1. Use the following pipe couplings for nonpressure applications:
      a. Sleeve type to join piping, of same size, or with small difference in OD.
      b. Increaser/reducer-pattern, sleeve type to join piping of different sizes.
      c. Bushing type to join piping of different sizes where annular space between smaller piping's OD and larger piping's ID permits installation.

B. Special Pipe Fittings: Use where indicated. Include PE film, pipe encasement.

3.6 INSTALLATION, GENERAL

A. Prior to survey layout, trenching, sawcutting paving, or installation of storm drainage pipeline, contractor to pothole and locate proposed horizontal and vertical connection points to existing storm drain.

In the event adjustments to storm drainage alignment are required to meet the existing conditions, notify the engineer of work immediately prior to commencing layout or construction of the storm drainage system. All potholing results shall be provided to the owner 5 working days in advance of storm drainage construction to allow for adjustment to storm drain alignment.

B. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground storm drainage piping. Location and arrangement of piping layout take design considerations into account. Install piping as indicated, to extent practical.

C. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements. Maintain swab or drag in line, and pull past each joint as it is completed.

D. Use type “A” cleanouts for changes in direction, unless fittings are indicated. Use fittings for branch connections, unless direct tap into existing sewer is indicated.

E. Use proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited.

F. Install gravity-flow piping and connect to building's storm drains, of sizes and in locations indicated. Terminate piping as indicated.

1. Install piping pitched down in direction of flow as indicated in the contract drawings.

G. Extend storm drainage piping and connect to building's storm drains, of sizes and in locations indicated. Terminate piping as indicated.

H. Bedding shall consist of a four inch layer of ¾" crushed rock.

I. For soft and unsuitable trench bottom material, an additional 10" layer of foundation rock shall be added. Foundation rock shall be 1-1/2" crushed rock wrapped with filter fabric with a 12-inch minimum overlap. Filter fabric shall be Mirafi 140N, or approved equivalent.

3.7 PIPE JOINT CONSTRUCTION AND INSTALLATION

A. General: Join and install pipe and fittings according to installations indicated.

B. Hub-and-Spigot, Cast-Iron Soil Pipe and Fittings: With rubber gaskets according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook." Use gaskets that match class of pipe and fittings.

C. Ductile-Iron Sewer Pipe with Ductile-Iron Fittings: According to AWWA C600.

D. PVC Sewer Pipe and Fittings: As follows:
1. Join pipe and gasketed fittings with gaskets according to ASTM D 2321.
2. Install according to ASTM D 2321.

E. Concrete Pipe and Fittings: Install according to ACPA's "Concrete Pipe Installation Manual." Use the following seals:
1. Round Pipe and Fittings: ASTM C 443, rubber gaskets.

F. System Piping Joints: Make joints using system manufacturer's couplings, unless otherwise indicated.

G. Join piping made of different materials or dimensions with couplings made for this application. Use couplings that are compatible with and that fit both systems' materials and dimensions.

3.8 MANHOLE INSTALLATION

A. General: Install manholes, complete with appurtenances and accessories indicated.

B. Form continuous concrete channels and benches between inlets and outlet.

C. Set tops of frames and covers at the rim grades shown rim elevations shown on plans.

D. Install precast concrete manhole sections with gaskets according to ASTM C 891.

3.9 CATCH-BASIN INSTALLATION

A. Construct catch basins to sizes and shapes indicated.

B. Set frames and grates to elevations indicated.

3.10 CONCRETE PLACEMENT

A. Place cast-in-place concrete according to ACI 318 and ACI 350R.

3.11 DRAINAGE SYSTEM INSTALLATION

A. Assemble and install components according to manufacturer's written instructions.

3.12 PIPE CLEANOUT INSTALLATION

A. Install pipe cleanout riser pipes to grade. Use commercially manufactured 45^0 wye and 45^0 bend fittings in storm drain pipes and risers for cleanouts. Install piping so cleanouts open in direction of flow in storm drain pipe.

B. Extend risers a minimum of 1.5 feet above subgrade and cap.

3.13 DRAIN INSTALLATION

A. Install type of drains in locations indicated.

B. Embed drains in 4-inch minimum depth of concrete around bottom and sides.

C. Fasten grates to drains if indicated.

D. Set drain frames and covers at elevations shown on plans.

3.14 TAP CONNECTIONS

A. Make connections to existing piping and underground structures so finished Work complies as nearly as practical with requirements specified for new Work.

B. Use commercially manufactured wye fittings for piping branch connections. Remove section of existing pipe; install wye fitting into existing piping; and encase entire wye fitting, plus 6-inch overlap, with not less than 6 inches of concrete with 28-day compressive strength of 3000 psi.

C. Make branch connections from side into existing piping, NPS 4 to NPS 20. Remove section of existing pipe; install wye fitting into existing piping; and encase entire wye with not less than 6 inches of concrete with 28-day compressive strength of 3000 psi.

D. Make branch connections from side into existing piping, NPS 21 or larger, or to underground structures by cutting opening into existing unit large enough to allow 3 inches of concrete to be packed around entering connection. Cut end of connection pipe passing through pipe or structure wall to conform to shape of and be flush with inside wall, unless otherwise indicated. On outside of pipe or structure wall, encase entering connection in 6 inches of concrete for minimum length of 12 inches to provide additional support of collar from connection to undisturbed ground.
   1. Use concrete that will attain minimum 28-day compressive strength of 3000 psi, unless otherwise indicated.
   2. Use epoxy-bonding compound as interface between new and existing concrete and piping materials.

E. Protect existing piping and structures to prevent concrete or debris from entering while making tap connections. Remove debris or other extraneous material that may accumulate.

3.15 ABANDONED STORM DRAINAGE SYSTEMS

A. All abandoned storm drain systems within the project area shall be excavated and removed. All trenching for such removal shall be backfilled and compacted in accordance with Section 31 00 00 Earthwork.

3.16 FIELD QUALITY CONTROL

A. Clear interior of piping and structures of dirt and superfluous material as work progresses. Maintain swab or drag in piping, and pull past each joint as it is completed.
   1. In large, accessible piping, brushes and brooms may be used for cleaning.
   2. Place plug in end of incomplete piping at end of day and when work stops.
   3. Flush piping between manholes and other structures to remove collected debris, if required by authorities having jurisdiction.

B. Video tape the interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches of backfill is in place, and again at completion of Project.
   1. Submit separate reports for each system inspection.
   2. Defects requiring correction include the following:
      a. Alignment: Less than full diameter of inside of pipe is visible between structures.
      b. Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of size not less than 92.5 percent of piping diameter.
      c. Crushed, broken, cracked, or otherwise damaged piping.
      d. Infiltration: Water leakage into piping.
      e. Exfiltration: Water leakage from or around piping.
   3. Replace defective piping using new materials, and repeat inspections until defects are within allowances specified.
   4. Reinspect and repeat procedure until results are satisfactory.

C. Test new piping systems, and parts of existing systems that have been altered, extended, or repaired, for leaks and defects.
   1. Do not enclose, cover, or put into service before inspection and approval.
   2. Test completed piping systems according to authorities having jurisdiction.
   3. Schedule tests and inspections by authorities having jurisdiction with at least 24 hours' advance notice.
   4. Submit separate reports for each test.
   5. Leaks and loss in test pressure constitute defects that must be repaired.
   6. Replace leaking piping using new materials, and repeat testing until leakage is within allowances specified.

END OF SECTION

SUPPLEMENTARY SPECIAL PROVISIONS

APPENDICES

APPENDIX A

Geotechnical Report by URS dated April 11, 2012

REPORT

GEOTECHNICAL INVESTIGATION AND FAULT HAZARD ASSESSMENT REHABILITATION OF HISTORIC PARK AND CONSTRUCTION OF NEW URBAN PLAZA AT HORTON PLAZA CITY OF SAN DIEGO, CALIFORNIA

Prepared for

Centre City Development Corporation
401 B Street, Suite 400
San Diego, California 92101-4298

URS Project No. 27661138.10000

April 11, 2012

URS

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URS

April 11, 2012

Mark A. Caro, ASLA, PLA
Senior Planner/Landscape Architect
Centre City Development Corporation
401 B Street, Suite 400
San Diego, California 92101-4298

Subject: Geotechnical Investigation and Fault Hazard Assessment
Rehabilitation of Historic Park and Construction of New Urban Plaza at Horton Plaza
City of San Diego, California
URS Project No. 27661138.10000

Dear Mr. Caro:

URS Corporation Americas (URS) is pleased to submit this report presenting the results of our geotechnical and fault hazard assessment for the Rehabilitation of the Historic Park and Construction of the New Urban Plaza at Horton Plaza project, in downtown San Diego, California. This investigation was performed in accordance with our proposal dated October 21, 2011.

This report presents our conclusions and geotechnical design recommendations, based on our understanding of the project provided in the Request for Fee Proposal (RFP) prepared by the Centre City Development Corporation (CCDC), dated October 5, 2011. Submittal of this report provides the final deliverable for this project.

We are pleased to be part of this project, and if you have any questions, please contact us at (858) 812-9292.

Sincerely,

URS CORPORATION

Charles Robin (Rob) Stroop, C.E.G. 2298
Senior Project Geotechnical Engineer

REGISTERED PROFESSIONAL ENGINEER CHARLES R. STROOP NO. 2298 Exp. 3/31/14 GEOTECHNICAL STATE OF CALIFORNIA

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Appendix A Previous Exploration Logs

ACI	American Concrete Institute
ASTM	ASTM International (formerly American Society of Testing and Materials)
bgs	below ground surface
BMP	Best Management Practices
Cal-OSHA	California Occupational Safety and Health Administration
CBC	California Building Code
CCDC	Centre City Development Corporation
CIDH	Cast-In-Drilled-Hole
EFZ	Earthquake Fault Zone
EI	Expansion Index
H:V	horizontal:vertical
LID	Low Impact Design
MSL	Mean Sea Level
PCC	Portland Cement Concrete
pcf	pounds per cubic foot
pci	pounds per cubic inch
psf	pounds per square foot
RCFZ	Rose Canyon Fault Zone
RFP	Request for Fee Proposal
The City	City of San Diego
TI	Traffic Index
URS	URS Corporation Americas

SECTION 1 INTRODUCTION

This report presents the results of URS Corporation Americas' (URS) geotechnical investigation and fault hazard assessment to support the architectural and engineering design of the Rehabilitation of the Historic Park and Construction of the New Urban Plaza at Horton Plaza in the City of San Diego (City), California. The site is located in the central business district of downtown San Diego and is bounded by Broadway to the north, the Westfield Horton Plaza retail center to the south, Fourth Avenue to the east and Broadway Circle to the west. Figure 1 presents a Site Vicinity Map.

1.1 PROJECT DESCRIPTION

Our understanding of the project is based on the Request for Fee Proposal (RFP) for Geotechnical and Fault Investigation for Horton Park Plaza prepared by Centre City Development Corporation (CCDC), dated October 5, 2011, and the project plans the 100% design development phase prepared under the direction of Walker Macy and dated February 17, 2012. The RFP included a previous geotechnical report prepared by Geocon, Inc. for a nearby project.

The existing Robinson May building will be demolished to develop an approximately 37,000 square foot urban public plaza. The project will also rehabilitate the historic Broadway fountain and City Park, which is about 20,000 square feet in area. The New Urban Plaza, which will include the historic park, will encompass an area of about 57,000 square feet, as shown on Figure 2, Site Plan. The New Urban Plaza is anticipated to conduct more than 200 civic events and community celebrations every year.

The New Urban Plaza will consist of a main plaza, amphitheater seating, three (3) kiosks that include public restrooms, American Disability Association (ADA) Ramps, underground storage space behind the seating area, and landscaping. The grade difference from the Plaza level and the finish level of the below grade storage area, to the top of the seating area is approximately 10 feet. The site lighting structures or 'Luminaires' and other columns will be supported on 36- or 48-inch diameter Cast-In-Drilled Hole (CIDH) piles. The pile embedment depths range from 7 to 13 feet. The proposed structures are steel framed and are lightly loaded.

1.2 PURPOSE AND SCOPE OF SERVICES

The purpose of this investigation was to provide geotechnical recommendations for architectural and engineering design of the project and assess the potential for fault rupture within the site. The scope of services included:

- Performing a desktop review of published geologic information and previous geotechnical and fault studies in the immediate vicinity of the site. A list of the documents reviewed is included in Section 7;
- Geologic and geotechnical engineering analyses and evaluations; and
- Preparing this report with findings, conclusions and recommendations.

S□C□I□□ 2 PR□□I□□S S□□DI□S

The current URS study has been completed using existing geotechnical information including the geotechnical report provided in the RFP and did not include new subsurface explorations. The locations of the previous projects are shown on Figures 2 and 3 and copies of the pertinent boring and trench logs are presented in Appendix A.

2.1 □RS S□□DI□S

URS (as its predecessor companies) has previously completed numerous geotechnical and fault hazard assessment studies in downtown San Diego. The relevant previous project files were retrieved from our archives and reviewed as detailed below.

- Woodward-Clyde-Sherard & Associates, 1967 – A report was prepared for Westgate California Realty Company titled "Soil Investigation for the Proposed Westgate Plaza Hotel, "C" Street & Second Avenue, San Diego, California," dated June 2, 1967. Nineteen (19) geotechnical borings were performed as part of this investigation. The borings extended to depths ranging from 23 to 75 feet below ground surface (bgs). The soils encountered in the borings were described as formational soils. These formational soils consisted of loose to medium dense silty and clayey sands and firm to very stiff sandy clay.

- Woodward-Clyde & Associates, 1970 – A preliminary investigation was completed at the site of Federal Office Buildings and the results were presented in a report titled "Preliminary Soil Studies, Federal Office Buildings, San Diego, California," dated September 3, 1970. This project performed six (6) geotechnical borings spread out in the blocks bounded by Broadway, Union, and F Streets and First Avenue, located west of the current project. The borings were advanced to a maximum depth of 58 feet. The subsurface conditions encountered in the borings were interpreted to be formational soils consisting of interbedded layers of medium dense to very dense sand and very stiff to hard clay. Groundwater was encountered in the borings at depths ranging from 26 to 41 feet bgs.

- Woodward-Gizienski & Associates, 1973 – A geotechnical investigation was completed for the Central Federal Savings and Loan Tower, located immediately west of the current project. The results were presented in a report titled "Soil Investigation for the Proposed Central Federal Savings and Loan Tower, San Diego, California," dated December 29, 1973. This project advanced seven (7) test borings to depths ranging from 26 to 96 feet bgs. The subsurface conditions were described as native soils in all but four (4) borings, where fill soils were reported. Deep fills were encountered to a maximum depth of 24 feet bgs and were interpreted to be structural and utility trench backfill. Groundwater was reported within soil borings at depths of 40 and 43 feet bgs.

- URS (2010) performed a preliminary fault hazard investigation for the proposed redevelopment of the Civic Center Complex in downtown San Diego. The study area was approximately bounded by A, C, Front Streets and Third Avenue. The study included a review of previous fault hazard investigations conducted by a number of consultants in the project vicinity. Due to the

large study area, and the preliminary nature of the study, trenching was not performed. Alternately, continuously cored borings were drilled to depths up to about 95 feet bgs to map geologic boundaries at depth below the study area. Correlative layers encountered in the borings, including gravel beds in the Bay Point Formation provided laterally continuous "marker beds" in the subsurface. Some of the marker beds could be traced over several city blocks, which suggested the absence of faulting between the borings. Prior to the study, there were no faults known within the study area, although the San Diego fault had been mapped just west of the Civic Center study area, as discussed below. The study confirmed there were no new faults in the proposed redevelopment area.

2.2 GEOCON INCS

Geocon, Inc. performed a geotechnical investigation in 2004 for the Balboa Theatre Rehabilitation, located at the intersection of 4th Avenue and E Street. As part of this investigation, Geocon advanced six (6) geotechnical borings to depths ranging from 8 to 20 feet bgs. The borings were reported to have encountered shallow fills (to a maximum depth of 3.5 feet bgs) over Bay Point Formation. Geocon reported that the shallow fills may have been the result of previous site development and generally consisted of loose to dense silty sand. Bay Point Formation was reported to consist of dense to very dense silty sand with some gravel, with intermittent stiff silty or sandy clay layers. Groundwater was not reported during drilling.

Geocon had previously performed a geotechnical investigation for the Horton Plaza Park for CCDC (Geocon, 1984). The investigation included excavating four shallow tests pits on the lawn and next to the fountain in the historic park, as shown on Figure 2. Geocon had concluded "the site is not located on any known earthquake fault trace". According to the report, this opinion was based on available downtown geologic studies at that time, that "….. indicate no evidence of faulting in the immediate site vicinity".

2.3 RINCS

Leighton & Associates (1980) performed a geotechnical investigation for the multi-block area that is now Horton Plaza. The investigation area included the southern two-thirds of the subject site (i.e., the approximate area of the former Robinsons May building). Thirty-eight test borings were performed over the multi-block site to depths up to 150 feet bgs. Five of these borings were located on the subject site, as shown on Figure 2. Based on their borings, Leighton & Associates prepared four subsurface geologic cross sections, two of which encompass the subject site (Appendix A). Correlations between the borings "indicate a distinct continuous stratigraphic sequence underlies the subject site". Faults were suspected by Leighton & Associates in an area (that was at the time) two city blocks to the southwest of the subject site. No other faults were indicated on the subject site based on subsurface correlations, as reported by Leighton & Associates (1980).

In about 1980, URS (as our predecessor Woodward-Clyde & Associates) was awarded a research investigation grant from the U.S Geological Survey, as part of the National Earthquake Hazard Reduction Program. A major cross-town sewer interceptor was to be constructed, and the grant funded geologic logging of trench excavation for the interceptor pipe. The San Diego fault (discussed further below) had been discovered previously on the city block bounded by Broadway, Front and E Streets, and First

Avenue (Artim and Streiff, 1981), about three blocks west of the site. The sewer trench extended along Broadway (on the north side of the site) to the intersection of Broadway and Fourth Avenue, and then turned south on Fourth Avenue (along the east side of the site), as shown on Figure 3. Artim and Streiff (1981) reported the results of the study, including geologic logs of the trench excavation. The sewer trench was typically about 18 feet deep, and extended into Holocene and late Pleistocene age sediment. The San Diego fault was the only fault observed within the entire length of the sewer trench; the fault was found about three blocks west of the subject site. The geologic log of the portion of the sewer trench along Broadway and 4th Avenue (encompassing the site) is included in Appendix A.

S□C□I□ □ 3 SI□□ □□D G□□L□GIC C□ □DI□I□ □S

Knowledge of the site conditions was developed from a review of available information and area geology, site reconnaissance, and previous studies.

3.1 G□□L□GIC S□□□I□G

The downtown area is located in the coastal plain sub-province of the Peninsular Ranges Physiographic Province. The Peninsular Ranges consist of a series of elongated northwest-trending mountain ranges with intervening valleys and structural basins. The coastal plain runs parallel to the coastline and flanks the western edge of the Peninsular Ranges in San Diego County.

The coastal plain sub-province is characterized by a broad wedge of Tertiary age sedimentary deposits that increase in thickness to the west and which are capped by Quaternary terrace deposits. The terrace deposits define broad, relatively flat mesa surfaces. Rivers and secondary drainages have subsequently incised these Quaternary and Tertiary deposits to create the mesa and valley physiography that is characteristic of the San Diego area.

The downtown area of San Diego is a low relief coastal plain that gains elevation towards the low mesas bordering the area to the north and east. The coastal plain is underlain by the Bay Point Formation, a sedimentary deposit of Pleistocene age. The Pliocene age San Diego Formation is a sedimentary formation that underlies the Bay Point Formation at depth. Kennedy (1975) mapped all of downtown San Diego (inland of the historic high tide line) as the Bay Point Formation. Figure 4 presents a regional geologic map. The age of the Bay Point Formation is considered to span a fairly wide range. Kern (1977) interpreted much of the Bay Point Formation as being deposited about 125,000 years ago corresponding to a major high stand of sea level. Studies by Deméré (1981) and Artim and Streiff (1981) have yielded estimates of up to 560,000 years before present for marine deposits mapped as the Bay Point Formation in areas of downtown San Diego. Recent digitally prepared mapping by Kennedy and Tan (2005) have subdivided and renamed the Bay Point Formation as Old Paralic Deposits. The older usage (i.e., “Bay Point Formation”) is adopted here for continuity with previous studies.

3.2 □□C□□ □IC S□□□I□G

The tectonic setting of the San Diego area is influenced by plate boundary interaction between the Pacific and North American lithospheric plates. This crustal interaction occurs along a broad zone of northwest striking, predominantly right slip faults that span the width of the Peninsular Ranges and extend offshore into the California Continental Borderland Province. At the latitude of San Diego, this zone extends from the San Clemente fault zone, located approximately 60 miles offshore of the San Diego coastline to the San Andreas fault, located about 70 miles east of San Diego.

Geologic, geodetic, and seismic data indicate that the faults along the eastern margin of the plate boundary, including the San Andreas, San Jacinto, and Imperial faults, including their associated branches, are currently the most active and appear dominant in accommodating the majority of the motion between the two adjacent plates. A smaller portion of the relative plate motion is being accommodated by northwest-striking faults to the west, including the Elsinore, Rose Canyon, San Miguel, and Agua Blanca

fault zones; and offshore faults, including the Coronado Bank, San Diego Trough, and San Clemente fault zones. Many of these faults have experienced historic seismic activity.

3.2.1 Rose Canyon Fault

Downtown San Diego is generally considered to lie within the Rose Canyon Fault Zone. The on-shore portion of the Rose Canyon Fault Zone (RCFZ) extends along the northeast flank of Mount Soledad at La Jolla and continues southward along the eastern margins of Mission Bay (just west of Interstate 5) towards downtown San Diego, as shown on Figure 4. Between Mission Bay and San Diego Bay, the zone appears to widen and diverge. At least three principal faults extend across San Diego Bay to Coronado and beyond to the south. The three principal faults identified in San Diego Bay are the Spanish Bight, Coronado, and Silver Strand Faults.

3.2.2 Other Faults

Onshore in downtown San Diego there are two active fault zones that are designated as Alquist Priolo Earthquake Fault Zones (EFZ) by the California State Geologist. Active[1] faulting has been demonstrated in these zones and any development within the designated zones requires fault hazard investigations. Figure 4 shows the locations of the EFZ zones in downtown San Diego. The main fault in the western EFZ is known as the San Diego fault and is considered active in the locations mapped (Treiman, 2002). This fault has a north trend with a slight west component. As shown in Figure 4, it projects across downtown towards the southern end of the RCFZ. This projection extends north and west of the proposed project.

Figure 3 shows the approximate extent of the EFZ near the project site. The EFZ in this area bounds the northernmost known location of the San Diego fault, as encountered in a sewer trench excavation along Broadway, approximately mid-block between Front Street and First Avenue (Treiman, 2002). Law Crandall's completed a previous fault investigation (2000) that indicated several subsurface anomalies, thought to be possible continuations of the San Diego fault north of Broadway, as shown on Figure 3.

3.2.3 Historical Seismicity

The site could be subject to moderate to strong ground shaking from a local or more distant, large magnitude earthquake occurring during the expected life span of the development. Figure 5 presents the locations of regional faults and historical earthquake epicenters in southern California.

To the east is the Salton Trough, a very active seismic zone that contains high slip rate faults including the southern San Andreas, Imperial and San Jacinto faults. The Imperial fault has ruptured twice in the last 70 years and the San Jacinto has displayed the highest activity level of any fault in the State. The recent Sierra El Major earthquake event occurred to the south of the Salton Trough in Mexico.

San Diego has experienced strong seismic shaking and minor damage from local and distant earthquakes, but none have been very destructive (Agnew and others, 1979). A large earthquake in 1862 may have

[1] "Active" faults are defined as faults that have moved in the past 11,000 years (Holocene epoch). The city of San Diego considers faults that have moved in the past approximately 2 million years to be "potentially active".

been centered locally (Anderson and others, 1989), and some researchers have suggested the 1862 event could have been in or near San Diego Bay. Paleoseismic studies suggest that the last large event on the Rose Canyon fault may have occurred on the order of 300 years ago.

3.3 G□□L□GIC □□I□S

Based on our interpretation of the subsurface conditions within the depths of the previous explorations completed near the proposed project, the site is underlain by shallow undocumented fill overlying Bay Point Formation. The following paragraphs briefly describe these units.

3.3.1 Undocumented Fill

Undocumented fill is soil placed with no records of observation and compaction testing by a Geotechnical Engineer. Across most of the site, undocumented fill is anticipated to be present to depths of 3 to 4 feet bgs and is expected to consist of loose to medium dense silty to clayey sand. In this urbanized setting, localized zones of deeper fill may be expected.

3.3.2 Bay Point Formation

The Bay Point Formation is expected to underlie the undocumented fill across the site. The formational soils are expected to consist of irregular layered sequences of dense to very dense silty sand, clayey sand, and/or very stiff to hard sandy clay.

Geocon's (1984) test pits within the historic Horton Park encountered 1 to 2 feet of clayey fine sand "topsoil", overlying dense, clayey fine sand of the Bay Point Formation to maximum exploration depths up to about 5 feet bgs.

The previous borings by Leighton & Associates (1980) reached depths up to about 50 feet bgs within the site limits. Below shallow fill soils, the borings penetrated four stratigraphic units within the Pleistocene age Bay Point Formation, which included (from ground surface down): sandy clayey silts and silty sands (Unit A); silty sands and sandy silts with some gravels (Unit B); sands to slightly silty sands (Unit C); and silty sands and sandy silts with lenses of clayey gravel (Unit D). Leighton & Associates geologic cross sections encompassing the site are included in Appendix A.

Leighton & Associates (1980) subsurface geologic correlations depicted layer continuity in the Bay Point Formation, with no faults indicated below the site. During review of Leighton & Associates test borings, we noted the borings (e.g., Borings 1 and 2, and other borings) within the site area penetrated a gravel layer at relatively uniform depths. The previous nearby sewer trench excavation (Artim and Streiff, 1981) had also encountered a continuous layer of gravels at comparable depths in the Bay Point Formation. From west to east along Broadway, the gravels in the trench appeared to slope down to the east from about 37 feet to 27 feet. As the trench turned south at 4th Avenue (approximate trench Station 2835), the gravels then appeared to slope southerly, to depths of about 27 feet MSL. The gravel layer in the trench appears to correlate with the gravel layer penetrated by Leighton & Associates' borings, as discussed below.

Figure 6 is a geologic cross section across the mid-portion of the site, based on Leighton & Associate's borings, and the sewer trench geologic log. As shown on Figure 6, the Bay Point Formation gravels in the borings appear to dip down to the east, at similar depths as the trench. Therefore, the gravel layer also appears to be another correlative "marker bed" in the Pleistocene Bay Point Formation that is laterally persistent in the subsurface below the site. It is unlikely that this pattern would be indicated, if a fault with significant vertical offset were present below the site.

3.4 GR□□□D□ □□□R

Groundwater is not expected to occur at shallow depths at the site. In general, the depth to groundwater within this area of downtown is expected at approximately 30 to 40 feet bgs. Shallow groundwater could occur in the future from seasonal rains or changes in land use. Other localized perched groundwater conditions may exist within the site at shallow depths.

S□C□I□□ 4 DISC□SSI□□S, C□□CL□SI□□S, □□D R□C□□□□□D□□I□□S

The discussions, conclusions, and recommendations in this report are based on the information provided to us, literature research, results of the previous investigations, engineering evaluations and analyses, and professional judgment. The recommendations provided in this report are in accordance with the City of San Diego (The City) 2011 Guidelines for Geotechnical Reports.

In our opinion, the site is geotechnically suitable for the proposed redevelopment. However, as discussed in the previous section, the site is underlain by shallow undocumented fill over Bay Point Formation. The existing fill is not suitable for the support of foundations. The following sections provide findings from our geotechnical evaluations, and recommendations for the geotechnical aspects of design and construction, including removal and recompaction of the undocumented fill.

4.1 S□IS□IC □□D G□□L□GIC □□□□RDS

4.1.1 Fault Hazard Assessment

No faults have been mapped or interpreted in the immediate site area. As discussed, the subsurface geology inferred from the previous borings within the site does not suggest faulting. Moreover, the trench by Artim and Strieff (1981) allowed direct observation and mapping of the surface geology along the north and east edges of the site, and beyond. No faults were observed in the trench in the immediate site area. Artim & Streiff (1981) did observe faulting and mapped the San Diego fault about three blocks to the west of the site; the fault was later determined to be active (Treiman, 2002). However, the San Diego fault does not project towards the site area based on a number of previous investigations as summarized in Treiman, 2002.

In our opinion, the site is not underlain by an active or a potentially active fault. No fault setbacks are recommended for the proposed redevelopment of the site.

4.1.2 Ground Shaking and CBC Seismic Coefficients

The project area will likely be subject to moderate to severe ground shaking in response to a local or more distant large-magnitude earthquake occurring during the expected life of the proposed facilities. Seismic hazard mapping by the California Geologic Survey has determined the peak ground acceleration (PGA) at the site (at 10% probability of being exceeded in 50 years) should be 0.29g, considering the soft rock conditions (Bay Point Formation).

We recommend that all structures on the site be built in accordance with the seismic recommendations provided in the 2010 California Building Code (CBC). The design parameters presented in the table below should be used for design.

2010 CBC Seismic Design Parameters

Parameter	Value	2010 CBC Reference
Site Class	C	Table 1613.5.2
Mapped Spectral Acceleration - Short Period, S_s (g)	1.572	Figure 1613.5(3)1
Mapped Spectral Acceleration - 1 Sec. Period, S_1 (g)	0.617	Figure 1613.5(4)1
Site Coefficient - Short Period, F_a	1.000	Table 1613.5.3(1)1
Site Coefficient - 1 Sec. Period, F_v	1.300	Table 1613.5.3(2)1
MCE2 Spectral Response Acceleration - Short Period, SM_S (g)	1.572	Equation 16-37, $SMS=F_aS_s$
MCE2 Spectral Response Acceleration - 1 Sec. Period, SM_1 (g)	0.802	Equation 16-38, $SM1=F_vS_1$
Design Spectral Response Acceleration - Short Period, SD_S (g)	1.048	Equation 16-39, $SDS=2/3*SM_S$
Design Spectral Response Acceleration - 1 Sec. Period, SD_1 (g)	0.534	Equation 16-40, $SD1=2/3*SM_1$

Notes:
1. Calculated using USGS program "Earthquake Ground Motion Parameters" Version 5.1.0.
2. MCE – Maximum Considered Earthquake.
3. Site coordinates estimated from 'Google Earth' computer program used to evaluate coefficients: 32.715319; -117.161556.

4.1.3 Soil Liquefaction

Liquefaction is a phenomenon in which loose to medium dense, saturated, granular materials undergo matrix rearrangement, develop high pore water pressure, and lose shear strength because of cyclic ground vibrations induced by earthquakes. This rearrangement and strength loss is followed by a reduction in bulk volume of the liquefied soils. The secondary effects of liquefaction can include the loss of bearing capacity below foundations, settlements in level ground, and instabilities in areas of sloping ground.

The Bay Point Formation underlying the site is a geologically older consolidated sedimentary deposit, and shallow groundwater is not anticipated at the site; therefore the potential for significant liquefaction and its secondary effects at the site should be low.

4.1.4 Other Hazards

The local geologic conditions indicate that the probability of other geologic hazards (such as expansive soils, slope instability, subsidence, seiches, tsunamis, and flooding), affecting the site should be very low. Expansive soils, if present in fill, should be removed and disposed off site, or placed in landscaped areas. There are no significant slopes near the project; therefore, slope instability is not considered a hazard. The potential for seiches or tsunamis to affect the site is considered low given the site location. Similarly, the site is not in an active flood plain and the risk from flooding is considered low. These hazards do not constitute constraints to site development.

4.2 SI□□ □□R□□□ □R□

4.2.1 General

Site earthwork will generally consist of demolition of the existing Robinson May building, construction of temporary slopes following the demolition, removal of unsuitable fill material, foundation excavations, and backfill of utility trenches. Based on the planned improvements and existing site conditions, major site grading operations are not expected at the site. Earthwork should be performed in accordance with the latest edition of the Standard Specifications for Public Works Construction ("Green Book").

4.2.2 Site Preparation

Weeds, grass, trees, shrubs, structures, and abandoned utilities and improvements, and construction debris within areas that are to be graded should be cleared and properly disposed of off-site. Roots and other vegetative matter should be removed and disposed either offsite or stockpiled for reuse in landscape areas. Existing infrastructure should be properly demolished and disposed at an appropriate facility offsite.

Removal of existing fill is required to expose suitable material on which to place fill. Removals should generally extend into competent formational materials as observed and approved by a Geotechnical Engineer. We anticipate about 4 feet of fill will need to be removed and replaced as properly compacted fill across the entire site. A Geotechnical Engineer should make the final determination of actual removal depths in the field during earthwork. There may be local areas of removal to other firm, native materials as approved by the Geotechnical Engineer.

Following the clearing of weeds, grass and debris, and upon completion of removals, the surface within areas to receive fill should be scarified, moisture conditioned to a depth of 12 inches, and compacted prior to fill placement. Areas temporarily excavated during earthwork should be similarly scarified, moisture conditioned and reworked to the satisfaction of a Geotechnical Engineer before placing additional fill to avoid drying out and lamination along the fill interface.

4.2.3 Fill and Import Materials

Granular on-site soils should be suitable for use as engineered fill. Clayey materials, if encountered within the site soils, should be tested for expansion potential prior to using as engineered fill. If these soils are found to be expansive, they should be disposed off site or placed in landscaped areas. All engineered fill placed at the site should meet the criteria listed below:

- No oversize materials greater than 6 inches in maximum dimension.
- An Expansion Index (EI) less than 30 and a Plasticity Index less than 25.
- A relatively well-graded particle size distribution with at least 60 percent (by weight) passing a 1-inch sieve and fines content (percent, by weight, passing the No. 200 sieve) not exceeding 30 percent.

4.2.4 Fill Placement and Compaction

All fill and backfill should generally be compacted to a minimum relative compaction of 90 percent, except as specifically noted under the pavements section. Relative compaction is defined as the ratio of the in-place dry density to the maximum dry density as determined by the latest ASTM D1557 standard. Fill soil should be placed in loose lifts no thicker than 8 inches. The moisture content of any fill material should be over the optimum moisture content.

4.3 S□R□□C□ DR□I□□G□

We recommend that positive measures be taken to properly finish grade the site so that drainage waters from the site are directed to appropriate outlets and away from the proposed features. Even when these measures have been taken, experience has shown that shallow groundwater or surface water conditions can and may develop in areas where no such water condition existed before site development; this is particularly true where a substantial increase in surface water infiltration results from landscaping irrigation.

We recommend that the ground surface in all areas be graded to slope away from the proposed features and foundations and that all runoff water be directed to proper drainage areas and not be allowed to pond.

4.4 □□□□D□□I□□S

Assuming that all of the existing fill will be removed and replaced with properly compacted engineered fill, the proposed lightly-loaded structures (including kiosks) may be supported on conventional spread or continuous footings founded in properly compacted fill or undisturbed formational materials. The proposed luminaires (lighting structures) and other columns will be supported on CIDH piles. The following sections provide geotechnical parameters for the design of foundations.

4.4.1 Spread or Continuous Foundations

We recommend that all shallow spread or continuous footings bear directly on properly compacted fill or undisturbed formational materials. We recommend embedding shallow footings at least 18 inches deep below lowest adjacent grade. Shallow footings should be at least 12 inches wide. Footings dimensioned as recommended may be designed using an allowable soil bearing pressure of 2,000 pounds per square foot (psf), founded on compacted fill or undisturbed formational materials. The allowable bearing values can be increased by 1,000 psf for each additional foot of embedment and by 500 psf for each additional foot of width beyond the minimum dimensions, up to a maximum of 4,000 psf. This allowable bearing pressure may be increased by one-third for loads that include wind or seismic forces. Footings should not transition between compacted fill and formational materials unless a Geotechnical Engineer provides recommendations for such placement.

Resistance to lateral loads on the shallow foundations can be provided by passive resistance along the edge of the footings and by frictional resistance along the bottom of the footings. For passive resistance, we recommend using an allowable equivalent fluid weight of 250 pounds per cubic foot (pcf) for footings or grade beams poured neat against the excavation or properly backfilled. The upper 12 inches of

material in areas not protected by hardscapes should not be included in design for passive resistance. If friction is to be used to resist lateral loads, we recommend using an allowable coefficient of friction of 0.35 between the soil and foundation concrete. If it is desired to combine frictional and passive resistance in design, we recommend using an allowable friction coefficient of 0.25. Passive resistance may be increased by one-third for loads that include wind or seismic forces.

A total settlement of less than one-half inch has been estimated for isolated spread and strip foundations, due to foundation loads only, designed with the allowable vertical foundation pressure provided in this report.

4.4.2 Deep Foundations

Cast-In-Drilled Hole (CIDH) piles will be used for support of proposed Luminaires or light structures. We understand that lateral loads govern the design of foundations for these light structures. Values of allowable lateral bearing pressure for the 2010 CBC post or pole design formula are presented in the table below. The allowable lateral bearing is per foot of depth below the lowest adjacent grade or slab-on-grade.

Ground Surface Inclination	Allowable Lateral Bearing Pressure (pounds per square foot per foot)
Level within 10 feet horizontally	250
2:1 descending slope	100

The CIDH foundations may be designed using an allowable vertical end bearing pressure of 4,000 psf for embedment of at least one pile diameter into the Bay Point formation.

We understand that depending on the final layout of the storage vaults, some of the areas currently shown as supported by CIDH piles may be supported by conventional foundations. The Geotechnical Engineer should be notified to provide additional recommendations once foundation plans are prepared or if ground conditions are different from those specified.

4.4.2.1 Pile Construction

The founding level should be cleaned of all loose or softened material, debris, or other substances that may cause settlement or affect the concrete strength. The bottom of the excavation should be dry.

Concrete should be placed in a manner that precludes segregation of particles and any other occurrence that may decrease the strength of the concrete. Caving soils should not be allowed to mix with the fresh concrete.

4.5 C□□CR□□□ SL□□S-□□-GR□D□

Concrete slabs-on-grade should be at least 5 inches thick. A modulus of vertical subgrade reaction of 150 pounds per cubic inch (pci) may be used to design concrete slabs-on-grade. The Structural Engineer should design the thickness and reinforcement of concrete slabs-on-grade to accommodate concentrated

loads and heavy distributed loads. Expansion joints and crack control sawcuts should be included at regular intervals.

Where moisture-sensitive floor coverings (such as carpets or tile) are used, we recommend using a vapor barrier (e.g., 10 mil Visqueen) underneath the slab and a 2-inch clean coarse sand placed below the membrane. Additionally, a 2-inch protective clean coarse sand layer may be placed between the membrane and the slab-on-grade. The Contractor should be careful not to puncture the membrane during construction. It may be prudent to specify a membrane thicker than needed for a vapor barrier. The Project Architect should review vapor barrier requirements relative to desired functionality of the space and floor coverings, construction considerations and recommendations of the American Concrete Institute (ACI).

4.6 R□□□I□I□G □ □LLS □□D □□L□ □ -GR□D□ □ □LLS

Retaining walls are planned along the edges of the amphitheater to support the ADA ramps. Permanent below-grade walls will be required to facilitate underground storage areas. The walls are expected to be designed for heights ranging between 8 and 10 feet.

4.6.1 Lateral Earth Pressures

Lateral earth pressure behind walls depends primarily on the allowable wall movement, wall inclination, backfill material, backfill slope, surcharge, and hydrostatic pressure. The following table presents recommended equivalent fluid pressures for walls with level or sloping ground behind the wall and a vertical back, coarse-grained backfill, no surcharge and no hydrostatic pressure. The table also includes a uniform seismic increment, where H is the retained height of the wall, which should be added to the triangular active pressure.

Retained Slope Condition	Equivalent Fluid Pressure (psf/ft)		Seismic Increment of Lateral Earth Pressure (psf)
	Free-to-deflect (Active)	Restrained (At-Rest)	
Level	35	55	6H
Sloping Ground at 2:1 (H:V)	55	75	20H

Note:
For slopes between level ground and 2:1, earth pressures may be interpolated.

The lateral earth pressure values should be compatible with the magnitude and direction of anticipated wall movements. In general, lateral deflections greater than 0.1 to 0.5% of the wall height are sufficient to mobilize free-to-deflect (active) earth pressures where there is coarse-grained backfill. The design of permanent free standing retaining walls typically adopts free-to-deflect (active) lateral earth pressures while the design of permanent below-grade retaining walls typically adopt restrained (at-rest) lateral earth pressures.

The lateral earth pressure values are applicable for coarse-grained, free-draining, non-to low-expansive soils placed as properly compacted backfill between the wall stem and an imaginary plane inclined at 1:1

horizontal: vertical (H:V) above the heel (back edge) of the wall footing. The values above assume that compaction within four feet of the wall will be performed with light hand-held or equivalent equipment; the lateral pressures would be higher if heavy equipment is used for compaction next to the walls.

The surcharging effect of nearby loads on the wall backfill (e.g., traffic) should be included in the wall design when the point of load application is located inside of a line projected at 1:1 H:V outward from the heel of the retaining wall footing. A rectangular surcharge pressure distribution should be assumed and added to the triangular distribution obtained from the equivalent fluid earth pressures presented above. Depending on whether the wall is free to deflect or is restrained, 30 or 45%, respectively, of a maximum surcharge load located on level ground that is within a horizontal distance equal to the height of the wall should be used to develop lateral earth pressures. The Geotechnical Engineer should be contacted to provide wall pressures for point, or other types of loads that occur behind the retaining wall.

4.6.2 Subsurface Drainage and Waterproofing

The retaining wall design should include subsurface drainage to reduce the potential for developing hydrostatic pressure behind the wall. Retaining walls that are less than five feet high should have a perimeter drain at the base of the wall. The base drain should be a minimum four-inch diameter perforated pipe (SDR 35) leading to a suitable outlet. The pipe should be surrounded by at least one cubic foot, per foot of pipe, of free draining ¾-inch crushed rock wrapped with filter fabric, such as Mirafi 140N, or approved equivalent.

Retaining walls greater than five feet high should have free draining material along the back of the wall in addition to the base drain. Except for the upper two feet, the backfill immediately adjacent to retaining walls (minimum horizontal distance of two feet measured perpendicular to the wall) should comprise ¾ inch crushed rock or gravel wrapped in filter fabric. Pervious Backfill conforming to Standard Specifications for Public Works Construction or Permeable Material conforming to Caltrans Standard Specifications may be used as an alternative to crushed rock or gravel. The free draining material should be placed in layers (no thicker than 6 inches) and lightly vibrated with four to five passes of a small, hand-operated vibratory compactor.

Prefabricated drainage composites may be an alternative to free draining crushed rock or gravel. Manufacturer recommendations for the installation of these products should be followed, although a Geotechnical Engineer should review the recommendations in consideration of the specific application and interpreted subsurface and groundwater conditions. Drainage composites should be attached to the back of the retaining or below-grade wall as opposed to the excavated face. A Geotechnical Engineer should review the proposed drainage composite, as well as the outlet detail.

The design development of the project should carefully review the position of retaining walls relative to water-bearing infrastructure and the surrounding surface conditions when assessing subsurface drainage requirements. Groundwater, existing or proposed water bearing pipes, or surface conditions that could promote infiltration (e.g., irrigated landscaping) behind walls may require additional subsurface drainage, depending on the type of backfill. In addition, groundwater could develop in other areas periodically from seasonal weather conditions or other factors.

Basement walls should be waterproofed for end use. Because of the potential for increased moisture from landscaping and underground utilities (particularly on the northern side, close to the Park), it may be necessary to place the waterproofing over the entire height of the walls, depending on the functionality of the wall surface needed. A high degree of waterproofing may be needed if functionality requires the interior of the basement wall surface to be free of all leakage, seepage and damp patches. The lowest degree of waterproofing typically allows damp patches and minor leakage through construction joints.

4.7 P□□□□ □□□S

We understand the proposed hardscape/pavement areas will be surfaced with granite paver blocks set on a reinforced mortar bed to enhance the aesthetic nature. The underlying Portland Cement Concrete (PCC) structural sections will be designed for the following Traffic Indices (TIs) as provided by the project Civil Engineer:

Location	TI
Vehicular Areas	9.5
Pedestrian Areas	7.5

The structural design of pavements depends primarily on anticipated traffic conditions, subgrade soils and construction materials. We have assumed an R-value of 20 as representative of the as-graded conditions, considering the presence of localized fill throughout the site.

Based on our analysis, we recommend the following structural sections:

Location	Recommended Thickness	
	PCC (in)	Aggregate Base (in)
Vehicular Areas	8	6
Pedestrian Areas	6	6

The recommended structural sections are assumed to be installed on properly prepared subgrade. We recommend the properly prepared subgrade consist of at least 12 inches of soil compacted to a minimum of 95% relative compaction, as determined by the latest version of ASTM D1557. The Aggregate Base (AB) should be placed at a minimum relative compaction of 95%. AB should conform to Section 26 of the Caltrans Standard Specifications or Section 200-2 of the "Standard Specification for Public Works Construction".

The concrete pavements should be provided with expansion joints at regular intervals (not exceeding every 15 feet each way). In addition, while not necessary for structural strength, the use of steel reinforcing in the slab (*e.g.,* welded wire mesh) may restrain the growth of cracks.

4.7.1 Surface Drainage

Adequate surface drainage should be provided to reduce ponding and possible infiltration of water into the base and subgrade materials. Paved and hardscape areas should have a minimum gradient of one

percent. It is important to provide adequate drainage to reduce possible future ponding and possible distress of the pavement section. As much as possible, planter areas next to pavements should be avoided; otherwise, subdrains should be used to drain the planter to appropriate outlets.

Concrete curbs bordering landscape areas should have a deepened edge to provide a cutoff to reduce moisture flow beneath the pavement. Generally, the edge of the curb can be extended an additional twelve inches below the base of the curb. The deepened edge should have a thickness of approximately 6 inches.

4. GENERAL CONSTRUCTION

The recommended design information presented in this report is intended to assist CCDC and their consultants in the planning and design of the project. We recommend that URS review the plans to verify that the intent of the recommendations presented herein has been properly interpreted and ultimately incorporated into the contract documents.

S□C□I□□ 5 C□□S□R□C□I□□ C□□SID□R□□I□□S

5.1 □□C□□□□I□□ C□□R□C□□RIS□ICS

The existing fill should not pose any unusual difficulty in excavation. Fill is underlain by dense and very dense or very stiff to hard formational materials. Modern trenching machines and backhoes should be able to complete shallow excavations within these materials with some moderate difficulty. Deeper excavations, if required, or grading of the proposed temporary slopes, may require heavy-duty excavators. Conventional earth-moving equipment (bulldozers and scrapers) should be able to excavate these materials; however, there may be locally resistant areas. Additionally, the selection of drilling equipment for deep foundations should consider potential cemented zones or dense gravel zones within the Bay Point Formation.

5.2 □□□P□R□R□ □□C□□□□I□□S

All temporary construction slopes, including trenches for buried pipes and other utilities should comply with local, California Occupational Safety and Health Administration (Cal-OSHA), and all other applicable safety ordinances. The safety of all construction slopes is the responsibility of the contractor. The contractor should assess the proposed temporary slope conditions. For planning purposes, soils encountered on-site may be classified as given in the table below, per Cal-OSHA determination of soil type. The assessment of Cal-OSHA soil types is based on preliminary engineering classifications of material encountered in previous explorations.

Geologic Unit (USCS Soil Type)	Cal-OSHA Classification
Fill (Silty Sand)	Type C
Bay Point Formation (Silty or Clayey Sand and Sandy Clay)	Type B

The tops of all excavations should be graded to prevent runoff from entering the excavation. Temporary slopes should not be allowed to become soaked with water or to dry out. Surcharge loads should not be permitted near the edge of excavations; they should be located a horizontal distance greater than the depth of the cut, measured horizontally from the top edge of the excavation, unless the cut is properly shored and designed to accommodate the surcharge. Excavations that might extend below an imaginary plane inclined at 1:1 H:V projected outward and down below the edge of an existing foundation should be properly shored to maintain foundation support of the existing structure (particularly Bradley Building along the east side). There may also be a need for temporary support of existing utilities if they coincide with the location of proposed excavations. Design of the shoring system is the responsibility of the contractor.

5.3 □□□P□R□R□ □□□□R□SS □ILL SL□P□S

Temporary fill slopes will be constructed along the north, east and west sides of the New Plaza site following the demolition of the Robinson May building. The purpose of these slopes is to reduce liability of the open excavation at the perimeters and to support the adjacent public right-of-way from collapse and/or settlement. The maximum height of these slopes is expected to be less than 10 feet.

5.3.1 Design Inclination and Fill Materials

For suitable longer term global stability, temporary fill slopes can be formed at 1.5:1 or 2:1 (horizontal:vertical) inclinations. A five foot wide horizontal bench should be provided at top of the slope.

Long-term global stability of the open excavation and surrounding areas is defined as the period beginning when the temporary fill slopes are completely in place to support the vertical faces of the excavation to the time when they are removed for construction of the urban park infrastructure. The Demolition Contractor is responsible for maintaining the short-term stability of the open excavation and surrounding areas, which begins when demolition removes the portions of the building that laterally support the below grade areas of the structure to the time when fill slopes have been fully formed to support below grade vertical faces. Therefore, temporary fill slopes should be formed immediately following demolition so that vertical faces are not left unsupported. The Demolition Contractor should provide a sequencing plan to the Geotechnical Engineer for review.

Import materials should be coarse-grained soils (less than 50% passing the No. 200 sieve) that are not excessively plastic and/or contain quantities of oversize material (greater than eight inches in maximum dimension) that could make compaction difficult. Depending upon the material used to construct the slope, surficial instability or "sloughing" and erosion may occur within temporary fill slopes that are constructed at the 1.5:1 ratio, which may require periodic maintenance.

5.3.2 Temporary Fill Slope Construction

The surface within areas to receive fill should be proof-rolled using a pneumatic tire roller, fully loaded dump truck or equivalent and soft, yielding pumping areas should be removed and recompacted to the satisfaction of the Engineer. When this remedial preparation is completed, the surface should be scarified, moisture conditioned as necessary, and compacted prior to fill placement.

Fill material should be placed in loose lifts no thicker than eight inches, moisture conditioned, and processed as necessary to achieve uniform moisture content above optimum. To achieve adequate shear strength, each lift should be compacted to not less than 90% relative compaction, using the latest version of ASTM D1557 as the compaction standard. When completed, the slope face should be rolled with a cable-lowered sheepsfoot, or similar equipment approved by the Geotechnical Engineer.

5.3.3 Maintenance and Monitoring

Surface drainage should be directed away from the temporary fill slopes. Surface drainage should not run over the face of the temporary fill slopes or pond at the crest of the slopes.

All sources of surcharge loads should be kept away from the crest of the temporary fill slope a horizontal distance that is greater than the maximum depth of excavation,

The temporary fill slopes should inspected monthly, or more frequently during periods of inclement weather for evidence of movement and other forms of distress. Movement or other forms of distress should be reported to the Geotechnical Engineer.

5.4 CONSTRUCTION OBSERVATION AND TESTING

Earthwork and placement of engineered fill should be performed under the observation and testing services of a geotechnical professional supervised by a California-registered Geotechnical Engineer. Tests should be taken to determine the in-place moisture and relative compaction of engineered fill.

Removal excavations should be observed and mapped by a geologic or geotechnical professional during earthwork. Cut slopes and other temporary excavations should be continuously observed to evaluate the presence of seeps and other sources of groundwater.

All footing, slab and pavement subgrade soils should be observed by a geotechnical or geologic professional prior to placement of steel and concrete to observe that the subgrade is satisfactory. Excavations should be free of soft fill or loose and disturbed soils. We recommend that foundation excavations be cleaned of loose material and that the excavations be observed by a qualified engineer or geologist before placing steel or concrete to verify soil conditions exposed at the bottoms of the excavations.

A California-registered Geotechnical Engineer should prepare a final report of earthwork testing and observation.

S□C□I□□ 6 LI□ I□□□I□□S

The professional judgments and interpretations presented in this report are based on our current knowledge of the proposed project, our interpretations of the subsurface conditions in the area from the previous subsurface explorations, and our understanding of the geologic and tectonic setting of the site. Future developments in the evaluation of local seismic hazards may alter the interpretations and judgments presented in this report.

The recommendations made herein are based on the assumption that soil conditions do not deviate appreciably from those found during previous investigations. We recommend that all earthwork, shoring, subgrade preparation, utility trench and retaining backfill, foundation excavations and other geotechnically significant forms of construction, be observed by a qualified geotechnical engineer or geologist to verify that site conditions are as anticipated or to provide revised recommendations, if necessary.

Geotechnical engineering and geologic sciences are characterized by uncertainty. Professional judgments presented herein are based partly on our understanding of the proposed construction and partly on our general experience. Our work and judgments rendered meet current professional standards; we do not guarantee the performance of the project in any respect.

S□C□I□□ 7 R□□□R□□C□S

Agnew, D. and others, 1979. "Earthquake History of San Diego in Earthquakes and Other Perils, San Diego Region," Abbott, P.L. and Elliott, W.J. ed, p. 11-21.

Anderson, J. G., T. Rockwell, and D. C. Agnew, 1989. "A Study of the Seismic Hazards in San Diego," Earthquake Spectra, Vol. 5, No. 2.

Artim, E. and D. Streiff, 1981. Trenching the Rose Canyon Fault Zone. United States Geological Survey, USGS Contract No. 14.

California Building Code, 2010.

Centre City Development Corporation, 2011. "Request for Fee Proposal for Geotechnical & Fault Investigation for Horton Plaza Park," October 5, 2011.

Deméré, T., 1981. "A Newly Recognized late Pleistocene Marine Fauna from the City of San Diego," in Geologic Investigation of the Coastal Plain, Abbott, P.L., and O'Dunn, eds.

Geocon, Inc., 1984, "Geotechnical Investigation for Horton Plaza Park, San Diego, California", prepared for Centre City Development Corporation.

Geocon, Inc., 2004. "Geotechnical Investigation, Balboa Theatre Rehabilitation, Fourth Avenue and E Street, San Diego, California," January 2, 2004.

Google Earth Pro.

Kennedy, M.P. 1975, "Geology of the San Diego Metropolitan Area", California Division of Mines and Geology, Bulletin 200.

Kennedy, M.P., and Tan, S, S., 2005. Geologic Map of the San Diego 30x60 Quadrangle, California.

Kern, J. P. 1977. "*Origin and History of Upper Pleistocene Marine Terraces, San Diego, California,*" GSA Bulletin, Vol. 88.

Law Crandall, 2000. "Report of Fault Surface Rupture Investigation. County of San Diego Property Between Broadway and A Street and Union Street and Front Street, City of San Diego, California," prepared for the County of San Diego, dated September 2000.

Leighton & Associates, 1980, "Geotechnical Investigation for Horton Plaza, San Diego, California", prepared for Ernest W. Hahn, Inc.

URS Corporation, 2010, "Fault Investigation, Proposed Redevelopment Civic Center Complex, San Diego, California", prepared for Centre City Development Corporation.

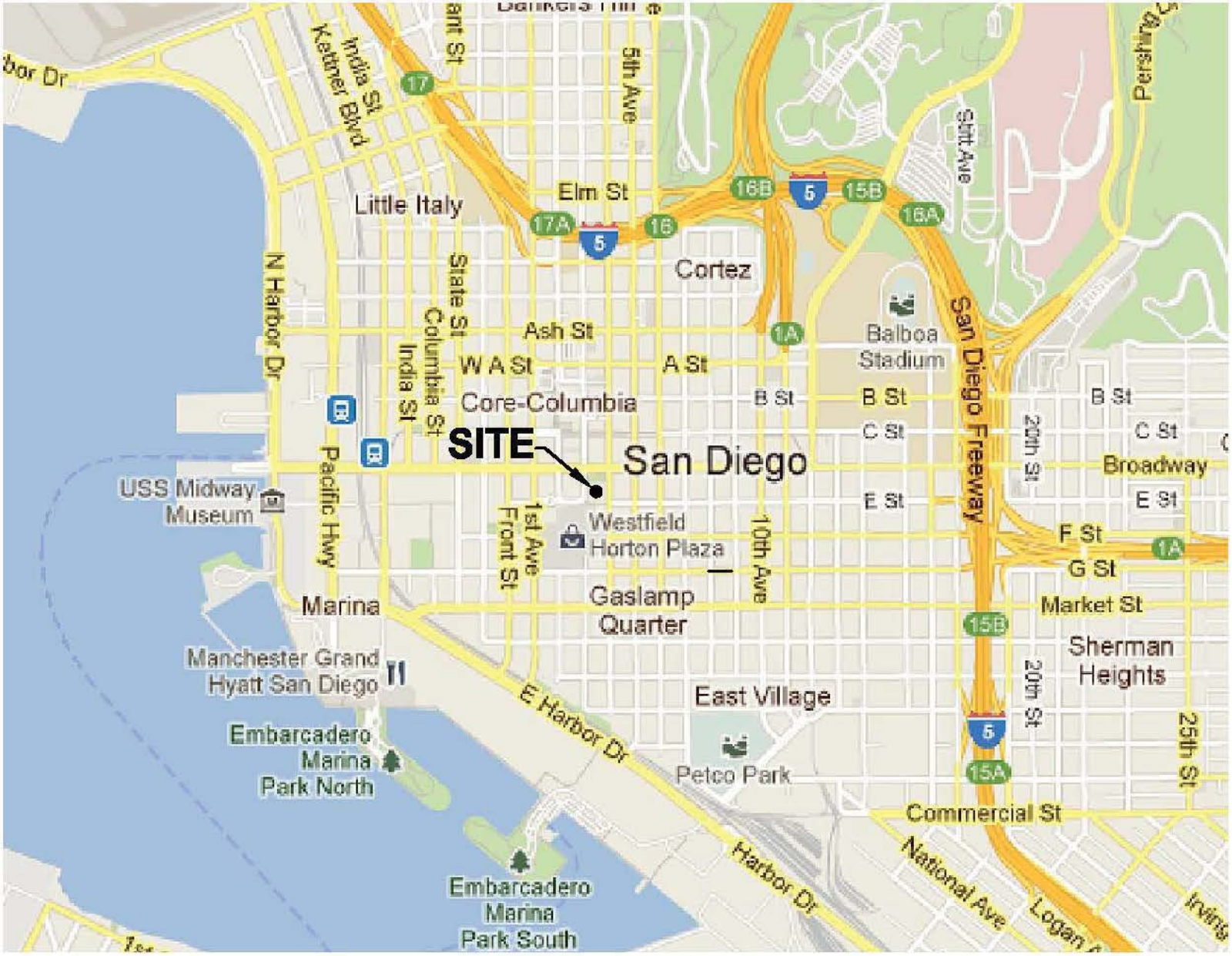
USGS National Seismic Hazard Mapping Program, Java Ground Motion Parameter Calculator – Version 5.1.0.

Treiman, J. A., 2002. "Silver Strand Fault, Coronado Fault, Spanish Bight Fault, and Downtown Graben, Southern Rose Canyon Fault Zone, San Diego, CA," California Division of Mines and Geology, Fault Evaluation Report FER

Woodward-Clyde & Associates, 1970. "Preliminary Soil Studies, Federal Office Buildings, San Diego, California," September 3, 1970 (Project No. 70-241).

Woodward-Clyde-Sherard & Associates, 1967. "Soil Investigation for the Proposed Westgate Plaza Hotel, "C" Street & Second Avenue, San Diego, California," June 2, 1967 (Project No. 66-113A).

Woodward-Gizienski & Associates, 1973. "Soil Investigation for the Proposed Central Federal Savings and Loan Tower, San Diego, California," December 29, 1973 (Project No. 73-243).

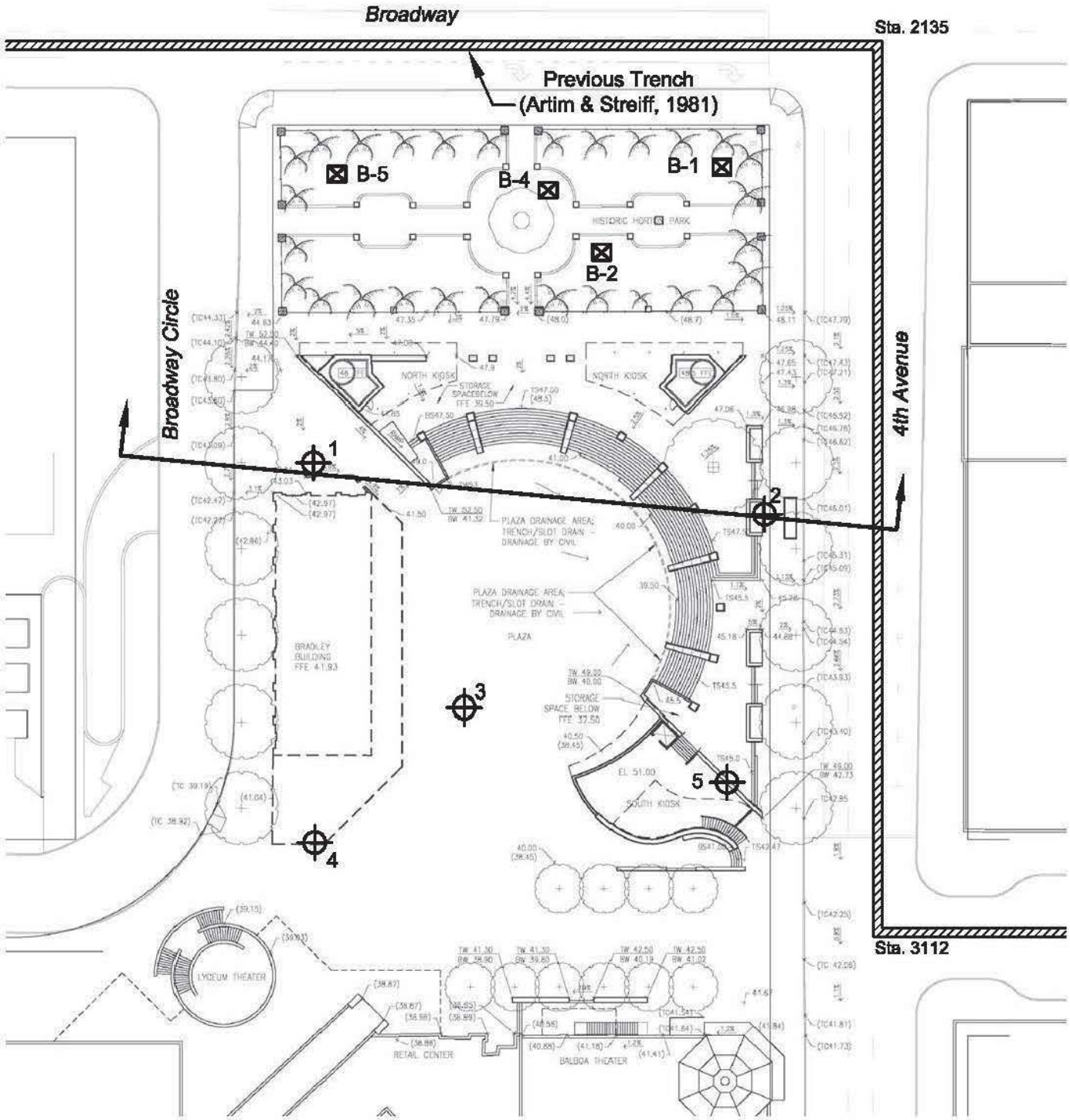


REFERENCE: GOOGLE MAPS

VICINITY MAP
REHABILITATION OF HISTORIC PARK
AND CONSTRUCTION OF NEW URBAN PLAZA
SAN DIEGO, CALIFORNIA

URS	NOT TO SCALE	CHECKED BY: PB	DATE: 04-11-12	FIG. NO: 1
		PM: CRS	PROJ. NO: 27661138.10000	

X:\27661138\Urban Plaza VicMap.dwg Jun 27, 2012 - 11:13am



REFERENCE: "Horton Plaza Improvement, San Diego, CA, 100% Schematic Design, Site Grading Concept Plan" Sheet L3.0, prepared by Walker Macy, dated 10-12-11.

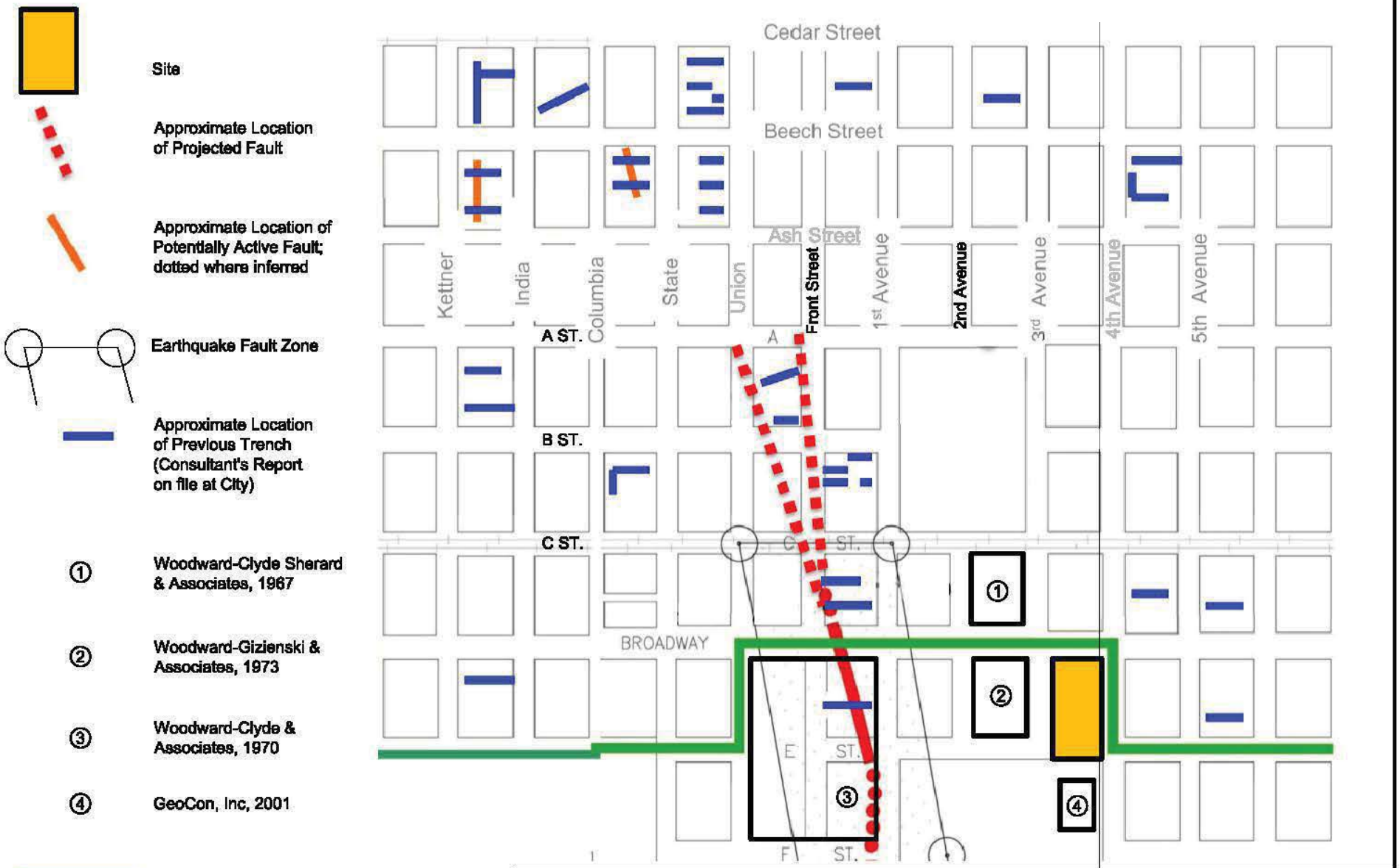
LEGEND

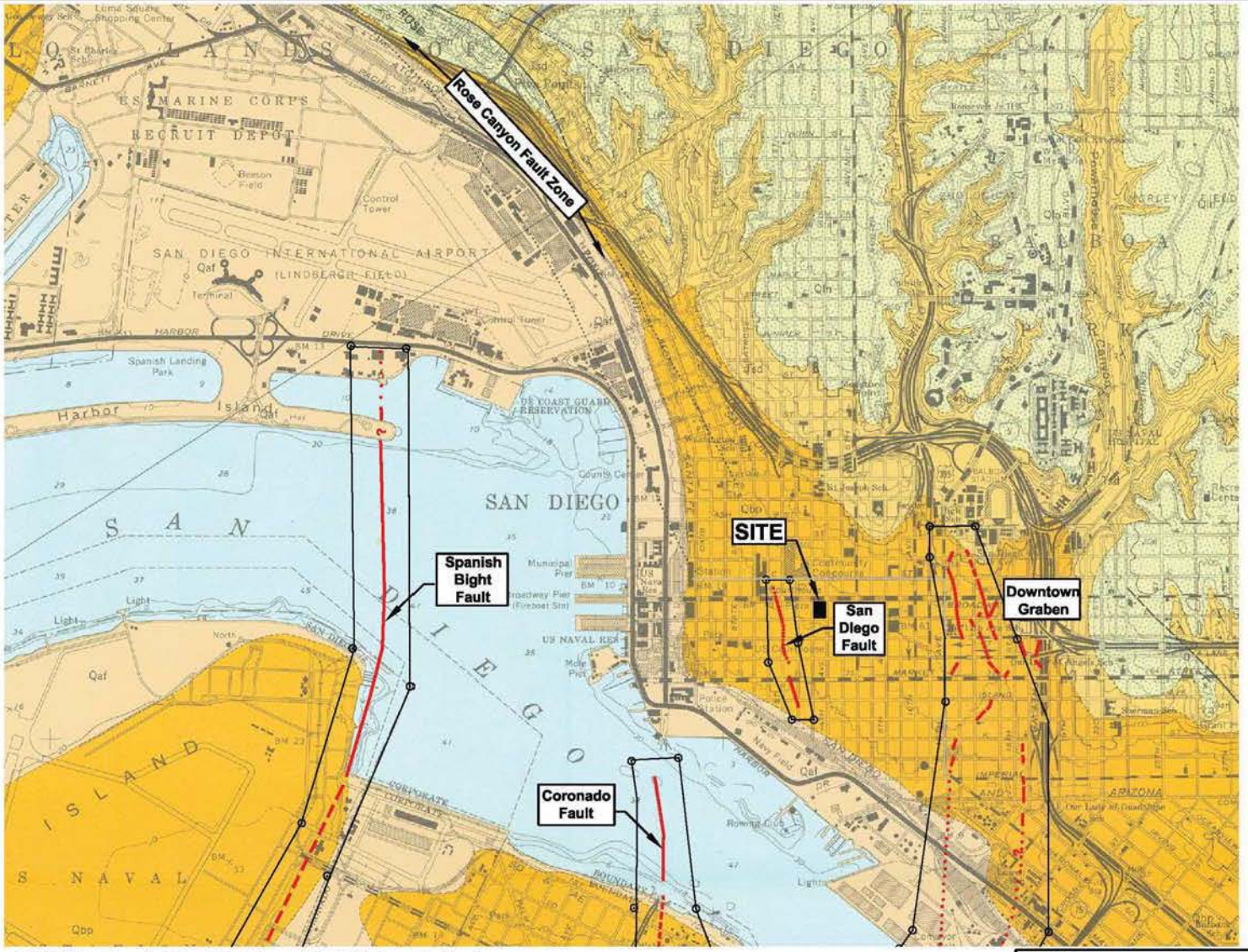
- ⊠ Previous Test Pit (Geocon, 1984)
- ⊕ Previous Boring (L&A, 1980)
- Generalized Geologic Cross Section

SITE PLAN
REHABILITATION OF HISTORIC PARK AND CONSTRUCTION OF NEW URBAN PLAZA
CITY OF SAN DIEGO, CALIFORNIA

URS	30 0 30 60 Feet SCALE: 1"= 60'	CHECKED BY: DLS	DATE: 04-11-12	FIG. NO: 2
		PM: CRS	PROJ. NO: 27661138.10000	

X:\27661138\Urban Plaza Site Plan.dwg Apr 10, 2012 - 2:29pm


Site
Approximate Location of Projected Fault
Approximate Location of Potentially Active Fault; dotted where inferred
Earthquake Fault Zone
Approximate Location of Previous Trench (Consultant's Report on file at City)
① Woodward-Clyde Sherard & Associates, 1967
② Woodward-Gizienski & Associates, 1973
③ Woodward-Clyde & Associates, 1970
④ GeoCon, Inc, 2001
Previous Sewer Trench Geologic Log (Artim & Streiff, 1981)
Note: Logs of the previous investigations listed as ① through ④ are provided in Appendix A.
Cedar Street
Beech Street
Ash Street
Kettner
India
Columbia
State
Union
Front Street
1st Avenue
2nd Avenue
3rd Avenue
4th Avenue
5th Avenue
A ST.
B ST.
C ST.
BROADWAY
E ST.
F ST.
LOCATION MAP OF PREVIOUS PROJECTS
REHABILITATION OF HISTORIC PARK
AND CONSTRUCTION OF NEW URBAN PLAZA
CITY OF SAN DIEGO, CALIFORNIA
URS
300 0 300 600 Feet
SCALE: 1"= 600'
CHECKED BY: PB
DATE: 04–11–12
PM: CRS
PROJ. NO: 27661138.10000
FIG. NO: 3
X:\27661138\Horton Plaza Rehabilitation Fault Map.dwg Apr 10, 2012 - 2:34pm



LEGEND

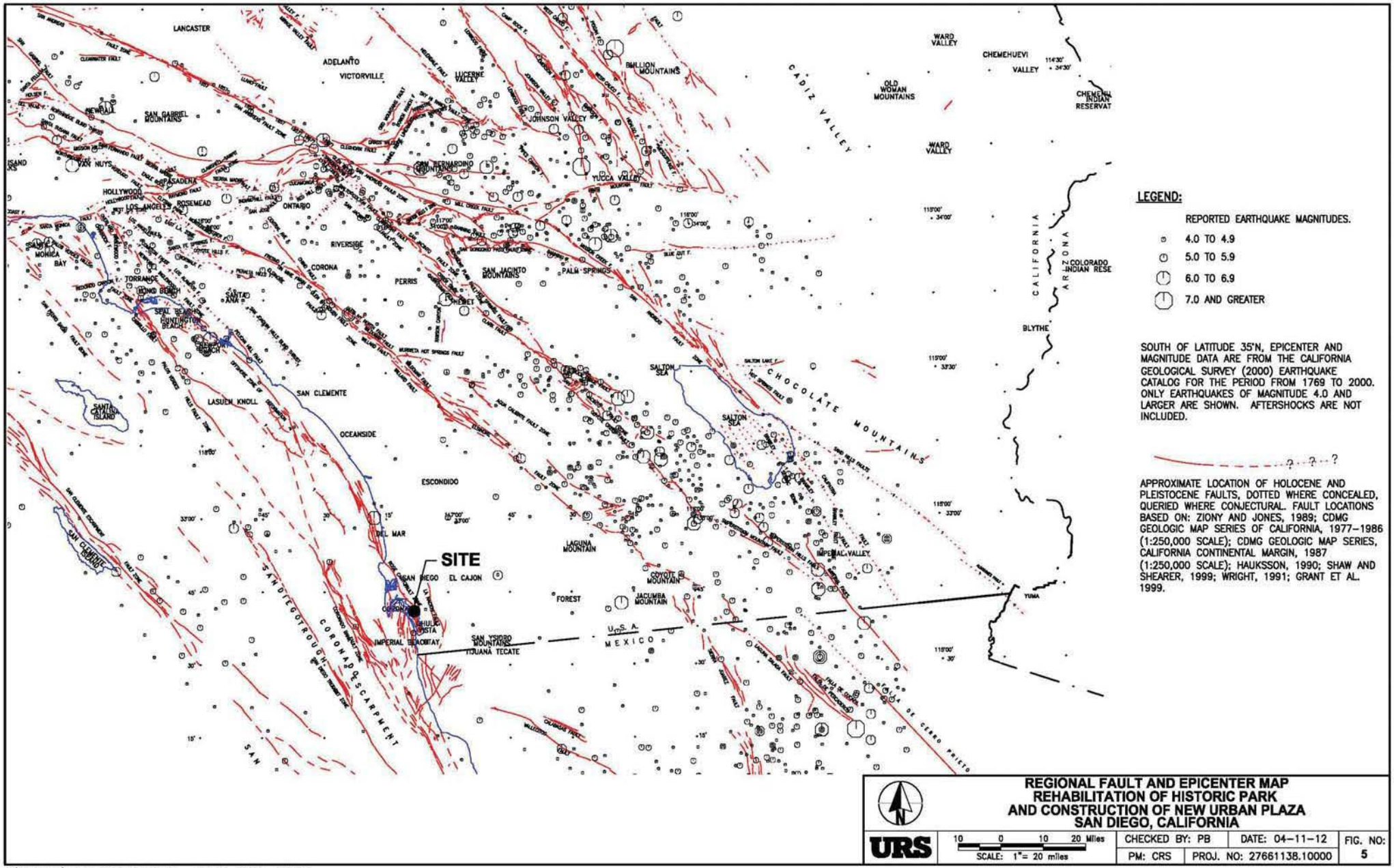
- Qaf — Artificial Fill
- Qbp — BayPoint Formation (Pleistocene)
- Qln — Lindavista Formation (Pleistocene)
- Tsd — San Diego Formation (Pleistocene)
- Contact (dashed where approximate, dotted where concealed)
- Fault (dashed where approximate, dotted where concealed: U=upthrown, D=Downthrown)
- Strike and Dip of bedding
- Approximate location of known fault
- Alquist Priolo Earthquake Fault Zone

REFERENCE: Kennedy, M.P., 1975 Geology of the Point Loma Quadrangle. San Diego County, California. CDMG Bulletin 200.

REGIONAL GEOLOGY MAP
REHABILITATION OF HISTORIC PARK AND CONSTRUCTION OF NEW URBAN PLAZA
SAN DIEGO, CALIFORNIA

URS | 1000 0 1000 2000 Feet | SCALE: 1"= 2000' | CHECKED BY: PB | DATE: 04-11-12 | PM: CRS | PROJ. NO: 27661138.10000 | FIG. NO: 4

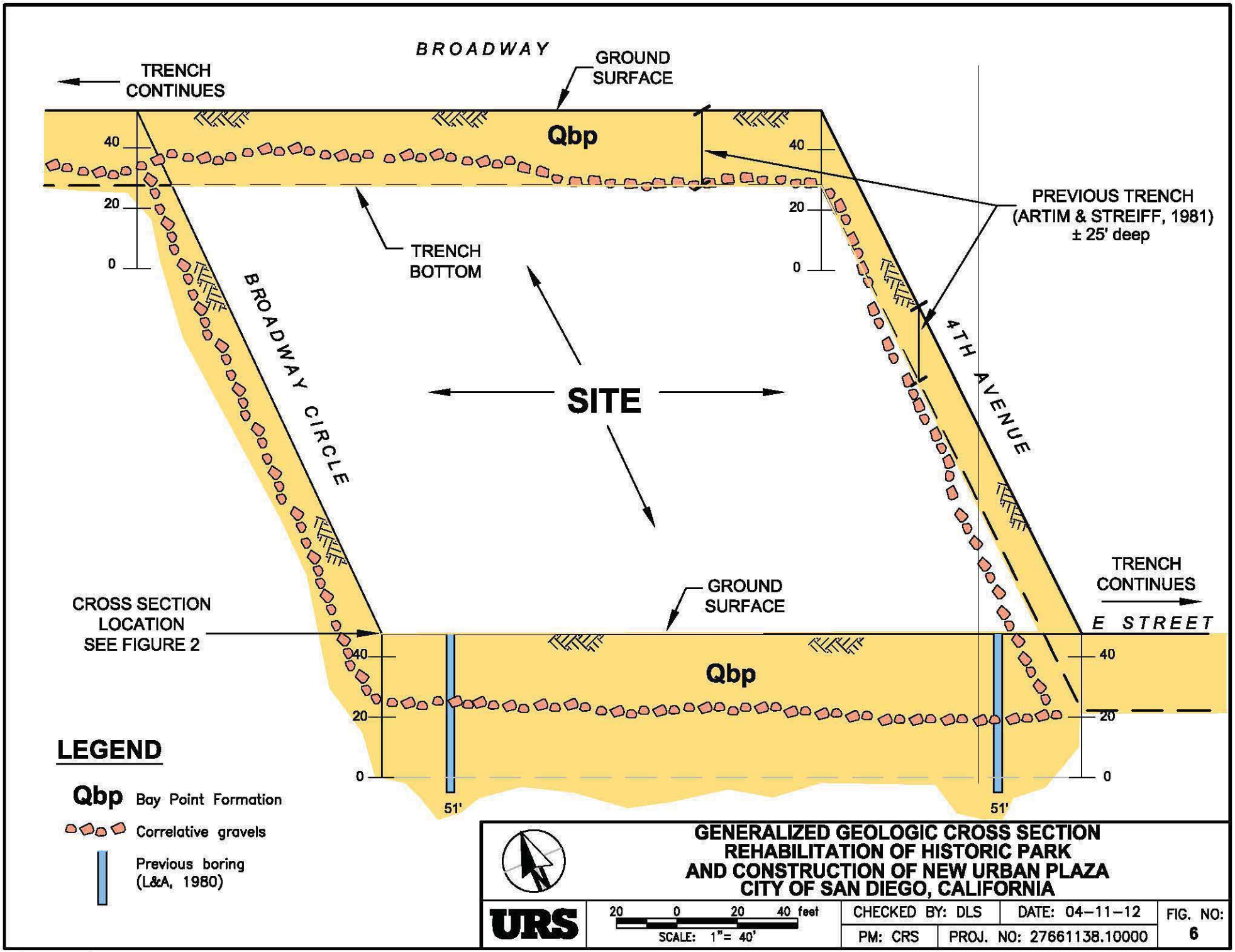
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REGIONAL FAULT AND EPICENTER MAP
REHABILITATION OF HISTORIC PARK
AND CONSTRUCTION OF NEW URBAN PLAZA
SAN DIEGO, CALIFORNIA

URS | 10 0 10 20 Miles, SCALE: 1"= 20 miles | CHECKED BY: PB | DATE: 04-11-12 | PM: CRS | PROJ. NO: 27661138.10000 | FIG. NO: 5

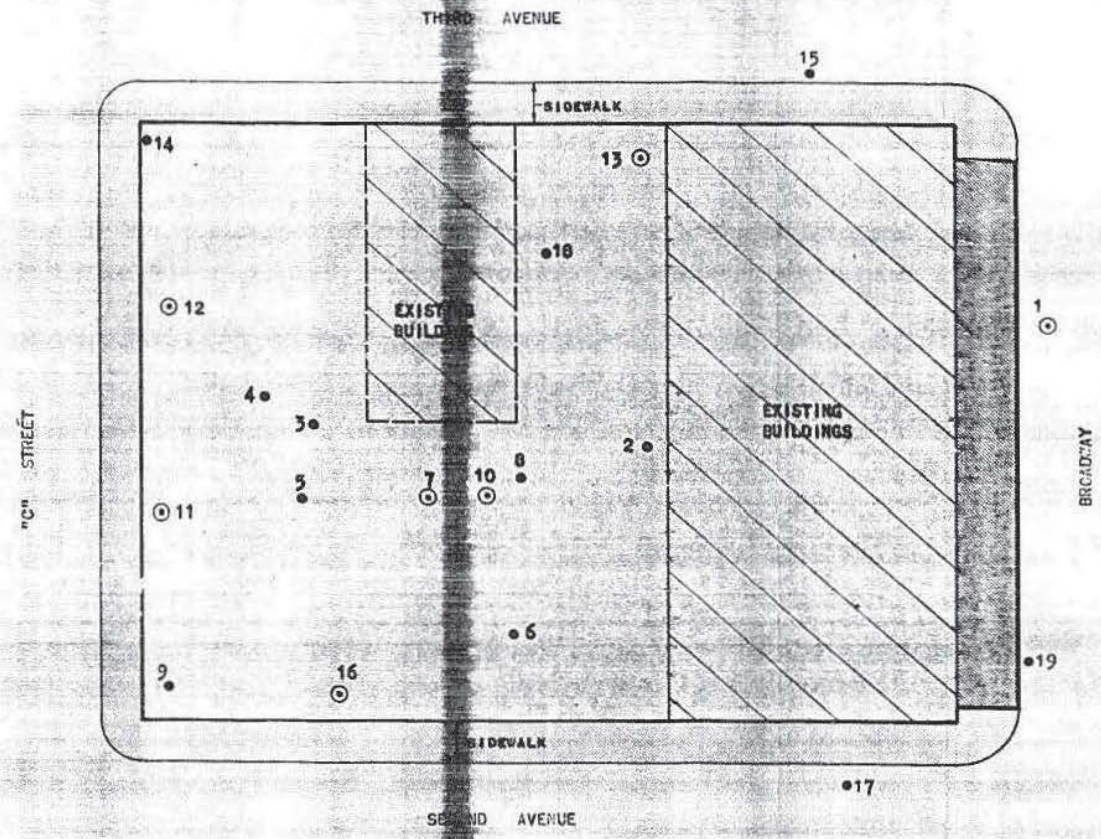
X:\27661138\Urban Plaza FaultMap.dwg Apr 10, 2012 – 2:32pm



X:\27661138\Urban Plaza Cross Section.dwg Apr 10, 2012 - 2:33pm

Woodward-Clyde Sherard & Associates, 1967

Fig. 1



N

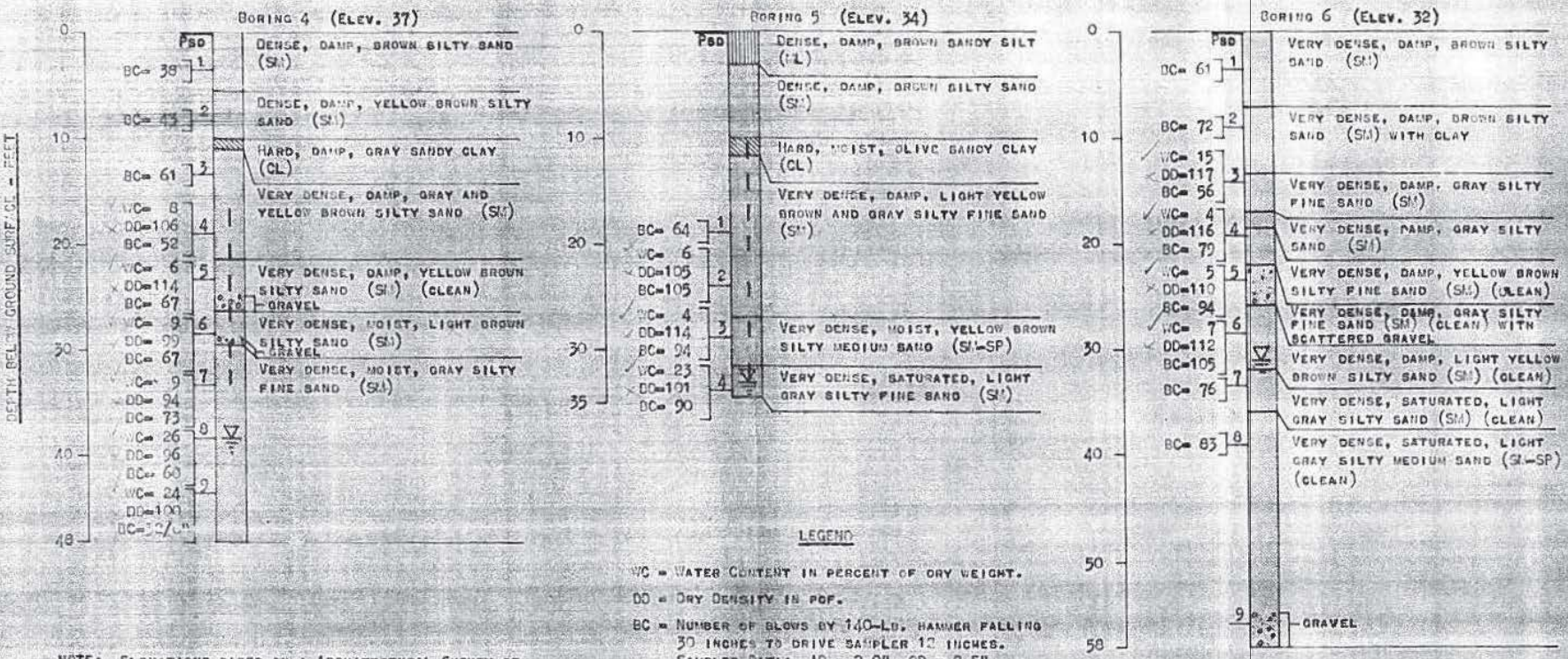
SCALE: 1"=40'

LEGEND

- ● INDICATES APPROXIMATE LOCATION OF 6 INCH DIAMETER TEST BORING.
- ⊙ INDICATES APPROXIMATE LOCATION OF 30 INCH OR 36 INCH DIAMETER TEST BORING.
- INDICATES APPROXIMATE LIMITS OF PROPOSED SUB-BASEMENT.
- INDICATES APPROXIMATE LIMITS OF EXISTING SIDEWALK.

NOTE: BORINGS 1, 2 AND 3 WERE MADE FOR A PRELIMINARY INVESTIGATION AND WERE REPORTED MARCH 10, 1966.

WOODWARD, CLYDE, SHERARD & ASSOCIATES	
SITE PLAN	
WESTGATE PLAZA HOTEL	
PROJECT NO. 66-113-A	
5-25-67	LCM



NOTE: ELEVATIONS BASED ON A ARCHITECTURAL SURVEY OF BLOCK 38 HORTON'S ADDITION, DATED NOVEMBER 1965, PREPARED BY DANIELS, BROWN AND HALL, CIVIL ENGINEERS AND LAND SURVEYS.
THE DATUM IS MEAN SEA LEVEL.

LEGEND

WC = WATER CONTENT IN PERCENT OF DRY WEIGHT.

DD = DRY DENSITY IN PCF.

BC = NUMBER OF BLOWS BY 140-LB. HAMMER FALLING 30 INCHES TO DRIVE SAMPLER 12 INCHES. SAMPLER DATA: ID = 2.0", OD = 2.5".

▽ = WATER LEVEL AT TIME OF DRILLING.

(SM) = GROUP CLASSIFICATION SYMBOL IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM.

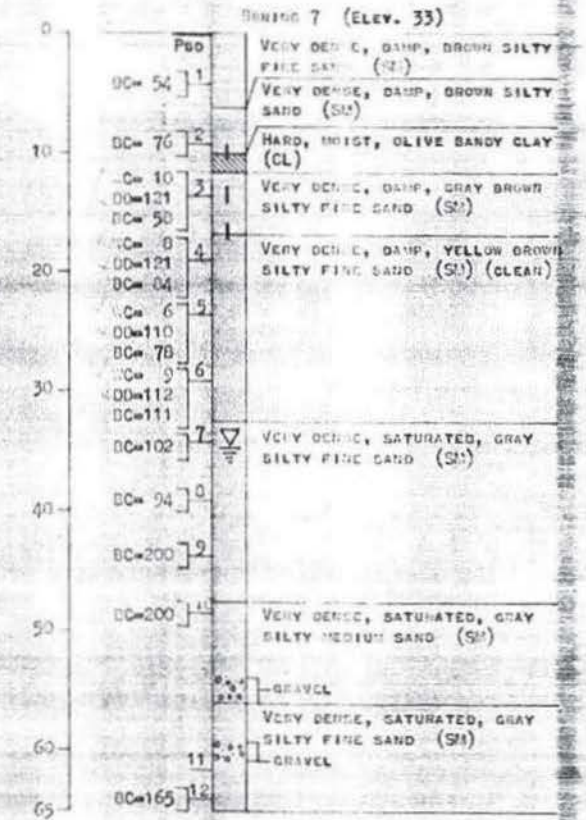
PLL = LINDA VISTA FORMATION.

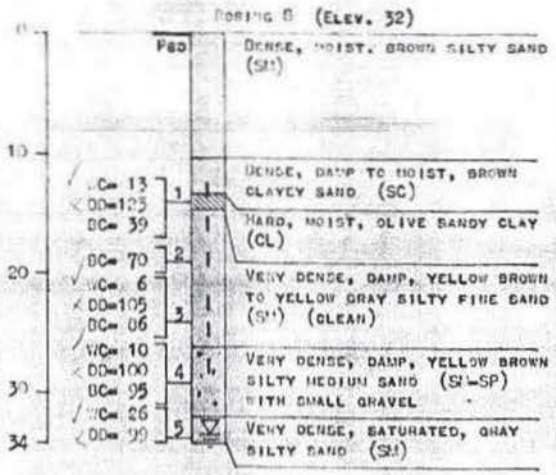
PSD = SAN DIEGO FORMATION.

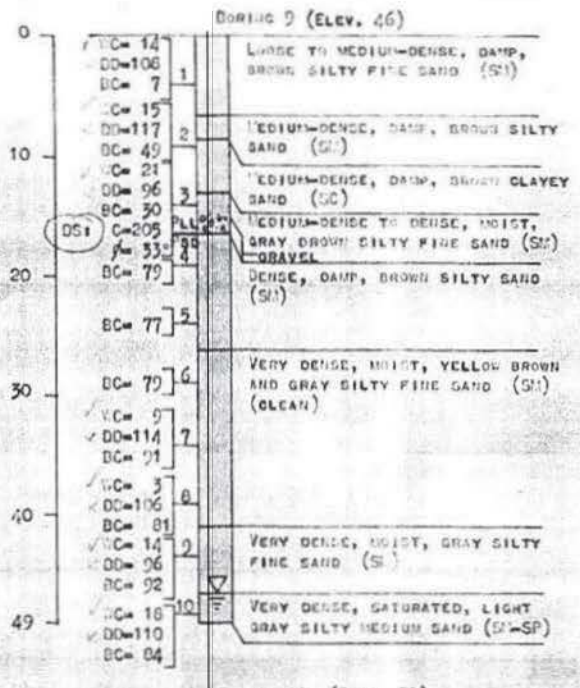
| = PRESSUREMETER TEST.

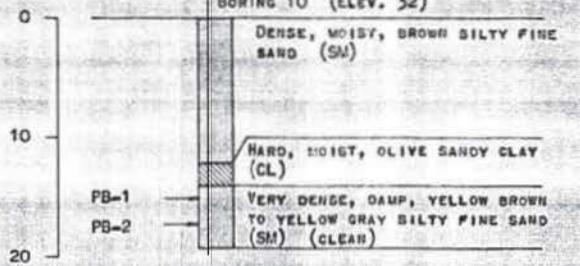
WC-13
DD-3
26

WOODWARD, CLYDE, SHERARD & ASSOCIATES
LOGS OF TEST BORINGS 4 THROUGH 6
WESTGATE PLAZA HOTEL
PROJECT NO. 66-113-A
4-24-67 LCM









NOTE: Elevations based on a Architectural Survey of Block 38 Horton's Addition, dated November 1965, prepared by Daniels, Brown and Hall, Civil Engineers and Land Surveys.
The Datum is Mean Sea Level.

LEGEND

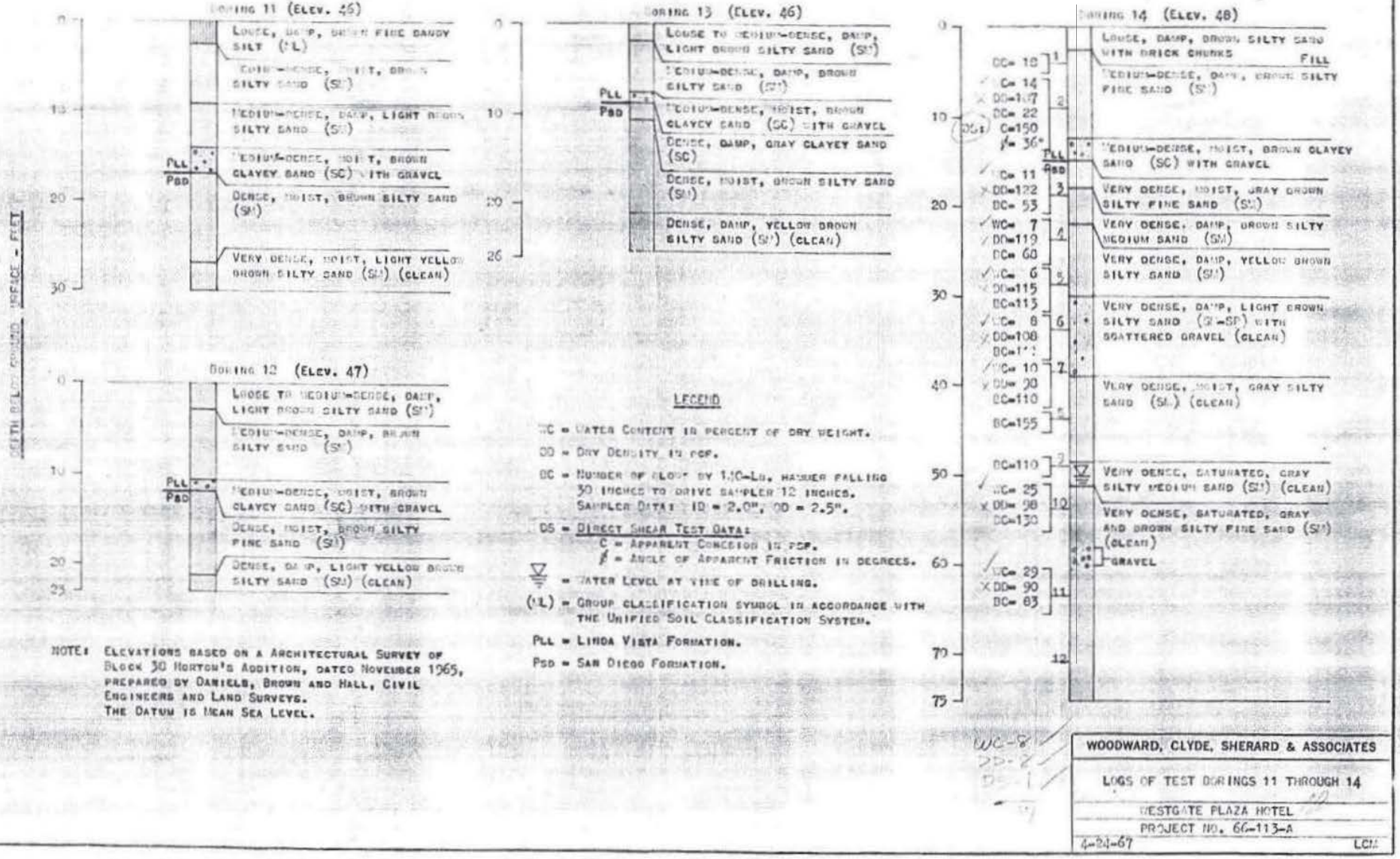
WC = Water Content in percent of dry weight.
DD = Dry Density in pcf.
BC = Number of blows by 140-lb. hammer falling 30 inches to drive sampler 12 inches. Sampler Data: ID = 2.0", OD = 2.5".
DS = Direct Shear Test Data:
C = Apparent Cohesion in psf.
φ = Angle of Apparent Friction in degrees.
▽ = Water Level at time of drilling.
(SM) = Group classification symbol in accordance with the Unified Soil Classification System.
Pll = Linda Vista Formation.
Psd = San Diego Formation.
I = Pressuremeter Test.
PB = Plate Bearing Test.

WOODWARD, CLYDE, SHERARD & ASSOCIATES

LOGS OF TEST BORINGS 7 THROUGH 10

WESTGATE PLAZA HOTEL
PROJECT NO. 66-113-A

4-24-67 LCM



NOTE: Elevations based on a Architectural Survey of Block 30 Horton's Addition, dated November 1965, prepared by Daniels, Brown and Hall, Civil Engineers and Land Surveys.
The Datum is Mean Sea Level.

LEGEND

WC = Water Content in percent of dry weight.

DD = Dry Density in pcf.

BC = Number of blows by 140-Lb. hammer falling 30 inches to drive sampler 12 inches. Sampler Data: ID = 2.0", OD = 2.5".

DS = Direct Shear Test Data:
C = Apparent Cohesion in psf.
ϕ = Angle of Apparent Friction in degrees.

▽ = Water Level at time of drilling.

(ML) = Group classification symbol in accordance with the Unified Soil Classification System.

Pll = Linda Vista Formation.

Psd = San Diego Formation.

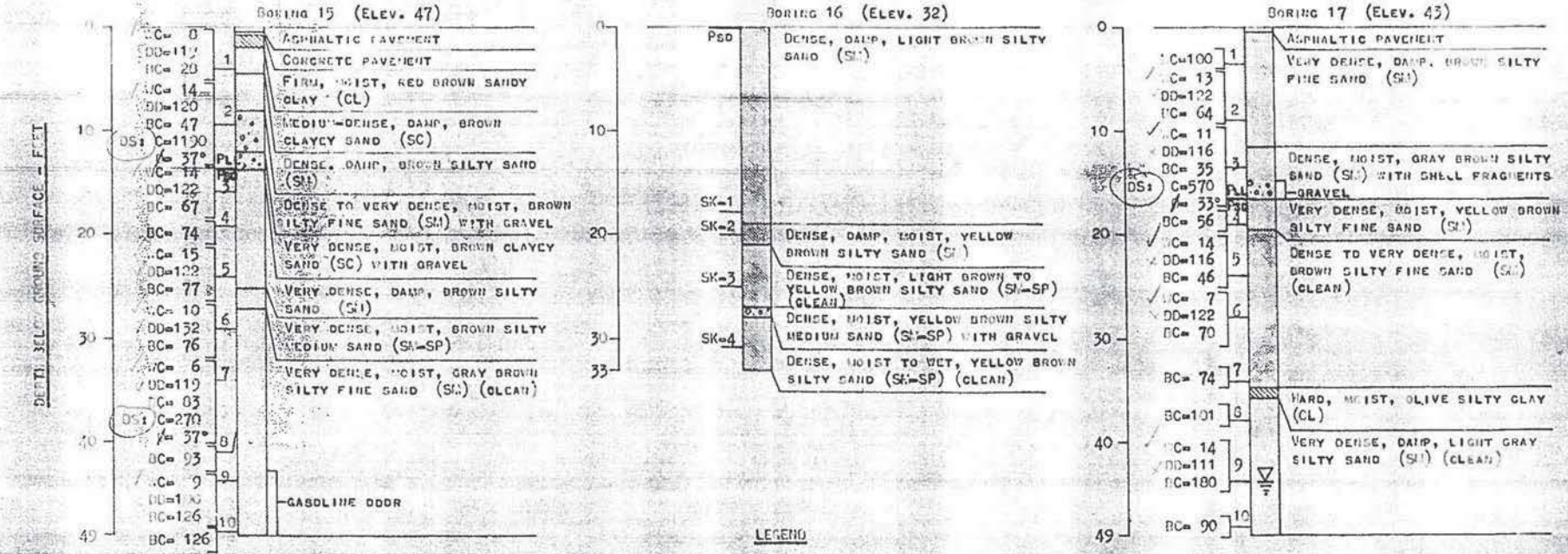
WOODWARD, CLYDE, SHERARD & ASSOCIATES

LOGS OF TEST BORINGS 11 THROUGH 14

WESTGATE PLAZA HOTEL

PROJECT NO. 66-113-A

4-24-67 LCH



NOTE: ELEVATIONS BASED ON A ARCHITECTURAL SURVEY OF BLOCK 38 HORTON'S ADDITION, DATED NOVEMBER 1965, PREPARED BY DANIELS, BROWN AND HALL, CIVIL ENGINEERS AND LAND SURVEYS.
THE DATUM IS MEAN SEA LEVEL.

LEGEND

WC = WATER CONTENT IN PERCENT OF DRY WEIGHT.

DD = DRY DENSITY IN PCF.

BC = NUMBER OF BLOWS BY 140-LB. HAMMER FALLING 30 INCHES TO DRIVE SAMPLER 12 INCHES. SAMPLER DATA: ID = 2.0", OD = 2.5".

DS = DIRECT SHEAR TEST DATA:
C = APPARENT COHESION IN PSF.
ϕ = ANGLE OF APPARENT FRICTION IN DEGREES.

▽ = WATER LEVEL AT TIME OF DRILLING.

(CL) = GROUP CLASSIFICATION SYMBOL IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM.

Pll = LINDA VISTA FORMATION.

Pso = SAN DIEGO FORMATION.

WC-12
DD-2
DS-3
27

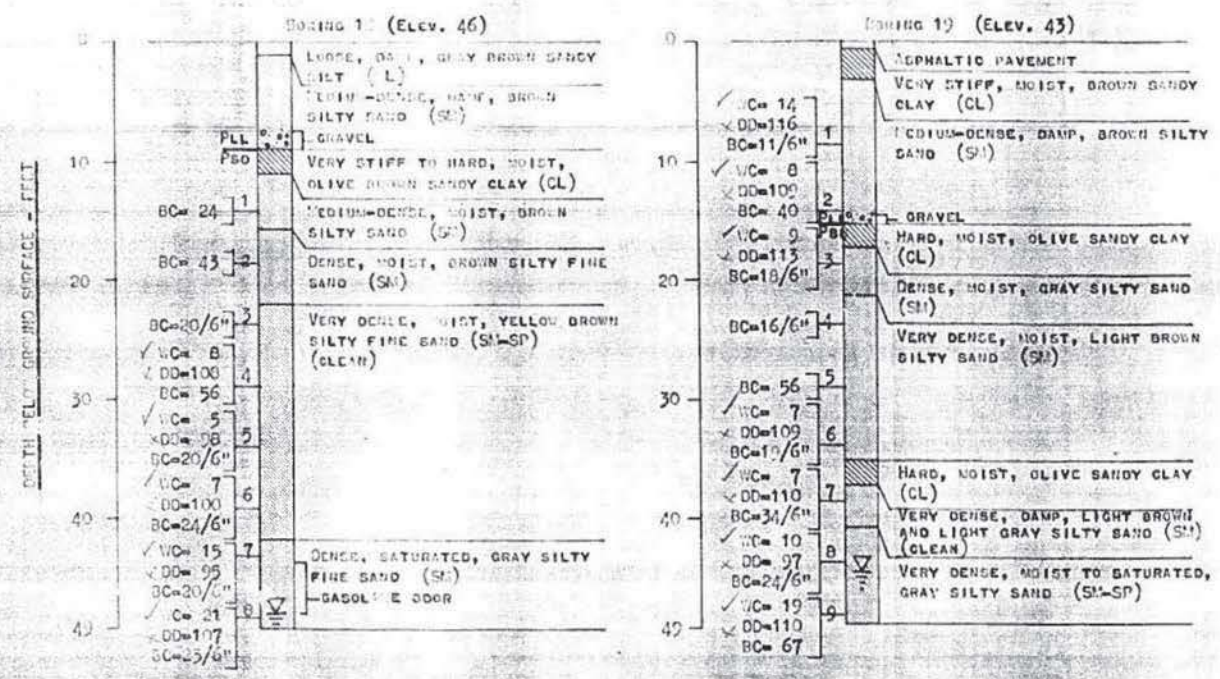
WOODWARD, CLYDE, SHERARD & ASSOCIATES

LOGS OF TEST BORINGS 15 THROUGH 17

WESTGATE PLAZA HOTEL

PROJECT NO. 66-113-A

4-24-67 LCM



LEGEND

WC = WATER CONTENT IN PERCENT OF DRY WEIGHT.

DD = DRY DENSITY IN PCF.

BC = NUMBER OF BLOWS BY 140-LB. HAMMER FALLING 30 INCHES TO DRIVE SAMPLER 12 INCHES. SAMPLER DATA: ID = 2.0", OD = 2.5".

▽ = WATER LEVEL AT TIME OF DRILLING.

(ML) = GROUP CLASSIFICATION SYMBOL IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM.

PLL = LINDA VISTA FORMATION.

PSD = SAN DIEGO FORMATION.

NOTE: ELEVATIONS BASED ON A ARCHITECTURAL SURVEY OF BLOCK 38 HORTON'S ADDITION, DATED NOVEMBER 1965, PREPARED BY DANIELS, BROWN AND HALL, CIVIL ENGINEERS AND LAND SURVEYS.
THE DATUM IS MEAN SEA LEVEL.

WC-12 ✓
DD-12 ✓
24

WOODWARD, CLYDE, SHERARD & ASSOCIATES

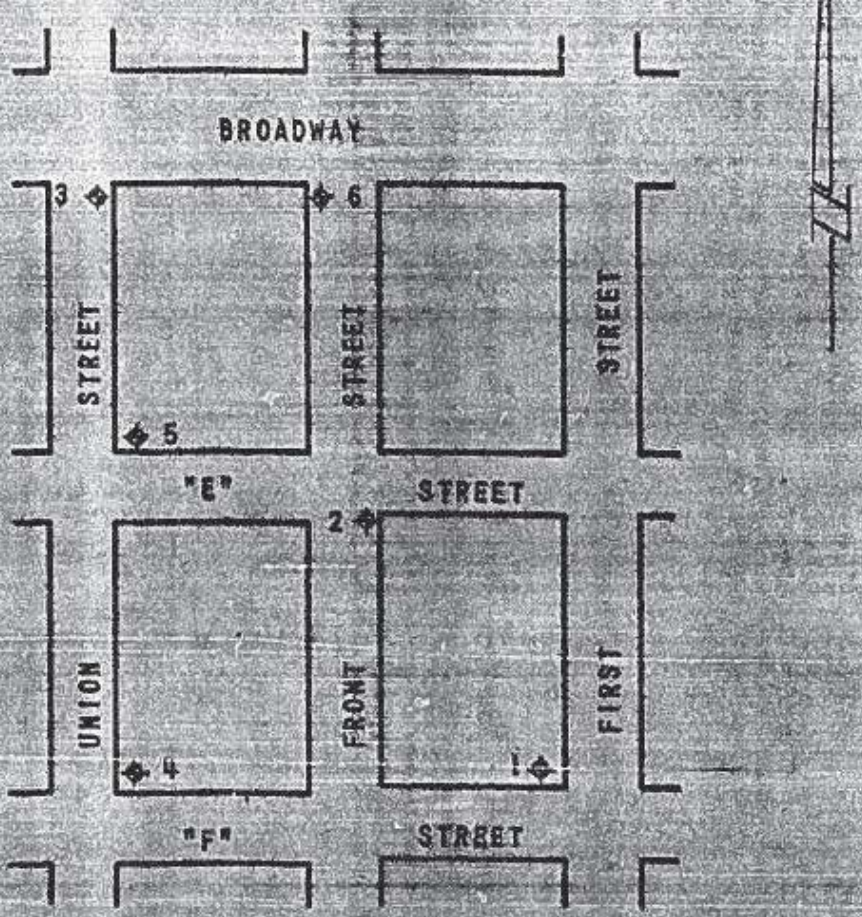
LOGS OF TEST BORINGS 18 & 19

WESTGATE PLAZA II TEL

PROJECT NO. 66-113-A

4-24-67 LCM

Woodward-Clyde & Associates, 1970



LEGEND:

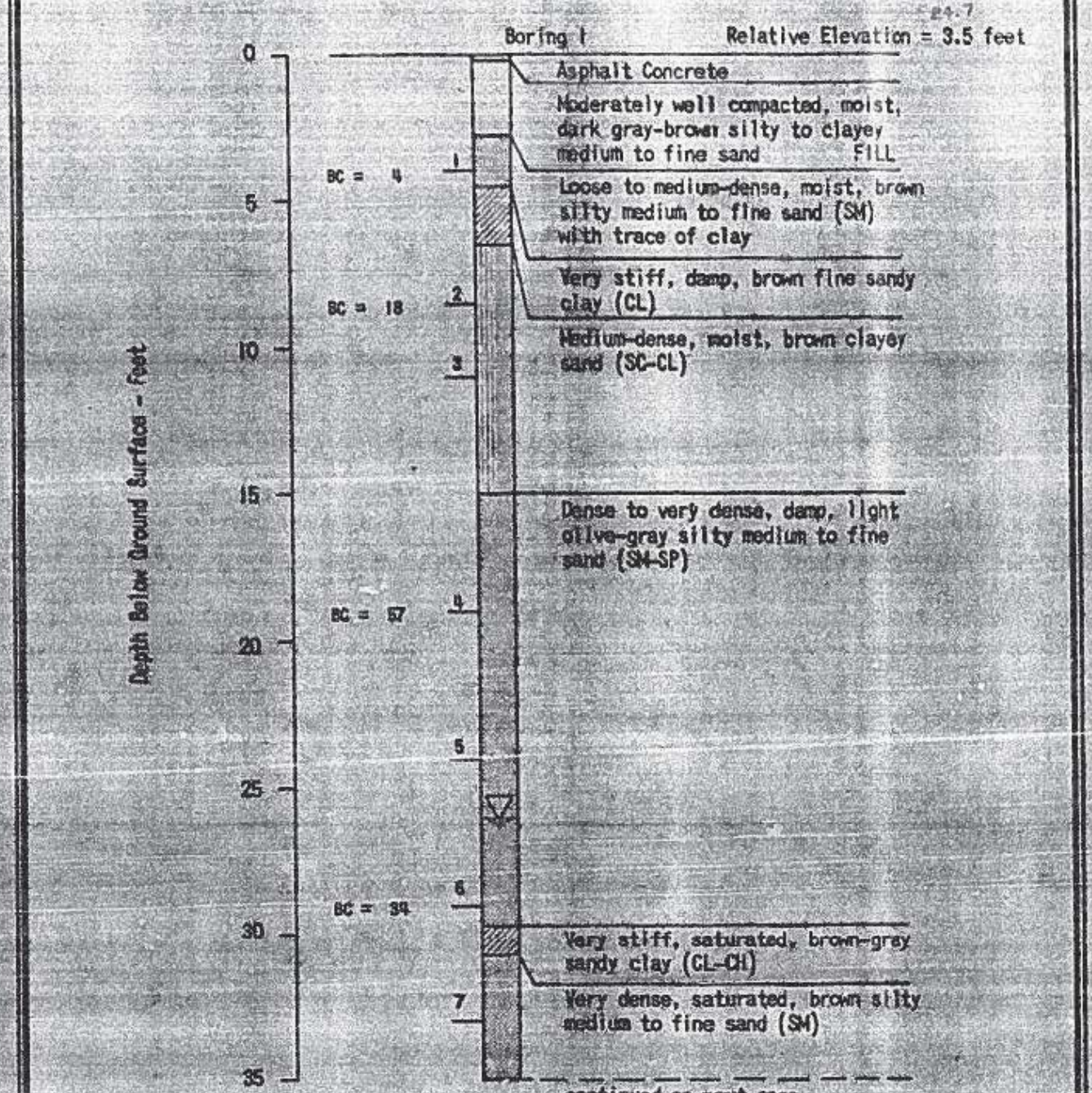
◈ Indicates approximate location of test boring.

SITE PLAN
FEDERAL OFFICE BUILDINGS

WOODWARD • CLYDE & ASSOCIATES
CONSULTING SOIL ENGINEERS AND GEOLOGISTS
SAN DIEGO, CALIFORNIA

DR. BY: ALS	SCALE: 1" = 200'	PROJ. NO: 70-241
CK'D BY: [illegible]	DATE: 8-20-70	PLATE NO: 1

Horton Plaza Improvement Project Appendix A – Geotechnical Report by URS dated April 11, 2012 Volume 1 of 2 (Rev. Jan. 2014) 840 Page

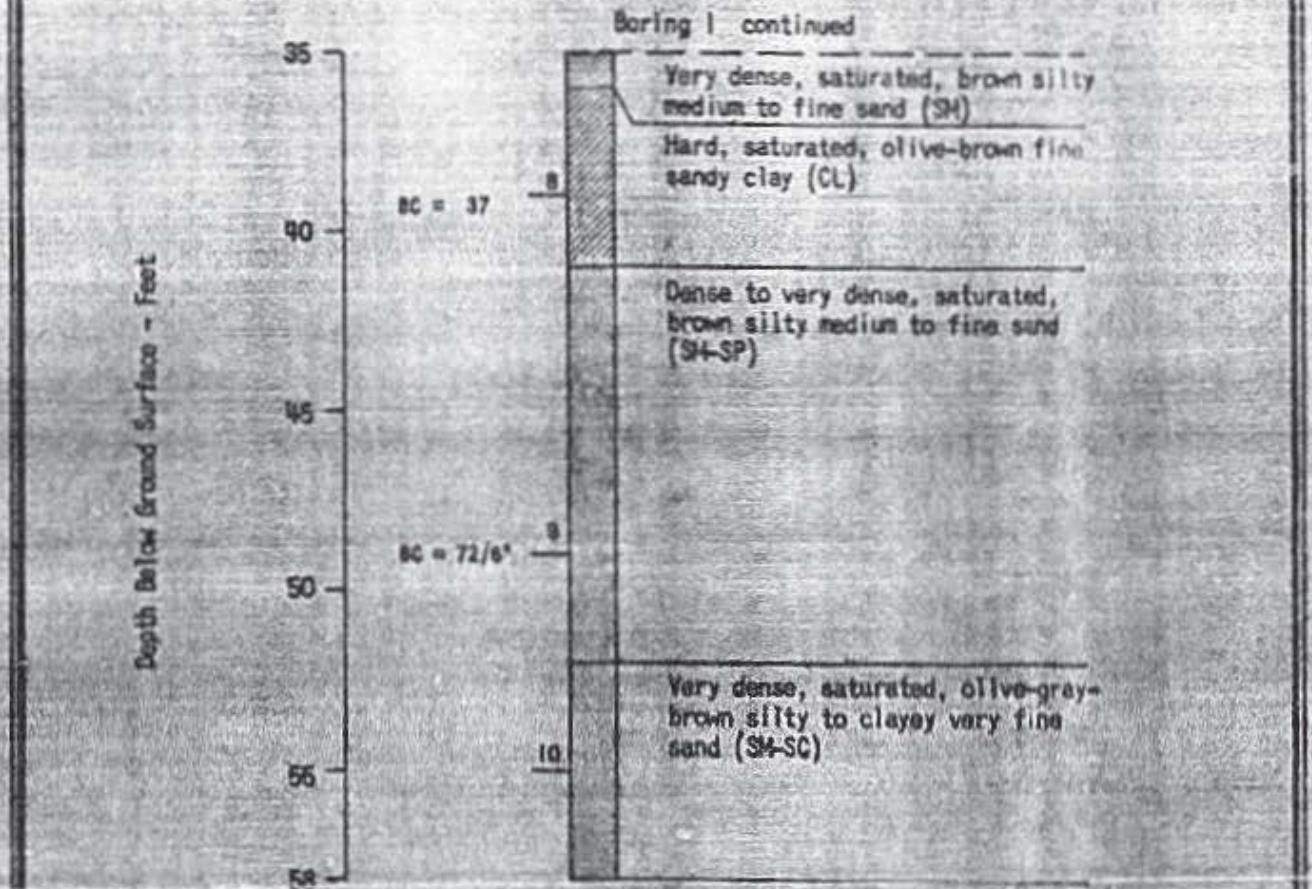


for Legend, see Figure 9.

LOG OF TEST BORING 1
FEDERAL OFFICE BUILDINGS

WOODWARD • CLYDE & ASSOCIATES
CONSULTING SOIL ENGINEERS AND GEOLOGISTS
SAN DIEGO, CALIFORNIA

DR. BY: ALS	SCALE: 1"=5'	PROJ. NO: 70-241
CK'D BY: DMC	DATE: 8-28-70	FIGURE NO: 2

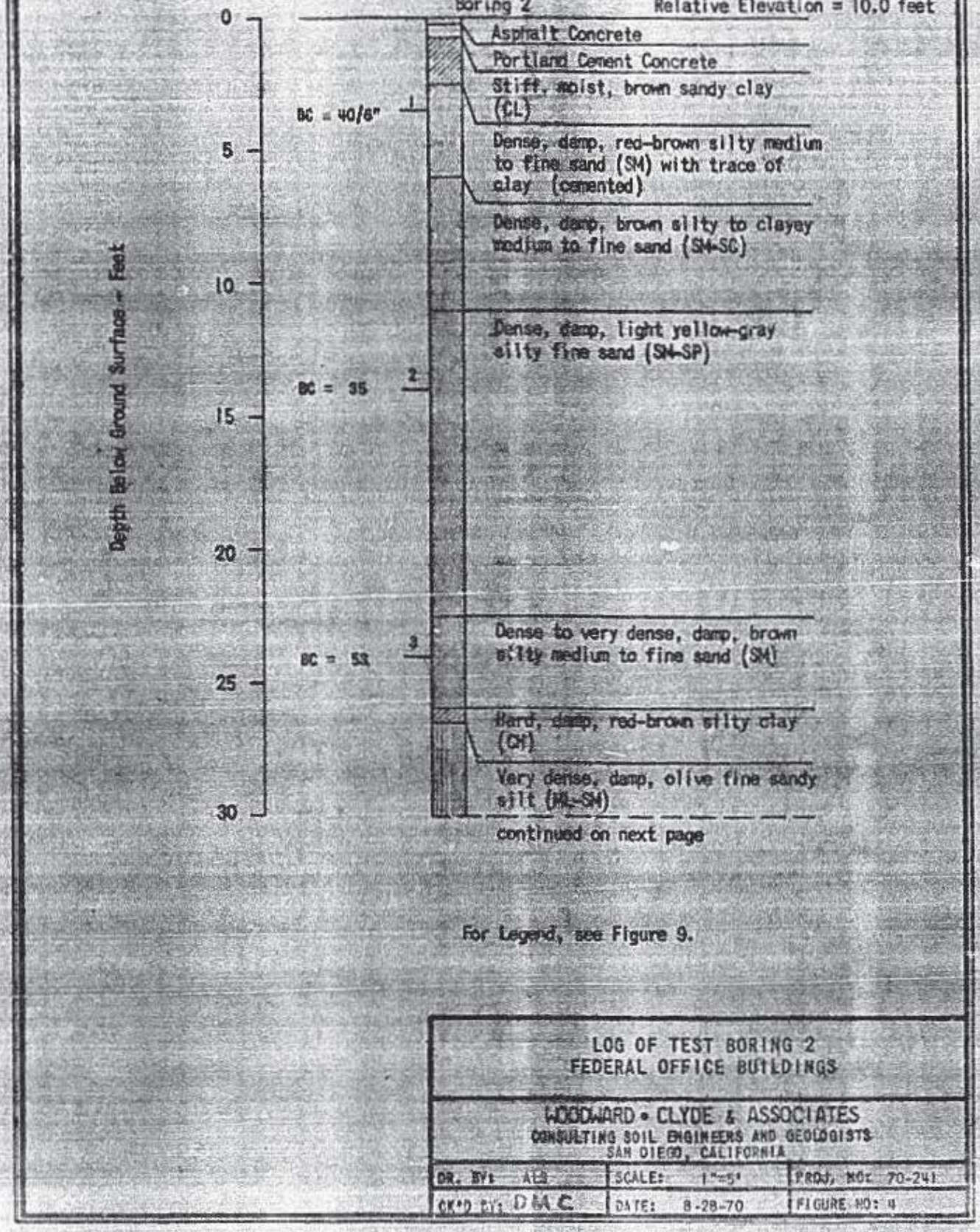


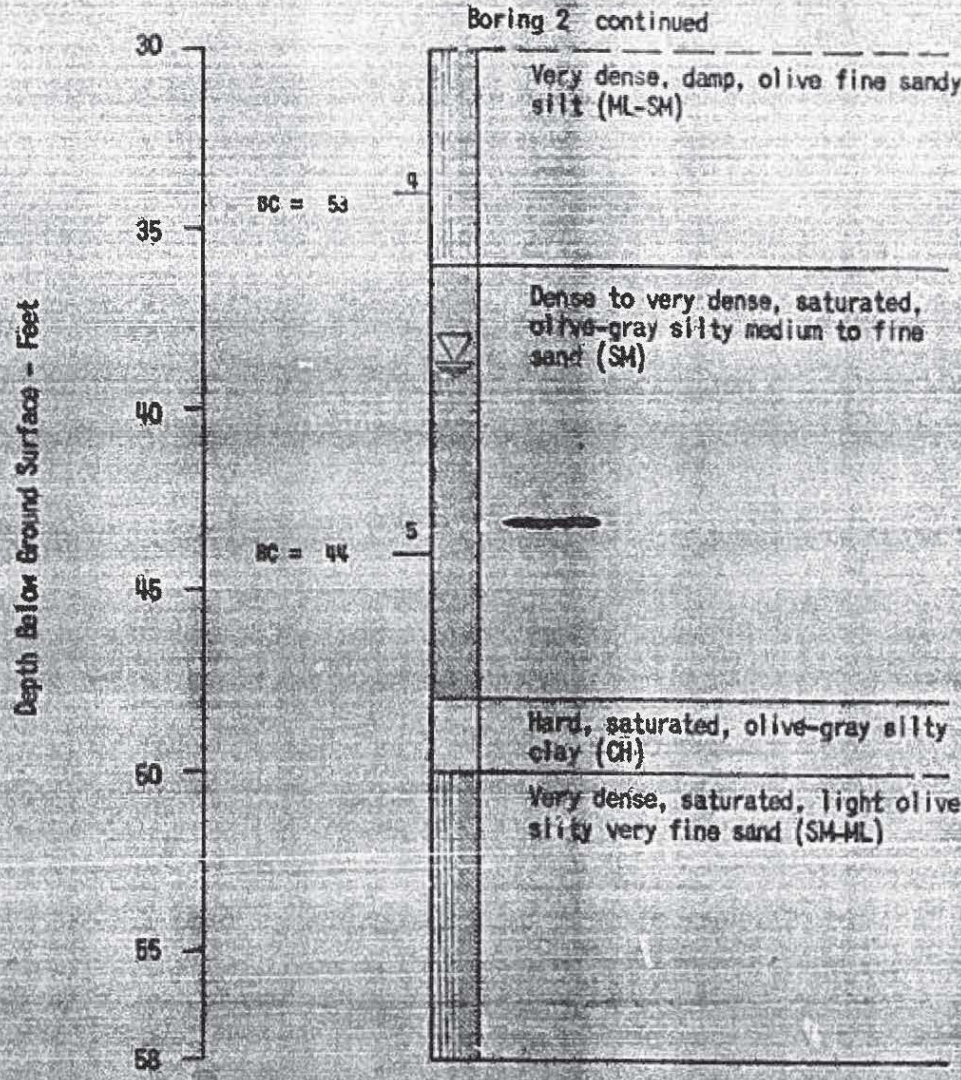
For Legend, see Figure 9.

LOG OF TEST BORING 1
FEDERAL OFFICE BUILDINGS

WOODWARD • CLYDE & ASSOCIATES
CONSULTING SOIL ENGINEERS AND GEOLOGISTS
SAN DIEGO, CALIFORNIA

DR. BY: ALS	SCALE: 1"=5'	PROJ. NO: 70-241
CK'D BY: DMC	DATE: 9-28-70	FIGURE NO: 3


Boring 2
Relative Elevation = 10.0 feet
Depth Below Ground Surface - Feet
0
5
10
15
20
25
30
BC = 40/6"
1
BC = 35
2
BC = 53
3
Asphalt Concrete
Portland Cement Concrete
Stiff, moist, brown sandy clay (CL)
Dense, damp, red-brown silty medium to fine sand (SM) with trace of clay (cemented)
Dense, damp, brown silty to clayey medium to fine sand (SM-SC)
Dense, damp, light yellow-gray silty fine sand (SM-SP)
Dense to very dense, damp, brown silty medium to fine sand (SM)
Hard, damp, red-brown silty clay (CH)
Very dense, damp, olive fine sandy silt (ML-SM)
continued on next page
For Legend, see Figure 9.
LOG OF TEST BORING 2
FEDERAL OFFICE BUILDINGS
WOODWARD • CLYDE & ASSOCIATES
CONSULTING SOIL ENGINEERS AND GEOLOGISTS
SAN DIEGO, CALIFORNIA
DR. BY: ALB
SCALE: 1"=5'
PROJ. NO: 70-241
CK'D BY: DMC
DATE: 8-28-70
FIGURE NO: 4

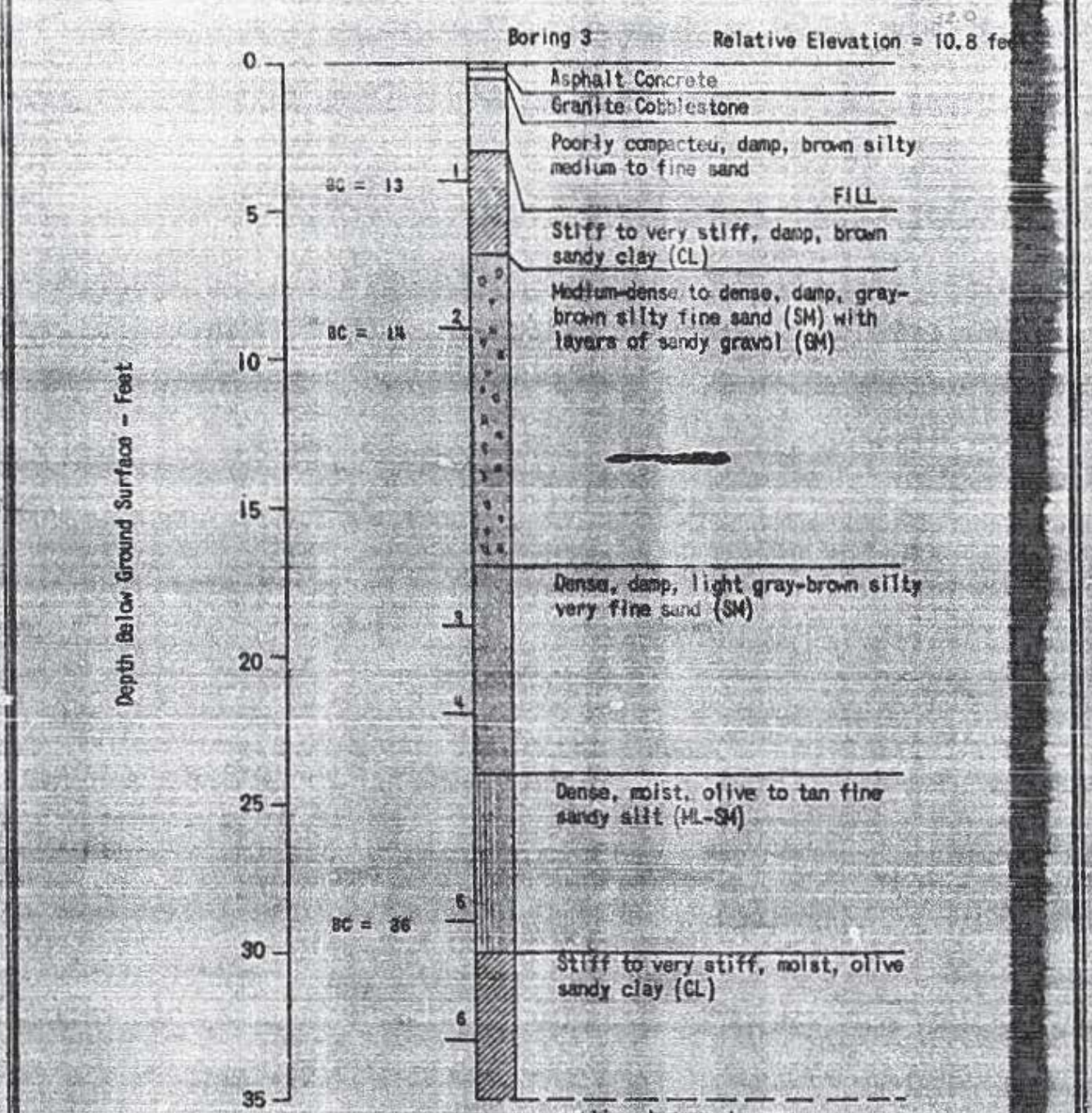


For Legend, see Figure 9.

LOG OF TEST BORING 2
FEDERAL OFFICE BUILDINGS

WOODWARD • CLYDE & ASSOCIATES
CONSULTING SOIL ENGINEERS AND GEOLOGISTS
SAN DIEGO, CALIFORNIA

DR. BY: ALS	SCALE: 1"=5'	PROJ. NO: 70-241
CK'D BY: DMC	DATE: 8-28-70	FIGURE NO: 5

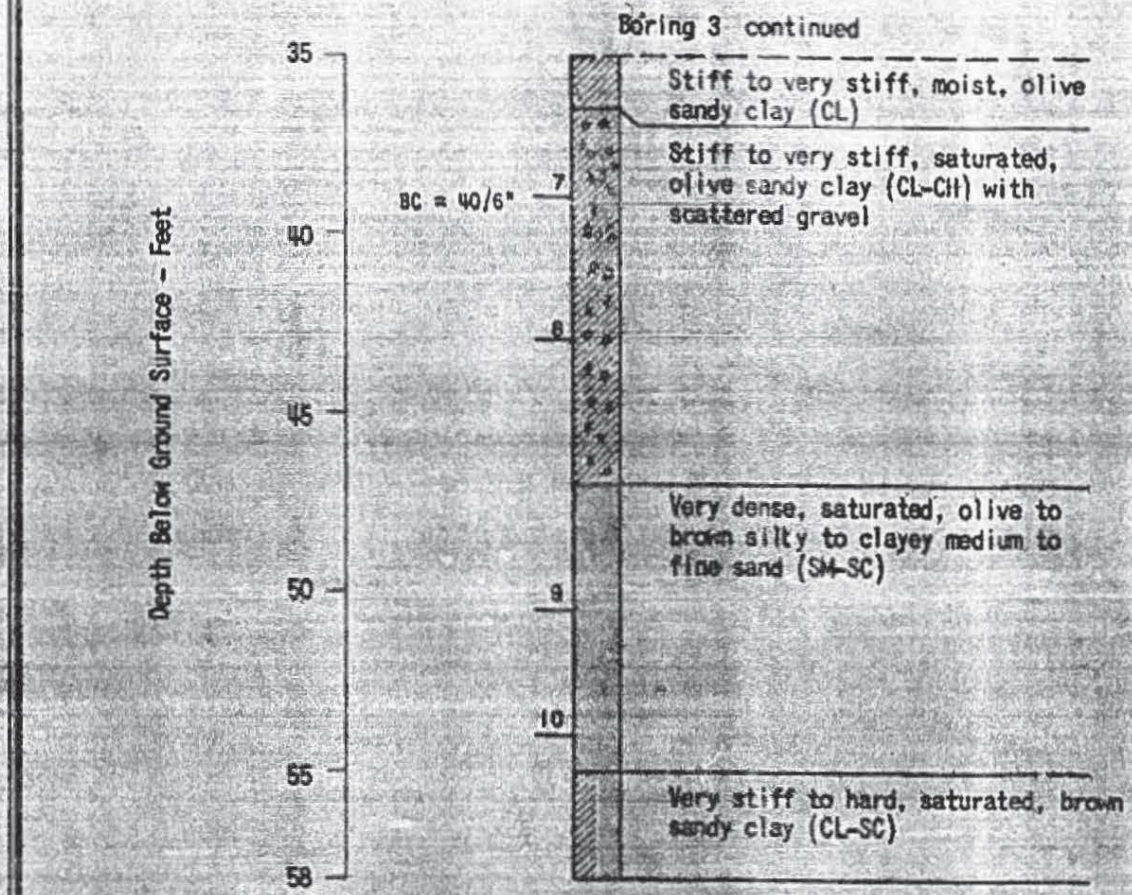


For Legend, see Figure 9.

LOG OF TEST BORING 3
FEDERAL OFFICE BUILDINGS

WOODWARD • CLYDE & ASSOCIATES
CONSULTING SOIL ENGINEERS AND GEOLOGISTS
SAN DIEGO, CALIFORNIA

DR. BY: ALS	SCALE: 1"=5'	PROJ. NO: 7
CK'D BY: DMC	DATE: 8-28-70	FIGURE NO:



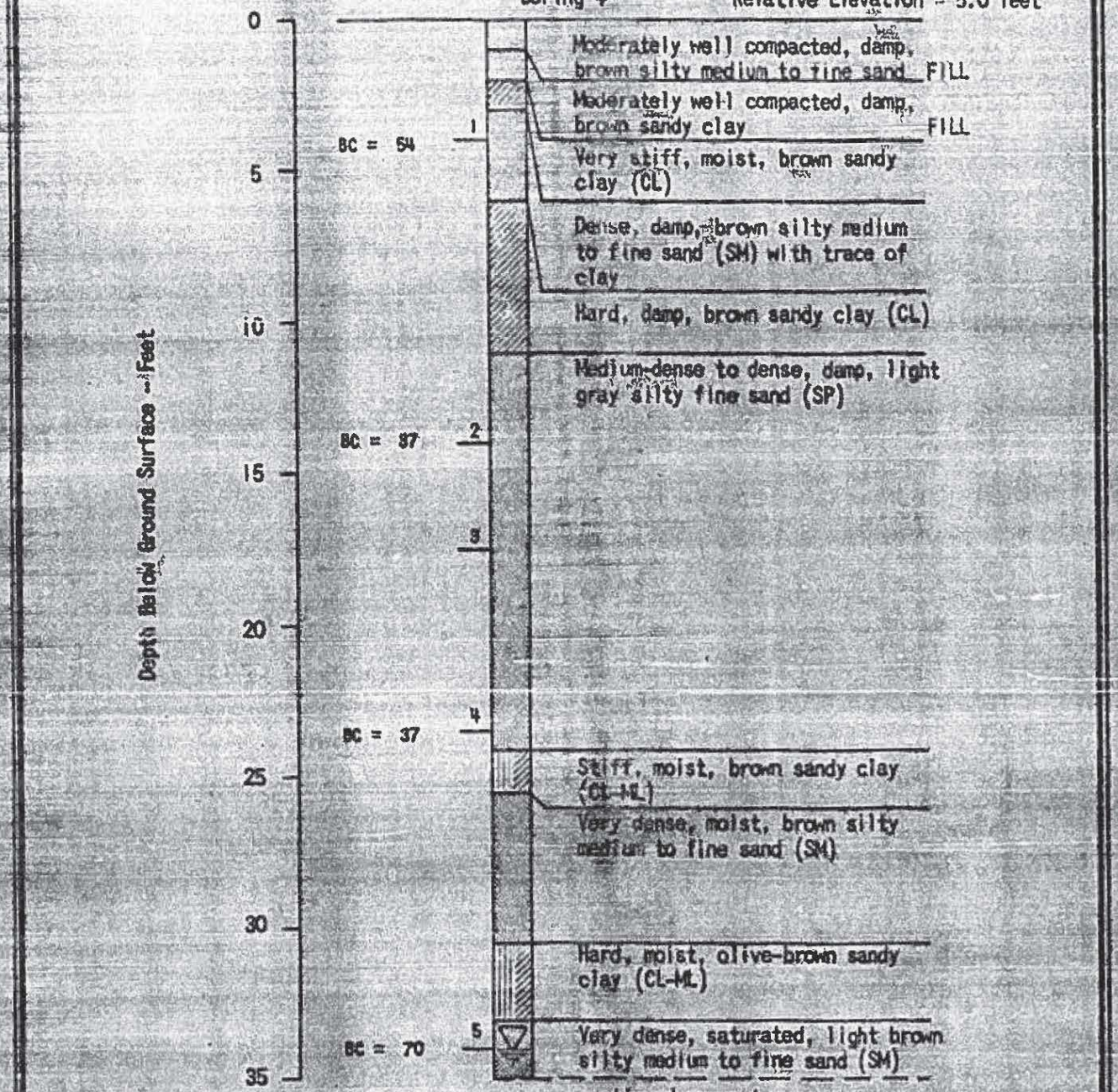
For Legend, see Figure 9.

LOG OF TEST BORING 3
FEDERAL OFFICE BUILDINGS

WOODWARD • CLYDE & ASSOCIATES
CONSULTING SOIL ENGINEERS AND GEOLOGISTS
SAN DIEGO, CALIFORNIA

DR. BY: ALS	SCALE: 1"=5'	PROJ. NO: 70-241
CK'D BY: DMC	DATE: 8-28-70	FIGURE NO: 7

Horton Plaza Improvement Project Appendix A - Geotechnical Report by URS dated April 15, 2012 Volume 1 of 2 (Rev. Jan. 2014) - 846 | Page

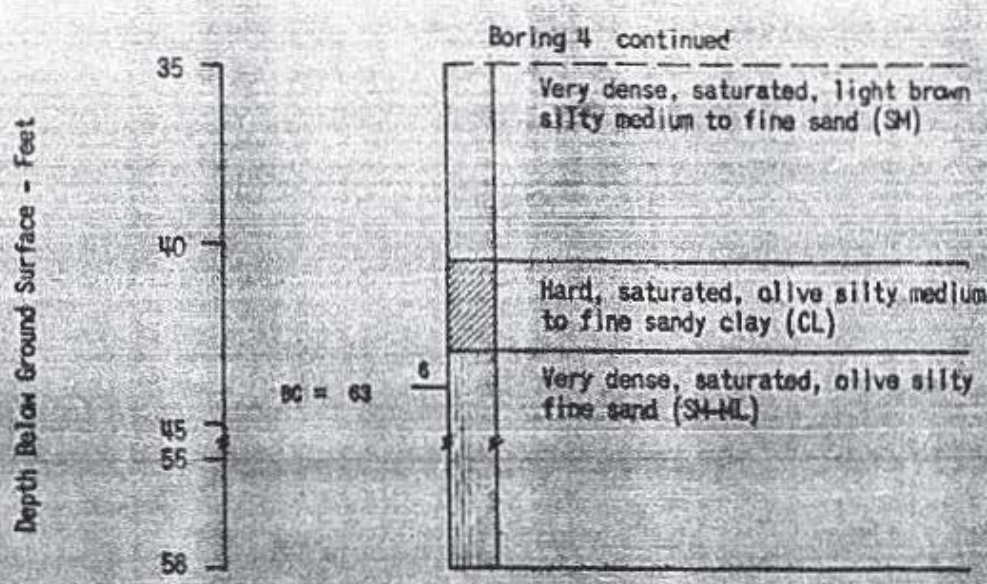


For Legend, see Figure 9.

LOG OF TEST BORING 4
FEDERAL OFFICE BUILDINGS

WOODWARD • CLYDE & ASSOCIATES
CONSULTING SOIL ENGINEERS AND GEOLOGISTS
SAN DIEGO, CALIFORNIA

DR. BY: ALS	SCALE: 1"=5'	PROJ. NO: 70-241
CK'D BY: DAC	DATE: 8-28-70	FIGURE NO: 8



LEGEND

BC = Number of blows by 140 pound hammer falling 30 inches to drive sampler 12 inches.
Sampler Data: ID = 2.0", OD = 2.5".

▽ = Water Level at time of drilling.

(SM) = Group classification symbol in accordance with the Unified Soil Classification System.

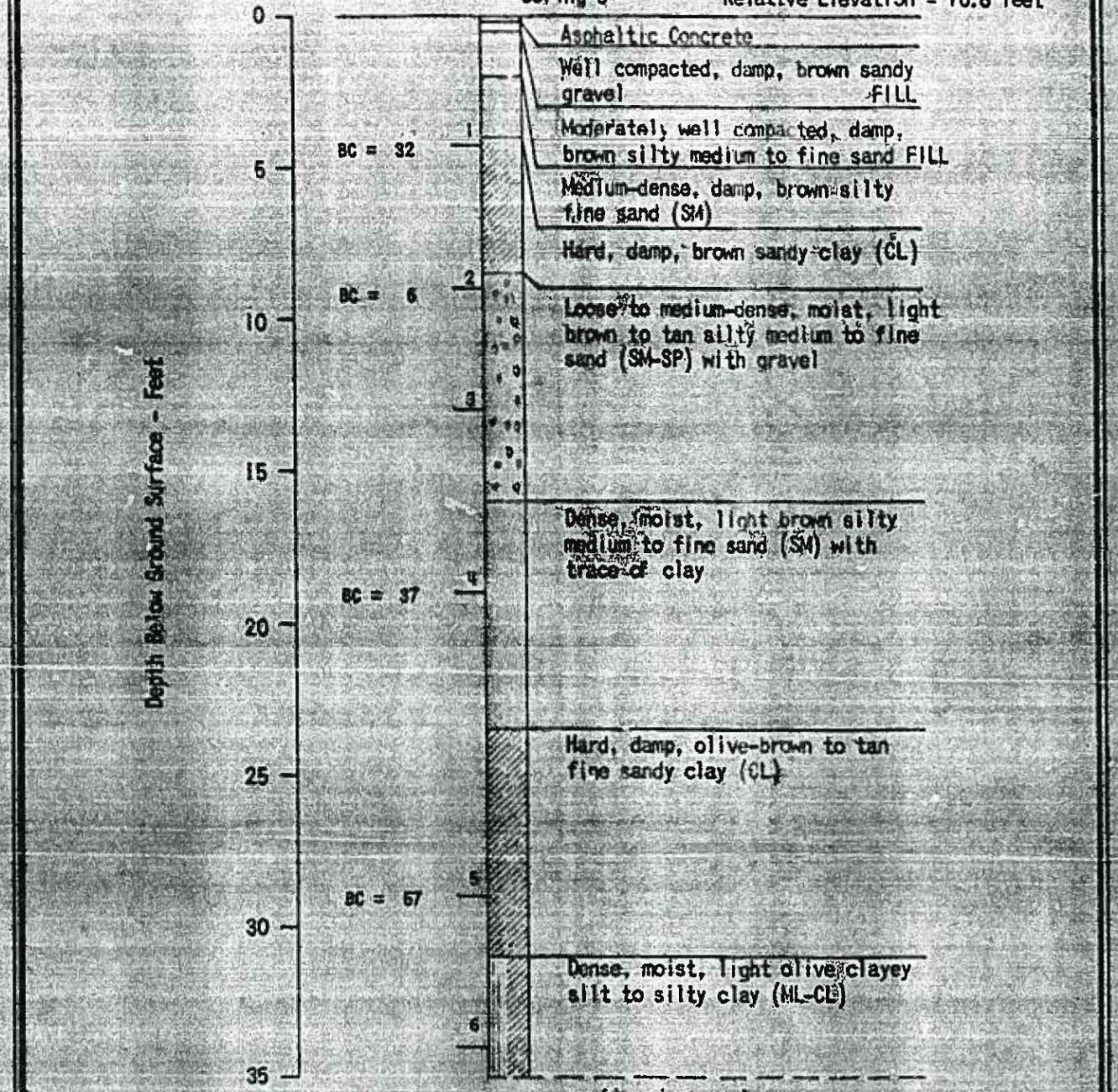
6 = Sample Number.

LOG OF TEST BORING 4
FEDERAL OFFICE BUILDINGS

WOODWARD • CLYDE & ASSOCIATES
CONSULTING SOIL ENGINEERS AND GEOLOGISTS
SAN DIEGO, CALIFORNIA

DR. BY: ALS	SCALE: 1"=5'	PROJ. NO: 70-241
CK'D BY: DNAC	DATE: 8-28-70	FIGURE NO: 9

Horton Plaza Improvement Project Appendix 3A Geotechnical Report by URS dated April 11, 2012 volume 1 of 2 (Rev. Jan. 2014) - 5487.1896

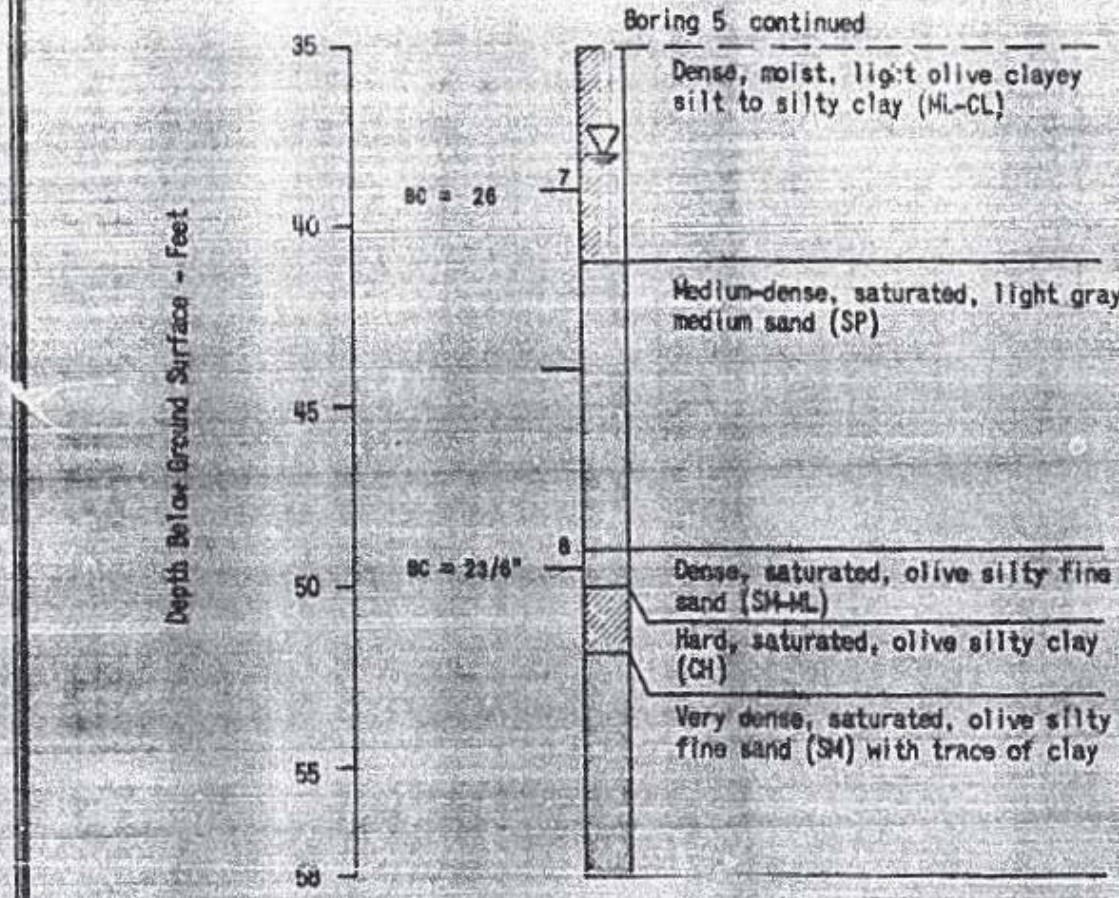


For Legend, see Figure 9.

LOG OF TEST BORING 5
FEDERAL OFFICE BUILDINGS

WOODWARD • CLYDE & ASSOCIATES
CONSULTING SOIL ENGINEERS AND GEOLOGISTS
SAN DIEGO, CALIFORNIA

DR. BY: ACG	SCALE: 1"=5'	PROJ. NO: 70-351
CK'D BY: DMC	DATE: 8-28-70	FIGURE NO: 10

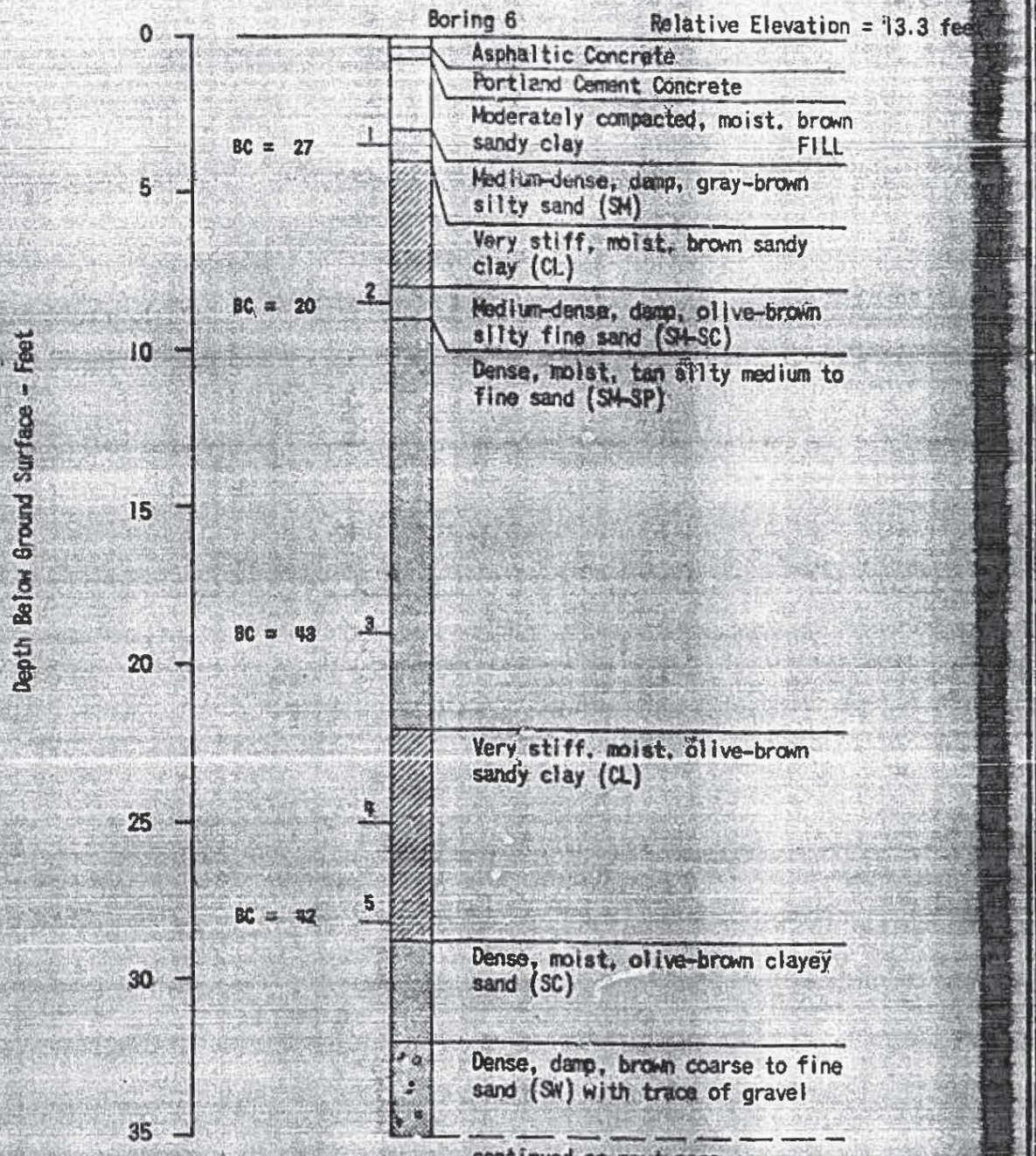


For Legend, see Figure 9.

LOG OF TEST BORING 5
FEDERAL OFFICE BUILDINGS

WOODWARD • CLYDE & ASSOCIATES
CONSULTING SOIL ENGINEERS AND GEOLOGISTS
SAN DIEGO, CALIFORNIA

DR. BY: ALS	SCALE: 1"=5'	PROJ. NO: 70-241
CK'D BY: DMC	DATE: 8-28-70	FIGURE NO: 11



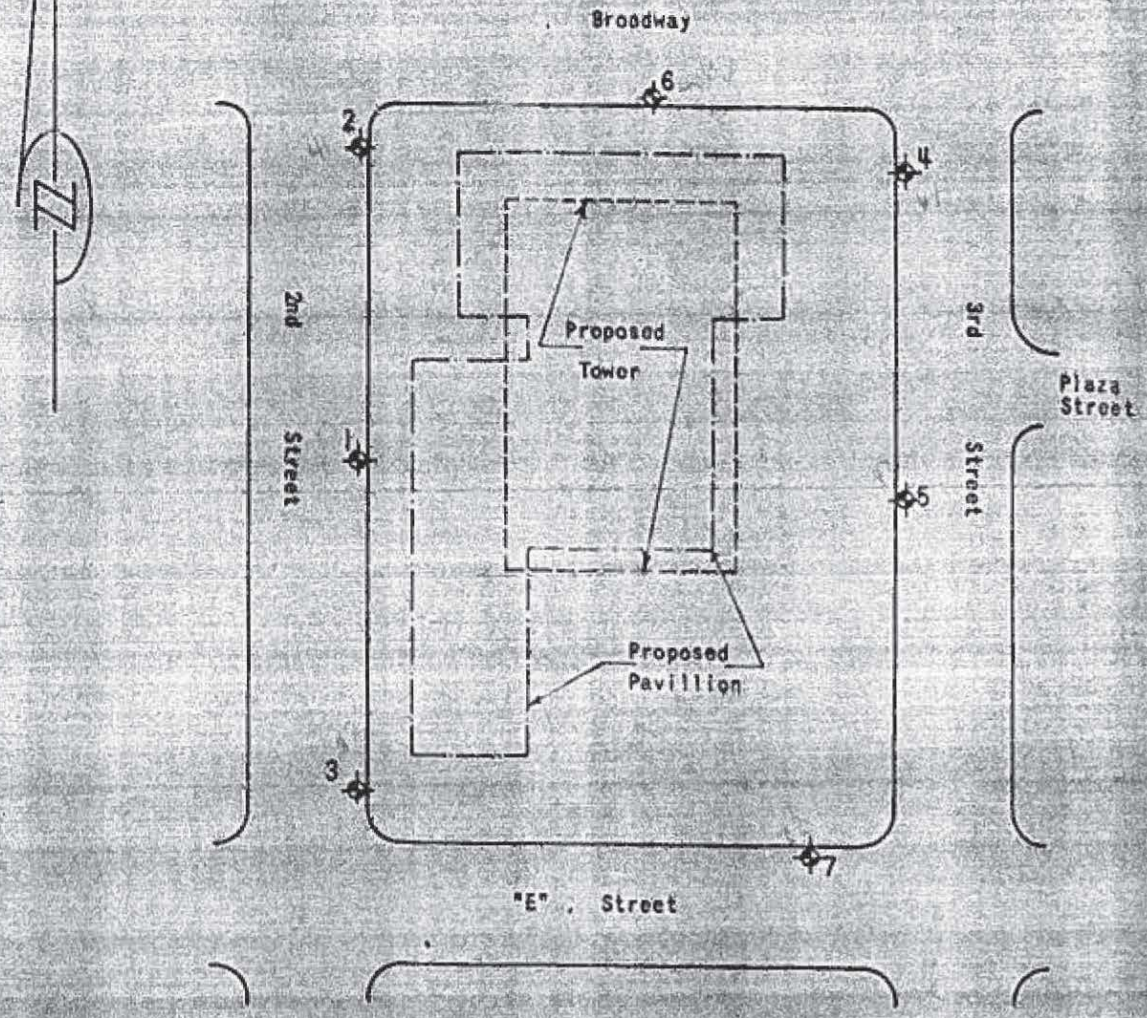
For Legend, see Figure 9.

LOG OF TEST BORING 6
FEDERAL OFFICE BUILDINGS

WOODWARD • CLYDE & ASSOCIATES
CONSULTING SOIL ENGINEERS AND GEOLOGISTS
SAN DIEGO, CALIFORNIA

DR. BY: ALS	SCALE: 1"=5'	PROJ. NO: 70-2
CK'D BY: DMC	DATE: 8-28-70	FIGURE NO: 12

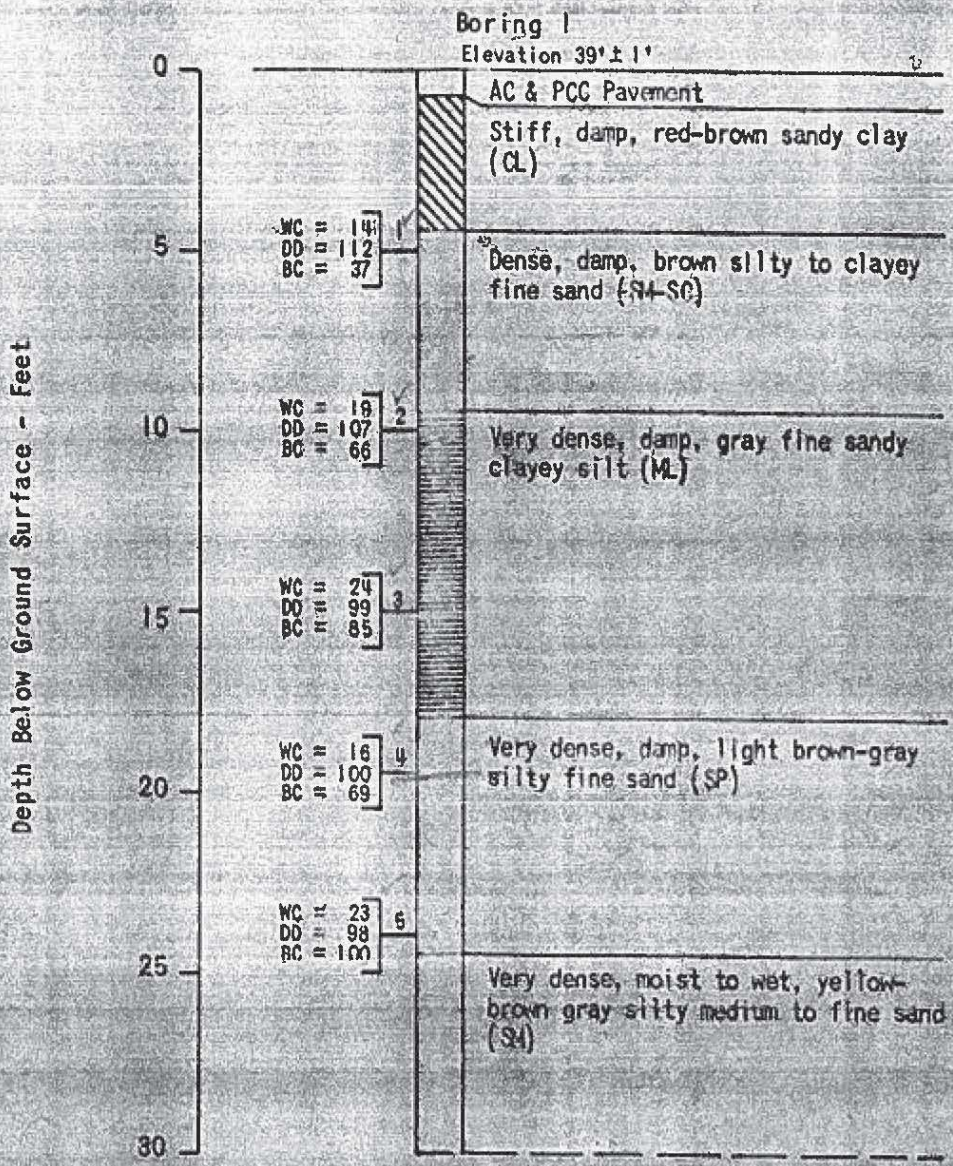
Woodward-Gizienski & Associates, 1973



LEGEND:

⊕ Indicates approximate location of Test Boring.

SITE PLAN CENTRAL FEDERAL SAVINGS AND LOAN TOWER		
WOODWARD – GIZIENSKI & ASSOCIATES CONSULTING SOIL AND FOUNDATION ENGINEERS AND GEOLOGISTS SAN DIEGO, CALIFORNIA		
DR. BY: AS/GS	APPROX. SCALE: 1" = 80'	PROJ. NO: 73-243
CK'D BY: [illegible]	DATE: 12/28/73	FIGURE NO: 1



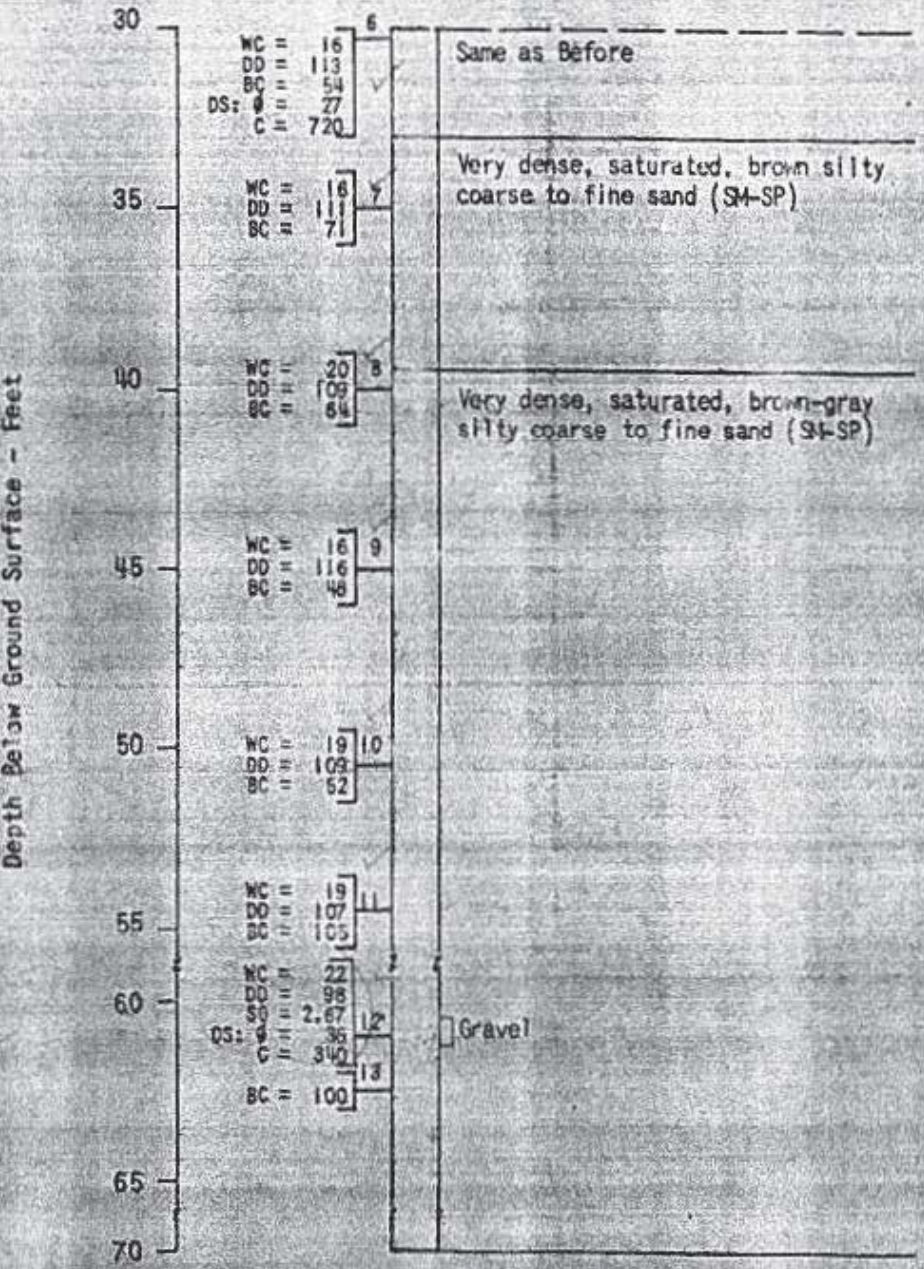
For Legend, see Fig. 6

LOG OF TEST BORING 1
CENTRAL FEDERAL SAVINGS AND LOAN TOWER

WOODWARD - GIZIENSKI & ASSOCIATES
CONSULTING SOIL AND FOUNDATION ENGINEERS AND GEOLOGISTS
SAN DIEGO, CALIFORNIA

DR. BY: AS/GS	APPROX. SCALE: 1" = 5'	PROJ. NO: 73-249
CK'D BY: [illegible]	DATE: 12/28/73	FIGURE NO: 2

Boring 1, Continued



Continued on next page

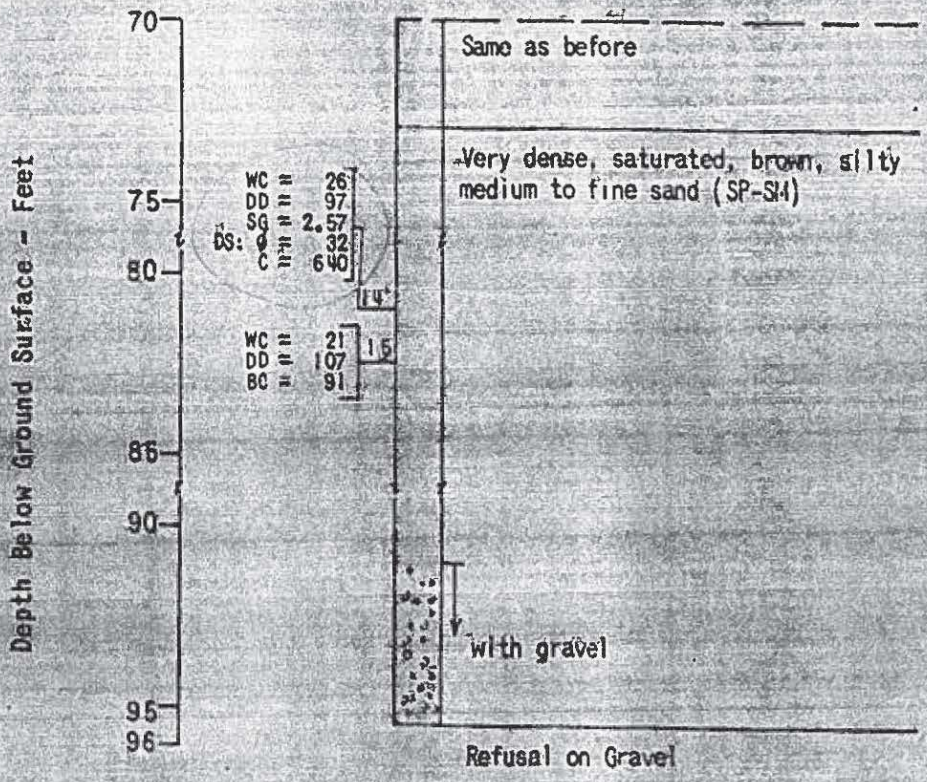
For Legend, see Fig. 6

LOG OF TEST BORING 1, CONTINUED
CENTRAL FEDERAL SAVINGS AND LOAN TOWER

WOODWARD - GIZIENSKI & ASSOCIATES
CONSULTING SOIL AND FOUNDATION ENGINEERS AND GEOLOGISTS
SAN DIEGO, CALIFORNIA

DR. BY: AS/CS	APPROX. SCALE: 1" = 5'	PROJ. NO.
CK'D BY: [illegible]	DATE: 12/28/73	FIGURE NO.

Boring 1, Continued

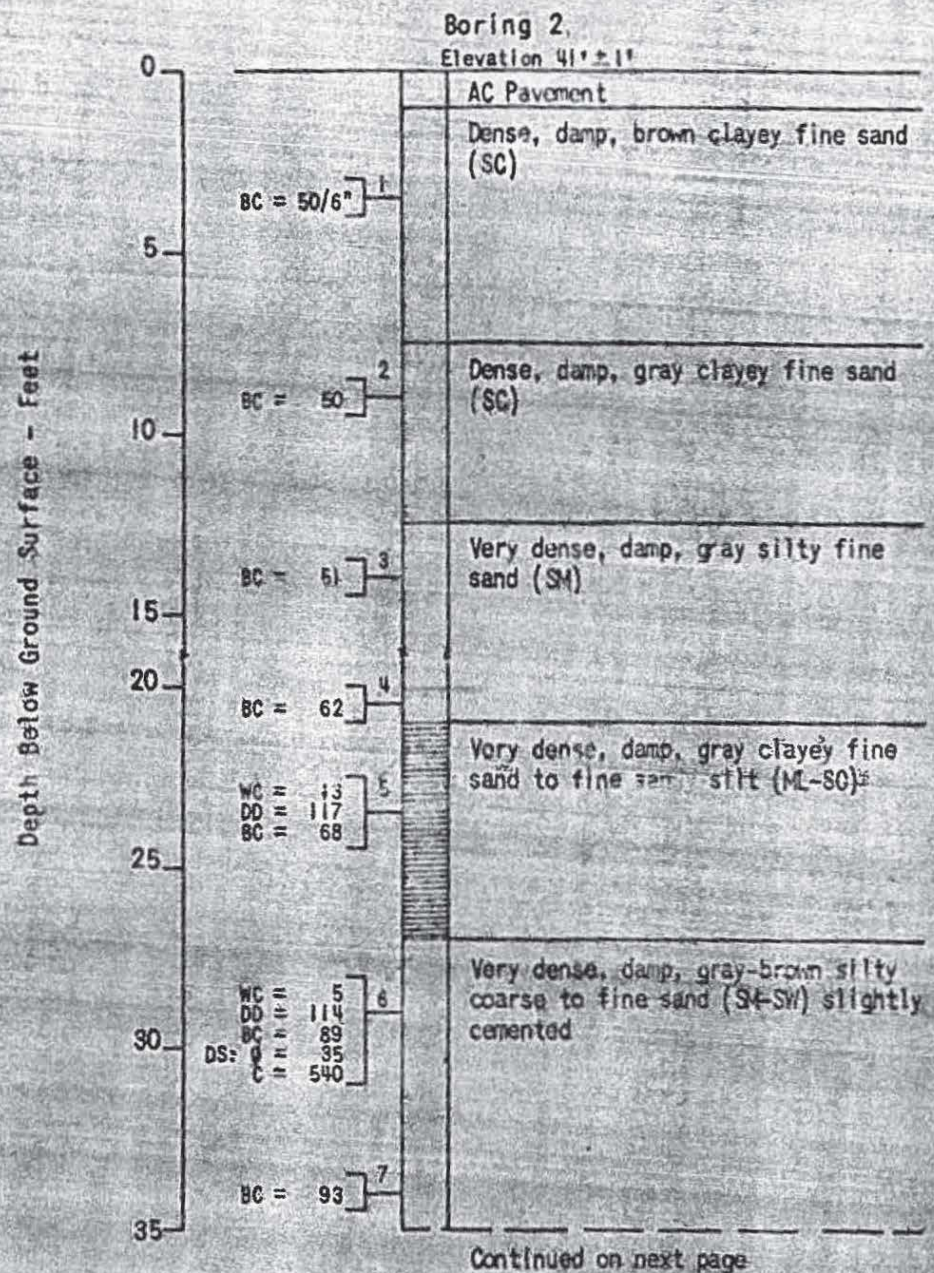


For Legend, see Fig. 6

LOG OF TEST BORING 1, CONTINUED
CENTRAL FEDERAL SAVINGS AND LOAN TOWER

WOODWARD - GIZIENSKI & ASSOCIATES
CONSULTING SOIL AND FOUNDATION ENGINEERS AND GEOLOGISTS
SAN DIEGO, CALIFORNIA

DR. BY: AS/GS	APPROX. SCALE: 1" = 5'	PROJ. NO: 73-243
CK'D BY: [illegible]	DATE: 12/28/73	FIGURE NO: 4



For Legend, see Fig. 6

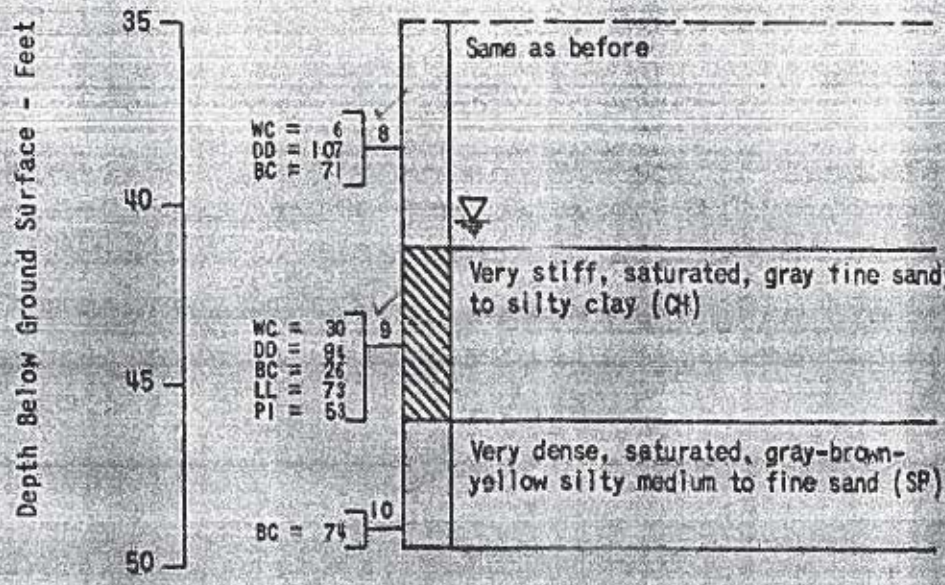
LOG OF TEST BORING 2
CENTRAL FEDERAL SAVINGS AND LOAN TOWER

WOODWARD - GIZIENSKI & ASSOCIATES
CONSULTING SOIL AND FOUNDATION ENGINEERS AND GEOLOGISTS
SAN DIEGO, CALIFORNIA

DR. BY: AS/CS	APPROX. SCALE: 1" = 5'	PROJ. NO: 73-243
CK'D BY: [illegible]	DATE: 12/28/73	FIGURE NO: 5

Horton Plaza Improvement Project Appendix A - Geotechnical Report by URS dated April 11, 2012 Volume 1 of 2 (Revised) Page

Boring 2, Continued



LEGEND

WC = Water Content in percent of dry weight.

DD = Dry Density in pcf.

BC = Number of blows by 140-lb. hammer falling 30 inches to drive sampler 12 inches.
Sampler Data: ID = 2.0", OD = 2.5"

SP = Specific Gravity

DS = Direct Shear Test Data:
ϕ = Angle of Apparent Friction in degrees.
C = Apparent Cohesion in psf.

(SM) = Group classification symbol in accordance with the Unified Soil Classification System.

12" = Pitcher Sample

1 = Sample Number

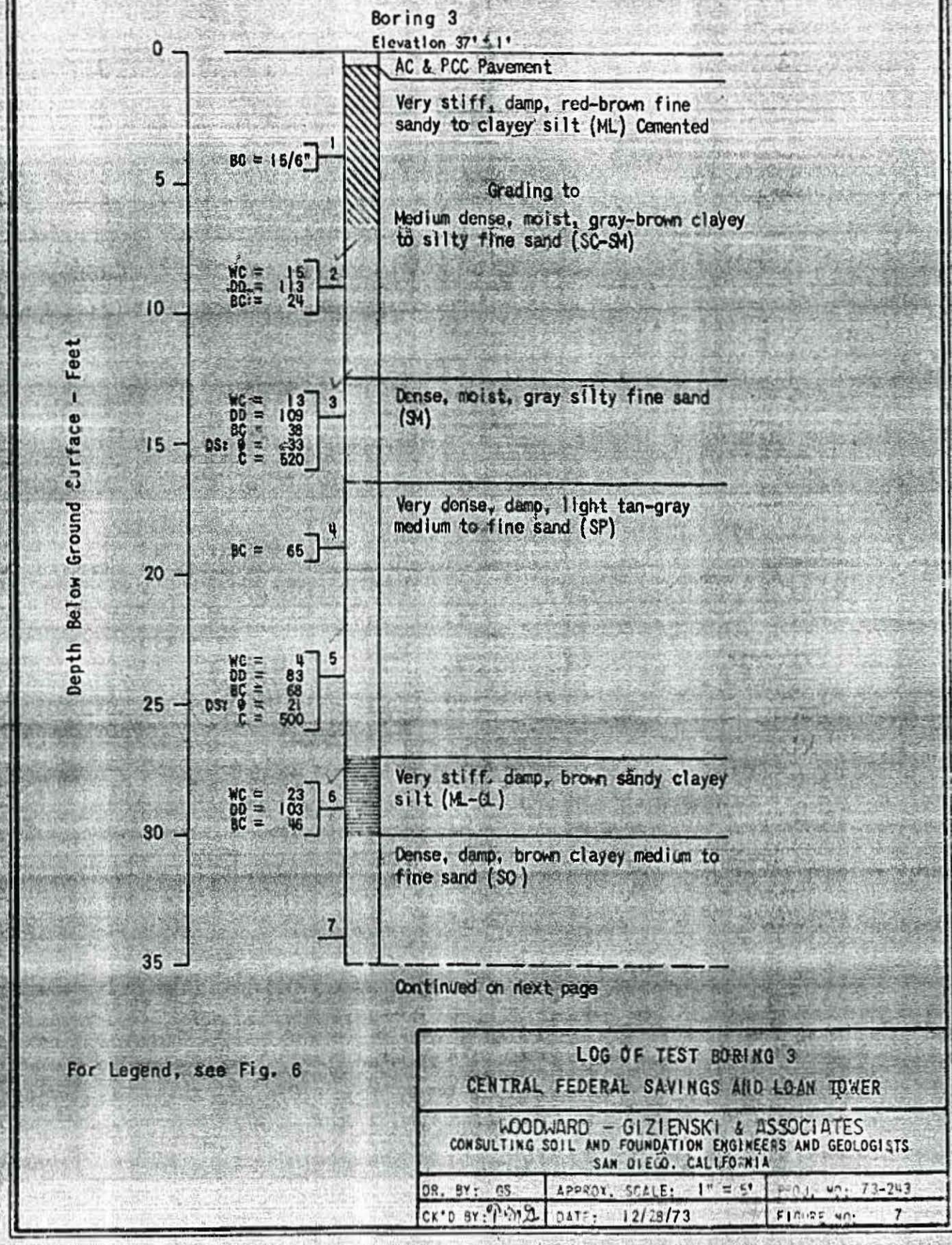
Refusal = Unable to extend excavation, practically, with equipment being used.

= Water level at time of drilling.

LOG OF TEST BORING 2, CONTINUED
CENTRAL FEDERAL SAVINGS AND LOAN TOWER

WOODWARD - GIZIENSKI & ASSOCIATES
CONSULTING SOIL AND FOUNDATION ENGINEERS AND GEOLOGISTS
SAN DIEGO, CALIFORNIA

DR. BY: AS/GS	APPROX. SCALE: 1" = 5'	PROJ. NO: 73-213
CK'D BY: [illegible]	DATE: 12/28/73	FIGURE NO: 6



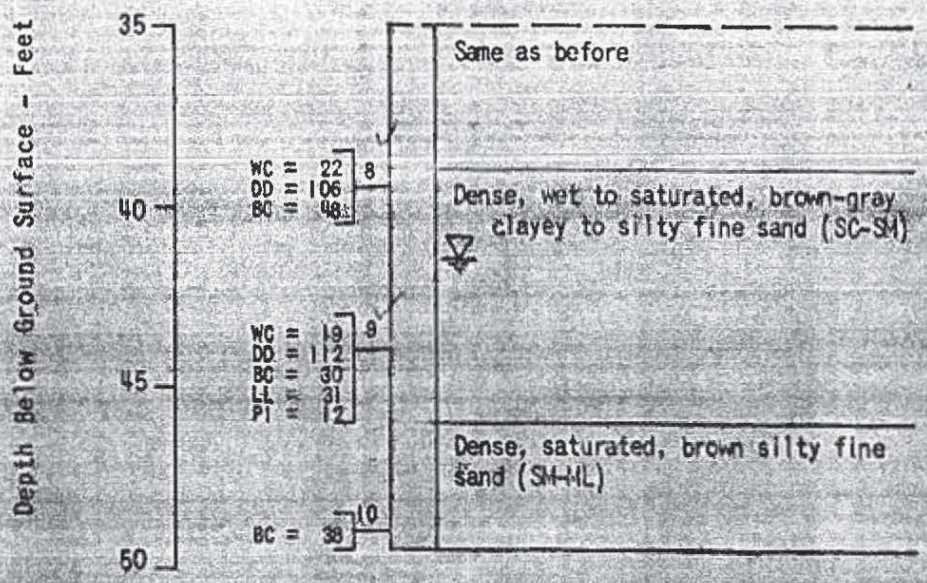
For Legend, see Fig. 6

LOG OF TEST BORING 3
CENTRAL FEDERAL SAVINGS AND LOAN TOWER

WOODWARD - GIZIENSKI & ASSOCIATES
CONSULTING SOIL AND FOUNDATION ENGINEERS AND GEOLOGISTS
SAN DIEGO, CALIFORNIA

DR. BY: GS	APPROX. SCALE: 1" = 5'	PROJ. NO: 73-243
CK'D BY:	DATE: 12/28/73	FIGURE NO: 7

Boring 3, Continued

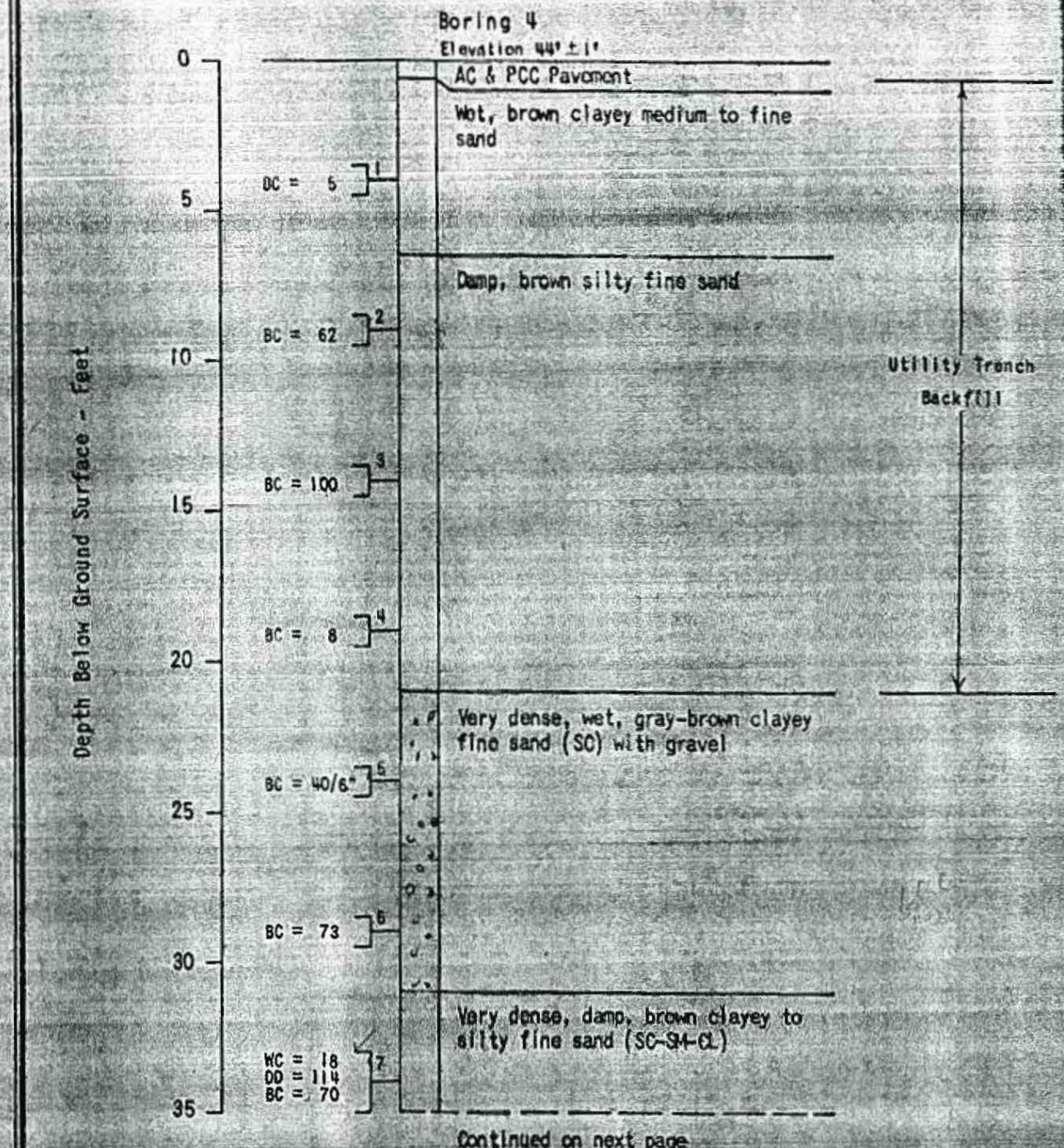


For Legend, see Fig. 6

LOG OF TEST BORING 3, CONTINUED
CENTRAL FEDERAL SAVINGS AND LOAN TOWER

WOODWARD - GIZIENSKI & ASSOCIATES
CONSULTING SOIL AND FOUNDATION ENGINEERS AND GEOLOGISTS
SAN DIEGO, CALIFORNIA

DR. BY: AS/GS	APPROX. SCALE: 1" = 5'	PROJ. NO: 73-243
CK'D BY: [illegible]	DATE: 12/28/73	FIGURE NO: 8



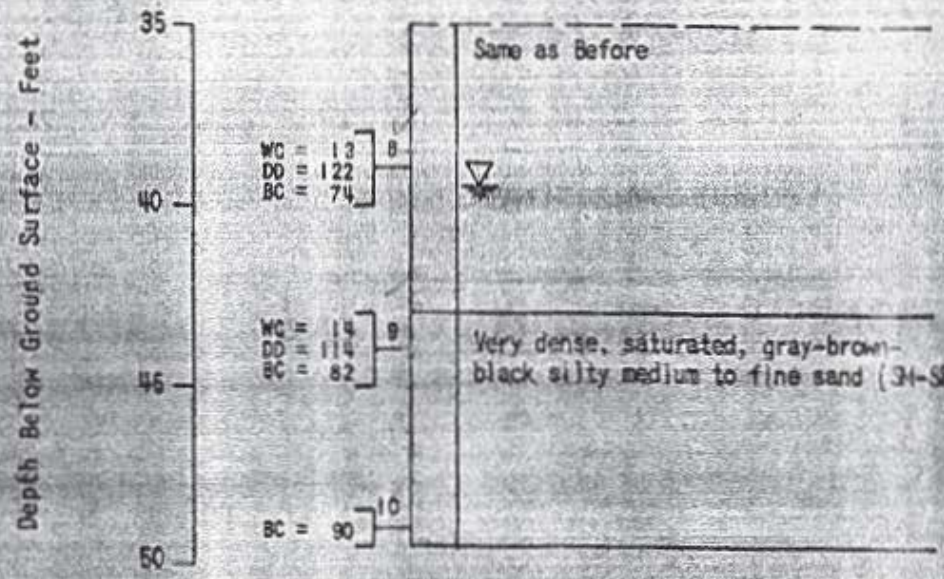
For Legend, see Fig. 6

LOG OF TEST BORING 4
CENTRAL FEDERAL SAVINGS AND LOAN TOWER

WOODWARD – GIZIENSKI & ASSOCIATES
CONSULTING SOIL AND FOUNDATION ENGINEERS AND GEOLOGISTS
SAN DIEGO, CALIFORNIA

DR. BY: AS/GS	APPROX. SCALE: 1" = 5'	PROJ. NO: 73-243
CK'D BY:	DATE: 12/24/73	FIGURE NO: 9

Boring 4, Continued

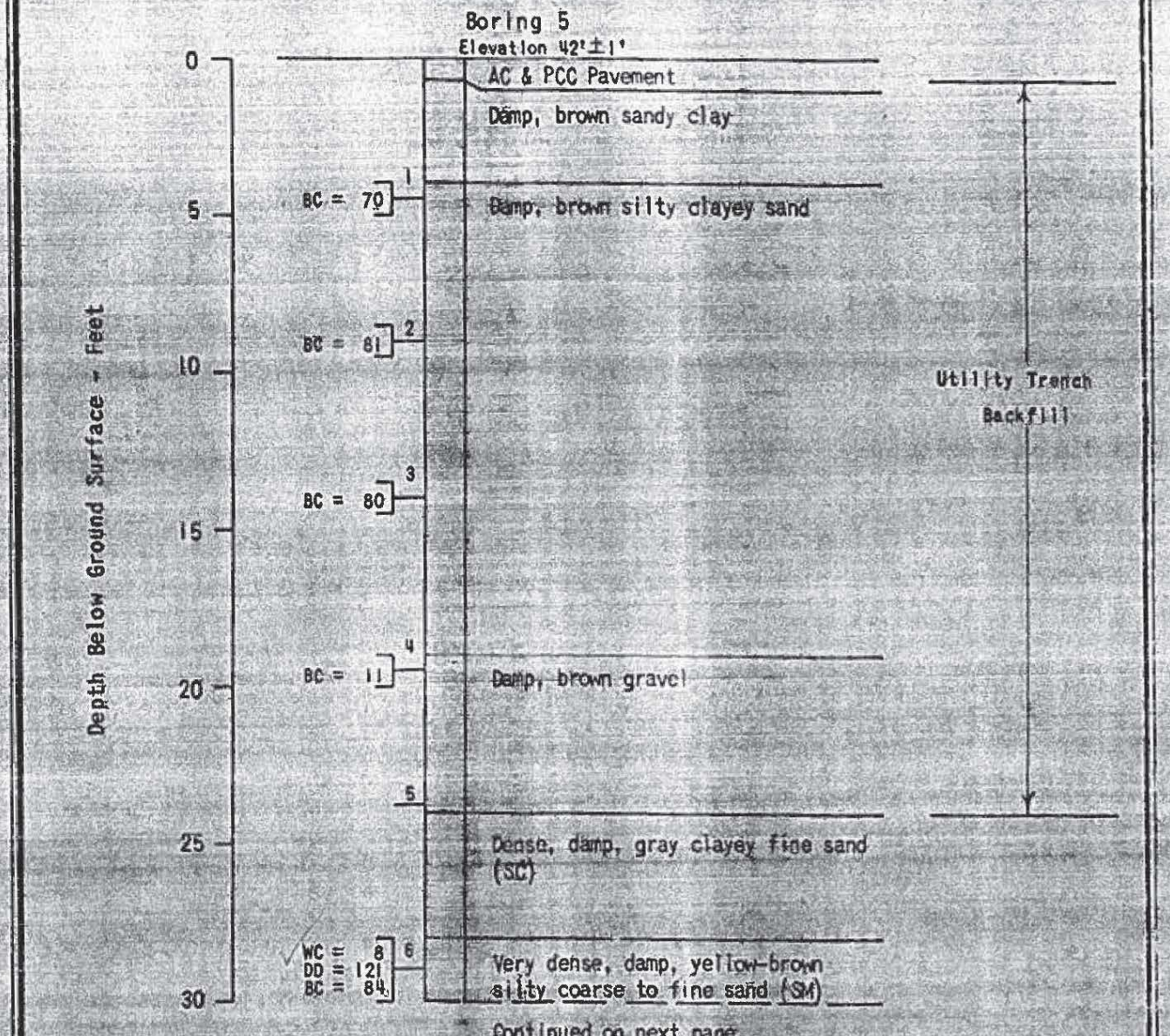


For Legend, see Fig. 6

LOG OF TEST BORING 4, CONTINUED
CENTRAL FEDERAL SAVINGS AND LOAN TOWER

WOODWARD - GIZIENSKI & ASSOCIATES
CONSULTING SOIL AND FOUNDATION ENGINEERS AND GEOLOGISTS
SAN DIEGO, CALIFORNIA

DR. BY: AS/CS	APPROX. SCALE: 1" = 4'	PROJ. NO: 73-243
CK'D BY: [illegible]	DATE: 12/29/73	FIGURE NO: 10



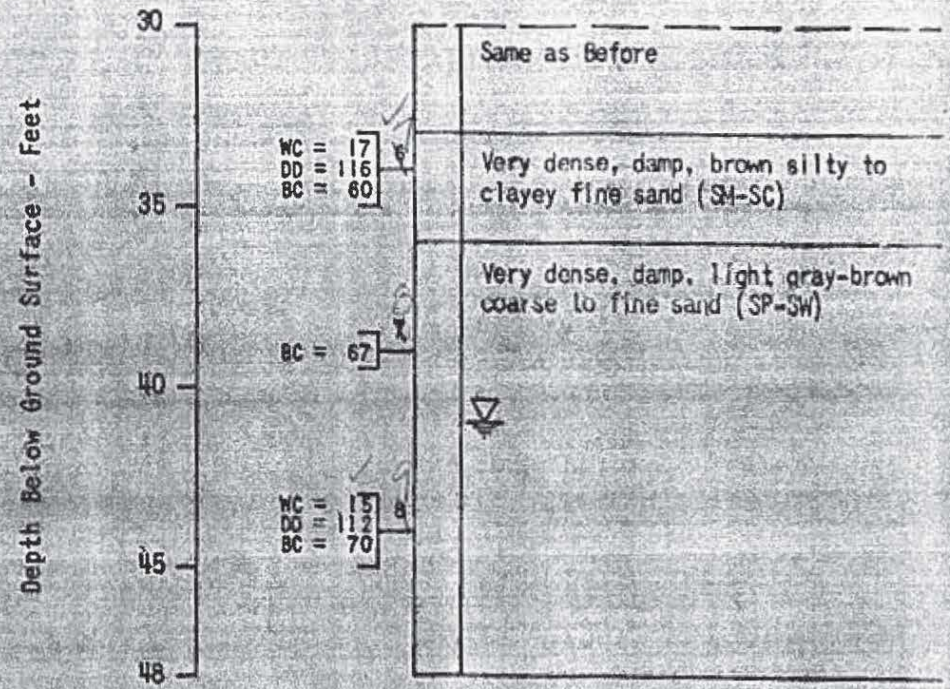
For Legend, see Fig. 6

LOG OF TEST BORING 5
CENTRAL FEDERAL SAVINGS AND LOAN TOWER

WOODWARD - GIZIENSKI & ASSOCIATES
CONSULTING SOIL AND FOUNDATION ENGINEERS AND GEOLOGISTS
SAN DIEGO, CALIFORNIA

DR. BY: AS/DS	APPROX. SCALE: 1" = 5'	PROJ. NO: 73-243
CK'D BY: [illegible]	DATE: 12/27/73	FIGURE NO: 11

Boring 5, Continued



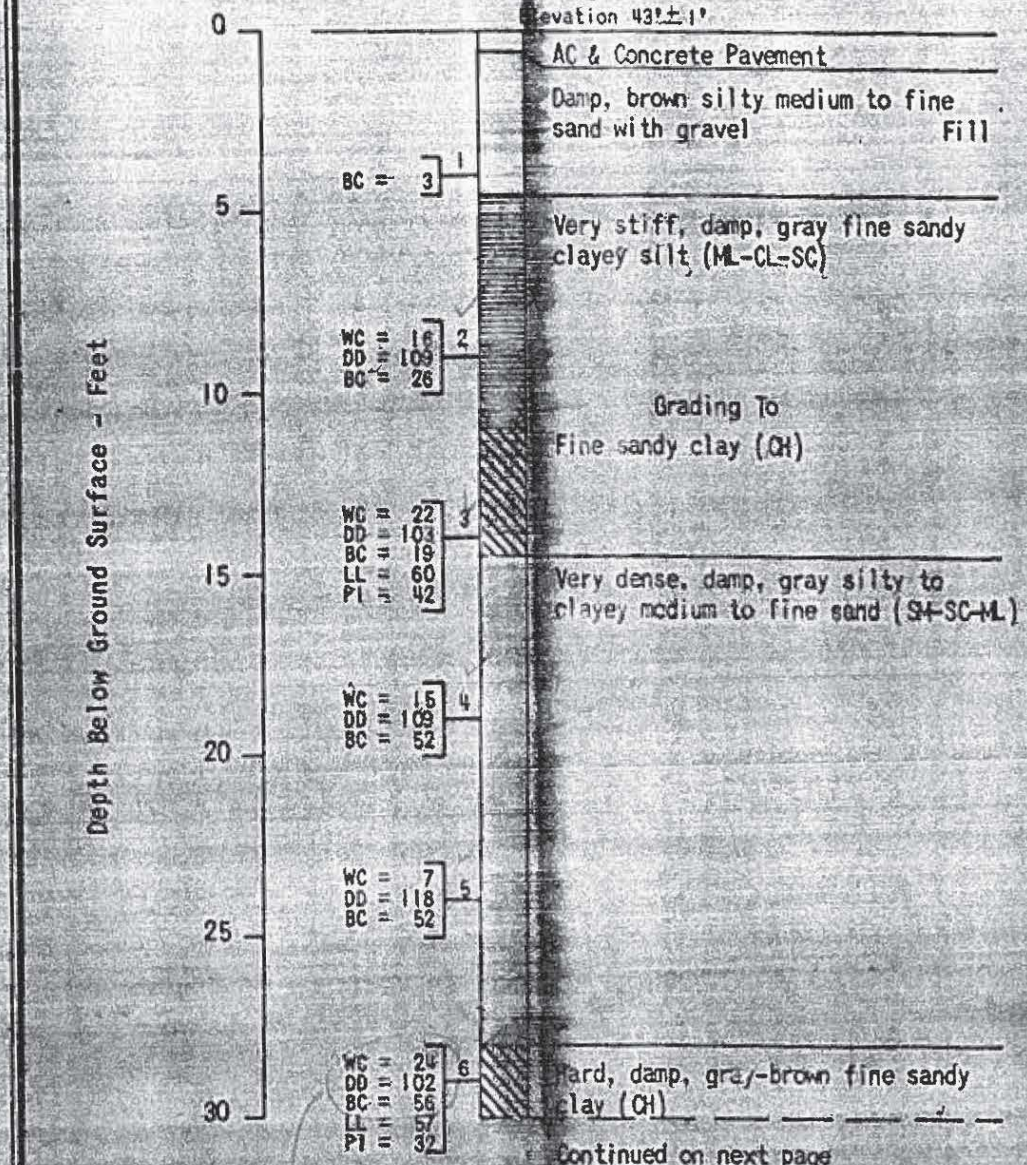
For Legend, see Fig. 6

LOG OF TEST BORING 5, CONTINUED

CENTRAL FEDERAL SAVINGS AND LOAN TOWER

WOODWARD – GIZIENSKI & ASSOCIATES
CONSULTING SOIL AND FOUNDATION ENGINEERS AND GEOLOGISTS
SAN DIEGO, CALIFORNIA

DR. BY: AS/GS	APPROX. SCALE: 1" = 5'	JOB NO: 73-243
CK'D BY: [illegible]	DATE: 10/31/73	FIG. OR NO: 12



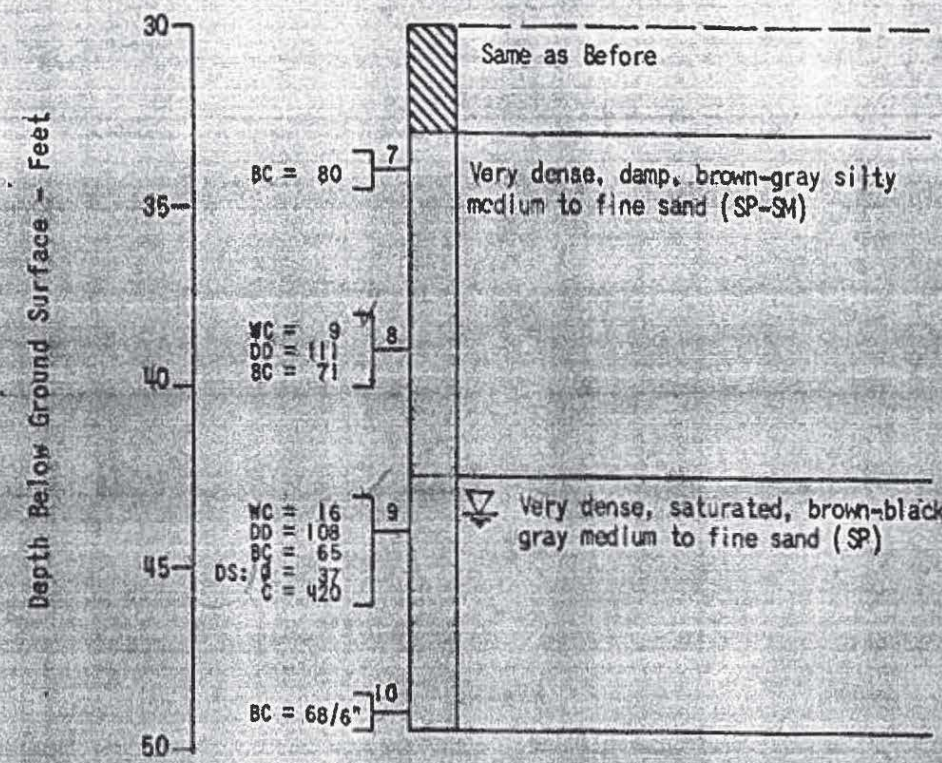
For Legend, see Fig. 6

LOG OF TEST BORING 6
CENTRAL FEDERAL SAVINGS AND LOAN TOWER

WOODWARD - GIZIENSKI & ASSOCIATES
CONSULTING SOIL AND FOUNDATION ENGINEERS AND GEOLOGISTS
SAN DIEGO, CALIFORNIA

DR. BY: AS/GS	APPROX. SCALE: 1" = 5'	PROJ. NO: 73-243
CK'D BY: [illegible]	DATE: 12/28/73	FIGURE NO: 13

Boring 6, Continued

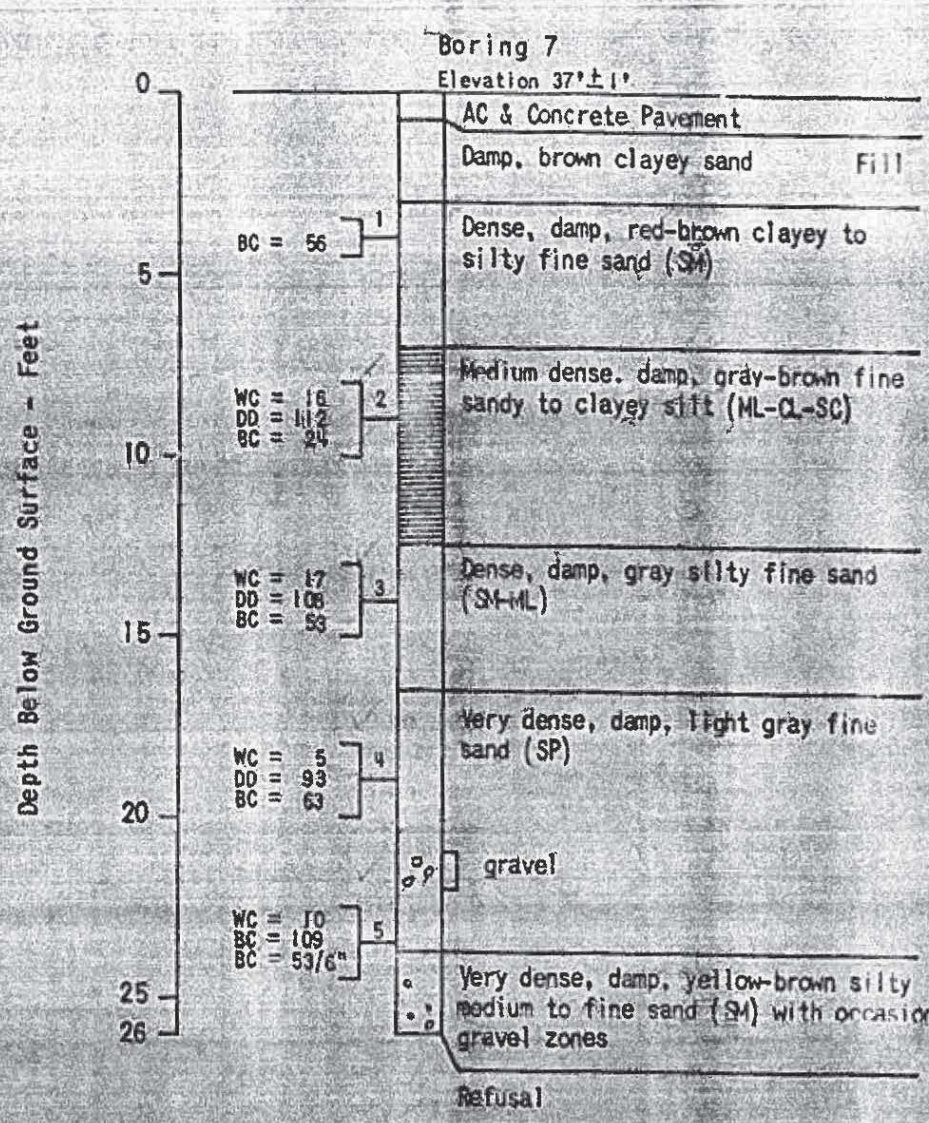


For Legend, see Fig. 6

LOG OF TEST BORING 6, CONTINUED
CENTRAL FEDERAL SAVINGS AND LOAD TOWER

WOODWARD - GIZIENSKI & ASSOCIATES
CONSULTING SOIL AND FOUNDATION ENGINEERS AND GEOLOGISTS
SAN DIEGO, CALIFORNIA

DR. BY: AS/GS	APPROX. SCALE: 1" = 5'	PROJ. NO: 73-243
CK'D BY: [illegible]	DATE: 12/3/73	FIGURE NO: 16



For Legend, see Fig. 6

LOG OF TEST BORING 7
CENTRAL FEDERAL SAVINGS AND LOAN TOWER

WOODWARD - GIZIENSKI & ASSOCIATES
CONSULTING SOIL AND FOUNDATION ENGINEERS AND GEOLOGISTS
SAN DIEGO, CALIFORNIA

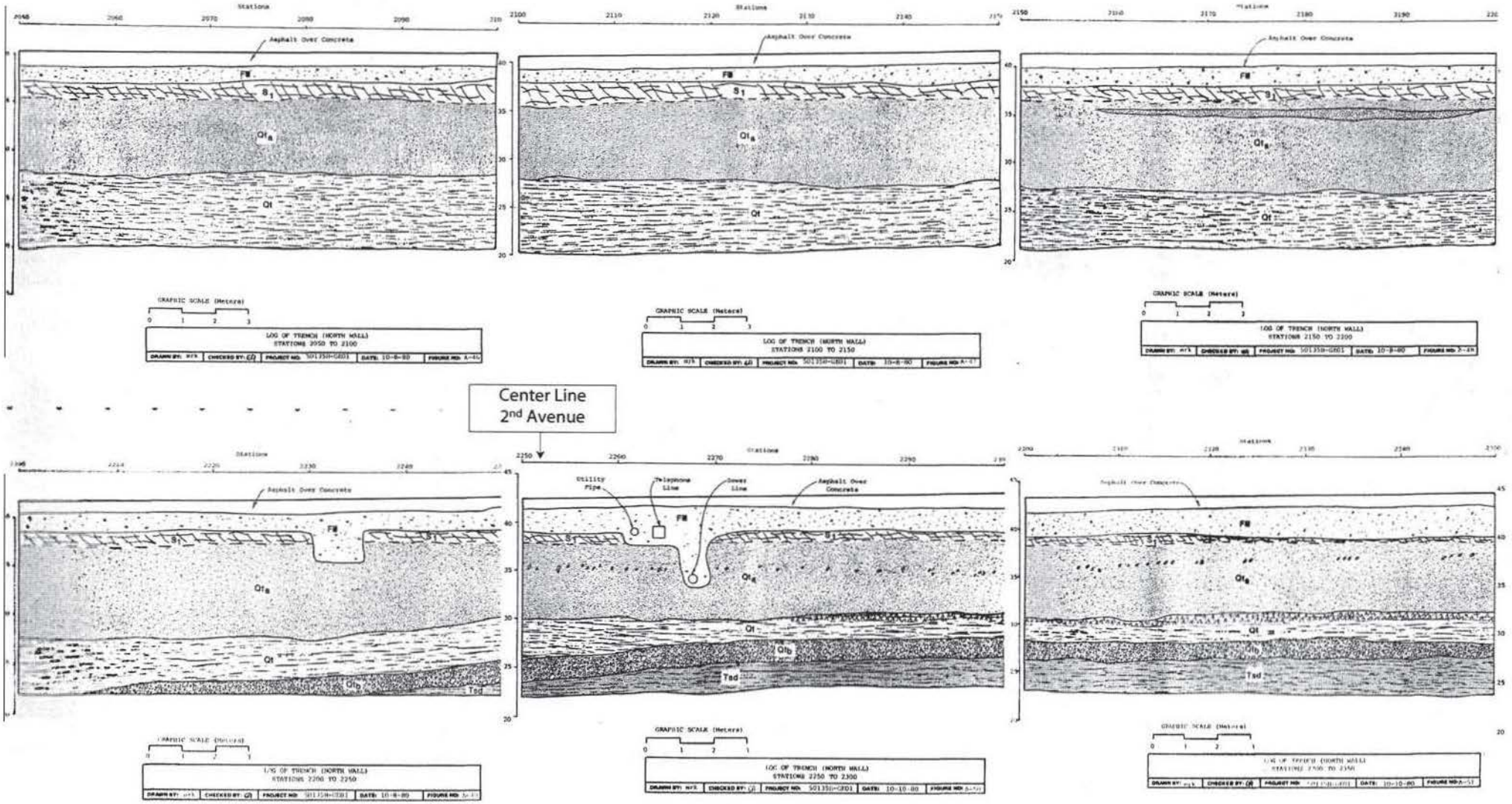
DR. BY: AS/GS	APPROX. SCALE: 1" = 5'	PROJ. NO: 73-[illegible]
CK'D BY: [illegible]	DATE: 12/28/73	FIGURE NO. [illegible]

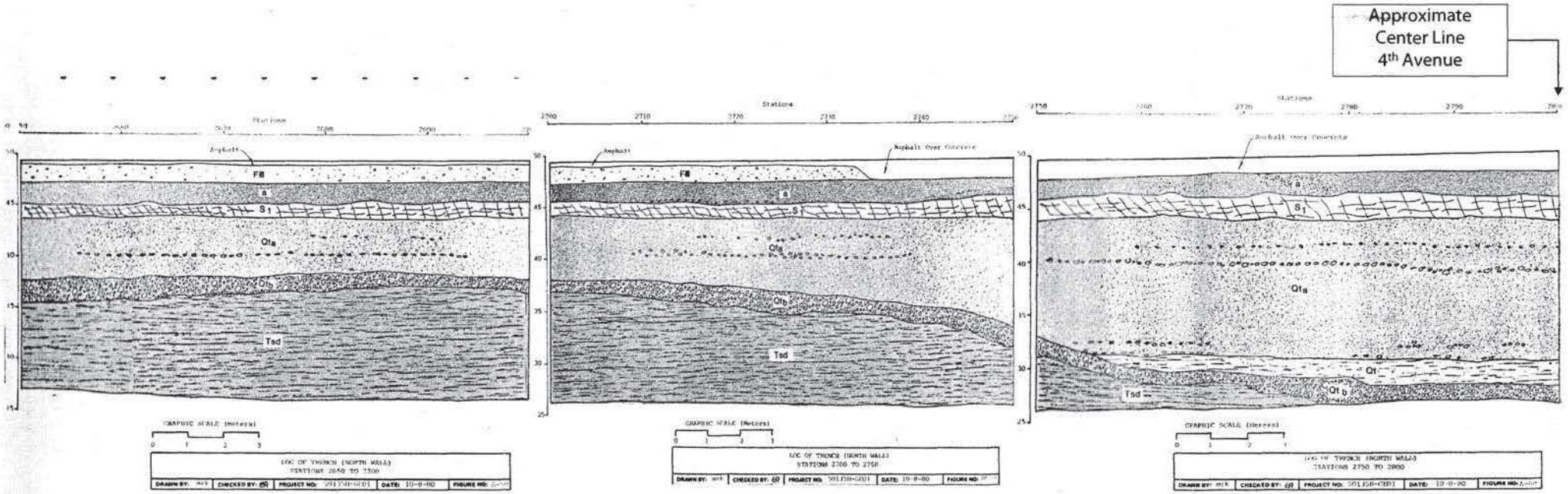
Artim and Streiff, 1980

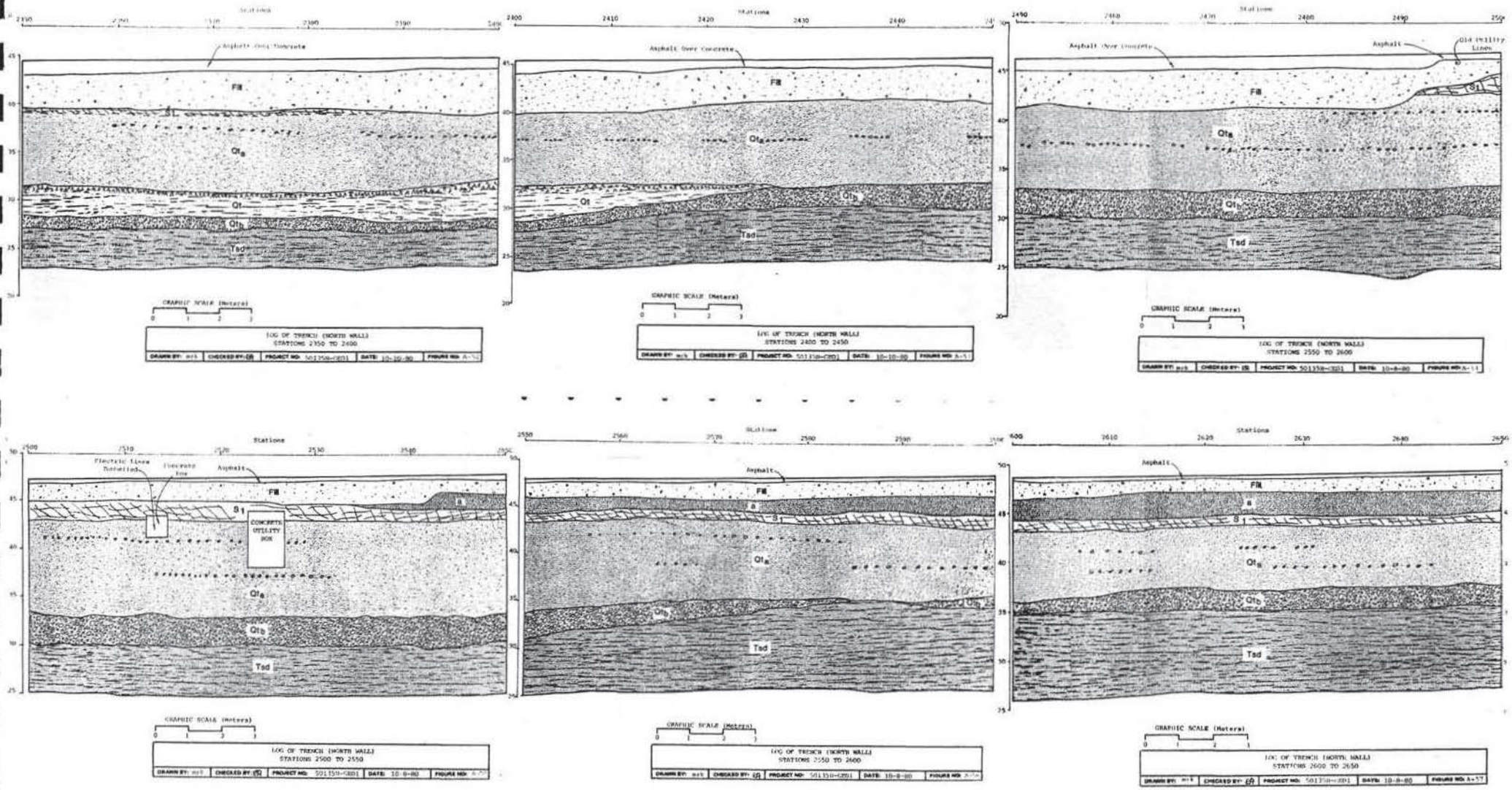
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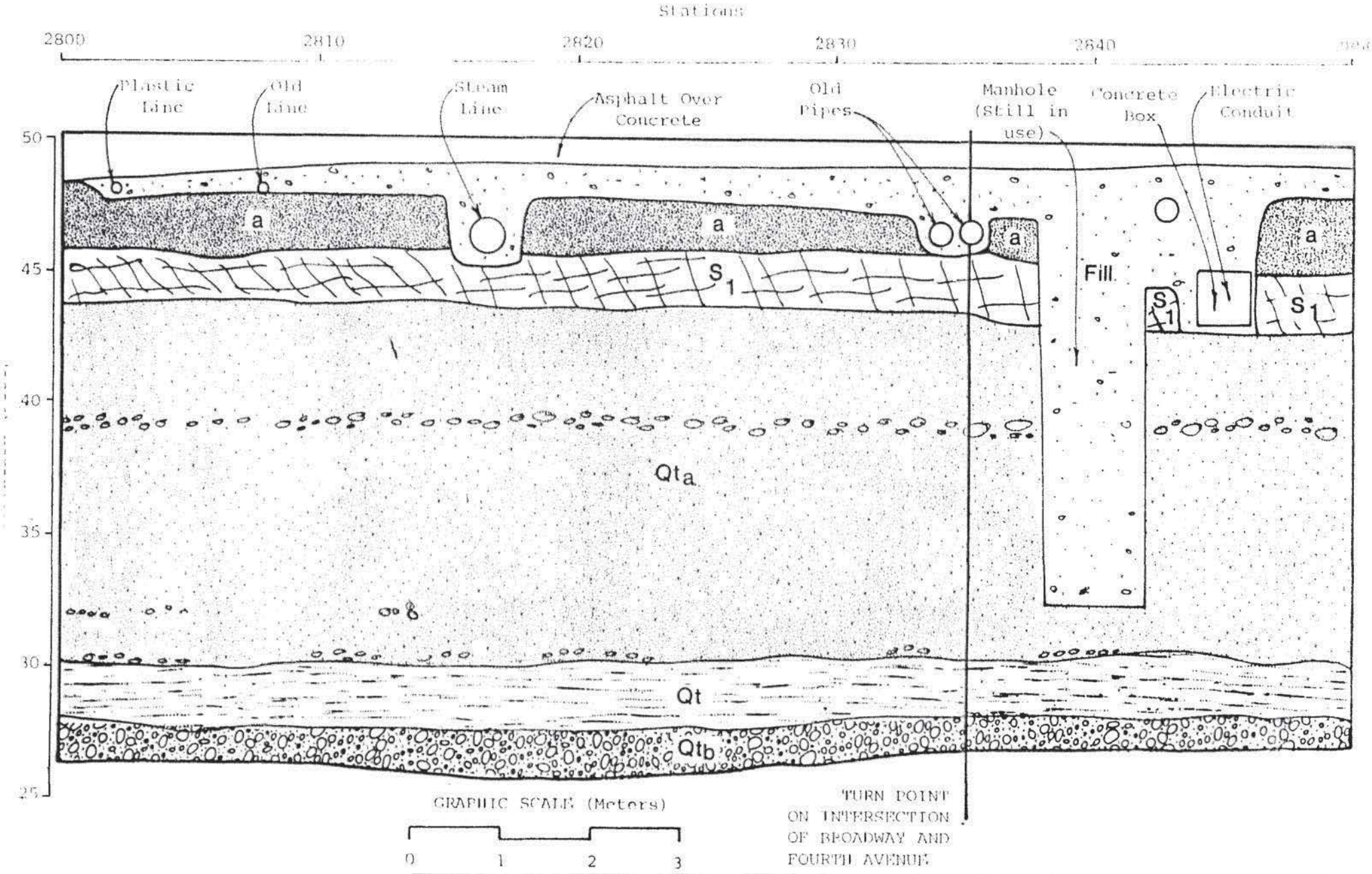


FIGURE 2 TRENCH LOCATION
DOWNTOWN SAN DIEGO


Asphalt Over Concrete
FILL
Qfa
Qf
Qfb
Tsd
Center Line
2nd Avenue
Utility Pipe
Telephone Line
Power Line
GRAPHIC SCALE (Meters)
LOG OF TRENCH (NORTH WALL)
STATIONS 2050 TO 2100
STATIONS 2100 TO 2150
STATIONS 2150 TO 2200
STATIONS 2200 TO 2250
STATIONS 2250 TO 2300

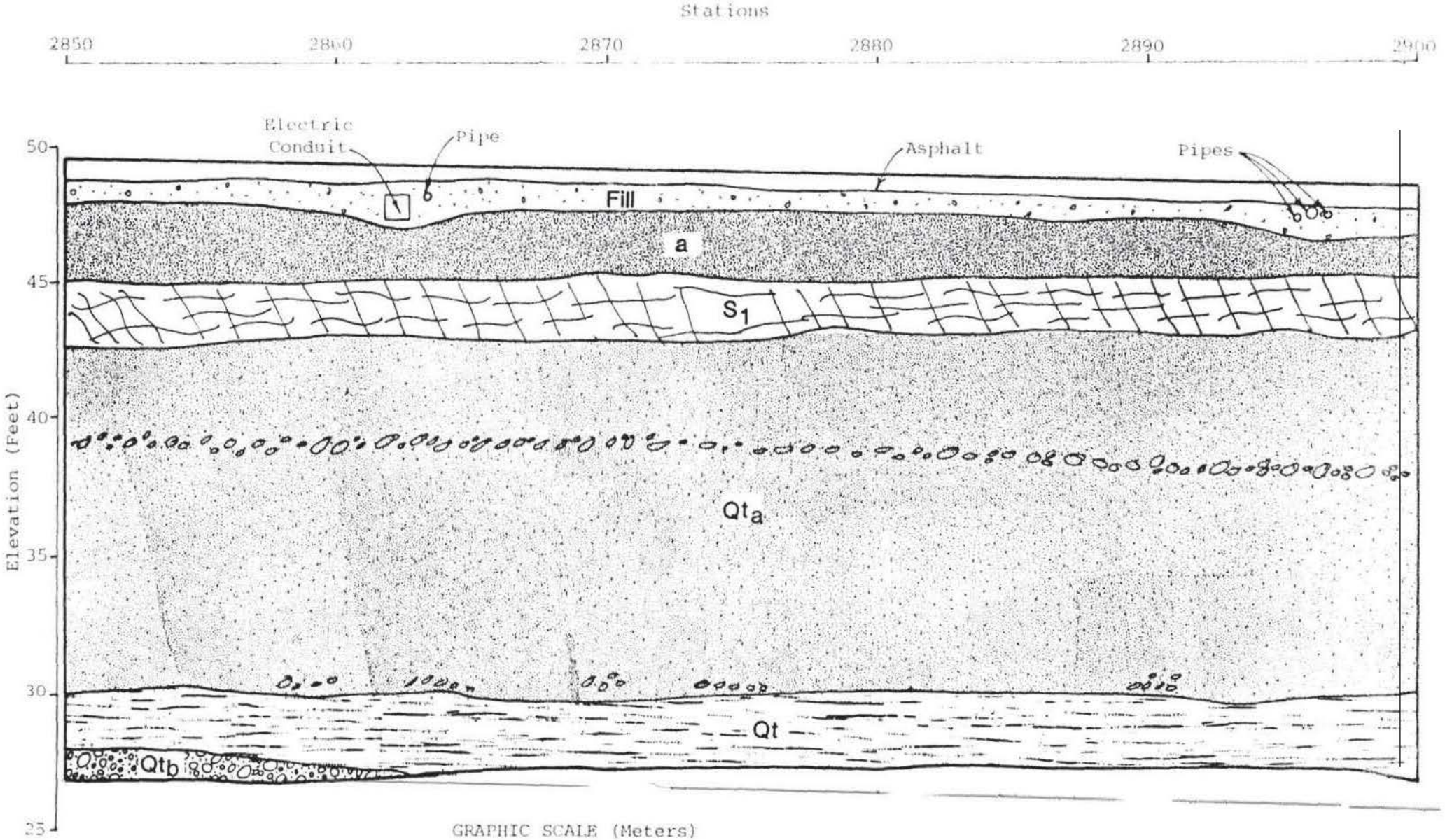

Approximate
Center Line
4th Avenue
Asphalt
Asphalt Over Concrete
Fill
Qta
Qtb
Tsd
Qt
Qt b
GRAPHIC SCALE (Meters)


Stations
Asphalt Over Concrete
Fill
Qta
Qt
Qtb
Tsd
GRAPHIC SCALE (Meters)
LOG OF TRENCH (NORTH WALL)
STATIONS 2350 TO 2400
LOG OF TRENCH (NORTH WALL)
STATIONS 2400 TO 2450
LOG OF TRENCH (NORTH WALL)
STATIONS 2550 TO 2600
Asphalt
Old Utility Lines
Electric Lines Installed
Concrete Box
CONCRETE UTILITY BOX
LOG OF TRENCH (NORTH WALL)
STATIONS 2500 TO 2550
LOG OF TRENCH (NORTH WALL)
STATIONS 2550 TO 2600
LOG OF TRENCH (NORTH WALL)
STATIONS 2600 TO 2650



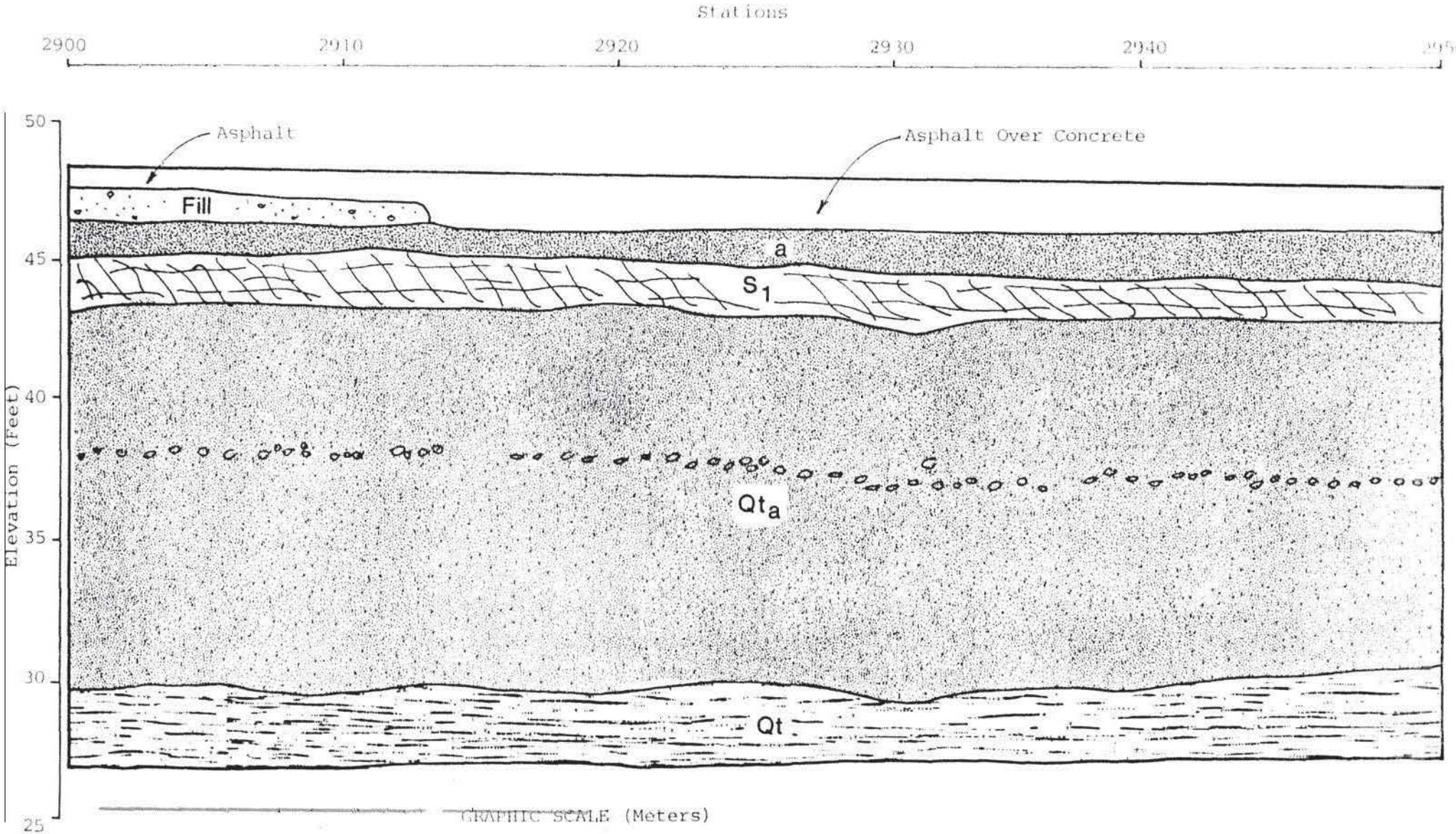
LOG OF TRENCH
STATION 2800 TO 2850
NORTH WALL TO STATION 2036 - EAST WALL TO STATION 2850

DRAWN BY: mjk	CHECKED BY: EA	PROJECT NO: 50135001-C001	DATE: 10-8-80	FIGURE NO: A-1



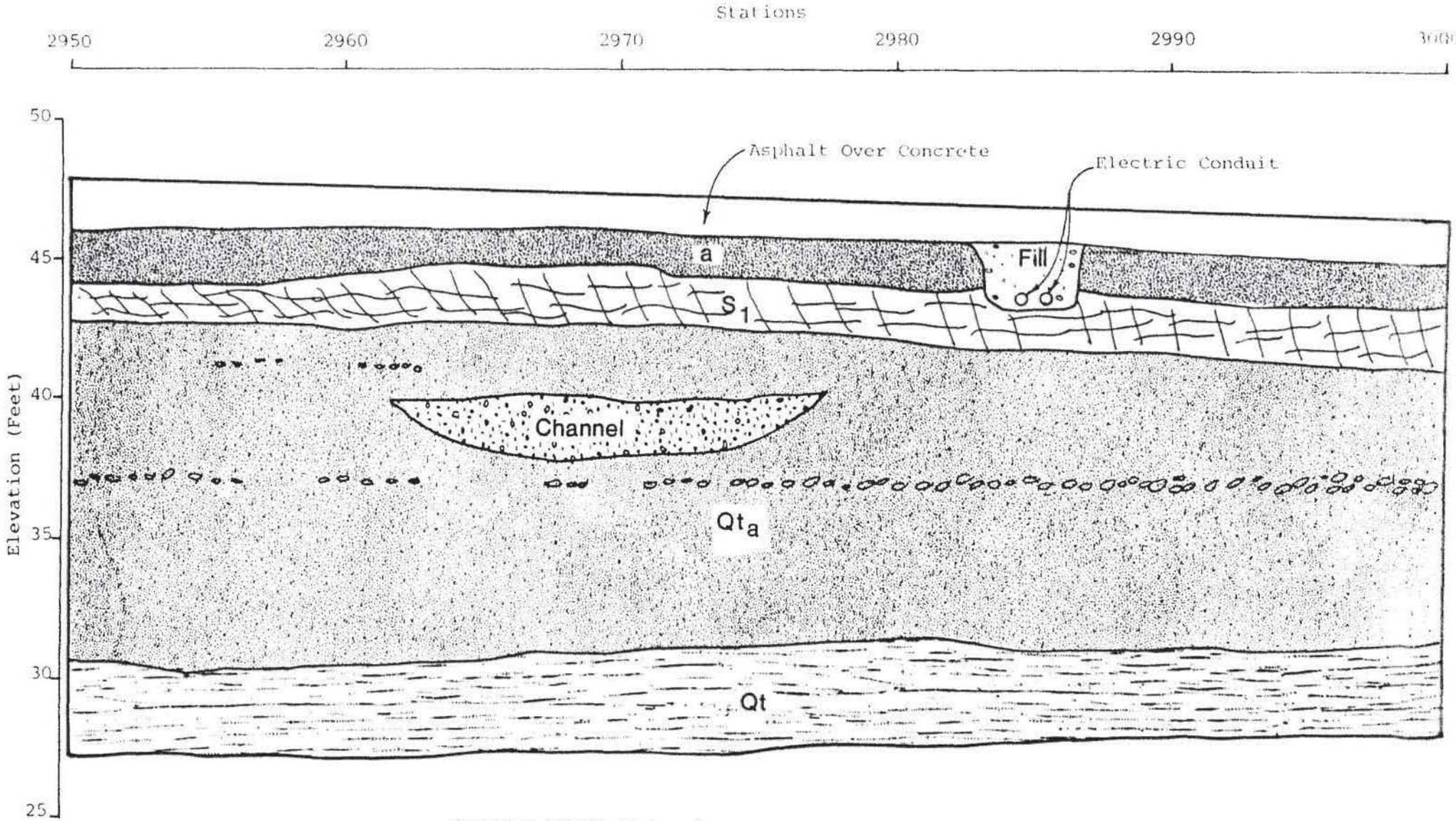
LOG OF TRENCH (EAST WALL)
STATIONS 2850 TO 2900

DRAWN BY:	CHECKED BY:	PROJECT NO:	DATE:	FIGURE NO:
mrk	ER	50135H-GE01	10-8-80	A-62



LOG OF TRENCH (EAST WALL)
STATIONS 2900 TO 2950

DRAWN BY: mrk	CHECKED BY: EA	PROJECT NO: 50135H-GE01	DATE: 10-8-80	FIGURE NO: A-63

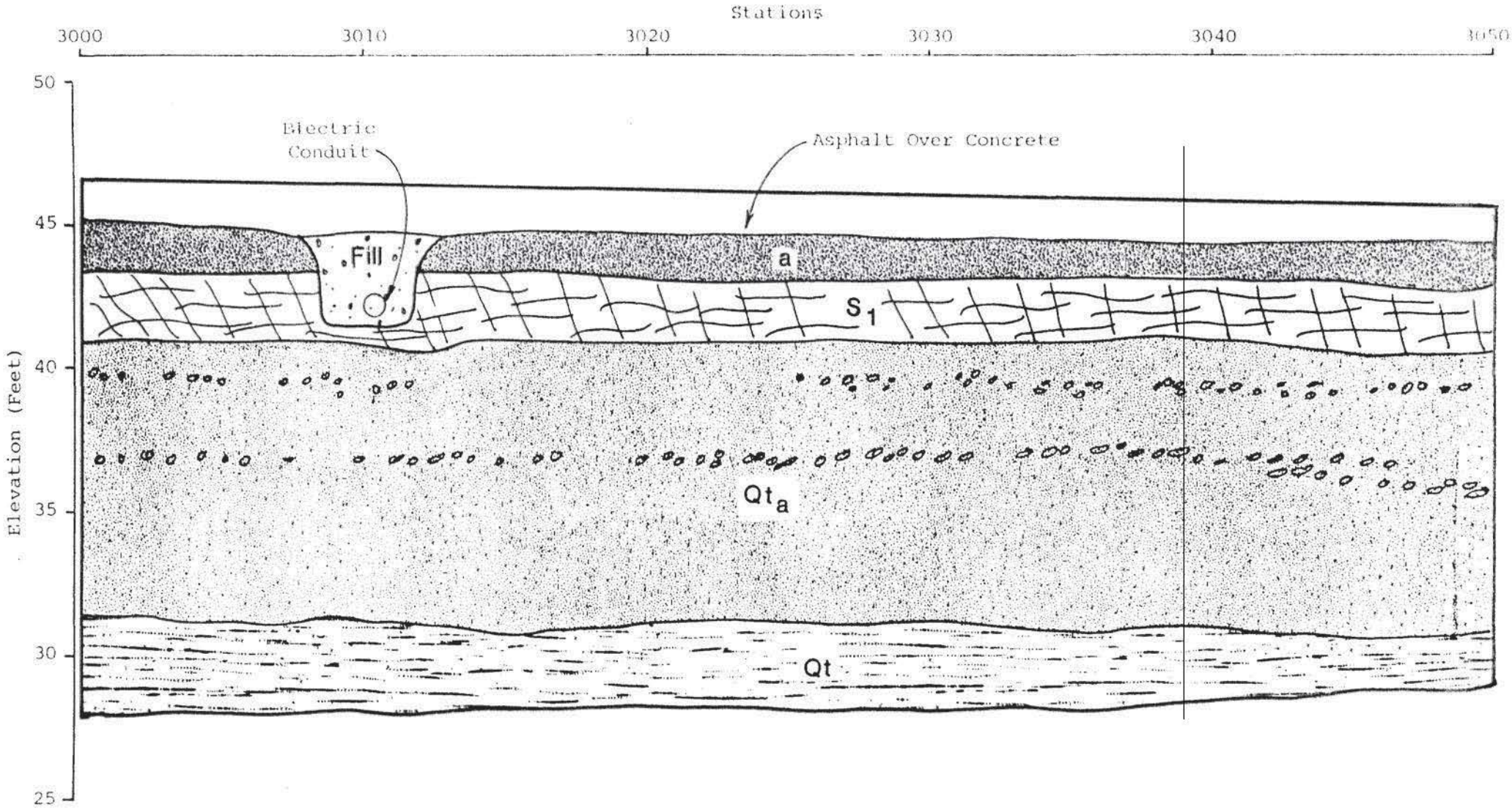


GRAPHIC SCALE (Meters)

0 1 2 3

LOG OF TRENCH (EAST WALL)
STATIONS 2950 TO 3000

DRAWN BY: mrk	CHECKED BY:	PROJECT NO: 50135H-GE01	DATE: 10-8-80	FIGURE NO: A-[illegible]

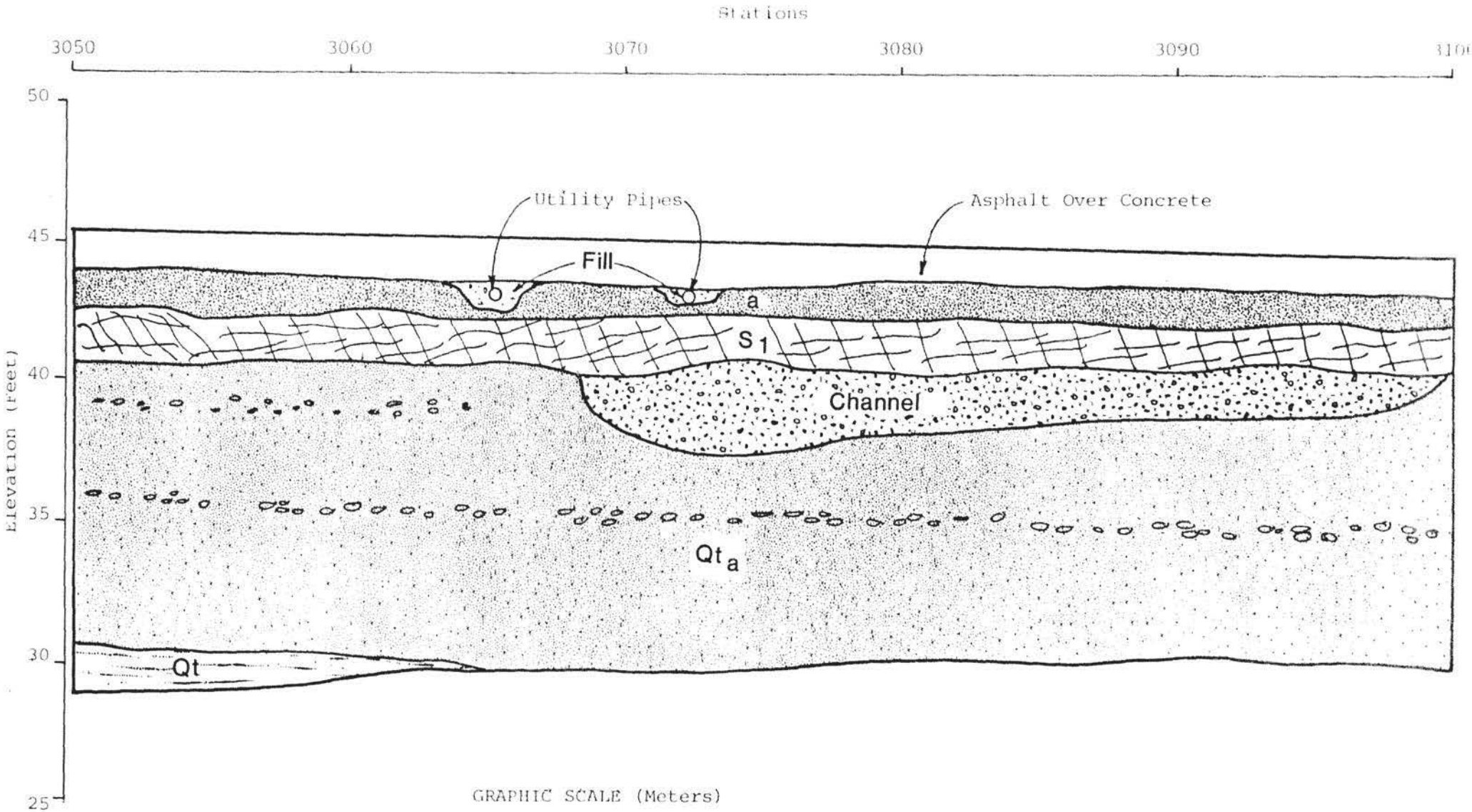


GRAPHIC SCALE (Meters)

0 1 2 3

LOG OF TRENCH (EAST WALL)
STATIONS 3000 TO 3050

DRAWN BY: mrk	CHECKED BY: EA	PROJECT NO: 50135II-GE01	DATE: 10-8-80	FIGURE NO: A-65

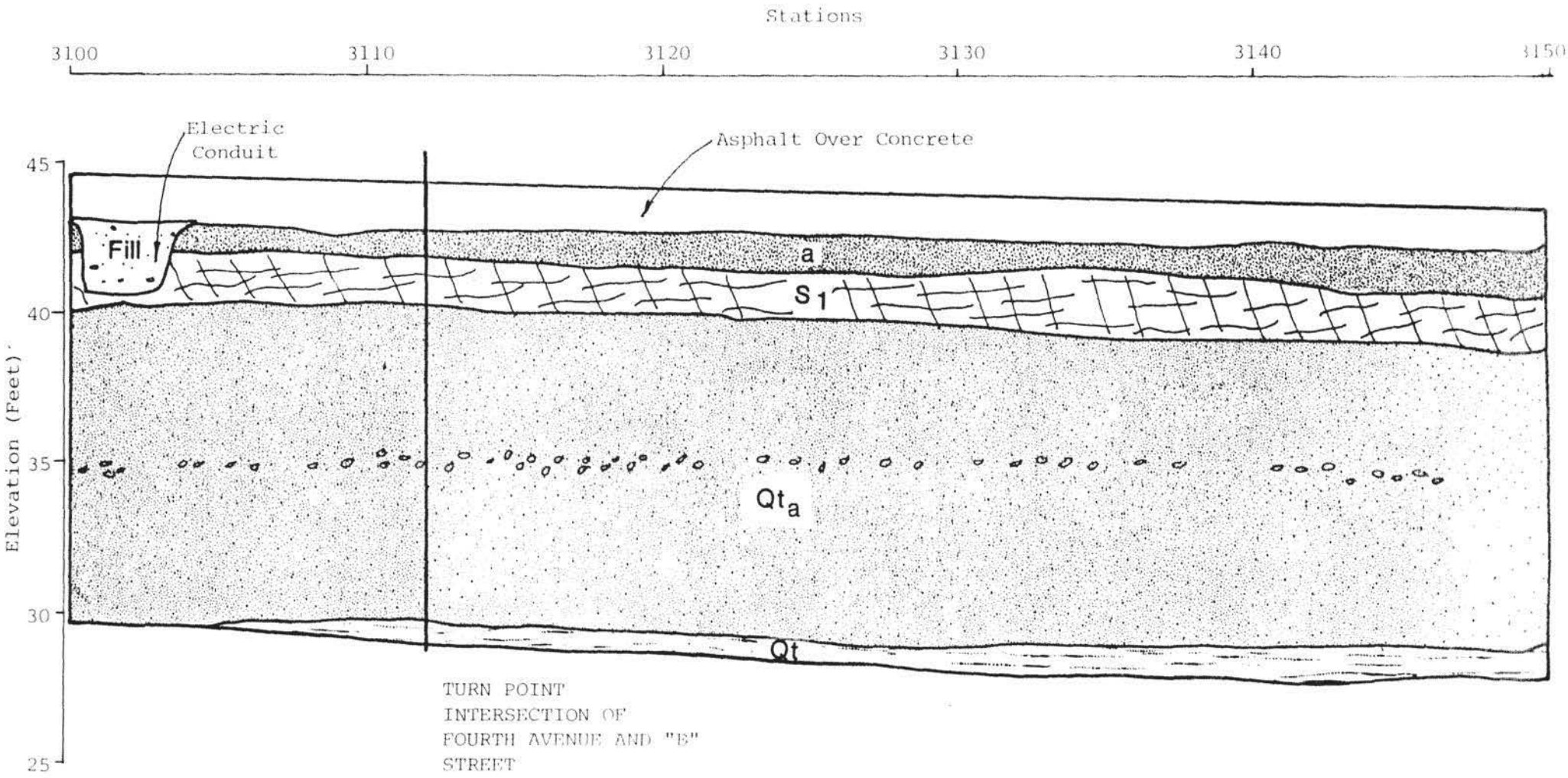


GRAPHIC SCALE (Meters)

0 1 2 3

LOG OF TRENCH (EAST WALL)
STATIONS 3050 TO 3100

DRAWN BY: mrk	CHECKED BY: EA	PROJECT NO: 50135H-GE01	DATE: 10-8-80	FIGURE NO: A-6



GRAPHIC SCALE (Meters)

0 1 2 3

LOG OF TRENCH
STATIONS 3100 TO 3150
EAST WALL TO STATION 3112 - NORTH WALL TO STATION 3150

DRAWN BY: mck	CHECKED BY: EA	PROJECT NO: 50135H-GE01	DATE: 10-8-80	FIGURE NO: A-47

Leighton and Associates, 1980

LEIGHTON and ASSOCIATES
INCORPORATED

SOIL ENGINEERING TESTING GEOLOGY ENVIRONMENTAL SCIENCES

GEOTECHNICAL INVESTIGATION
FOR
HORTON PLAZA
SAN DIEGO, CALIFORNIA

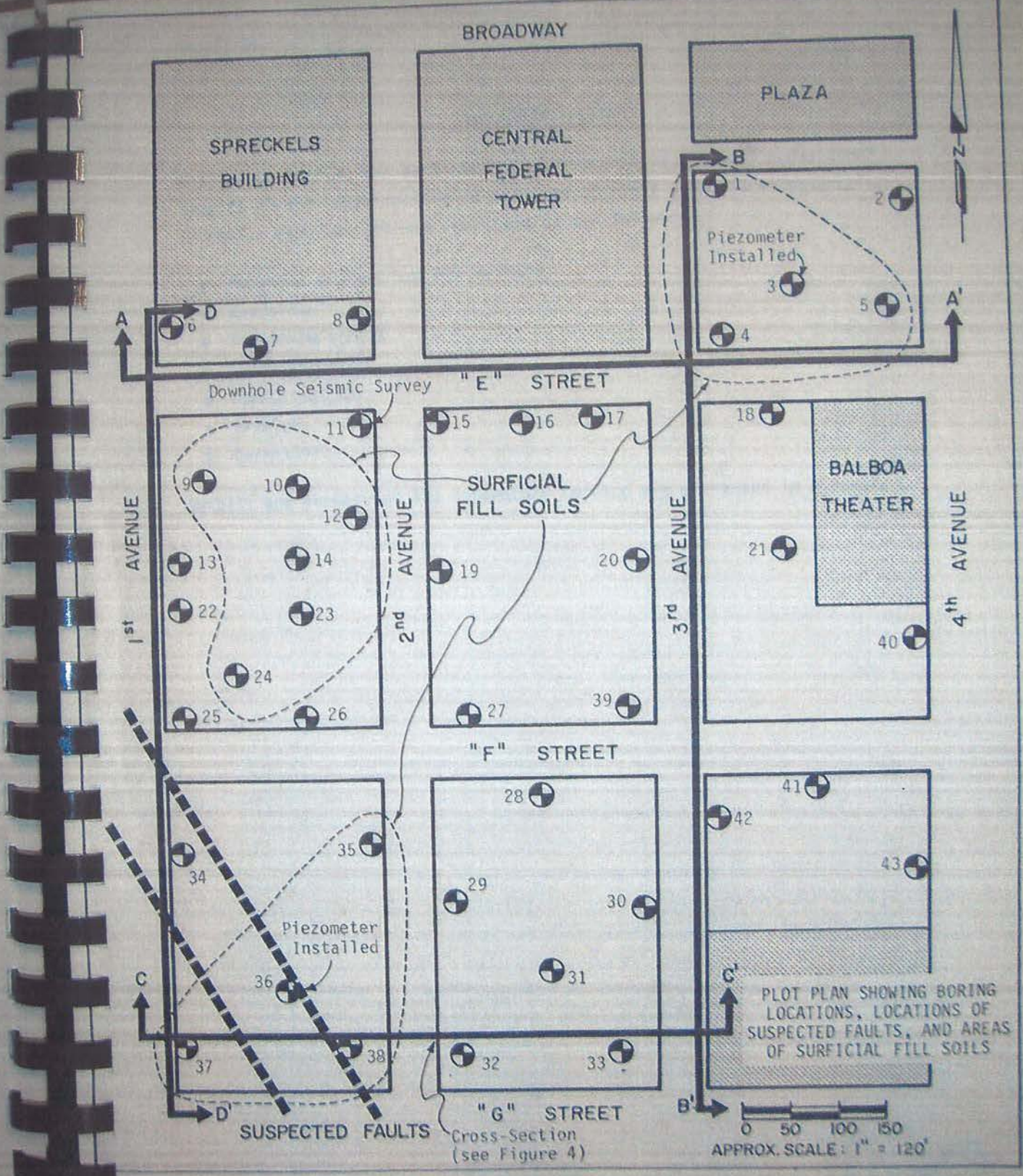
November 14, 1980
Project No. 480342-01

Prepared for

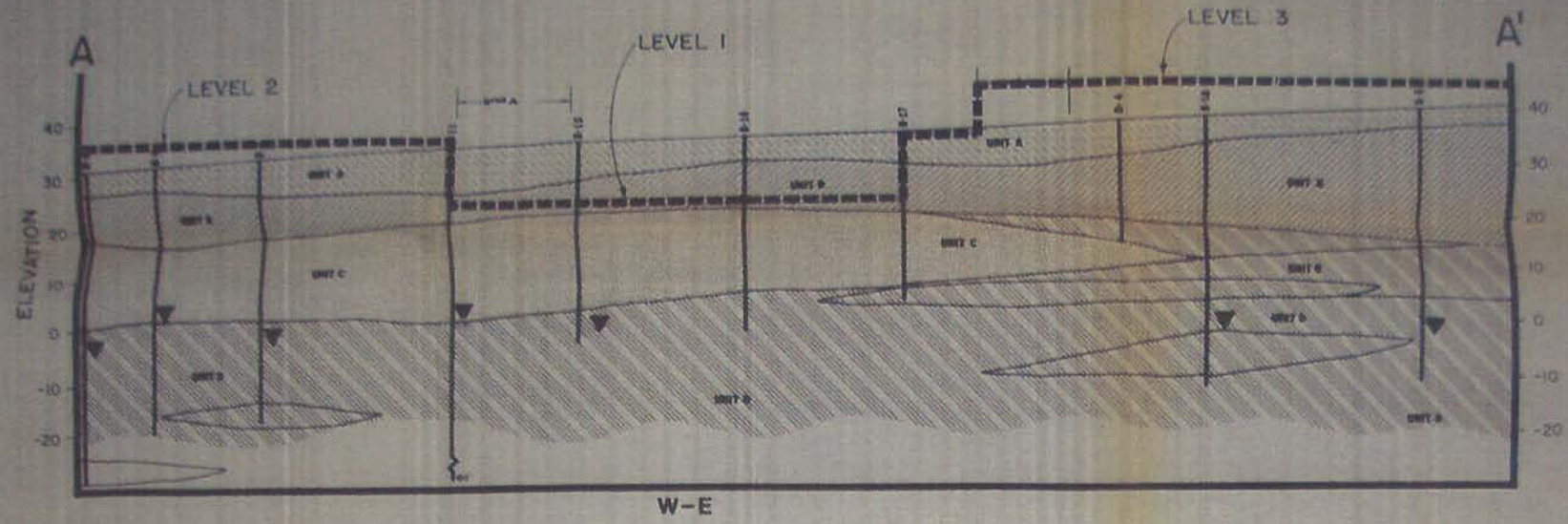
Ernest W. Hahn, Inc.
200 Continental Boulevard
El Segundo, California 90245

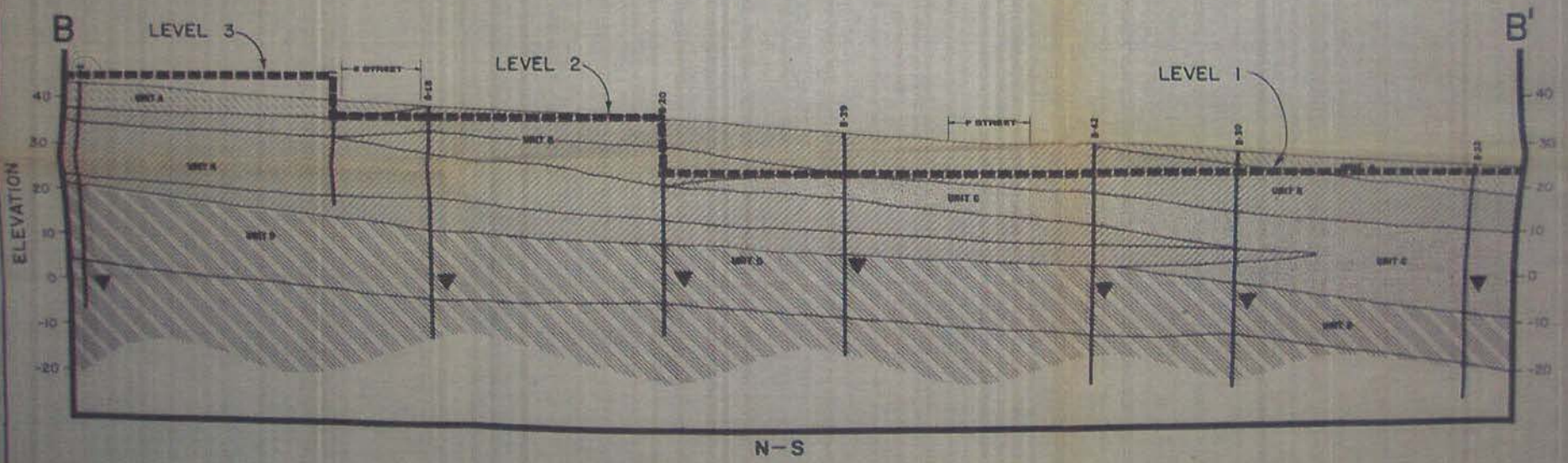
7290 ENGINEER ROAD, SUITE H, SAN DIEGO, CALIFORNIA 92111 (714) 292-8030

IRVINE • WESTLAKE/VENTURA • DIAMOND BAR/WALNUT • SAN BERNARDINO/RIVERSIDE • SAN DIEGO • PALM DESERT



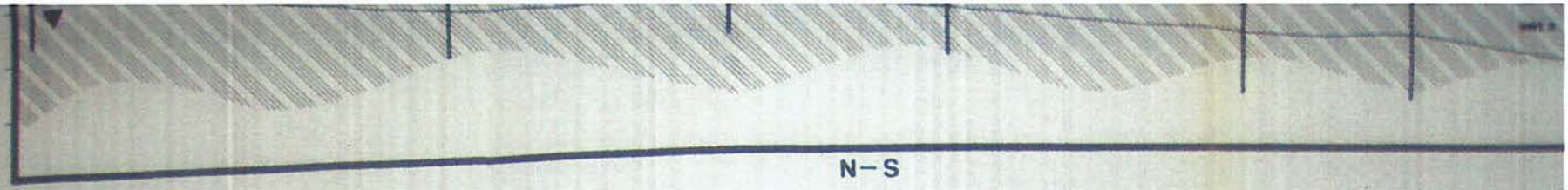
oject No. 480342-01 -7- FIGURE 3

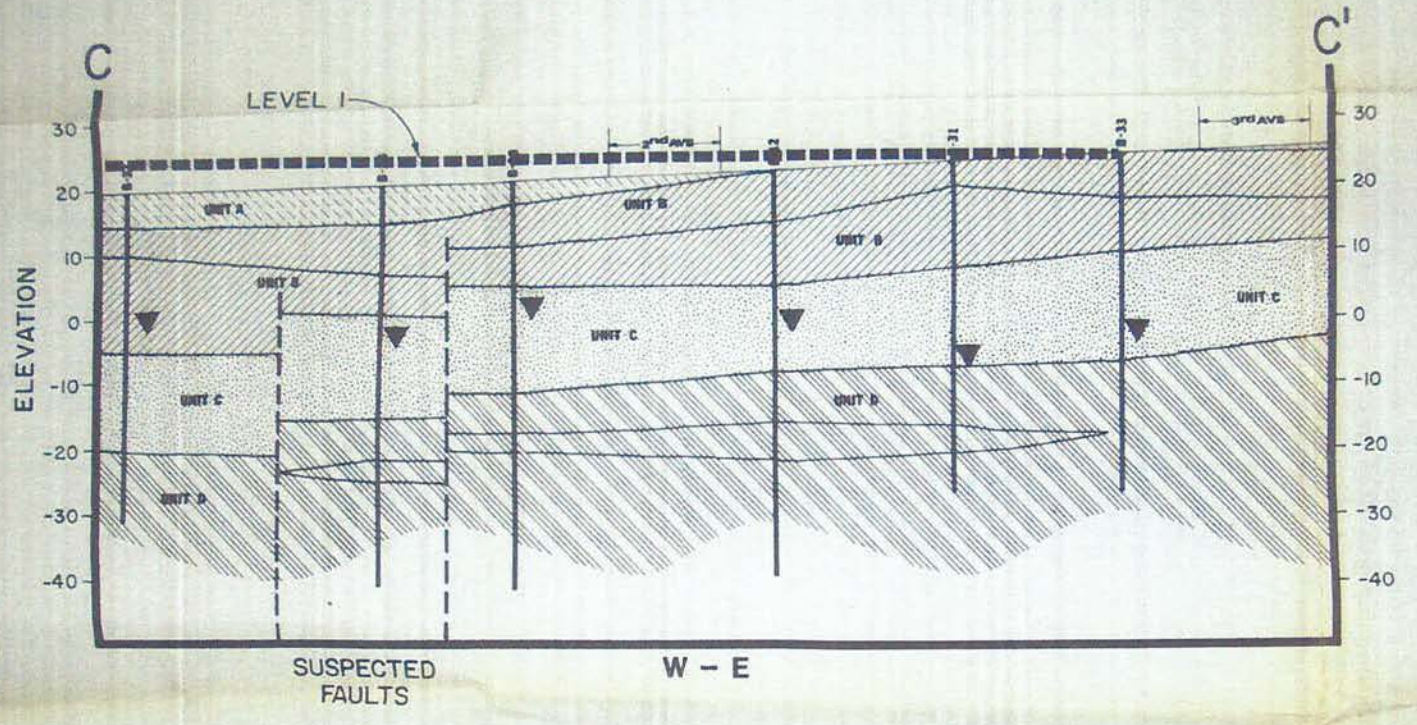






Horton Plaza Improvement Project Appendix A - Geotechnical Report by URS dated April 11, 2012 Volume 1 of 2 (Rev. Jan. 2014) 883 | Page



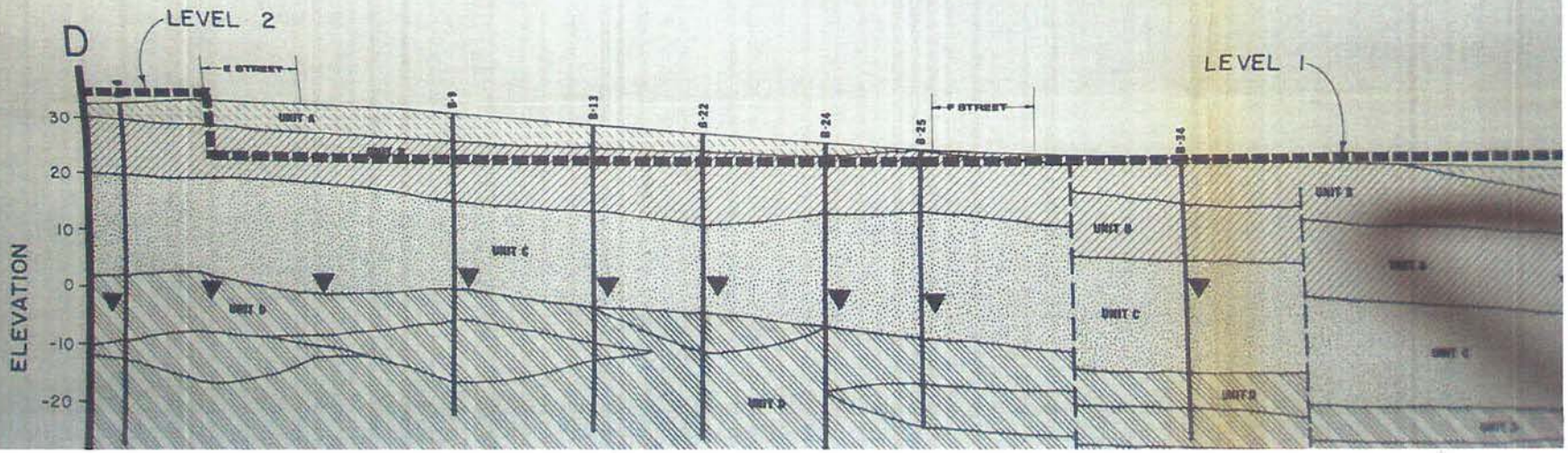


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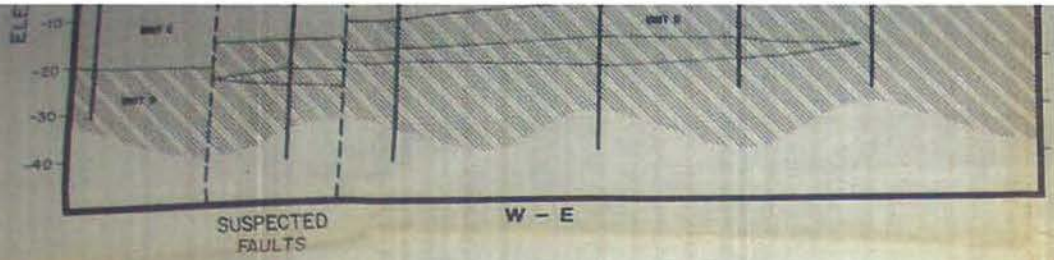
VERTICA

HORIZON

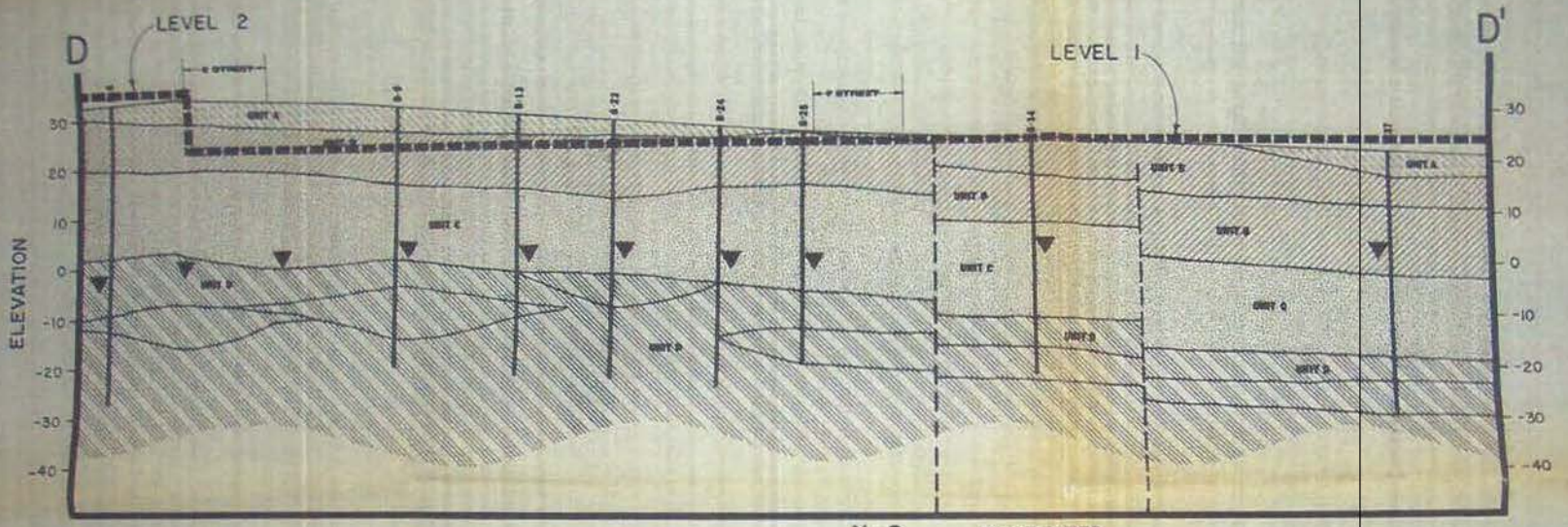
(NOTE EXAG



Horton Plaza Improvement Project Appendix A - Geotechnical Report by URS dated April 11, 2012 Volume 1 of 2 (Rev. Jan. 2014) 884 | Page



(NOTE EXAGGERATED SCALE)



EXPLANATION

UNIT A Sandy clayey silts and silty sands

UNIT B Silty sands and sandy silts with some gravel

UNIT C Sands to slightly silty sands

UNIT D Silty sands to sandy silts with lenses of clay and gravel

Approximately located contact between geologic units (±5 feet)

Approximate groundwater level

Approximate location of suspected fault

Approximate exploratory boring location

STRATIGRAPHIC CROSS - SECTIONS
HORTON PLAZA

LEIGHTON & ASSOCIATES INC.

FIGURE 4

GEOTECHNICAL BORING LOG

Date 7/30/80 Drill Hole No. 1 Sheet 1 of 2
Project Horton Plaza Project No. 480343.01
Drilling Co. Geo Drill Type of Rig Continuous Flight
Hole Diameter 6" Drive Weight 140 lbs. Drop 30 in.
Elevation Top of Hole 45' Ref. or Datum MSL

Depth Feet	Graphic Log	Attitudes	Tube Sample No.	Blows Per Foot	Dry Density PCF	Moisture Content, %	Soil Class. (U.S.C.S.)	Geotechnical Description
								Logged by TG Sampled by TG
0								7" Concrete sidewalk
							ML	FILL: Dark red-brown, wet, stiff, sandy, clayey silt with brick and concrete rubble
5			1	70/9"	119.3	14.6	ML	NATURAL GROUND: Orange-brown, moist, hard, slightly clayey sandy silt
							SM	Olive-brown, orange, mottled, moist, very dense, silty fine sand
10			(1S)	40/6"				
							SP-SM	Orange to olive-brown, moist, very dense, slightly gravelly, slightly silty sand
15			2	100/8½"	127.0	10.6		
20			(2S)	125			GM	Olive-brown, moist, very dense, silty, sandy gravels
							ML	Olive-brown, orange and gray, mottled, moist, hard, sandy silt
25			3	120/8"	116.0	13.3		
30								

GEOTECHNICAL BORING LOG

DATE 7/3/80 DRILL HOLE NO. 1 SHEET 2 OF 2
PROJECT Horton Plaza PROJECT NO. 480342-01
DRILLING CO. Geo Drill TYPE OF RIG Continuous Flight
HOLE DIAMETER 6" DRIVE WEIGHT 140 lbs. DROP 30 IN.
ELEVATION TOP OF HOLE 45' REF. OR DATUM MSL

LOGGED BY TG
SAMPLED BY TG

Depth Feet	Graphic Log	Attitudes	Tube Sample No.	Blows Per Foot	Dry Density PCF	Moisture Content, %	Soil Class. (U.S.C.S.)	GEOTECHNICAL DESCRIPTION
30			(35)	76/9"			ML-SM	Olive-brown, moist to very moist, very dense, silty fine sand to sandy silt
35								
40			4	88/11"	123.8	11.1	SP-SM	Olive-brown, orange, mottled, very moist, very dense, medium to fine sand
45	GWT							
50			(45)	95/9"				Becomes orange laminated
								Total Depth: 51 Feet Groundwater at ±45 Feet
55								
60								

GEOTECHNICAL BORING LOG

DATE 7/1/80 DRILL HOLE NO. 2 SHEET 1 OF 2
PROJECT Horton Plaza PROJECT NO. 480342-01
DRILLING CO. Geo Drill TYPE OF RIG Continuous Flight
HOLE DIAMETER 6" DRIVE WEIGHT 140 lbs. DROP 30 IN.
ELEVATION TOP OF HOLE 46' REF. OR DATUM MSL

LOGGED BY TG
SAMPLED BY TG

DEPTH FEET	GRAPHIC LOG	ATTITUDES	TUBE SAMPLE NO.	BLOWS PER FOOT	DRY DENSITY PCF	MOISTURE CONTENT, %	SOIL CLASS. (U.S.C.S.)	GEOTECHNICAL DESCRIPTION
0								3" Concrete sidewalk
							ML	Medium red-brown, moist, stiff, sandy, clayey silt
							ML	Olive-brown, orange, mottled, moist, hard, fine sandy silt
5			1	63 120	116.6	12.8		
10			2	71	116.7	15.3		Becomes very moist with occasional fine gravel
15			(15)	75				
20			3	122	110.8	10.8		
25			(25)	50				More silt
			(35)				GM	Olive-brown, moist, very dense, silty, sandy gravel (hard drilling)
30							SP	Orange-brown, moist, very dense, slightly silty, medium to fine sand

GEOTECHNICAL BORING LOG

DATE 7/1/80 DRILL HOLE NO. 2 SHEET 2 OF 2
PROJECT Horton Plaza PROJECT NO. 480342-01
DRILLING CO. Geo Drill TYPE OF RIG Continuous Flight
HOLE DIAMETER 6" DRIVE WEIGHT 140 lbs. DROP 30 IN.
ELEVATION TOP OF HOLE 46' REF. OR DATUM MSL

LOGGED BY TG
SAMPLED BY TG

Depth Feet	Graphic Log	Attitudes	Tube Sample No.	Blows Per Foot	Dry Density PCF	Moisture Content, %	Soil Class. (U.S.C.S.)	Geotechnical Description
30								Same
			4	158	107.1	22.1	SM	Olive-brown, orange, mottled, very moist, very dense, silty fine sand
35								
							SP-SM	Olive-brown, very moist to wet, very dense, slightly silty to silty fine sand
40			45	105				
	GWT							
45								
50				163/9"				
								Total Depth: 51 Feet Groundwater at ±45 Feet
55								
60								

Geocon, Inc, 1984

GEOTECHNICAL INVESTIGATION

FOR

HORTON PLAZA PARK

SAN DIEGO, CALIFORNIA

For

CENTRE CITY DEVELOPMENT CORPORATION

San Diego, California

By

GEOCON, INCORPORATED

San Diego, California

November, 1984

GEOCON
INCORPORATED

ENGINEERS AND GEOLOGISTS • CONSULTANTS IN THE APPLIED EARTH SCIENCES

File No. D-3296-J01
November 19, 1984

Centre City Development Corporation
Spreckels Building, Suite 601
San Diego, California 92101

Attention: Mr. Al Mercer

Subject: HORTON PLAZA PARK
SAN DIEGO, CALIFORNIA
GEOTECHNICAL INVESTIGATION

Gentlemen:

In accordance with your request, we have performed a geotechnical investigation for the subject site. The accompanying report presents the findings of our study and our recommendations pertaining to the geotechnical engineering aspects of project development.

Should you have questions regarding this report or if we may be of further service, please do not hesitate to contact the undersigned.

Very truly yours,

GEOCON, INCORPORATED

James E. Likins
RCE 17030

Michael W. Hart
CEG 706

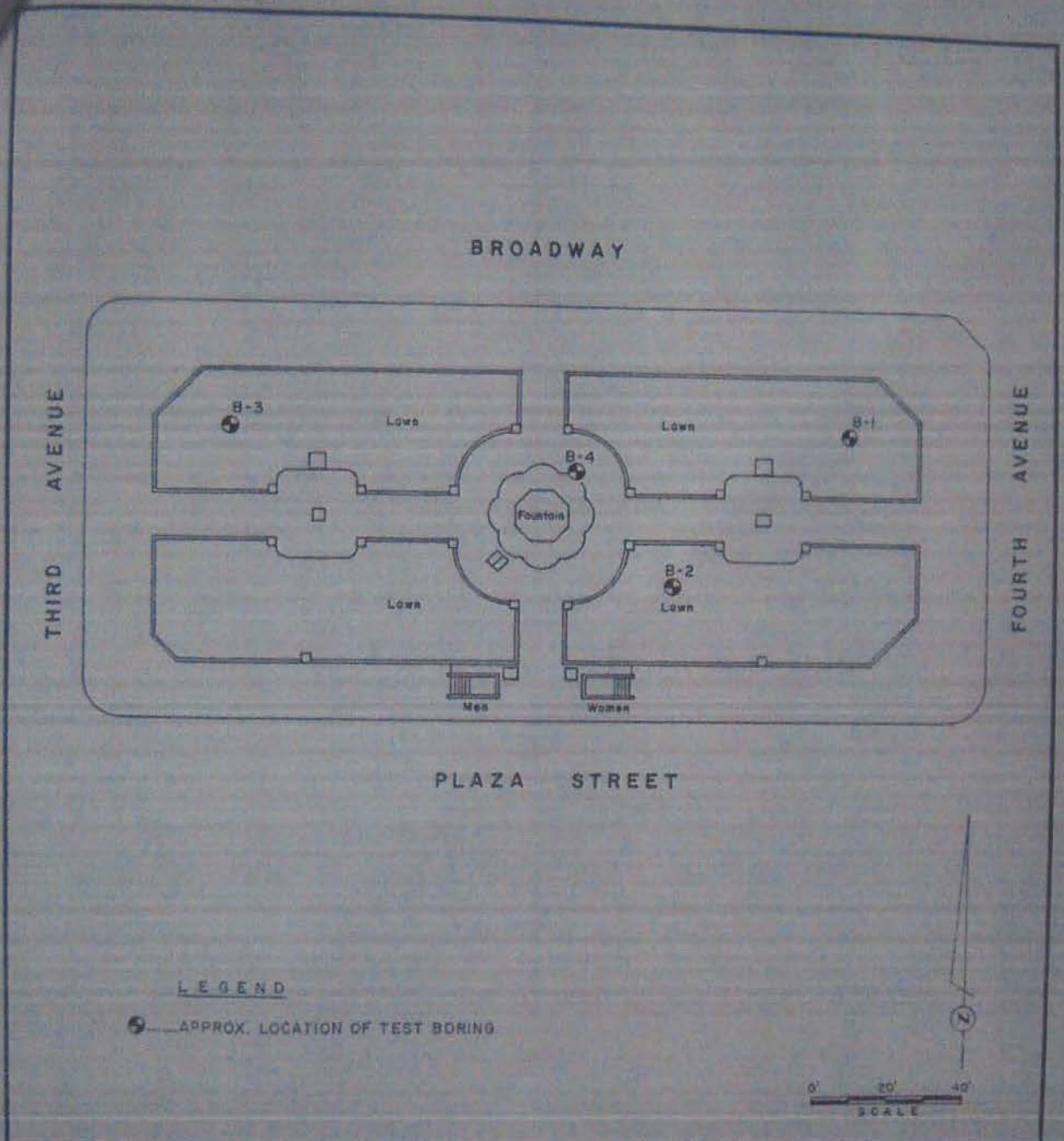
Steven R. Penn
RS 4009

SRP:JEL:lm

(4) addressee
(2) VTN-San Diego

9530 DOWDY DRIVE • SAN DIEGO, CALIFORNIA 92126 • PHONE (619) 695-2880

File No. D-3296-J01
November 19, 1984



SITE PLAN

HORTON PLAZA PARK
SAN DIEGO, CALIFORNIA

Figure 1

GEOCON
INCORPORATED

File No. D-3296-J01
November 19, 1984

DEPTH IN FEET	SAMPLE NO	LITHOLOGY	GROUNDWATER	SOIL CLASS (U.S.C.S.)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE BLOWS/FT	DRY DENSITY PCF	MOISTURE CONTENT %
					PIT 1 ELEVATION _____ DATE DRILLED _____ EQUIPMENT _____			
0								
	1-1				TOPSOIL Firm, damp, medium gray-brown, slightly Clayey, fine SAND		90.0	9.8
1								
	1-2				BAY POINT FORMATION Moderately dense, damp, reddish-brown, slightly Clayey, fine SAND		95.0	6.7
2								
	1-3						100.0	7.6
3								
	1-4						101.0	7.5
4								
	1-5						119.0	12.0
5					PIT TERMINATED AT 5.0 FEET			
0					PIT 2			
	2-1				TOPSOIL Firm, moist, medium brown, slightly Clayey, fine SAND		99.0	10.0
1								
	2-2				BAY POINT FORMATION Slightly dense, moist, medium reddish-brown, slightly Clayey, fine SAND		82.7	15.1
2								
	2-3						99.4	15.4
3								
	2-4						111.3	10.3
4								
	2-5						116.8	13.8
5					PIT TERMINATED AT 5.0 FEET			

Figure A-1, Log of Test Pits 1 and 2

SAMPLE SYMBOLS: ☐ — SAMPLING UNSUCCESSFUL; ◧ — STANDARD PENETRATION TEST; ■ — DRIVE SAMPLE (UNDISTURBED); ☒ — DISTURBED OR BAG SAMPLE; ◣ — CHUNK SAMPLE; ▼ — WATER TABLE OR SEEPAGE

NOTE: THE LOGS OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON INCORPORATED

File No. D-3296-J01
November 19, 1984

DEPTH IN FEET	SAMPLE NO	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	PIT 3 ELEVATION _____ DATE DRILLED _____ EQUIPMENT _____ MATERIAL DESCRIPTION	PENETRATION RESISTANCE BLOWS/FT	DRY DENSITY P.C.F.	MOISTURE CONTENT %
0								
	3-1				TOPSOIL Slightly dense, damp, medium brown, slightly Clayey, Silty fine SAND		100.1	8.9
1								
	3-2				BAY POINT FORMATION Moderately dense, damp, medium reddish-brown, slightly Clayey fine SAND		107.3	6.6
2								
	3-3						101.8	7.8
3								
	3-4						113.5	10.2
4								
	3-5						116.9	14.6
5					PIT TERMINATED AT 5.0 FEET			
0					PIT 4			
	4-1				TOPSOIL Soft, wet, gray-brown, Clayey SAND		103.4	19.5
1					BAY POINT FORMATION Moderately dense, moist, reddish-brown, slightly Clayey, fine to medium SAND		110.5	11.2
	4-2							
2								
	4-3						99.1	12.7
3					PIT TERMINATED AT 3.0 FEET			

Figure A-2, Log of Test Pits 3 and 4

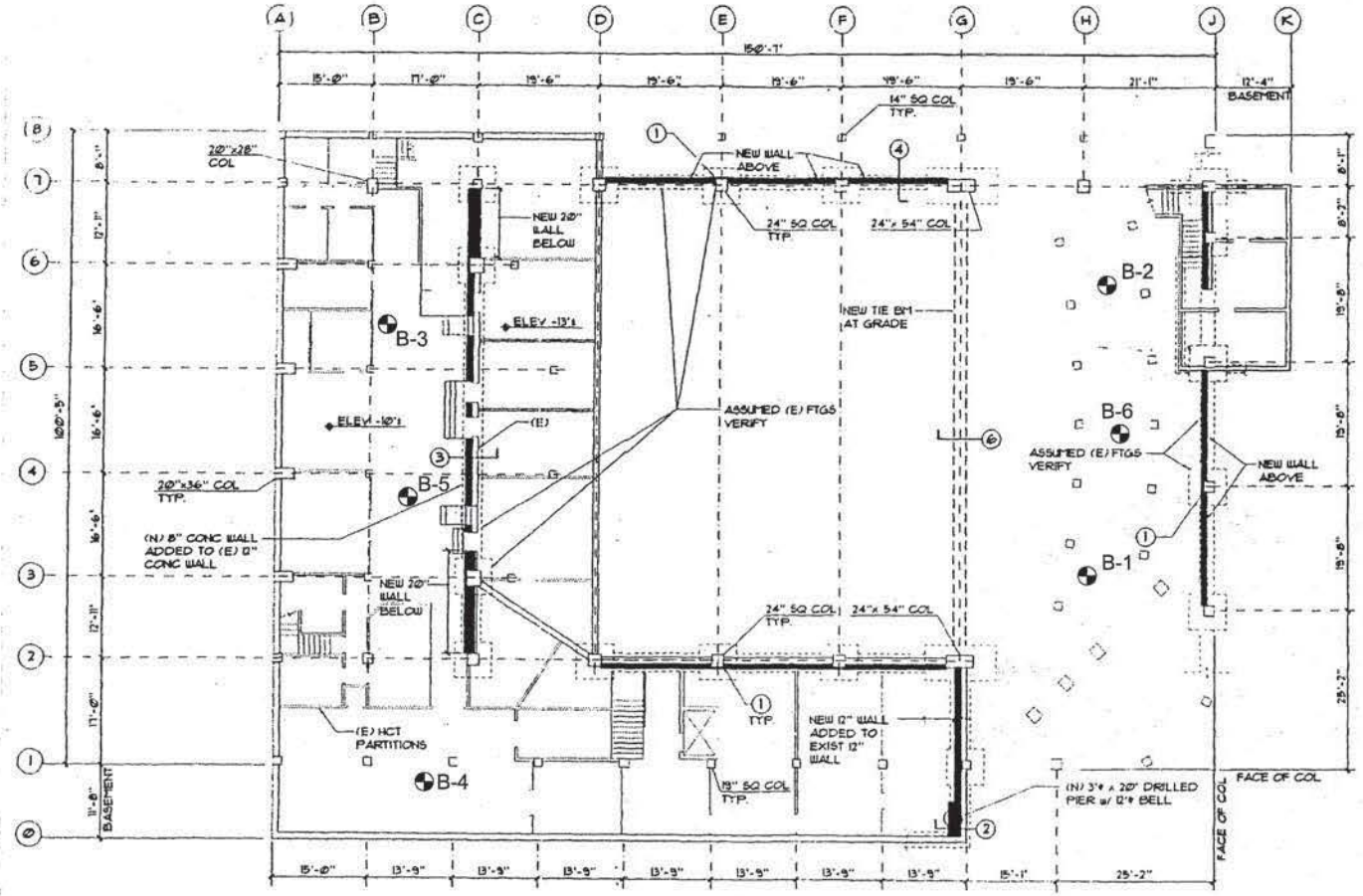
SAMPLE SYMBOLS: ☐ ... SAMPLING UNSUCCESSFUL; ▮ ... STANDARD PENETRATION TEST; ■ ... DRIVE SAMPLE (UNDISTURBED); ☒ ... DISTURBED OR BAG SAMPLE; ◣ ... CHUNK SAMPLE; ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON INCORPORATED

Geocon, Inc., 2004

BALBOA THEATER REHABILITATION
SAN DIEGO, CALIFORNIA



GEOCON LEGEND

B-6 ⊕ .....APPROX. LOCATION OF GEOTECHNICAL BORING

N

SCALE: 1" = 20'

SITE PLAN

GEOCON
INCORPORATED
GEOTECHNICAL CONSULTANTS
6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121 - 2974
PHONE 858 558-6900 - FAX 858 558-6159

PROJECT NO. 07199 - 22 - 01
FIGURE 2
DATE 1-2-2004

PROJECT NO. 07199-22-01

BORING B 1

ELEV. (MSL.) ~ 40 DATE COMPLETED 11-20-2003

EQUIPMENT TRIPOD

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B1-1				6-inch thick slab			
				SM	**FILL** Loose, moist, red brown, Silty, fine to medium SAND			
2	B1-2					12	109.6	11.1
4					**BAY POINT FORMATION** Very dense, moist, dark red brown, Silty, fine to medium SAND			
	B1-3			SM		60/6"	112.8	9.2
6								
8	B1-4			SM	Very dense, moist, Silty, fine to coarse SAND, with GRAVEL to 1.5 inch diameter	81		
10				SM	Very dense, moist, yellowish brown, Silty, fine to coarse SAND, with GRAVEL to 1 inch diameter subrounded			
12				SC	Very dense, moist, brown, Clayey, fine to coarse SAND, with GRAVEL to 1 inch diameter subrounded			
	B1-5							
14								
	B1-6			SM	Very dense, moist, orange brown, Silty, fine to medium SAND	52		
				CL	Hard, moist, olive gray, Silty CLAY; medium plasticity			
				SM	Very dense, moist, orange brown, Silty, fine to medium SAND			
					BORING TERMINATED AT 15.5 FEET No groundwater encountered			

07199-22-01.GPJ

Figure A-1,
Log of Boring B 1, Page 1 of 1

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ▨ ... DISTURBED OR BAG SAMPLE
- ◧ ... STANDARD PENETRATION TEST
- ◥ ... CHUNK SAMPLE
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. 07199-22-01

BORING B 2

ELEV. (MSL.) ~ 40 DATE COMPLETED 11-20-2003

EQUIPMENT TRIPOD

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0					5 and 3/4-inch thick slab			
				SM	**FILL** Medium dense, moist, orange brown, Silty, fine to coarse SAND			
2	B2-1					17	98.8	12.3
	B2-2				**BAY POINT FORMATION** Very dense, moist, dark brown, Silty, fine to coarse SAND			
4				SM				
	B2-3				- Becomes orange brown at 5 feet	75/10"	104.9	9.4
6								
				CL	Hard, moist, brown, Silty, Sandy CLAY			
8	B2-4 B2-5							
					BORING TERMINATED AT 8.5 FEET No groundwater encountered			

Figure A-2,
Log of Boring B 2, Page 1 of 1

07199-22-01.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◥ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. 07199-22-01

BORING B 3

ELEV. (MSL.) ~ 28 DATE COMPLETED 11-20-2003

EQUIPMENT TRIPOD

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B3-1				3 and 1/4-inch thick slab			
				SM	**FILL** Dense, damp, orange brown, Silty, fine to medium SAND			
2	B3-2					52	108.8	16.6
4					**BAY POINT FORMATION** Very dense, damp, olive brown, Silty, very fine to fine SAND			
	B3-3			SM		50/6"		
6	B3-4							
8						50/3"		
					BORING TERMINATED AT 8 FEET (REFUSAL) No groundwater encountered			

Figure A-3,
Log of Boring B 3, Page 1 of 1

07199-22-01.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◥ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. 07199-22-01

BORING B 4

ELEV. (MSL.) ~ 28 DATE COMPLETED 11-20-2003

EQUIPMENT TRIPOD

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B4-1				3 and 1/4-inch slab			
				SM-SC	**FILL** Medium dense to dense, moist, orange brown, Silty, Clayey, fine to coarse SAND; with GRAVEL of 3/4-inch diameter			
2	B4-2					66		
					BAY POINT FORMATION Dense, moist, orange brown, Silty, fine to coarse SAND			
4				SM				
	B4-3					61	104.3	18.5
6					- Very fine, silty sand at 5.5 to 6 feet			
	B4-4				Very dense, moist, Silty, fine to coarse SAND and COBBLE to 1.5-inch diameter			
8				SM				
					BORING TERMINATED AT 8.5 FEET (REFUSAL) No groundwater encountered			

Figure A-4,
Log of Boring B 4, Page 1 of 1

07199-22-01.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◥ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. 07199-22-01

BORING B 6

ELEV. (MSL.) ~ 40 DATE COMPLETED 11-25-2003

EQUIPMENT TRIPOD

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SM	**FILL** Dense, moist, orange brown, Silty, fine to coarse SAND			
2								
4				SM	**BAY POINT FORMATION** Dense, moist, dark brown, Silty, fine to coarse SAND, some GRAVEL			
6								
8				SC	Very dense, moist, brown, Clayey SANDSTONE; cemented			
10	B6-1			SM	Dense, moist, brown, Silty, fine to coarse SAND; with trace clay	45	111.5	11.2
12								
14								
16	B6-2				- Becomes very dense at 15 feet	85	128.5	13.5
18								
	B6-3			SM	Very dense, moist, tan brown, Silty, fine to coarse SANDSTONE; with some gravel and cobble	50/5"	118.0	7.4

BORING TERMINATED AT 19.5 FEET
No groundwater encountered

07199-22-01.GPJ

Figure A-6,
Log of Boring B 6, Page 1 of 1

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ▨ ... DISTURBED OR BAG SAMPLE
- ◥ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. 07199-22-01

BORING B 5

ELEV. (MSL.) ~ 28 DATE COMPLETED 11-25-2003

EQUIPMENT TRIPOD

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0					3 and 1/4-inch slab			
				SM	**FILL**			
	B5-1				Medium dense, moist, orange brown, Silty, fine to coarse SAND			
2					**BAY POINT FORMATION**			
				SM	Very dense, moist, orange brown, Silty, fine to coarse SAND, some GRAVEL			
4								
	B5-2							
6								
	B5-3				Very dense, moist, orange brown, Silty, fine to coarse SAND and COBBLE to	50/5"		
	B5-4				3-inch diameter	43		
8				SM	- Cobble in sampler			
	B5-5					53		
10								
	B5-6					50/0"		
					BORING TERMINATED AT 10.5 FEET (REFUSAL)			
					No groundwater encountered			

07199-22-01.GPJ

Figure A-5,
Log of Boring B 5, Page 1 of 1

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◥ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

APPENDIX B

Fire Hydrant Meter Program

CITY OF SAN DIEGO CALIFORNIA DEPARTMENT INSTRUCTIONS	**NUMBER** **DI** 55.27	**DEPARTMENT** Water Department
SUBJECT **FIRE HYDRANT METER PROGRAM (FORMERLY: CONSTRUCTION METER PROGRAM)**	**PAGE** 1**OF** 10	**EFFECTIVE DATE** October 15, 2002
	SUPERSEDES **DI** 55.27	**DATED** April 21, 2000

1. **PURPOSE**

1.1 To establish a Departmental policy and procedure for issuance, proper usage and charges for fire hydrant meters.

2. **AUTHORITY**

2.1 All authorities and references shall be current versions and revisions.

2.2 San Diego Municipal Code (NC) Chapter VI, Article 7, Sections 67.14 and 67.15

2.3 Code of Federal Regulations, Safe Drinking Water Act of 1986

2.4 California Code of Regulations, Titles 17 and 22

2.5 California State Penal Code, Section 498B.0

2.6 State of California Water Code, Section 110, 500-6, and 520-23

2.7 Water Department Director

Reference

2.8 State of California Guidance Manual for Cross Connection Programs

2.9 American Water Works Association Manual M-14, Recommended Practice for Backflow Prevention

2.10 American Water Works Association Standards for Water Meters

2.11 U.S.C. Foundation for Cross Connection Control and Hydraulic Research Manual

3. **DEFINITIONS**

3.1 **Fire Hydrant Meter:** A portable water meter which is connected to a fire hydrant for the purpose of temporary use. (These meters are sometimes referred to as Construction Meters.)

3.2 **Temporary Water Use:** Water provided to the customer for no longer than twelve (12) months.

3.3 **Backflow Preventor:** A Reduced Pressure Principal Assembly connected to the outlet side of a Fire Hydrant Meter.

4. POLICY

4.1 The Water Department shall collect a deposit from every customer requiring a fire hydrant meter and appurtenances prior to providing the meter and appurtenances (see Section 7.1 regarding the Fees and Deposit Schedule). The deposit is refundable upon the termination of use and return of equipment and appurtenances in good working condition.

4.2 Fire hydrant meters will have a 2 ½" swivel connection between the meter and fire hydrant. The meter shall not be connected to the 4" port on the hydrant. All Fire Hydrant Meters issued shall have a Reduced Pressure Principle Assembly (RP) as part of the installation. Spanner wrenches are the only tool allowed to turn on water at the fire hydrant.

4.3 The use of private hydrant meters on City hydrants is prohibited, with exceptions as noted below. All private fire hydrant meters are to be phased out of the City of San Diego. All customers who wish to continue to use their own fire hydrant meters must adhere to the following conditions:

a. Meters shall meet all City specifications and American Water Works Association (AWWA) standards.

b. Customers currently using private fire hydrant meters in the City of San Diego water system will be allowed to continue using the meter under the following conditions:

1. The customer must submit a current certificate of accuracy and calibration results for private meters and private backflows annually to the City of San Diego, Water Department, Meter Shop.

2. The meter must be properly identifiable with a clearly labeled serial number on the body of the fire hydrant meter. The serial number shall be plainly stamped on the register lid and the main casing. Serial numbers shall be visible from the top of the meter casing and the numbers shall be stamped on the top of the inlet casing flange.

3. All meters shall be locked to the fire hydrant by the Water Department, Meter Section (see Section 4.7).

4. All meters shall be read by the Water Department, Meter Section (see Section 4.7).

5. All meters shall be relocated by the Water Department, Meter Section (see Section 4.7).

6. These meters shall be tested on the anniversary of the original test date and proof of testing will be submitted to the Water Department, Meter Shop, on a yearly basis. If not tested, the meter will not be allowed for use in the City of San Diego.

7. All private fire hydrant meters shall have backflow devices attached when installed.

8. The customer must maintain and repair their own private meters and private backflows.

9. The customer must provide current test and calibration results to the Water Department, Meter Shop after any repairs.

10. When private meters are damaged beyond repair, these private meters will be replaced by City owned fire hydrant meters.

11. When a private meter malfunctions, the customer will be notified and the meter will be removed by the City and returned to the customer for repairs. Testing and calibration results shall be given to the City prior to any re-installation.

12. The register shall be hermetically sealed straight reading and shall be readable from the inlet side. Registration shall be in hundred cubic feet.

13. The outlet shall have a 2 ½ "National Standards Tested (NST) fire hydrant male coupling.

14. Private fire hydrant meters shall not be transferable from one contracting company to another (i.e. if a company goes out of business or is bought out by another company).

4.4 All fire hydrant meters and appurtenances shall be installed, relocated and removed by the City of San Diego, Water Department. All City owned fire hydrant meters and appurtenances shall be maintained by the City of San Diego, Water Department, Meter Services.

4.5 If any fire hydrant meter is used in violation of this Department Instruction, the violation will be reported to the Code Compliance Section for investigation and appropriate action. Any customer using a fire hydrant meter in violation of the requirements set forth above is subject to fines or penalties pursuant to the Municipal Code, Section 67.15 and Section 67.37.

4.6 **Conditions and Processes for Issuance of a Fire Hydrant Meter**

Process for Issuance

a. Fire hydrant meters shall only be used for the following purposes:

1. Temporary irrigation purposes not to exceed one year.

2. Construction and maintenance related activities (see Tab 2).

b. No customer inside or outside the boundaries of the City of San Diego Water Department shall resell any portion of the water delivered through a fire hydrant by the City of San Diego Water Department.

c. The City of San Diego allows for the issuance of a temporary fire hydrant meter for a period not to exceed 12 months (365 days). An extension can only be granted in writing from the Water Department Director for up to 90 additional days. A written request for an extension by the consumer must be submitted at least 30 days prior to the 12 month period ending. No extension shall be granted to any customer with a delinquent account with the Water Department. No further extensions shall be granted.

d. Any customer requesting the issuance of a fire hydrant meter shall file an application with the Meter Section. The customer must complete a "Fire Hydrant Meter Application" (Tab 1) which includes the name of the company, the party responsible for payment, Social Security number and/or California ID, requested location of the meter (a detailed map signifying an exact location), local contact person, local phone number, a contractor's license (or a business license), description of specific water use, duration of use at the site and full name and address of the person responsible for payment.

e. At the time of the application the customer will pay their fees according to the schedule set forth in the Rate Book of Fees and Charges, located in the City Clerk's Office. All fees must be paid by check, money order or cashiers check, made payable to the City Treasurer. Cash will not be accepted.

f. No fire hydrant meters shall be furnished or relocated for any customer with a delinquent account with the Water Department.

g. After the fees have been paid and an account has been created, the

meter shall be installed within 48 hours (by the second business day). For an additional fee, at overtime rates, meters can be installed within 24 hours (within one business day).

4.7 **Relocation of Existing Fire Hydrant Meters**

a. The customer shall call the Fire Hydrant Meter Hotline (herein referred to as "Hotline"), a minimum of 24 hours in advance, to request the relocation of a meter. A fee will be charged to the existing account, which must be current before a work order is generated for the meter's relocation.

b. The customer will supply in writing the address where the meter is to be relocated (map page, cross street, etc). The customer must update the original Fire Hydrant Meter Application with any changes as it applies to the new location.

c. Fire hydrant meters shall be read on a monthly basis. While fire hydrant meters and backflow devices are in service, commodity, base fee and damage charges, if applicable, will be billed to the customer on a monthly basis. If the account becomes delinquent, the meter will be removed.

4.8 **Disconnection of Fire Hydrant Meter**

a. After ten (10) months a "Notice of Discontinuation of Service" (Tab 3) will be issued to the site and the address of record to notify the customer of the date of discontinuance of service. An extension can only be granted in writing from the Water Department Director for up to 90 additional days (as stated in Section 4.6C) and a copy of the extension shall be forwarded to the Meter Shop Supervisor. If an extension has not been approved, the meter will be removed after twelve (12) months of use.

b. Upon completion of the project the customer will notify the Meter Services office via the Hotline to request the removal of the fire hydrant meter and appurtenances. A work order will be generated

for removal of the meter.

c. Meter Section staff will remove the meter and backflow prevention assembly and return it to the Meter Shop. Once returned to the Meter Shop the meter and backflow will be tested for accuracy and functionality.

d. Meter Section Staff will contact and notify Customer Services of the final read and any charges resulting from damages to the meter and backflow or its appurtenance. These charges will be added on the customer's final bill and will be sent to the address of record. Any customer who has an outstanding balance will not receive additional meters.

e. Outstanding balances due may be deducted from deposits and any balances refunded to the customer. Any outstanding balances will be turned over to the City Treasurer for collection. Outstanding balances may also be transferred to any other existing accounts.

5. EXCEPTIONS

5.1 Any request for exceptions to this policy shall be presented, in writing, to the Customer Support Deputy Director, or his/her designee for consideration.

6. MOBILE METER

6.1 Mobile meters will be allowed on a case by case basis. All mobile meters will be protected by an approved backflow assembly and the minimum requirement will be a Reduced Pressure Principal Assembly. The two types of Mobile Meters are vehicle mounted and floating meters. Each style of meters has separate guidelines that shall be followed for the customer to retain service and are described below:

a) **Vehicle Mounted Meters**: Customer applies for and receives a City owned Fire Hydrant Meter from the Meter Shop. The customer mounts the meter on the vehicle and brings it to the Meter Shop for

inspection. After installation is approved by the Meter Shop the vehicle and meter shall be brought to the Meter Shop on a monthly basis for meter reading and on a quarterly basis for testing of the backflow assembly. Meters mounted at the owner's expense shall have the one year contract expiration waived and shall have meter or backflow changed if either fails.

b) **Floating Meters**: Floating Meters are meters that are not mounted to a vehicle. **(Note: All floating meters shall have an approved backflow assembly attached.)** The customer shall submit an application and a letter explaining the need for a floating meter to the Meter Shop. The Fire Hydrant Meter Administrator, after a thorough review of the needs of the customer, (i.e. number of jobsites per day, City contract work, lack of mounting area on work vehicle, etc.), may issue a floating meter. At the time of issue, it will be necessary for the customer to complete and sign the "Floating Fire Hydrant Meter Agreement" which states the following:

    1) The meter will be brought to the Meter Shop at 2797 Caminito Chollas, San Diego on the third week of each month for the monthly read by Meter Shop personnel.

    2) Every other month the meter will be read and the backflow will be tested. This date will be determined by the start date of the agreement.

If any of the conditions stated above are not met the Meter Shop has the right to cancel the contract for floating meter use and close the account associated with the meter. The Meter Shop will also exercise the right to refuse the issuance of another floating meter to the company in question.

Any Fire Hydrant Meter using reclaimed water shall not be allowed use again with any potable water supply. The customer shall incur the cost of replacing the meter and backflow device in this instance.

7. FEE AND DEPOSIT SCHEDULES

7.1 **Fees and Deposit Schedules:** The fees and deposits, as listed in the Rate Book of Fees and Charges, on file with the Office of the City Clerk, are based on actual reimbursement of costs of services performed, equipment and materials. Theses deposits and fees will be amended, as needed, based on actual costs. Deposits, will be refunded at the end of the use of the fire hydrant meter, upon return of equipment in good working condition and all outstanding balances on account are paid. Deposits can also be used to cover outstanding balances.

All fees for equipment, installation, testing, relocation and other costs related to this program are subject to change without prior notification. The Mayor and Council will be notified of any future changes.

8. UNAUTHORIZED USE OF WATER FROM A HYDRANT

8.1 Use of water from any fire hydrant without a properly issued and installed fire hydrant meter is theft of City property. Customers who use water for unauthorized purposes or without a City of San Diego issued meter will be prosecuted.

8.2 If any unauthorized connection, disconnection or relocation of a fire hydrant meter, or other connection device is made by anyone other than authorized Water Department personnel, the person making the connection will be prosecuted for a violation of San Diego Municipal Code, Section 67.15. In the case of a second offense, the customer's fire hydrant meter shall be confiscated and/or the deposit will be forfeited.

8.3 Unauthorized water use shall be billed to the responsible party. Water use charges shall be based on meter readings, or estimates when meter readings are not available.

8.4 In case of unauthorized water use, the customer shall be billed for all applicable charges as if proper authorization for the water use had been obtained, including but not limited to bi-monthly service charges, installation charges and removal charges.

8.5 If damage occurs to Water Department property (i.e. fire hydrant meter, backflow, various appurtenances), the cost of repairs or replacements will be charged to the customer of record (applicant).

Larry Gardner
Water Department Director

Tabs: 1. Fire Hydrant Meter Application
2. Construction & Maintenance Related Activities With No Return To Sewer
3. Notice of Discontinuation of Service

APPENDIX

Administering Division: Customer Support Division

Subject Index:
Construction Meters
Fire Hydrant
Fire Hydrant Meter Program
Meters, Floating or Vehicle Mounted
Mobile Meter
Program, Fire Hydrant Meter

Distribution: DI Manual Holders

City of San Diego
PUBLIC UTILITIES
Water & Wastewater

Application for Fire Hydrant Meter (EXHIBIT A)

METER SHOP (619) 527-7449

(For Office Use Only)

NS REQ	FAC#
DATE	BY

Application Date	Requested Install Date:

Meter Information

Fire Hydrant Location: (Attach Detailed Map//Thomas Bros. Map Location or Construction drawing.) Zip:	T.B.	G.B. (CITY USE)
Specific Use of Water:		
Any Return to Sewer or Storm Drain, If so , explain:		
Estimated Duration of Meter Use: ☐	☐ Check Box if Reclaimed Water	

Company Information

Company Name:			
Mailing Address:			
City:	State:	Zip:	Phone: ( )
*Business license#	*Contractor license#		
A Copy of the Contractor's license OR Business License is required at the time of meter issuance.			
Name and Title of Billing Agent: (PERSON IN ACCOUNTS PAYABLE)			Phone: ( )
Site Contact Name and Title:			Phone: ( )
Responsible Party Name:			Title:
Cal ID#			Phone: ( )
Signature:		Date:	

Guarantees Payment of all Charges Resulting from the use of this Meter. Insures that employees of this Organization understand the proper use of Fire Hydrant Meter

☐ Fire Hydrant Meter Removal Request	Requested Removal Date:	
Provide Current Meter Location if Different from Above:		
Signature:	Title:	Date:
Phone: ( )	Pager: ( )	

☐ City Meter ☐ Private Meter		
Contract Acct #:	Deposit Amount: $ 936.00	Fees Amount: $ 62.00
Meter Serial #	Meter Size: 05	Meter Make and Style: 6-7
Backflow #	Backflow Size:	Backflow Make and Style:
Name:	Signature:	Date:

WATER USES WITHOUT ANTICIPATED CHARGES FOR RETURN TO SEWER

Auto Detailing
Backfilling
Combination Cleaners (Vactors)
Compaction
Concrete Cutters
Construction Trailers
Cross Connection Testing
Dust Control
Flushing Water Mains
Hydro Blasting
Hydro Seeing
Irrigation (for establishing irrigation only; not continuing irrigation)
Mixing Concrete
Mobile Car Washing
Special Events
Street Sweeping
Water Tanks
Water Trucks
Window Washing

Note:

1. If there is any return to sewer or storm drain, then sewer and/or storm drain fees will be charges.

Date

Name of Responsible Party
Company Name and Address
Account Number:_____

Subject: Discontinuation of Fire Hydrant Meter Service

Dear Water Department Customer:

The authorization for use of Fire Hydrant Meter #_____, located at *(Meter Location Address)* ends in 60 days and will be removed on or after *(Date Authorization Expires)*. Extension requests for an additional 90 days must be submitted in writing for consideration 30 days prior to the discontinuation date. If you require an extension, please contact the Water Department, or mail your request for an extension to:

City of San Diego
Water Department
Attention: Meter Services
2797 Caminito Chollas
San Diego, CA 92105-5097

Should you have any questions regarding this matter, please call the Fire Hydrant Hotline at (619)_____-_____.

Sincerely,

Water Department

APPENDIX C

Materials Typically Accepted by Certificate of Compliance

Materials Typically Accepted by Certificate of Compliance

1. Soil amendment
2. Fiber mulch
3. PVC or PE pipe up to 16 inch diameter
4. Stabilizing emulsion
5. Lime
6. Preformed elastomeric joint seal
7. Plain and fabric reinforced elastomeric bearing pads
8. Steel reinforced elastomeric bearing pads
9. Waterstops (Special Condition)
10. Epoxy coated bar reinforcement
11. Plain and reinforcing steel
12. Structural steel
13. Structural timber and lumber
14. Treated timber and lumber
15. Lumber and timber
16. Aluminum pipe and aluminum pipe arch
17. Corrugated steel pipe and corrugated steel pipe arch
18. Structural metal plate pipe arches and pipe arches
19. Perforated steel pipe
20. Aluminum underdrain pipe
21. Aluminum or steel entrance tapers, pipe downdrains, reducers, coupling bands and slip joints
22. Metal target plates
23. Paint (traffic striping)
24. Conductors
25. Painting of electrical equipment
26. Electrical components
27. Engineering fabric
28. Portland Cement
29. PCC admixtures
30. Minor concrete, asphalt
31. Asphalt (oil)
32. Liquid asphalt emulsion
33. Epoxy

APPENDIX D

Tenant Improvement Laydown and Access Corridors

EXTERIOR WALLS CBC TABLE 602

FIRE RESISTANCE RATING BASED ON FIRE SEPARATION DISTANCE – PROPOSED BUILDING

FIRE SEPARATION (FT)	TYPE OF CONST	OCCUP GROUP A	OCCUP GROUP M
X < 5	V-B	1-HR	1-HR
5 ≤ X ≤ 10	V-B	1-HR	1-HR
10 ≤ X ≤ 30	**V-B**	**0-HR**	**0-HR**
X ≥ 30	V-B	0-HR	0-HR

OPENING PROTECTION CBC TABLE 705.8 MAXIMUM AREA OF EXTERIOR WALL OPENINGS BASED ON FIRE SEPARATION DISTANCE IN FEET

CLASSIFICATION OF OPENINGS	0 TO 3	>3 TO <5	5 TO <10	**>10 TO ≤15**	>15 TO ≤20	>20
UNPROTECTED SPRINKLERED	NOT PERM	15%	25%	**45%**	75%	NO LIMIT

PER CBC 705.8.1 EXCEPTION 2, BUILDINGS WHOSE EXTERIOR BEARING WALLS, EXTERIOR NONBEARING WALLS AND EXTERIOR PRIMARY STRUCTURAL FRAME ARE NOT REQUIRED TO BE FIRE-RESISTANCE RATED SHALL BE PERMITTED TO HAVE UNLIMITED UNPROTECTED OPENINGS.

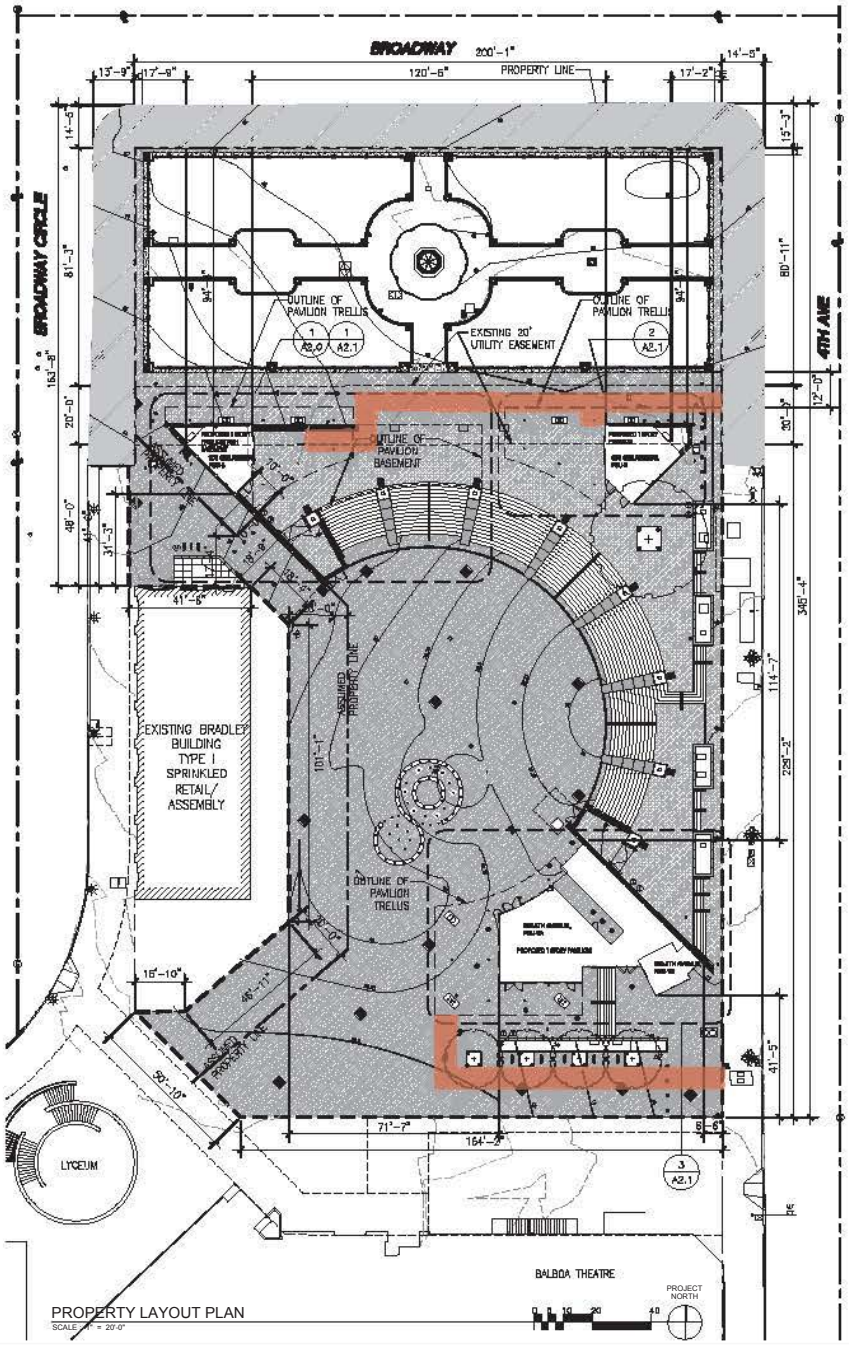
EXISTING BRADLEY BUILDING
CONSTRUCTION TYPE: TYPE I
OCCUPANCY: RETAIL/ASSEMBLY
FIRE SPRINKLERED

FIRE RESISTANCE RATING BASED ON FIRE SEPARATION DISTANCE – EXISTING BUILDING

FIRE SEPARATION (FT)	TYPE OF CONST	OCCUP. GROUP A	OCCUP. GROUP M
X < 5	I	1-HR	1-HR
5 ≤ X ≤ 10	I	1-HR	1-HR
10 ≤ X ≤ 30	I	**1-HR**	**1-HR**
X ≥ 30		0-HR	0-HR

OPENING PROTECTION CBC TABLE 705.8 MAXIMUM AREA OF EXTERIOR WALL OPENINGS BASED ON FIRE SEPARATION DISTANCE IN FEET

CLASSIFICATION OF OPENINGS	0 TO 3	>3 TO <5	5 TO <10	>10 TO <20	**>10 TO <20**	>20
UNPROTECTED SPRINKLERED	NOT PERM	15%	25%	45%	**75%**	NO LIMIT



PROPERTY LAYOUT PLAN
SCALE: 1" = 20'-0"

GENERAL NOTES

1. REFER TO LANDSCAPE PLAN L.A.0 FOR COORDINATE DATA, LOCATING THIS PROJECT ON THE SITE.
2. REFER TO LANDSCAPE PLANS L.A.0 AND L.A.1 FOR ALL SITE, LANDSCAPE ELEMENTS WHICH ARE SHOWN HERE FOR REFERENCE ONLY.
3. REFER TO LANDSCAPE PLANS L.A.0 AND L.A.1 FOR ALL FINISH SHADES WHICH ARE SHOWN HERE FOR REFERENCE ONLY.

NOT FOR CONSTRUCTION

Civic San Diego
401 B STREET, SUITE 400
SAN DIEGO, CA 92101

City of San Diego
Park & Recreation

Signature:

WALKER MACY

carrierjohnson + CULTURE

HORTON PLAZA IMPROVEMENT PROJECT

SAN DIEGO, CALIFORNIA





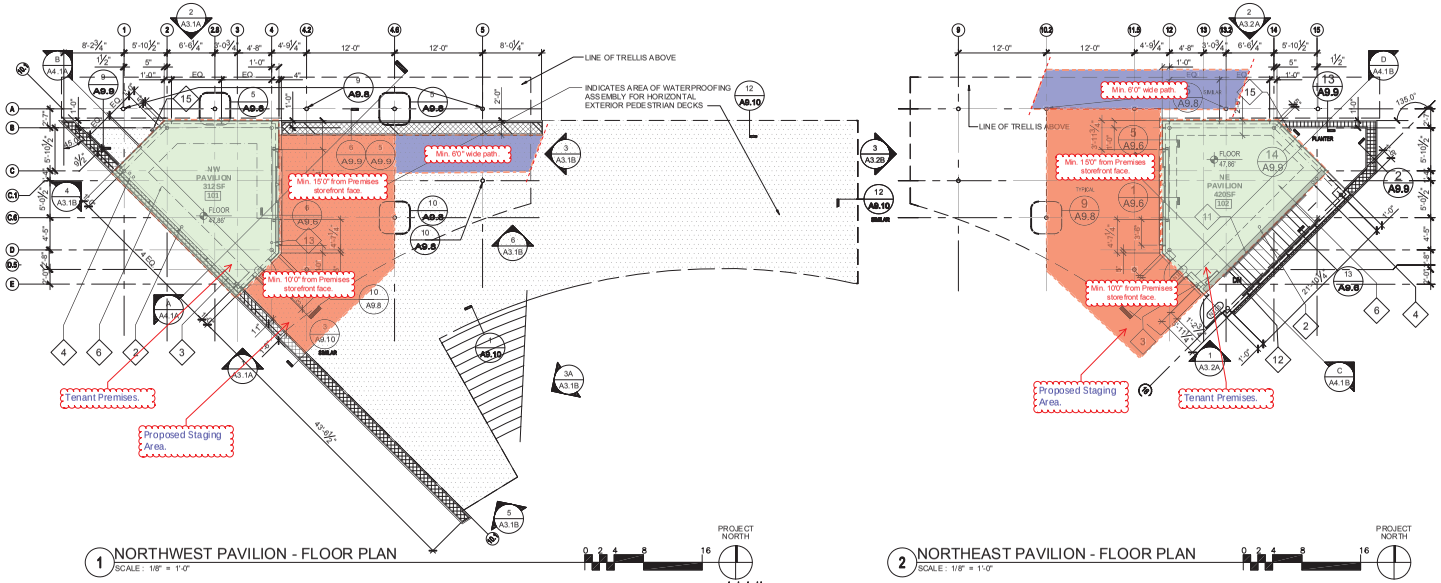
WM-1109

100% CONSTRUCTION DOCUMENTS
PERMIT REVIEW SET
05/28/2013

37342-D

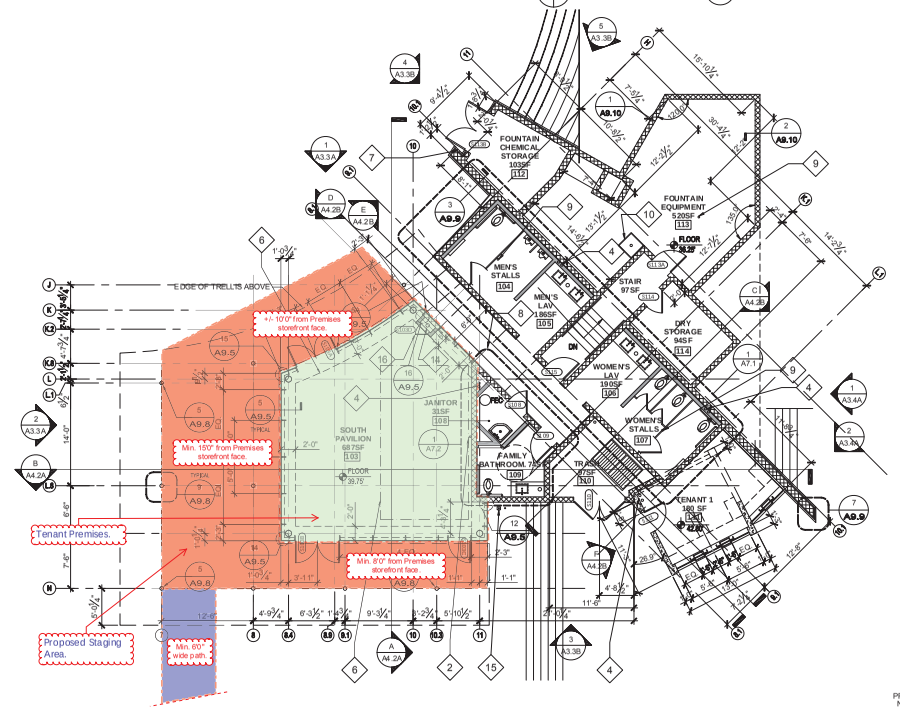
PROPERTY LAYOUT PLAN

A1.1



1 NORTHWEST PAVILION - FLOOR PLAN
SCALE : 1/8" = 1'-0"

2 NORTHEAST PAVILION - FLOOR PLAN
SCALE : 1/8" = 1'-0"



3 SOUTH PAVILION - FLOOR PLAN
SCALE : 1/8" = 1'-0"

GENERAL NOTES

DIMENSIONS:
ALL DIMENSIONS ARE TO FINISH FACE, CENTER OF WALL, COLUMN GRID LINES, OR FACE OF CONCRETE AND CMU WALLS (NOMINAL), U.O.N. WINDOW AND DOOR LOCATIONS ARE DIMENSIONED TO ROUGH OPENING. ALL "HOLD" OR "CLR" DIMENSIONS MUST BE MAINTAINED.

WALL BACKING:
BLOCKING OR BACKING SHALL BE PROVIDED IN PARTITIONS AS REQUIRED FOR WALL ATTACHED ITEMS. PROVIDE 6" MIN, 18 GA. BACKING FOR CABINETRY, SHELVING, MARKER BOARDS, CHAIR RAILS, GRAB BARS, SHOWER SEATS, HANDRAILS, FIXTURES, EQUIPMENT, FURNISHINGS AND OTHER ITEMS AS REQUIRED. ALL WOOD BLOCKING, GROUNDS, ROUGH BUCKS AND MISCELLANEOUS BLOCKING SHALL BE FIRE RETARDANT TREATED IN ACCORDANCE WITH FIRE CODES.

PENETRATIONS:
PENETRATIONS OF FIRE-RESISTIVE WALLS, FLOOR-CEILINGS, AND ROOF-CEILINGS SHALL BE PROTECTED BY AN APPROVED PENETRATION FIRESTOP SYSTEM INSTALLED AS TESTED IN ACCORDANCE WITH UBC STANDARD 7-5 AND SHALL HAVE AN F RATING (AND A T RATING AT FLOORS ONLY) OF NOT LESS THAN THE REQUIRED RATING OF THE WALL OR FLOOR PENETRATED. PENETRATIONS OF ACOUSTICAL WALLS FOR PIPES, DUCTS, AND OUTLETS SHALL BE SEALED WITH AN ACOUSTICAL SEALANT.

ACCESS PANELS:
PROVIDE ACCESS PANELS AS REQUIRED PER APPLICABLE CODES FOR MAINTENANCE ACCESS TO INSTALLED MEP EQUIPMENT. PROVIDE STAINLESS STEEL AT CERAMIC TILE LOCATIONS. COORDINATE TYPES AND LOCATIONS OF WALL ACCESS PANELS WITH ARCHITECT PRIOR TO INSTALLATION.

KEYNOTES

		SPEC SECTION
1	ROOF ACCESS LADDER	055000
2	PLUMBING POC	
3	ELECTRICAL PANEL	
4	DRAIN LEADERS	
5	EDGE OF SLAB	
6	APPROXIMATE AREA OF FUTURE TI SERVICE AREA	
7	RECESSED KNOX BOX SET FLUSH WITH STONE FACE 60" ABOVE FINISH GRADE - SEE DETAIL 10/A9.9	
8	COILING GRILLE, SEE DET. 3/A9.1 & 9/A9.1	
9	FLOOR DRAIN PER PLUMBING PLANS.	
10	MOP SINK PER AQUATIC PLANS.	
11	WALL MOUNTED HANDRAIL PER DETAIL 7/A9.2	
12	FLOOR MOUNTED HANDRAIL PER DETAIL 8/A9.3	
13	IRRIGATION CONDUIT TO CONTROLLER AND WEATHER STATION ON ROOF.	
14	SPRINKLER RISER	
15	LOW PRESSURE NATURAL GAS LINE WITH SHUT-OFF VALVE	
16	18 X 36 ACCESS PANEL	

LEGEND

SYMBOL	DESCRIPTION	SEE SHEET(S)
XXX	ROOM NUMBER	
XX	DOOR NUMBER	A9.0
	CMU WALL - SEE STRUCTURAL DRAWINGS	
	STUD WALL	7/A9.1, 11/A9.1
	CONCRETE WALL - SEE STRUCTURAL DRAWINGS	
FEC	WALL MOUNTED FIRE EXTINGUISHER 2A:10B:C	

NOT FOR CONSTRUCTION

Civic San Diego
401 B STREET, SUITE 400
SAN DIEGO, CA 92101

City of San Diego
Park & Recreation

Signature:

WALKER MACY

carrierjohnson + CULTURE
1201 third avenue . san diego . ca . 92101
phone 619.239.2200 | fax 619.239.6327

HORTON PLAZA IMPROVEMENT PROJECT

SAN DIEGO, CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER MARK WALKER No. C 34697 CIVIL FEB. 28 2013 STATE OF CALIFORNIA

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PAVILION FLOOR PLANS

A2.1

APPENDIX E

Conservation Assessment of the Electric Fountain at Horton Plaza

Griswold Conservation Associates, LLC

Conservation Report

PROJECT NO.:	GCA no. 07.305.10
PROJECT TITLE:	Conservation Assessment of the *Electric Fountain* at Horton Plaza, San Diego, California
CLIENT:	City of San Diego / Centre City Development Corp.
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This report describes the work performed by Griswold Conservation Associates, LLC (GCA), under the direction of John Griswold, in fulfillment of an Agreement for Professional Services with the Centre City Development Corporation (CCDC) and the City of San Diego, to perform a condition assessment of the historic *Broadway Electric Fountain* in Horton Plaza, San Diego, California, and to develop a conservation treatment plan and proposal, with a detailed cost estimate. GCA consulted with structural engineer Melvyn Green, of Melvyn Green Associates, Inc. during this project.



Figure 1. View of Electric Fountain *from the southwest. The waterworks have been turned of and the basin drained for this assessment.*

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1 Introduction

The work described in this report was performed from April to June, 2009, starting with a two-week-long, on-site examination period of the Broadway Electric Fountain in Horton Plaza, San Diego, California. The study builds on initial observations made by conservator John Griswold during a Getty Foundation grant-funded survey of sculpture collections for the City of San Diego, completed in 2006.[1] A copy of this original survey record is included in the appendix of this report. In it, the need to develop a comprehensive conservation treatment plan for the fountain was stressed. Orange-brown staining on the marble columns and column bases indicated the presence of corroding ferrous metal on the interior of the stone. Pitting and bulbous corrosion on the copper alloy components suggested extensive bronze disease. Layers of caulking and silicone sealants around the glass panes of the lower dome, and constant moisture penetrating to the interior of the structure, as seen in the subterranean chamber, all were cause for concern for the long-term preservation of the fountain.

Remarkably, the fountain has been, more or less, in continuous use since the beginning decade of the 20th century. Although no apparent signs of structural failure were visible, such as structural cracks or displacement of masonry units, the deep, presumably metallic corrosion visible on the stone cast some doubt on the ability of the structure to withstand future seismic events. Smaller copper alloy leaf elements of the capitals had fallen because of corroded screws, and the original eagle, designed by Felix Paeano, was removed and replaced with a lesser-quality stand-in. As Horton Plaza became the gathering place of transients, the fountain basin was used for bathing and received an influx of garbage and other abuse. City maintenance workers added chlorine in significant amounts to the recirculating water, exacerbating the corrosion.

Since the initial condition survey in 2006, concern for the stability of the subterranean chamber was raised by City maintenance workers, based on cracking and loss of concrete at a support beam near the entry hatch. Constant moisture had obviously corroded the rebar within the concrete, resulting in the damage.

This report presents the observations made by the conservator, assisted by conservation technician Andy Ritzo, and the engineer, and includes prioritized

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1 Griswold Conservation Associates, LLC (GCA) provided expertise in three-dimensional objects conservation to the Balboa Art Conservation Center (BACC), who coordinated the overall collections survey.

recommendations and treatment goals, followed by a conservation work plan and cost estimate.

2 Historical Background

The fountain was designed by architect Irving J. Gill, who won a public competition for the commission. Built in 1909 and dedicated on October 15, 1910, it was a daring design combining flowing water and colored electric lights, and stirred considerable controversy at the time with concerns for public safety upon its unveiling.[2] It has been variously referred to as the Wilde Electric Fountain, the Horton Plaza Fountain, the Broadway Fountain, and the Broadway Electric Fountain, etc. and is the centerpiece for Gill's redesign of the plaza.



This fountain was reportedly the first to successfully combine these elements.[3] Gill's ingenious approach was to illuminate the fountain from the interior, behind the cascades and sprays of water.

The *tholos-shaped* fountain design is loosely based on the Choragic Monument of Lysicrates in Athens. There are three relief plaques depicting the Portuguese explorer Juan Rodriguez Cabrillo, Father Junipero Serra, and Alonzo Horton, the founder of New San Diego. A fourth plaque presents the fountain from Louis J.

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[2] City electrical inspector Harry Brown had repeatedly expressed grave concern about the danger of electrocution, and even cut off the power at the critical moment of the unveiling. The dispute between Brown and the architect is recorded in the San Diego Union, October 16, 1910, and elsewhere.

[3] Ferris, Helen M. *The Plaza Fountain (Wilde Fountain).* A report dated 7/7/71 and submitted to the Research Committee of the Historic Sites Board, San Diego, CA.

Wilde. The architrave frieze bears the inscription “THE BROADWAY FOUNTAIN FOR THE PEOPLE”.



Image copyright San Diego HIstorical Society.

A study of the archival images shows that several changes have been made to the fountain and its basin. The profile of the basin wall has been changed; there is no longer a prominent base molding with straight side wall, and the smoother texture is now roughened stucco. The basic footprint remains unchanged, however. Also, the two series of glazed openings at and below the water level, around the base of the central structure, have been replaced with cast concrete, no longer providing illumination under the cascading falls over the granite spillways. It is interesting to observe how wet the pavement is around the fountain basin in the early photos. In order for the water sprays to converge at a height above the eagle, and the

spillways to issue more water at an angle farther out from the base, the overall volume output rate would have been higher than the current equipment and plumbing configuration produces. It is not surprising that changes have occurred over the years, given the inefficiency of the traditional glazing technology used in the fountain to provide a watertight seal, and the need to reduce the amount of overspray for both safety and water conservation reasons.

While Horton Plaza has changed around it, the Electric Fountain remains otherwise quite unchanged. It is remarkable, and highly laudable, that the fountain not only still works, but that it remains in place at all. Much credit goes to city workers who have found ways to patch leaks and repair faulty and old equipment, and especially to organizations such as SOHO and CCDC, and to city leaders, for finding ways to incorporate this highly important piece of history into visions for the future.



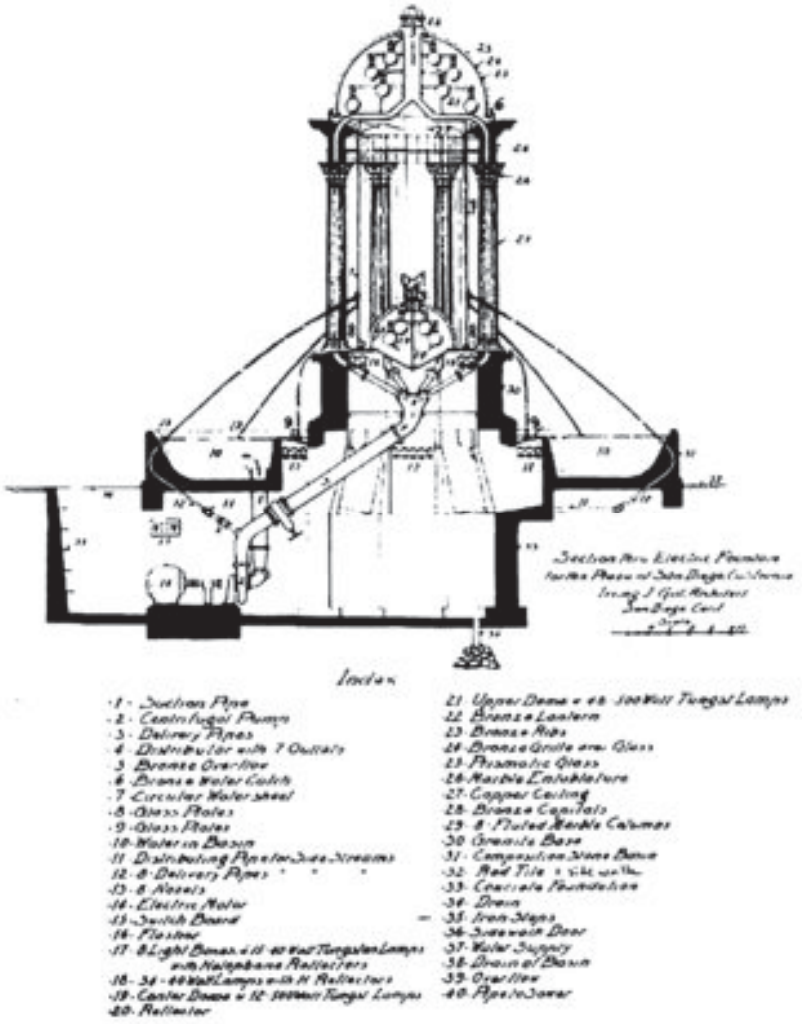
Historic postcard views ca. 1914. (Not from collection of an Diego Historical Society.)



View of the Electric Fountain from the south, ca 1940's.

3 Description

The fountain is well documented in archival images. Also, the original drawings exist. These were located at the Art Library at UCSB. of particular value in understanding the original configuration of the fountain plumbing and lighting is this diagram, showing a cut-away view, including the subterranean chamber:



It shows the original location of pipes, lanterns, reflectors, etc. now gone. This is key to understanding the architect's original intent, and spectacular achievement, and allows a fuller interpretation of the archival images.

Siting

The fountain is located roughly 30 feet from the south curb of Broadway, between 3rd and 4th Streets, in a plaza surfaced with ceramic pavers. The fountain area is flanked on east and west by long planting beds. There are no overhanging trees in the vicinity. The site is illuminated at night. It is a gathering, and presumably sleeping place, of many transients. There is a rectangular access hatch fitted into the pavement southwest of the basin; this leads via metal rung ladder into a formed

concrete chamber housing the electrical and plumbing works. This chamber extends west, then northeast under the center of the fountain. The access hatch is locked when not in use.

Basin

The basin footprint is an eight-lobed octafoil design. The floor of the basin is curved where it approaches the outer side wall, as seen in the original drawings. Around the central feature the basin floor raises to form a low octagonal plinth, with eight, six-sided recesses in the top surface spanning each of the corners. These recesses are now empty boxes, just below the waterline. The raised, flat areas between them were once fitted with glass panes, allowing illumination from lanterns below to shine up and under the cascades. There are remnants of iron fasteners for the lanterns in both areas on the interior of the concrete formwork in the underground chamber. The recessed areas were likely intended to have contained aquatic plants.[4]



The outside of the basin is noted as “composition stone” on the original drawings, a term used to describe cement-based mixes of sand, pigment, aggregate, etc. designed to imitate stone, usually solid cast. The low base molding seen in the early photos has given way to a more crude, higher step molding reaching almost half-

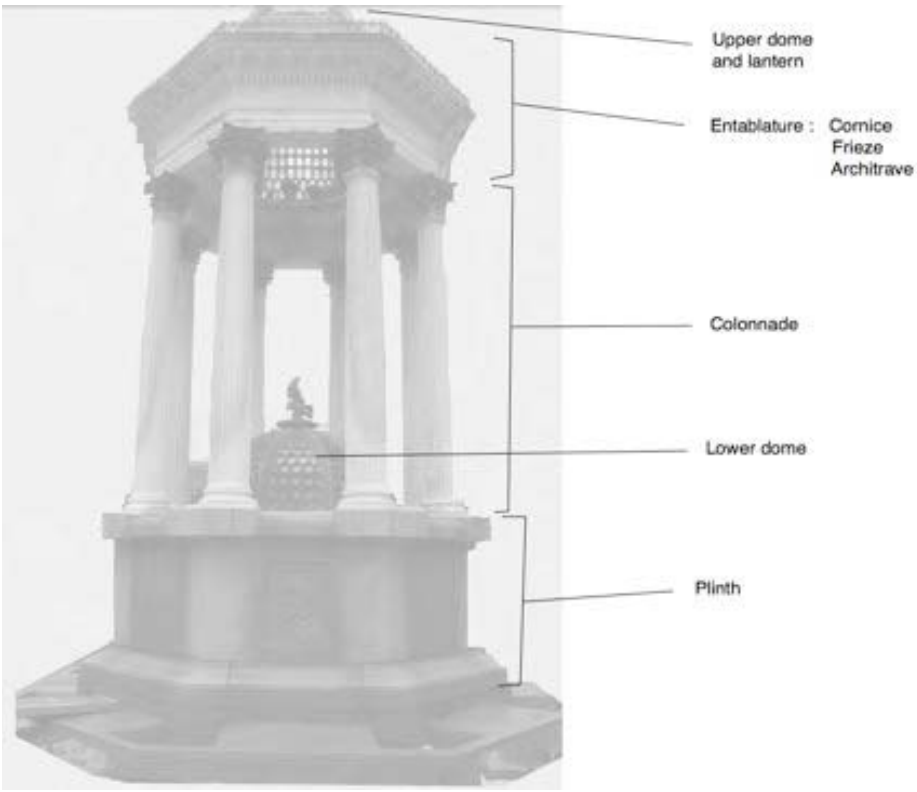
[4] “...Below the lordly bird in the occasional box-like crevasses are aquatic plants catching the whirling spray.” San Diego Evening Tribune, October 15, 1910, p. 4, col. 1.

way up the vertical side of the basin. It is not known whether the original profile and surface are retained underneath the present surface.

Modern, moveable lighting secured to the floor of the basin replaces the original illumination, shining up and onto the cascading water from an angle farther out from the base than the original intention of the architect.

Central Structure

The central structure components can generally be divided into the plinth, the lower dome, the colonnade, the entablature (incorporating the architrave, inscription frieze and cornice assembly), and the upper dome and lantern. The eagle sculpture, relief panels and filigree border work are all removable artwork components.



Plinth

The lower portion of the central structure is constructed of dimensional granite blocks. The granite is a fine-grained, gray stone, possibly Vermont Barre granite,

pre-carved and imported to California for installation. The rough interior sides of the stone can be seen in the underground chamber, with Portland cement mortar smeared liberally across joints. The joints, as seen on the exterior, are uniform and tight, no more than 1/4" wide, and the pointing mortar, is apparently original for the most part. It is hard and presumably contains Portland cement as well.



It is not known whether metal reinforcements were used to secure the granite masonry. No such details are called out on the drawings, however this is not unusual, the architect expecting such standard details to be employed according to accepted trade practices. An area of cracked mortar between the capstone and the side block was removed across a joint, in a vain attempt to find a metal cramp embedded across the top of the joint. A fiber optic borescope was used to search for any metal spanning the joint, but none was found here. Also, a James Instruments Rebar Locator was used to detect internal metal, with no success. False negative results in such thick, dense stone are not unusual, however, and typical fasteners may be assumed to be present.

At any rate, the interlocking construction of the granite blocks, evidenced by the staggered joint alignment and the complexity of the unit shapes forming the

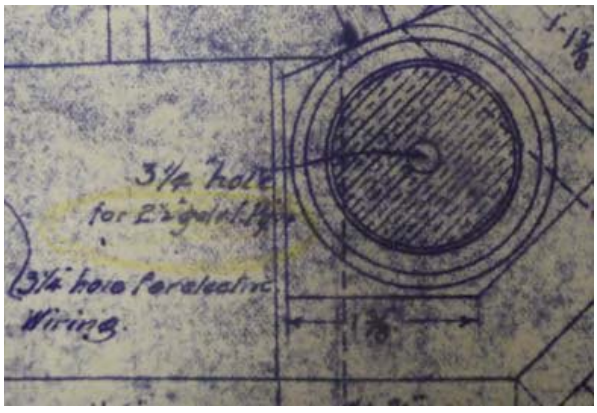
octagonal structure, appears to be quite stable. No cracking or differential movement of the masonry was seen, suggesting that this section of the monument acts as a monolith during seismic movement.

Lower Dome

The lower dome appears to be supported on a new framework of angle iron stock, welded together and bolted to the granite inside the central structure. The flat glass panes surrounding the dome have been replaced with thick plexiglass. The framework of the dome itself retains the original cast bronze panels, possibly sand cast, and much of the original "prismatic" glass. There may be remnants of original putty embedded within the many layers of added grout and polymer caulking, but none was found during this inspection. Disassembly may reveal more evidence of original materials. The bronze panels are apparently bolted together, and the joints covered with a rounded, hollow rib of shaped sheet bronze, held in place with copper alloy machine screws. An internal framework may also be present, but is not visible without disassembly.

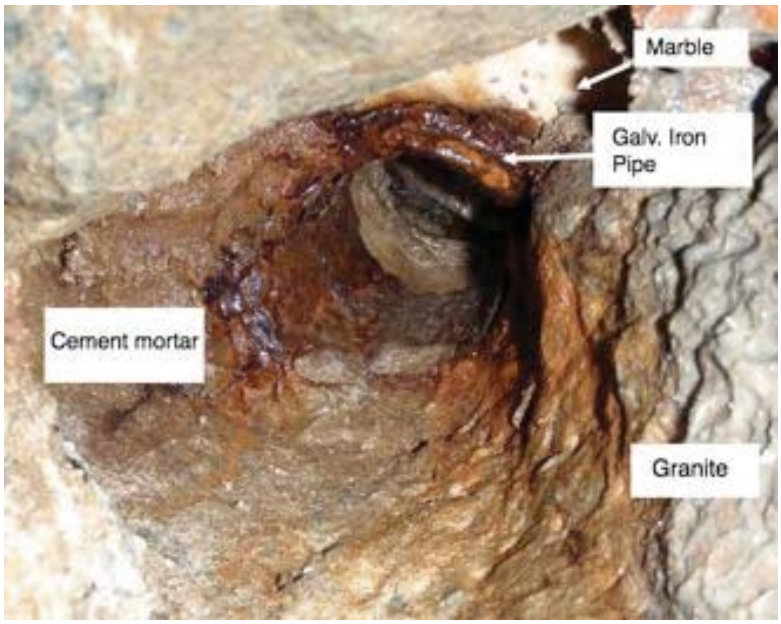
Colonnade

The eight columns supporting the entablature and dome are carved from single blocks of white, fine grained marble. Circular in cross section, they appear to display a slight entasis. The sides are fluted. A fillet near the top defines the bottom edge of the capitals, which are bronze attachments. There is a 3 1/4" diameter hole bored through the center of each column and a 2 1/2" dia. galvanized steel pipe passing through the center of the bored hole. This is the water distribution feed for the upper part of the fountain.



Detail of original drawing, showing notation for pipe inside column. No indication of lead is shown.

A hole in each wall of the granite plinth inside the structure shows the underside of the column and the original pipe inside. The pipes were anchored to the granite with Portland cement mortar.



Underside of column visible on interior of structure.

The marble is smoothly finished, but apparently never to a high polish, based on the condition of the protected areas within the columns (see below). The column bases are each single blocks incorporating a profiled ring atop a five-sided, asymmetrical block, fitted to match the footprint of the granite capstone corners between the spillways. Extensive orange-brown (ferrous?) staining on the columns and bases suggests there may be internal iron pins or other fasteners, however it is equally likely that the presence of the steel pipes within may be contributing to this.

A James Instruments rebar locator was used to detect internal metal components. A weak positive signal was received along the length of each column, with no obvious spikes at the base.

Entablature

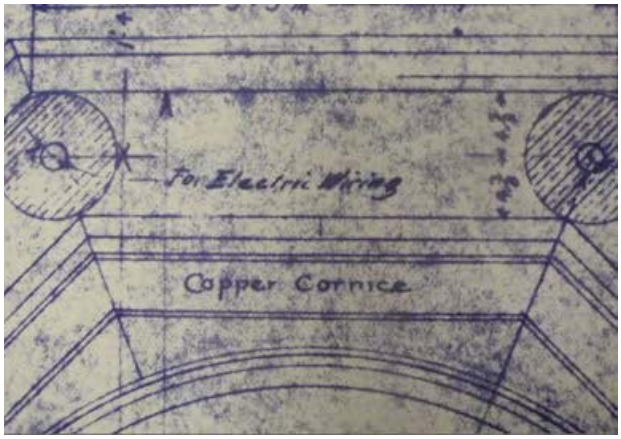
The octagonal marble entablature is comprised of a lower architrave block with fillet and profile moldings, on top of which is a plain-faced frieze block featuring the incised inscription, both of which are then surmounted by an intricately carved cornice, incorporating a dentil molding band, an egg-and-dart molding, imitation

rafter tails under the cornice eaves, and a gently sloping top surface with slight profile detailing on the underside.



Three separate blocks make up each side of the entablature.

When joined, the eight blocks form a circular oculus, a round opening that was, according to original drawings, fitted with a copper conice, presumably a skirt that would have enhanced the flow of the water into a continuous cylindrical sheet falling between the columns.



Detail of original drawing, with notation for copper cornice at oculus.

The marble blocks are tightly jointed, some joinery staggered and interlocking. the joints are pointed with fine, white lime/cement-based mortar. Ferrous metal cramps are embedded in slots spanning the corner miter joints at the top, set into Portland cement patches finished flush with the marble surface.

Upper Dome

The upper dome is constructed similarly to the lower dome, with separately cast bronze panels with variously shaped apertures, fitted with curved, “prismatic” glass having horizontal ribbing cast into the exterior face. The frame elements are screwed together with copper alloy machine screws. An inner framework may be hidden within the ribs. The glass apertures may or may not have been sealed with glazing putty; many layers of later grout and caulk obscure this. The dome is raised approximately 2 inches above the marble “gutter”, allowing water cascading down the exterior (issuing from the lantern) to flow beneath it. The metal legs supporting the dome are now missing, replaced with a new stainless steel support frame, with legs relocated to the center of each side of the dome.

Removable Artwork

The four relief plaques may be sand-cast copper alloy (bronze). Any original chemical patina or applied coatings such as toned lacquer, etc. are no longer present, nor is any sign of original chasing or other tool marks, due to the weathering and corrosion. One item in the archives mentions the inscription plaque being installed later than the other relief plaques, c. 1931. The plaques are held in place only by the four threaded bolts at the corners. The original rosette fastener type remains on some bolts. Bolts and fasteners also appear to be bronze.

The eagle is a replacement, added in the late 20th century. The original is in the Mayor’s Office. It was examined during the 2006 sculpture survey. The description text from that entry is as follows:

“The sculpture depicts an eagle standing, preening its feathers. The eagle’s head is turned towards his right wing. The sculpture is affixed to a round base, 10 inches across.

“The base is separately cast bronze, attached to the integral ground base of the sculpture with three large bronze screws between the feet, the visible heads of which are slotted and shaped to roughly follow the contour of the ground . The sub-base (octagonal?) is also bronze. Four tabs on the base allow attachment with screws to the sub base. The eagle is hollow-cast in sections, brazed together. Note separation plane at beak, etc. Casting is flawed, porous, with ragged casting edges under the PL wing, etc. Holes in the lower part of the inside of the PR wing appear to be original, exacerbated by some corrosion. Chlorides presumed present.

“The surface is dull dark to golden brown, a combination of chemical and natural patina. Some green appears deliberate "verdigris" imitation, e.g. on the base below the PL talons. Some golden passages on wing, body, top of head, etc. appear

either to be gold toned paint, remnants of gilding, or areas of un-oxidized bronze protected by remnants of a clear lacquer coating. all recommended to be confirmed through analysis at a later time.

"The bronze is highly oxidized. There are several holes in the inner wing of the eagle, and white smudges along the lower edges of the wings."



Image of original eagle, from 2006 sculpture survey.

While the original eagle is in relatively good condition, it is highly vulnerable to further deterioration and returning it to use in the fountain should not be considered.

The decorative bronze tracery border around the top of the entablature, at the base of the upper dome, appears to be an original feature seen in early photographs. However none of these photos are detailed enough to allow confirmation. The eight segments are apparently sand cast copper alloy (bronze). No obvious remnants of original chemical patination or applied coatings were seen during this inspection.



Bronze tracery grille work along top of cornice.

The pattern does not properly terminate at the ends/corners, suggesting that this is mass-produced stock cut to fit its present configuration. It seems unlikely that the architect would have approved of such lack of detailed finish. It is more likely that the present grille work is a more modern replacement.

In addition to the above removable artwork features, something may be missing, but this is a bit of a mystery. There are sets of small holes drilled into the top of the granite capstones, aligned parallel to the central axis of each stone, spanning the spillways. The holes appear to retain remnants of setting plaster and/or lead anchors. Early photos do not show any attached items in this location.

4 Condition

Basin

The basin has been altered, as noted above. The original profile and finish of the exterior may remain under the later addition of base molding and stucco coating, but this is not likely to be in good condition. The interior of the basin has been completely resurfaced, and possibly re-sloped. The sand-textured coating extends over the former light boxes and planters around the base of the central structure. The basin has been maintained according to standard pool maintenance practices over the years. Such care has allowed the fountain to continue to function, even at the expense of some of the historic authenticity.

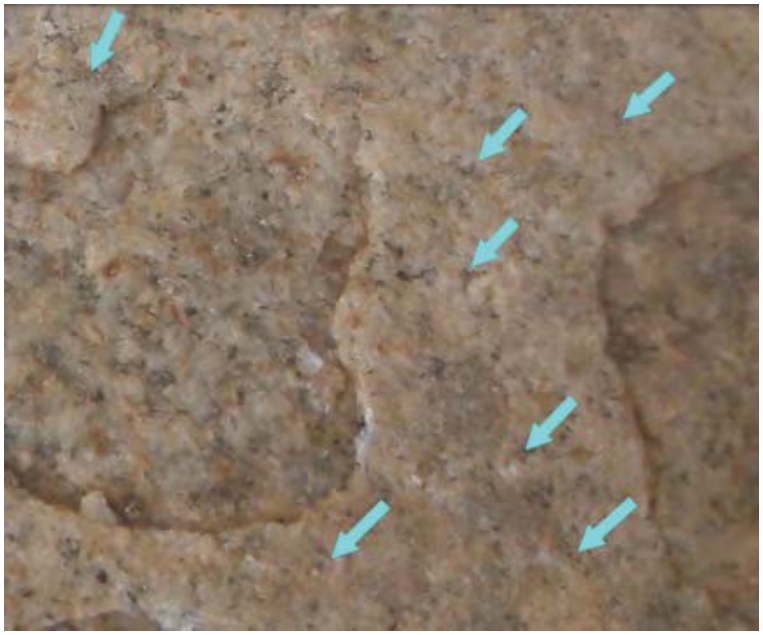
Granite Base Structure

The blocks of the granite plinth are in very good condition, with no significant breaks, losses, displacement, or other damage. The surface is scaling in local areas.



Scaling of granite surface on capstone.

Scaling of the granite surface is seen on the capstone, mainly where the water spills over, and is fairly uniform in depth of about 1/8". This type of scaling is common on dressed granite blocks, where micro-fractures caused by bush hammering, etc. populate the surface as crystalline matrix is compressed. Horizontal cleavage at a uniform depth spreads as moisture infiltrates. Exacerbated by freeze-thaw and salt formation.



Arrows indicate some of the visible fractures left from dressing the stone (60x magnification).

There are indications of the break-down of some of the feldspathic minerals on the surface of the granite. Local mineral flakes are cracking and flaking. The original dressing marks are worn, but the surface is generally compact and otherwise stable, with slight spalling and chip losses at edges.



Active deterioration and flaking of feldspathic minerals in granite.

There is extensive reddish-brown staining on much of the surface, corresponding to the path of the flowing and cascading water. These are presumably mainly ferrous corrosion products, from ferrous metal pipes in the plumbing system. This staining appears not to be deep, within 1-2 mm of the surface.

The pointing mortar in the joints of the granite are generally intact, with local cracking especially under the capstone at the south side, and some dislodged segments.



Under the capstone of the granite, with pointing mortar intact.

The color of the granite may originally have been darker and more richly saturated, but never highly polished.

Columns

The columns are generally in good condition, with no significant breaks, displacement or repairs. Edges of some flutes are chipped, and the general texture of the marble is altered, presumably by aggressive abrasive and chemical cleaning techniques, possibly in attempts to remove the deep orange-brown staining. Joints at bases and the architrave are tight, with pointing mortar largely intact, if slightly eroded.

Part of the bottom surface of some columns can be seen in large holes in the granite blocks on the interior, from beneath the structure in the underground chamber. The marble appears smooth, flat, in good condition. The lead pipe lining the interior hole through each column may be isolating it from most of the corrosion occurring on the ferrous metal feed pipes. There are no cracks on the columns suggesting internal pressure from expanding ferrous corrosion ("iron jacking").



Extensive orange-brown staining deep within the marble.



Detail of deep staining on column.



Loss in flute edge on column.



Glossy, pitted surface suggests abrasive blasting and acid cleaning.



Mineral re-deposition (branched growths) along ridge lines on column flutes. Also glossy surface and pitting suggests acid and abrasive cleaning in the past.

Entablature

The entablature is in remarkably good condition overall, with some losses in the fillets and moldings of the architrave. The ferrous metal cramps on the top, spanning the corner joints, are corroding, with the resulting expansion causing cracks in the marble and spalling of the hard concrete patches. Ultimately, these cramps will fail and de-stabilize the upper structure.



The entablature, supported by the columns.

Much of the pointing mortar is deteriorated, cracked or missing from the joints, especially those in the cornice. The surface of the marble is saccharoidal (sugaring), with rounded edges to formerly crisp details such as dentils. This deterioration appears to be an ongoing process. Several areas of deep, reddish brown staining (e.g. at the corners of the frieze) may indicate other internal iron connectors are rusting. A curved crack within one of these areas may be an incipient spall, related to “iron jacking”. Again, tests with a James Instruments rebar locator did not conclusively show the presence on internal iron, possibly because of the highly mineralized state of the metal.

There are areas of moderate sulfation of the marble (formation of calcium sulfate from exposure to airborne pollutants), with related dark soiling embedded in the gypsum crystals. This is mainly in the form of rivulets streaming down the face of

the entablature. There are also isolated ares of black spotting, possibly related to biological growth, commonly associated with bacteria, etc.

Various items of trash, coins, discarded items, etc. were found on top of the entablature. Metal anti-bird spikes, adhered to the marble, are partially or completely detached in many instances.



Concrete patch spanning a joint in the cornice, with part of the iron cramp visible at its center. Prominent rusting is from metal foreign objects resting on the wet surface.



Detail showing spalling concrete mortar and marble, with cracks related to iron jacking of the cramp.



Interior of the entablature, showing the steel tube ring, modern lights installed to replace original dome globe lights. The copper cornice is missing. Brown staining appears related to ferrous corrosion of the galvanized pipes inside the columns. Black biological growth is seen in crevices of the stonework.



Rebar locator in use. No metal was detected, probably due to awkward angle and thickness of dense stone, and possibly the highly mineralized state of internal iron.



Eroding mortar in joints, sulfate crusts, black rivulets on saccharoidal marble. edge erosion of marble blocks visible here.



Mineral growth from hard water and re-precipitated calcium minerals dissolved from marble, on anti-bird spikes.



Shallow, angled crack in marble at frieze, with related iron staining.

Eagle

The original eagle was removed several decades ago, and is now displayed indoors in the Mayor's Office. It is a highly porous casting, thin walled, and highly vulnerable to corrosion. It was examined as part of the sculpture condition survey performed by Griswold in 2006. See above.

The present eagle is different in pose, dimensions and quality. Its feet are smeared with epoxy adhesive, with bolt and wire visible at the cast bronze branch. The original eagle features an octagonal base, corresponding with the octagonal plate to which the replacement is attached.



Modern replacement eagle sculpture, with various makeshift repairs to feet.

The replacement eagle us moderately corroded and pitted, with some ferrous staining present, suggesting iron or steel fasteners, armature, or etc. are present.

Capitals

Approximately 15 to 20 of the separately cast leaves are detached and/or missing. Held in place with screws, it appears the relatively high rate of corrosion of these fasteners suggests that they are made of a different alloy compared with the casting, and thus may have preferentially corroded due to galvanic processes.

To fully understand the construction of the capitals and the uppermost part of the columns, the NNE capital was partially disassembled, as noted above. Three of the four screws to be removed were found to be completely mineralized, with no metal core left in the threaded shaft. The threads of the holes in the cast pieces of the capitals and leaves were, however, crisply detailed and undamaged, further reinforcing the idea that differing alloys in a wet, acidic environment would have created a galvanic cel. Upon removal of one of the sides of the capital, the hollow interior was found to be almost completely packed with fine, wet soil, probably from years of bird droppings, accumulated debris, and metallic corrosion. The smooth surface of the marble within the capital was found to be in excellent condition, if somewhat stained. A quick check with a pH strip showed the soil to be in the range of 4-5 pH. A nitrate spot test was performed on a sample of the soil, with a positive indication of nitrates present.[5] Bird guano is the likely source.

This constant supply of acidic moisture in intimate proximity to the back of the cast bronze, combined with dissolved calcareous minerals from the sugaring marble above, would help explain the gradient of blue, purple and greenish blue copper corrosion products on the surface of the bronze, intermingled with translucent bulbous deposits and glazes of carbonate minerals, etc.

A sample of the mineral deposits on one of the leaves was tested for chlorides. A weak positive result was achieved with the silver nitrate test.[6]

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[5] The test was performed on 1 gram of sample in 50 mL of distilled water using an Aquarium Pharmaceuticals Nitrate Test Kit. Comparison of the color of the solution with the supplied chart suggested a range of roughly 80-100 mg/L.

[6] *Testing for chlorides with silver nitrate.* Conserve-O-Gram, July, 1993, Vol. 6, no. 3. National Park Service.



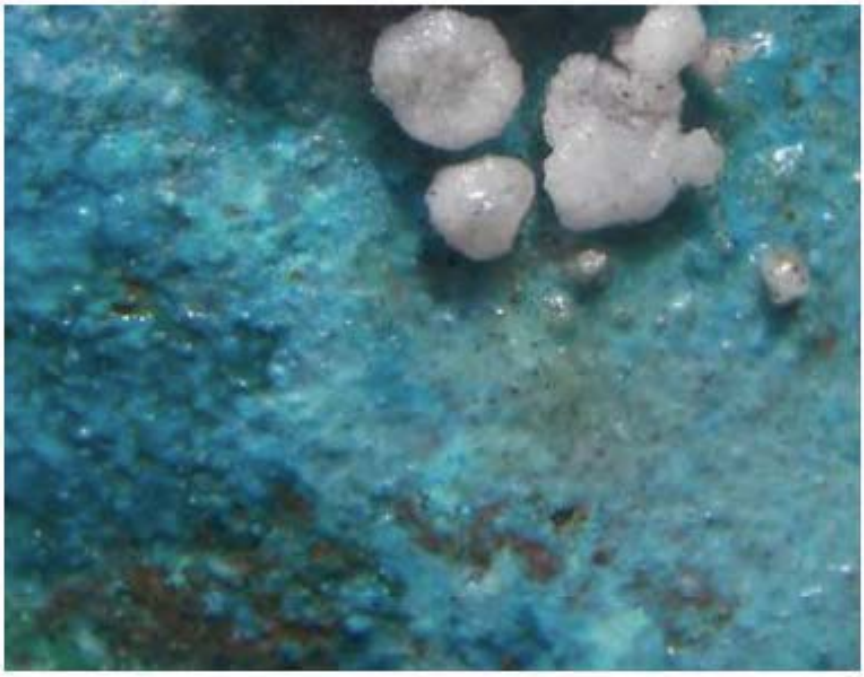
Copper alloy column capital at north northeast position. Note missing leaves at lower front.

No other loose capital components were noted during this inspection. It is assumed, however, that some insecurity may develop over time if corrosion is allowed to continue at the present rate.

The overall “patina” formed by the corrosion and mineral deposition is not unsightly, but likely harbors active corrosion beneath it, with the casting becoming pitted.



Arrow indicates typical missing screw at leaf on capital.



Bulbous white mineral growth on surface of leaf from capital, typical of equilibrium state crystal growth from a constant supply of saturated solution.



The arrow shows the location of sample collection for nitrate spot testing of accumulated soil inside capital.

Plaques

The four plaques are all intact and without significant structural damage or loss. Several rosette head fasteners are missing from many of them, some replaced with modern stand-ins, some not. Several of the plaques are loose to the touch.



Inscription plaque, with typical pitting, eruptions. Screws are all replacements.

The surfaces of all plaques are covered with varying degrees of pitting and eruptions of corrosion products. These hard deposits are green to blue in color, and exhibit a concentrically layered, or conchoidal, structure. Excavation of several of these eruptions with a scalpel blade reveal a bright pink-red interior, recessed below the original surface of the casting. This may be cuprite. The overlying layers seem to vary in hardness. These observations suggest a complex surface chemistry where chloride ions play a role in the process.[7] This is to be expected on copper alloy in an urban marine environment, in a fountain with heavily chlorinated water.

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[7] Scott, David A. *Bronze Disease: A review of some chemical problems and the role of relative humidity.* JAIC 1990, Volume 29, Number 2, Article 7 (pp. 193 to 206).



Conchoidal eruptions of corrosion products on copper alloy relief plaque, 40x magnification.



Excavated center of conchoidal eruption, showing fine-grained, reddish corrosion layer within (80x magnification).

No signs of applied coatings or chemical patination were found on any of the plaques, even under magnification. While there is some evidence of directional scratching, it is not certain whether the raised lettering on the inscription plaque was differentially polished in contrast with the background, as is common.

Cupola Dome (Upper Dome) and Lantern

The dome, once supported at brackets under the four cross ribs, are now supported on stainless steel tubing frame with welded feet. The time of this restoration work is not recorded in any available file documentation. The bronze frame panels and glass panes of the upper dome are largely intact, with some cracks seen in several glass panes. Multiple campaigns of flexible grouts and sealants have been applied locally in efforts to reduce leaking or to secure loose panes.

The lantern is generally intact, but slightly loose on the dome structure. There are several attachment screws missing.



Top view of upper dome and lantern.

Water still cascades down the exterior of the upper dome, flowing into the marble oculus after running over the “gutter” under the elevated dome’s legs. Extensive bird droppings cover the lantern. Spike clusters adhered to the marble have failed to significantly deter roosting pigeons and gulls.

A copper skirt, extending inside the marble oculus under the dome, is shown in original drawings but is now missing. this may have helped create a uniform sheet of water falling between the columns.



The lantern has been refitted with new plumbing, but still functions as it did originally to deliver water to the top of the dome. Several fastener screws are missing, and the lantern is loose.



Interior of upper dome. Much of the original glass appears to be intact, with some cracks. Pigeons are visible standing above.



The base of the upper dome is elevated above the marble. This detail shows a modern stainless steel foot located in the center of one side of the dome.

Lower Dome

The octagonal dome assembly is now supported by a welded frame of 1" steel angle stock, which also hold the horizontal glazing panels around its perimeter. This frame appears to be a modern replacement.



Underside of lower dome, with modern steel supports. Distribution pipes branching off of main water feed are seen below the dome.

The drawings show an octagonally faceted reflector attached below the dome structure. this is no longer present. The reflector originally enclosed a cluster of

globe lights within the dome, while the sidelights were illuminated by series of separate lanterns hung on the walls of the concrete formwork.





Extensive silicone caulking applied at all joints around lower dome and at flat plexiglass panels.

Subterranean Chamber / Plumbing and Electrical Systems

The most prominent sign of structural damage in the subterranean chamber is the presence of corrosion jacking of the rebar along the underside of a header beam near the entry hatch, adjacent to a series of stainless steel, electrical utility boxes. Comparison of the space with the archival diagram shows that the original distributing pipe for the side streams (water jets around the basin) entered the concrete in the general vicinity of this damaged beam. This pipe is no longer in use, and is presumably no longer contributing large amounts of water under high pressure through whatever cracks or insecurities might exist within. Elevated humidity and condensation would be enough to continue the corrosion process of the now-exposed rebar.







The glazed openings inside the concrete formwork are filled in with formed concrete, while iron fasteners remain where lamps were once held.



Interior of concrete chamber below the granite plinth.



Inspecting holes in the granite blocks.

Holes in the backs of the granite blocks, hewn to allow placement of the original water distribution pipes and electrical conduit through the center of four of the

columns above, afforded a view of the interface between marble column and top of the granite. No supplemental anchors were seen from this angle. However, the galvanized steel piping noted in the original drawings were seen entering the cored center holes of the marble columns, embedded in concrete mortar. These serve to help anchor the marble to the granite, but are highly corroded. The 3/4" difference in diameter between the cored holes and the outer dimension of the pipes may account for the lack of any visible cracking or other damage in the columns related to expansion of the corroding ferrous metal.

The following images show the state of the present motor and pump apparatus. Although working, they are inefficient and prone to break-down and leakage.











The mechanical components of the present recirculating plumbing system are in the same general location as the original equipment, based on the cut-away diagram of the fountain published shortly after its installation. Comparison of the present piping shows that not only have original pipes, pumps, motors, etc. been replaced

(more than once), the configuration has also changed, partly to include lines for filtered water. The original gravity-fed drain remains in use, without a sump pump. Some additional modern equipment is sitting, disconnected, in the general area, including a tank presumably for filtration or water softening. Older steel pipes and connectors are moderately to severely corroded with rust, and lock-grip pliers are rusted in place on several valves.

Although water feed and return paths have been altered, they still deliver water in much the same configuration as originally intended. A modern, pierced stainless steel ring tube is mounted at top of the interior of the marble structure, centered within the oculus in the center of the marble gutter. This ring creates a cylindrical shower of water drops or streams within the columns, falling onto the flat glazed panels around the bottom dome. Jet nozzles around the basin direct forceful streams of water converging at the eagle sculpture, while the archival photos show the water here as a more divided mist, and concentrated above the eagle.

5 Structural Assessment

Structural engineer Melvyn Green was consulted during the course of this assessment. His report is attached. He agrees that invasive disassembly of the structure is not warranted, given conditions found and the historical importance of the original construction evidence, as well as the risk of damage to the original materials. The corroding rebar and cracking concrete beam in the underground chamber can be repaired, and does not represent a threat of collapse of this space, as feared by some city staff. Some insertion of reinforcing stainless steel pins is recommended at key areas to ensure the columns are tied to the granite and the entablature. Replacement of the ferrous metal cramps in the entablature blocks with stainless steel is also recommended.

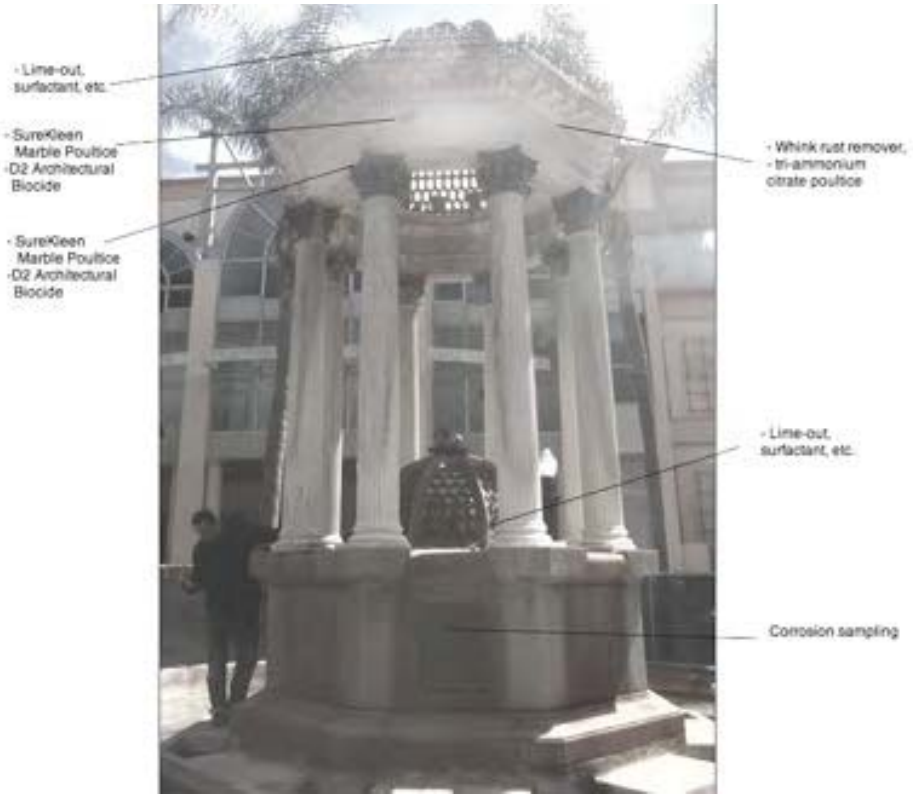
6 Treatment Materials and Methods/Testing/ Evaluation

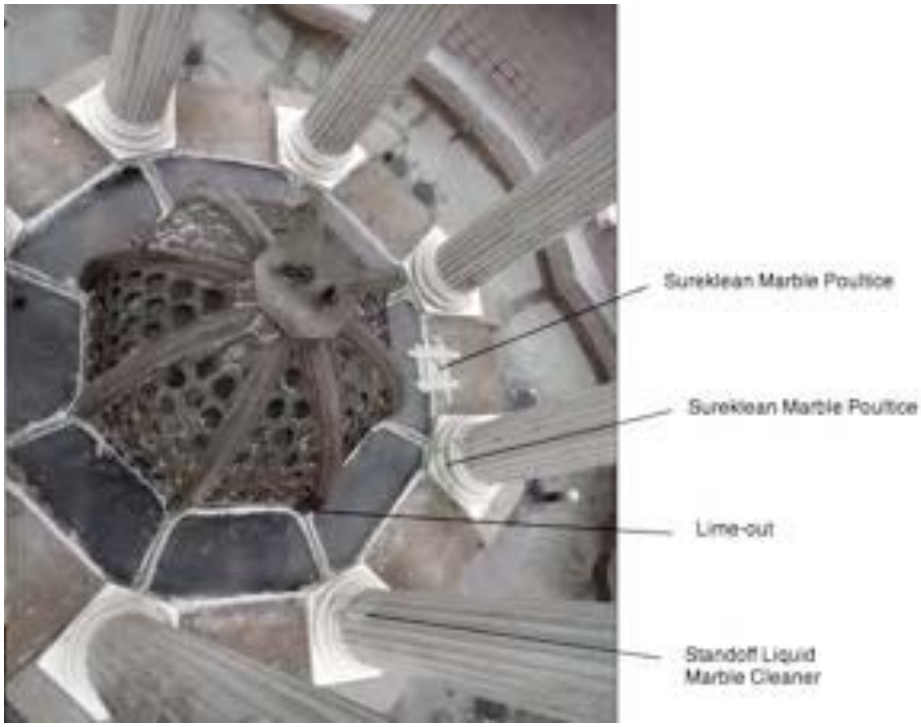
During the assessment period, Griswold and Ritzo performed a series of tests using various proprietary materials to remove accretions, staining, and other deposits. The condition matrix table in the appendix records specific tests and observations made. Following is an overview of tests performed. In general, minimally invasive hand methods, respectful of the historic patina acquired by the stone, metal and glass components, were tested. All methods were chosen to be suitable for simple, selective maintenance procedures within the context of an active maintenance program. Such an approach is in keeping with accepted best practices for museum-quality artifacts, including outdoor monuments and sculpture. We have adhered to the Code of Ethics and Guidelines for Practice of the American institute for the Conservation of Historic and Artistic Works (AIC)[8], as well as the Secretary of the Interior's Standards for the Treatment of Historic Properties.[9]

[8] The AIC Code of Ethics and Guidelines for Practice can be found at http://www.conservation-us.org/index.cfm?fuseaction=page.viewPage&pageID=858&nodeID=1

[9] The Secretary of the Interior's Standards can be found at http://www.nps.gov/history/local-law/arch_stnds_8_2.htm

General test locations:



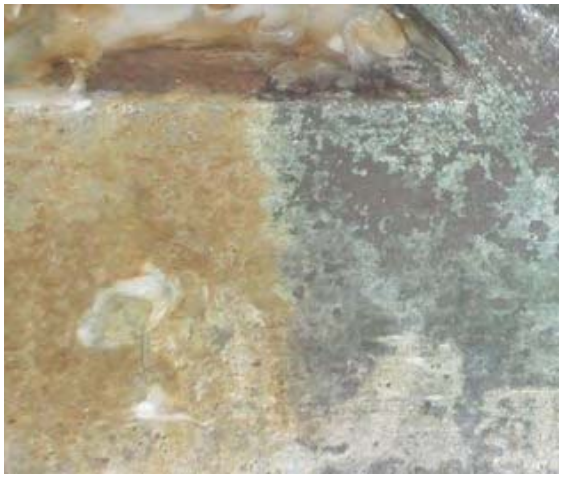


Test locations around the lower dome.

Copper alloy components of domes were test cleaned using a household commercial mineral deposit remover based on buffered organic acids, chosen for their environmental friendliness. Small amounts were used, and allowed to evaporate before clearing with distilled water and scrubbing with a nylon abrasive pad. Varying grades of abrasive quality pads were selected in sequential order, with the least abrasive pad necessary being used for the greatest area of the surface. More abrasive pads, and also a carborundum paper sanding sponge, were used for severely caked areas with good results.



Area of upper dome, cleaned with a single application of Lime-off product, applied neat. Cleared with distilled water and a sponge, prior to scrubbing.



Detail of cleaned area (right half), prior to scrubbing.



Scrubbing cleaned area with abrasive pad. Patina is retained on the copper alloy.

Once cleaned, the surface was heated with a small propane torch, not to exceed 180 degrees F. This was confirmed using a Raytheon laser-pointed IR surface temperature gun. The heated area was then waxed with Butcher's bowling alley wax, a high carnauba/microcrystalline blend containing no silicone oils.



Test coating with Butcher's wax, demonstrating rich patina when saturated.

While the wax would require routine maintenance, this methods affords good protection and appearance without the risk of coating failure were a lacquer to be used in this harsh fountain environment. Also, the wax will gracefully oxidize and

wear away without adverse effect or unsightly appearance should maintenance be deferred.

The same product, Lime-off, was tested to remove mineral accretions on the glass. It proved successful here as well.



A natural bristle brush was used to apply and agitate Lime-off product, in order to loosen mineral accretions on glass panes.



A commercial penetrating sealer, to saturate granite color, was tested on a discrete area of the granite capstone. The stone was successfully darkened to a more saturated appearance, once the polymer emulsion turned clear. No surface film was detected after curing.



Poulticing tests.

Restoration-grade poultices were tested to reduce the brown staining on the granite. Dwell times of up to 48 hours were tested, with the first 24 hours being covered with plastic film, taped in place. Excellent results were noted in both areas with Prosoco Sure Klean Marble Poultice and Sure Klean Light Duty Restoration Cleaner.

Some black staining on the marble, presumably related to biological growth such as bacteria or fungi, proved difficult to remove with general cleaning methods. D2 architectural cleaner and biocide was tested with poor to fair initial results. Repeated treatments are expected to improve the appearance.



D2 architectural biocide applied in a test spray bottle. Streaking was reduced, but spotting (below) of the white marble was not immediately affected.



Test location of D2 on black spotting on marble.

The prominent brown stain on the inscription frieze (between the “D” and the “R” in “BROADWAY”) was chosen as a site for test cleaning of deep iron staining. The test compared a commercial product (Whink rust remover), with 4% aqueous triammonium citrate solution as a poultice in kaolin.



Deep ferrous stain removal test location.

Dwell times for each: 5 min, 10 min, 15 min, 25 min, 1 hr, 2 hr. The kaolin poultice worked as well as the commercial product, minimizing the stain by up to 50%. Both areas were cleared with distilled water. Because of these results, repeated poulticing with longer dwell times, or further poulticing with sodium citrate and sodium dithionite solutions in subsequent poultices, are expected to improve results.

Silicone and urethane flexible grouts and caulking are found on various locations, posing removal challenges. Solvent and heat resistant, they are best removed using tedious hand methods. In some cases, failing adhesion facilitates removal by pulling with fingers. Other areas lend themselves to removal with scalpels and X-acto blades. While not tested, silicone-dissolving solvents might be used in small quantities for extremely stubborn areas.



Hand removal of flexible urethane caulking between bronze capital and marble architrave.

7 Prioritized Recommendations and Treatment Goals

1. Implement engineer's minimally invasive recommendations for connecting elements, by pinning with selectively placed stainless steel pins inserted into drilled holes, to supplement seismic stability.

2. Remove ferrous metal cramps at corners of top of entablature, replace with stainless steel, embedded in low-alkali restoration mortar. Inject cracks in marble with adhesive micro-grout.

3. Disassemble and remove all copper alloy elements, including domes, relief plaques, eagle sculpture, and treat in conservation lab. Reduce corrosion and accretions, desalinate through immersion monitoring for chlorides, clean and chemically passivate surfaces and pits of active corrosion, coat with hot wax processes. Re-secure in place using reversible yet secure, corrosion-resistant stainless steel fasteners.

4. Reduce staining on stone elements (granite and marble) using methods and materials described in this report.

5. Redirect water jets, replace nozzles, to shoot above the eagle.

Long term:

6. Replace presently-installed eagle with copy of original. Conservator to facilitate protection, moldmaking, replication process.

7. Replace mechanical and electrical equipment, reconfiguring to more closely match the original intent of the architect. Research and design improved glazing and water-seal to re-illuminate the bays around the base of central structure within the basin.

8 Conservation Work Plan

Phase I

The following scope of services is intended to be performed by a qualified art conservator. This scope is considered an art conservation project, exempt from normal construction classification.

- Written and photographic documentation of condition before, during and after treatment, in keeping with the Code of Ethics and Guidelines for Practice of the American Institute for the Conservation of Historic and Artistic Works (AIC).
- Removal of eagle, plaques, grillework, upper and lower dome assemblies.
- Proper packing and transport to and from a reputable art conservation studio or laboratory for treatment
- Treat removed elements, including removal of modern sealants, grouts, caulks, coatings with least invasive methods shown to be effective based on testing; disassembly into component parts; replace rusted/corroded fasteners with similar in stainless steel; clean loose corrosion with careful hand methods, preserving as much existing stable patina as is feasible; excavate active pits of chloride corrosion, chemically passivate with silver nitrate, BTA or other accepted museum conservation-based treatment for “bronze disease”; repair structural cracks in bronze using TIG welding methods with local heat isolation methods to minimize damage to adjacent surfaces; locally repatinate bronze elements with liver of sulfur solution, ferric nitrate solution, and other stable chemical patina formulation primarily to further passivate any exposed bare metal; clean glass with appropriate chemical and solvent solutions, following methods demonstrated in this report; clean, degrease and inject cracks with Hxtal NYL-1 epoxy, possibly after pre-treating with A1100 silane pre-treatment; reassemble components, seal between glass and bronze framework with Dow silicone sealant if considered beneficial after full examination upon disassembly; apply two coats of Butcher’s wax or other high carnauba/microcrystalline wax blend without added silicone oil, to pre-heated bronze surfaces (not to exceed 180 degrees F).
- Drill small diameter (<5/8”), long holes through adjacent marble elements (columns/column bases and granite, entablature blocks to column tops, at an angle appropriate to achieve solid connection to reinforce lateral movement and to locate hole no closer than 3” from an edge or outer surface; insert and anchor

316 grade stainless steel all-thread rod with a diameter not more than 2/3 the diameter of the drilled hole; anchor rods using Sikadur Hi Mod 31 epoxy or equal structural epoxy; isolate marble surfaces first with Rohm and Haas Acryloid B72 (ethyl methacrylate-methylacrylate copolymer) dilute in acetone prior to contact with epoxy adhesive; cover ends of rods in drilled holes to a depth of not less than 1/2", using Jahn M120 restoration-grade mortar.

- Remove ferrous metal cramps and hard concrete patches from top of entablature, replace with 316 grade stainless steel using original holes; heat stainless steel to ensure that slight shrinkage on cooling will result in a tight connection; replace concrete mortar at cramps with Edison Custom 45 mortar formulation, or equal, to closely match the marble. Inject cracks in marble with Jahn M30 microgrout or equal.
- Clean granite using Prosoco Sure Klean 942 Marble Cleaner, Light Duty Restoration Cleaner, or equal, to reduce metallic staining, mineral accretions and grime. Actual materials and methods to be used should be tested in inconspicuous areas by the conservator and submitted for review by the owner's representative.
- Clean marble with Sure Klean 942 Marble Cleaner, and/or Marble Poultice, or equal, to reduce soiling, sulfation, and grime; further reduce surface-related ferrous staining with materials and methods described in this report; deep ferrous staining is to remain visible.
- Treat marble with Conservare HCT and HCT Finishing Rinse to enhance resistance to acid degradation, etc.
- Re-pack, transport and install removed elements.
- Replace plexiglass panels around lower dome with tempered safety glass, at least 1/2" thick.
- Final report to include additional conditions found, detailed description of methods and materials used (including locations), and recommendations for added or modified scope for Phase II. Report is also to include a detailed training manual for routine maintenance of the historic fountain elements.

The following should be performed as part of Phase I, under a contract separate from the conservator. A specialty contractor experienced with historic concrete restoration/repair should perform the work.

• Repair the corroding and damaged rebar and concrete beam in underground chamber, per the Structural Engineer's recommendations (see attached report).

Phase II

To be performed by qualified, licensed specialty contractors.

- Replace plumbing system, to be based on separate recommendations made by a consulting plumber experienced with historic fountains, in consultation with a conservator.
- Reconfigure lighting to allow illumination from within light boxes, now sealed closed.

10 Appendix

Condition Matrix

Engineer's Report

Sculpture Survey Records

Horton Plaza Fountain
Condition Matrix

	Section of fountain	Material	Description	Orientation	Dimensions	Condition	In Situ Tests	Sampling / Analysis
								comparison with historical evidence indicates basin has been modified. A second, lower level has been added to the perimeter, possibly for structural reinforcement
1	outer basin	cast stone	eight semicircular bays with a water nozzle in each, directed to spray water between the columns	follows pattern of the fountain, a corner of the basin is aligned with each column	approximately 20 feet in diameter overall. Points between bays 4'6" from upper basin, 7'6" from each other.	stable, red staining		
2	lower basin	cast stone	fitted with modern lighting		approximately 18 inches deep at maximum	stable, red staining		
3	upper basin	cast stone	octagonal, modified to fill in original glass covered light wells. alternating between 12 inch recessions at corners and raised platforms at flat sides.		67" wide at outer edge by 18 3/4"	stable, red staining		
4	plinth base, N	granite	Granite block forming lower part of octagonal plinth, molded profile; relatively smooth-dressed with fine parallel grooves		50" wide, 5" high, 21 1/2" thick	stable and intact with large areas of staining	Rebar locator tests and physical inspections inside and out were inconclusive in finding metal joining braces or other means of support. Stain testing with liquid marble cleaner, marble poultice, and 942 masonry cleaner, of which 942 had the best result.	
5	plinth wall, N	granite	Granite block forming central flat part of octagonal plinth, with recessed area for bronze relief plaque (seen on N,S,E,W sides;) relatively smooth-dressed with fine parallel grooves		7 1/2" high, 18 1/2" thick	stable and intact with large areas of staining	Rebar locator tests and physical inspections inside and out were inconclusive in finding metal joining braces or other means of support. Stain testing with liquid marble cleaner, marble poultice, and 942 masonry cleaner, of which 942 had the best result.	
6	plinth capstone, N	granite	each of eight blocks together form octagon; spillway lip overhanging the plinth wall; flat at corners with outward sloping watersheds between		27 3/4" high, 13 1/2" thick	stable and intact with large areas of reddish brown surface staining. Local areas (up to 10%) of shallow scaling/spalling.	Lundmark Marble Restore penetrating sealer (siloxane), good results in resaturating color. Rebar locator tests and physical inspections inside and out were inconclusive in finding metal joining braces or other means of support. Stain testing with Prosoco liquid marble cleaner, 1260 marble poultice, and 942 masonry cleaner, of which 942 had the best result, but not complete reduction.	Sample collected at area of spalling granite. Examination using visible light microscopy showed presence of perpendicular microfractures, presence of mineral accretions on underside of scaled flake.
7	plaque, north	bronze	Sand cast bronze with raised lettering, bears the inscription "presented to the city of San Diego by Louis J. Wilde 1909". Added 1931.	centered on foundation and recessed 3/4" deep	16 by 20 inches	intact, moderate discoloration and staining; severe pitting and bulbous corrosion eruptions overall. ("Bronze disease".)		Scalpel used to collect several eruptions. Chloride test: strong positive using silver nitrate method.

Horton Plaza Fountain
Condition Matrix

	Section of fountain	Material	Description	Orientation	Dimensions	Condition	In Situ Tests	Sampling / Analysis
8	plaque, east	bronze	Sand cast bronze, low relief portrait of Junipero Serra from shoulders up, wearing Franciscan hood, with "Junipero Serra" above. Artist Felix Peano.	centered on foundation and recessed 3/4" deep	16 by 20 inches	intact, moderate discoloration and staining; severe pitting and bulbous corrosion eruptions overall. Mineral accretions in crevices.		
9	plaque, south	bronze	Sand cast bronze, low relief portrait of Alonzo Horton from shoulders up, with the inscription "Alonzo E. Horton" above. Artist Felix Peano.	centered on foundation and recessed 3/4" deep	16 by 20 inches	intact, moderate discoloration and staining; severe pitting and bulbous corrosion eruptions overall. ("Bronze disease".)		
10	plaque, west	bronze	Sand cast bronze, low relief portrait of Juan Cabrillo with "Juan Cabrillo" above. Artist Felix Peano.	centered on foundation and recessed 3/4" deep	16 by 20 inches	intact, moderate discoloration and staining; severe pitting and bulbous corrosion eruptions overall. ("Bronze disease".)		
11	column pedestal NxNE	marble	Smooth-carved and polished white marble, assymetrical pentagonal shape, with integrally carved, molded column base	irregular with shortest side facing inward	one side 10 1/2 inches, two sides 13 3/8 inches, two sides 11 3/8 inches. 1 1/2 inches tall.	intact with red staining		
12	column pedestal ExNE	marble	Smooth-carved and polished white marble, assymetrical pentagonal shape, with integrally carved, molded column base	irregular with shortest side facing inward	one side 10 1/2 inches, two sides 13 3/8 inches, two sides 11 3/8 inches. 1 1/2 inches tall.	intact with red staining		
13	column pedestal ExSE	marble	Smooth-carved and polished white marble, assymetrical pentagonal shape, with integrally carved, molded column base	irregular with shortest side facing inward	one side 10 1/2 inches, two sides 13 3/8 inches, two sides 11 3/8 inches. 1 1/2 inches tall.	intact with red staining		
14	column pedestal SxSE	marble	Smooth-carved and polished white marble, assymetrical pentagonal shape, with integrally carved, molded column base	irregular with shortest side facing inward	one side 10 1/2 inches, two sides 13 3/8 inches, two sides 11 3/8 inches. 1 1/2 inches tall.	intact with red staining		
15	column pedestal SxSW	marble	Smooth-carved and polished white marble, assymetrical pentagonal shape, with integrally carved, molded column base	irregular with shortest side facing inward	one side 10 1/2 inches, two sides 13 3/8 inches, two sides 11 3/8 inches. 1 1/2 inches tall.	intact with red staining		
16	column pedestal WxSW	marble	pentagonal, with integrally carved, molded column base	irregular with shortest side facing inward	one side 10 1/2 inches, two sides 13 3/8 inches, two sides 11 3/8 inches. 1 1/2 inches tall.	intact with red staining	Prosoco 942 marble stain remover, liquid and Prosoco 1260 poultice tested; 942 found to be more effective in reducing the reddish brown metallic staining.	
17	column pedestal WxNW	marble	pentagonal, with integrally carved, molded column base	irregular with shortest side facing inward	one side 10 1/2 inches, two sides 13 3/8 inches, two sides 11 3/8 inches. 1 1/2 inches tall.	intact with red staining		

Horton Plaza Fountain
Condition Matrix

	Section of fountain	Material	Description	Orientation	Dimensions	Condition	In Situ Tests	Sampling / Analysis
18	column pedestal NxNW	marble	pentagonal, with integrally carved, molded column base	irregular with shortest side facing inward	one side 10 1/2 inches, two sides 13 3/8 inches, two sides 11 3/8 inches. 1 1/2 inches tall.	intact with red staining		
19	column NxNE	marble	Fluted, slight entasis to cylindrical shape; half-round filled integrally carved forms base of Corinthian capital (attached).		7' 7 3/4" tall including section inside capital	Surface is pitted from excessive cleaning efforts including pressure washing. Marble is stained with mineral and biological deposits.		
20	column ExNE	marble	Fluted, slight entasis to cylindrical shape; half-round filled integrally carved forms base of Corinthian capital (attached).		7' 7 3/4" tall including section inside capital	Surface is pitted from excessive cleaning efforts including pressure washing. Marble is stained with mineral and biological deposits.		
21	column ExSE	marble	Fluted, slight entasis to cylindrical shape; half-round filled integrally carved forms base of Corinthian capital (attached).		7' 7 3/4" tall including section inside capital	Surface is pitted from excessive cleaning efforts including pressure washing. Marble is stained with mineral and biological deposits.		
22	column SxSE	marble	Fluted, slight entasis to cylindrical shape; half-round filled integrally carved forms base of Corinthian capital (attached).		7' 7 3/4" tall including section inside capital	Surface is pitted from excessive cleaning efforts including pressure washing. Marble is stained with mineral and biological deposits.		
23	column SxSW	marble	Fluted, slight entasis to cylindrical shape; half-round filled integrally carved forms base of Corinthian capital (attached).		7' 7 3/4" tall including section inside capital	Surface is pitted from excessive cleaning efforts including pressure washing. Marble is stained with mineral and biological deposits.		
24	column WxSW	marble	Fluted, slight entasis to cylindrical shape; half-round filled integrally carved forms base of Corinthian capital (attached).		7' 7 3/4" tall including section inside capital	Surface is pitted from excessive cleaning efforts including pressure washing. Marble is stained with mineral and biological deposits.	marble stain remover, liquid and poultice	
25	column WxNW	marble	Fluted, slight entasis to cylindrical shape; half-round filled integrally carved forms base of Corinthian capital (attached).		7' 7 3/4" tall including section inside capital	Surface is pitted from excessive cleaning efforts including pressure washing. Marble is stained with mineral and biological deposits.		
26	column NxNW	marble	Fluted, slight entasis to cylindrical shape; half-round filled integrally carved forms base of Corinthian capital (attached).		7' 7 3/4" tall including section inside capital	Surface is pitted from excessive cleaning efforts including pressure washing. Marble is stained with mineral and biological deposits.		

Horton Plaza Fountain
Condition Matrix

	Section of fountain	Material	Description	Orientation	Dimensions	Condition	In Situ Tests	Sampling / Analysis
27	capital NxNE	cast bronze	pentagonal Corinthian (five volutes), made in sections attached around column, screwed together with brass screws at volute, etc., plus three overlapping rows of leaves attached with flat-head, countersunk brass screws.		12 1/2 " tall	Surfaces are corroded and stained, mostly due to heavy presence of birds above. Some secondary and tertiary leaves are missing	partial disassembly for examination/analysis; reassembly	three leaf sections removed to lab for testing
28	capital ExNE	cast bronze	pentagonal Corinthian (five volutes), made in sections attached around column, screwed together with brass screws at volute, etc., plus three overlapping rows of leaves attached with flat-head, countersunk brass screws.		12 1/2 " tall	Surfaces are corroded and stained, mostly due to heavy presence of birds above. Some secondary and tertiary leaves are missing		
29	capital ExSE	cast bronze	pentagonal Corinthian (five volutes), made in sections attached around column, screwed together with brass screws at volute, etc., plus three overlapping rows of leaves attached with flat-head, countersunk brass screws.		12 1/2 " tall	Surfaces are corroded and stained, mostly due to heavy presence of birds above. Some secondary and tertiary leaves are missing		
30	capital SxSE	cast bronze	pentagonal Corinthian (five volutes), made in sections attached around column, screwed together with brass screws at volute, etc., plus three overlapping rows of leaves attached with flat-head, countersunk brass screws.		12 1/2 " tall	Surfaces are corroded and stained, mostly due to heavy presence of birds above. Some secondary and tertiary leaves are missing		
31	capital SxSW	cast bronze	pentagonal Corinthian (five volutes), made in sections attached around column, screwed together with brass screws at volute, etc., plus three overlapping rows of leaves attached with flat-head, countersunk brass screws.		12 1/2 " tall	Surfaces are corroded and stained, mostly due to heavy presence of birds above. Some secondary and tertiary leaves are missing		
32	capital WxSW	cast bronze	pentagonal Corinthian (five volutes), made in sections attached around column, screwed together with brass screws at volute, etc., plus three overlapping rows of leaves attached with flat-head, countersunk brass screws.		12 1/2 " tall	Surfaces are corroded and stained, mostly due to heavy presence of birds above. Some secondary and tertiary leaves are missing		

	Section of fountain	Material	Description	Orientation	Dimensions	Condition	In Situ Tests	Sampling / Analysis
33	capital WxNW	cast bronze	pentagonal Corinthian (five volutes), made in sections attached around column, screwed together with brass screws at volute, etc., plus three overlapping rows of leaves attached with flat-head, countersunk brass screws.		12 1/2 " tall	Surfaces are corroded and stained, mostly due to heavy presence of birds above. Some secondary and tertiary leaves are missing		
34	capital NxNW	cast bronze	pentagonal Corinthian (five volutes), made in sections attached around column, screwed together with brass screws at volute, etc., plus three overlapping rows of leaves attached with flat-head, countersunk brass screws.		12 1/2 " tall	Surfaces are corroded and stained, mostly due to heavy presence of birds above. Some secondary and tertiary leaves are missing		
35	lower dome grill north	bronze and lead	Curved side of octagonal dome, with four rows of semicircular apertures over three rows of alternating octagonal and square apertures		15 inches wide by 33 1/2 tall	intact with large areas of staining and corrosion	lime out, good results	
36	lower dome grill northeast	bronze and lead	Curved side of octagonal dome, with four rows of semicircular apertures over three rows of alternating octagonal and square apertures		15 inches wide by 33 1/2 tall	intact with large areas of staining and corrosion		
37	lower dome grill east	bronze and lead	Curved side of octagonal dome, with four rows of semicircular apertures over three rows of alternating octagonal and square apertures		15 inches wide by 33 1/2 tall	intact with large areas of staining and corrosion		
38	lower dome grill southeast	bronze and lead	Curved side of octagonal dome, with four rows of semicircular apertures over three rows of alternating octagonal and square apertures		15 inches wide by 33 1/2 tall	intact with large areas of staining and corrosion		
39	lower dome grill south	bronze and lead	Curved side of octagonal dome, with four rows of semicircular apertures over three rows of alternating octagonal and square apertures		15 inches wide by 33 1/2 tall	intact with large areas of staining and corrosion		
40	lower dome grill southwest	bronze and lead	Curved side of octagonal dome, with four rows of semicircular apertures over three rows of alternating octagonal and square apertures		15 inches wide by 33 1/2 tall	intact with large areas of staining and corrosion		

Horton Plaza Fountain
Condition Matrix

	Section of fountain	Material	Description	Orientation	Dimensions	Condition	In Situ Tests	Sampling / Analysis
41	lower dome grill west	bronze and lead	Curved side of octagonal dome, with four rows of semicircular apertures over three rows of alternating octagonal and square apertures		15 inches wide by 33 1/2 tall	intact with large areas of staining and corrosion		
42	lower dome grill northwest	bronze and lead	Curved side of octagonal dome, with four rows of semicircular apertures over three rows of alternating octagonal and square apertures		15 inches wide by 33 1/2 tall	intact with large areas of staining and corrosion		
43	lower dome glass north	prismatic glass	single piece of curved, clear glass, with horizontal fluting ("prisms")		14 1/4 " wide by 32" tall	extensive mineral and biological deposits, cracks throughout glass, previous maintenance attempted with large deposits of caulk.		
44	lower dome glass northeast	prismatic glass	single piece of curved, clear glass, with horizontal fluting ("prisms")		14 1/4 " wide by 32" tall	extensive mineral and biological deposits, cracks throughout glass, previous maintenance attempted with large deposits of caulk.		
45	lower dome glass east	prismatic glass	single piece of curved, clear glass, with horizontal fluting ("prisms")		14 1/4 " wide by 32" tall	extensive mineral and biological deposits, cracks throughout glass, previous maintenance attempted with large deposits of caulk.		
46	lower dome glass southeast	prismatic glass	single piece of curved, clear glass, with horizontal fluting ("prisms")		14 1/4 " wide by 32" tall	extensive mineral and biological deposits, cracks throughout glass, previous maintenance attempted with large deposits of caulk.		
47	lower dome glass south	prismatic glass	single piece of curved, clear glass, with horizontal fluting ("prisms")		14 1/4 " wide by 32" tall	extensive mineral and biological deposits, cracks throughout glass, previous maintenance attempted with large deposits of caulk.		
48	lower dome glass southwest	prismatic glass	single piece of curved, clear glass, with horizontal fluting ("prisms")		14 1/4 " wide by 32" tall	extensive mineral and biological deposits, cracks throughout glass, previous maintenance attempted with large deposits of caulk.		
49	lower dome glass west	prismatic glass	single piece of curved, clear glass, with horizontal fluting ("prisms")		14 1/4 " wide by 32" tall	extensive mineral and biological deposits, cracks throughout glass, previous maintenance attempted with large deposits of caulk.		
50	lower dome glass northwest	prismatic glass	single piece of curved, clear glass, with horizontal fluting ("prisms")		14 1/4 " wide by 32" tall	extensive mineral and biological deposits, cracks throughout glass, previous maintenance attempted with large deposits of caulk.		

Horton Plaza Fountain
Condition Matrix

	Section of fountain	Material	Description	Orientation	Dimensions	Condition	In Situ Tests	Sampling / Analysis
							Lime-Out product, good results to soften and reduce mineral accretions; nylon abrasive pads, bronze wool for further reduction, retain patina; saturates with Butcher's wax	
51	lower dome rib NxNE	bronze	rounded ribs form the dome and span joints between dome grills; screwed assembly		37 1/2"	mineral and biological deposits, surface discoloration		
52	lower dome rib ExNE	bronze	rounded ribs form the dome and span joints between dome grills; screwed assembly		37 1/2"	mineral and biological deposits, surface discoloration		
53	lower dome rib ExSE	bronze	rounded ribs form the dome and span joints between dome grills; screwed assembly		37 1/2"	mineral and biological deposits, surface discoloration		
54	lower dome rib SxSE	bronze	rounded ribs form the dome and span joints between dome grills; screwed assembly		37 1/2"	mineral and biological deposits, surface discoloration		
55	lower dome rib SxSW	bronze	rounded ribs form the dome and span joints between dome grills; screwed assembly		37 1/2"	mineral and biological deposits, surface discoloration		
56	lower dome rib WxSW	bronze	rounded ribs form the dome and span joints between dome grills; screwed assembly		37 1/2"	mineral and biological deposits, surface discoloration		
57	lower dome rib WxNW	bronze	rounded ribs form the dome and span joints between dome grills; screwed assembly		37 1/2"	mineral and biological deposits, surface discoloration		
	lower dome rib NxNW	bronze	rounded ribs form the dome and span joints between dome grills; screwed assembly		37 1/2"	mineral and biological deposits, surface discoloration		
58	eagle sculpture	bronze	Solid (?) cast bronze eagle, smaller and stylistically incongruent replacement of original eagle (now in Mayor's Office)	facing north; depicted in a dynamic pose, wings spread, landing on branch	approximately 18 inch wingspan	stained, held in place to octagonal plate with mismatched bolts, wood screws and caulk		
59	entablature: architrave	marble	White marble block (8 pieces), smooth-finished, with fillets and molded profile	top surface is contoured inward to accommodate copper watershed now missing	47 1/4 inches long each side by 8 1/4 inches tall	Iron braces in concrete joining the sides of the architrave are corroding and causing cracks in surrounding marble with related water retention and staining.	D2	
60	entablature: frieze	marble	White marble block (8 pieces), smooth-finished, with inscription band	bears the inscription "the Broadway fountain for the people", starting on the east side	39 3/4 inches long by 8 1/4 inches tall	staining on interior is biological in part, due to the presence of birds. Rust staining is present inside and out	Wink rust stain remover	
61	entablature: cornice	marble	White marble block (8 pieces); complex profile ofdimensional blocks , including dentil molding, egg and dart molding, engaged rafter tails under eaves, molded cornice, and shallow-sloped gutter forming the border of an oculus.		49 1/2 inches wide by 11 inches tall	staining on interior is biological in part, due to the presence of birds. Rust staining is present inside and out		

Horton Plaza Fountain
Condition Matrix

	Section of fountain	Material	Description	Orientation	Dimensions	Condition	In Situ Tests	Sampling / Analysis
	entablature interior, north	marble	flat inner surface, comprised of three levels, following corresponding exterior elements		29 1/2 " wide	heavy biological staining		
	entablature interior, northeast	marble	flat inner surface, comprised of three levels, following corresponding exterior elements		29 1/2 " wide	heavy biological staining		
	entablature interior, east	marble	flat inner surface, comprised of three levels, following corresponding exterior elements		29 1/2 " wide	heavy biological staining		
	entablature interior, southeast	marble	flat inner surface, comprised of three levels, following corresponding exterior elements		29 1/2 " wide	heavy biological staining		
	entablature interior, south	marble	flat inner surface, comprised of three levels, following corresponding exterior elements		29 1/2 " wide	heavy biological staining		
	entablature interior, southwest	marble	flat inner surface, comprised of three levels, following corresponding exterior elements		29 1/2 " wide	heavy biological staining		
	entablature interior, west	marble	flat inner surface, comprised of three levels, following corresponding exterior elements		29 1/2 " wide	heavy biological staining		
	entablature interior, northwest	marble	flat inner surface, comprised of three levels, following corresponding exterior elements		29 1/2 " wide	heavy biological staining		
62	upper decorative railing	cast bronze	Cast open tracery of interlocking foliate designs, with integral peg legs; copper alloy	along perimeter of upper entablature. Originally designed to include a sheet of prismatic glass, now missing	47 inches long, approximately 6 inches tall	surface pitting overall, corners held in place with twisted wire, feet are loose or detached		
63	upper dome grill, exterior, north	bronze	three rows of square apertures, over four rows of alternating oval and square apertures, over two rows of semicircular apertures, over two rows of octagonal apertures	dome is raised about two inches off the entablature by a stainless steel support system, following a missing original feature	33" wide by 70" long	intact with various kinds of staining, red stains concentrated in center of panel, surface corrosion		
64	upper dome grill, exterior, northeast	bronze	three rows of square apertures, over four rows of alternating oval and square apertures, over two rows of semicircular apertures, over two rows of octagonal apertures	dome is raised about two inches off the entablature by a stainless steel support system, following a missing original feature	33" wide by 70" long	intact with various kinds of staining, red stains concentrated in center of panel, surface corrosion		
65	upper dome grill, exterior, east	bronze	three rows of square apertures, over four rows of alternating oval and square apertures, over two rows of semicircular apertures, over two rows of octagonal apertures	dome is raised about two inches off the entablature by a stainless steel support system, following a missing original feature	33" wide by 70" long	intact with various kinds of staining, red stains concentrated in center of panel, surface corrosion		

Horton Plaza Fountain
Condition Matrix

	Section of fountain	Material	Description	Orientation	Dimensions	Condition	In Situ Tests	Sampling / Analysis
66	upper dome grill, exterior, southeast	bronze	three rows of square apertures, over four rows of alternating oval and square apertures, over two rows of semicircular apertures, over two rows of octagonal apertures	dome is raised about two inches off the entablature by a stainless steel support system, following a missing original feature	33" wide by 70" long	intact with various kinds of staining, red stains concentrated in center of panel, surface corrosion		
67	upper dome grill, exterior, south	bronze	three rows of square apertures, over four rows of alternating oval and square apertures, over two rows of semicircular apertures, over two rows of octagonal apertures	dome is raised about two inches off the entablature by a stainless steel support system, following a missing original feature	33" wide by 70" long	intact with various kinds of staining, red stains concentrated in center of panel, surface corrosion		
68	upper dome grill, exterior, southwest	bronze	three rows of square apertures, over four rows of alternating oval and square apertures, over two rows of semicircular apertures, over two rows of octagonal apertures	dome is raised about two inches off the entablature by a stainless steel support system, following a missing original feature	33" wide by 70" long	intact with various kinds of staining, red stains concentrated in center of panel, surface corrosion		
69	upper dome grill, exterior, west	bronze	three rows of square apertures, over four rows of alternating oval and square apertures, over two rows of semicircular apertures, over two rows of octagonal apertures	dome is raised about two inches off the entablature by a stainless steel support system, following a missing original feature	33" wide by 70" long	intact with various kinds of staining, red stains concentrated in center of panel, surface corrosion		
70	upper dome grill, exterior, northwest	bronze	three rows of square apertures, over four rows of alternating oval and square apertures, over two rows of semicircular apertures, over two rows of octagonal apertures	dome is raised about two inches off the entablature by a stainless steel support system, following a missing original feature	33" wide by 70" long	intact with various kinds of staining, red stains concentrated in center of panel, surface corrosion		
71	upper dome glass, north	prismatic glass	individual lenses, 5 inches by 3 13/16 inches		33" wide by 70" long, 1/4" thick	some cracked or replaced lenses. Stains and deposits on glass	lime out, good results	
72	upper dome glass, northeast	prismatic glass	individual lenses, 5 inches by 3 13/16 inches		33" wide by 70" long, 1/4" thick	some cracked or replaced lenses. Stains and deposits on glass		
73	upper dome glass, east	prismatic glass	individual lenses, 5 inches by 3 13/16 inches		33" wide by 70" long, 1/4" thick	some cracked or replaced lenses. Stains and deposits on glass		
74	upper dome glass, southeast	prismatic glass	individual lenses, 5 inches by 3 13/16 inches		33" wide by 70" long, 1/4" thick	some cracked or replaced lenses. Stains and deposits on glass		
75	upper dome glass, south	prismatic glass	individual lenses, 5 inches by 3 13/16 inches		33" wide by 70" long, 1/4" thick	some cracked or replaced lenses. Stains and deposits on glass		
76	upper dome glass, southwest	prismatic glass	individual lenses, 5 inches by 3 13/16 inches		33" wide by 70" long, 1/4" thick	some cracked or replaced lenses. Stains and deposits on glass		
77	upper dome glass, west	prismatic glass	individual lenses, 5 inches by 3 13/16 inches		33" wide by 70" long, 1/4" thick	some cracked or replaced lenses. Stains and deposits on glass		

Horton Plaza Fountain
Condition Matrix

	Section of fountain	Material	Description	Orientation	Dimensions	Condition	In Situ Tests	Sampling / Analysis
78	upper dome glass, northwest	prismatic glass	individual lenses, 5 inches by 3 13/16 inches		33" wide by 70" long, 1/4" thick	some cracked or replaced lenses. Stains and deposits on glass		
79	upper dome grill, interior, north	bronze with lead dividers around glass	three rows of square apertures, over four rows of alternating oval and square apertures, over two rows of semicircular apertures, over two rows of octagonal apertures		33" wide by 70" long	intact with discoloration and mineral and biological deposits		
80	upper dome grill, interior, northeast	bronze with lead dividers around glass	three rows of square apertures, over four rows of alternating oval and square apertures, over two rows of semicircular apertures, over two rows of octagonal apertures		33" wide by 70" long	intact with discoloration and mineral and biological deposits, surface corrosion		
81	upper dome grill, interior, east	bronze with lead dividers around glass	three rows of square apertures, over four rows of alternating oval and square apertures, over two rows of semicircular apertures, over two rows of octagonal apertures		33" wide by 70" long	intact with discoloration and mineral and biological deposits, surface corrosion		
82	upper dome grill, interior, southeast	bronze with lead dividers around glass	three rows of square apertures, over four rows of alternating oval and square apertures, over two rows of semicircular apertures, over two rows of octagonal apertures		33" wide by 70" long	intact with discoloration and mineral and biological deposits, surface corrosion		
83	upper dome grill, interior, south	bronze with lead dividers around glass	three rows of square apertures, over four rows of alternating oval and square apertures, over two rows of semicircular apertures, over two rows of octagonal apertures		33" wide by 70" long	intact with discoloration and mineral and biological deposits, surface corrosion		
84	upper dome grill, interior, southwest	bronze with lead dividers around glass	three rows of square apertures, over four rows of alternating oval and square apertures, over two rows of semicircular apertures, over two rows of octagonal apertures		33" wide by 70" long	intact with discoloration and mineral and biological deposits, surface corrosion		
85	upper dome grill, interior, west	bronze with lead dividers around glass	three rows of square apertures, over four rows of alternating oval and square apertures, over two rows of semicircular apertures, over two rows of octagonal apertures		33" wide by 70" long	intact with discoloration and mineral and biological deposits, surface corrosion		

Horton Plaza Fountain
Condition Matrix

	Section of fountain	Material	Description	Orientation	Dimensions	Condition	In Situ Tests	Sampling / Analysis
86	upper dome grill, interior, northwest	bronze with lead dividers around glass	three rows of square apertures, over four rows of alternating oval and square apertures, over two rows of semicircular apertures, over two rows of octagonal apertures		33" wide by 70" long	intact with discoloration and mineral and biological deposits, surface corrosion		
87	upper dome rib, NxNE	bronze	rounded ribs form the dome and span joints between dome grills		70" long	intact with discoloration and mineral and biological deposits		
88	upper dome rib, ExNE	bronze	rounded ribs form the dome and span joints between dome grills		70" long	intact with discoloration and mineral and biological deposits		
89	upper dome rib, ExSE	bronze	rounded ribs form the dome and span joints between dome grills		70" long	intact with discoloration and mineral and biological deposits		
90	upper dome rib, SxSE	bronze	rounded ribs form the dome and span joints between dome grills		70" long	intact with discoloration and mineral and biological deposits		
91	upper dome rib, SxSW	bronze	rounded ribs form the dome and span joints between dome grills		70" long	intact with discoloration and mineral and biological deposits		
92	upper dome rib, WxSW	bronze	rounded ribs form the dome and span joints between dome grills		70" long	intact with discoloration and mineral and biological deposits		
93	upper dome rib, WxNW	bronze	rounded ribs form the dome and span joints between dome grills		70" long	intact with discoloration and mineral and biological deposits		
94	upper dome rib, NxNW	bronze	rounded ribs form the dome and span joints between dome grills		70" long	intact with discoloration and mineral and biological deposits		
95	lantern	bronze	originally functional, the octagonal lantern shaped carried water to the outside of the dome by way of eight openings. Its plumbing has been disconnected.	centered on dome	10 1/4 inches tall by 16 inches wide	stable, surface discoloration		

Date of Report	1/22/06
Inventory #	1909.1
Artist	Irving Gill
Title	Horton Plaza Fountain
Material	Bronze, glass, concrete
Dimensions	1100 x 144 inches (actual)



Feature Description

The fountain stands in a concrete basin with six lobes. Inside the fountain is a cupola, with faceted glass inserts. A faceted glass dome sits underneath the cupola dome, with a bronze figure of an eagle on top of the dome. Three copper alloy panels with depictions of Alonzo Horton, Junipero Serra and Cabrillo are placed on the fountain's base at the west, south and east sides (described in separate records). A bronze dedication plaque is placed at the north point of the fountain. The panel reads: *Presented to the City of San Diego By Louis J. Wilde 1909 A.D.*

The core of the central octagonal plinth is a cast, reinforced concrete form, to which the granite blocks are anchored, presumably with metal connectors and mortar. The concrete form is open on the interior, with lights shining up through the faceted glass dome. This interior space is accessible from the equipment room below. The eight fluted marble columns have turned marble bases, and bronze Corinthian style capitals made up of separately cast components, screwed together. These are presumably hollow, and steel connectors may attach the columns to the marble entablature. The dome components are mainly copper alloy, including a small lantern at the top of the upper dome.

Previous Condition Notes

Poor. The fountain is extremely corroded around all of the facets in the cupola dome and the interior dome. The bronze eagle replacement is also extremely corroded, with white deposits scattered across the entire surface.

Irving Gill
Horton Plaza Fountain



Condition

Although beyond the scope of this survey, the conservator examined the entire fountain, including the subterranean pumpworks and interior beneath the lower dome. The fountain is in daily operation, and the fountain re-circulating system is maintained faithfully by City personnel. Nonetheless, the entire fountain structure and decorative components are actively deteriorating and will eventually become structurally unstable. Internal copper alloy and ferrous metal components are obviously corroding, with rust stains deeply penetrating the marble (e.g. at column bases and the entablature). Eventually, internal supports will fully corrode, compromising the stability of the cupola.

The glass and bronze dome beneath the eagle is smeared with much flexible caulking material, apparently silicone sealant. The plaques are heavily corroded, as described in individual survey records. Extensive chloride-based corrosion is present on the plaques, and presumably on the other copper alloy elements.

The water jets are directed to hit the dome and plaque elements directly; a second set are aimed upward at the superstructure. Various parts of the fountain structure are wetted with constant erosive force, while other parts are wholly or partially dry. This condition accelerates the physical and chemical deterioration mechanisms at work.

These are only brief examination notes; a complete assessment of all components should be performed as soon as possible.

Irving Gill
Horton Plaza Fountain



Treatment Recommendations

Phase I:

A feasibility study should be performed to ascertain whether or not the fountain should be disassembled and internal ferrous elements replaced with stainless steel, corroding copper alloy components removed and treated overall for chloride-based corrosion, and whether the recirculating system can be updated to incorporate new filtration and water treatment methods to eliminate or reduce the amount of chlorine in the system. Altering the direction and force of the water jets may help reduce the rate of deterioration. Such decisions must be made in light of a full review of archival documentation and a full understanding of the historical significance of the fountain and the original components. Some exploratory disassembly and/or remote sensing should be performed to confirm internal ferrous metal, etc.

A team comprised of a conservator, a structural engineer, and a fountains systems specialist should be assembled to conduct the investigation.

The Phase I study should be funded with a budget up to $10,000, to include scaffolding, erection of a secure enclosure, etc. While the fountain is thus protected, the City should be prepared to proceed immediately with the Phase II recommendations if results so indicate. A possible budget of $100,000 to $400,000 should be anticipated if major structural intervention is required.

If this cost is prohibitive, an alternative program of in situ repairs and treatment should be developed as an option in Phase I, including development of a conservation maintenance and monitoring plan, with the understanding that major intervention is only being postponed.

Treatment Priority (◉) 1 ( ) 2 ( ) 3

Time Estimate (Conservator Hours) [ ]
x Blended Rate ($) [ ]
+ Other Costs ($) [?]

Total Cost Estimate *$10,000*

Irving Gill
Horton Plaza Fountain

Main Image/Diagram



A- Underside of lower dome, showing corroded framework, layers of silicone caulking smeared throughout glass/metal joints.
B- Internal ferrous metal corroding, causing stains in marble architrave; marble is sugaring, eroding. Copper alloy, multi-part column capitals are corroded, possibly with chloride corrosion
C- Detail showing ferrous corrosion staining on column base.
D- The central eagle, a replacement, has mineral deposits, corrosion

A



B



C



D



Date of Report	11/9/05
Inventory #	1909.3
Artist	Felix Peano
Title	Eagle Preening Its Feathers
Material	Bronze
Dimensions	20-3/4 in. tall (actual)



Feature Description

The sculpture depicts an eagle standing, preening its feathers. The eagle's head is turned towards his right wing. The sculpture is affixed to a round base, 10 inches across.

The base is separately cast bronze, attached to the integral ground base of the sculpture with three large bronze screws between the feet, the visible heads of which are slotted and shaped to roughly follow the contour of the ground . The sub-base (octagonal?) is also bronze. Four tabs on the base allow attachment with screws to the sub base. The eagle is hollow-cast in sections, brazed together. Note separation plane at beak, etc. Casting is flawed, porous, with ragged casting edges under the PL wing, etc. Holes in the lower lart of the inside of the PR wing appear to be original, exacerbated by some corrosion. Chlorides presumed present.

Surface is dull dark to golden brown, combination of chemical and natural patina. Some green appears deliberate "verdigris" imitation, e.g. on the base below the PL talons. Some golden passages on wing, body, top of head, etc. appear either to be gold toned paint, remnants of gilding, or areas of unoxidized bronze protected by remnants of a clear lacquer coating. all recommended to be confirmed through analysis at a later time.

Previous Condition Notes

Poor. The bronze is highly oxidized. There are several holes in the inner wing of the eagle, and white smudges along the lower edges of the wings.



Felix Peano
Eagle Preening Its Feathers

Condition

Dark gray, slightly discontinuous areas on front of base in front of PL talons appears to be a solder repair. Holes in the lower part of the inside of the PR wing appear to be original, exacerbated by some corrosion. Chlorides presumed present, esp. in recesses of feathers on interior sides of wings. Possible degraded lacquer (see comments in Description section). Opaque brown putty-like residue seen in crevices of PR wing, overlying general patina. This might be remnants of a later moldmaking process? General soiling in crevices, including adhered grime and loosely adhered dust. Some upper surfaces are worn smooth from handling e.g. (tops of wings). Isolated whitish accretions, esp. a 1" diameter area near tail on PL wing flight feathers. Several drips of bright green paint (top of PL wing, top of neck behind head), probably house paint.



Felix Peano
Eagle Preening Its Feathers

Treatment Recommendations

- Written and photographic documentation before, during and after treatment following AIC Code of Ethics/Guidelines for Practice.
- Superficial cleaning with soft, natural bristle brushes and vacuum pressure.
- Solvent testing to determine solubilities of coatings and original surfaces.
- Reduce moderately adhered accretions with sharpened and custom-shaped wood tools.
- Testing to include:

- Determination of presence of chlorides in corrosion products.

- Chemical passivation of active chloride corrosion using benzotriazole solution, silver oxide powder treatment, etc. as appropriate.
- General cleaning with an appropriate aqueous and/or solvent-based system, based on conservator testing.
- Application of protective coating of microcrystalline wax.

Add stable artist quality pigment to tone second layer of wax for visual reintegration.

- Develop new mount for stable presentation and/or handling during transport and storage.
- Develop a long range maintenance program, including a training manual.

Treatment Priority ○ 1 ◉ 2 ○ 3

Time Estimate (Conservator Hours)	12
x Blended Rate ($)	100
+ Other Costs ($)	50

Total Cost Estimate *$1,250*

Felix Peano

Eagle Preening Its Feathers

Main Image/Diagram



A- Multi-part base
B- Weeping investment? white accretion at hole in casting on wing
C- Active corrosion at pinholes in casting
D- Detail of base with old repairs, original screw?

A



B



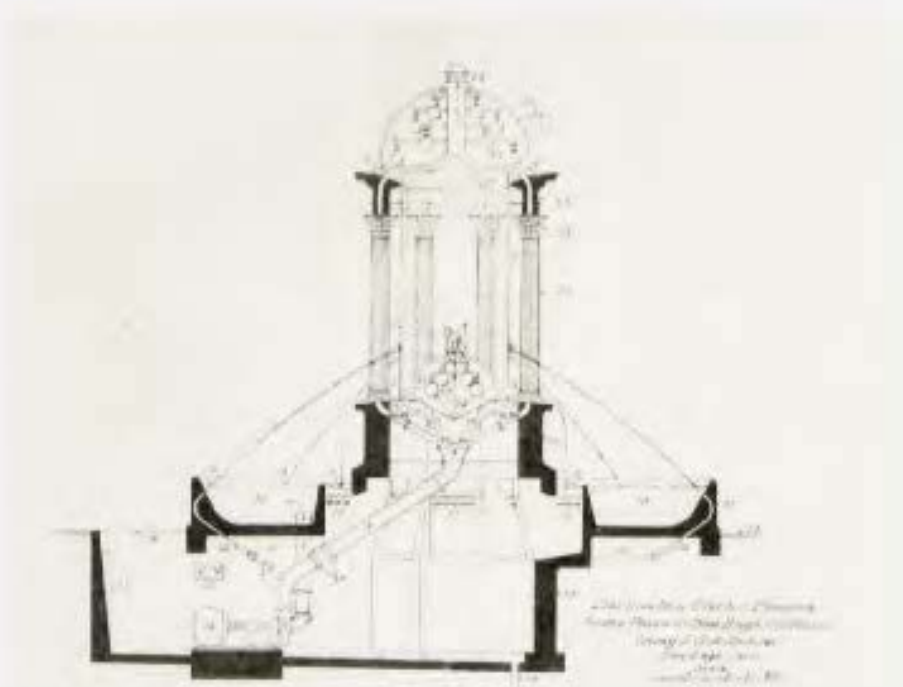
C



D



GREEN



Horton Plaza Fountain
San Diego
Preliminary Structural Assessment Report

Prepared for

Griswold Conservation Associates, Inc.
Culver City, California

Submitted by

Melvyn Green and Associates
Structural Engineers

July, 2009

Melvyn Green and Associates, Inc. 21311 Hawthorne Blvd., Suite 230, Torrance, CA 90503

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Original Construction Drawings.	10

Scope and Intent

Introduction

In support of Griswold Conservation Associates, Inc., a preliminary structural assessment of the Horton Plaza Fountain was conducted by Melvyn Green and Associates, Structural Engineers.

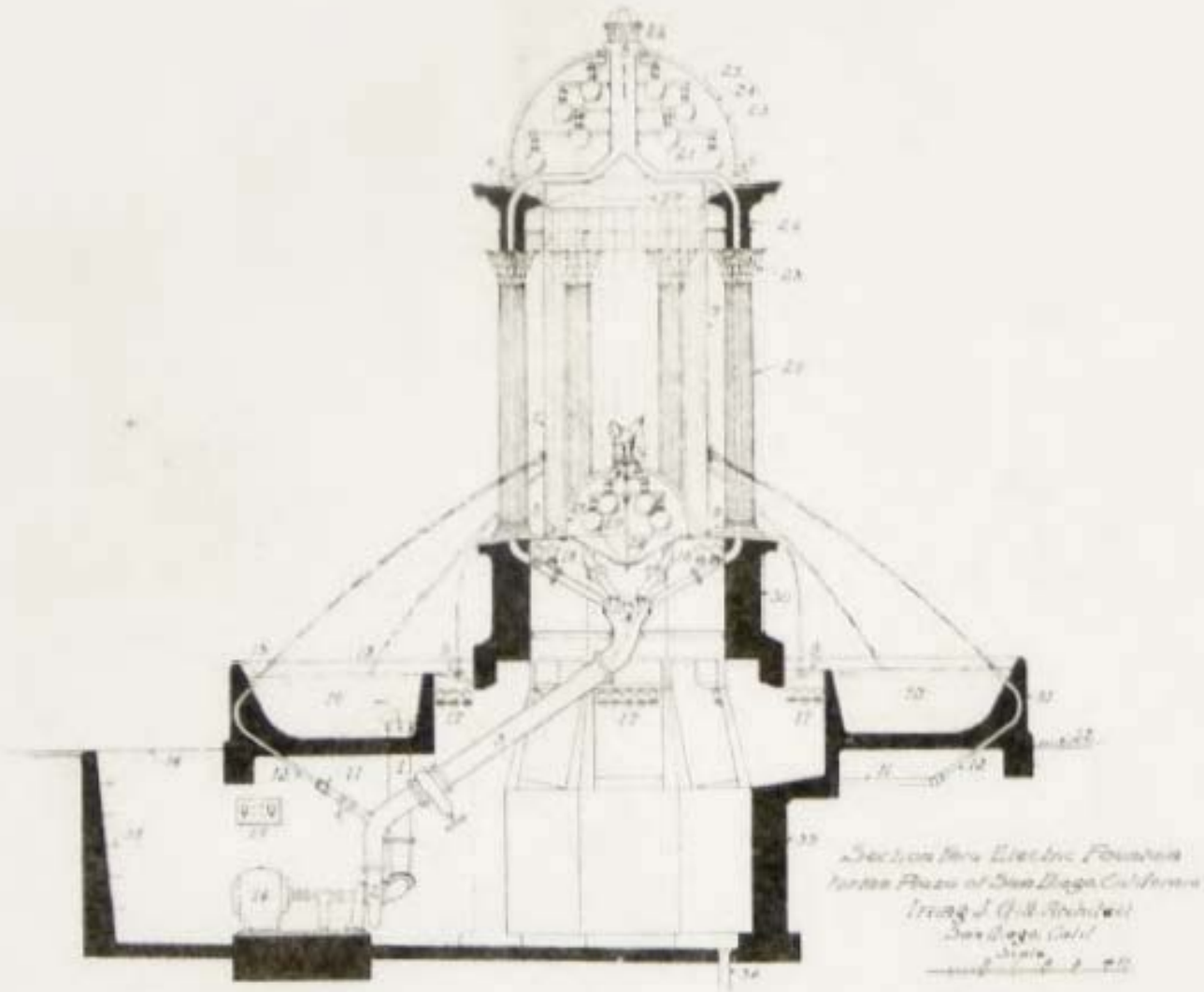
The Horton Plaza Founain was constructed in the early 20th Century by Irving Gill, Architect.

The intent of this study is to review the general condition of the fountain's foundation system and concrete elements including an inspection of the deteriorated concrete beams that support the public sidewalk. In addition a review of the fountain's superstructure is included.

Approach

A physical inspection of the fountain superstructure and underground areas was conducted.

The original plans for the fountain were reviewed.



Section thru Electric Fountain
Horton Plaza of San Diego California
Irving J. Gill Architect
San Diego Calif
Scale

Index

1 - Suction Pipe
2 - Centrifugal Pumps
3 - Delivery Pipes
4 - Distributor with 7 Outlets
5 - Bronze Overflow
6 - Bronze Water Cocks
7 - Circular Water Jewel
8 - Brass Rules
9 - Glass Rules
10 - Water in Basin
11 - Distributing Pipe for Jet Streams
12 - 8 Delivery Pipes " " "
13 - 8 Nozzels
14 - Electric Motor
15 - Switch Board
16 - Flasher
17 - 8 Light Bands with 15-40 watt Tungsten Lamps with Holophane Reflectors
18 - 32 - 40 Watt Lamps with R Reflectors
19 - Center Dome with 12 - 300 watt Nitrogen Lamps
20 - Reflector
21 - Upper Dome with 48 - 100 Watt Nitrogen Lamps
22 - Bronze Lantern
23 - Bronze Ribs
24 - Bronze Grille over Glass
25 - Prismatic Glass
26 - Marble Entablature
27 - Copper Ceiling
28 - Bronze Capitals
29 - 8 - Fluted Marble Columns
30 - Granite Base
31 - Composition Stone Basin
32 - Red Tile
33 - Concrete Foundation
34 - Drain
35 - Iron Steps
36 - Steel Gate Door
37 - Water Supply
38 - Drain of Basin
39 - Overflow
40 - Pipe to Sewer

Structural Description

Foundations and Underground Areas

The areas that serve the pump room and the fountain foundations are of concrete construction.

In the underfloor area the retaining walls are 16 inches thick. The maximum height is 6 foot 2 inches. The retaining walls are not reinforced. However, on one drawing, there is a note showing "rib metal" placed in the walls and slabs.

The supported sidewalk around the southeast side of the fountain consists of a 7 inch thick concrete 2 ½ inch diameter reinforcing steel bars around the edges of the opening. The rib metal acts as the reinforcing in the slab. An 8 foot long concrete beam, with two ¾ inch reinforcing bars, supports the sidewalk slab across the opening for equipment.

Under the fountain water area is a heavier section with a 10 ½ inch thick slab. This slab is supported on a concrete beam

The fountain walls are 2 foot 4 inches in height. They are trapezoidally shaped with a minimum thickness or 4 ½ inches at the top, sloping to a width of about 24 inches at the bottom. The pool enclosure walls bear on a 12 inch wide by 14 inch deep continuous foundation.

The main part, the superstructure, of the fountain is supported on an 8 foot diameter octagonal foundation that extends to the bottom of the pump room, 6 foot 2 inches below grade. The concrete support walls below grade are 12 inches thick. A 2 foot wide foundation, extending about 12 inches below the basement slab supports the structure.

Superstructure

The superstructure starts about 8 feet above grade. There 8 marble columns extending vertically about 11 feet to the base of the dome. The dome is about 4 feet 6 inches above the top of the columns. No physical connection is shown from the bottom of the column into the concrete. None was visible in the field.

Dome

The dome consists of several metal elements that support the glazing, lighting and piping. All elements of the dome are physically attached to provide a tension ring at the bottom.

The dome also appears to be physically connected to the column capitals.



Photo 1. Rust where the dome bears on the cap. Rust may be due to a number of different metals and water piping.



Photo 2. Bolt intended to connect elements showing rust..



Photo 3. Underside of fountain showing concrete walls with algae and rust stains.



Photo 4. Concrete beam in the pumproom showing spalled concrete and exposed reinforcing.



Photo 5. Sidewalk around the fountain in area of underground access.

Evaluation Approach

Seismic Safety

San Diego is located in a zone of potential significant seismic shaking. Structures under earthquake loads tend to dislodge, or become disconnected from each as the primary means of failure.

Under current design criteria and loads, connections should be provided between the various elements and the foundations.

Vertical Loads

The area around the fountain is a public gathering place and should be treated as an assembly area for vertical design loads. A load of 100 pounds per square foot would be an appropriate design load.

Observations and Findings

Substructure and Pump Room

The underground "vault" of the structure is an area of high moisture content. This is due to inflowing water from cracks, spills and possibly groundwater. It enters through cracks in the concrete as well from piping.

This has resulted in deterioration of the support system for the public walkway over this area. The concrete cover has deteriorated to a point where reinforcing steel is exposed and rusting. While not a hazard at this time, the continuing deterioration could lead to a hazardous condition in the future. Deterioration tends to accelerate as it increases.

Seismic

There are no connections between the columns and the concrete foundation system. This presents the possibility for damage, lateral movement, or even overturning of the fountain superstructure.

In the superstructure there are a number of areas with cracks and rusted bolts. Each must be verified for its effect on the life of the structure.

Recommendations

Concrete Repair

A first item of work would be to repair the deteriorated concrete beam and slab in the pump room. This will require removing loose concrete cover, sandblasting the rusted reinforcing steel, and possibly adding reinforcing steel to make up for the deteriorated material. Then the beam and slab soffit concrete would be replaced.

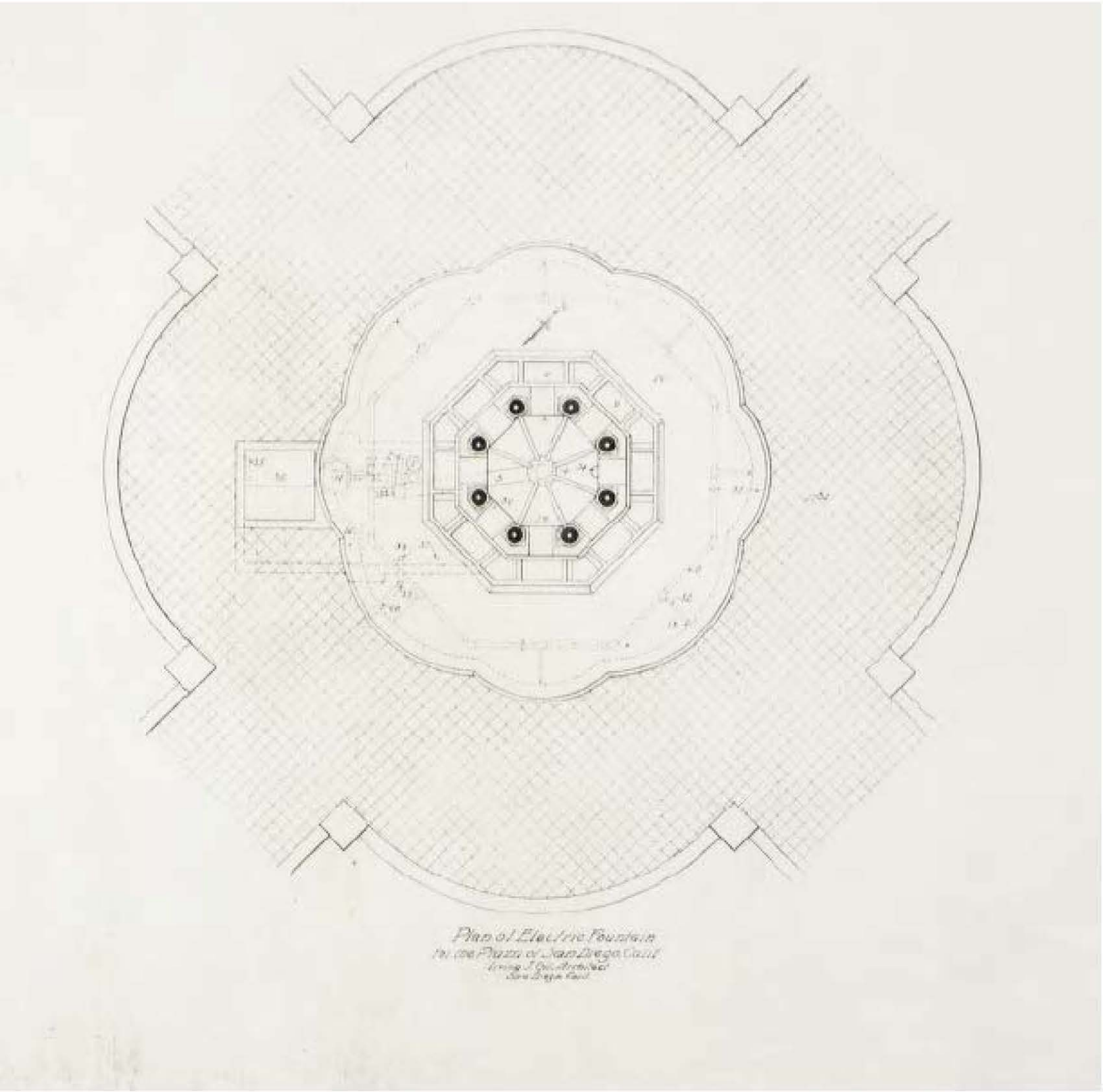
Connections between Elements

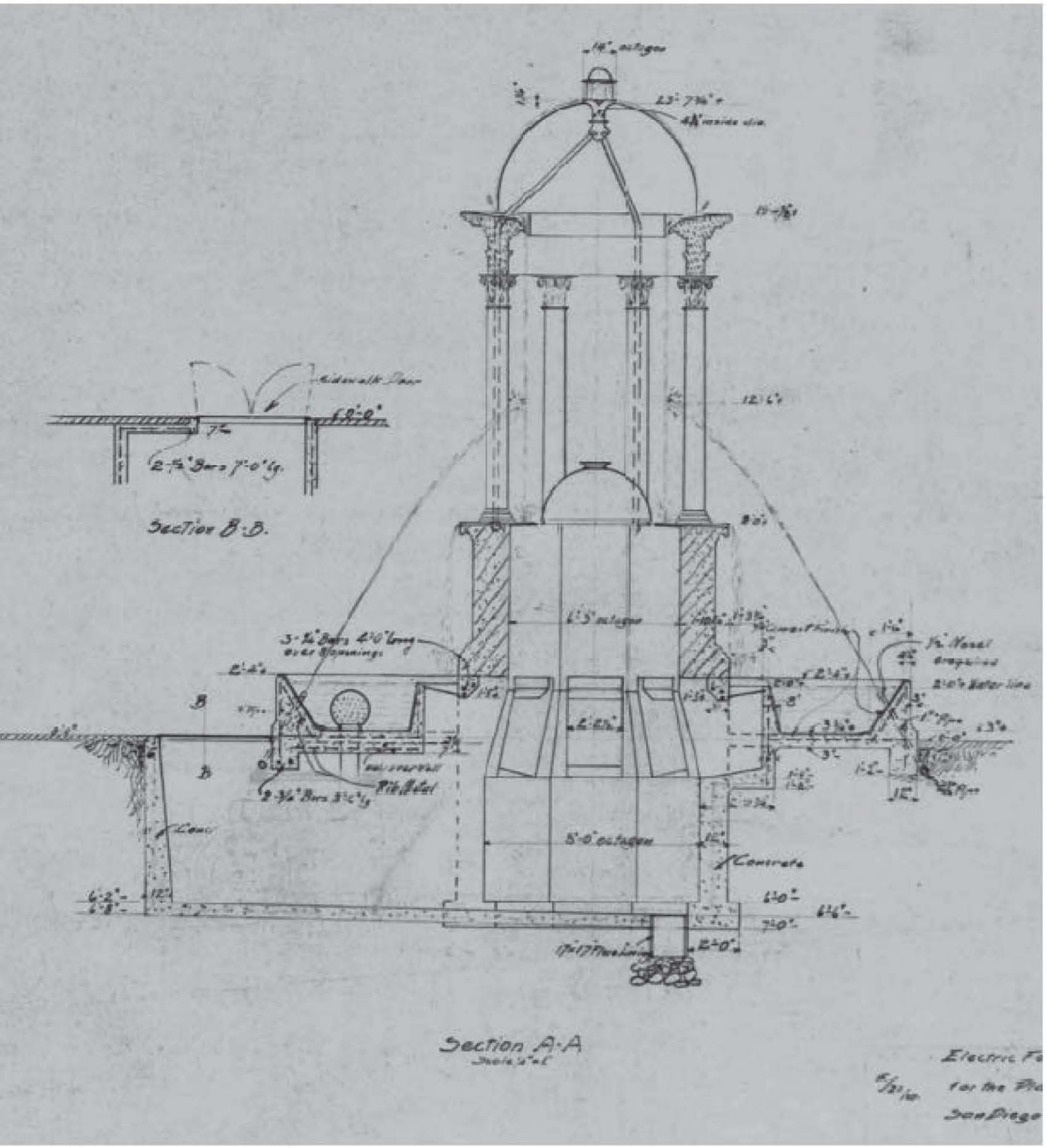
It would be desirable to, as a minimum, physically attach the marble columns to the concrete base and the ring at the top to the columns and dome. Any connection must be carefully thought through so as to not have a visual impact on the structure.

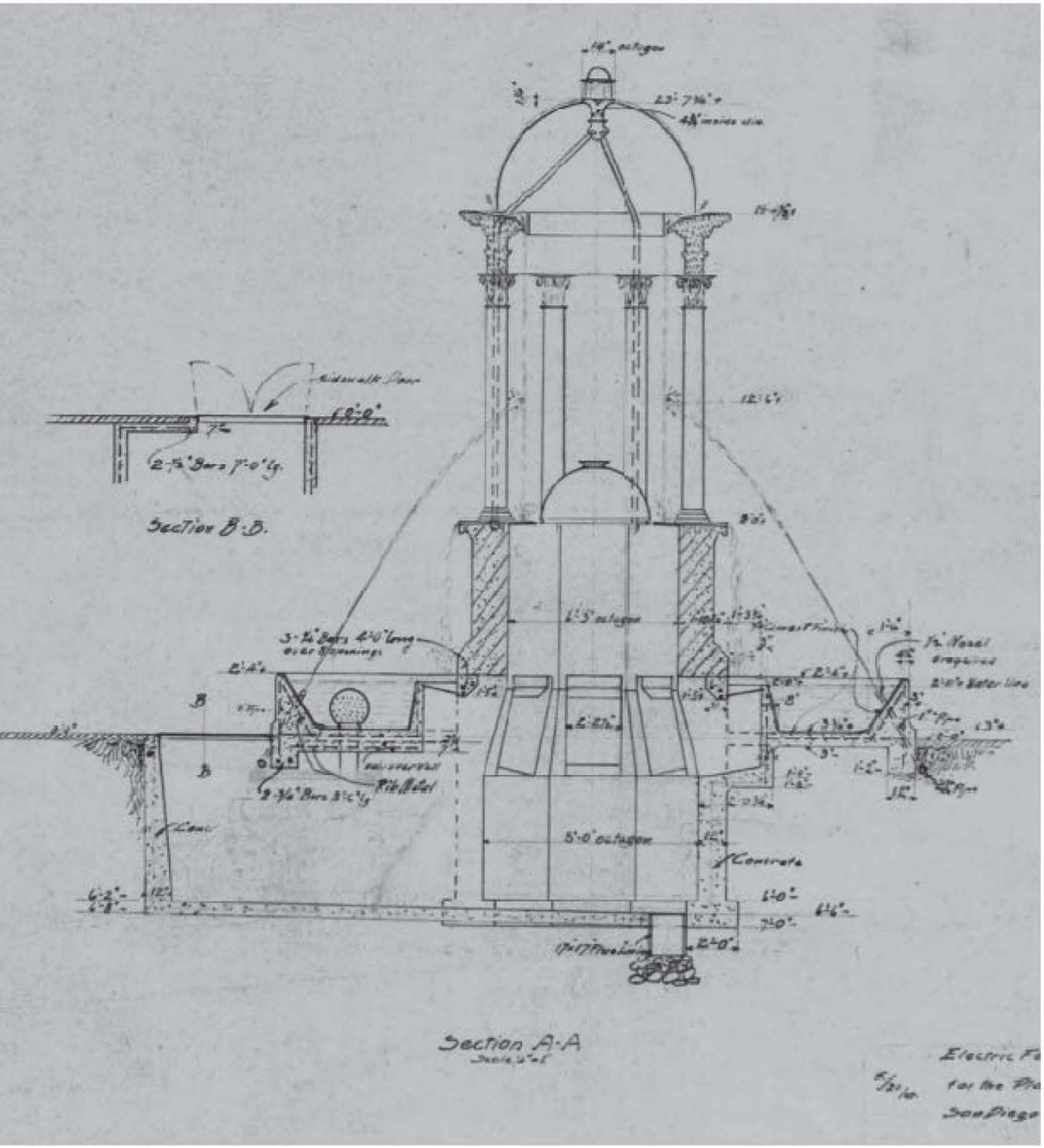
Where bolts are rusted and missing they should be replaced. In some areas of the dome, it may be desirable to remove and clean the bolts as part of a general repair.

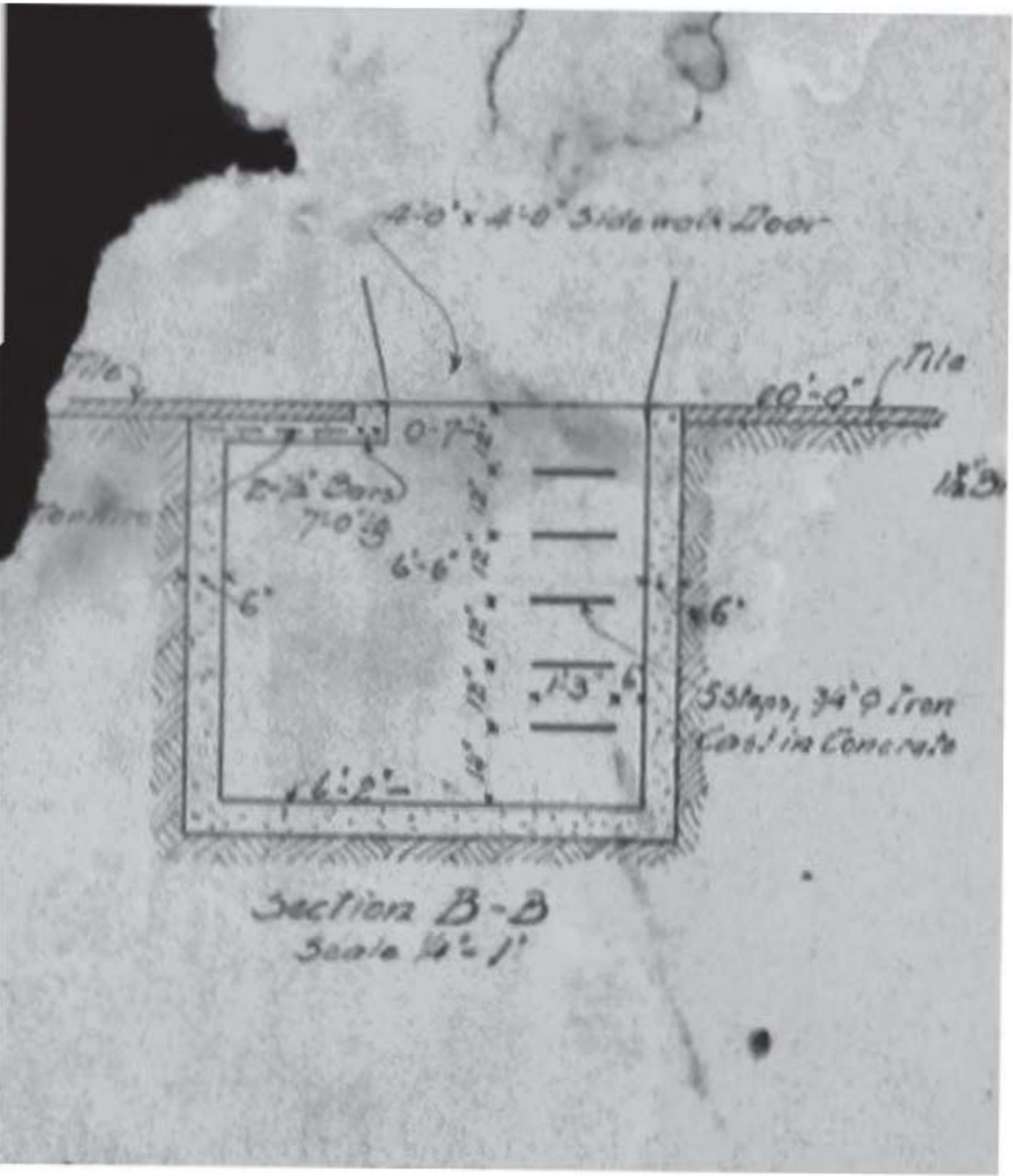
Original Construction Drawings.

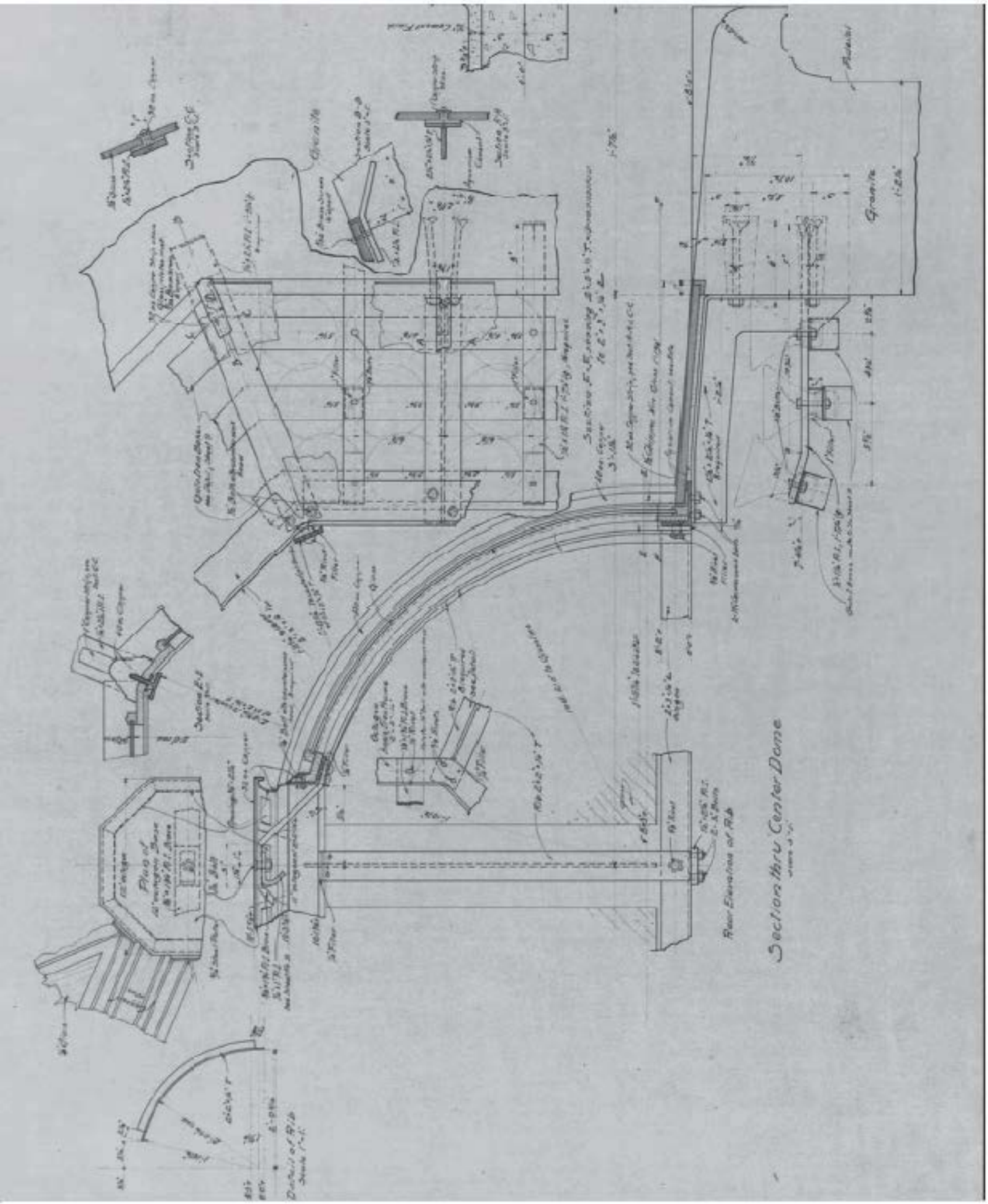
The following pages show representative structural details.

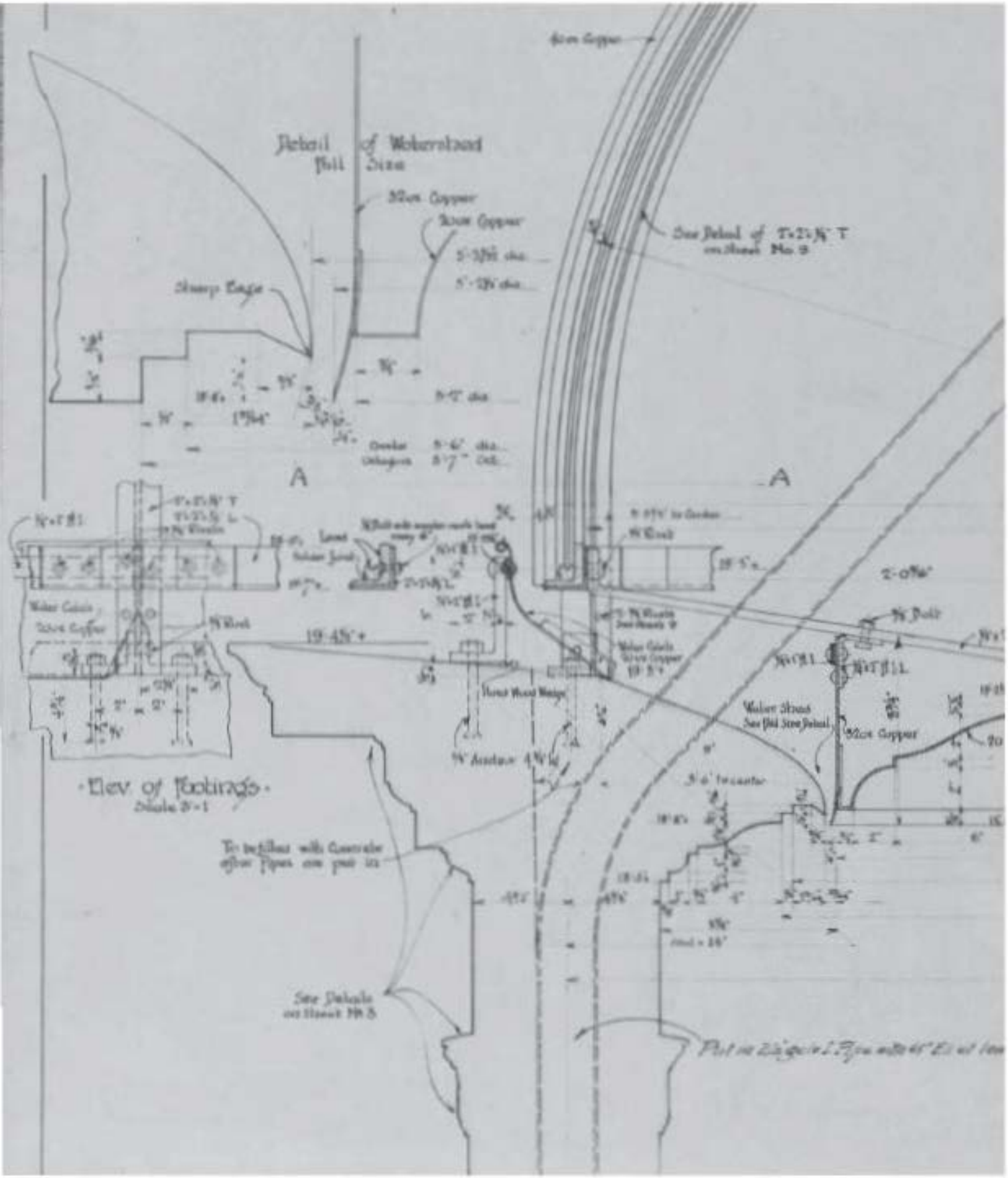

Plan of Electric Fountain

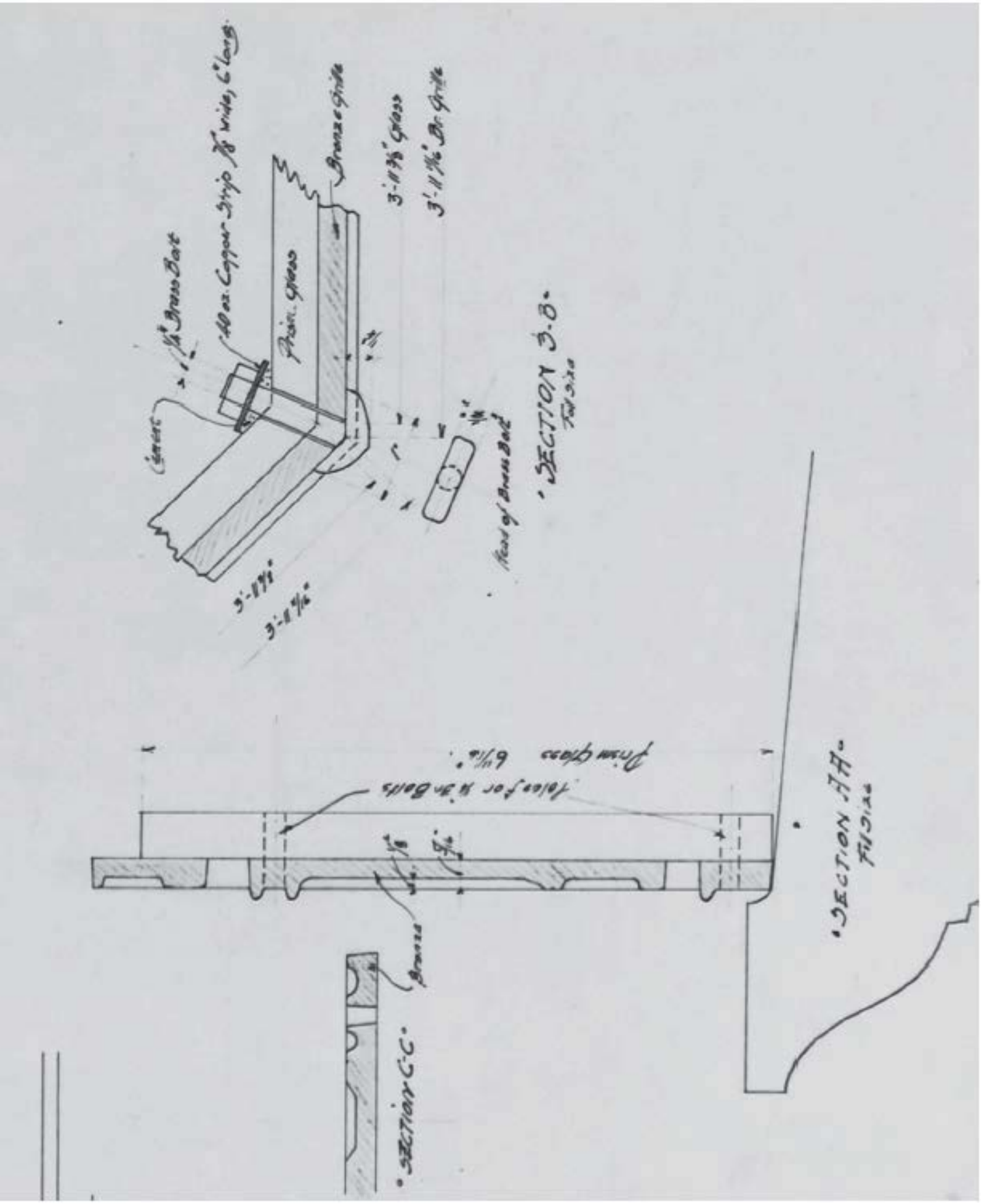

Section B-B.
Section A-A
Electric Fo
for the Pla
San Diego


Section B-B.
Section A-A


4'-0" x 4'-0" Sidewalk Door
Tile
60'-0"
Tile
0'-7½"
2-¾" Bars
7'-0" ℄
6'-6"
6"
6"
13"
6'-2"
5 Steps, 34'-0" Iron
Cast in Concrete
Section B-B
Scale ½" = 1'


Section thru Center Dome


Detail of Waterstand
Full Size
Elev of Footings
A
A


Bronze Grille
Plain Glass
3'-11 3/8"
3'-11 3/8"
Bronze Grille
Plain Glass
3'-11 3/8"
3'-11 3/8"
SECTION 3-B
SECTION A-A
SECTION C-C

APPENDIX F

Water Quality Technical Report

WATER QUALITY TECHNICAL REPORT

PTS No. 287741
I.O. No. 24002919
DWG No. 37098-D

Horton Plaza Park

APN: 533-610-17

Prepared For

Civic San Diego
401 B Street, Suite 400
San Diego, CA 92101

Prepared By

Nasland Engineering
4740 Ruffner Street
San Diego, CA 92111

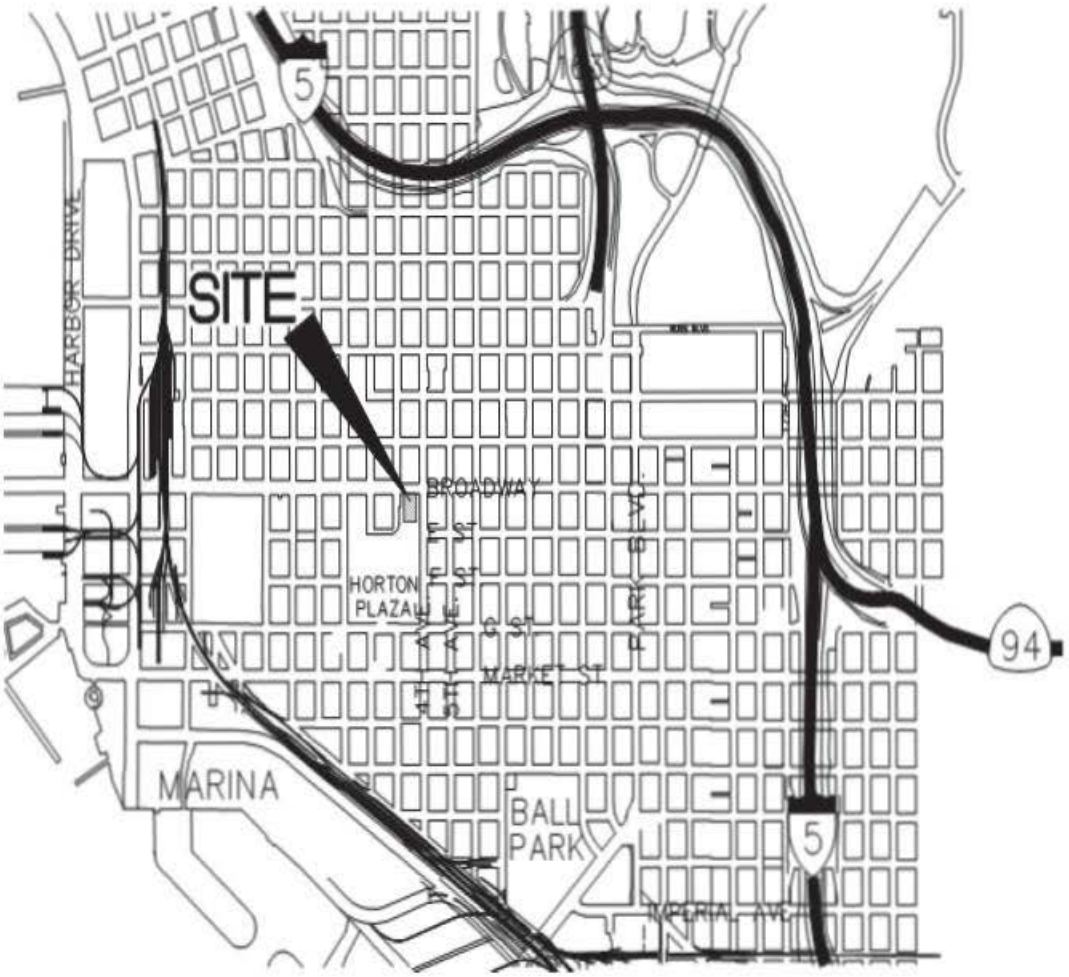
October 10, 2013

WATER QUALITY TECHNICAL REPORT
Horton Plaza Park

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ATTACHMENTS
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B. Storm Water Requirements Applicability Checklist
C. Hydrologic Unit Map
D. 303(d) List of Water Quality
E. Priority BMP Matrix
F. Anticipated and Potential Pollutants
G. Calculations
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J. Stormwater Agreement
K. Cost Analysis and Storm Drain Exhibit
L. Self Certification Form
M. On-Site Maintenance Program (Property Landscape Specs.)

1.0 VICINITY MAP



2.0 PROJECT DESCRIPTION

The project is on City of San Diego owned property located at the block surrounded by Broadway Circle to the west, Broadway to the north, Fourth Avenue to the east, and Horton Plaza to the south; in San Diego, California (See Vicinity Map in **Section 1.0**). The site consists of an approximately 1.30 acre parcel slated for redevelopment. The site is currently occupied by an existing historic park in the northern portion, hardscape areas, and the Robinson May building at Horton Plaza in the southern portion of the site.

The existing Robinson May building on the property is being processed per another permit to be demolished as part of the first phase of this project. The proposed project will consist of restoring the existing historic Horton Plaza Park on the north portion of the site, as well as to create a new large outdoor public plaza at the location of the Robinson May building. The plaza will be constructed mostly of pavers and hardscape an urban park, with landscaping, small kiosks, and fountains.

For water quality treatment, the design utilizes source control BMPs, a self-treating area, a green roof on the largest kiosk, and media filters at all storm drain inlets as the site's primary permanent best management practice (BMP). This will provide the most treatment for the runoff from the site before entering into the storm drain system.

This project proposes to implement a green roof (see attachment I) as one of the site's permanent best management practice (BMP). A green roof is a roof of a building that is partially or completely covered with vegetation and a growing medium, planted over a waterproofing membrane.

3.0 SITE MAP

Please see **Attachment A** for the project Site Map. A summary of the Site Map is explained below.

3.1 DRAINAGE

There is an existing underground storm drain system located on site that discharges to the east of the project site into a public storm drain on Fourth Avenue. The northern portion of the project site which includes the historic Horton Plaza Park area currently surface flows to existing inlets; which then flows to the on-site 15" storm drain. That storm drain discharges to the east of the project site into the public storm drain on Fourth Avenue. The majority of the project site is the rooftop of the Robinson May Building. That area surface flows into downspouts on the roof and discharges into storm drain to the east side of the project site into Fourth Avenue Storm Drain. In summary, the total site runoff flow via

storm drain to the existing public 27" RCP storm drain on Fourth Avenue which then travels south to the San Diego Bay.

The proposed project will preserve and enhance the existing drainage for the project site. The existing on site drainage pattern of having the storm water drainage flow to the storm drain on Fourth Avenue will remain. The project will slightly decrease flow from the pre construction. The net result is marginally less flow to the offsite storm system.

Existing and proposed discharges for the 100 year storm are shown below (see **Attachment G** for calculations).

Existing Q_{100} = 4.76 cfs*
Proposed Q_{100} = 4.72 cfs*
* cfs is ft^3/sec. For Calculations, see **Attachment G**.

3.2 IMPROVEMENT PLANS

Improvements will be made to the fronting sidewalks, adjacent to the property, on Broadway Circle, Broadway, and Fourth Avenue, respectively. For specific improvements see 37098-D.

3.3 EXISTING STORM DRAIN SYSTEM

There is an existing private on-site storm drain system on the project site. This system will be enhanced with new storm drain lines in the area of construction. The total site runoff travels to in an existing 27" RCP storm on Fourth Avenue.

4.0 POLLUTANTS AND CONDITIONS OF CONCERN

4.1 WATERSHED

The Horton Plaza Park drains to the San Diego Bay which is located in the Pueblo Watershed and within the San Diego Mesa Hydrologic Sub-Area HAS 908.10. Under Section 303(d), 2006 edition, of the Federal Clean Water Act (CWA), HAS 908.21 CALWATER Watershed 90821000.

4.2 POLLUTANTS FROM THE PROJECT AREA

The pollutants from the Horton Plaza Park project area as identified in the Land Development Manual-Storm Water Standards Table 2 (page 14, March 2008) are:

Project Category	***General Pollutants***
Commercial Development	-Sediments -Nutrients -Heavy Metals -Organic Compounds -Trash & Debris -Oxygen Demanding Substances -Oil & Grease -Bacteria & Viruses -Pesticides

4.3 IMPAIRED DOWNSTREAM WATER BODIES

The downstream body of water that could be affected by the Horton Plaza Park is the San Diego Bay. See Attachments for applicable portion of the current CWA Section 303(d) list.

According to the approved 2006 CWA Section 303(d) list of Water Quality Limited Segment in Attachments, identifies contaminated or stressed waters. According to the current 303(d) list, this watershed has the following pollutants and/or stressors:

- Copper

The potential sources of the identified pollutants/stressors are:

- Source Unknown

The pollutants and or stressors may or may not be present, but each is a potential impact if the storm water run-off from the project contains similar pollutants of concern. With proper site maintenance and the installation of pollution capturing devices, the potential impact from the proposed site development would be insignificant.

4.4 IMPACT TO HYDROLOGIC REGIME

Hydrologic regime refers to the proposed drainage pattern for the project. The proposed drainage pattern will improve since the project proposes to construct a green roof which will capture a percentage of the runoff from the property. The filter basins will treat the runoff of any pollutants or debris and then release it to the storm drain system.

5.0 BEST MANAGEMENT PRACTICES

5.1 LOW IMPACT DEVELOPMENT BMPs

Low Impact Development (LID) is an innovative storm water management approach with a basic principle that is modeled after nature: manage rainfall at the source using uniformly distributed decentralized micro-scale controls. LID's are to mimic a site's predevelopment hydrology by using design techniques that infiltrate, filter, store, evaporate, and detain runoff close to its source. See section 5.4.5 for sizing calculations.

5.2 SOURCE CONTROL BMPs

The list of Source Control Best Management Practices (Storm Water Standards, section 3.1, January 2011) contains the following:

- Maintenance Bays
  - There are no maintenance bays for this project.
- Vehicle and Equipment wash areas
  - There are no vehicle wash areas for this project.
- Outdoor processing areas
  - There are no outdoor processing areas for this project.
- Fueling Areas
  - There are no fueling areas for this project.
- Steep Hillside Landscaping.
  - There are no steep hillsides proposed for this project.
- Use efficient irrigation systems & landscape design.
  - All irrigation systems will be designed and setup to use the minimum amount of water. This will prevent over usage and runoff.
- Design trash storage areas to reduce pollution introduction
  - The designated trash area is inside the kiosk/buildings. This will prevent any storm runoff from becoming contaminated by trash generation. In addition, the project will implement a Trash Management plan that will minimize transfer of trash and potential for

contaminating site runoff. All grease from food handling in the proposed kiosk will be captured inside each kiosk using grease traps. This should alleviate concerns of possible pollutants from oil and grease.

- Design outdoor material storage areas to reduce pollution contribution
    - There are no designated outdoor material storage areas planned for this project.
- Design loading docks to reduce pollution contribution
    - There are no loading docks planned for this project.
- Employ integrated pest management principles.
    - All chemicals used for pest management will be used with caution to prevent any cross contamination.
- Provide storm water conveyance system stamping and signage
    - All storm drain inlets and will have signage indicating no dumping.
- Design new buildings fire sprinklers systems to enable discharge to sanitary sewer.
    - Designing the fire sprinkler system to discharge in to the sewer system will prevent runoff into the storm drain system.
- Manage air conditioning condensate.
    - All condensation from the air conditioning system will be contained and disposed of properly preventing any metal contamination of the storm drain system.
- Use non-toxic roofing materials where feasible.
- Other Source Control Requirements.
    - The project will provide soil stabilization. Copper roofs are not planned for this project.
    - For a Comprehensive On-Site Maintenance program see **Attachment M**.

5.3 STRUCTURAL TREATMENT BMPs

Structural Treatment Best Management Practices (Storm Water Standards, section 3.1, January 2011) are slightly different than previous categories of best management practices because they are applied to each project on a case-by-case basis. Structural Treatment Best Management Practices are design considerations instead of a list of suggestions. The following areas were evaluated:

- Basis for Selection
    - Targeted Pollutants of Concern
    - Pollutants Nor Present
    - Justification
    - Exclusions

    - Alternative Analysis
- Design Criteria (and calculations)
- Pollutant Removal Information
- Literature References
- Maintenance Condition(s)

Due to the unique nature of this proposed urban park, expansive landscaping, flow thru planters, and bio-retention basins were not possible to incorporate into the design. The topography of the site, poor filtration of soils, settlement issues with regards to A.D.A. paths of travel, high foot traffic for a public gathering place limit the use of LID BMPs for both feasibility and design uses. The project focused on use of Source Control measures, a self treating area, media filters in each inlet and a green roof be the primary treatment for this project site.

Filter inserts were selected in lieu of larger vault based media filter devices (with higher removal efficiencies) due primarily to existing off site storm drain constraints and the overall the topography of the proposed project site. Because the site surface drains to a focal point at the base of the pavilion (37.8 Flow Line), installing a large vault there would make it prohibitive to filter the water and have it drain to the city storm drain system (the vault is 5' deep placing the invert elevation at 32.8IE). The existing public storm drain in which this project ties into on Fourth avenue has a fixed invert elevation (34.1IE) and cannot be lowered without having to remove large portions of the existing public storm drain (see Attachment K for cost analysis and Exhibit to illustrate storm drain). Installing a large vault would put the storm flow below the existing drainage facilities. Installing pumps would greatly affect the design, costs, and maintenance for the city (see Attachment K for cost analysis and comparison to the projects bonding costs). The entire offsite costs for installation for the proposed storm drain and improvements are estimated to be $160,000. The alternate of lowering the storm drain would lead to a cost increase of $638,000 (400% increases in costs).

Pollutants of concern for this specific project will be alleviated through source control techniques as described above in Section 5.2. This project houses its trash inside, provides no parking which often are the primary pollutants of oil, grease, bacteria common with typical commercial projects. Any pesticides would be used in the grass area in which it is self retaining. The project designers anticipate only minor pollutants for this specific project, mainly being trash and debris, which the proposed filter inserts treat at high efficiency rate.

5.4 PRIORITY DEVELOPMENT PROJECT LID BMPs

5.4.1 DRAIN STORM WATER TO LANDSCAPED AREAS

The majority of project is an urban park, there are very limited uses of landscape for this project, so large amounts of storm water cannot drain to landscape areas. In the northern portion of the site the project does drain to landscape areas.

5.4.2 PROPERLY DESIGN THE LANDSCAPED AREAS TO INFILTRATE

Where infiltration is possible, in the north historic park area, infiltration will occur. This option isn't available in the southern portion of the urban plaza.

5.4.3 USE PERMEABLE PAVING WHEN POSSIBLE

The project considered using permeable paving in portions of the plaza area, however due to the proximity to existing structures, poor infiltration rates of the existing soils, and long-term maintenance issues, settlement, and A.D.A. issues, the use of permeable pavers was not desirable.

5.4.4 USE RETENTION IF INFILTRATION NOT POSSIBLE

The project considered using unlined retention basins, however due to the overall design concept of an urban gathering place, the proximity to existing structures and poor infiltration rates of the existing soils, the use of infiltration systems was not feasible for the projects uses or recommended by the Geotechnical Engineer.

5.4.5 LID Sizing

This project proposes to implement LIDs into the project design by incorporating bio-retention basins. These areas, according to Chapter 4 of the Countywide Model SUSMP dated January 2, 2009, shall be 4 percent of the entire impervious project site. Sizing calculations are as follows:

Self treating area

DMA *Name*	DMA *Area (SF)*			
Basin 1	15,500ft^2			

DMA Name	DMA Area (SF)	Post-Project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor	Soil Type	IMP Inlet Media Filters	
					D	Hardscaped Area	
Basin 2	31,800ft^2	Roofs/ Pavers	1	31,800	IMP *Sizing Factor*	*Minimum Area*	*Proposed Area*
			Total	31,800	**0.04**	1,272 ft^2	N/A ft^2

DMA Name	DMA Area (SF)	Post-Project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor	Soil Type	IMP *Green Roof / Inlet Filters*	
					D	Hardscaped Area	
Basin 3	7,500ft^2	Roofs/ Pavers	1	7,500	IMP *Sizing Factor*	*Minimum Area*	*Proposed Area*
			Total	7,500	**0.04**	300 ft^2	1,500 ft^2

5.5 MAINTENANCE CONDITIONS

BMP Type	Inspection	Maintenance	Maintenance Indicator
Structural BMPs			
Green Roof	Weekly for vegetation up keep. Additionally within 48 hrs for every storm event greater than 1 inch	Water and trim vegetation as needed. Remove weeds and trash. If ponding exceeds 72 hours, replace sand media	Ponding persists longer than 72 hours. Vegetation is overgrown or unhealthy. Presence of weeds, debris or trash.
Filter Inserts	Once monthly during the rainy season. Additionally within 24 hours after every storm event greater than 1.0 inch.	Replace filter insert at a minimum of once yearly or as needed earlier if not operating.	Filters clogged with sediment, debris, water not draining properly.
Non-Structural BMPs			
Street Sweeping	Visual inspection weekly. Identify chronic trash and debris contributors.	Provide routine monthly sweeping of hardscape areas. Sweeping to be scheduled for times when the fewest users are in the park.	Order more frequent sweeping if visual inspections find excess trash and debris.

*Additionally see **Attachment M** for a Comprehensive On-Site Maintenance Program.

6.0 HMP APPLICABILITY

The Horton Plaza Park project does not increase the impervious area of the site. It drains directly to a hardened system and then to the San Diego Bay. Because of the reasons the Horton Plaza Park project is HMP exempt. Refer to the HMP flow chart in appendix H.

7.0 CONCLUSION

It is our conclusion that the most effective means of treating the targeted pollutants while keeping the design intent for an urban gathering place is to implement thorough source control BMPs. In combination with inlet media filters to settle out the potential trash & debris and heavy metals, a self treating area, and the use of a green roof to reduce runoff flows.

8.0 CERTIFICATION

This Water Quality Technical Report (WQTR) has been prepared under the direction of the following Registered Civil Engineer. The Registered Civil Engineer (Engineer) attests to the technical information contained herein and the engineering data upon which the following design, recommendations, conclusions and decisions are based. The selection, sizing, and design of the stormwater treatment and other control measures in this report meet the requirements of Regional Water Quality Control Board Order R9-2007-001 and subsequent amendments.

Adam E. Podlich RCE 69298 Expires 6-30-2014



9.0 REFERENCES

City of San Diego Storm Water Standards, section 3.1, January 2011 edition.

Best Management Practices for Erosion and Sediment Control & Storm Water Retention/Detention by San Diego County Association of Resource Conservation Districts, San Diego County Edition

Construction Site Best Management Practices (BMPs) Manual by Caltrans

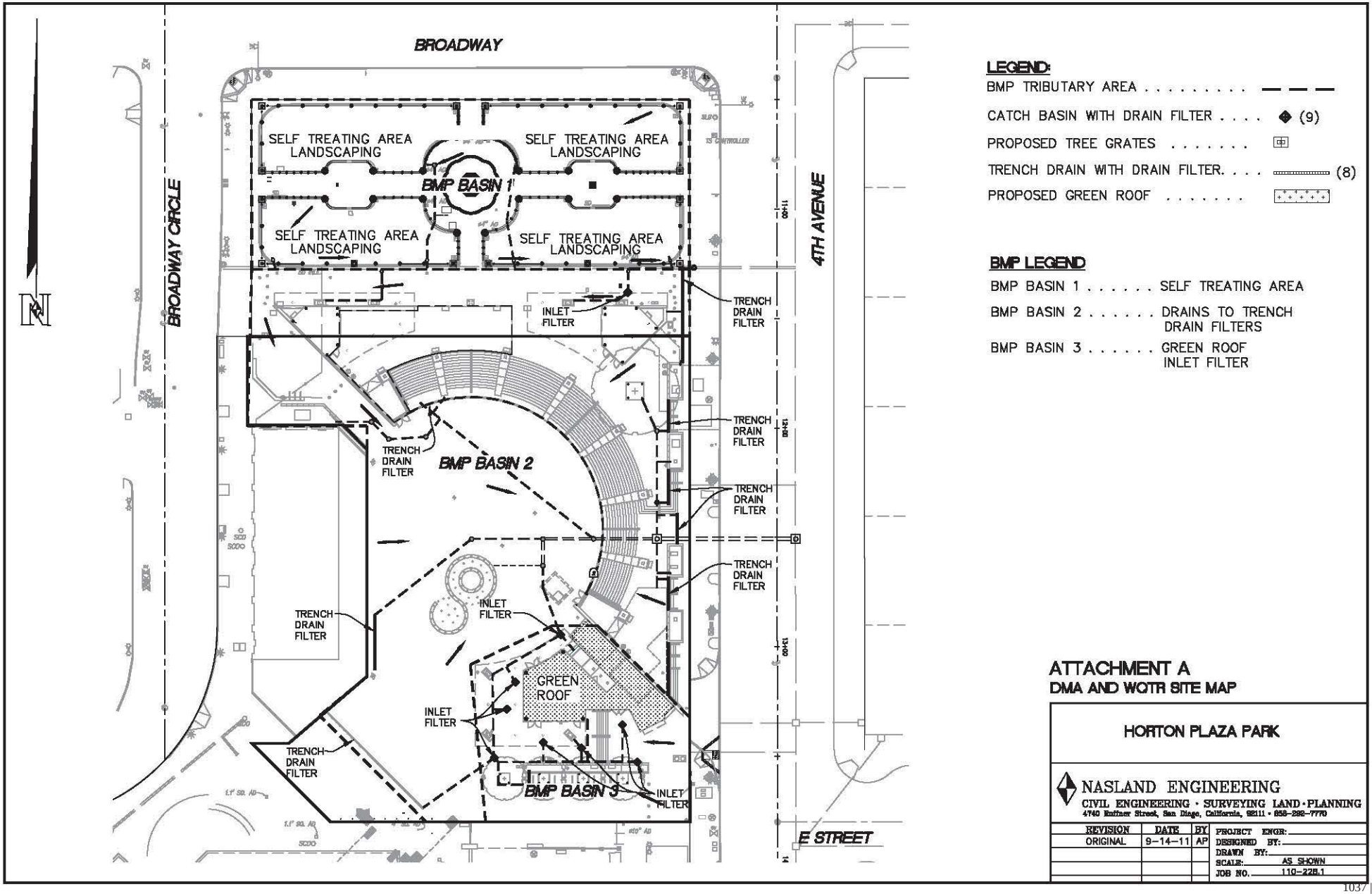
Construction Activity Best Management Practice Handbook prepared for the Stormwater Quality Task Force

San Diego County Hydrology Manual (Draft), prepare by the County of San Diego Department of Public Works, Flood Control Section, September, 2001

Water Quality Control Plan for the San Diego Basin (9), prepared for the California Regional Water Quality Control Board, San Diego Region, dated September 8, 1994

ATTACHMENT A

SITE MAP



ATTACHMENT A
DMA AND WQTR SITE MAP

HORTON PLAZA PARK

NASLAND ENGINEERING
CIVIL ENGINEERING · SURVEYING LAND · PLANNING
4740 Kaiser Street, San Diego, California, 92111 · 858-292-7770

REVISION	DATE	BY
ORIGINAL	9-14-11	AP

PROJECT ENGR:
DESIGNED BY:
DRAWN BY:
SCALE: AS SHOWN
JOB NO. 110-225.1

ATTACHMENT B

STORM WATER REQUIREMENTS APPLICABILITY CHECKLIST

City of San Diego
Development Services
1222 First Ave., MS-302
San Diego, CA 92101
(619) 446-5000

THE CITY OF SAN DIEGO

Storm Water Requirements Applicability Checklist

FORM DS-560
JANUARY 2011

Project Address:	Project Number *(for City Use Only)*:
Corner of Broadway Circle, Broadway, and Fourth Avenue	

SECTION 1. Permanent Storm Water BMP Requirements:

Additional information for determining the requirements is found in the Storm Water Standards Manual.

Part A: Determine if Exempt from Permanent Storm Water BMP Requirements.

Projects that are considered maintenance, or are otherwise not categorized as "development projects" or "redevelopment projects" according to the Storm Water Standards manual are not required to install permanent storm water BMPs. **If "Yes" is checked for any line in Part A, proceed to Part C and check the box labeled "Exempt Project." If "No" is checked for all of the lines, continue to Part B.**

1.	The project is not a Development Project as defined in the Storm Water Standards Manual: for example habitat restoration projects, and construction inside an existing building.	☐ Yes ☐ No
2.	The project is only the construction of underground or overhead linear utilities.	☐ Yes ☑ No
3.	The project qualifies as routine maintenance (replaces or renews existing surface materials because of failed or deteriorating condition). This includes roof replacement, pavement spot repairs and resurfacing treatments such as asphalt overlay or slurry seal, and replacement of damaged pavement.	☐ Yes ☑ No
4.	The project only installs sidewalks, bike lanes, or pedestrian ramps on an existing road, and does not change sheet flow condition to a concentrated flow condition.	☐ Yes ☑ No

Part B: Determine if Subject to Priority Development Project Requirements.

Projects that match one of the definitions below are subject to additional requirements including preparation of a Water Quality Technical Report.
If "Yes" is checked for any line in Part B, proceed to Part C and check the box labeled "Priority Development Project." If "No" is checked for all of the lines, continue to Part C and check the box labeled "Standard Development Project."

1.	**Residential development of 10 or more units.**	☐ Yes ☑ No
2.	**Commercial development and similar non-residential development greater than one acre.** Hospitals; laboratories and other medical facilities; educational institutions; recreational facilities; municipal facilities; commercial nurseries; multi-apartment buildings; car wash facilities; mini-malls and other business complexes; shopping malls; hotels; office buildings; public warehouses; automotive dealerships; and other light industrial facilities.	☑ Yes ☐ No
3.	**Heavy industrial development greater than one acre.** Manufacturing plants, food processing plants, metal working facilities, printing plants, and fleet storage areas.	☐ Yes ☑ No
4.	**Automotive repair shop.** Facilities categorized in any one of Standard Industrial Classification (SIC) codes 5013, 5014, 5541, 7532-7534, or 7536-7539.	☐ Yes ☑ No
5.	**Restaurant.** Facilities that sells prepared foods and drinks for consumption, including stationary lunch counters and refreshment stands selling prepared foods and drinks for immediate consumption (SIC code 5812), and where the land area for development is greater than 5,000 square feet.	☐ Yes ☑ No
6.	**Hillside development greater than 5,000 square feet.** Development that creates 5,000 square feet of impervious surface and is located in an area with known erosive soil conditions and where the development will grade on any natural slope that is twenty-five percent or greater.	☐ Yes ☑ No
7.	**Water Quality Sensitive Area.** Development located within, directly adjacent to, or discharging directly to a Water Quality Sensitive Area (as depicted in Appendix C) in which the project either creates 2,500 square feet of impervious surface on a proposed project site or increases the area of imperviousness of a proposed project site to 10% or more of its naturally occurring condition. "Directly adjacent" is defined as being situated within 200 feet of the Water Quality Sensitive Area. "Discharging directly to" is defined as outflow from a drainage conveyance system that is composed entirely of flows from the subject development or redevelopment site, and not commingled with flows from adjacent lands.	☐ Yes ☑ No
8.	**Parking lot with a minimum area of 5,000 square feet or a minimum of 15 parking spaces** and potential exposure to urban runoff (unless it meets the exclusion for parking lot reconfiguration on line 11).	☐ Yes ☑ No

9.	**Street, road, highway, or freeway.** New paved surface in excess of 5,000 square feet used for the transportation of automobiles, trucks, motorcycles, and other vehicles (unless it meets the exclusion for road reconfiguration on line 11).	☐ Yes ☑ No
10.	**Retail Gasoline Outlet (RGO)** that is: (a) 5,000 square feet or more or (b) has a projected Average Daily Traffic (ADT) of 100 or more vehicles per day.	☐ Yes ☑ No
11.	**Significant Redevelopment**; project installs and/or replaces 5,000 square feet or more of impervious surface and the existing site meets at least one of the categories above. The project is not considered Significant Redevelopment if reconfiguring an existing road or parking lot without a change to the footprint of an existing developed road or parking lot. The existing footprint is defined as the outside curb or the outside edge of pavement when there is no curb.	☑ Yes ☐ No
12.	**Other Pollutant Generating Project.** Any other project not covered in the categories above, that disturbs one acre or more and is not excluded by the criteria below.	☐ Yes ☑ No

Projects creating less than 5,000 sf of impervious surface and where added landscaping does not require regular use of pesticides and fertilizers, such as slope stabilization using native plants. Calculation of the square footage of impervious surface need not include linear pathways that are for infrequent vehicle use, such as emergency maintenance access or bicycle pedestrian use, if they are built with pervious surfaces or if they sheet flow to surrounding pervious surfaces.

Part C: Select the appropriate category based on the outcome of Parts A & B.

1.	If "Yes" is checked for any line in Part A, then check this box. Continue to Section 2.	☐ Exempt Project
2.	If "No" is checked for all lines in Part A, and Part B, then check this box. Continue to Section 2.	☐ Standard Development Project
3.	If "No" is checked for all lines in Part A, and "Yes" is checked for at least one of the lines in Part B, then check this box. Continue to Section 2. See the Storm Water Standards Manual for guidance on determining if Hydromodification Management Plan requirements apply.	☑ Priority Development Project

SECTION 2. Construction Storm Water BMP Requirements:
For all projects, complete Part D. If "Yes" is checked for any line in Part D, then continue to Part E.

Part D: Determine Construction Phase Storm Water Requirements.

1.	Is the project subject to California's statewide General NPDES Permit for Storm Water Discharges Associated with Construction Activities? (See State Water Resources Control Board Order No. 2009-0009-DWQ for rules on enrollment)	☑ Yes ☐ No
2.	Does the project propose grading or soil disturbance?	☑ Yes ☐ No
3.	Would storm water or urban runoff have the potential to contact any portion of the construction area, including washing and staging areas?	☑ Yes ☐ No
4.	Would the project use any construction materials that could negatively affect water quality if discharged from the site (such as, paints, solvents, concrete, and stucco)?	☑ Yes ☐ No
5.	Check this box if "Yes" is checked for line 1. Continue to Part E.	☑ SWPPP Required
6.	Check this box if "No" is checked for line 1, and "Yes is checked for any line 2-4. Continue to Part E.	☐ WPCP Required
7.	Check this box if "No" is checked for all lines 1-4. Part E does not apply.	☐ No Document Required

Part E: Determine Construction Site Priority

This prioritization must be completed with this form, noted on the plans, and included in the SWPPP or WPCP. The City reserves the right to adjust the priority of the projects both before and during construction. [Note: The construction priority does NOT change construction BMP requirements that apply to projects; rather, it determines the frequency of inspections that will be conducted by City staff.]

☐ 1. **High Priority**
- a) Projects where the site is 50 acres or more and grading will occur during the wet season
- b) Projects 1 acre or more and tributary to an impaired water body for sediment (e.g., Peñasquitos watershed)
- c) Projects 1 acre or more within or directly adjacent to or discharging directly to a coastal lagoon or other receiving water within a Water Quality Sensitive Area.
- d) Projects subject to phased grading or advanced treatment requirements.

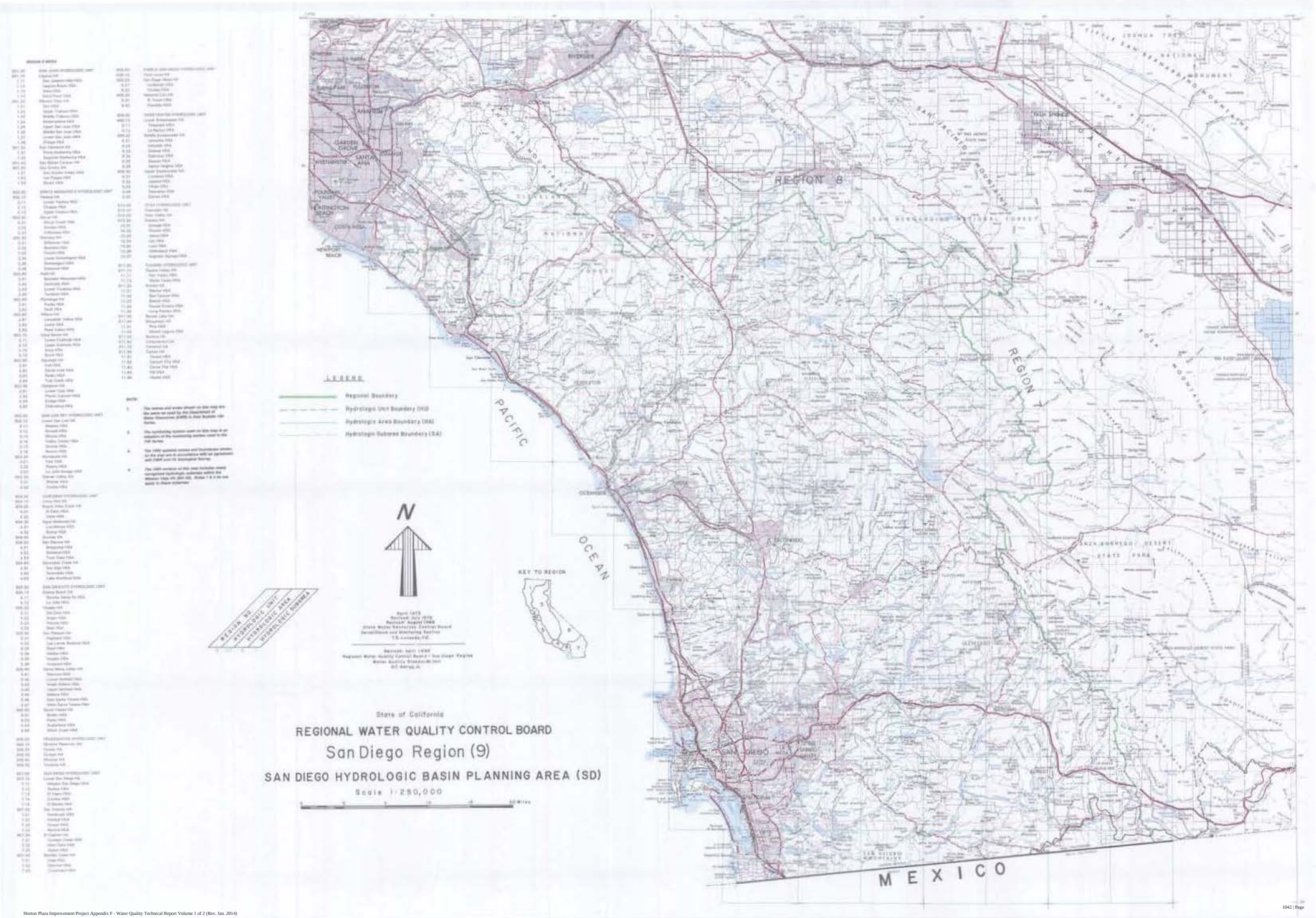
☑ **2 Medium Priority**. Projects 1 acre or more but not subject to a high priority designation.

☐ **3 Low Priority.** Projects requiring a Water Pollution Control Plan but not subject to a medium or high priority designation.

Name of Owner or Agent *(Please Print):* Adam Podlich (Nasland Engineering)	Title: Project Engineer
Signature: Adam Podlich	Date: 06/22/2012

ATTACHMENT C

HYDROLOGIC UNIT MAP


LEGEND
Regional Boundary
Hydrologic Unit Boundary (HU)
Hydrologic Area Boundary (HA)
Hydrologic Subarea Boundary (SA)
REGION 8
REGION 9
PACIFIC
OCEAN
MEXICO
N
KEY TO REGION
REGION NO.
HYDROLOGIC UNIT
HYDROLOGIC AREA
HYDROLOGIC SUBAREA
State of California
REGIONAL WATER QUALITY CONTROL BOARD
San Diego Region (9)
SAN DIEGO HYDROLOGIC BASIN PLANNING AREA (SD)
Scale 1:250,000

ATTACHMENT D

303(d) LIST OF WATER QUALITY

2006 CWA SECTION 303(d) LIST OF WATER QUALITY LIMITED SEGMENTS REQUIRING TMDLS

SAN DIEGO REGIONAL WATER QUALITY CONTROL BOARD

USEPA APPROVAL DATE: JUNE 28, 2007

REGION	TYPE	NAME	CALWATER WATERSHED	POLLUTANT/STRESSOR	POTENTIAL SOURCES	ESTIMATED SIZE AFFECTED		PROPOSED TMDL COMPLETION
				Sulfates		5	Miles	2019
					Source Unknown			
				Total Dissolved Solids		5	Miles	2019
					Source Unknown			
9	R	Reidy Canyon Creek	90462000					
				Phosphorus		3.9	Miles	2019
					Source Unknown			
9	B	San Diego Bay	91010000					
				PCBs (Polychlorinated biphenyls)		10783	Acres	2019
					Source Unknown			
9	B	San Diego Bay Shoreline, 32nd St San Diego Naval Station	90822000					
				Benthic Community Effects		103	Acres	2019
					Nonpoint/Point Source			
				Sediment Toxicity		103	Acres	2019
					Nonpoint/Point Source			
9	B	San Diego Bay Shoreline, at Americas Cup Harbor	90810000					
				Copper		88	Acres	2019
					Source Unknown			
9	B	San Diego Bay Shoreline, at Bayside Park (J Street)	90911000					
				Indicator bacteria		50	Acres	2019
				This listing was made by USEPA for 2006.				
					Source Unknown			
9	B	San Diego Bay Shoreline, at Coronado Cays	91010000					
				Copper		47	Acres	2019
					Source Unknown			

2006 CWA SECTION 303(d) LIST OF WATER QUALITY LIMITED SEGMENTS REQUIRING TMDLS

SAN DIEGO REGIONAL WATER QUALITY CONTROL BOARD

USEPA APPROVAL DATE: JUNE 28, 2007

REGION	TYPE	NAME	CALWATER WATERSHED	POLLUTANT/STRESSOR	POTENTIAL SOURCES	ESTIMATED SIZE AFFECTED	PROPOSED TMDL COMPLETION
9	B	San Diego Bay Shoreline, at Glorietta Bay	91010000	Copper	Source Unknown	52 Acres	2019
9	B	San Diego Bay Shoreline, at Harbor Island (East Basin)	90821000	Copper	Source Unknown	73 Acres	2019
9	B	San Diego Bay Shoreline, at Harbor Island (West Basin)	90810000	Copper	Source Unknown	132 Acres	2019
9	B	San Diego Bay Shoreline, at Marriott Marina	90821000	Copper	Source Unknown	24 Acres	2019
9	B	San Diego Bay Shoreline, between Sampson and 28th Streets	90822000	Copper	Nonpoint/Point Source	53 Acres	2005
				Mercury	Nonpoint/Point Source	53 Acres	2006
				PAHs (Polycyclic Aromatic Hydrocarbons)	Nonpoint/Point Source	53 Acres	2006
				PCBs (Polychlorinated biphenyls)	Nonpoint/Point Source	53 Acres	2019
				Zinc	Nonpoint/Point Source	53 Acres	2019

2006 CWA SECTION 303(d) LIST OF WATER QUALITY LIMITED SEGMENTS REQUIRING TMDLS

SAN DIEGO REGIONAL WATER QUALITY CONTROL BOARD

USEPA APPROVAL DATE: JUNE 28, 2007

REGION	TYPE	NAME	CALWATER WATERSHED	POLLUTANT/STRESSOR	POTENTIAL SOURCES	ESTIMATED SIZE AFFECTED	PROPOSED TMDL COMPLETION
9	C	San Diego Bay Shoreline, Chula Vista Marina	90912000				
				Copper		0.41 Miles	2019
					Source Unknown		
9	B	San Diego Bay Shoreline, Downtown Anchorage	90821000				
				Benthic Community Effects		7.4 Acres	2019
					Nonpoint/Point Source		
				Sediment Toxicity		7.4 Acres	2019
					Nonpoint/Point Source		
9	C	San Diego Bay Shoreline, G Street Pier	90821000				
				Indicator bacteria		0.42 Miles	2006
					Urban Runoff/Storm Sewers		
					Unknown Nonpoint Source		
					Unknown point source		
9	B	San Diego Bay Shoreline, near Chollas Creek	90822000				
				Benthic Community Effects		15 Acres	2006
					Nonpoint/Point Source		
				Sediment Toxicity		15 Acres	2006
					Nonpoint/Point Source		
9	B	San Diego Bay Shoreline, near Coronado Bridge	90822000				
				Benthic Community Effects		37 Acres	2019
					Nonpoint/Point Source		
				Sediment Toxicity		37 Acres	2019
				Includes Crosby Street/Cesar Chavez Park area, that will receive additional monitoring.			
					Nonpoint/Point Source		
9	B	San Diego Bay Shoreline, near sub base	90810000				
				Benthic Community Effects		16 Acres	2019
					Nonpoint/Point Source		
				Sediment Toxicity		16 Acres	2019
					Nonpoint/Point Source		

2006 CWA SECTION 303(d) LIST OF WATER QUALITY LIMITED SEGMENTS REQUIRING TMDLS

SAN DIEGO REGIONAL WATER QUALITY CONTROL BOARD

USEPA APPROVAL DATE: JUNE 28, 2007

REGION	TYPE	NAME	CALWATER WATERSHED	POLLUTANT/STRESSOR	POTENTIAL SOURCES	ESTIMATED SIZE AFFECTED	PROPOSED TMDL COMPLETION
9	B	San Diego Bay Shoreline, near Switzer Creek	90821000				
				Chlordane		5.5 Acres	2019
					Urban Runoff/Storm Sewers		
					Other		
					Boatyards		
					Nonpoint/Point Source		
				Lindane/Hexachlorocyclohexane (HCH)		5.5 Acres	2019
					Urban Runoff/Storm Sewers		
					Other		
					Boatyards		
					Nonpoint/Point Source		
				PAHs (Polycyclic Aromatic Hydrocarbons)		5.5 Acres	2019
					Urban Runoff/Storm Sewers		
					Other		
					Boatyards		
					Nonpoint/Point Source		
9	B	San Diego Bay Shoreline, North of 24th Street Marine Terminal	90832000				
				Benthic Community Effects		9.5 Acres	2019
					Nonpoint/Point Source		
				Sediment Toxicity		9.5 Acres	2019
					Nonpoint/Point Source		
9	B	San Diego Bay Shoreline, Seventh Street Channel	90831000				
				Benthic Community Effects		9 Acres	2008
					Nonpoint/Point Source		
				Sediment Toxicity		9 Acres	2008
					Nonpoint/Point Source		
9	C	San Diego Bay Shoreline, Shelter Island Shoreline Park	90810000				
				Indicator bacteria		0.42 Miles	2006
					Unknown Nonpoint Source		
					Unknown point source		

2006 CWA SECTION 303(d) LIST OF WATER QUALITY LIMITED SEGMENTS REQUIRING TMDLS

SAN DIEGO REGIONAL WATER QUALITY CONTROL BOARD

USEPA APPROVAL DATE: JUNE 28, 2007

REGION	TYPE	NAME	CALWATER WATERSHED	POLLUTANT/STRESSOR	POTENTIAL SOURCES	ESTIMATED SIZE AFFECTED	PROPOSED TMDL COMPLETION
9	B	San Diego Bay Shoreline, Vicinity of B St and Broadway Piers	90821000				
				Benthic Community Effects		9.9 Acres	2019
					Nonpoint/Point Source		
				Indicator bacteria		9.9 Acres	2006
				Estimated size of impairment is 0.4 miles around the shoreline of the bay.			
					Urban Runoff/Storm Sewers		
					Unknown Nonpoint Source		
					Unknown point source		
				Sediment Toxicity		9.9 Acres	2019
					Nonpoint/Point Source		
9	R	San Diego River (Lower)	90711000				
				Fecal Coliform		16 Miles	2005
				Lower 6 miles.			
					Urban Runoff/Storm Sewers		
					Wastewater		
					Nonpoint/Point Source		
				Low Dissolved Oxygen		16 Miles	2019
				Impairment transcends adjacent Calwater wtareshed 90712.			
					Urban Runoff/Storm Sewers		
					Unknown Nonpoint Source		
					Unknown point source		
				Phosphorus		16 Miles	2019
				Impairment transcends adjacent Calwater watershed 90712.			
					Urban Runoff/Storm Sewers		
					Unknown Nonpoint Source		
					Unknown point source		
				Total Dissolved Solids		16 Miles	2019
				Impairment transcends adjacent Calwater watershed 90712.			
					Urban Runoff/Storm Sewers		
					Flow Regulation/Modification		
					Natural Sources		
					Unknown Nonpoint Source		
					Unknown point source		

2006 CWA SECTION 303(d) LIST OF WATER QUALITY LIMITED SEGMENTS REQUIRING TMDLS

SAN DIEGO REGIONAL WATER QUALITY CONTROL BOARD

USEPA APPROVAL DATE: JUNE 28, 2007

REGION	TYPE	NAME	CALWATER WATERSHED	POLLUTANT/STRESSOR	POTENTIAL SOURCES	ESTIMATED SIZE AFFECTED	PROPOSED TMDL COMPLETION

ABBREVIATIONS

REGIONAL WATER QUALITY CONTROL BOARDS

1	North Coast
2	San Francisco Bay
3	Central Coast
4	Los Angeles
5	Central Valley
6	Lahontan
7	Colorado River Basin
8	Santa Ana
9	San Diego

WATER BODY TYPE

B =	Bays and Harbors
C =	Coastal Shorelines/Beaches
E =	Estuaries
L =	Lakes/Reserviors
R =	Rivers and Streams
S =	Saline Lakes
T =	Wetlands, Tidal
W=	Wetlands, Freshwater

CALWATER WATERSHED

"Calwater Watershed" is the State Water Resources Control Board hydrological subunit area or an even smaller area delineation.

GROUP A PESTICIDES OR CHEM A

aldrin, dieldrin, chlordane, endrin, heptachlor, heptachlor epoxide, hexachlorocyclohexane (including lindane), endosulfan, and toxaphene

ATTACHMENT E

PRIORITY BMP MATRIX

Table 2-1. Priority Development Project Determination		
Yes	No	Is the project in any of these categories?
☐	☒	**Residential development of 10 or more dwelling units.** Examples: single-family homes, multi-family homes, condominiums, and apartments.
☒	☐	**Commercial development and similar non-residential development greater than one acre.** Examples: hospitals; laboratories and other medical facilities; educational institutions; recreational facilities; municipal facilities; commercial nurseries; multi-apartment buildings; car wash facilities; mini-malls and other business complexes; shopping malls; hotels; office buildings; public warehouses; automotive dealerships; airfields; and other light industrial facilities.
☐	☒	**Heavy industrial development greater than one acre.** Examples: manufacturing plants, food processing plants, metal working facilities, printing plants, and fleet storage areas (bus, truck, etc.).
☐	☒	**Automotive repair shop.** A facility categorized in any one of Standard Industrial Classification (SIC) codes 5013, 5014, 5541, 7532-7534, or 7536-7539.
☒	☐	**Restaurant.** Any facility that sells prepared foods and drinks for consumption, including stationary lunch counters and refreshment stands selling prepared foods and drinks for immediate consumption (SIC code 5812), ***and*** where the land area for development is greater than 5,000 square feet.
☐	☒	**Hillside development greater than 5,000 square feet.** Any development that creates 5,000 square feet of impervious surface and is located in an area with known erosive soil conditions ***and*** where the development will grade on any natural slope that is twenty-five percent or greater.
☐	☒	**Water Quality Sensitive Area.** All development located within, directly adjacent to, or discharging directly to a Water Quality Sensitive Area (as depicted in Appendix C) in which the project either creates 2,500 square feet of impervious surface on a proposed project site or increases the area of imperviousness of a proposed project site to 10% or more of its naturally occurring condition. "Directly adjacent" is defined as being situated within 200 feet of the Water Quality Sensitive Area. "Discharging directly to" is defined as outflow from a drainage conveyance system that is composed entirely of flows from the subject development or redevelopment site, and not commingled with flows from adjacent lands.
☐	☒	**Parking lot with a minimum area of 5,000 square feet <u>or</u> a minimum of 15 parking spaces** and potential exposure to urban runoff (unless it meets the exclusion for parking lot reconfiguration on line 11).
☐	☒	**Street, road, highway, or freeway.** Any new paved surface in excess of 5,000 square feet used for the transportation of automobiles, trucks, motorcycles, and other vehicles (unless it meets the exclusion for road reconfiguration on line 11).
☐	☒	**Retail Gasoline Outlet (RGO)** that is: (a) 5,000 square feet or more or (b) have a projected Average Daily Traffic (ADT) of 100 or more vehicles per day.
☒	☐	**Significant Redevelopment;** the project installs and/or replaces 5,000 square feet or more of impervious surface ***and*** the existing site meets at least one of the categories above. The project is not considered Significant Redevelopment if reconfiguring an existing road or parking lot without a change to the footprint of an existing developed road or parking lot. The existing footprint is defined as the outside curb or the outside edge of pavement when there is no curb.
☐	☒	**Other Pollutant Generating Project.** Any other project not covered in the categories above, that disturbs one acre or more and is not excluded by the criteria below. *Exclusions that apply to line 12 only: Projects creating less than 5,000 sf of impervious surface and where any added landscaping does not require regular use of pesticides and fertilizers, such as a slope stabilization project using native plants, are excluded from this category. Calculation of the square footage of impervious surface need not include linear pathways that are for infrequent vehicle use, such as for emergency or maintenance access or for bicycle or pedestrian use, if they are built with pervious surfaces or if they sheet flow to surrounding pervious surfaces*

ATTACHMENT F

ANTICIPATED AND POTENTIAL POLLUTANTS

Table 4-1. Anticipated and Potential Pollutants Generated by Land Use Type.									
General Project Categories	General Pollutant Categories								
	Sediments	Nutrients	Heavy Metals	Organic Compounds	Trash & Debris	Oxygen Demanding Substances	Oil & Grease	Bacteria & Viruses	Pesticides
Detached Residential Housing Development	X	X			X	X	X	X	X
Attached Residential Development	X	X			X	P(1)	P(2)	P	X
Commercial Development	P(1)	P(1)	X	P(2)	X	P(5)	X	P(3)	P(5)
Industrial Development	X		X	X	X	X	X		
Automotive Repair Shops			X	X(4)(5)	X		X		
Restaurants					X	X	X	X	P(1)
Steep Hillside Developments	X	X			X	X	X		X
Parking Lots	P(1)	P(1)	X		X	P(1)	X		P(1)
Streets, Highways & Freeways	X	P(1)	X	X(4)	X	P(5)	X	X	P(1)
Retail Gasoline Outlets (RGO)			X	X	X	X	X		

X = anticipated
P = potential
(1) A potential pollutant if landscaping exists on-site.
(2) A potential pollutant if the project includes uncovered parking areas.
(3) A potential pollutant if land use involves food or animal waste products.
(4) Including petroleum hydrocarbons.
(5) Including solvents.

4.1.6 Identification of Pollutants of Concern for the Receiving Water

For PDPs, the following analysis shall be conducted and reported in the project's Water Quality Technical Report:

- For each of the proposed project discharge points, identify the receiving waters (including hydrologic unit basin numbers) as identified in the most recent version of the *Water Quality Control Plan for the San Diego Basin*[2], prepared by the RWQCB (see Suggested Resources in Appendix A).

[2] To view a copy of the Basin Plan, go to: http://www.swrcb.ca.gov/rwqcb9/programs/basinplan.html

Table 4-3. Structural BMP Treatment Control Selection Matrix									
BMP	LID	HMP Control	Sediment	Nutrients	Trash	Metals	Bacteria	Oils and Grease	Organics
Infiltration Basin	Y	Y	H	H	H	H	H	H	H
Bioretention Basin	Y	Y	H	M	H	H	H	H	H
Cistern Plus Bioretention	Y	Y	H	M	H	H	H	H	H
Vault plus Bioretention	Y	Y	H	M	H	H	H	H	H
Self-retaining Area	Y	Y	H	H	H	H	H	H	H
Dry Wells	Y	Y	H	H	H	H	H	H	H
Constructed Wetlands	Y	Y	H	M	H	H	H	H	H
Extended Detention Basin	Y	Y	M	L	H	M	M	M	M
Vegetated Swale	Y	N	M	L	L	M	L	M	M
Vegetated Buffer Strips	Y	N	H	L	M	H	L	H	M
Flow-Through Planter Boxes	Y	Y	H	M	H	H	H	H	H
Vortex Separator or Wet Vault	N	N	M	L	M	L	L	L	L
Media Filter	N	N	H	L	H	H	M	H	H

H High removal efficiency
M Medium removal efficiency
L Low removal efficiency

4.4.2 Restrictions on the Use of Infiltration Treatment BMPs

Treatment control BMPs that are designed to function as infiltration devices shall meet the following conditions (these conditions do not apply to treatment BMPs which allow incidental infiltration and are not designed to function primarily as infiltration devices, such as grassy swales, detention basins, vegetated buffer strips, constructed wetlands, etc.):

- Urban runoff from commercial developments shall undergo pretreatment to remove both physical and chemical contaminants prior to infiltration.
- All dry weather flows shall be diverted from infiltration devices except for those non-storm water discharges authorized pursuant to 40 CFR 122.26(d)(2)(iv)(B)(1):
  - Diverted stream flows
  - Rising ground waters

ATTACHMENT G

HYDROLOGY STUDY

EXISTING ONSITE PROJECT FLOW

BASIN	RUNOFF COEFF. C	INTENSITY (I in/hr)	AREA (ACRES)	DISCHARGE (Q cfs)
1	0.53	3.85	0.49	1.00
2	0.85	5.39	0.45	2.06
3	0.85	5.14	0.39	1.70
TOTAL RUNOFF LEAVING THE PROJECT AREA =				**4.76**

BASIN 1

TOTAL AREA OF SITE = 0.49 ACRES

C= 0.53
D= 200.00 FEET
Δ= 4.00 FEET
S= 2.00 %
Iso= 2.50

T_C= 11.52 MINUTES
I= 3.85 INCHES/HR

Q=CIA 1.00 CFS

BASIN 2

TOTAL AREA OF SITE = 0.45 ACRES

C= 0.85
D= 165.00 FEET
Δ= 1.00 FEET
S= 0.61 %
Iso= 2.50

T_C= 6.83 MINUTES
I= 5.39 INCHES/HR

Q=CIA 2.06 CFS

BASIN 3

TOTAL AREA OF SITE = 0.39 ACRES

C= 0.85
D= 180.00 FEET
Δ= 1.00 FEET
S= 0.56 %
Iso= 2.50

T_C= 7.34 MINUTES
I= 5.14 INCHES/HR

Q=CIA 1.70 CFS

PROPOSED ONSITE PROJECT FLOW

BASIN	RUNOFF COEFF. C	INTENSITY (I in/hr)	AREA (ACRES)	DISCHARGE (Q cfs)
1	0.50	4.01	0.36	0.72
2	0.85	5.23	0.9	4.00
TOTAL RUNOFF LEAVING THE PROJECT AREA =				**4.72**

BASIN 1

TOTAL AREA OF SITE = 0.36 ACRES

C= 0.50 C= 23% Imp/80% Imp * .85
D= 190.00 FEET
Δ= 5.00 FEET
S= 2.63 %
Iso= 2.50

T_C= 10.78 MINUTES
I= 4.01 INCHES/HR

Q=CIA 0.72 CFS

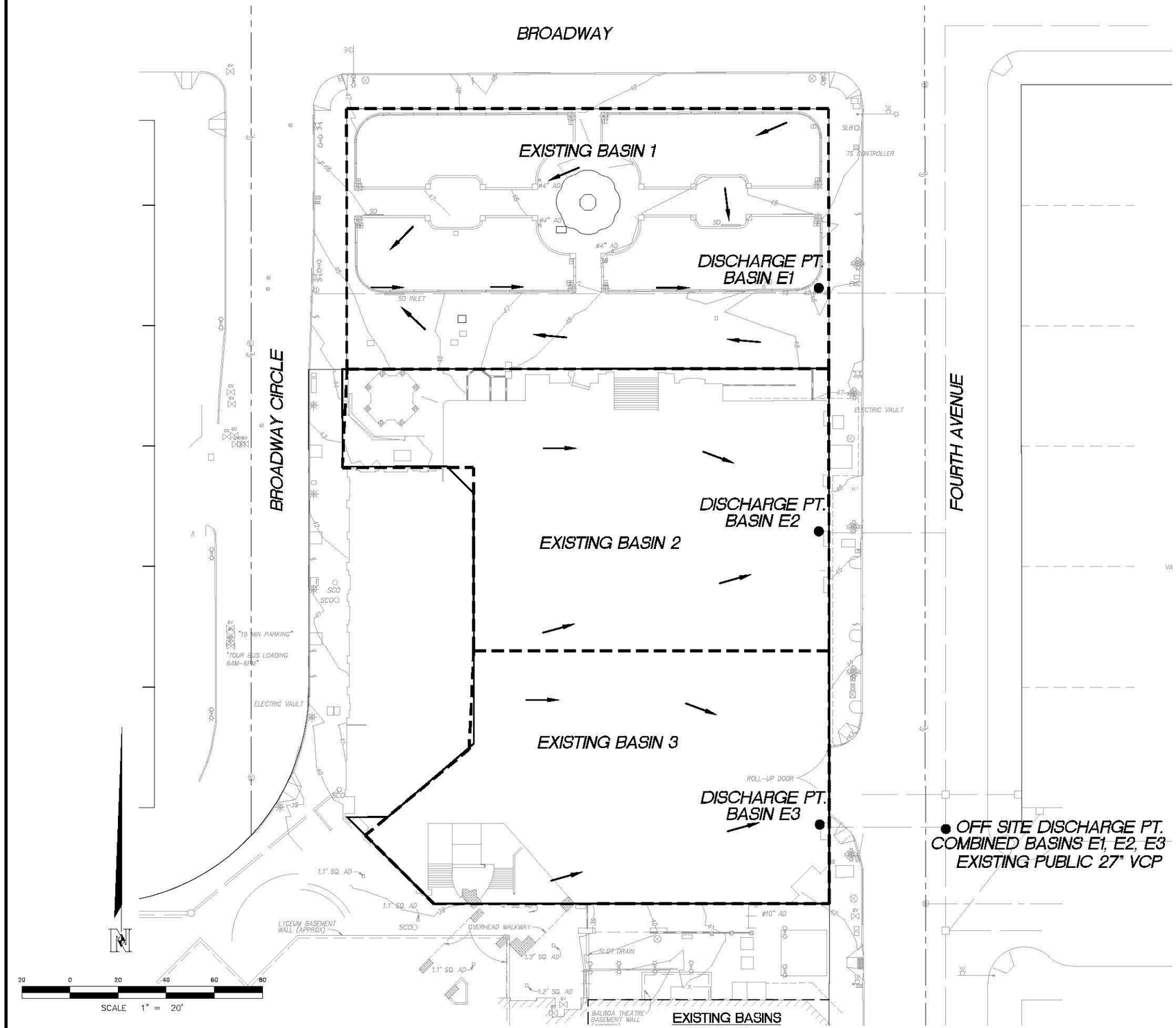
BASIN 2

TOTAL AREA OF SITE = 0.90 ACRES

C= 0.85
D= 420.00 FEET
Δ= 9.00 FEET
S= 2.14 %
Iso= 2.50

T_C= 7.15 MINUTES
I= 5.23 INCHES/HR

Q=CIA 4.00 CFS



EXISTING ONSITE FLOW

BASIN	C VALUE	INTENSITY	AREA	DISCHARGE (Q)
E1	0.53	3.85 IN/HR	0.49 AC	1.00 CFS
E2	0.85	5.39 IN/HR	0.45 AC	2.06 CFS
E3	0.85	5.14 IN/HR	0.39 AC	1.70 CFS
				4.76 CFS

EXHIBIT A

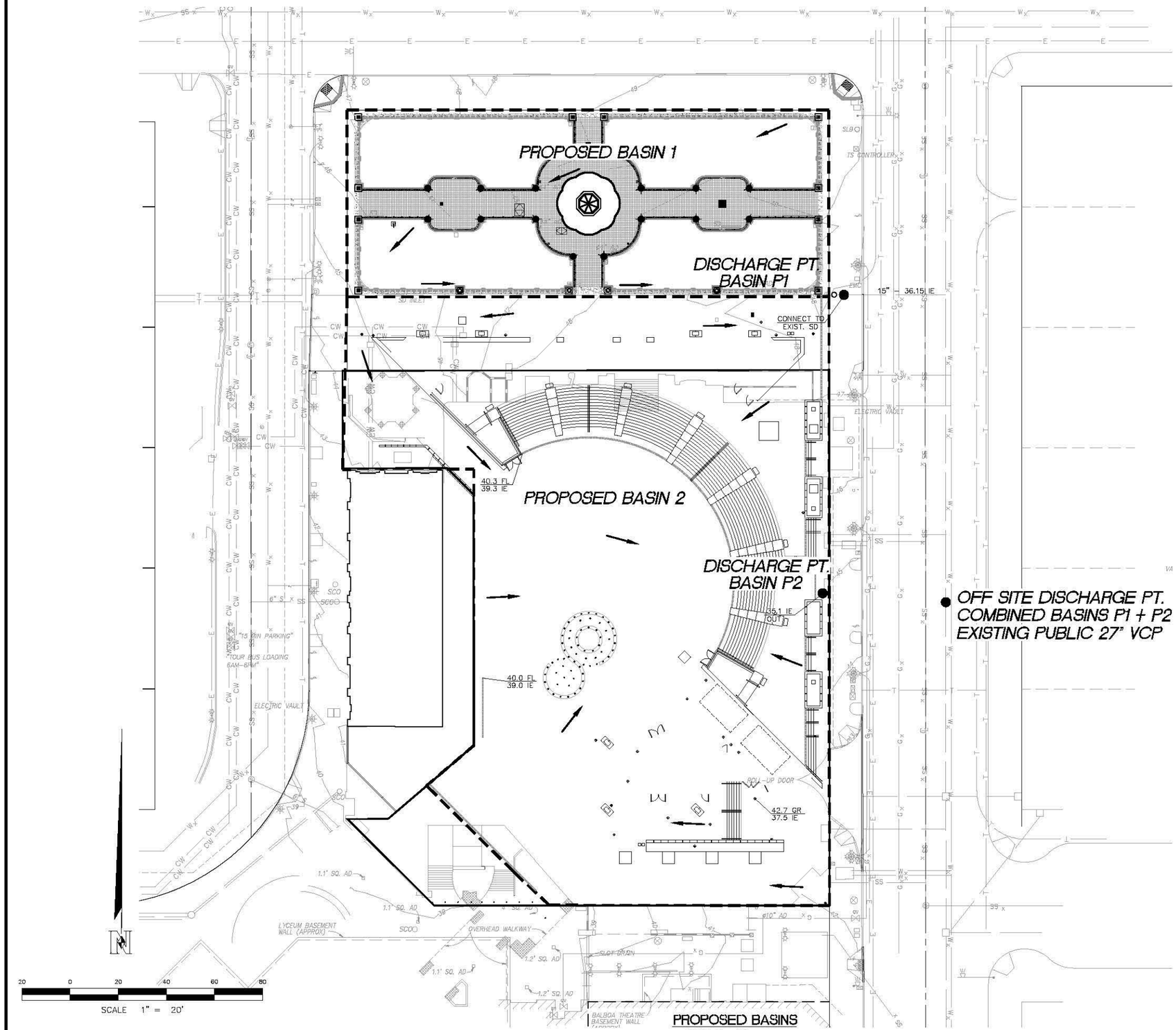
HORTON PLAZA PARK

NASLAND ENGINEERING

CIVIL ENGINEERING • SURVEYING • LAND PLANNING
4740 Huffner Street, San Diego, California, 92111 •858-292-7770

REVISION	DATE	BY
ORIGINAL	9-14-11	AP

PROJECT ENGR:
DESIGNED BY:
DRAWN BY:
SCALE: AS SHOWN
JOB NO. 110-228.1



PROPOSED BASINS
SCALE 1" = 20'

PROPOSED ONSITE FLOW

BASIN	C VALUE	INTENSITY	AREA	DISCHARGE (Q)
P1	0.50	4.01 IN/HR	0.36 AC	0.72 CFS
P2	0.85	5.23 IN/HR	0.90 AC	4.00 CFS

4.72 CFS

EXHIBIT B

HORTON PLAZA PARK

NASLAND ENGINEERING
CIVIL ENGINEERING • SURVEYING • LAND PLANNING
4740 Ruffner Street, San Diego, California, 92111 •858-292-7770

REVISION	DATE	BY
ORIGINAL	9-14-11	AP

PROJECT ENGR:
DESIGNED BY:
DRAWN BY:
SCALE: AS SHOWN
JOB NO. 110-228.1

ATTACHMENT H

HMP APPLICABILITY DETERMINATION CHART

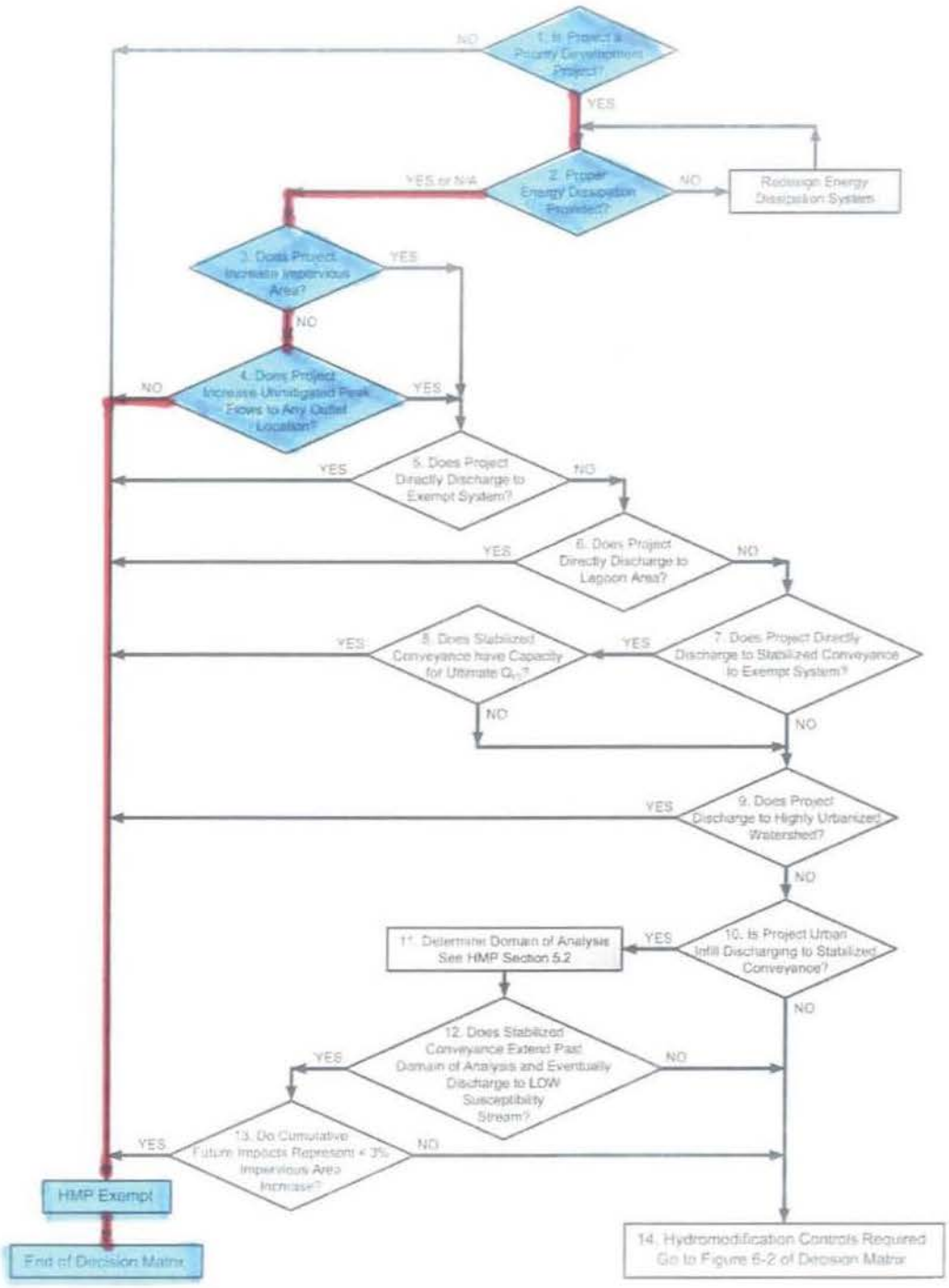


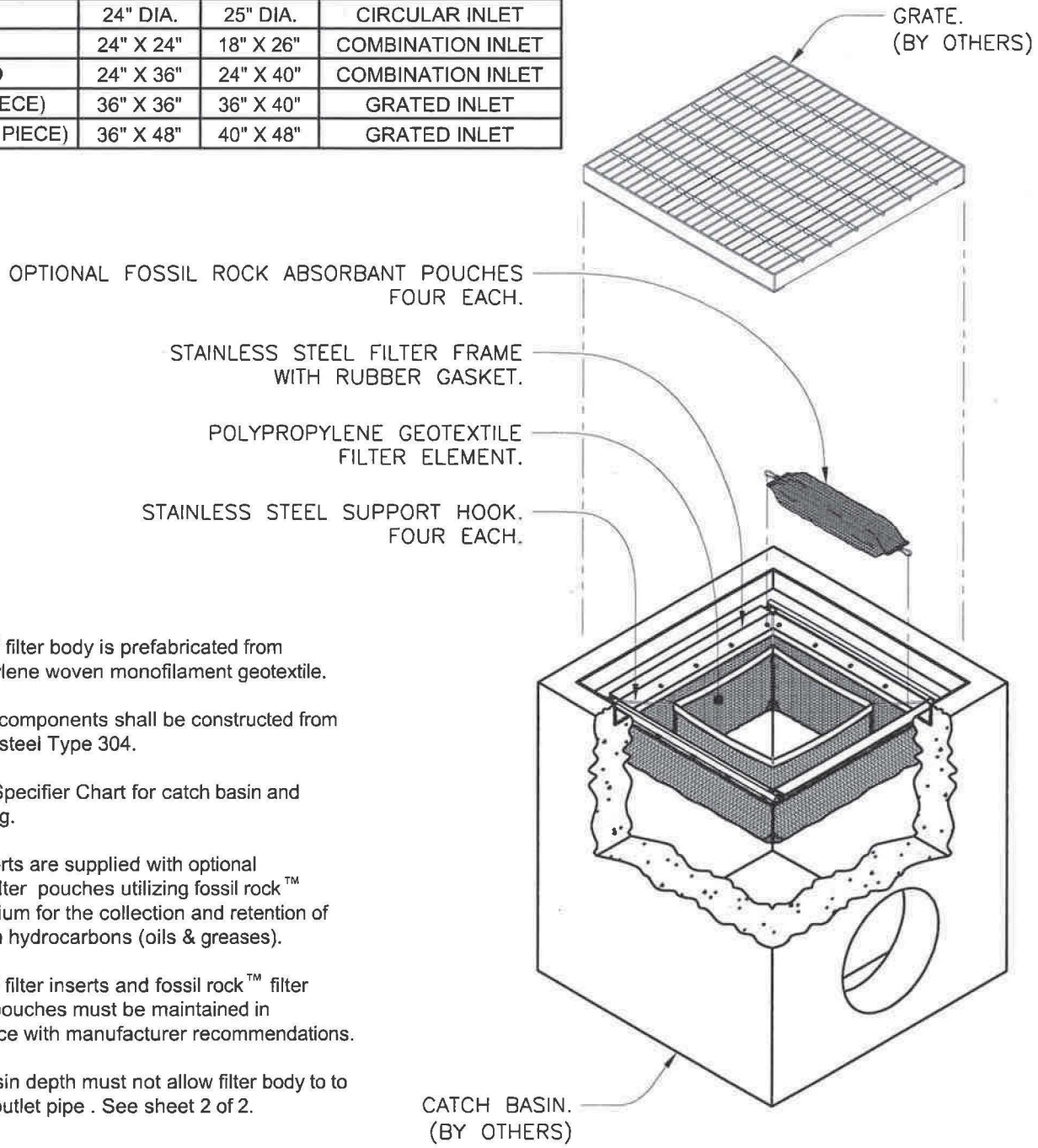
Figure 4-1. HMP Applicability Determination

ATTACHMENT I

FILTER INSERT DETAILS

FG-0001

SPECIFIER CHART			
MODEL	INLET ID	GRATE OD	COMMENTS
FF-12D	12" X 12"	15" X 15"	GRATED INLET
FF-16D	16" X 16"	18" X 18"	GRATED INLET
FF-18D	18" X 18"	20" X 20"	GRATED INLET
FF-1836SD	18" X 36"	18" X 40"	GRATED INLET
FF-1836DGO	18" X 36"	18" X 40"	COMBINATION INLET
FF-24D	24" X 24"	26" X 26"	GRATED INLET
FF-2436D	24" X 36"	24" X 40"	GRATED INLET
FF-RF24D	24" DIA.	25" DIA.	CIRCULAR INLET
FF-24DGO	24" X 24"	18" X 26"	COMBINATION INLET
FF-2436DGO	24" X 36"	24" X 40"	COMBINATION INLET
FF-36D (2 PIECE)	36" X 36"	36" X 40"	GRATED INLET
FF-3648D (2 PIECE)	36" X 48"	40" X 48"	GRATED INLET



NOTES:

1. FloGard® filter body is prefabricated from polypropylene woven monofilament geotextile.
2. All metal components shall be constructed from stainless steel Type 304.
3. Refer to Specifier Chart for catch basin and filter sizing.
4. Filter inserts are supplied with optional "clip-in" filter pouches utilizing fossil rock™ filter medium for the collection and retention of petroleum hydrocarbons (oils & greases).
5. FloGard® filter inserts and fossil rock™ filter medium pouches must be maintained in accordance with manufacturer recommendations.
6. Catch basin depth must not allow filter body to to obstruct outlet pipe . See sheet 2 of 2.

TITLE

FloGard®

CATCH BASIN FILTER INSERT

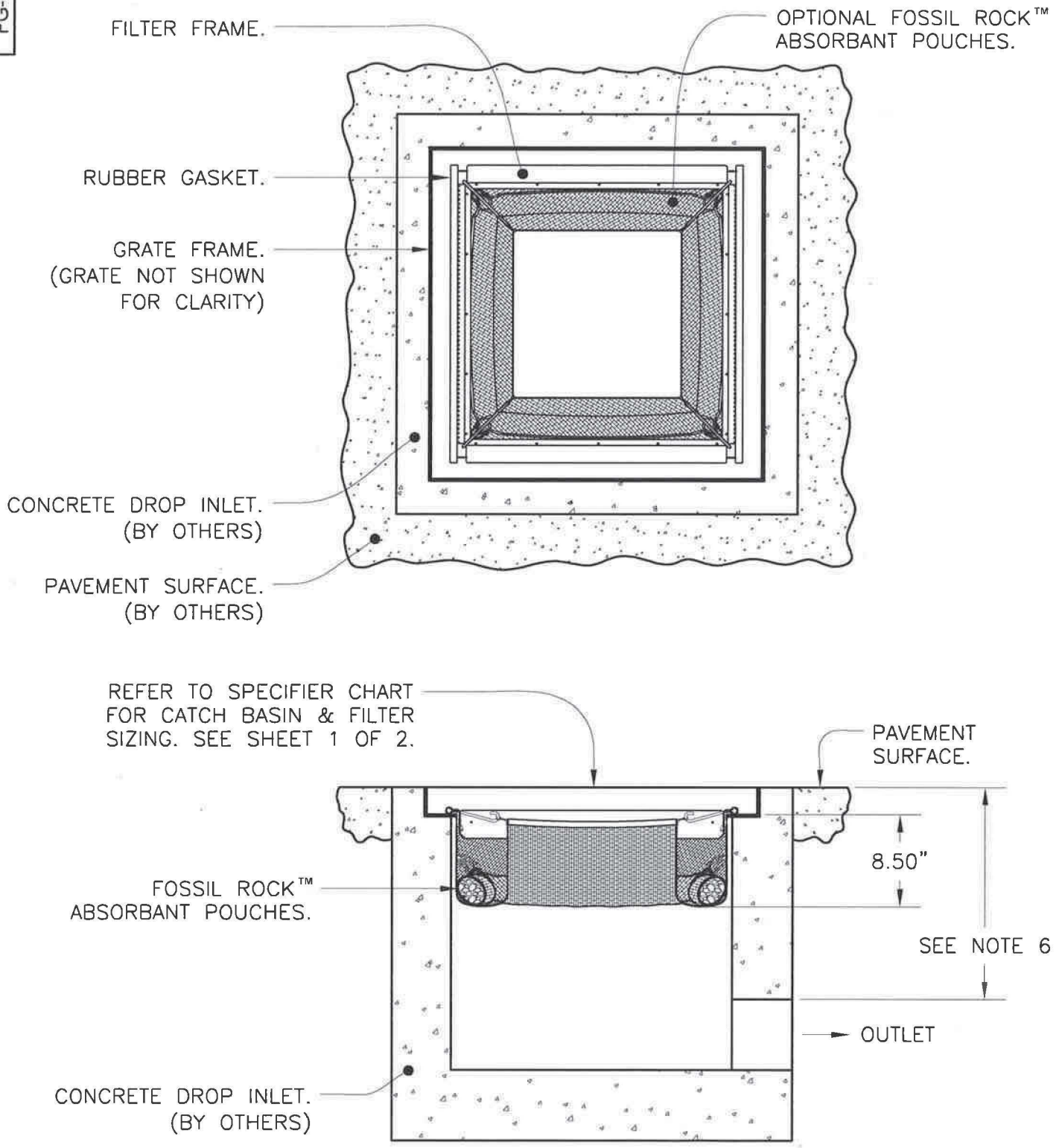
KRISTAR

KriStar Enterprises, Inc.

360 Sutton Place, Santa Rosa, CA 95407
Ph: 800.579.8819, Fax: 707.524.8186, www.kristar.com

DRAWING NO.	REV	ECO	DATE	SHEET
FG-0001	C	0109 JPR 12/4/12	JPR 12/18/06	SHEET 1 OF 2

FG-0001



SECTION VIEW

TITLE

FloGard®

CATCH BASIN FILTER INSERT

KriStar Enterprises, Inc.

360 Sutton Place, Santa Rosa, CA 95407
Ph: 800.579.8819, Fax: 707.524.8186, www.kristar.com

DRAWING NO.	REV	ECO	DATE	
FG-0001	C	0109 JPR 12/4/12	JPR 12/18/06	SHEET 2 OF 2

TRITONTT3 FILTER™

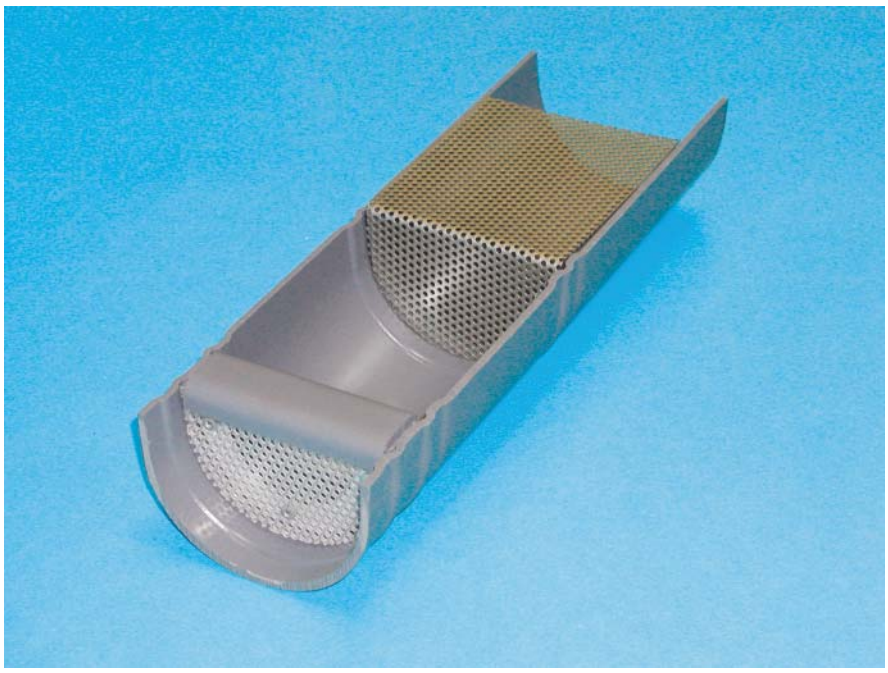
Spring 2004 | **Product Specification**

TRENCH DRAIN FILTER INSERT (TT3)

Revel Environmental Manufacturing, Inc.

THE TRITON TRENCH DRAIN FILTER™ INSERT FEATURES:

- Non-reactive, high impact polystyrene plastic with increased UV resistance.
- Over 40% recycled material.
- Filter Media Cartridge is easily removed for ease of maintenance.
- Filter Media Cartridges available for the removal of hydrocarbons, metals, sand, silt and debris.
- Optional Antimicrobial Media Pak, which adds the prevention of bacterial growth and the protection against odor-causing water borne pathogens to our current media.
- Media is non hazardous and meets all EPA and OSHA standards.
- REM Service Program recycles all spent absorbents.
- Patent Pending design with both nominal flow and high overflow capacities.
- Easy to install in new and existing trench drains.
- Meets Best Available Technology for use in Stormwater BMP (Best Management Practices).
- Cleaning and Maintenance contracts available through REM Service Department.



MODEL TT3

TRITON TRENCH DRAIN FILTER™ INSERT

REM has developed the TRITON Trench Drain Filter™ Insert to help eliminate hydrocarbons and other contaminants such as metals, sand, silt and litter from stormwater runoff that enters trench drains.

The TRITON TT3™ is designed to be inserted below the grate of trench drain inlets, and is a cost effective solution to filtering your trench drains.

Patent Pending

REM - HELPING KEEP OUR WATERWAYS CLEAN

The most recent National Water Quality Inventory reports that runoff from urban areas is the leading source of impairments to surveyed estuaries and the third largest source of water quality impairments to surveyed lakes. In addition, population and development trends indicate that by 2010 more than half of the Nation will live in coastal towns and cities. Runoff from these rapidly growing urban areas will continue to degrade coastal waters.[1]

[1]Environmental Protection Agency's Office of Water EPA841–F–96–004G

REM

Revel Environmental Manufacturing Inc.
sales@remfilters.com **(888) 526-4736** www.remfilters.com

Northern California
960-B Detroit Avenue
Concord, California 94518
P: (925) 676-4736
F: (925) 676-8676

Southern California
215 E. Orangethorpe Ave., #282
Fullerton, California 92832
P: (714) 720-4604
F: (714) 523-4143

Servicing filters on a regular basis is a requirement to meet most local and state BMP's.

MADE IN THE USA

TRITON TT3 TRENCH DRAIN FILTER™ INSERT

Standard Dimensions:

3.25" height, x 4" width, x 13" length.

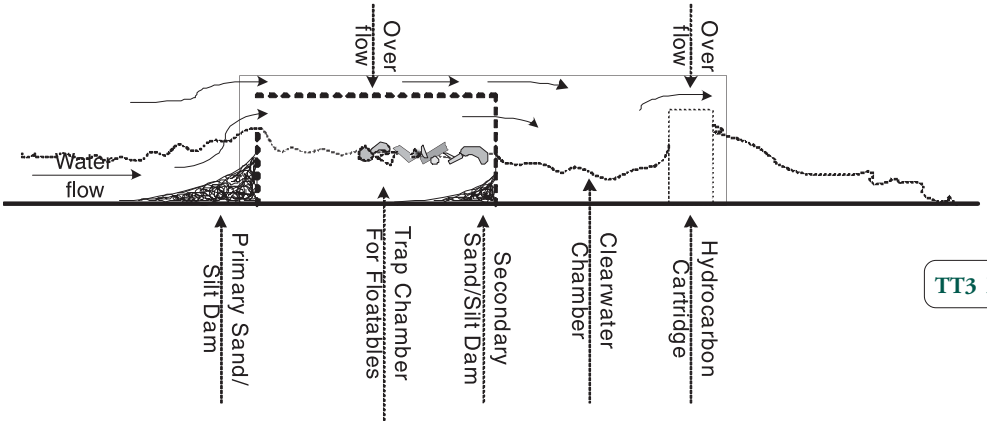
Units should be installed every 3 to 4 feet along entire length of trench drain.



MODEL TT3 INSTALLED IN TRENCH

Notes:

1. Filter Frame made of HDPE with an average thickness of 0.1875".
2. Removable cartridge is made of 0.0625" polypropylene perforation, with 0.117" openings on 5/32" staggered centers.
3. Cartridge frame is made of polypropylene with an average thickness of 0.125".
3. Secondary dam is made of stainless steel type 304 with 0.117" openings on 5/32" staggered centers.
4. Filter medium is an EPA-approved absorbent material that contains no hazardous ingredients.
5. Optional Antimicrobial Media Pak which adds the prevention of bacterial growth and the protection against odor-causing water borne pathogens to our current media.



TT3 EXPLODED VIEW

HOW THE TT3 WORKS:

1. Storm Water flows through the trench drain.
2. The water passes through the Primary Sand/Silt Dam, where large particulates are filtered out.
3. The water then passes through the Trap Chamber where floatables are collected.
4. A secondary sand/silt filtration is performed after the Trap Chamber, removing the last of the sediment.
5. Hydrocarbons are retained by the ABSORB media in the Hydrocarbon Collection Cartridge.
6. Clean Water passes to the end of the trench and into the storm water system.

REM

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Distributed By:

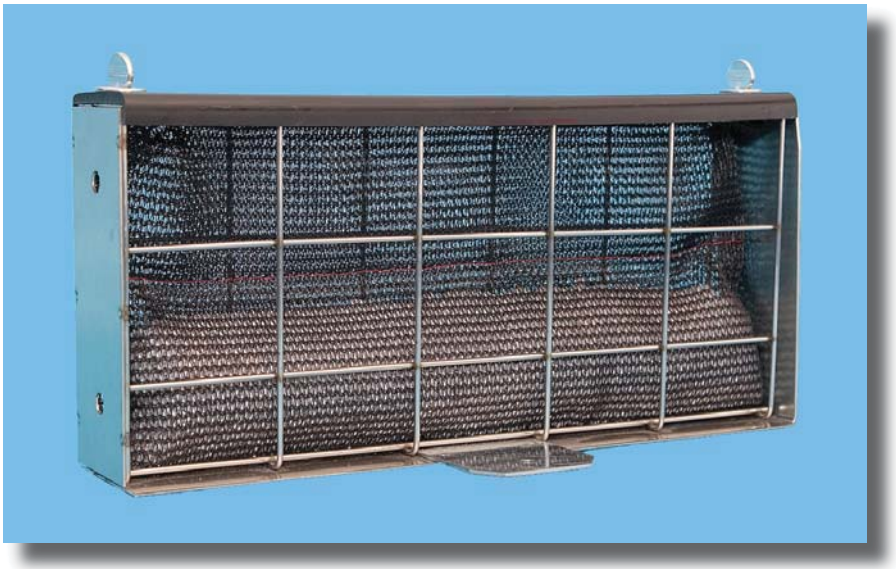
TRITON T-DAM FILTER™

Product Specification

TRENCH DRAIN FILTER INSERT

T-DAM FILTER

- Non-reactive High Impact Polystrene plastic construction with U.V. inhibitors.
- Exterior side constructed with Type 304 Stainless Steel.
- Filter Media-Pak available for the removal of hydrocarbons, metals, sand, silt, and litter.
- Filter Media-Pak is easily removed for ease of maintenance.
- Disposable Media-Pak is constructed from durable geo-textile polypropylene fabric.
- Media is nonhazardous, per EPA and OSHA standards.
- Patent Pending design with high nominal flow and high overflow capacities.
- Easy to install in new and existing trench drains.
- Meets Best Available Technology (BAT) for use in Stormwater Best Management Practices (BMP).
- Maintenance contracts, including recycling of all spent absorbents are available through REM Service Department.
- Servicing of filters on a regular basis is a requirement to meet most local and state BMP's.



MODEL TDAM12

TRITON T-DAM TRENCH DRAIN FILTER INSERT

REM has developed the TRITON T-DAM Trench Drain Filter Insert to help eliminate hydrocarbons and other contaminants such as metals, sand, silt and litter from stormwater runoff.

The TRITON T-DAM is designed to be inserted below the grate of trench drain inlets, and is a easy and cost effective solution to filtering your trench drains

Patent Pending

REM - HELPING KEEP YOUR WATERWAYS CLEAN

The most recent National Water Quality Inventory reports that runoff from urban areas is the leading source of impairments to surveyed estuaries and the third largest source of water quality impairments to surveyed lakes. In addition, population and development trends indicate that by 2010 more than half of the Nation will live in coastal towns and cities. Runoff from these rapidly growing urban areas will continue to degrade coastal waters.[1]

[1]Environmental Protection Agency's Office of Water EPA841–F–96–004G

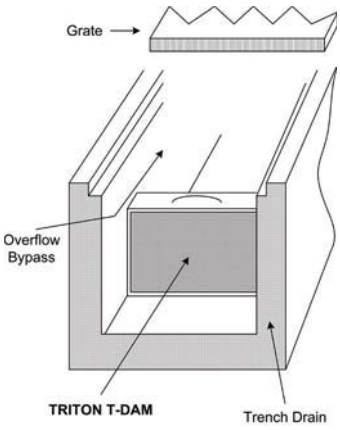
Revel Environmental Manufacturing, Inc.
www.remfilters.com
888-526-4736

MADE IN USA

TRITON T-DAM TRENCH DRAIN FILTER™



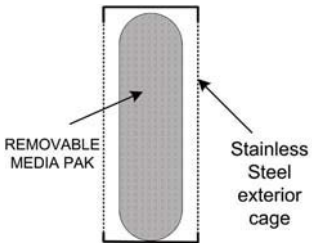
T-DAM INSTALLED



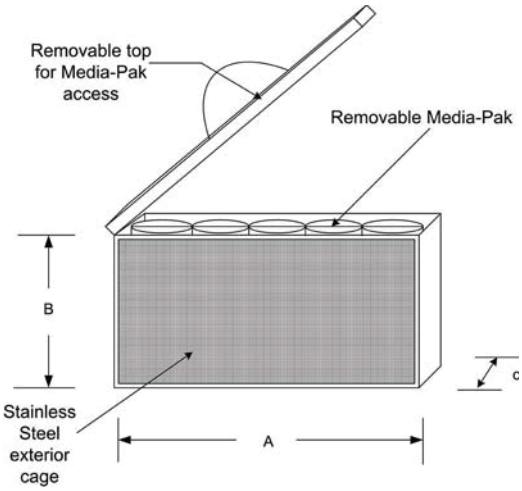
INSTALLED VIEW



T-DAM INSTALLED



END VIEW



NOTES:

1. T-DAMs can be customized to be adaptable to the many different types of trench drains available today.
2. T-DAM external cage shall be made of .162 diameter, 8 gauge Type 304 stainless steel.
3. Top cap is made of High Impact Polystyrene Plastic with U.V. inhibitors added.
4. Filter Media-Paks are easily removed from units for easy maintenance.
5. Filter design requires storm events to be filtered through Media-Pak. This prevents flows from bypassing Media-Pak, which filters out hydrocarbons and other pollutants.
6. Media-Paks can be customized for different removal needs.
7. The disposable Media-Pak is constructed from durable geo-textile polypropylene fabric.
8. Filter Media is non-hazardous per EPA and OSHA standards.
9. Please refer to manufacture's recommendations for an approved maintenance program.

STANDARD DIMENSIONS

MODEL*	A	B**	C
TDAM5	4.5"	5.5"	1.5"
TDAM6	5.5"	5.5"	1.5"
TDAM8	7.5"	5.5"	1.5"
TDAM10	9.5"	5.5"	1.5"
TDAM12	11.5"	5.5"	1.5"
TDAM15	14.5"	5.5"	1.5"
TDAM18	17.5"	5.5"	1.5"
TDAM20	19.5"	5.5"	1.5"
TDAM24	23.5"	5.5"	1.5"

note:
* Many other sizes are also available.
** Dimension "B" (height) can be customized as needed.

Revel Environmental Manufacturing Inc.
sales@remfilters.com (888) 526-4736 Lic. No. 857410

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Concord, California 94518
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F: (925) 676-8676

Southern California
2110 South Grand Avenue
Santa Ana, California 92705
P: (714) 557-2676
F: (714) 557-2679

REM
www.remfilters.com

Distributed By:

South Bay Foundry
phone: 619-956-2780
fax: 619-956-2788
http://www.southbayfoundry.com

ATTACHMENT J

STORMWATER AGREEMENT

No Fee for Recordation
Government Code Section 6103

THE CITY OF SAN DIEGO

RECORDING REQUESTED BY:
THE CITY OF SAN DIEGO

AND WHEN RECORDED MAIL TO:

City of San Diego
Development Services Department
1222 First Avenue, M.S. 501
San Diego, CA 92101-4155

Space above this line for Recorder's use only

P.T.S. APPROVAL NUMBER: _____	ASSESSOR'S PARCEL NUMBERS: 533-610-17, 533-610-09	P.T.S. PROJECT NUMBER: 287746

STORM WATER MANAGEMENT AND DISCHARGE CONTROL MAINTENANCE AGREEMENT

This Storm Water Management and Discharge Control Maintenance Agreement ("**Agreement**") is made by and among the City of San Diego, a municipal corporation ("**City**"), the City of San Diego, solely in its capacity as the designated successor agency to the Redevelopment Agency of the City of San Diego, a former public body, corporate and politic ("**Successor Agency**"), and HORTON PLAZA LLC, a Delaware limited liability company ("**Property Manager**").

RECITALS

A. Prior to its dissolution effective February 1, 2012, the Redevelopment Agency of the City of San Diego, a former public body, corporate and politic ("**Former RDA**"), was engaged in activities necessary and appropriate to carry out the Redevelopment Plan for the Horton Plaza Redevelopment Project within the Horton Plaza Redevelopment Project Area ("**Project Area**"). The City Council of the City of San Diego approved and adopted the Project Area by Ordinance No. 10882[NS].

B. As part of its implementation of redevelopment activities in the Project Area, the Former RDA entered into that certain Owner Participation Agreement dated January 19, 2011 ("**OPA**"), with HORTON LAND LLC, a Delaware limited liability company, HORTON PLAZA VENTURE LLC, a Delaware limited liability company,

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and HORTON PLAZA LP, a Delaware limited partnership formerly known as Horton Plaza LLC (collectively, the predecessor-in-interest to Property Manager). Upon the Former RDA's dissolution, the Successor Agency assumed the Former RDA's rights and obligations under the OPA.

C. The City is the fee title owner of certain real property consisting of a public park site commonly known as Horton Plaza Mini-Park, located at 325 Broadway Avenue in the City of San Diego, State of California, and designated as Assessor's Parcel Number 533-610-17 ("**Park Property**"). The legal description of the Park Property is set forth in **Exhibit "A"** attached hereto. The Property Manager is the current fee title owner of certain real property located adjacent to the Park Property, at 199 Horton Plaza in the City of San Diego, State of California, and designated as Assessor's Parcel Number 533-610-09 ("**Sales Parcel**"). The legal description of the Sales Parcel is set forth in **Exhibit "B"** attached hereto.

D. Simultaneous with the execution of the OPA, the City and the Former RDA executed that certain Cooperation Agreement dated January 19, 2011 ("**Cooperation Agreement**"). Pursuant to the Cooperation Agreement, the Former RDA agreed to cause the design and development of the Sales Parcel as a public plaza, consistent with the Redevelopment Plan, as amended, for the Horton Plaza Redevelopment Project, and to cause the refurbishment and renovation of the Park Property, and thereafter to convey the Sales Parcel to the City. Upon recordation of a parcel map in the near future, the Property Manager will transfer ownership to the Sales Parcel to the Successor Agency. The Successor Agency will then commence construction of the improvements on the Sales Parcel and the Park Property. Upon completion of such improvements, the Successor Agency will transfer ownership of the Sales Parcel to the City. Pursuant to the Cooperation Agreement, the City agreed to cause the maintenance of both the Sales Parcel and the Park Property, as improved (collectively, "**Plaza Property**"), subject to the Property Manager's fulfillment of its 25-year maintenance obligation as described below. The Plaza Property is graphically depicted in **Exhibit "C"** attached hereto.

E. The OPA requires the Property Manager to maintain and operate, and pay for the costs to maintain and operate, the Plaza Property for twenty-five (25) years commencing upon completion of the work at the Plaza Property. The City and the Property Manager will soon enter into that certain Maintenance and Operations Agreement in substantially the same form as Attachment No. 9 to the OPA and Exhibit D to the Cooperation Agreement ("**Operations Agreement**"). As confirmed in the Operations Agreement, the Property Manager will be responsible for the maintenance and operation of the Plaza Property for twenty-five (25) years ("**Maintenance Period**") in conformance with the "Maintenance Standard" defined in Section 4 of the Operations Agreement. The Maintenance Standard, as further described in Exhibits D and E to the Operations Agreement, includes, among other things, compliance with all applicable local and federal Best Management Practices related to site drainage. In addition, Section 33 of the Operations Agreement requires the Property Manager to comply with all applicable municipal, state and federal laws and regulations during the Maintenance Period in connection with its maintenance obligations under the Operations Agreement.

F. The Successor Agency and the Property Manager are required pursuant to the City of San Diego Municipal Code, Chapter 4, Article 3, Division 3, Chapter 14, Article 2, Division 2, and the Land Development Manual, Storm Water Standards to enter into this Agreement for the installation and maintenance of Permanent Storm Water Best Management Practices ("**Permanent Storm Water BMP's**") prior to the issuance of construction permits for the improvements on the Plaza Property. This Agreement is intended to ensure the establishment and maintenance of Permanent Storm Water BMP's onsite, as described in the project's Water Quality Technical Report ("**WQTR**") and Grading and/or Improvement Plan Drawing No. 37098-D, or Building Plan PTS Project No. 287746.

G. The Succesor Agency and the Property Manager wishes to obtain a building or engineering permit according to the Grading and/or Improvement Plan Drawing No. 37098-D or Building Plan PTS Project No. 287746.

AGREEMENT

NOW, THEREFORE, the parties agree as follows:

1. The Successor Agency shall cause to be prepared, or if qualified, shall prepare an Operation and Maintenance Procedure ("**OMP**") for Permanent Storm Water BMP's, satisfactory to the City, according to **Exhibit "D"** attached hereto, consistent with the Grading and/or Improvement Plan Drawing No. 37098-D, or Building Plan PTS Project No. 287746.

2. The Successor Agency shall install, and during the Maintenance Period the Property Manager shall maintain and repair or replace, all Permanent Storm Water BMP's within the Plaza Property, according to the OMP guidelines as described in **Exhibit "D"** attached hereto, the project's WQTR and Grading and/or Improvement Plan Drawing No. 37098-D, or Building Plan PTS Project No. 287746.

3. The Property Manager shall maintain operation and maintenance records for at least five (5) years. These records shall be made available to the City for inspection upon request at any time.

4. This Agreement shall commence upon execution of this Agreement by all parties named hereon, and shall run with the land and shall bind the Property Manager and its successors and assigns for the duration of the Maintenance Period. This Agreement shall terminate automatically upon the expiration of the Maintenance Period, at which time the City (as the owner of the Plaza Property) shall assume the maintenance obligations set forth in this Agreement.

[remainder of this page intentionally left blank]

PROPERTY MANAGER:

[insert signature block for correct Westfield entity]

CITY:

City of San Diego,
a municipal corporation

APPROVED:

_____
City Control Engineer

Date:_____

SUCCESSOR AGENCY:

City of San Diego,
solely in its capacity as the designated successor agency
to the Redevelopment Agency of the City of San Diego,
a former public body, corporate and politic

By: _____
Name: _____
Title: _____
Date: _____

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

As of January 1, 2008

State of California
County of San Diego

On _____, before me, _____, a Notary Public, in and for State, personally appeared, _____, who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature _____ (Seal)

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CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

As of January 1, 2008

State of California
County of San Diego

On _____, before me, _____, a Notary Public, in and for State, personally appeared, _____, who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature _____ (Seal)

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CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

As of January 1, 2008

State of California
County of San Diego

On _____, before me, _____, a Notary Public, in and for State, personally appeared, _____, who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

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Signature _____ (Seal)

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EXHIBIT "A"

LEGAL DESCRIPTION OF PARK PROPERTY

All that certain real property designated as the "Plaza" on the map of Horton Addition made by L.L. Lockling, filed in the Office of the County Recorder of San Diego County on June 21, 1871 in Book 13, Page 522 of Deeds.

Together with the Northerly 27 feet of Plaza Street, lying contiguous to said Plaza and closed to public use by City of san Diego Council Resolution 257247 recorded on October 11, 1982 File/Page 82-311788 and as shown on Map 18604-D.

EXHIBIT "B"

LEGAL DESCRIPTION OF SALES PARCEL

Those portions of Parcel 4 of Parcel Map No. 15076 and Parcel 3 of Parcel Map No. 15803, in the City of San Diego, County of San Diego, State of California, according to said Maps thereof filed in the office of the County Recorder of San Diego County, December 18, 1987 as File No. 87-695990 and September 21, 1989 as File No. 89-509482, respectively, of Official Records, Parcel Map No. 15803 corrected by certificate of correction recorded April 12, 1993 as File No. 1993-0223222 of official records, described as a whole as follows:

Beginning at the northeast corner of said Parcel 4, said point being on the west line of Fourth Avenue as shown on said Map 15076;
Thence along said west line, South 0º04'06" East 182.21 feet;
Thence continuing along said west line, South 0º08'34" East 39.99 feet to a point on the easterly prolongation of the south line said Parcel 4, having a bearing and distance of 'South 89º50'00" West 90.44 feet';
Thence along said easterly prolongation and continuing westerly, South 89º50'00" West 164.13 feet to a point on the southeasterly prolongation of the west line of said Parcel 4, having a bearing and distance of 'North 45º10'00" West 50.10 feet';
Thence along said southeasterly prolongation and said west line, North 45º10'00" West 50.86 feet;
Thence North 89º50'00" East 16.86 feet;
Thence North 49º26'00" East 46.80 feet to a line that is parallel with and distant 12.50 feet easterly, measured at right angles from the west line of said Parcel 4 having a bearing and distance of 'North 0º10'00" West 147.93 feet';
Thence along said parallel line, North 0º10'00" West 114.67 feet;
Thence South 89º50'00" West 54.47 feet;
Thence North 00º09'20" West 41.02 feet to a point on the north line of said Parcel 4;
Thence along said north line, North 89º46'27" East 202.39 feet to said aforementioned northeast corner of Parcel 4 and point of beginning.

Containing an area of 36,835 square feet or 0.846 acres.

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EXHIBIT "C"

MAP OF PLAZA PROPERTY

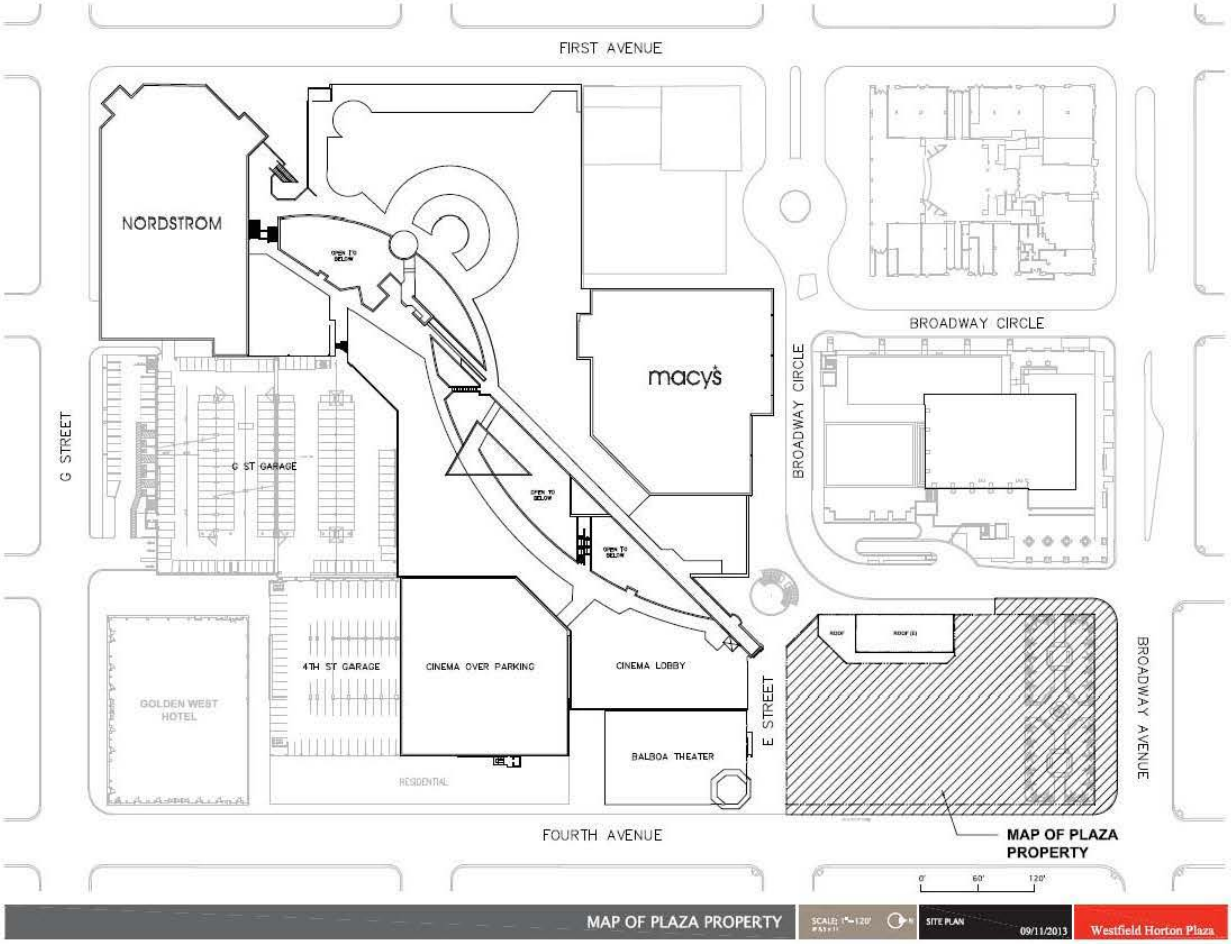


EXHIBIT "D"

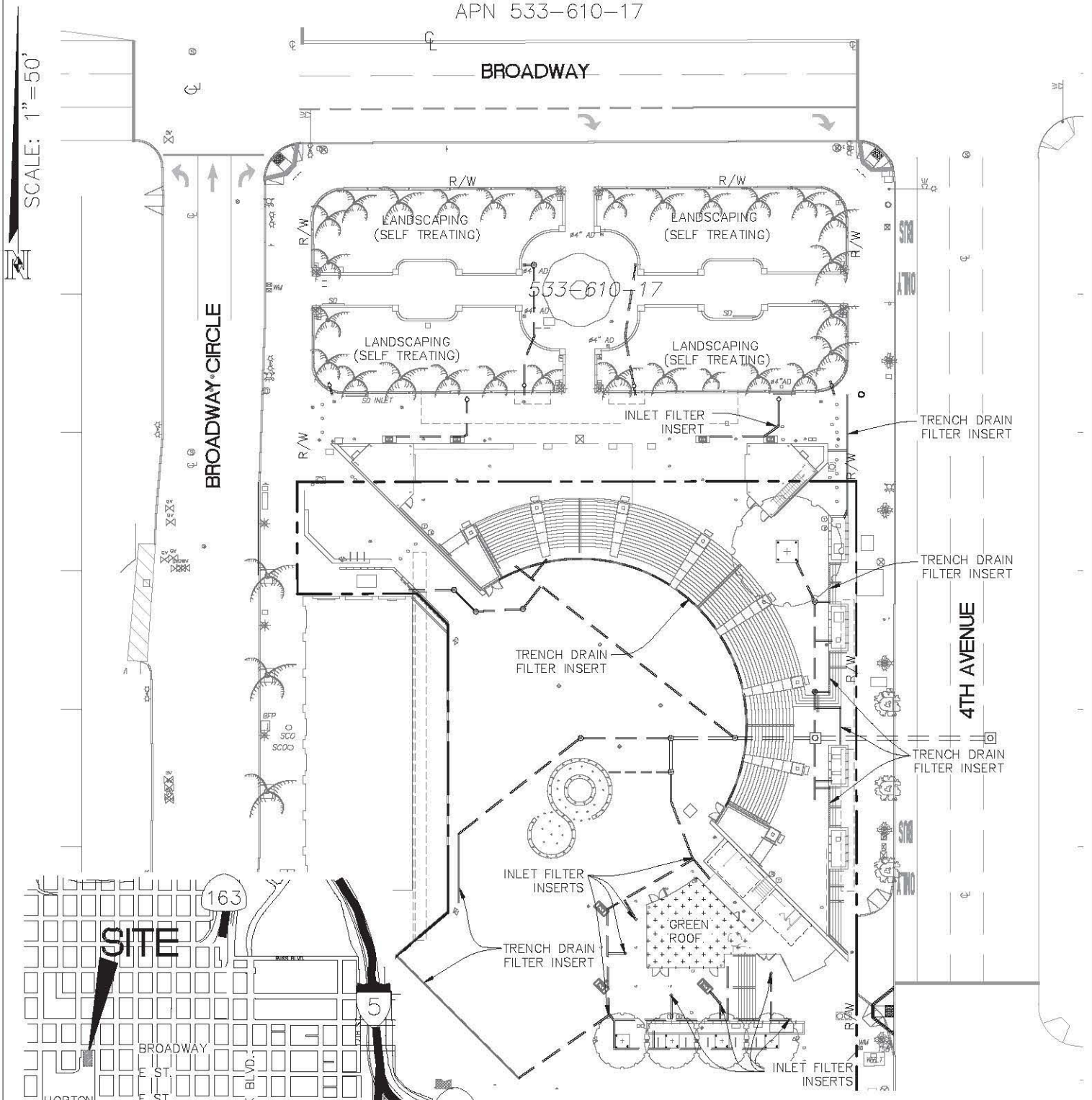
OPERATION AND MAINTENANCE PROCEDURE GUIDELINES

[see following page]

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EXHIBIT "D"

STORM WATER MANAGEMENT & DISCHARGE CONTROL MAINTENANCE AGREEMENT
PORTION OF PLAZA OF HORTON'S ADDITION DEED BOOK 13–522
IN THE CITY OF SAN DIEGO, COUNTY OF SAN DIEGO, STATE OF CA.
APN 533–610–17





VICINITY MAP

NO SCALE

LIST OF BMPS:

GREEN ROOF
PRIVATE INLET FILTER INSERTS (9)
PRIVATE TRENCH FILTER INSERT (8)
LANDSCAPING (SELF TREATMENT)

ATTACHMENT K

COST ANALYSIS

Horton Plaza Park Alternate Drainage Cost Analysis Estimate
Job No: 110-228.10

Lowering Storm Drain on Fourth Avenue to accommodate on-site Treatment Vault

Item	Quantity	UM	Unit Cost	Total Cost
Removal of existing Storm Drain	500	LF	$50.00	$25,000
18" RCP Storm Drain	500	LF	$150.00	$75,000
Trench Shoring and Safety	500	LF	$100.00	$50,000
Cleanouts	3	EA	$5,000.00	$15,000
Grind, Overlay, Restripe	1	LS	$30,000.00	$30,000
Traffic Control	1	LS	$50,000.00	$50,000
		Subtotal		**$220,000**
Soft Costs				
Night Work Premium (1.5x)				$330,000
Design and Permitting (20%)				$44,000
Contractors General Conditions and Contengencies (20%)				$44,000
		Total		**$638,000**

Adding pumping system to accommodate on-site Treatment Vault

Item	Quantity	UM	Unit Cost	Total Cost
Install Vault	1	LS	$20,000.00	$20,000
Install Pump	1	LS	$20,000.00	$20,000
Replace Pump (10 years)	5	LS	$20,000.00	$100,000
Yearly Maintenance Pump Vault	50	Year	$1,000.00	$50,000
		Subtotal		**$150,000**
Soft Costs				
Design and Permitting (20%)				$30,000
Contractors General Conditions and Contengencies (20%)				$30,000
		Total		**$210,000**

CITY OF SAN DIEGO-BOND ESTIMATE TEMPLATE

Horton Plaza Park

INTERNAL ORDER NO: 24002919

DRAWING NO: 37098-D
PROJECT NO: 287746

Nasland Engineering
4740 Ruffner Street
San Diego, CA 92111
(858) 292-7770 (Phone)
(858) 571-3241 (Fax)

PUBLIC IMPROVEMENT TOTALS

DRAINAGE IMPROVEMENTS	$	12,863
WATER & WASTEWATER UTILITIES	$	23,267
SURFACE IMPROVEMENTS	$	89,881
TRAFFIC	$	4,799
MISCELLANEOUS	$	7,936
SUBTOTAL - IMPROVEMENTS	$	138,745
TRAFFIC CONTROL (5% of Subtotal-Improvements)	$	6,937
TOTAL PUBLIC IMPROVEMENTS (w/o Contingency)	$	145,683
10% Contingency	$	14,568
TOTAL PUBLIC IMPROVEMENT:	$	160,251

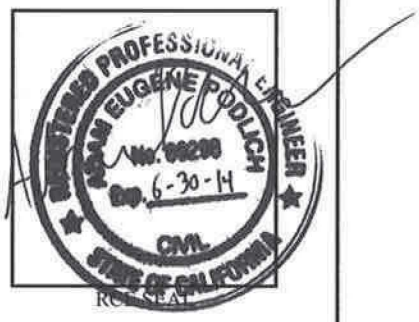
Engineer of Work

Date: 3-21-13

RCE Expiration: 6-30-14

LAND DEVELOPMENT TOTALS

EARTHWORK TOTAL	$	-
100% of First $5,000 of Earthwork Total	$	-
50% of Earthwork Total from $5,000 to $50,000	$	-
25% of of Earthwork Total Over $50,000	$	-
PRIVATE DRAINAGE IMPROVEMENTS	$	52,099
LANDSCAPE & IRRIGATION TOTAL	$	-
50% of Landscape & Irrigation Total	$	-
As-Built Drawings	$	2,457
TOTAL LAND DEVELOPMENT:	$	2,457



RCE SEAL

COST ESTIMATE-LDR: $ 200,238

TOTAL BOND AMOUNT: $ 214,806

INITIAL INSPECTION DEPOSIT: $ 7,002

( ) Bond Required: A Bond in the amount of $ 214,806 is required per San Diego Municipal Code Section 129.0119.

Control Engineer: _____ Date: _____

( ) Bond Waived: The Bond requirement is waived.

Control Engineer: _____ Date: _____

Note: Unit prices are based on available City of San Diego Land Development Review Division, Cost Estimate Unit Price List, January 2009.

(THIS TEMPLATE IS CURRENT TO 12/21/09)

CITY OF SAN DIEGO CONSTRUCTION COST ESTIMATE

Horton Plaza Park

Nasland Engineering
4740 Ruffner Street
San Diego, CA 92111
(858) 292-7770
(858) 571-3241

INTERNAL ORDER NO: 24002919
DRAWING NO: 37098-D
PROJECT NO: 287746
0

DESCRIPTION	UNIT	LUMP SUM	TOTAL QUANTITY	UNIT PRICE	TOTAL COST
RCP CULVERTS					
18" RCP STORM DRAIN	LF		50.00	$ 123.50	$ 6,175
				SUBTOTAL:	**$** 6,175
MISCELLANEOUS DRAINAGE					
'CLEAN OUT, PER D-9 (TYPE A)	EA		1	$ 6,368.00	$ 6,368
CONNECT TO EXISTING S.D.	EA		1.00	$ 320.00	$ 320
				SUBTOTAL:	**$** 6,688
				SECTION 2 TOTAL:	**$ 12,863**

SECTION 3-SURFACE IMPROVEMENTS

CURB AND GUTTER					
ROLLED CURB, PER G-4	LF		64	$ 28.60	$ 1,830
				SUBTOTAL:	**$** 7,264
PAVEMENT					
PAVEMENT DESIGN, PER SDG-113 (SCHEDULE J)	SF		84.00	$ 8.40	$ 706
				SUBTOTAL:	**$** 12,046
CURB RAMPS & SIDEWALK					
CURB RAMPS, PER SDG132 (TYPE A&B, NEW CONSTRUCTION)	EA		2	$ 1,876.00	$ 3,752
SIDEWALK REMOVAL	SF		6150.00	$ 2.01	$ 12,362
4" PCC SIDEWALK, PER G-7	SF		6,150	$ 6.40	$ 39,360
				SUBTOTAL:	**$** 55,474
MISCELLANEOUS SURFACE IMPROVEMENTS					
TRENCH RESURFACING, PER SDG-107&108	LF		366.00	$ 41.25	$ 15,098
				SUBTOTAL:	**$** 15,098
				SECTION 3 TOTAL:	**$ 89,881**

SECTION 4-TRAFFIC

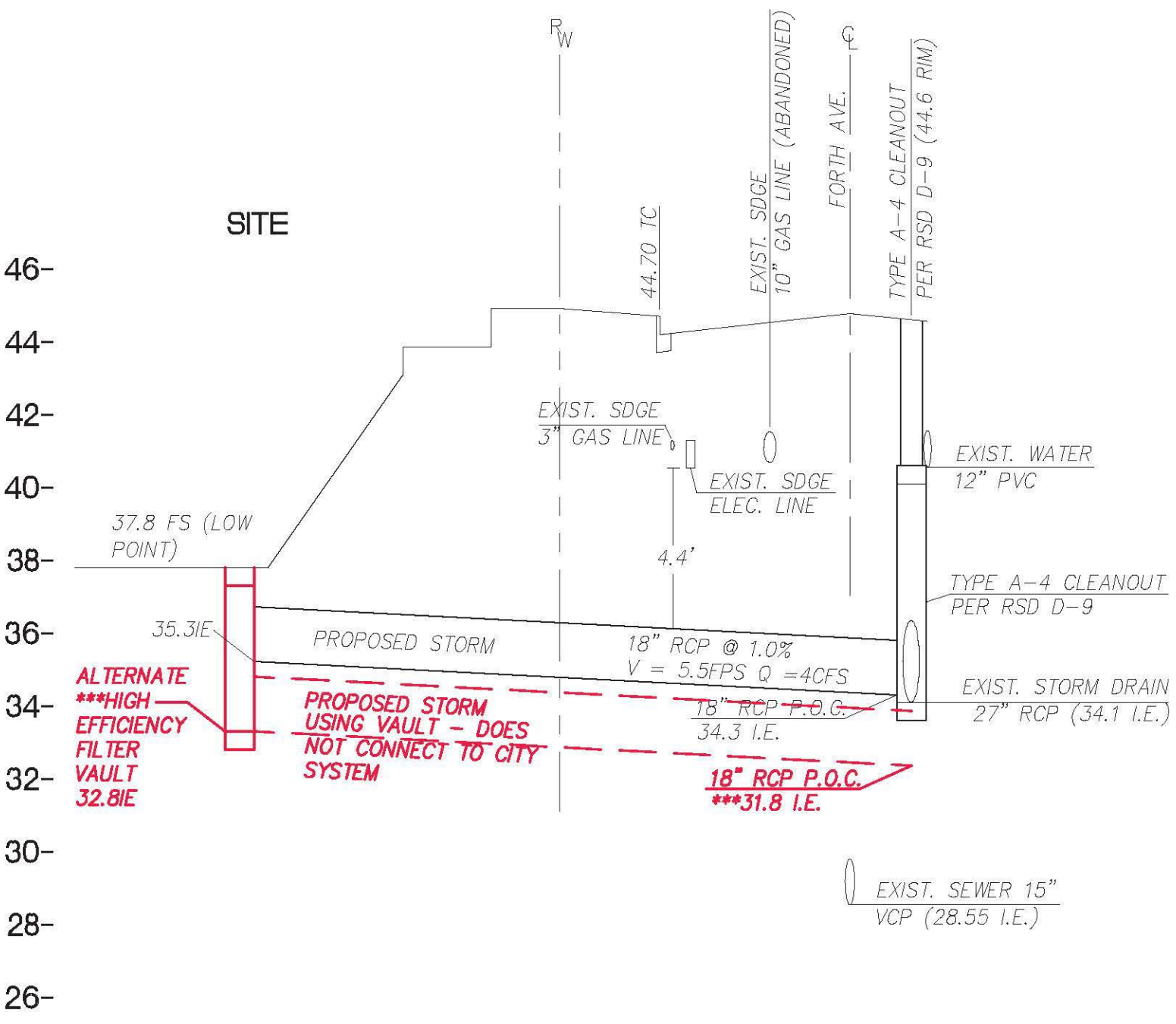
TRAFFIC CONTROLS					
FLASHING ARROW BOARD/ELECTRIC MESSAGE SIGN	LS		2	$ 2,000.00	$ 4,000
				SUBTOTAL:	**$** 4,799
				SECTION 4 TOTAL:	**$ 4,799**

CITY OF SAN DIEGO CONSTRUCTION COST ESTIMATE

Nasland Engineering
4740 Ruffner Street
San Diego, CA 92111
(858) 292-7770
(858) 571-3241

INTERNAL ORDER NO: 24002919
DRAWING NO: 37098-D
PROJECT NO: 287746
0

DESCRIPTION	UNIT	LUMP SUM	TOTAL QUANTITY	UNIT PRICE	TOTAL COST
SECTION 5-WATER & WASTEWATER					
WASTEWATER					
STREET SEWER LATERAL, PER SDS-105 (4", 40' LONG)	EA		5.00	$ 1,788.90	$ 8,945
				SUBTOTAL:	$ 8,945
WATER					
WATER METER BOX	EA			$ 406.00	
6" FIRE SERVICE	EA		1	$ 1,900.00	$ 1,900
				SUBTOTAL:	$ 1,900
WATER SERVICE					
WTR SERV. PER WS-01 (1" W/1"X 0.75" METER)	EA		4	$ 2,389.00	$ 9,556
WTR SERV. PER WS-02 (2" W/2" METER)	EA		1	$ 2,866.00	$ 2,866
				SUBTOTAL:	$ 12,422
				SECTION 5 TOTAL:	$ **23,267**
SECTION 6-MISCELLANEOUS					
MISCELLANEOUS ITEMS					
SAW CUT EXISTING (AC/PCC)	LF		680.00	$ 5.12	$ 3,482
TRENCH SHORING (11'-15' DEEP)	LF		200.00	$ 22.27	$ 4,454
				SUBTOTAL:	$ 7,936
				SECTION 6 TOTAL:	$ **7,936**
SECTION 8-PRIVATE DRAINAGE					
PRIVATE RCP CULVERTS					
18" RCP STORM DRAIN	LF		45.00	$ 123.50	$ 5,557.50
				SUBTOTAL:	$ **5,557.50**
PRIVATE PVC/CMP/HDPE CULVERTS					
4"-6" PVC STORM DRAIN	LF		625.00	$ 26.00	$ 16,250.00
				SUBTOTAL:	$ **16,250.00**
MISCELLANEOUS PRIVATE DRAINAGE					
CLEAN OUT, PER D-9 (TYPE A)	EA		2.00	$ 6,368.00	$ 12,736.00
9"x9" BOX INLET	EA		7.00	$ 2,000.00	$ 14,000.00
TRENCH DRAIN	LF		237.00	$ 15.00	$ 3,555.00
				SUBTOTAL:	$ **30,291.00**
				SECTION 8 TOTAL:	$ **52,099**



STORM DRAIN
STA. 12+50.67 4TH AVE.
SCALE HORIZ. 1"=20'
VERT. 1"=4'

ATTACHMENT L

SELF CERTIFICATION BMP FORM

City of San Diego
Development Services
1222 First Ave., MS-501
San Diego, CA 92101
(619) 236-5500

THE CITY OF SAN DIEGO

Permanent BMP Construction

Self Certification Form

FORM
DS-563
FEBRUARY 2013

Date Prepared:	Project No.:
Project Applicant:	Phone:
Project Address:	
Project Engineer:	Phone:

The purpose of this form is to verify that the site improvements for the project, identified above, have been constructed in conformance with the approved Standard Urban Storm Water Mitigation Plan (SUSMP) documents and drawings.

This form must be completed by the engineer and submitted prior to final inspection of the construction permit. Completion and submittal of this form is required for all new development and redevelopment projects in order to comply with the City's Storm Water ordinances and NDPES Permit Order No. R9-2007-0001. Final inspection for occupancy and/or release of grading or public improvement bonds may be delayed if this form is not submitted and approved by the City of San Diego.

CERTIFICATION:
As the professional in responsible charge for the design of the above project, I certify that I have inspected all constructed Low Impact Development (LID) site design, source control and treatment control BMP's required per the approved SUSMP and Construction Permit No. _____; and that said BMP's have been constructed in compliance with the approved plans and all applicable specifications, permits, ordinances and Order No. R9-2007-0001 of the San Diego Regional Water Quality Control Board.

I understand that this BMP certification statement does not constitute an operation and maintenance verification.

Signature: _____

Date of Signature: _____

Printed Name: _____

Title: _____

Phone No. _____

Engineer's Stamp

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Upon request, this information is available in alternative formats for persons with disabilities.

ATTACHMENT M

PROPERTY LANDSCAPE MAINTENANCE PROGRAM

EXHIBIT "E"

PROPERTY LANDSCAPE MAINTENANCE SPECIFICATIONS

A. GENERAL CONDUCT OF WORK

1. Scope of Work. Complete maintenance of all Plaza Property areas including, but not limited to, irrigation, pruning, shaping, and training of trees, shrubs, turf, and groundcover plants; fertilization; litter control; weed control; control of all plant diseases and pests; mowing; edging; sweeping; renovation and aerification of turf areas; maintenance and repairs of equipment, pathways, irrigation and drainage systems; and all other maintenance required to maintain the areas included in this Agreement in safe, attractive and useable condition and to maintain the plant material in good condition with horticulturally acceptable growth and color. The Property Manager shall be obligated to maintain the park in accordance with the 100% Design Development Drawings pursuant to the OPA.

2. Scheduling of Work. The Property Manager shall accomplish all normal maintenance required under this Agreement between the hours of 6:00 a.m. and 10:00 p.m., Monday through Sunday. Exceptions may be made to normal working hours where incidence of use may be too great during the hours specified to allow for proper maintenance. No maintenance functions that generate excess noise, e.g., operations of power equipment which would cause annoyance to residents of the area, shall be commenced before 6:00 a.m.

The Property Manager shall conduct the work at all times in a manner which will not unreasonably interfere with pedestrian traffic on adjacent sidewalks or vehicular traffic on adjacent streets

3. Repair of Damage or Malfunction. Damage to or malfunction of any improvement shall be reported to the Owner within twenty-four (24) hours and repaired immediately if such repair is a day to day non-capital repair and is therefore Property Manager's responsibility under the Agreement.

4. Miscellaneous Requirements. Appropriate work zone safety provisions shall be made at all times for the protection of traffic and workers. Workers shall wear safety vests or designated uniforms at all times when performing site maintenance. All tools and equipment shall be appropriate for the task performed and shall be maintained in good working condition.

Application of pesticides shall be done in accordance with all applicable laws and under the direct supervision of a California Certified Pesticide Applicator.

5. Performance Requirements. All work shall be inspected by the Owner for compliance with these specifications. All incomplete or improperly performed work shall be rectified immediately.

Adverse weather conditions may delay the schedule of work to be performed, but shall not eliminate the performance requirement for any work specified herein.

The Property Manager shall also have available all ancillary tools and equipment needed to perform the specifications herein (shovels, rakes, pruners, etc).

B. INSPECTION

1. Facility Inspection. The Property Manager shall provide for comprehensive, ongoing daily inspections of the Plaza Property. This inspection shall be performed by the workers as well as a non-working supervisor who shall provide a written punch list each week of items requiring remedial action or attention together with dates when the required work will be performed. Failure to provide such a punch list will indicate that no remedial action is required and that all work has been performed in accordance with these specifications.

C. HARD SURFACE MAINTENANCE

1. Litter and Waste Removal. All trash, foreign substances, dangerous objects, and other debris shall be removed from the area at least daily. Litter shall be removed by 11:00 a.m. to keep all areas litter-free and allow the public usage of park facilities. Includes emptying all trash receptacles as needed and daily removal of litter on the ground or in lawn/planter/sand areas. Trash receptacles shall be repaired as needed.

The Property Manager will remove and replace liners when receptacle is more than half full or has a strong odor, and replace with a new liner. Area around the trash receptacle is also clear of litter. Clean to remove odor from receptacle. Dumpsters are to be emptied before they are 100% full. The area around dumpster is to be kept clear of litter.

2. Sweeping /Blowing. All paved areas shall be inspected daily when litter is removed. Remove sand, dirt, and debris to avoid hazardous conditions. Blowers may be used, if operated in a responsible manner – not before 6:00 a.m. Areas should also be inspected for safety and/or items requiring repair. Potential hazards shall be immediately barricaded/taped off for non-use until the problem can be evaluated and/or repaired. Owner shall immediately be notified of such hazards. Repairs shall be completed as needed.

3. Graffiti Abatement. Amenities are to be kept free of graffiti and vandalism on buildings, concrete, benches, tables, play equipment, site furnishings should be repaired in a timely manner but no later than within forty-eight (48) hours of observation. Acts of vandalism causing a hazard shall be repaired or taken out of service immediately.

4. Sidewalks and Paved Areas. All sidewalks and other paved surfaces shall be maintained in a safe, non-hazardous, and useable condition and free of trip hazards at all times. All fecal matter, stones, glass, paper, leaves, twigs, and all other debris shall be removed from paved areas. Painted lines and informational / directional signs shall be maintained so as to be clear, distinct, and readable.

5. Steam Cleaning and Power Washing. Before steam cleaning and power washing, workers will sweep, collect and dispose of debris; dry clean oil spots, dispose of absorbent in trash; and place oil-absorbent booms around storm drains. When using soap, cleaners may direct discharge to sewer. When using pressurized water, direct flow may be directed to storm drains.

Workers shall power wash a minimum of two times per week or more as necessary based upon commercially reasonable practices.

D. TURF MAINTENANCE (if applicable)

1. Mowing. Mowing equipment shall be maintained so as to provide a smooth, even cut without tearing. The blade adjustment shall provide a uniform, level cut without ridges or depressions. The mower blades shall be kept sharp. Equipment shall not be allowed to create ruts or depressions in the turf.

Mowing shall be performed so that no more than one-third (1/3) of the grass blade is removed during each mowing in returning the grass to the accepted height for the species of grass being mowed.

Mowing must be done in a neat pattern. Mowing patterns are to be alternated to avoid compaction of soil. All sidewalks shall be cleaned immediately after mowing. Cuttings shall be removed from all hardscape and turf areas and not blown into the street or shrub beds. Persons providing the mowing services shall report wet soggy areas in turf due to over watering or leaks to their supervisors immediately.

2. Edging Method. All turf shall be edged adjacent to all improved surfaces. Where no improved surfaces exist, turf edges shall be maintained if the turf area abuts a shrub bed or property line or any other area where turf delineation is required. All edging must have a clean cut with the cut perpendicular to the hard surface and not removed from it. Edging shall include all fixtures (e.g., fire hydrants, manhole covers, meter boxes, valve boxes, quick couplers, gate valves). Chemical edging is unacceptable.

3. Fertilization. Fertilizer shall be delivered to the site only in the original unopened containers bearing the manufacturer's guaranteed analysis. Damaged packages will not be accepted.

Fertilizers shall be applied Three (3) times a year to promote healthy plant growth at the rates as follows: One (1) pound of actual nitrogen per 1,000 square feet of planted area shall be applied to shrubs, vines, groundcovers, and trees as specified.

Acceptable complete fertilizers include, but are not limited to: Nitra King 22-3-9-(S), Turf Supreme 16-6-8, Turf Supreme with Best-Cote 15-5-7, and Best Super Turf (for September fertilization). Acceptable organic fertilizers include, but are not limited to, Milorganite or Gro-Power, which have been processed to remove excess levels of salt.

As deemed necessary, other materials including, but not limited to, iron chelate, soil sulfur, gypsum, surfactant enzymes such as Sarvon or Naiad, etc., may be needed and shall be applied as necessary.

Adequate irrigation shall immediately follow the application of fertilizers and/or amendments to force fertilizer material to rest directly on the soil surface. Drip irrigated areas shall be adequately hand watered using quick coupler valves and hoses to dissolve fertilizer.

Fertilization must occur in prescribed months, and shall be accomplished in a manner so as to achieve an even green. If fertilization results are patchy, remedial fertilizer must be applied immediately

4. Renovation. Renovation shall be the operation that removes accumulated thatch from turf areas. Refuse generated from renovation shall be removed from the work site no later than the day following renovation. Thatch and other debris left on the site overnight shall be completely contained in bags or burlap sheets so that it does not migrate to adjacent areas.

5. Aerification. All turf areas shall be aerified by core removal to a depth of 2". Under adverse conditions or where turf is suffering from compaction due to high use, aerification may be necessary at more frequent intervals. The frequency interval shall be as required to promote healthy, vigorous growth.

In performing periodic operations as required herein, routine grounds maintenance services at the same work site such as, but not limited to, litter control, weed control, and irrigation shall continue without interruption.

6. Top Dress and Overseed. Once a year minimum, between December and May or more as needed. To provide continuity of turf surfaces. Seed mix shall be spread at 6.0 lbs. per 1,000 sq. ft. Top Dress at a rate of one (1) yard of top soil per 2,500 sq. ft. or 1/8 inch shall be spread ½ sand and ½ organic materials.

Seed and top dress material shall be dragged and rolled to correct low spots and seed is to be in contact with soil. Top dress and overseed shall be spread in conjunction with aerification.

7. Weed/Pest/Fungicide Control. Prompt remedial action as necessary to maintain plant material in optimum condition.

Regularly inspect all landscaped areas for presence of disease, insect, or rodent infestation and identify the disease, insect, or rodent and specify control measures to be taken, and shall implement an approved control measures, exercising extreme caution in the application of all sprays, dusts, or other materials utilized. Approved control measures shall be continued until the disease, insect or rodent is controlled to the satisfaction of the Owner. Property Manager shall utilize all safeguards necessary during disease, insect or rodent control operations to ensure safety of the public and the employees, in accordance with current standard practices accepted by the State of California Department of Food and Agriculture.

E. PLANT MAINTENANCE

1. Weed Removal. Weeds shall be removed from all shrub and groundcover beds, planters, tree wells, cracks in paved areas, including sidewalks, and areas covered with ornamental rocks to maintain all turf, shrub and hardscape areas in a weed-free condition.

Weed removal shall mean complete removal of all weed growth. For the purpose of this specification, a weed will be considered "any undesirable or misplaced plant". Weeds shall be controlled by manual, mechanical, or chemical methods.

2. Pruning – Trees. All trees shall be maintained in their natural shapes. Pruning shall be performed in such a manner as to promote the best growth habits, appearance, and health of the tree, and to prevent encroachment which blocks vision or is in any manner deemed undesirable by the Owner. Property Manager shall, as part of this Agreement, be responsible for tree pruning all trees. Trees shall not be topped. Property Manager shall bring to the attention of the Owner within twenty-four (24) hours any tree that shows signs of root heaving or leaning, or is in any manner a safety hazard.

All newly planted trees shall be securely staked with two (2) "lodge pole" type stakes placed on opposite sides of the tree, outside the root ball, and secured to the tree with at least two (2) flexible rubber tree ties.

Tree ties shall be inspected regularly to ensure against girdling and abrasion.

Trees and shrubs that are uprooted and/or broken due to storms, regardless of size, shall be up righted immediately, if possible. If this is not possible, they shall be removed immediately (including roots) and the holes must be filled.

3. Pruning – Shrubs and Groundcover. All shrubs and groundcover plants growing in the Plaza Property shall be pruned as required to maintain plants in a healthy, growing condition; to maintain plant growth within reasonable bounds; and to prevent encroachment of passage ways, walks, streets, or view of signs; or encroachment in any manner deemed objectionable by the Owner. Dead or damaged limbs shall be removed with sharp pruning tools, with no stubs remaining. Pruning shall be done so as to permit plants to grow naturally in accordance with their normal growth characteristics. Shearing, hedging or severe pruning of plants, unless authorized by the Owner, shall not be permitted. Growth regulators shall not be used.

4. Fertilization – Trees, Shrubs, and Groundcover. Fertilizer shall be delivered to the site only in the original unopened containers bearing the manufacturer's guaranteed analysis. Damaged packages will not be accepted.

Fertilizers shall be applied at the rates as follows: One (1) pound of actual nitrogen per 1,000 square feet of planted area shall be applied to shrubs, vines, groundcovers, and trees as specified.

Acceptable complete fertilizers include, but are not limited to: Nitra King 22-3-9-(S), Turf Supreme 16-6-8, Turf Supreme with Best-Cote 15-5-7, and Best Super Turf (for September fertilization). Acceptable organic fertilizers include, but are not limited to, Milorganite or Gro-Power, which have been processed to remove excess levels of salt.

As deemed necessary, other materials including, but not limited to, iron chelate, soil sulfur, gypsum, surfactant enzymes such as Sarvon or Naiad, etc., may be needed and shall be applied as necessary.

Adequate irrigation shall immediately follow the application of fertilizers and/or amendments to force fertilizer material to rest directly on the soil surface. Drip irrigated areas shall be adequately hand watered using quick coupler valves and hoses to dissolve fertilizer.

Fertilization must occur in prescribed months, and shall be accomplished in a manner so as to achieve an even green. If fertilization results are patchy, remedial fertilizer must be applied immediately

5. Season Color / Plant Replacement. Property Manager shall supply the labor and all materials to replace any tree, shrub, groundcover, or other plant which is damaged or lost as a result of faulty maintenance or negligence. Any plant damaged or lost through vehicular damage, theft, or vandalism shall be replaced in kind and size unless Property Manager and Owner determine that such plant should not be replaced because its placement is the reason it was damaged and it is likely to be damaged again.

In order to ensure maximum healthy growth and overall aesthetic appearance of planting in the work area, it may be desirable to replace certain plants. The necessity or desirability of such plant replacement shall be determined upon agreement by and between Property Manager and Owner.

6. Mulch Inspection / Replacement. Mulch Two (2) times a year in all planting beds which shall be checked regularly for appropriate coverage and depth (3" minimum). Replace as needed.

F. FACILITIES / STRUCTURES / SYSTEMS MAINTENANCE

1. Irrigation Systems Maintenance and Repair. Irrigation shall be done by the use of automatic, mechanical sprinkler systems where available and operable; however, failure of the existing irrigation system to provide full and proper coverage shall not relieve Property Manager of the responsibility to provide adequate irrigation with full and proper coverage to all areas.

Irrigation systems are regularly and continuously functional. Maintain efficient and effective irrigation systems and adhere to current water restrictions. Sprinkler systems shall be maintained in such a way as to guarantee proper coverage and full working capability, and shall make whatever adjustments may be necessary to prevent excessive run-off into streets, rights-of-way or other areas not meant to be irrigated. Frequency and amount of irrigation is determined by Evapotranspiration (ET) requirements.

Repair components to their original operating level at installation. Replace or repair worn out components when a problem is reported or noticed during inspection. Irrigation repairs are initiated within 24 hours after a problem is identified. Significant changes should be recorded on as-builts.

Program Controllers should routinely be checked and programmed to meet ET needs by plant type. The system will be programmed to water between 10:00 p.m. and 6:00 a.m. not more than three nights per week per zone. Application rate should be less than infiltration rate. Water use should be monitored and evaluate actual consumption compared to ET and water budgets. Irrigation Audits should be performed periodically by a certified Irrigation Association's Certified Landscape Irrigation

All areas not adequately covered by a sprinkler system shall be irrigated by a portable irrigation method. Property Manager shall furnish all hoses, nozzles, sprinklers, etc. necessary to

accomplish this supplementary irrigation. Care shall be exercised to prevent water waste, erosion, and/or detrimental seepage into existing underground improvements or structures.

Irrigation shall be accomplished as follows:

(a) Shrub beds shall be irrigated as required to maintain horticulturally acceptable growth and color, and to promote deep rooting. Shrub areas shall be irrigated at a rate which keeps surface runoff to a minimum. The irrigation rate shall be adjusted to the needs of shrub types, seasons and weather conditions.

(b) Newly planted trees, shrubs, and groundcover shall receive special attention until these plants are established. Adequate water and fertilizer shall be applied to promote normal, healthy growth. Proper berms or basins shall be maintained during the establishment period.

2. Water Feature / Fountain Repair and Maintenance. All water features and fountain equipment is to be maintained and operated according to manufacturer's recommendations. All servicing technicians will be factory certified or trained and certified in the work to be performed.

Decorative water features and fountains should be cleaning once per week or more frequently if required. Maintenance will consist of blowing debris off the decks immediately surrounding the water feature / fountains, Vacuum, brush sides, empty skimmer baskets and remove any floating debris, scrub the tile to remove visible oil buildup.

The fountain water chemistry must be tested and balanced the monthly and maintain CPO log per Health Department requirements. All routine maintenance chemicals required to maintain the water chemistry are to be provided by the Property Manager. The Property Manager will maintain a log a test results for reference

The Property Manager shall provide a cell phone number for emergency calls outside the normal business hours and must respond within a timely manner to fountain related emergency. The fountain maintenance contractor or personnel must have a minimum of 5 years experience in Commercial Fountain Construction (not swimming pool construction) and should be able to show references of past projects constructed and serviced and references from Fountain Component Manufacturers that they have experience in dealing with similar improvements.

Drinking fountains are to be kept operational, clean and sanitary. Plumbing maintenance is to be performed by a licensed plumber.

3. Electrical /Lighting Repair and Maintenance. Any electrical and lighting equipment is to be maintained and operated according to manufacturer's recommendations. Electrical maintenance is to be performed by a licensed electrician.

Lights are to be checked biweekly during operating period to report any outages. Graffiti on light poles is to be removed within 48 hours.

4. Audio Visual and Data Systems Maintenance and Repair. Any electronic kiosks, audio visual and data systems equipment is to be maintained and operated according to manufacturer's recommendations. Equipment maintenance is to be performed by a licensed or certified technician.

5. Theatrical Systems Repair and Maintenance. Any theatrical systems equipment is to be maintained and operated according to manufacturer's recommendations. Electrical maintenance is to be performed by a licensed electrician.

6. Site Furniture and Structures Repair and Maintenance. All equipment and public site furnishings shall be maintained in a clean and safe condition at all times. Benches and tables are clean and free of debris and litter. Tabletops and benches are smooth and clear of any sharp edges. Identification, traffic, and rules signs must be properly secured and signs are clean, legible, visible, and free of any protrusions.

Any damage to or malfunction of site furnishing or equipment shall be reported to the Owner and repaired immediately if such repair is a day to day non-capital repair and is therefore Property Manager's responsibility under the Agreement.

7. Structure Maintenance. Fences and gates shall be maintained so as to perform to design specifications, and shall be operational and attractive. Fabric, bollards posts, and rails are securely fastened, free of holes, gaps, and rust.

8. Site Plumbing and Drainage Repair and Maintenance. All plumbing systems equipment is to be maintained and operated according to designer's intentions and manufacturer's recommendations. Plumbing maintenance is to be performed by a licensed plumber.

9. Restroom Repair and Maintenance. Restrooms are clean and sanitary, if required, free of any debris or hazards, and all amenities are functional; paper products are stocked; and restrooms are free of graffiti.

10. Vendor Cart Repair and Maintenance. Equipment is maintained and operated according to manufacturer's recommendations.

11. Seasonal Decorations Installations. Equipment is maintained and operated according to manufacturer's recommendations. Electrical work is to be performed by a licensed electrician.

12. Vector Control. Prompt remedial action as necessary to maintain plant material in optimum condition. Vector control is to be performed by a licensed professional.

APPENDIX G

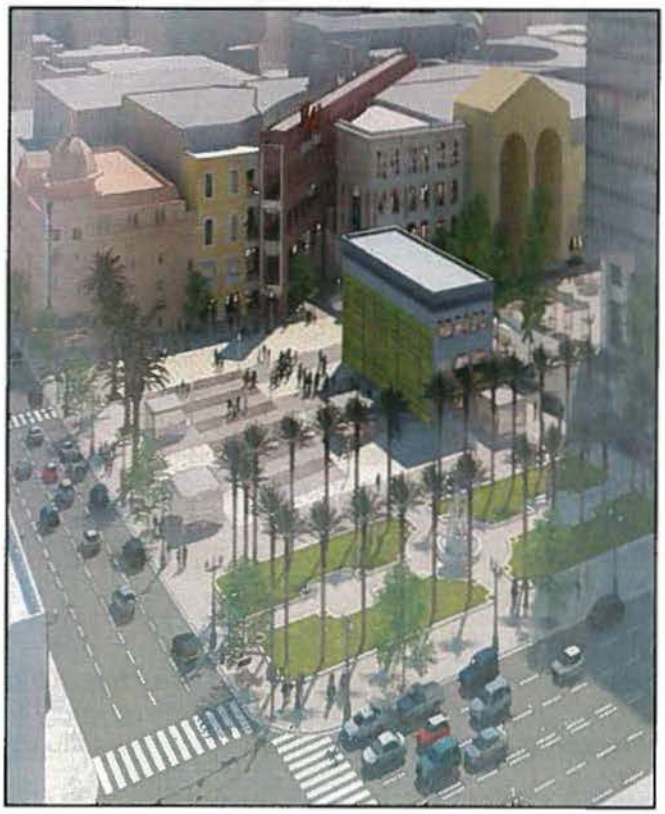
Environmental Secondary Study

ATTACHMENT E

ENVIRONMENTAL SECONDARY STUDY

FOR THE

HORTON PLAZA PARK REVITALIZATION PROJECT



DECEMBER 2010

Prepared for: City of San Diego Redevelopment Agency
1200 Third Avenue, 14th Floor
San Diego, CA 92101

Preparation Administered by: Centre City Development Corporation
401 B Street, Suite 400
San Diego, California 92101

Prepared by: AECOM
1420 Kettner Boulevard, Suite 500
San Diego, California 92101

ENVIRONMENTAL SECONDARY STUDY

1. **PROJECT TITLE:** Horton Plaza Park Revitalization Project

2. **APPLICANT:** Horton Land, L.L.C., Horton Plaza Venture, LLC, Horton Plaza LP, and the City of San Diego Redevelopment Agency.

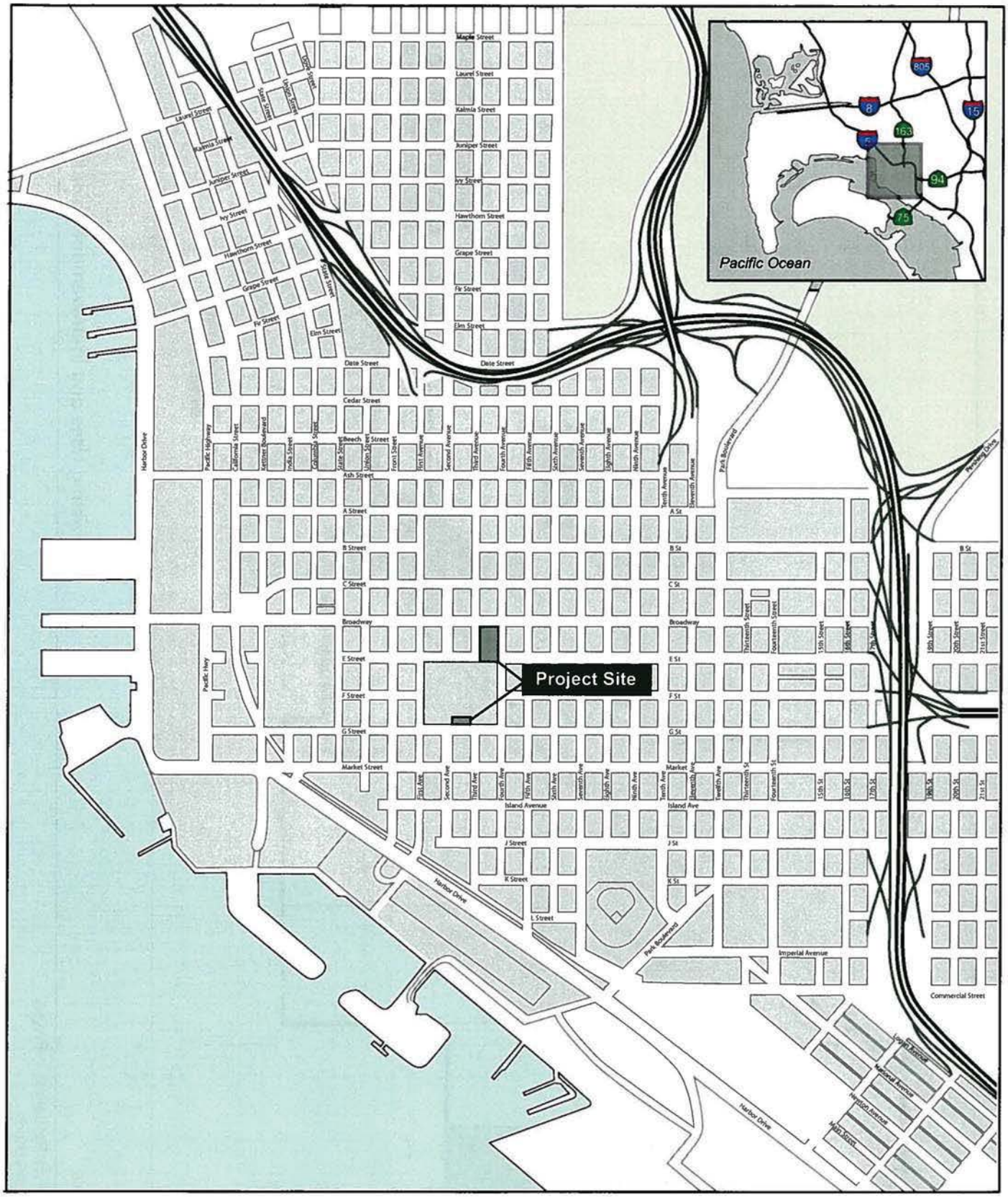
3. **PROJECT LOCATION:** The Horton Plaza Park Revitalization Project (proposed project) is located within the Horton Plaza Redevelopment Project area of the Downtown Community Plan area in the City of San Diego (Figure 1). The Downtown Community Plan area includes approximately 1,500 acres of the metropolitan core of San Diego, bounded by Interstate 5 on the north and east and San Diego Bay on the south and southwest. Centre City is located 15 miles north of the United States International Border with Mexico.

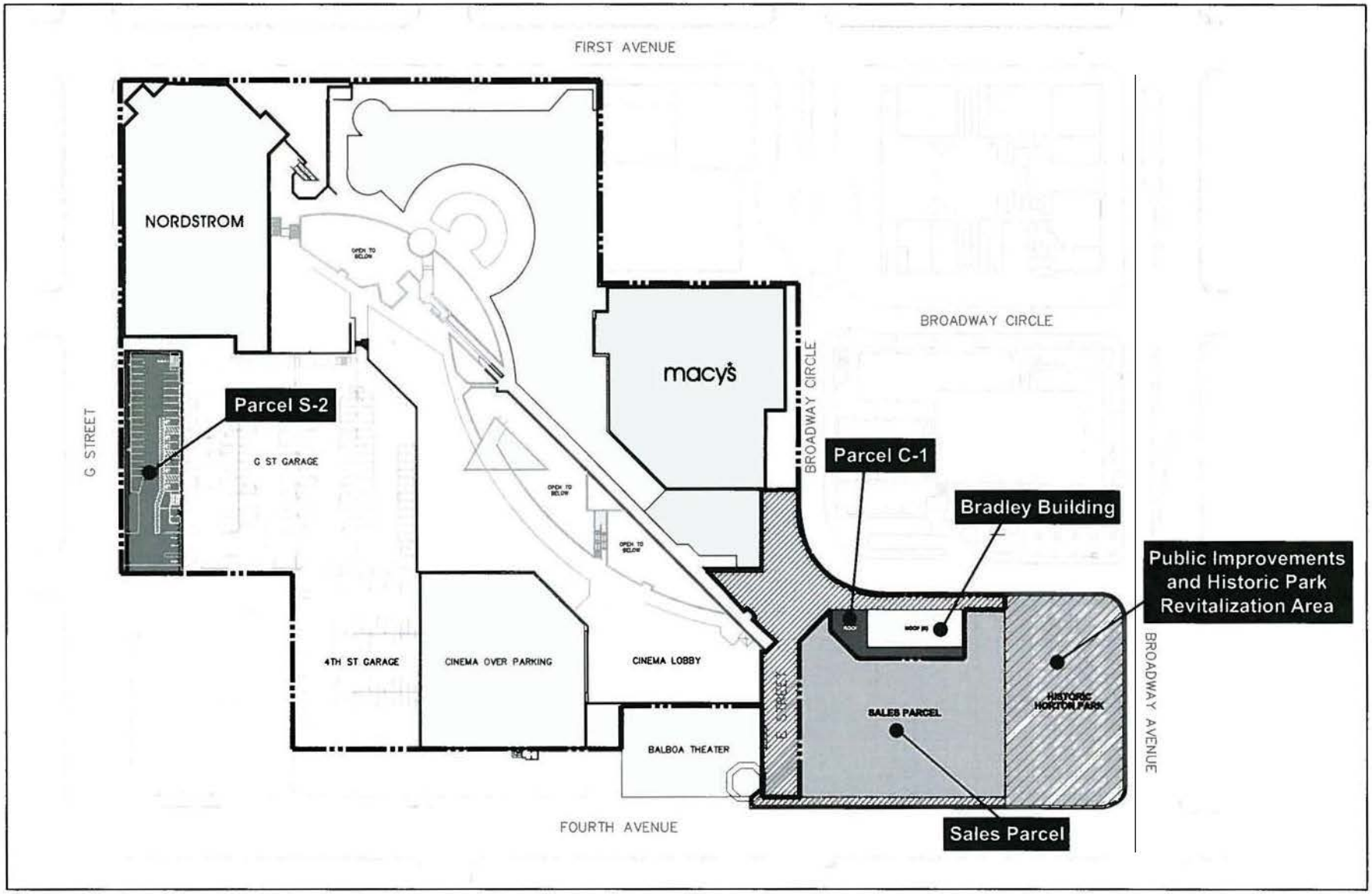
4. **PROJECT SETTING:** The FEIR for the San Diego Downtown Community Plan, Centre City Planned District Ordinance, and Redevelopment Plan for the Centre City Project Area describe the existing setting of Downtown San Diego ("Downtown") including the Horton Plaza Redevelopment Project area. This description is hereby incorporated by reference.

   Located in the highly urbanized Downtown environment, the project site is located within the Horton Plaza Retail Center and historic Horton Plaza park, which occupies the superblock bounded by Fourth Avenue to the east, First Avenue and Broadway Circle to the west, Broadway to the north, and G Street to the south. Horton Plaza is currently occupied by a mixed-use, multi-level regional mall with approximately 872,525 total square feet of commercial retail and assembly/theater space and approximately 2,275 parking spaces in two structures. The Horton Plaza Retail Center is immediately adjacent to the National Register Gaslamp Quarter Historic District to the east. The historic Horton Plaza park is located along the south side of Broadway between Broadway Circle and Fourth Avenue. Surrounding land uses in the vicinity of the project site include a high concentration of multi-story and high-rise office and commercial buildings.

   The proposed project would allow for improvements and revitalization activities in specific areas located within the Horton Plaza Redevelopment Project. The areas subject to improvements and revitalization activities are defined in the project description (paragraph 5) and illustrated in Figure 2. For the purposes of this Secondary Study, these areas are referred to collectively as the project site.

   Applicable plans and policies governing the project site include the Horton Plaza Redevelopment Plan, San Diego Downtown Community Plan, Centre City Planned District Ordinance (PDO) and the amendments thereof, and the Land Development Code (LDC). The proposed project is not located in the coastal zone. The Horton Plaza Retail Center is located within the Employment/Residential Mixed Use (ER) Land Use District of the Centre City Planned District, which is intended to accommodate a diverse array of uses including residential, artists' studios, live/work spaces, hotels, offices, research and development, retail, and a variety of other uses that are indented support other residential and commercial uses within the district. The historic Horton Plaza park is located within the Park/Open Space (OS) Land Use District which is meant to provide areas for public parks and open spaces. Below-ground parking facilities, eating and drinking establishments, arts and cultural uses (enclosed spaces should be underground), and community centers are also permitted within the OS District. Broadway is designated as a Main Street which, under the Main Street Overlay District (MS), requires that a minimum of 80 percent of the ground-floor street frontage of any building contain active commercial uses. However, this portion of the project site is existing park land and does not have buildings fronting on Broadway. Lastly, the entire block bounded by Broadway to the north, Fourth Avenue to the east, E Street to the south, and Broadway Circle to the west is designated with the Employment Required (E) Overlay.


Pacific Ocean
Project Site
Maple Street
Laurel Street
Kalmia Street
Juniper Street
Ivy Street
Hawthorn Street
Grape Street
Fir Street
Elm Street
Date Street
Cedar Street
Ash Street
A Street
B Street
C Street
Broadway
E Street
F Street
G Street
Market Street
Island Avenue
J Street
K Street
L Street
Harbor Drive
Pacific Highway
Park Boulevard
Imperial Avenue
Commercial Street
Pershing Drive
Harbor Drive
Pacific Hwy
Front Street
State Street
Union Street
India Street
Columbia Street
Kettner Boulevard
California Street
Beech Street
First Avenue
Second Avenue
Third Avenue
Fourth Avenue
Fifth Avenue
Sixth Avenue
Seventh Avenue
Eighth Avenue
Ninth Avenue
Tenth Avenue
Eleventh Avenue
Twelfth Ave
Thirteenth St
Fourteenth St
15th St
16th St
17th St
18th St
19th St
20th St
21st St
A St
B St
C St
E St
F St
G St
J St
K St
Harbor Drive
Pacific Highway
Park Boulevard
Broadway
Market
Island Ave
Imperial Avenue
Commercial Street
Pershing Drive
Harbor Drive
Laurel Street
Kalmia Street
Juniper Street
Ivy Street
Hawthorn Street
Grape Street
Fir Street
Elm Street
Date Street
Cedar Street
Ash Street
A Street
B Street
C Street
Broadway
E Street
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J Street
K Street
L Street
Harbor Drive
Pacific Highway
Park Boulevard
Imperial Avenue
Commercial Street
Pershing Drive
Harbor Drive
Front Street
State Street
Union Street
India Street
Columbia Street
Kettner Boulevard
California Street
Beech Street
First Avenue
Second Avenue
Third Avenue
Fourth Avenue
Fifth Avenue
Sixth Avenue
Seventh Avenue
Eighth Avenue
Ninth Avenue
Tenth Avenue
Eleventh Avenue
Twelfth Ave
Thirteenth St
Fourteenth St
15th St
16th St
17th St
18th St
19th St
20th St
21st St
A St
B St
C St
E St
F St
G St
J St
K St
Broadway
Market
Island Ave
Imperial Avenue
Commercial Street
Pershing Drive
Harbor Drive
Harbor Drive
Pacific Highway
Park Boulevard



Source:

N

No Scale

Figure 2
Existing Uses and Improvement/Revitalization Areas

Horton Plaza Park Revitalization Project
CCDC Secondary Study

December 2010
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The E Overlay requires at least 50 percent of the gross floor area within each development in this overlay district to be dedicated to employment uses such as professional office, education, cultural uses, retail, hotel, or similar commercial uses. The OPA provides for the future development of a café building adjacent to the Bradley Building and four kiosks within the new urban plaza, all of which will contain uses envisioned by the E Overlay district. It should be noted that public parks, plazas, and open space areas are permitted by right in all Land Use and Overlay Districts, including the ER District and the E Overlay, as stated in Table 156-0308A of the PDO. In addition, Article V, Section 500.7 of the Horton Plaza Redevelopment Plan states that the establishment or enlargement of public, semi-public, institutional, or non-profit uses, including parks and recreational facilities are permitted in any area within the Horton Plaza Redevelopment Area.

5. PROJECT DESCRIPTION: This Secondary Study analyzes the potential environmental impacts associated with approval of the Owner Participation Agreement (OPA) by and between the Redevelopment agency of the City of San Diego (Agency) and the Developer (therein) for the demolition of the existing 130,000 square foot Robinsons-May building, the redevelopment and construction of a public urban plaza and the rehabilitation of the existing historic Horton Plaza park (collectively referred to therein as the Plaza Improvements), and the Design Review of the associated improvements to the Horton Plaza Retail Center. These project components are discussed in further detail in the following paragraphs and illustrated in Figures 2 through 9.

Plaza Improvements

The Plaza Improvements consist of the creation of an approximately 37,000 square foot public urban plaza and the rehabilitation of the adjacent existing 20,000 square foot, historic Horton Plaza park (Figure 2). The Plaza Improvements are envisaged to be the dynamic, active, public heart of the city and a true community gathering place. The Plaza Improvements (both new urban plaza and rehabilitation of the historic Horton Plaza park) would be designed and constructed to create a physically, aesthetically and operationally integrated urban plaza and park. The objective of the Plaza Improvements is to create a vibrant and stimulating place to gather for large civic events and host community celebrations. The Plaza Improvements will complement the historic Horton Plaza park, Westfield Horton Retail Center, the historic Balboa Theatre and Fourth Avenue environs. As such, the concept of the new plaza evokes the vision of a place that actively connects, integrates and responds to these three significant adjoining community gathering places. Preliminary design guidelines for features, fixtures, materials and finishes to be included in the Plaza Improvements have been developed and would be used throughout the design review process.

Examples of potential components and elements may also include, but not be limited to, the following:

- Flexible outdoor performance space;
- Interactive water features;
- Public restrooms;
- Public art/sculpture;
- Other utility and operational amenities.

The Plaza Improvements would also include four permanent kiosks not to exceed 300 square feet per kiosk.

The OPA provides that the Plaza Improvements shall meet the following programmatic goals:

- Year 1 – Not less than 75 Events totaling at least 180 hours in the aggregate;
- Year 2 – Not less than 125 Events totaling at least 300 hours in the aggregate;
- Year 3 – Not less than 175 Events totaling at least 420 hours in the aggregate; and

- Year 4 and for the balance of the Term of this Agreement – Not less than 208 Events totaling at least 500 hours in the aggregate.

Sales Parcel

Figure 2 illustrates the location of the Sales Parcel, which contains the partially vacant former Robinsons-May Building (currently occupied by retail stores Sam Goody, Abercrombie & Fitch, and a portion the United Artist Theaters complex). As shown in Figures 3 though 6, this existing four-level, commercial retail building on Fourth Avenue (approximately 130,000 square feet) and the adjoining improvements immediately adjacent to the historic Horton Plaza park would be demolished and removed from the site in compliance with existing laws and regulations - including rules of the San Diego Air Pollution Control District (SDAPCD). In addition, the exterior escalator and double fire stair attached to the south side of the above commercial retail building will be demolished and removed. All existing utilities that serve this building will be disconnected, capped and/or removed in compliance with existing laws and regulations. After remediation and demolition of the entire building (including subsurface improvements, foundations, slabs, basement, loading dock, tanks and abandoned utilities), the site would be excavated and shoring will be installed to support the adjacent Bradley Building structure.

As shown in Figure 7, the south and east facades of the Bradley Building would be repaired and finished to include: (i) the construction of a new cornice element to match the existing cornice along the north and west facades; (ii) a plaster finish matching the north and east facades (iii) the installation of green wall panels on the south and east facades. In addition, a new exit stairway within the Retail Center will be constructed as required to meet all applicable building and fire code requirements.

Once the commercial retail building and the adjoining improvements are demolished, the graded site would be conveyed to the Agency for the purpose of improving it as an urban open space adjacent to the existing historic Horton Plaza park (Plaza Improvements). The Agency would be responsible for making the Plaza Improvements and thereafter convey the Sales Parcel to the City.

Public Improvements

Specified public improvements would be completed in the area generally described as the former E Street area, an area along side Broadway Circle and along Fourth Avenue, as shown in Figure 2. The public improvements include: demolishing existing sidewalk paving and replacing with new sidewalk paving material, street trees (if necessary) and street lighting (if necessary), signage installation, litter container installation, and utility work. In addition, public improvements also include demolishing, repairing, and modifying the northern terminus of the red viaduct (pedestrian walkway) with the north façade of the main retail center.

Parcel S-2

Cosmetic improvements would occur on Parcel S-2, which is generally located along the north side of G Street between Second and Third Avenues (Figure 2). Improvements include, removing current landscape material (except trees) from the planter bed along the sidewalk on G Street and install new landscaping. The exterior elevator and stairs of the parking garage, as well as the mesh screening, would be painted. A new solid screen rail would be installed and painted along the south and east facades on the upper parking level. The addition of new signage and lighting improvements along the exterior of the existing parking structure would also occur. Figure 8 illustrates the potential cosmetic improvements that may occur on Parcel S-2.

Parcel C-1

Improvements at Parcel C-1 (location shown in Figure 2) work would either consist of temporary beautification improvements (Interim Improvements) or permanent improvements (Permanent

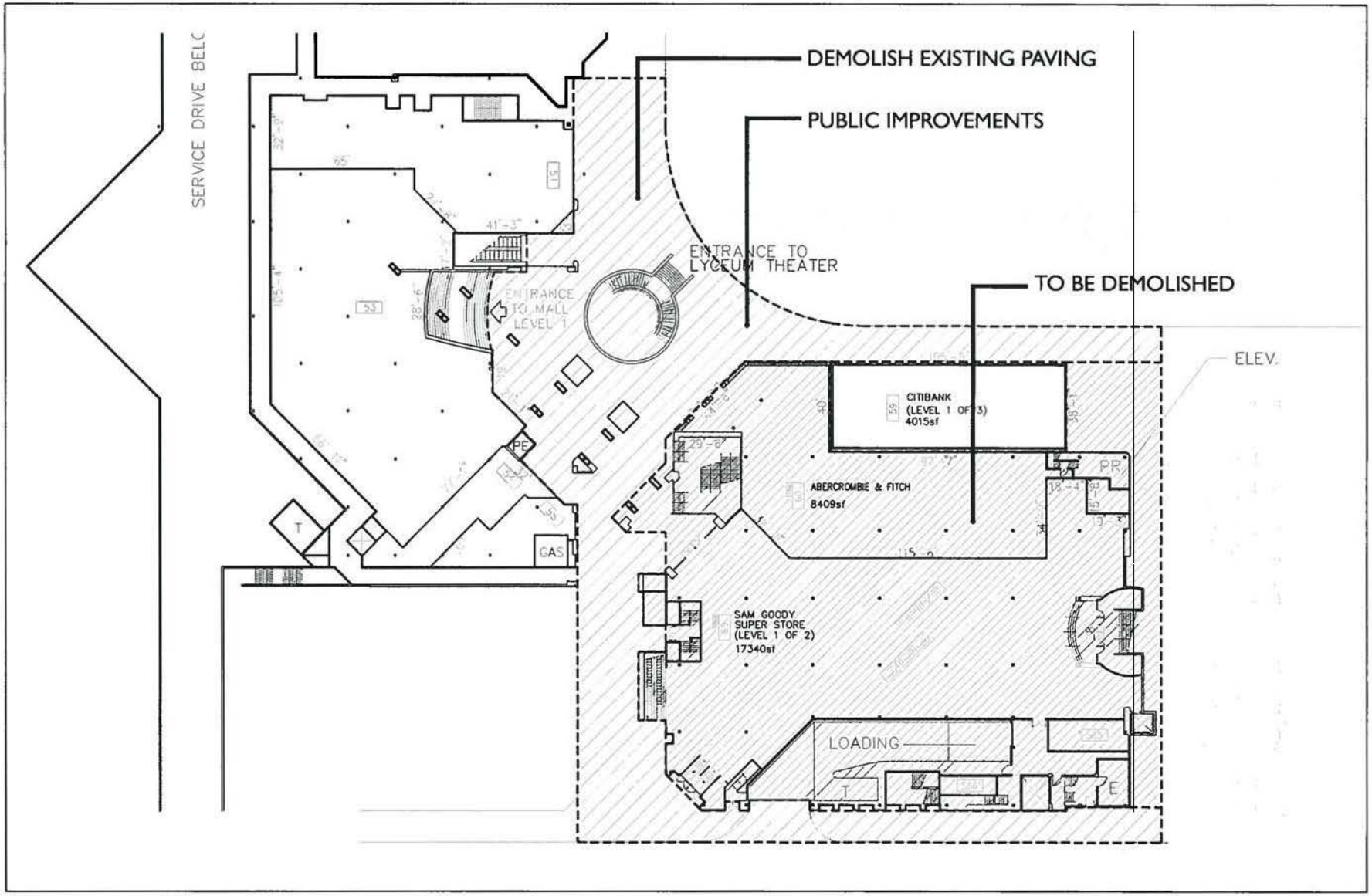
Improvements) as described below.

Interim Improvements

Construction of a kiosk within the area immediately to the south of the Bradley Building for the preparation and sale of food and/or beverages. The kiosk structure would have a footprint no greater than 300 square feet and 15 feet high. Improvements would also consist of landscaping and hardscape.

Permanent Improvements

Construction of a commercial retail building to contain a café/restaurant use consisting of approximately 2,797 square feet, a single story, 21-feet tall with outdoor patio space immediately adjacent to and east of the existing Bradley Building near Broadway Circle (Figure 9). Improvements would also consist of landscaping, hardscape, lighting, and signage..



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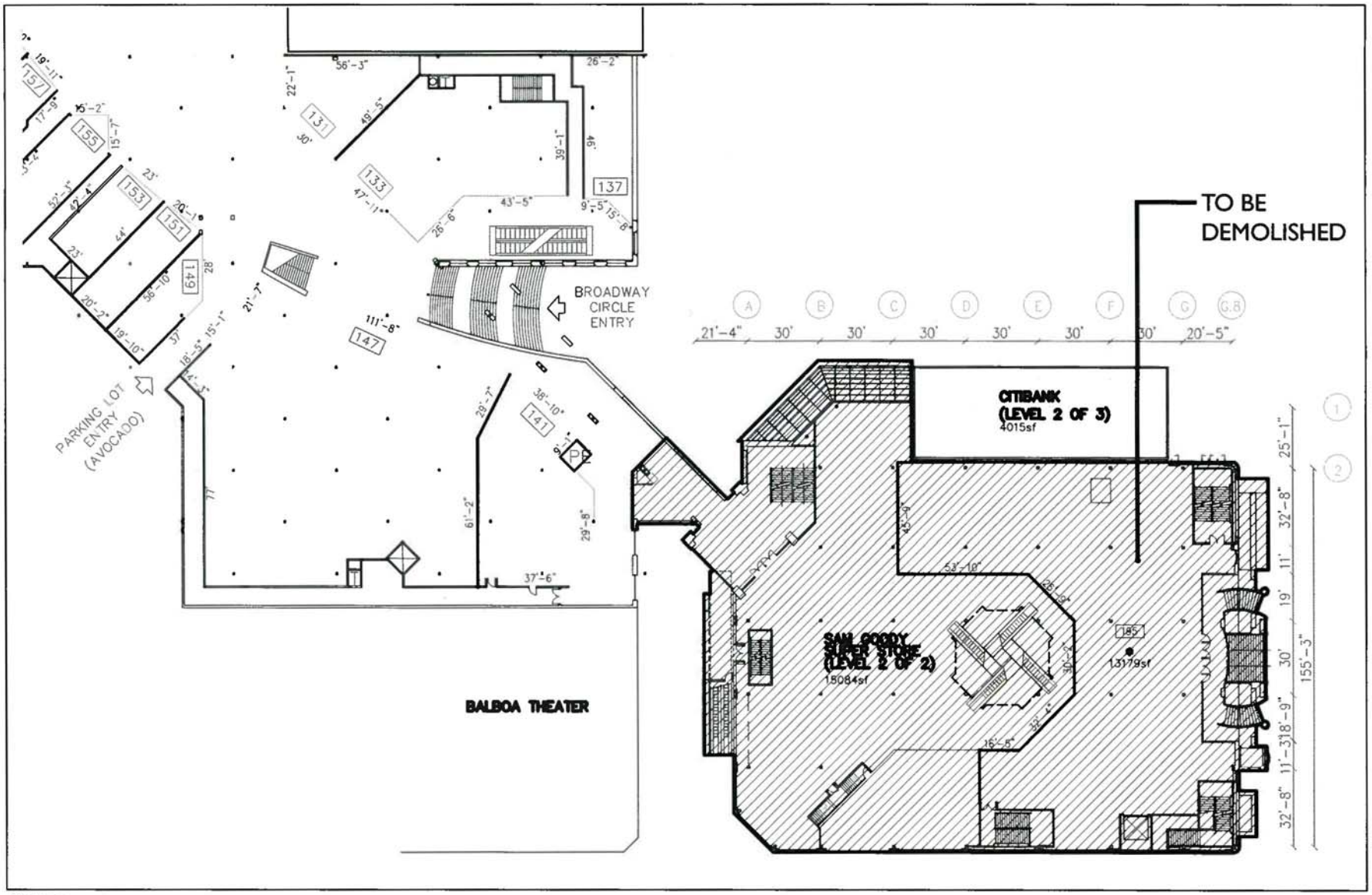
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Figure 3
Sales Parcel – Existing Level P2

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December 2010
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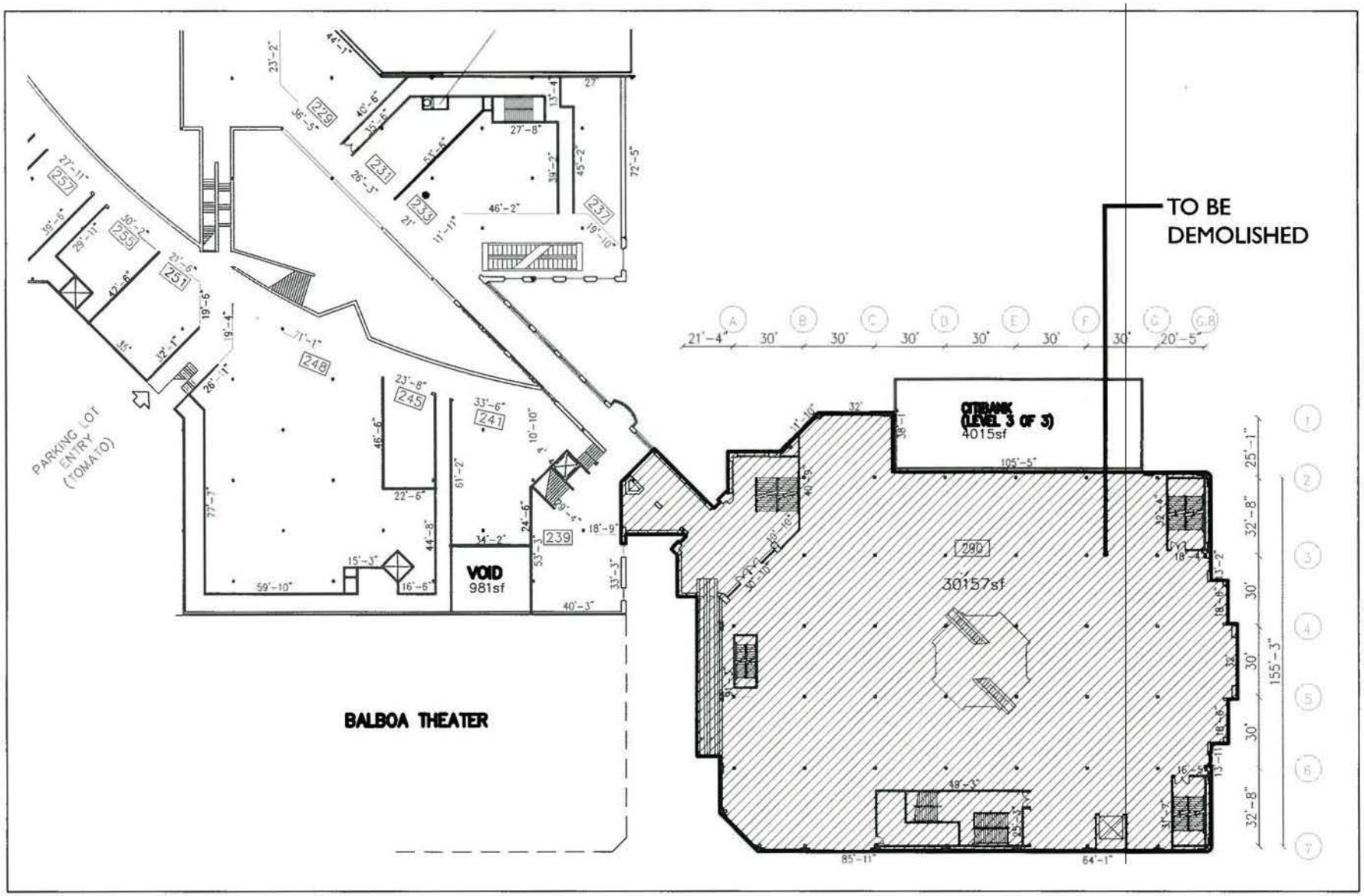
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Figure 4
Sales Parcel – Existing Level M1

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CCDC Secondary Study

December 2010
AECOM



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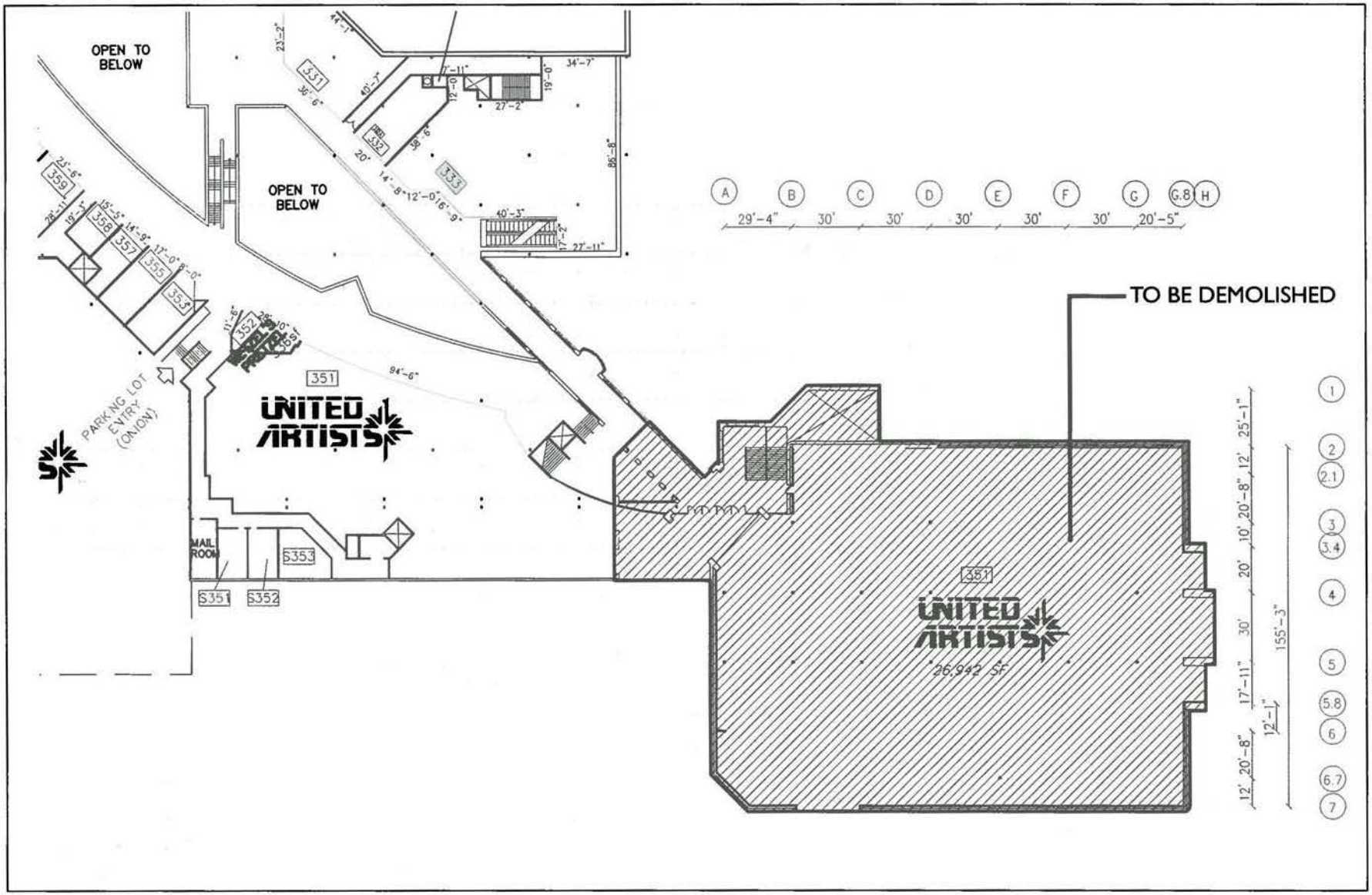
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Figure 5
Sales Parcel – Existing Level M2

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Figure 6
Sales Parcel – Existing Level M3

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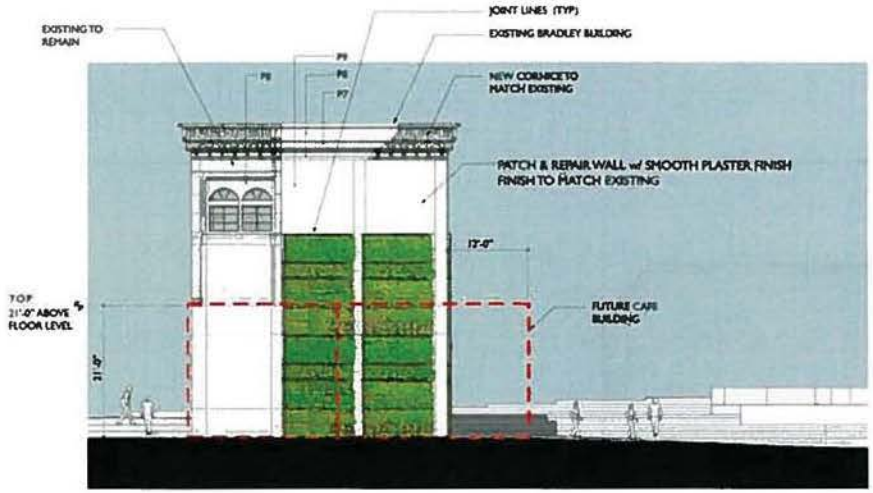




EXISTING CONDITIONS



GREEN WALL PANELS

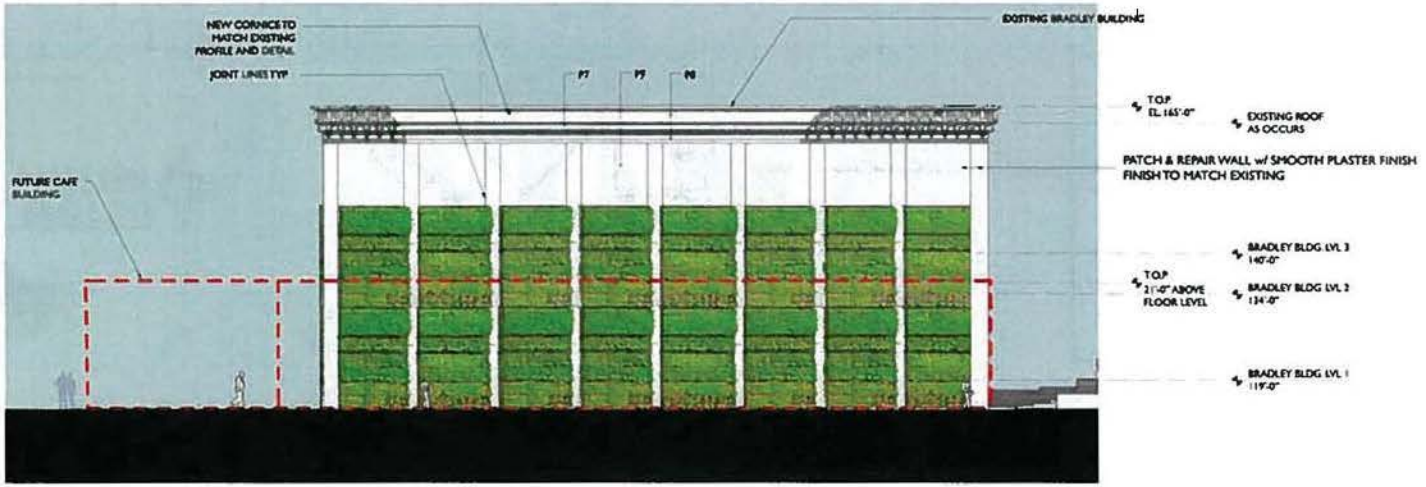


COLORS

P7 SW 7074 SOFTWARE- CORNICE

P8 SW 7075 WEB GRAY- CORNICE/WINDOWS

P9 SW 7071 GRAY SCREEN- BASE BUILDING

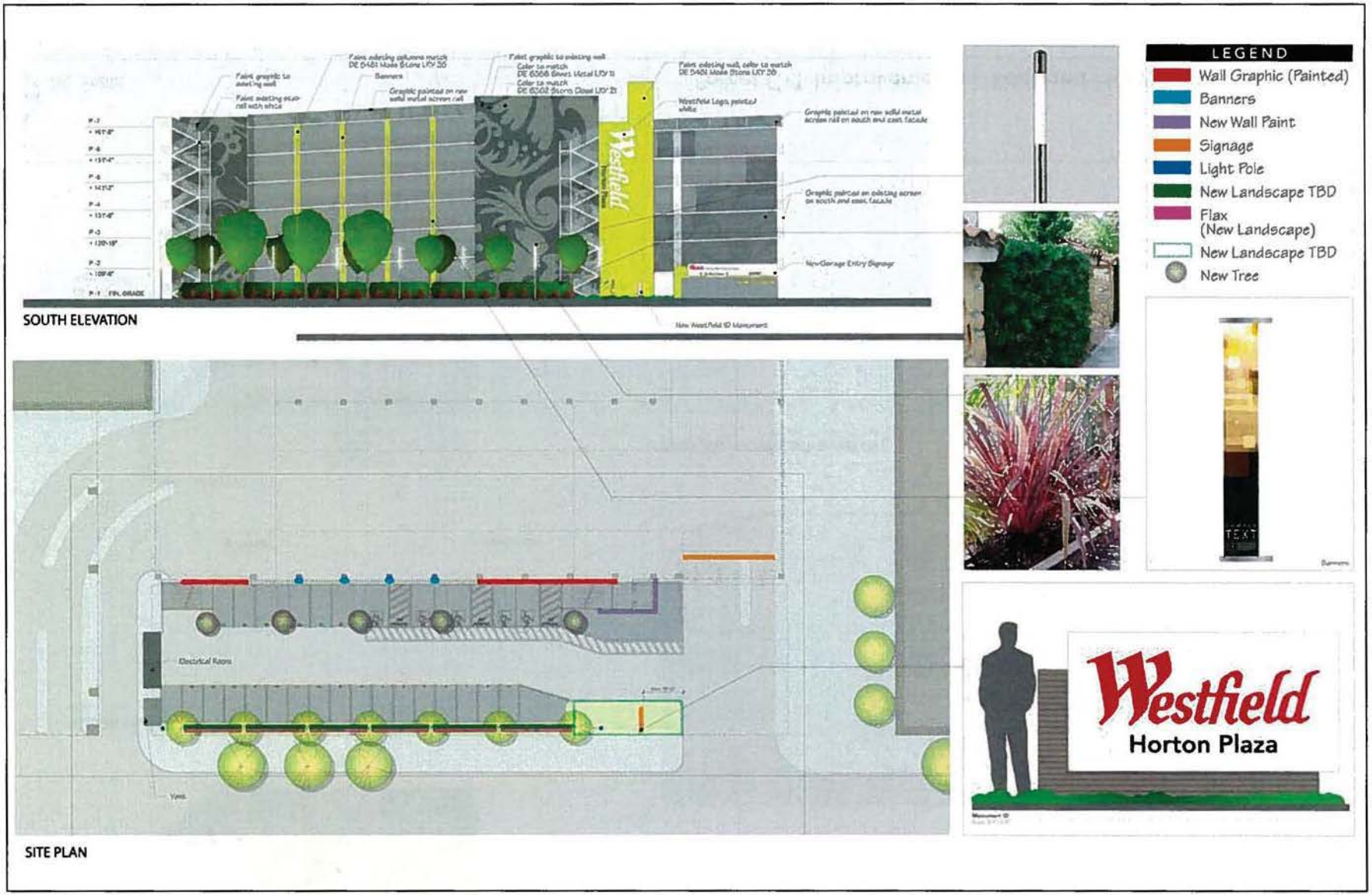


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Figure 7
Sales Parcel – Bradley Building Improvements



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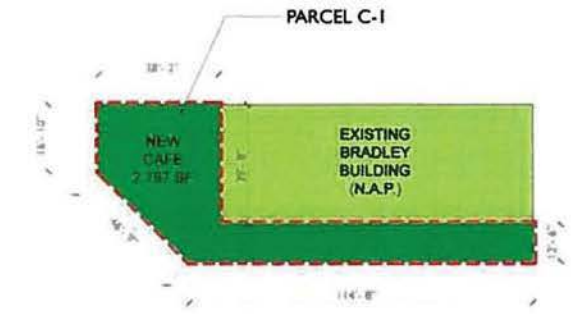
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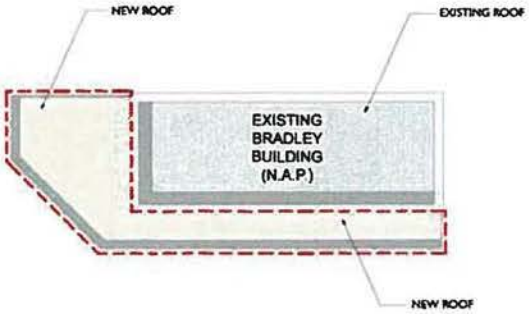
Figure 8
Parcel S-2 Improvements (G Street)

Horton Plaza Park Revitalization Project
CCDC Secondary Study

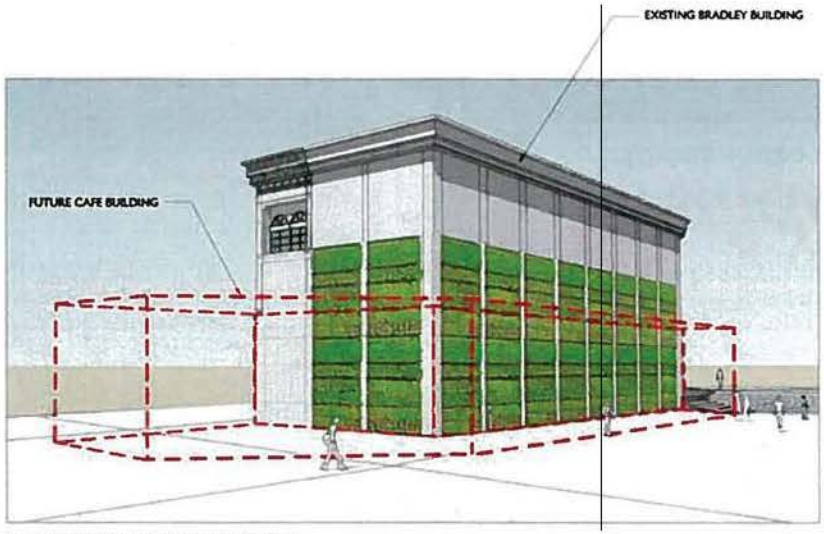
December 2010
AECOM



FLOOR PLAN
SCALE: 1"=20'



ROOF PLAN
SCALE: 1"=20'



INDICATIVE CONCEPT ENVELOPE

Source:

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No Scale

Figure 9
Parcel C-1 Improvements – Roof and Floor Plan (Future Café)

6. **California Environmental Quality Act (CEQA) COMPLIANCE:** The Centre City Redevelopment Project and related activities have been addressed by the following environmental documents, which were prepared prior to this Secondary Study and are hereby incorporated by reference:

   Final Environmental Impact Report (FEIR) for the San Diego Downtown Community Plan, Centre City Planned District Ordinance, and 10th Amendment to the Redevelopment Plan for the Centre City Project (State Clearinghouse Number 2003041001, certified by the Redevelopment Agency (Resolution No. R-04001) and the City Council (Resolution No. R 301265) on March 14, 2006.

   Addendum to the FEIR for the 11th Amendment to the Redevelopment Plan for the Centre City Redevelopment Project, Amendments to the San Diego Downtown Community Plan, Centre City Planned District Ordinance, Marina Planned District Ordinance, and Mitigation, Monitoring and Reporting Program of the FEIR for the San Diego Downtown Community Plan, Centre City Planned District Ordinance, and the Redevelopment Plan for the Centre City Redevelopment Project certified by the Redevelopment Agency by Resolution R-04193 and by the City Council by R-302932 with date of final passage on August 3, 2007.

   Second Addendum to the FEIR for the proposed amendments to the San Diego Downtown Community Plan, Centre City Planned District Ordinance, Marina Planned District Ordinance, and Mitigation Monitoring and Reporting Program certified by the Redevelopment Agency by Resolution R-04508 302932 with date of final passage on April 21, 2010.

   Third Addendum to the FEIR for the Residential Emphasis District Amendments to the Centre City Planned District Ordinance certified by the Redevelopment Agency by Resolution R-04510 with date of final passage on April 21, 2010.

   Fourth Addendum to the FEIR for the San Diego Civic Center Complex Project certified by the Redevelopment Agency by Resolution R-04544 with date of final passage on August 3, 2010.

   The FEIR is a "Program EIR" as described in Section 15168 of the State CEQA Guidelines. The aforementioned environmental documents are the most recent and comprehensive environmental documents pertaining to the proposed project. These environmental documents are available for review at the office of the Centre City Development Corporation, 401 B Street, Suite 400, San Diego, California 92101.

   This Secondary Study has been prepared in compliance with the San Diego Redevelopment Agency's amended "Procedures for Implementation of CEQA and the State CEQA Guidelines" (adopted July 17, 1990). Under these Agency Guidelines, environmental review for subsequent specific development projects is accomplished using the Secondary Study process defined in the Agency Guidelines, as allowed by Sections 15168 and 15180 of the State CEQA Guidelines. The Secondary Study includes the same evaluation criteria as the Initial Study defined in Section 15063 of the State CEQA Guidelines. Under this process, the Secondary Study is prepared for each subsequent specific development project to determine whether the potential impacts were anticipated in the FEIR. No additional documentation is required for subsequent specific development projects if the Secondary Study determines that the potential impacts have been adequately addressed in the FEIR and subsequent specific development projects implement appropriate mitigation measures identified in the Mitigation, Monitoring, and Reporting Program (MMRP) that accompanies the FEIR.

   If the Secondary Study identifies new impacts or a substantial change in circumstances, additional environmental documentation is required. The form of this documentation depends upon the nature of the impacts of the subsequent specific development project being proposed. Should a proposed project result in: (a) new or substantially more severe significant impacts that are not adequately

addressed in the FEIR, or (b) there is a substantial change in circumstances that would require major revision to the FEIR, or (c) that any mitigation measures or alternatives previously found not to be feasible or not previously considered would substantially reduce or lessen any significant effects of the project on the environment, a Subsequent or Supplement to the EIR would be prepared in accordance with Sections 15162 or 15163 of the State CEQA Guidelines (CEQA Statutes Section 21166). If the lead agency under CEQA finds pursuant to Sections 15162 and 15163, no new significant impacts will occur or no new mitigation will be required, the lead agency can approve the subsequent specific development project, as being within the scope of the project covered by the FEIR, and no new environmental document is required.

7. **PROJECT-SPECIFIC ENVIRONMENTAL ANALYSIS:** See attached Environmental Checklist and *Section 10 Evaluation of Environmental Impacts*.

8. **MITIGATION, MONITORING, AND REPORTING PROGRAM:** As described in the Environmental Checklist and summarized in **Attachment A**, the following mitigation measures included in the MMRP found in Volume 1B of the FEIR will be implemented by the proposed project:

   - Air Quality (AQ-B.1-1)
   - Historical Resources (HIST-B.1-1)
   - Paleontology (PAL-A.1-1)

9. **DETERMINATION:**

   In accordance with Sections 15168 and 15180 of the CEQA Guidelines, the potential impacts associated with future development within the Downtown Community Plan area are addressed in the FEIR prepared for the San Diego Downtown Community Plan, Centre City Planned District Ordinance and Tenth Amendment to the Redevelopment Plan for the Centre City Redevelopment Project, which was certified on March 14, 2006 and the Addenda certified thereafter in 2007 and 2010.

   These previous documents address the potential effects of future development within the Downtown Community Plan based on buildout forecasts projected from the land use designations, density bonus, and other policies and regulations governing development intensity and density. Based on this analysis, the FEIR and Addenda concluded that development would result in significant impacts related to the following issues (mitigation and type of impact shown in parentheses):

   <u>Significant but Mitigated Impacts</u>
   - Air Quality: Construction Emissions (AQ-B.1) (Direct (D))
   - Land Use: Ballpark Noise (LU-B.1) (D)
   - Land Use: Ballpark Lighting (LU-B.5) (D)
   - Noise: Interior From Traffic Noise (NOI-B.1) (D)
   - Noise: Interior From Ballpark Noise (NOI-B.2) (D)
   - Paleontology: Impacts to Significant Paleontological Resources (PAL-A.1) (D)

   <u>Significant and Not Mitigated Impacts</u>
   - Aesthetics/Visual Quality: Views Of Bay And Bay Bridge (VIS-B.1) (D)
   - Air Quality: Construction Emissions (AQ-B.1) (Cumulative (C))
   - Air Quality: Mobile-source Emissions (C)
   - Historical Resources: Historical (D/C)
   - Historical Resources: Archaeological (D/C)
   - Land Use: Traffic Noise (LU-B.2) (D)
   - Land Use: Aircraft Noise (LU-B.3) (D)

- Land Use: Railroad Noise (LU-B.4) (D)
- Land Use: Physical Changes Related to Transient Activity (LU-B.6) (D/C)
- Noise: Traffic Noise Level Increase on Grid Streets (NOI-A.1) (D/C)
- Noise: Exterior Traffic Noise in Residential Development (NOI-C.1) (D)
- Noise: Exterior Aircraft Noise in Residential Development (NOI-C.2) (D)
- Noise: Exterior Traffic Noise in Public Parks and Plazas (NOI-D.1) (D)
- Noise: Exterior Aircraft Noise in Public Parks and Plazas (NOI-D.2) (D)
- Parking: Excessive Parking Demand (TRF-D.1) (D/C)
- Traffic: Impact on Grid Streets (TRF-A.1.1) (D)
- Traffic: Impact on Surrounding Streets (TRF-A.1.2) (D/C)
- Traffic: Impact on Freeway Ramps and Segments (TRF-A.2.1) (D/C)
- Traffic: Impact from Removal of Cedar Street Ramp (TRF-A.2.2) (D)
- Water Quality: Urban Runoff (WQ-A.1) (C)

In certifying the FEIR and approving the Downtown Community Plan, Planned District Ordinance, and 10th Amendment to the Redevelopment Plan, the San Diego City Council and Redevelopment Agency adopted a Statement of Overriding Considerations, which determined that the unmitigated impacts were acceptable in light of economic, legal, social, technological, or other factors including the following:

Overriding Considerations

- Develop downtown as the primary urban center for the region.
- Maximize employment opportunities within the downtown area.
- Develop full-service, walkable neighborhoods linked to the assets downtown offers.
- Increase and improve park and public spaces.
- Maximize the advantages of downtown's climate and waterfront setting.
- Implement a coordinated, efficient system of vehicular, transit, bicycle and pedestrian traffic.
- Integrate historical resources into the new downtown plan.
- Facilitate and improve the development of business and economic opportunities located in the downtown area.
- Integrate health and human services into neighborhoods within downtown.
- Encourage a regular process of review to ensure the Plan and related activities are best meeting the vision and goals of the Plan.

The proposed activity analyzed within this Secondary Study is covered under the FEIR for the San Diego Downtown Community Plan, Centre City Planned District Ordinance, Horton Plaza Redevelopment Plan, and 10th Amendment to the Redevelopment Plan for the Centre City Redevelopment Project, which was certified by the Redevelopment Agency by Resolution R-04001 and by the City Council by Resolution R-301265 on March 14, 2006, and the Addenda certified thereafter in 2007 and 2010.

This activity is adequately addressed in the environmental documents noted above and the Secondary Study prepared for this project reveals there is no change in circumstance, additional information, or project changes to warrant additional environmental review. Because the prior environmental documents adequately covered this activity as part of the previously approved project, this activity is not a separate project for purposes of review under the CEQA pursuant to CEQA Guidelines Sections 15060(c) (3), 15180, and 15378(c).

SUMMARY OF FINDINGS: In accordance with Public Resources Code sections 21166, 21083.3, and CEQA Guidelines sections 15162(a), 15168 and 15183, the following findings are derived from the environmental review documented by this Secondary Study and the 2006 FEIR.

1. No substantial changes are proposed with respect to the circumstances under which the proposed OPA is being undertaken which will require important or major revisions of the 2006 FEIR due to the involvement of new significant environmental effects or a substantial increase in the severity of significant environmental effects previously identified in the 2006 FEIR or Addenda;
2. No substantial changes have occurred with respect to the circumstances under which the proposed OPA is being undertaken which will require major revisions of the 2006 FEIR due to the involvement of new significant environmental effects or a substantial increase in the severity of significant environmental effects previously identified in the 2006 FEIR or Addenda;
3. No new information of substantial importance which was not known or could not have been known at the time the 2006 FEIR was certified as complete, and which shows that the OPA will have any significant effects not discussed previously in the 2006 FEIR or Addenda, or that any significant effects previously examined will be substantially more severe than shown in the 2006 FEIR or Addenda, or that any mitigation measures or alternatives previously found not to be feasible or not previously considered would substantially reduce or lessen any significant effects of the OPA on the environment;
4. No Negative Declaration, Subsequent EIR, or Supplement or Addendum to the 2006 FEIR is necessary or required; and
5. The proposed OPA will have no significant effect on the environment, except as identified and considered in the 2006 FEIR and Addenda. No new or additional project-specific mitigation measures are required for this project.
6. The proposed OPA and its associated activities would not have any new effects that were not adequately covered in the 2006 FEIR or Addenda, and therefore, the proposed OPA is within the scope of the program approved under the 2006 FEIR and Addenda.

The CCDC, the implementing body for the Redevelopment Agency of the City of San Diego, administered the preparation of this Secondary Study.

Signature of Lead Agency Representative — Date: 12/20/2010

Signature of Preparer — Date: 12/16/2010

ENVIRONMENTAL CHECKLIST

10. EVALUATION OF ENVIRONMENTAL IMPACTS

This environmental checklist evaluates the potential environmental effects of the proposed project consistent with the significance thresholds and analysis methods contained in the FEIR for the San Diego Downtown Community Plan and Addenda certified thereafter in 2007 and 2010; Centre City PDO; and the Horton Plaza Redevelopment Plan.

In addition, this environmental checklist also recognizes the requirements of Assembly Bill 32 and Senate Bill (SB) 97. Assembly Bill 32, the California Global Warming Solutions Act, established a state goal of reducing Greenhouse Gas Emissions (GHG) emissions to 1990 levels by the year 2020 (a reduction of approximately 30 percent from forecast emission levels). Senate Bill (SB) 97, a companion bill directed the California Natural Resources Agency (Resource Agency) to certify and adopt guidelines for the mitigation of GHG or the effects of greenhouse gas emissions. SB 97 was the State Legislature's directive to the Resources Agency to specifically establish that GHG emissions and their impacts are appropriate subjects for CEQA analysis.

On December 30, 2009, the Resources Agency adopted revisions to the State CEQA Guidelines (Title 14, California Administrative Code Section 15000 et.seq.) to address analysis and mitigation of pursuant to SB 97. These amendments became effective March 18, 2010. CEQA now requires that public agencies review the environmental impacts of proposed projects. As such, this review includes an analysis of GHG emissions for the proposed project.

Based on the assumption that the proposed activity is adequately addressed in the FEIR and the Addenda to the FEIR, the environmental checklist table indicates how the impacts of the proposed activity relate to the conclusions of the FEIR and the Addenda to the FEIR. As a result, the impacts are classified into one of the following categories:

- Significant and Not Mitigated (SNM)
- Significant but Mitigated (SM)
- Not Significant (NS)

The checklist identifies each potential environmental effect and provides information supporting the conclusion drawn as to the degree of impact associated with the proposed project. As applicable, mitigation measures from the FEIR are identified and are summarized in Attachment A to this Secondary Study. Some of the mitigation measures are plan-wide and not within the control of the proposed project. Other measures, however, are to be specifically implemented by the proposed project. Consistent with the FEIR analysis, the following issue areas have been identified as SNM even with inclusion of the proposed mitigation measures, where feasible:

- Air Quality: Mobile-source Emissions (C)
- Land Use: Physical Changes Related to Transient Activity (LU-B.6) (D/C)
- Traffic: Impact on Surrounding Streets (TRF-A.1.2) (C)
- Traffic: Impact on Freeway Ramps and Segments (TRF-A.2.1) (C)
- Traffic: Impact on Parking (TRF-D.1-1) (C)
- Water Quality: Urban Runoff (WQ-A.1) (C)

The following Overriding Considerations apply to the proposed project:

- Develop downtown as the primary urban center for the region.
- Develop full-service, walkable neighborhoods linked to the assets downtown offers.
- Increase and improve park and public spaces.
- Maximize the advantages of downtown's climate and waterfront setting.

Issues and Supporting Information	Significant And Not Mitigated (SNM)		Significant But Mitigated (SM)		Not Significant (NS)	
	Direct (D)	Cumulative (C)	Direct (D)	Cumulative (C)	Direct (D)	Cumulative (C)
1. AESTHETICS/VISUAL QUALITY:						
(a) **Substantially disturb a scenic resource, vista, or view from a public viewing area, including a State scenic highway or view corridor designated by the Community Plan?** Views of scenic resources such as San Diego Bay, San Diego-Coronado Bay Bridge, Point Loma, Coronado and the downtown skyline are afforded by public viewing areas within and around the downtown and along view corridor streets within the planning area. No designated scenic resources exist within the downtown planning area, although the northern downtown planning area includes an approximately quarter-mile-long portion of the segment of State Route 163 from Ash Street to Interstate 8, which is eligible for designation as a California Scenic Highway. This segment of State Route 163 begins at Ash Street approximately 1 mile north east of the project site. The proposed project would not disturb this portion of the eligible California Scenic Highway. The proposed project consists of improvements to the Horton Plaza Retail Center, including the creation of an urban plaza, the rehabilitation of the adjacent historic Horton Plaza park, and other cosmetic improvements. The proposed project would result an open space area for public use and would be would be not only compatible with, but would also improve the visual characteristics of the surrounding neighborhood. The project site is bordered on the north by Broadway which is a designated view corridor in the FEIR, Downtown Community Plan, and the PDO. However, no new building fronting on Broadway would be constructed; therefore, view corridor setbacks and stepbacks would not be required. Furthermore, the project site does not possess any significant scenic resources that could be negatively impacted by the proposed project.					X	X

Issues and Supporting Information		Significant And Not Mitigated (SNM)		Significant But Mitigated (SM)		Not Significant (NS)	
		Direct (D)	Cumulative (C)	Direct (D)	Cumulative (C)	Direct (D)	Cumulative (C)
	Therefore, no significant direct or cumulative impacts associated with this issue area have been identified.						
(b)	**Substantially incompatible with the bulk, scale, color and/or design of surrounding development?** The bulk, scale, color and design of the proposed project would be compatible with the existing and planned development of the surrounding area in the vicinity of the project site. Redevelopment of the site into an urban plaza would improve the aesthetic condition of the site by providing a newly designed public space that is compatible with the setting of the Retail Center and would complement the historic Horton Plaza park. This portion of the project site is currently occupied by a partially vacant building and is underutilized given its central location and the vitality of the Gaslamp District. Other cosmetic improvements associated with the proposed project, such as the aesthetic improvements to Parcel S-2 would comply with strict design guidelines created to enhance the existing visual character of the development in a manner that is compatible with the surrounding development. Therefore, the proposed project would be compatible with the bulk, scale, color, and design of the surrounding existing and planned development and there would be no significant direct or cumulative impacts.					X	X
(c)	**Substantially affect daytime or nighttime views in the area due to lighting?** The proposed project would not include a substantial amount of exterior lighting or include materials that would generate substantial glare. Furthermore, the City's Light Pollution Law (Municipal Code Section 101.1300 et seq.) also protects nighttime views (e.g., astronomical activities) and light-sensitive land uses from excessive light generated by development in the downtown area. The proposed project's conformance with these requirements would ensure that direct and cumulative impacts					X	X

Issues and Supporting Information	Significant And Not Mitigated (SNM)		Significant But Mitigated (SM)		Not Significant (NS)	
	Direct (D)	Cumulative (C)	Direct (D)	Cumulative (C)	Direct (D)	Cumulative (C)
associated with this issue are not significant.						
2. AGRICULTURAL RESOURCES						
(a) **Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland) to non-agricultural use?** The proposed project is located in an urban downtown environment that does not contain land designated as prime agricultural soils by the Soils Conservation Service, nor does it contain prime farmlands designated by the California Department of Conservation. Therefore, no direct or cumulative impacts to agricultural resources would occur.					X	X
(b) **Conflict with existing zoning for agricultural use, or a Williamson Act contract?** The proposed project site does not contain, nor is it near, land zoned for agricultural use or land subject to a Williamson Act contract pursuant to Section 51201 of the California Government Code. Therefore, no direct or cumulative impacts resulting from conflicts with existing zoning for agricultural use or a Williamson Act contract would occur.					X	X
3. AIR QUALITY						
(a) **Conflict with or obstruct implementation of an applicable air quality plan, including the County's Regional Air Quality Strategies or the State Implementation Plan?** The proposed project site is located within the San Diego Air Basin, which is under the jurisdiction of the San Diego Air Pollution Control District (SDAPCD). The San Diego Air Basin is designated by state and federal air quality standards as nonattainment for ozone and particulate matter (PM) less than 10 microns (PM_{10}) and less than 2.5 microns ($PM_{2.5}$) in equivalent diameter. The SDAPCD has developed a Regional Air Quality Strategy (RAQS) to achieve the state air quality standards for ozone. According to the FEIR, development					X	X

Issues and Supporting Information	Significant And Not Mitigated (SNM)		Significant But Mitigated (SM)		Not Significant (NS)	
	Direct (D)	Cumulative (C)	Direct (D)	Cumulative (C)	Direct (D)	Cumulative (C)
consistent with the Community Plan would not conflict with regional air quality planning, and would be consistent with the RAQS. The proposed project is consistent with the Downtown Community Plan and would therefore not conflict with or obstruct implementation of applicable air quality plans. No direct or cumulative impacts relative to the obstruction of air quality attainment plans would occur with implementation of the proposed project.						
(b) **Expose sensitive receptors to substantial air contaminants including, but not limited to, criteria pollutants, smoke, soot, grime, toxic fumes and substances, particulate matter, or any other emissions that may endanger human health?** During demolition, site preparation, and construction of the plaza improvements, the proposed project could involve the exposure of surrounding sensitive receptors to substantial air contaminants associated with the use of construction equipment and the generation of dust. The potential for impacts to surrounding sensitive receptors during construction activities would be mitigated to below a level of significance through compliance with the City's mandatory standard dust control measures and the dust control and construction equipment emission reduction measures required by FEIR Mitigation Measure AQ-B.1-1 (See Table A). As stated in the project description, the proposed project would include the development of an open space urban plaza and aesthetic improvements to existing structures and facades which would not have long-term operational impacts related to the exposure of sensitive air contaminants. However, the proposed project would allow for the construction and operation of a café/restaurant approximately 3,000 square feet in size and up to four permanent kiosks (not to exceed 300 square feet per kiosk) in the plaza. However, it is not likely that the long-term			X			X

Issues and Supporting Information		Significant And Not Mitigated (SNM)		Significant But Mitigated (SM)		Not Significant (NS)	
		Direct (D)	Cumulative (C)	Direct (D)	Cumulative (C)	Direct (D)	Cumulative (C)
	operation of these components of proposed project would involve the exposure of surrounding sensitive receptors to substantial air contaminants including reactive organic gases (ROGs), toxic air contaminants (TACs), emissions from trolley operations, and substantial concentrations of carbon monoxide (commonly referred to as CO "hot spots"). CO hot spots could result from traffic congestion near the project site, at the intersections of Broadway and 4th Avenue, which operate at LOS F during the PM peak period. However, it s not likely that the proposed project would increase traffic trips which contribute to the CO hot spots. Additionally, the FEIR concludes that development within the downtown would not expose sensitive receptors to significant levels of any of the substantial air contaminants discussed above. Since the land use designation of the proposed development is compatible with the land use designation assumed in the FEIR analysis, the project would not expose sensitive receptors to a level of air contaminants beyond the level assumed by the FEIR. Additionally, the project is not located near any industrial activities and therefore would not be impacted by any emissions associated with such activities. Therefore, impacts associated with this issue would not be significant. Project impacts associated with the generation of substantial air contaminants are discussed below in 3(c).						
(c)	**Generate substantial air contaminants including, but not limited to, criteria pollutants, smoke, soot, grime, toxic fumes and substances, PM, or any other emissions that may endanger human health?** Implementation of the proposed project could result in potentially adverse air quality impacts related to the following air emission generators: construction activities, mobile- and stationary-sources. Demolition of the existing structures, site preparation activities, and construction of the plaza improvements could		**X**	**X**			

Issues and Supporting Information	Significant And Not Mitigated (SNM)		Significant But Mitigated (SM)		Not Significant (NS)	
	Direct (D)	Cumulative (C)	Direct (D)	Cumulative (C)	Direct (D)	Cumulative (C)
involve potentially adverse impacts associated with hazardous building materials, the creation of dust, and the generation of emissions from construction equipment. Compliance with the City's existing regulations requiring a pre-construction hazards assessment and strict remediation measures if harmful materials are present and would ensure that air quality impacts associated with hazardous building materials are not significant (See also Section 8a). However, the clearing, grading, excavation and construction activities associated with the proposed project would result in dust and equipment emission that could endanger human health. Implementation of FEIR Mitigation Measure AQ-B.1-1 (see Attachment A) would reduce dust and construction equipment emissions generated during construction of the proposed project to below a level of significance. The proposed project does not propose any uses that would significantly increase stationary-source emissions in the downtown planning area; therefore, impacts from stationary sources would not be significant. The project's mobile source emissions would not be significant in and of itself; however, in combination with dust generated during construction of the project, would contribute to the significant and unmitigated cumulative impact to air quality identified in the FEIR. Therefore, direct impacts associated with project implementation are potentially significant but mitigated below a level of significance while cumulative impacts remain significant and not mitigated, consistent with the FEIR.							
4. BIOLOGICAL RESOURCES						
(a) **Substantially effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive or special status species in local or regional plans, policies, or regulations, or by local, state, or**					**X**	**X**

Issues and Supporting Information	Significant And Not Mitigated (SNM)		Significant But Mitigated (SM)		Not Significant (NS)	
	Direct (D)	Cumulative (C)	Direct (D)	Cumulative (C)	Direct (D)	Cumulative (C)
federal agencies? Due to the highly urbanized nature of the downtown area, there are no sensitive plant or animal species, habitats, or wildlife migration corridors within the area, including the proposed project site. In addition, the ornamental street trees and landscaping included in the proposed project are not considered of significant value to native wildlife in their proposed location. Therefore, no impact associated with this issue could occur.						
(b) **Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations by local, state, or federal agencies?** As identified in the FEIR, the Downtown Community Plan area is not within a subregion of the San Diego County Multiple Species Conservation Program (MSCP). In addition, the proposed project will comply with the provisions of the Migratory Bird Treaty Act regarding nesting birds, nests, and fledglings, as applicable. Furthermore, the proposed project will comply with any applicable local, regional, state, and federal plans, policies and regulations protecting riparian habitat or other sensitive natural communities. Therefore, impacts associated with substantial adverse effects on riparian habitat or other sensitive natural communities identified in local or regional plans, policies, and regulations by local, state or federal agencies would not occur.					X	X
5. HISTORICAL RESOURCES						
(a) **Substantially impact a significant historical resource, as defined in § 15064.5?** The proposed project would occur within Horton Plaza Redevelopment Project area, located on a superblock bounded by Fourth Avenue to the east, First Avenue and Broadway Circle to the West, Broadway to the north, and G street to the south. There are two designated historic buildings identified within the Horton Plaza					X	X

Issues and Supporting Information	Significant And Not Mitigated (SNM)		Significant But Mitigated (SM)		Not Significant (NS)	
	Direct (D)	Cumulative (C)	Direct (D)	Cumulative (C)	Direct (D)	Cumulative (C)
super block. In addition, the site is adjacent to the National Register listed Gaslamp Quarter Historic District to the east. Project activities include rehabilitation of the San Diego Register-Listed Horton Plaza park, which includes the Gill Fountain, and public improvements adjacent to the National Register-Listed Balboa Theater at Fourth Avenue and E Street. Project activities also include aesthetic improvements to the parking structure and surrounding area along G Street between Second and Third Avenues, located adjacent to the National Register-Eligible Golden West Hotel. The proposed project also includes modifications to the Bradley Building which is a re-creation of a former historic building. Rehabilitation of the historic Horton Plaza park would meet the Secretary of Interior Standards for the Treatment of Historic Properties and Guidelines for Preserving, Rehabilitating, Restoring and Reconstructing Historic Buildings and be consistent with the Historical Resources Regulations pursuant to the San Diego Municipal Code, which contains stringent regulations to preserve and protect historical resources to the greatest intent possible. Other project activities would not result in the demolition or substantial alteration of the nearby historical resources. Therefore, no direct or cumulative impacts on significant historical resources would occur.							
(b) **Substantially impact a significant archaeological resource pursuant to § 15064.5, including the disturbance of human remains interred outside of formal cemeteries?** According to the conclusions in the FEIR, the likelihood of encountering archaeological resources is greatest for projects that include grading and/or excavation of areas on which past grading and/or excavation activities have been	X	X				

Issues and Supporting Information	Significant And Not Mitigated (SNM)		Significant But Mitigated (SM)		Not Significant (NS)	
	Direct (D)	Cumulative (C)	Direct (D)	Cumulative (C)	Direct (D)	Cumulative (C)
minimal (e.g., surface parking lots). Construction activities associated with the proposed project would occur within areas where previous ground disturbances, including grading and excavation, have occurred. In addition, the existing building proposed to be demolished as part of the project contains a subsurface basement. As stated in the FEIR, previously excavated areas are generally considered to have a low potential for archaeological resources, since the soil containing the archaeological resources has been removed. While it is not likely that the proposed project would require additional subsurface excavation or grading activities at a greater depth than that which has occurred previously, it is recognized that the potential for archaeological resources and human remains at the proposed project site cannot be confirmed until site excavation and grading are conducted. As such, the exact nature and extent of impacts associated with the proposed project cannot be predicted with certainty. Implementation of FEIR Mitigation Measure HIST-B.1-1 (see Attachment A) would minimize these potential impacts. However, the required mitigation may or may not be sufficient to reduce these direct project-level impacts to below a level of significance. Therefore, impacts associated with this issue remain potentially significant and not fully mitigated, consistent with the analysis of the FEIR. Furthermore, project-level significant impacts to important archaeological resources would contribute to the potentially significant and unmitigated cumulative impacts identified in the FEIR.							
(c) **Substantially impact a unique paleontological resource or site or unique geologic feature?** The proposed project site is underlain by the San Diego Formation and Bay Point Formation,			X	X		

Issues and Supporting Information	Significant And Not Mitigated (SNM)		Significant But Mitigated (SM)		Not Significant (NS)	
	Direct (D)	Cumulative (C)	Direct (D)	Cumulative (C)	Direct (D)	Cumulative (C)
which have high paleontological resource potentials. The FEIR concludes that development would have potentially adverse impacts to paleontological resources if grading and/or excavation activities are conducted beyond a depth of 1-3 ft. As discussed in Section 5(b), the project site has been previously disturbed during construction of the existing structures on site. While it is not likely that the proposed project would require additional subsurface excavation or grading activities at a greater depth than that which has occurred previously, it is recognized that ground disturbing activities would still occur, resulting in potentially significant impacts to paleontological resources. However, implementation of FEIR Mitigation Measure PAL-A.1-1 (see Table A) would ensure that the proposed project's potentially direct and cumulative impacts to paleontological resources are not significant.							
6. GEOLOGY AND SOILS						
(a) **Substantial health and safety risk associated with seismic or geologic hazards?** The proposed project is located in a seismically active region and lies within the City of San Diego's Special Study Fault Zone as defined by the City's Seismic Safety Study. The Rose Canyon Fault Zone traverses the downtown planning area and contains two recognized areas of active faulting; the Downtown Graben and the San Diego Fault. The proposed project is located within close proximity of the San Diego Fault, which lies directly west of the Horton Plaza superblock. The Southwestern portion of the Horton Plaza superblock falls within an identified Alquist-Priolo Fault Zone. Proposed project					X	X

Issues and Supporting Information	Significant And Not Mitigated (SNM)		Significant But Mitigated (SM)		Not Significant (NS)	
	Direct (D)	Cumulative (C)	Direct (D)	Cumulative (C)	Direct (D)	Cumulative (C)
improvements occurring on Parcel S-2 would be taking place directly adjacent to the area designated as the Alquist–Priolo Zone. In addition, the site is located on the Baypoint Formation and although the potential for geologic hazards (landslides, liquefaction, slope failure, and seismically induced settlement) is considered low due to the site's moderate to low-expansive geologic structure, such hazards could nevertheless occur. Therefore, the potential exists for substantial health and safety risks associated with a seismic hazard. However, conformance with, and implementation of, all seismic-safety development requirements, including City requirements for the Downtown Special Fault Zone, the seismic design requirements of the Uniform Building Code, the City of San Diego Notification of Geologic Hazard procedures would ensure that the potential impacts associated with seismic and geologic hazards are not significant.						
7. GREENHOUSE GAS EMISSIONS						
(a) **Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?** CCDC has not adopted a recommended methodology for evaluating GHG emissions associated with new development. CCDC recommends that the City of San Diego's guidance titled Addressing Greenhouse Gas Emissions from Projects subject to CEQA (Guidance) be used for analyzing the proposed project's impacts from greenhouse gas (GHG) emissions (City 2010). The City of San Diego (City) does not currently have adopted thresholds of significance for GHG emissions. The City is utilizing guidance from the California Air Pollution Control Officers Association (CAPCOA) report "CEQA &					X	X

Issues and Supporting Information	Significant And Not Mitigated (SNM)		Significant But Mitigated (SM)		Not Significant (NS)	
	Direct (D)	Cumulative (C)	Direct (D)	Cumulative (C)	Direct (D)	Cumulative (C)
Climate Change" dated January 2008 as an interim threshold to determine whether a GHG analysis will be required. A 900 metric ton screening threshold for determining when a GHG analysis is required was chosen based on available guidance from the CAPCOA white paper. The CAPCOA report references the 900 metric ton guideline as a conservative threshold for requiring further analysis and mitigation. This emission level is based on the amount of vehicle trips, the typical energy and water use, and other factors associated with projects. CAPCOA identifies project types that are estimated to emit approximately 900 metric tons of GHG's annually. The proposed project does not fall into an identified category in the Guidance. The Guidance recommends that for project types not listed, an analysis must be performed to show that the project is below the 900 metric ton screening criteria. The analysis should include, at a minimum, the five primary sources of GHG emissions: vehicular traffic, generation of electricity, natural gas consumption/combustion, solid waste generation, and water usage. The proposed project's direct and indirect GHG emissions from the above-mentioned sectors were estimated according to the recommended methodologies from the California Air Resources Board (ARB) and the California Climate Action Registry (CCAR). Direct sources include emissions such as vehicle trips and natural gas consumption. Indirect sources include off-site emissions occurring as a result of the project's operations such as electricity and water consumption. Direct emissions associated with mobile sources were estimated using URBEMIS (Rimpo and Associates 2007). Modeling was based on project-specific data (e.g., size and type of proposed uses) and vehicle trip information							

Issues and Supporting Information	Significant And Not Mitigated (SNM)		Significant But Mitigated (SM)		Not Significant (NS)	
	Direct (D)	Cumulative (C)	Direct (D)	Cumulative (C)	Direct (D)	Cumulative (C)
from City's Trip Generation Manual (City 2003). Consumption and generation data for electricity, natural gas, water, and solid waste for the proposed uses were estimated using data for similar uses. Energy consumption rates were obtained from the California Energy Commission (CEC) California Commercial End Use Survey (CEC 2006). Data from the Bay Area Air Quality Management District was used as a conservative estimate, as needed, in the absence of published data from the San Diego Air Pollution Control District. GHG emission factors associated with energy consumption were obtained from SDG&E's "2008 Annual Entity Emissions" report to CCAR and the CCAR General Reporting Protocol Version 3.1 (CCAR 2009). Indirect GHG emissions associated with the consumption of water were calculated based on the estimated level of electricity required to convey, treat, and distribute the project's estimated water usage and the aforementioned emission factors for electricity production. Electricity consumption associated with water consumption was estimated using an electricity consumption rate from the CEC's Refining Estimates of Water-Related Energy Use in California report (CEC 2007). GHG emissions from solid waste disposal were calculated using CalRecycle waste generation and characterization data, and emission factors contained in EPA's Waste Reduction Model (WARM). It is important to note that all CO2 emissions from project operation may not necessarily be considered "new" emissions. The project site is currently partially occupied by retail uses and a portion of the United Artists Theaters. These uses generate GHG emissions from the same sources as identified above. GHG emissions associated with the existing uses were estimated							

Issues and Supporting Information	Significant And Not Mitigated (SNM)		Significant But Mitigated (SM)		Not Significant (NS)	
	Direct (D)	Cumulative (C)	Direct (D)	Cumulative (C)	Direct (D)	Cumulative (C)

using the same methodology as described above. Emissions were estimated for existing uses and the maximum uses currently allowed onsite. Emissions from existing and proposed uses and the net change in emissions from implementation of the proposed project (Proposed Project Emissions – Existing Emissions) are shown in Table 1. Refer to Attachment B for a detailed summary of the modeling assumptions, inputs, and outputs.

Table 1. Summary of Modeled Greenhouse Gas Emissions (CO_2e) from Implementation of the Proposed Project

Source	Existing CO_2e Emissions[1] (Metric Tons)	Existing CO_2e Emissions based on allowed uses (Metric Tons)	CO_2e Emissions from the Proposed Project (Metric Tons)	Net CO_2e Emissions (Proposed – Existing) (Metric Tons)	Net CO_2e Emissions (Proposed – Existing allowed uses) (Metric Tons)
Mobile Sources	4,185	5,732	482	-3,703	-5,250
Electricity Consumption	383	526	39	-344	-487
Natural Gas Consumption	20	27	32	12	5
Landscaping	1	1	1	0	0
Water Consumption	20	27	10	-10	-17
Solid Waste Generation	173	232	4	-170	-229
Total GHG Emissions (Metric Tons per Year)	**4,781**	**6,544**	**568**	**-4,215**	**-5,978**

Notes: CO_2e = carbon dioxide equivalent

1 The values presented do not include the full life cycle of GHG emissions that would occur over the production/transport of materials used during the construction of the project or used during the operational life of the project and the end of life for the materials and processes that would occur as an indirect result of the project. Estimating the GHG emissions associated with these processes would be too speculative for meaningful consideration and would require analysis beyond the current state of the art in impact assessment, and may lead to a false or misleading level of precision in reporting operational GHG emissions. Furthermore, indirect emissions

Issues and Supporting Information	Significant And Not Mitigated (SNM)		Significant But Mitigated (SM)		Not Significant (NS)	
	Direct (D)	Cumulative (C)	Direct (D)	Cumulative (C)	Direct (D)	Cumulative (C)
associated with in-state energy production and generation of solid waste would be regulated under AB 32 directly at the source or facility that would handle these processes. The emissions associated with off-site facilities in California would be closely controlled, reported, capped, and traded under AB 32 and California ARB programs, as recommended by ARB's Scoping Plan (ARB 2008). Therefore, it is assumed that GHG emissions associated with these life-cycle stages would be consistent with AB 32 requirements. It should be noted that EPA's WARM model is based on a life-cycle approach, which reflects emissions and avoided emissions upstream and downstream from the point of use. As such, the emission factors provided in the model provide an account of the net benefit of these actions to the environment. However, the WARM model is the most applicable tool to estimate GHG emissions from solid waste disposal at the time of this writing and the emissions are included here for completeness. Source: Modeling performed by AECOM in 2010 As shown in Table 1, the proposed project's GHG emissions would be below the recommended screening threshold of 900 metric tons per year. Thus, the project would have a less than significant impact with respect to GHG emissions and climate change.							
(b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emission of greenhouse gases? Since the project's GHG emissions would fall below the level deemed by CAPCOA and the City of San Diego to be less than significant, implementation of the proposed project would not hinder the State's ability to attain the GHG reduction goals identified in Assembly Bill 32 (the Global Warming Solutions Act). This impact is less than significant.					X	X
8. HAZARDS AND HAZARDOUS MATERIALS						
(a) **Substantial health and safety risk related to on-site hazardous materials?** The proposed project would not be located on a site that has known hazardous materials, nor is it anticipated to involve the use or storage of materials which may be considered hazardous to the public. Consistent with the uniformly applied					X	X

Issues and Supporting Information	Significant And Not Mitigated (SNM)		Significant But Mitigated (SM)		Not Significant (NS)	
	Direct (D)	Cumulative (C)	Direct (D)	Cumulative (C)	Direct (D)	Cumulative (C)
development policies and standards identified within the FEIR, if contamination is identified, the County of San Diego Department of Environmental Health (DEH) has a Voluntary Assistance Program, whereby the applicant (or its consultant) can submit a work plan which identifies the manner in which the contamination will be excavated, sampled, and analyzed for waste profiling purposes; transported; and the manner in which it will be disposed. With or without DEH oversight, these activities must comply with all existing waste profiling and disposal laws and regulations. The project's adherence to these uniformly applied development policies and standards will ensure that the impacts associated with this issue are not significant. However, the demolition and excavation activities associated with the redevelopment of the project site into an urban plaza could result in the exposure of construction workers to hazardous or potentially hazardous materials. Consistent with the conclusions in the FEIR, the proposed project's adherence to existing mandatory federal, state and local regulations controlling hazardous materials would ensure that impacts associated with this issue are not significant. Therefore, no significant direct or cumulative impacts associated with this issue would occur.							
(b) **Be located on or within 2,000 feet of a site that is included on a list of hazardous materials sites compiled pursuant to Government Code § 65962.5 and, as a result, would it create a significant hazard to the public or the environment?** The project site is not located on the State of California Hazardous Waste and Substances Sites (Cortese) List and is not located on or within 2,000 feet of a site on the State of California Hazardous Waste and Substances Sites List. The County of San Diego maintains a Site Assessment Mitigation (SAM) Case Listing of known contaminated sites throughout the County.					X	X

Issues and Supporting Information	Significant And Not Mitigated (SNM)		Significant But Mitigated (SM)		Not Significant (NS)	
	Direct (D)	Cumulative (C)	Direct (D)	Cumulative (C)	Direct (D)	Cumulative (C)
According to the most recent SAM case listing dated March 22, 2010, there are several sites on the SAM case listing that are within 2,000 feet of the project site. There are two SAM-listed cases within Horton Plaza; one located at 200 G Street and one at 121 1st Avenue. is also one SAM site identified at within the project site at 200 G Street. Both of these cases are closed, and the majority of the SAM-listed sites in the proposed project vicinity are also closed cases. Compliance with existing regulations will avoid significant impacts to human health and the environment. Additionally, in accordance with the analysis in the FEIR, adherence to existing mandatory federal, state, and local regulations as well as uniformly applied development policies and standards would avoid significant impacts to human health and the environment.							
(c) **Substantial safety risk to operations at San Diego International Airport?** The proposed project site is within the boundaries of the Airport Influence Area of the Airport Land Use Compatibility Plan (ALUCP) for San Diego International Airport (SDIA). The Airspace Protection guidelines for the project site limit building heights to 500 feet above mean sea level. The proposed project would include the demolition and removal of an existing four-story building. One additional structure would be added as a result of the proposed project; a café/restaurant adjoined to the Bradley Building with a building high point of 21 feet. As such, the proposed project would be well within the limits for airspace protection. Therefore, no direct or cumulative impacts associated with this issue are anticipated to occur.						X	X
(d) **Substantially impair implementation of an adopted emergency response plan or emergency evacuation plan?** The FEIR concludes that development that occurs in accordance with the Downtown Community Plan would not adversely affect implementation of the						X	X

Issues and Supporting Information	Significant And Not Mitigated (SNM)		Significant But Mitigated (SM)		Not Significant (NS)	
	Direct (D)	Cumulative (C)	Direct (D)	Cumulative (C)	Direct (D)	Cumulative (C)
City of San Diego's Emergency Operations Plan. Since the proposed land use designation of the proposed project is compatible with the designation assumed in the FEIR analysis, the proposed project would not affect the City's ability to adequately respond during an emergency. Therefore, no direct or cumulatively significant impacts associated with this issue are anticipated.						
9. HYDROLOGY AND WATER QUALITY						
(a) **Substantially degrade groundwater or surface water quality?** Urban runoff generated within the Downtown Community Plan area is collected by storm drains that eventually discharge into San Diego Bay. San Diego Bay is currently experiencing water quality problems caused by urban development within its watershed. The proposed project site is currently paved and or/ covered by a structure and redevelopment of the site would not result in an increase in impervious surfaces onsite, and therefore no increase in runoff would occur. In fact, the addition of landscaping and design features set forth in the preliminary design guidelines for the proposed project would help reduce and minimize runoff. However, demolition and construction activities onsite could result in groundwater discharge of runoff, which would contribute in a cumulative nature to the water quality impacts to San Diego Bay. Existing state and local regulations, as described under the FEIR, would apply to the project and would provide protection against significant water quality impacts. Implementation of Best Management Practices required by the City's Standard Urban Storm Water Mitigation Program would likely reduce the project's urban runoff contribution below the present level. In addition, Waste Discharge Permits required for groundwater discharge during construction would ensure that impacts to groundwater quality are not significant. It is not		**X**				**X**

Issues and Supporting Information	Significant And Not Mitigated (SNM)		Significant But Mitigated (SM)		Not Significant (NS)	
	Direct (D)	Cumulative (C)	Direct (D)	Cumulative (C)	Direct (D)	Cumulative (C)
anticipated that construction and dewatering activities would be required. Therefore, no direct impacts associated with groundwater and surface water quality would not be significant. Although the proposed project would not result in direct impacts to water quality, the FEIR concluded that the water quality of San Diego Bay is already impacted, and the addition of any pollutants in urban runoff discharged to the Bay would result in a cumulatively significant impact. Thus, the project's incremental contribution to the discharge of polluted urban runoff into San Diego Bay, when viewed in connection with polluted runoff discharged into San Diego Bay by past, existing, and reasonably foreseeable future projects, is considered a significant cumulative impact. No mitigation other than adhering to existing regulations has been identified to feasibly reduce this impact to below a level of significance. Consistent with the FEIR, the cumulative water quality impact would remain significant and not mitigated.							
(b) **Substantially increase impervious surfaces and associated runoff flow rates or volumes?** The proposed project is located on a site that is currently developed and covered with impervious surfaces. Implementation of the proposed project would result in impervious surfaces similar to those that presently exist onsite. If fact, the addition of landscaping and design features proposed in the preliminary design guidelines for the project may serve to reduce the amount of impervious surfaces through planting design techniques, such as the vertical landscaping proposed for the Bradley Building. Therefore, redevelopment of the proposed site would not substantially increase the runoff volume entering the storm drain system, and the proposed project would not substantially increase the runoff volume or pollutant concentration entering the storm drain system since the amount of					X	X

Issues and Supporting Information	Significant And Not Mitigated (SNM)		Significant But Mitigated (SM)		Not Significant (NS)	
	Direct (D)	Cumulative (C)	Direct (D)	Cumulative (C)	Direct (D)	Cumulative (C)
impervious surfaces would not increase. Consistent with the analysis of the FEIR, direct and cumulative impacts associated with this issue are not significant.						
(c) **Substantially impede or redirect flows within a 100-year flood hazard area?** The proposed project is located on a site that is not within a 100-year floodplain. Similarly, the proposed project would not affect off-site flood hazard areas, as no 100-year floodplains are located downstream. Therefore, direct and cumulative impacts associated with this issue are not significant.					X	X
(d) **Substantially increase erosion and sedimentation?** The proposed project is located on a site that is currently developed with impervious surfaces. The hydrology of the proposed site would not be substantially altered by implementation of the proposed project as the site would maintain a similar quantity of impervious surfaces and, therefore, the proposed project would not substantially increase the long-term potential for erosion and sedimentation. However, the potential for erosion and sedimentation could increase during the short-term during site preparation, demolition and other construction activities. The proposed project's compliance with regulations mandating the preparation and implementation of a Storm Water Pollution Prevention Plan would ensure that impacts associated with erosion and sedimentation are not significant. Therefore, no direct or cumulative impacts associated with this issue are anticipated.					X	X
10. LAND USE AND PLANNING						
(a) **Physically divide an established community?** No features or structures of the proposed project would physically divide an established community; rather, it would provide a public gathering space in the heart of the downtown					X	X

Issues and Supporting Information	Significant And Not Mitigated (SNM)		Significant But Mitigated (SM)		Not Significant (NS)	
	Direct (D)	Cumulative (C)	Direct (D)	Cumulative (C)	Direct (D)	Cumulative (C)
planning area. The proposed project is located in, and consistent with, the Employment/Residential Mixed Use (ER) and Parks/Open Space Land Use Districts. The project's design respects the existing street grid, and incorporates components to complement the existing uses and provides pedestrian engagement through access and visual interest. Therefore, no direct or cumulative impacts associated with this issue are anticipated.						
(b) **Substantially conflict with the City's General Plan and Progress Guide, Downtown Community Plan, Centre City PDO or other applicable land use plan, policy, or regulation?** The proposed project is located in the Employment/Residential Mixed Use (ER) Land Use District, while the historic Horton Plaza park is located within the Parks/Open Space (OS) Land Use District, which is meant to provide areas for public parks and open spaces. The Broadway frontage of the project site is within the Main Street Overlay (MS), which requires a minimum of 80 percent of the ground-floor street frontage of a building shall contain active commercial uses. However, no new buildings are proposed along this frontage. Lastly, the entire block bounded by Broadway to the north, Fourth Avenue to the east, E Street to the south, and Broadway Circle to the west is designated with the Employment Required (E) Overlay. The E Overlay requires at least 50 percent of the gross floor area within each development in this overlay district to be dedicated to employment uses such as professional office, education, cultural uses, retail, hotel, or similar commercial uses, and the future uses within the café building and kiosks within the new plaza will comply with this requirement. It should be noted that public parks, plazas, and open space areas are permitted by right in all Land Use Districts, including the ER District, as stated in Table 156-0308A of the PDO. In addition, Article V, Section 500.7 of the Horton Plaza					X	X

Issues and Supporting Information	Significant And Not Mitigated (SNM)		Significant But Mitigated (SM)		Not Significant (NS)	
	Direct (D)	Cumulative (C)	Direct (D)	Cumulative (C)	Direct (D)	Cumulative (C)
Redevelopment Plan states that the establishment or enlargement of public, semi-public, institutional, or non-profit uses, including parks and recreational facilities are permitted in any area within the Horton Plaza Redevelopment Area. Furthermore, the proposed project also fulfills the objectives of the Horton Plaza Redevelopment Plan as it would eliminate blighted conditions, preserve architecturally significant historic sites (i.e., the Horton Plaza park and Bradley Building), and redesign areas that are currently stagnant and underutilized. As discussed in 7.c, the proposed project is within the jurisdiction of the ALUCP for SDIA and complies with all applicable land use regulations. The proposed project would comply with the goals and requirements of the Downtown Community Plan and would meet all applicable standards of the PDO. Therefore, no significant direct or cumulative impact associated with an adopted land use plan would occur.							
(c) **Substantial incompatibility with surrounding land uses**? Sources of land use incompatibility include noise, lighting/shading, and industrial activities. It is not anticipated that the proposed project would result in, or be subject to, adverse impacts due to substantially incompatible land uses. Compliance with the City's Light Pollution Ordinance would ensure that land use incompatibility impacts related to the proposed project's emitting of, and exposure to, lighting are not significant. Existing mandatory local, state, and federal regulations controlling industrial activities would ensure that if the project were to be implemented at the project site, it would not be vulnerable to potential land use compatibility impacts resulting from its proximity to nearby industrial activities located in nearly neighborhoods.					X	X

Issues and Supporting Information	Significant And Not Mitigated (SNM)		Significant But Mitigated (SM)		Not Significant (NS)	
	Direct (D)	Cumulative (C)	Direct (D)	Cumulative (C)	Direct (D)	Cumulative (C)
The proposed project is not located on or near any portion of street segments identified in the FEIR as exceeding the 70 dB(A)CNEL. While the proposed project would allow for special events to occur that would produce noise, it would not include components that's would substantially increase permanent ambient noise in the area. The proposed project also does not propose the addition of sensitive noise receivers as defined in the FEIR. In addition, all sound and amplification equipment associated with these special events would remain at acceptable levels in accordance with the noise abatement and control regulations of Chapter 5, Article 9.5od the San Diego Municipal Code. As such, no significant direct or cumulative impacts associated with this issue are anticipated.						

Issues and Supporting Information	Significant And Not Mitigated (SNM)		Significant But Mitigated (SM)		Not Significant (NS)	
	Direct (D)	Cumulative (C)	Direct (D)	Cumulative (C)	Direct (D)	Cumulative (C)
(d) **Substantially impact surrounding communities due to sanitation and litter problems generated by transients displaced by downtown development?** The proposed project is not anticipated to result in impacts to surrounding communities. However, transients are known to congregate on-site and within the immediate vicinity; therefore, consistent with the conclusions in the FEIR, the proposed project could have a significant direct land use compatibility impact on surrounding neighborhoods due to the displacement of transients on-site. Further, the proposed project, through the promotion of increased street activity and redevelopment, would, in tandem with other downtown redevelopment activities, contribute to the significant cumulative impact on surrounding communities resulting from sanitation problems and litter generated by transients who are displaced from downtown into surrounding canyons and vacant land, as discussed in the FEIR. Continued support of Homeless Outreach Teams (HOTs) and similar transient outreach efforts will reduce, but not fully mitigate, the adverse impacts to surrounding neighborhoods caused by transient relocation. Therefore, the proposed project could contribute to the direct and cumulatively significant impact to surrounding neighborhoods. Impacts would remain significant and not mitigated.	X	X				
11. MINERAL RESOURCES						
(a) **Substantially reduce the availability of important mineral resources?** The FEIR concludes that the viable extraction of mineral resources is limited in downtown due to its urbanized nature and the fact that the area is not designated as having high mineral resource potential. Therefore, no direct or cumulative impacts associated with this issue would occur.					X	X
12. NOISE						

Issues and Supporting Information	Significant And Not Mitigated (SNM)		Significant But Mitigated (SM)		Not Significant (NS)	
	Direct (D)	Cumulative (C)	Direct (D)	Cumulative (C)	Direct (D)	Cumulative (C)
(a) **Substantial noise generation?** The proposed project would result in short-term impacts from noise generated from construction activity. Impacts from construction noise would be avoided by adherence to construction noise limitations imposed by the City's Noise Abatement and Control Ordinance. According to the analysis in the FEIR, long-term impacts associated with noise generation could result from new development and an increase in traffic on identified street segments. The FEIR identifies nine segments in the downtown planning area that would be significantly impacted as a result of traffic generation. The proposed project is not located on any of the identified segments. In addition, the proposed project would result in the aesthetic improvements to an existing retail center and establish an urban plaza to complement the rehabilitation of the Historic Horton Plaza park. It is not anticipated that the proposed project would substantially increase vehicular traffic in the area or create noise generators or receivers that are not already part of the existing urban environment. Once completed, the proposed project would provide a space for public events to occur such as outdoor concerts and festivals, educational and public awareness events, special holiday events, and sporting and fitness activities. However, these noise generators would be temporary and would not include components that would substantially increase permanent ambient noise in the area. The proposed project also does not include the addition of sensitive noise receivers as defined in the FEIR. In addition, all sound and amplification equipment associated with these special events would remain at acceptable levels in accordance with the noise abatement and control regulations of Chapter 5, Article 9.5od the San Diego Municipal Code. Furthermore, the FEIR concludes that noise generation resulting from new development would not generate						X	X

Issues and Supporting Information	Significant And Not Mitigated (SNM)		Significant But Mitigated (SM)		Not Significant (NS)	
	Direct (D)	Cumulative (C)	Direct (D)	Cumulative (C)	Direct (D)	Cumulative (C)
substantial stationary noise to adversely affect the existing acoustic environment.. Therefore, no direct or cumulative impacts associated with this issue would occur.						
(b) **Substantial exposure of required outdoor residential open spaces or public parks and plazas to noise levels (e.g., exposure to levels exceeding 65 dBA CNEL)?** While the proposed project is providing a new public open space area, the proposed project does not include residential uses. The proposed project site is bounded on all sides by streets that have noise levels that exceed 65 dBA CNEL, but any potential sound barriers to reduce noise into the proposed plaza would detract from the open public design envisioned for this public park. Therefore, no direct and cumulative impacts associated with this issue would occur.					X	X
(c) **Substantial interior noise within habitable rooms (e.g., levels in excess of 45 dBA CNEL)?,** As discussed above in 11b, the proposed project does not include residential or other noise-sensitive land uses; therefore, no habitable rooms would be developed as a result of the proposed project. Therefore, no direct or cumulative impacts associated with this issue would occur.					X	X
13. POPULATION AND HOUSING						
(a) **Substantially induce population growth in an area?** The proposed project is consistent in land use with the Downtown Community Plan. The project would not induce growth to exceed that analyzed throughout the FEIR and this Secondary Study. Therefore, no direct or cumulative impacts associated with this issue would occur.					X	X
(b) **Substantial displacement of existing housing units or people?** The proposed project would not displace housing units or people as no existing housing units would be demolished or added as a result of project implementation.					X	X

Issues and Supporting Information	Significant And Not Mitigated (SNM)		Significant But Mitigated (SM)		Not Significant (NS)	
	Direct (D)	Cumulative (C)	Direct (D)	Cumulative (C)	Direct (D)	Cumulative (C)
Furthermore, the proposed project is consistent in land use with the Downtown Community Plan. Therefore, no direct or cumulative impacts associated with this issue would occur.						
14. PUBLIC SERVICES AND UTILITIES:						
(a) **Substantial adverse physical impacts associated with the provision of new schools?** The population of school-aged children attending public schools is dependent upon current and future residential development. The proposed project does not include residential development. As such, the proposed project would not generate a sufficient number of students to warrant construction of a new school facility. Therefore, the proposed project would not result in direct or cumulative impacts associated with this issue.					X	X
(b) **Substantial adverse physical impacts associated with the provision of new libraries?** The FEIR concludes that, cumulatively, development in the downtown would generate the need for a new Main Library and possibly several smaller libraries within the downtown. In and of itself, the proposed project would not generate significant additional demand necessitating the construction of new library facilities. The proposed project would not generate or induce population growth, but would instead provide a public open space area for the existing population to gather and use for recreational purposes. Therefore, the proposed project would not result in direct or cumulative impacts associated with this issue.					X	X
(c) **Substantial adverse physical impacts associated with the provision of new fire protection/emergency facilities?** The proposed project would not generate or induce population growth, but would instead provide a public open space area for the existing population to gather and use for recreational purposes. The proposed project would not result in direct or cumulative impacts associated with the provision of new fire					X	X

Issues and Supporting Information	Significant And Not Mitigated (SNM)		Significant But Mitigated (SM)		Not Significant (NS)	
	Direct (D)	Cumulative (C)	Direct (D)	Cumulative (C)	Direct (D)	Cumulative (C)
protection/emergency services. It should be noted that while the FEIR does not conclude that the cumulative development of the downtown area would generate additional demand necessitating the construction of new fire protection/emergency facilities, collective efforts of the City, the Redevelopment Agency, and CCDC have secured two sites for new fire stations in the downtown planning area to ensure adequate provision of services.						
(d) **Substantial adverse physical impacts associated with the provision of new law enforcement facilities?** The proposed project would not generate or induce population growth, but would instead provide a public open space area for the existing population to gather and use for recreational purposes. The preliminary design guidelines for the proposed project include safety features and appropriate lighting plans to promote visibility. Since the land use designation of the proposed project is consistent with the Downtown Community Plan land use designation for the site, the project would not generate a level of demand for law enforcement facilities beyond the level assumed by the FEIR. The FEIR analyzes impacts to law enforcement service resulting from the cumulative development of the downtown and concludes that the construction of new law enforcement facilities would not be required. However, the need for a new facility could be identified in the future. Pursuant to Section 15145 of CEQA, analysis of the physical changes in the downtown planning area, which may occur from future construction of law enforcement facilities, would be speculative and no further analysis of their impacts is required. However, construction of new law enforcement facilities would be subject to CEQA. Environmental documentation prepared pursuant to CEQA would identify potentially significant impacts and appropriate mitigation measures. Therefore, the proposed project would not result in					X	X

Issues and Supporting Information	Significant And Not Mitigated (SNM)		Significant But Mitigated (SM)		Not Significant (NS)	
	Direct (D)	Cumulative (C)	Direct (D)	Cumulative (C)	Direct (D)	Cumulative (C)
direct or cumulative impacts associated with this issue.						
(e) **Substantial adverse physical impacts associated with the provision of new water transmission or treatment facilities?** Since the land use designation of the proposed project is consistent with the Downtown Community Plan land use designation for the site, the project would not generate a level of demand for new water treatment facilities beyond the level assumed by the FEIR. The FEIR concludes that new water treatment facilities would not be required to address the cumulative development of the downtown. In addition, water pipe improvements that may be needed to serve the proposed project are categorically exempt from environmental review under CEQA as stated in the FEIR. Therefore, the proposed project would not result in direct or cumulative impacts associated with this issue.					X	X
(f) **Substantial adverse physical impacts associated with the provision of new storm water facilities?** The FEIR concludes that the cumulative development of the downtown would not impact the existing downtown storm drain system. Since implementation of the proposed project would result in impervious surfaces similar to, or less than, the existing use of the site, the amount of runoff volume entering the storm drain system would not increase. Therefore, the proposed project would not create demand for new storm water facilities, and would not result in direct or cumulative impacts associated with this issue.					X	X
(g) **Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?** California Water Code Section 10910 requires projects analyzed under CEQA to assess water demand and compare that finding to the jurisdiction's projected water					X	X

Issues and Supporting Information	Significant And Not Mitigated (SNM)		Significant But Mitigated (SM)		Not Significant (NS)	
	Direct (D)	Cumulative (C)	Direct (D)	Cumulative (C)	Direct (D)	Cumulative (C)
supply. The proposed project does not require the preparation of a Water Supply Assessment (WSA) as it does not meet any of the thresholds established by SB 610 or SB 221. According to the FEIR, in the short term, planned water supplies and transmission or treatment facilities are adequate. Expansion of the Alvarado Water Treatment Plant (construction scheduled to be complete in Winter 2010) would also provide increased capacity for treating water supply for the downtown area. Water transmission infrastructure necessary to transport water supply to the downtown area is already in place. Potential direct impacts would not be significant. However, buildout of the 2006 Downtown Community Plan would generate 1.4% more water demand than planned for in the adopted 2005 UWMP. This additional demand was not considered in SDCWA's Urban Water Management Plan (UWMP). To supplement this and meet the additional need, SDCWA indicates that it will have a local water supply (from surface water, water recycling, groundwater, and seawater desalination) to meet the additional demand resulting from buildout of the Downtown Community Plan. In accordance with the conclusion in the FEIR, this additional demand would not represent a substantial increase in the challenge of meeting the otherwise anticipated demand for water within the SDCWA service area. Since the proposed project does not meet the requirements of SB 610 and is consistent with the Downtown Community Plan, direct and cumulative impacts related to water supply would be considered not significant.							

Issues and Supporting Information	Significant And Not Mitigated (SNM)		Significant But Mitigated (SM)		Not Significant (NS)	
	Direct (D)	Cumulative (C)	Direct (D)	Cumulative (C)	Direct (D)	Cumulative (C)
(h) **Substantial adverse physical impacts associated with the provision of new wastewater transmission or treatment facilities?** The FEIR concludes that new wastewater treatment facilities would not be required to address the cumulative development of the downtown. In addition, sewer improvements that may be needed to serve the proposed project are categorically exempt from environmental review under CEQA as stated in the FEIR. Therefore, the proposed project would not result in direct or cumulative impacts associated with this issue.					X	X
(i) **Substantial adverse physical impacts associated with the provision of new landfill facilities?** The FEIR concludes that cumulative development within the downtown planning area would increase the amount of solid waste sent to the Miramar Landfill and contribute to the eventual need for an alternative landfill. The proposed project is not likely to generate a higher level of solid waste than the existing use of the site. However, the project would contribute, in combination with other development activities in the downtown, to the cumulative increase in the generation of solid waste sent to the Miramar Landfill and the eventual need for a new landfill as identified in the FEIR. The location and size of a new landfill is unknown at this time. Pursuant to Section 15145 of CEQA, analysis of the physical changes that may occur from future construction of landfills would be speculative and no further analysis of their impacts is required. However, construction or expansion of a landfill would be subject to CEQA. Environmental documentation prepared pursuant to CEQA would identify potentially significant impacts and appropriate mitigation measures. Therefore, the proposed project would not result in direct or cumulative impacts associated					X	X

Issues and Supporting Information	Significant And Not Mitigated (SNM)		Significant But Mitigated (SM)		Not Significant (NS)	
	Direct (D)	Cumulative (C)	Direct (D)	Cumulative (C)	Direct (D)	Cumulative (C)
with this issue.						
15. PARKS AND RECREATIONAL FACILITIES:						
(a) **Substantial increase in the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?** The proposed project would result in the creation of an urban plaza and the rehabilitation of the Historic Horton Plaza park. Consistent with the goals and objectives in both the Downtown Community Plan and the Horton Plaza Redevelopment Plan, the proposed project would enhance and add public park space and recreational uses in a centralized area of downtown. The proposed project would increase the variety, quality, and accessibility of park and recreational opportunities and would not result in the deterioration of existing neighborhood or regional parks. No direct or cumulative significant impacts associated with this issue would occur.					X	X
16. TRANSPORTATION/TRAFFIC						
(a) **Cause the level of service (LOS) on a roadway segment or intersection to drop below LOS E?** According to the FEIR, any project that is anticipated to generate more than 2,400 Average Daily Trips (ADT) could result in significant direct impacts on roadway segments and intersections and a project-level traffic study would be required. As discussed in the following paragraphs, the proposed project does not include uses that would exceed this threshold. Based on the anticipated use of the proposed project (i.e., urban park space including a café/restaurant and four permanent retail kiosks), and the May 2003 San Diego Municipal Code Trip Generation Manual (Trip Generation Manual), the worst-case scenario is 312 Average Daily Trips		X			X	

Issues and Supporting Information	Significant And Not Mitigated (SNM)		Significant But Mitigated (SM)		Not Significant (NS)	
	Direct (D)	Cumulative (C)	Direct (D)	Cumulative (C)	Direct (D)	Cumulative (C)
(ADT). The urban plaza component of the proposed project is estimated to generate approximately 215 daily trips (50 trips per acre). The café/restaurant component is estimated to generate approximately 75 daily trips (27 trips per 1,000 square feet). The kiosks component would include four permanent kiosks not to exceed 300 square feet each. This component would generate approximately 22 daily trips (18 trips per 1,000 square feet). It is important to note that all trips from project operation are not considered "new" trips. The project site is currently occupied by a four-story commercial-retail building that will be demolished. The current uses on the project site (i.e., occupied commercial retail space and Horton park) would generate approximately 2,735 daily trips. When compared to the proposed project, this represents a net reduction of 2,423 daily trips. Based on the allowed uses and square footages of the existing building, up to 3,747 daily trips could be generated from this building. When compared to the proposed project, this would result in a net reduction of 3,435 trips. According to the FEIR and the Downtown Near-Term Traffic Assessment, there are no impacted intersections surrounding the project site. Because of the relatively small number of trips estimated to be generated from the project, the overall reduction in trips from existing uses, and that the nearby intersections are not impacted, as described above, the direct impact of the proposed project would not be significant since it would not cause the level of service (LOS) on a roadway segment or intersection to drop below the acceptable level. Therefore, the proposed project would not result in significant direct impacts.							

Issues and Supporting Information	Significant And Not Mitigated (SNM)		Significant But Mitigated (SM)		Not Significant (NS)	
	Direct (D)	Cumulative (C)	Direct (D)	Cumulative (C)	Direct (D)	Cumulative (C)
While no study intersections would drop below the LOS threshold as a direct impact of the proposed project, the proposed project would generate trips, nonetheless. In conjunction with other development downtown, this could contribute to the cumulative traffic impacts anticipated by the FEIR. The FEIR includes mitigation measures to address these impacts, but they may or may not be able to fully mitigate these cumulative impacts (these mitigation measures are not the responsibility of the proposed project and are therefore not included in Attachment A). Therefore, consistent with the conclusions in the FEIR, the proposed project would contribute to significant cumulative impacts associated with roadway and intersection capacity and could contribute to causing the level of service (LOS) on a roadway segment or intersection to drop below LOS E.						
(b) **Cause the LOS on a freeway segment to drop below LOS E or cause a ramp delay in excess of 15 minutes?** The FEIR concludes that development pursuant to the Downtown Community Plan would result in significant cumulative impacts to freeway segments and ramps serving the downtown planning area. The proposed project would not have a significant direct impact because of the relatively low traffic generation that is estimated to occur according to the analysis conducted in 16(a). However, the FEIR concludes that redevelopment within the downtown area would result in significant cumulative impacts to freeway segments and ramps serving the downtown area. Since the land use designation of the project is not substantially different from the land use designation assumed in the FEIR analysis, the proposed development would contribute on cumulative-level to the substandard LOS F identified in the FEIR on all freeway segments in the downtown area and on several ramps serving the downtown. FEIR		X				X

Issues and Supporting Information	Significant And Not Mitigated (SNM)		Significant But Mitigated (SM)		Not Significant (NS)	
	Direct (D)	Cumulative (C)	Direct (D)	Cumulative (C)	Direct (D)	Cumulative (C)
Mitigation Measure TRF-A.2.1-1 would reduce these impacts to the extent feasible, but not below a level of significance, (this mitigation measure is not the responsibility of the proposed project, and therefore, is not included in Attachment A). The FEIR concludes that the uncertainty associated with implementing freeway improvements and limitations in increasing ramp capacity limits the feasibility of fully mitigating impacts to these facilities. Thus, the proposed project's cumulative-level impacts to freeways would remain significant and unavoidable, consistent with the analysis of the FEIR.						
(c) **Create an average demand for parking that would exceed the average available supply?** The proposed project would occur within the Horton Plaza Redevelopment area, which currently provides approximately 2,275 parking spaces. In addition, there is also street parking surrounding the retail center along portions of Fourth Avenue, G Street, and First Avenue. The proposed project would not provide parking spaces in addition to what already exists on-site. The proposed square-footage dedicated to the future café/restaurant and retail kiosks would not meet the 30,000 square foot threshold in the PDO that would require off-site parking to be provided for commercial-retail uses. Also, as discussed in the project description and elsewhere throughout this Secondary Study, the current commercial retail uses in the existing building would be eliminated with demolition of the building. The space once occupied with these uses would be redeveloped into an urban plaza. As discussed in Section 16(a), the proposed project would result in a significant reduction of ADT at the site than existing conditions. As a result of the conversion of land use, there would also be a reduction in the demand for parking. Therefore, it is anticipated that the proposed project would not create an average demand for parking that would		X				X

Issues and Supporting Information	Significant And Not Mitigated (SNM)		Significant But Mitigated (SM)		Not Significant (NS)	
	Direct (D)	Cumulative (C)	Direct (D)	Cumulative (C)	Direct (D)	Cumulative (C)
exceed the average supply and impacts would not be significant. Therefore, no direct significant direct impacts associated with this issue would occur. However, the FEIR concludes that the cumulative effect of the parking requirements established in the PDO would result in a parking demand that is greater than parking supply. FEIR Mitigation Measure TRF-D.1.1 would reduce these impacts to the extent feasible, but not below a level of significance, (this mitigation measure is not the responsibility of the proposed project, and therefore, is not included in Attachment A). The FEIR identifies actions that could be taken to help balance parking supply and demand, but that the actions identified would not provide a guarantee that parking demand would be met. Furthermore, the FEIR concludes that unrestricted parking availability would be contrary to transportation, air quality, and quality of life goals established in the Downtown Community Plan. Therefore, the proposed project would contribute to significant cumulative impacts associated with this issue.							
(d) **Substantially discourage the use of alternative modes of transportation or cause transit service capacity to be exceeded?** The proposed project does not include any features that would discourage the use of alternative modes of transportation, nor does it include any design features that would cause hazards or barriers for pedestrians or bicyclists. The proposed project would provide an engaging environment to passing pedestrians and bicyclists. The project is located in close proximity to transit and would allow residents to choose to take the bus, trolley, and commuter rail. Therefore, no impact will occur associated with transit or alternative modes of transportation.					X	X
17. MANDATORY FINDINGS OF SIGNIFICANCE						
(a) **Does the project have the potential to degrade the quality of the environment, substantially**					X	X

Issues and Supporting Information	Significant And Not Mitigated (SNM)		Significant But Mitigated (SM)		Not Significant (NS)	
	Direct (D)	Cumulative (C)	Direct (D)	Cumulative (C)	Direct (D)	Cumulative (C)
reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory? As indicated in the FEIR, due to the highly urbanized nature of the downtown area, no sensitive plant or animal species, habitats, or wildlife migration corridors are located in the project area. The project does not have the potential to eliminate important examples of major periods of California history or prehistory at the project level. No other aspects of the project would substantially degrade the environment. Cumulative impacts are described in subsection 16.b below.							
(b) **Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?** As acknowledged in the FEIR, implementation of the Downtown Community Plan, PDO, and Redevelopment Plan would result in cumulative impacts associated with: aesthetics/visual quality, air quality, historical and archaeological resources, physical changes associated with transient activities, noise, parking, traffic, and water quality. The proposed project would contribute to those impacts, specifically air quality, historical and archeological resources, traffic, and water quality. Implementation of the mitigation measures identified in the FEIR would reduce some significant cumulative impacts; however, the impacts would remain significant and immitigable. Cumulative impacts would not be		X				

Issues and Supporting Information	Significant And Not Mitigated (SNM)		Significant But Mitigated (SM)		Not Significant (NS)	
	Direct (D)	Cumulative (C)	Direct (D)	Cumulative (C)	Direct (D)	Cumulative (C)
greater than those identified in the FEIR						
(c) **Does the project have environmental effects that will cause substantial adverse effects on human beings, either directly or indirectly?** As described elsewhere in this study, the proposed project would result in significant and unmitigated impacts. Those impacts associated with air quality could have substantial adverse effects on human beings. However, these impacts would be no greater than those assumed in the FEIR. Implementation of the mitigation measures identified in the FEIR would mitigate many, but not all, of the significant impacts.	X	X				

REFERENCES

California Air Resources Board (ARB)

2008 *Climate Change Scoping Plan.* Available at http://www.arb.ca.gov/cc/scopingplan/document/adopted_scoping_plan.pdf. December.

California Climate Action Registry (CCAR)

2009 *California Climate Action Registry General Reporting Protocol: Reporting Entity-Wide Greenhouse Gas Emissions.* Version 3.1. Los Angeles, CA. January.

California Energy Commission (CEC)

2006 *California Commercial End Use Survey.* Available at http://www.energy.ca.gov/2006publications/CEC-400-2006-005/CEC-400-2006-005.PDF. Accessed December 2010.

2007 *Water-Related Energy Use in California.* Available at http://www.energy.ca.gov/2007publications/CEC-999-2007-008/CEC-999-2007-008.PDF. Accessed December 2010.

San Diego, City of (City)

2003 San Diego Municipal Code: Land Development Code: Trip Generation Manual. May

2010 Memorandum from Cecilia Gallardo to the Environmental Analysis Section. *UPDATED - Addressing Greenhouse Gas Emissions from Projects subject to CEQA.* August 18.

Rimpo & Associates

2007 URBEMIS 2007 for Windows, Version 9.2.4. Available: <www.urbemis.com>. Last updated 2007. Accessed December 2010.

ATTACHMENT A

MITIGATION MEASURES

FOR THE PROPOSED

HORTON PLAZA PARK REVITALIZATION PROJECT

December 2010

ATTACHMENT A
MITIGATION MONITORING AND REPORTING PROGRAM

SIGNIFICANT IMPACT(S)	MITIGATION MEASURE(S)	IMPLEMENTATION TIME FRAME	IMPLEMENTATION RESPONSIBILITY	VERIFICATION RESPONSIBILITY
AIR QUALITY (AQ)				
Impact AQ-B.1: **Dust and construction equipment engine emissions generated during grading and demolition would impact local and regional air quality. (Direct and Cumulative)**	***Mitigation Measure AQ-B.1-1:*** Prior to approval of a Grading or Demolition Permit, the City shall confirm that the following conditions have been applied, as appropriate: 1. Exposed soil areas shall be watered twice per day. On windy days or when fugitive dust can be observed leaving the development site, additional applications of water shall be applied as necessary to prevent visible dust plumes from leaving the development site. When wind velocities are forecast to exceed 25 miles per hour, all ground disturbing activities shall be halted until winds that are forecast to abate below this threshold. 2. Dust suppression techniques shall be implemented including, but not limited to, the following: a. Portions of the construction site to remain inactive longer than a period of three months shall be seeded and watered until grass cover is grown or otherwise stabilized in a manner acceptable to the CCDC. b. On-site access points shall be paved as soon as feasible or watered periodically or otherwise stabilized. c. Material transported offsite shall be either sufficiently watered or securely covered to prevent excessive amounts of dust. d. The area disturbed by clearing, grading, earthmoving, or excavation operations shall be minimized at all times. 3. Vehicles on the construction site shall travel at speeds less than 15 miles per hour. 4. Material stockpiles subject to wind erosion during construction activities, which will not be utilized within three days, shall be covered with plastic, an alternative cover deemed equivalent to plastic, or sprayed with a nontoxic chemical stabilizer.	Prior to Demolition or Grading Permit (Design)	Developer	City

SIGNIFICANT IMPACT(S)	MITIGATION MEASURE(S)	IMPLEMENTATION TIME FRAME	IMPLEMENTATION RESPONSIBILITY	VERIFICATION RESPONSIBILITY
	5. Where vehicles leave the construction site and enter adjacent public streets, the streets shall be swept daily or washed down at the end of the work day to remove soil tracked onto the paved surface. Any visible track-out extending for more than fifty (50) feet from the access point shall be swept or washed within thirty (30) minutes of deposition. 6. All diesel-powered vehicles and equipment shall be properly operated and maintained. 7. All diesel-powered vehicles and gasoline-powered equipment shall be turned off when not in use for more than five minutes, as required by state law. 8. The construction contractor shall utilize electric or natural gas-powered equipment in lieu of gasoline or diesel-powered engines, where feasible. 9. As much as possible, the construction contractor shall time the construction activities so as not to interfere with peak hour traffic. In order to minimize obstruction of through traffic lanes adjacent to the site, a flag-person shall be retained to maintain safety adjacent to existing roadways, if necessary. 10. The construction contractor shall support and encourage ridesharing and transit incentives for the construction crew. 11. Low VOC coatings shall be used as required by SDAPCD Rule 67. Spray equipment with high transfer efficiency, such as the high volume-low pressure (HPLV) spray method, or manual coatings application such as paint brush hand roller, trowel, spatula, dauber, rag, or sponge, shall be used to reduce VOC emissions, where feasible. 12. If construction equipment powered by alternative fuel sources (LPG/CNG) is available at comparable cost, the developer shall specify that such equipment be used during all construction activities on the development site. 13. The developer shall require the use of particulate filters on diesel construction equipment if use of such filters is demonstrated to be cost-competitive for use on this development. 14. During demolition activities, safety measures as required by			

SIGNIFICANT IMPACT(S)	MITIGATION MEASURE(S)	IMPLEMENTATION TIME FRAME	IMPLEMENTATION RESPONSIBILITY	VERIFICATION RESPONSIBILITY
	City/County/State for removal of toxic or hazardous materials shall be utilized. 15. Rubble piles shall be maintained in a damp state to minimize dust generation. 16. During finish work, low-VOC paints and efficient transfer systems shall be utilized, to the extent possible. 17. If alternative-fueled and/or particulate filter-equipped construction equipment is not feasible, construction equipment shall use the newest, least-polluting equipment, whenever possible.			
HISTORICAL RESOURCES (HIST)				
Impact HIST-B.1: **Development in downtown could impact significant buried archaeological resources. (Direct and Cumulative)**	***Mitigation Measure HIST-B.1-1:*** If the potential exists for direct and/or indirect impacts to significant buried archaeological resources, the following measures shall be implemented in coordination with a Development Services Department designee and/or City Staff to the Historic Resources Board (HRB) ("City Staff") in accordance with Chapter 14, Article 3, Division 2, Historical Resources Regulations of the Land Development Code. Prior to issuance of any permit that could directly affect an archaeological resource, City Staff shall assure that all elements of the MMRP are performed in accordance with all applicable City regulations and guidelines by an Archaeologist meeting the qualifications specified in Appendix B of the San Diego Land Development Code, Historical Resources Guidelines. City Staff shall also require that the following steps be taken to determine: (1) the presence of archaeological resources and (2) the appropriate mitigation for any significant resources which may be impacted by a development activity. Sites may include residential and commercial properties, privies, trash pits, building foundations, and industrial features representing the contributions of people from diverse socio-economic and ethnic backgrounds. Sites may also include resources associated with pre-historic Native American activities. Archeological resources which also meet the definition of historical resources or unique archaeological resources under CEQA or the SDMC shall be treated in accordance with the following evaluation procedures and applicable mitigation program: Step 1-Initial Evaluation	Prior to Demolition or Grading Permit (Design) Prior to Certificate of Occupancy (Implementation)	Developer	City Staff

SIGNIFICANT IMPACT(S)	MITIGATION MEASURE(S)	IMPLEMENTATION TIME FRAME	IMPLEMENTATION RESPONSIBILITY	VERIFICATION RESPONSIBILITY
	An initial evaluation for the potential of significant subsurface archaeological resources shall be prepared to the satisfaction of City Staff as part of an Environmental Secondary Study for any activity which involves excavation or building demolition. The initial evaluation shall be guided by an appropriate level research design in accordance with the City's Land Development Code, Historical Resources Guidelines. The person completing the initial review shall meet the qualification requirements as set forth in the Historical Resources Guidelines and shall be approved by City Staff. The initial evaluation shall consist , at a minimum, of a review of the following historical sources: The 1876 Bird's Eye View of San Diego, all Sanborn Fire Insurance Company maps, appropriate City directories and maps that identify historical properties or archaeological sites, and a records search at the South Coastal Information Center for archaeological resources located within the property boundaries. Historical and existing land uses shall also be reviewed to assess the potential presence of significant prehistoric and historic archaeological resources. The person completing the initial review shall also consult with and consider input from local individuals and groups with expertise in the historical resources of the San Diego area. These experts may include the University of California, San Diego State University, San Diego Museum of Man, Save Our Heritage Organization (SOHO), local historical and archaeological groups, the Native American Heritage Commission (NAHC), designated community planning groups, and other individuals or groups that may have specific knowledge of the area. Consultation with these or other individuals and groups shall occur as early as possible in the evaluation process. When the initial evaluation indicates that important archaeological sites may be present on a project site but their presence cannot be confirmed prior to construction or demolition due to obstructions or spatially limited testing and data recovery, the applicant shall prepare and implement an archaeological monitoring program as a condition of development approval to the satisfaction of City Staff. If the NAHC Sacred Lands File search is positive for Native American resources within the project site, then additional evaluation must include participation of a local Native American consultant in accordance with CEQA Sections 15064.5(d), 15126.4(b)(3) and Public Resources Code Section 21083.2. No further action is required if the initial evaluation demonstrates there is no			

SIGNIFICANT IMPACT(S)	MITIGATION MEASURE(S)	IMPLEMENTATION TIME FRAME	IMPLEMENTATION RESPONSIBILITY	VERIFICATION RESPONSIBILITY
	potential for subsurface resources. The results of this research shall be summarized in the Secondary Study. Step 2-Testing A testing program is required if the initial evaluation demonstrates that there is a potential for subsurface resources. The testing program shall be conducted during the hazardous materials remediation or following the removal of any structure or surface covering which may be underlain by potential resources. The removal of these structures shall be conducted in a manner which minimizes disturbance of underlying soil. This shall entail a separate phase of investigations from any mitigation monitoring during construction. The testing program shall be performed by a qualified Historical Archaeologist meeting the qualifications specified in Appendix B of the San Diego Land Development Code, Historical Resources Guidelines. The Historical Archaeologist must be approved by City Staff prior to commencement. Before commencing the testing, a treatment plan shall be submitted for City Staff approval that reviews the initial evaluation results and includes a research design. The research design shall be prepared in accordance with the City's Historical Resources Guidelines and include a discussion of field methods, research questions against which discoveries shall be evaluated for significance, collection strategy, laboratory and analytical approaches, and curation arrangements. All tasks shall be in conformity with best practices in the field of historic urban archaeology. A recommended approach for historic urban sites is at a minimum fills and debris along interior lot lines or other areas indicated on Sanborn maps. Security measures such as a locked fence or surveillance shall be taken to prevent looting or vandalism of archaeological resources as soon as demolition is complete or paved surfaces are removed. These measures shall be maintained during archaeological field investigations. It is recommended that exposed features be covered with steel plates or fill dirt when not being investigated. The results of the testing phase shall be submitted in writing to City Staff and shall include the research design, testing results, significance evaluation, and recommendations for further treatment. Final determination of significance			

SIGNIFICANT IMPACT(S)	MITIGATION MEASURE(S)	IMPLEMENTATION TIME FRAME	IMPLEMENTATION RESPONSIBILITY	VERIFICATION RESPONSIBILITY
	shall be made in consultation with City Staff , and with the Native American community, if the finds are prehistoric. If no significant resources are found and site conditions are such that there is no potential for further discoveries, then no further action is required. If no significant resources are found but results of the initial evaluation and testing phase indicates there is still a potential for resources to be present in portions of the property that could not be tested, then mitigation monitoring is required and shall be conducted in accordance with the provisions set forth in Step 4 - Monitoring. If significant resources are discovered during the testing program, then data recovery in accordance with Step 3 shall be undertaken prior to construction. If the existence or probable likelihood of Native American human remains or associated grave goods area discovered through the testing program, the Qualified Archaeologist shall stop work in the area, notify the City Building Inspector, City staff, and immediately implement the procedures set forth in CEQA Guidelines Section 15064.5 and the California Public Resources Code (PRC) Section 5097.98 for discovery of human remains. This procedure is further detailed in the Mitigation, Monitoring and Reporting Program (Step 4). City Staff must concur with evaluation results before the next steps can proceed. Step 3-Data Recovery For any site determined to be significant, a Research Design and Data Recovery Program (RDDRP) shall be prepared in accordance with the City's Historical Resources Guidelines, approved by City Staff, and carried out to mitigate impacts before any activity is conducted which could potentially disturb significant resources. The archaeologist shall notify City Staff of the date upon which data recovery will commence ten (10) working days in advance. All cultural materials collected shall be cleaned, catalogued and permanently curated with an appropriate institution. Native American burial resources shall be treated in the manner agreed to by the Native American representative or be reinterred on the site in an area not subject to further disturbance in accordance with CEQA section 15164.5 and the Public Resources Code section 5097.98. All artifacts shall be analyzed to identify function and chronology as they relate to the history of the area. Faunal material shall be identified as to species and specialty studies shall be completed, as appropriate. All newly discovered archaeological sites shall be recorded with the South Coastal Information			

SIGNIFICANT IMPACT(S)	MITIGATION MEASURE(S)	IMPLEMENTATION TIME FRAME	IMPLEMENTATION RESPONSIBILITY	VERIFICATION RESPONSIBILITY
	Center at San Diego State University. Any human bones and associated grave goods of Native American origin encountered during Step 2-Testing, shall, upon consultation, be turned over to the appropriate Native American representative(s) for treatment in accordance with state regulations as further outlined under Step 4-Monitoring (Section IV. Discovery of Human Remains). A draft Data Recovery Report shall be submitted to City Staff within twelve months of the commencement of the data recovery. Data Recovery Reports shall describe the research design or questions, historic context of the finds, field results, analysis of artifacts, and conclusions. Appropriate figures, maps and tables shall accompany the text. The report shall also include a catalogue of all finds and a description of curation arrangements at an approved facility, and a general statement indicating the disposition of any human remains encountered during the data recovery effort (please note that the location of reinternment and/or repatriation is confidential and not subject to public disclosure in accordance with state law). Finalization of draft reports shall be subject to City Staff review. Step 4 – Monitoring If no significant resources are encountered, but results of the initial evaluation and testing phase indicates there is still a potential for resources to be present in portions of the property that could not be tested, then mitigation monitoring is required and shall be conducted in accordance with the following provisions and components: **I. Prior to Permit Issuance** A. Construction Plan Check 1. Prior to Notice to Proceed (NTP) for any construction permits, including but not limited to, the first Grading Permit, Demolition Permits and Building Permits, but prior to the first Precon Meeting, whichever is applicable, City Staff shall verify that the requirements for Archaeological Monitoring and Native American monitoring, where the project may impact Native American resources, have been noted on the appropriate construction documents. B. Letters of Qualification have been submitted to City Staff			

SIGNIFICANT IMPACT(S)	MITIGATION MEASURE(S)	IMPLEMENTATION TIME FRAME	IMPLEMENTATION RESPONSIBILITY	VERIFICATION RESPONSIBILITY
	1. The applicant shall submit a letter of verification to City Staff identifying the Principal Investigator (PI) for the project and the names of all persons involved in the archaeological monitoring program, as defined in the City of San Diego Historical Resources Guidelines (HRG). If applicable, individuals involved in the archaeological monitoring program must have completed the 40-hour HAZWOPER training with certification documentation. 2. City Staff will provide a letter to the applicant confirming that the qualifications of the PI and all persons involved in the archaeological monitoring of the project meet the qualifications established in the HRG. 3. Prior to the start of work, the applicant must obtain written approval from City Staff for any personnel changes associated with the monitoring program. **II. Prior to Start of Construction** A. Verification of Records Search 1. The PI shall provide verification to City Staff that a site-specific records search (1/4 mile radius) has been completed. Verification includes, but is not limited to a copy of a confirmation letter from South Coastal Information Center, or, if the search was in-house, a letter of verification from the PI stating that the search was completed. 2. The letter shall introduce any pertinent information concerning expectations and probabilities of discovery during trenching and/or grading activities. 3. The PI may submit a detailed letter to City Staff requesting a reduction to the ¼ mile radius. B. PI Shall Attend Precon Meetings 1. Prior to beginning any work that requires monitoring, the Applicant shall arrange a Precon Meeting that shall include the PI, Native American consultant/monitor (where Native American resources may be impacted), Construction Manager (CM) and/or Grading Contractor, Resident Engineer (RE), the Native American representative(s) (where Native American resources may be impacted), Building Inspector (BI), if appropriate, and			

SIGNIFICANT IMPACT(S)	MITIGATION MEASURE(S)	IMPLEMENTATION TIME FRAME	IMPLEMENTATION RESPONSIBILITY	VERIFICATION RESPONSIBILITY
	City Staff. The qualified Archaeologist and the Native American consultant/monitor shall attend any grading/excavation related Precon Meetings to make comments and/or suggestions concerning the Archaeological Monitoring program with the Construction Manager and/or Grading Contractor. (a) If the PI is unable to attend the Precon Meeting, the Applicant shall schedule a focused Precon Meeting with City Staff, the PI, RE, CM or BI, if appropriate, prior to the start of any work that requires monitoring. 2. Archaeological Monitoring Plan (AMP) (a) Prior to the start of any work that requires monitoring, the PI shall submit an Archaeological Monitoring Plan (with verification that the AMP has been reviewed and approved by the Native American consultant/monitor when NA resources may be impacted) which describes how the monitoring would be accomplished for approval by City Staff and the Native American monitor. The AMP shall include an Archaeological Monitoring Exhibit (AME) based on the appropriate construction documents (reduced to 11x17) to City Staff identifying the areas to be monitored including the delineation of grading/excavation limits. (b) The AME shall be based on the results of a site-specific records search as well as information regarding existing known soil conditions (native or formation). (c) Prior to the start of any work, the PI shall also submit a construction schedule to City Staff through the RE indicating when and where monitoring will occur. (d) The PI may submit a detailed letter to City Staff prior to the start of work or during construction requesting a modification to the monitoring program. This request shall be based on relevant information such as review of final construction documents which indicate site conditions such as depth of excavation and/or site graded to bedrock, etc., which may reduce or increase the potential for resources to be present. **III. During Construction**			

SIGNIFICANT IMPACT(S)	MITIGATION MEASURE(S)	IMPLEMENTATION TIME FRAME	IMPLEMENTATION RESPONSIBILITY	VERIFICATION RESPONSIBILITY
	A. Monitor(s) Shall be Present During Grading/Excavation/Trenching 1. The Archaeological monitor shall be present full-time during all soil disturbing and grading/excavation /trenching activities which could result in impacts to archaeological resources as identified on the AME. The Construction Manager is responsible for notifying the RE, PI, and City Staff of changes to any construction activities. 2. The Native American consultant/monitor shall determine the extent of their presence during soil disturbing and grading/excavation/trenching activities based on the AME, and provide that information to the PI and City Staff. If prehistoric resources are encountered during the Native American consultant/monitor's absence, work shall stop and the Discovery Notification Processes detailed in Sections III.B-C, and IVA-D, shall commence. 3. The archeological and Native American consultant/monitor shall document field activity via the Consultant Site Visit Record (CSVR). The CSVR's shall be faxed by the CM to the RE the first day of monitoring, the last day of monitoring, monthly (Notification of Monitoring Completion), and in the case of ANY discoveries. The RE shall forward copies to City Staff. 4. The PI may submit a detailed letter to City Staff during construction requesting a modification to the monitoring program when a field condition such as modern disturbance post-dating the previous grading/trenching activities, presence of fossil formations, or when native soils are encountered that may reduce or increase the potential for resources to be present. B. Discovery Notification Process 1. In the event of a discovery, the Archaeological Monitor shall direct the contractor to temporarily divert all soil disturbing activities, including but not limited to, digging, trenching, excavating, or grading activities in the area of discovery and in the area reasonably suspected to overlay adjacent resources and immediately notify the RE or BI, as appropriate. 2. The Monitor shall immediately notify the PI (unless Monitor is			

SIGNIFICANT IMPACT(S)	MITIGATION MEASURE(S)	IMPLEMENTATION TIME FRAME	IMPLEMENTATION RESPONSIBILITY	VERIFICATION RESPONSIBILITY
	the PI) of the discovery. 3. The PI shall immediately notify City Staff by phone of the discovery, and shall also submit written documentation to City Staff within 24 hours by fax or email with photos of the resource in context, if possible. 4. No soil shall be exported off-site until a determination can be made regarding the significance of the resource specifically if Native American resources are encountered. C. Determination of Significance 1. The PI and Native American consultant/monitor, where Native American resources are discovered, shall evaluate the significance of the resource. If Human Remains are involved, follow protocol in Section IV below. (a) The PI shall immediately notify City Staff by phone to discuss significance determination and shall also submit a letter to City Staff indicating whether additional mitigation is required. (b) If the resource is significant, the PI shall submit an Archaeological Data Recovery Program (ADRP) which has been reviewed by the Native American consultant/monitor when applicable, and obtain written approval from City Staff and the Native American representative(s), if applicable. Impacts to significant resources must be mitigated before ground disturbing activities in the area of discovery will be allowed to resume. (c) If the resource is not significant, the PI shall submit a letter to City Staff indicating that artifacts will be collected, curated, and documented in the Final Monitoring Report. The letter shall also indicate that that no further work is required. **IV. Discovery of Human Remains** If human remains are discovered, work shall halt in that area and no soil shall be exported off-site until a determination can be made regarding the provenance of the human remains; and the following procedures set forth in CEQA Section 15064.5(e), the California			

SIGNIFICANT IMPACT(S)	MITIGATION MEASURE(S)	IMPLEMENTATION TIME FRAME	IMPLEMENTATION RESPONSIBILITY	VERIFICATION RESPONSIBILITY
	Public Resources Code (Sec. 5097.98) and State Health and Safety Code (Sec. 7050.5) shall be undertaken: A. Notification 1. Archaeological Monitor shall notify the RE or BI as appropriate, City Staff , and the PI, if the Monitor is not qualified as a PI. City Staff will notify the appropriate Senior Planner in the Environmental Analysis Section (EAS) of the Development Services Department to assist with the discovery process. 2. The PI shall notify the Medical Examiner after consultation with the RE, either in person or via telephone. B. Isolate discovery site 1. Work shall be directed away from the location of the discovery and any nearby area reasonably suspected to overlay adjacent human remains until a determination can be made by the Medical Examiner in consultation with the PI concerning the provenance of the remains. 2. The Medical Examiner, in consultation with the PI, will determine the need for a field examination to determine the provenance. 3. If a field examination is not warranted, the Medical Examiner will determine with input from the PI, if the remains are or are most likely to be of Native American origin. C. If Human Remains are determined to be Native American 1. The Medical Examiner will notify the Native American Heritage Commission (NAHC) within 24 hours. By law, **ONLY** the Medical Examiner can make this call. 2. NAHC will immediately identify the person or persons determined to be the Most Likely Descendent (MLD) and provide contact information.. 3. The MLD will contact the PI within 24 hours or sooner after the Medical Examiner has completed coordination, to begin the consultation process in accordance with CEQA Section 15064.5(e) and the California Public Resources and Health & Safety Codes. 4. The MLD will have 48 hours to make recommendations to the property owner or representative, for the treatment or disposition			

SIGNIFICANT IMPACT(S)	MITIGATION MEASURE(S)	IMPLEMENTATION TIME FRAME	IMPLEMENTATION RESPONSIBILITY	VERIFICATION RESPONSIBILITY
	with proper dignity, of the human remains and associated grave goods. 5. Disposition of Native American Human Remains will be determined between the MLD and the PI, and if: (a) The NAHC is unable to identify the MLD, OR the MLD failed to make a recommendation within 48 hours after being notified by the Commission; OR; (b) The landowner or authorized representative rejects the recommendation of the MLD and mediation in accordance with PRC 5097.94 (k) by the NAHC fails to provide measures acceptable to the landowner, THEN, (c) In order to protect these sites, the Landowner shall do one or more of the following: (1) Record the site with the NAHC; (2) Record an open space or conservation easement on the site; (3) Record a document with the County. 6. Upon the discovery of multiple Native American human remains during a ground disturbing land development activity, the landowner may agree that additional conferral with descendants is necessary to consider culturally appropriate treatment of multiple Native American human remains. Culturally appropriate treatment of such a discovery may be ascertained from review of the site utilizing cultural and archaeological standards. Where the parties are unable to agree on the appropriate treatment measures the human remains and buried with Native American human remains shall be reinterred with appropriate dignity, pursuant to Section 5.c., above. D. If Human Remains are not Native American 1. The PI shall contact the Medical Examiner and notify them of the historic era context of the burial. 2. The Medical Examiner will determine the appropriate course of action with the PI and City staff (PRC 5097.98). 3. If the remains are of historic origin, they shall be appropriately removed and conveyed to the San Diego Museum of Man for analysis. The decision for internment of the human remains shall be made in consultation with City Staff, the applicant/landowner			

SIGNIFICANT IMPACT(S)	MITIGATION MEASURE(S)	IMPLEMENTATION TIME FRAME	IMPLEMENTATION RESPONSIBILITY	VERIFICATION RESPONSIBILITY
	and the San Diego Museum of Man. **V. Night and/or Weekend Work** A. If night and/or work is included in the contract 1. When night and/or weekend work is included in the contract package, the extent and timing shall be presented and discussed at the Precon Meeting. 2. The following procedures shall be followed. (a) No Discoveries In the event that no discoveries were encountered during night and/or weekend work, the PI shall record the information on the CSVR and submit to City Staff via fax by 8 am of the next business day. (b) Discoveries All discoveries shall be processed and documented using the existing procedures detailed in Sections III - During Construction, and IV – Discovery of Human Remains. Discovery of human remains shall always be treated as a significant discovery. (c) Potentially Significant Discoveries If the PI determines that a potentially significant discovery has been made, the procedures detailed under Section III - During Construction and IV-Discovery of Human Remains shall be followed. (d) The PI shall immediately contact City Staff, or by 8 am of the next business day to report and discuss the findings as indicated in Section III-B, unless other specific arrangements have been made. B. If night and/or weekend work becomes necessary during the course of construction 1. The Construction Manager shall notify the RE, or BI, as appropriate, a minimum of 24 hours before the work is to begin. 2. The RE, or BI, as appropriate, shall notify City Staff immediately. C. All other procedures described above shall apply, as appropriate. **VI. Post Construction**			

SIGNIFICANT IMPACT(S)	MITIGATION MEASURE(S)	IMPLEMENTATION TIME FRAME	IMPLEMENTATION RESPONSIBILITY	VERIFICATION RESPONSIBILITY
	A. Submittal of Draft Monitoring Report 1. The PI shall submit two copies of the Draft Monitoring Report (even if negative) prepared in accordance with the Historical Resources Guidelines and Appendices which describes the results, analysis, and conclusions of all phases of the Archaeological Monitoring Program (with appropriate graphics) to City Staff, for review and approval within 90 days following the completion of monitoring, (a) For significant archaeological resources encountered during monitoring, the Archaeological Data Recovery Program shall be included in the Draft Monitoring Report. (b) Recording sites with State of California Department of Parks and Recreation The PI shall be responsible for recording (on the appropriate State of California Department of Park and Recreation forms-DPR 523 A/B) any significant or potentially significant resources encountered during the Archaeological Monitoring Program in accordance with the City's Historical Resources Guidelines, and submittal of such forms to the South Coastal Information Center with the Final Monitoring Report. 2. City Staff shall return the Draft Monitoring Report to the PI for revision or, for preparation of the Final Report. 3. The PI shall submit revised Draft Monitoring Report to City Staff for approval. 4. City Staff shall provide written verification to the PI of the approved report. 5. City Staff shall notify the RE or BI, as appropriate, of receipt of all Draft Monitoring Report submittals and approvals. B. Handling of Artifacts and Submittal of Collections Management Plan, if applicable 1. The PI shall be responsible for ensuring that all cultural remains collected are cleaned and catalogued. 2. The PI shall be responsible for ensuring that all artifacts are analyzed to identify function and chronology as they relate to the			

SIGNIFICANT IMPACT(S)	MITIGATION MEASURE(S)	IMPLEMENTATION TIME FRAME	IMPLEMENTATION RESPONSIBILITY	VERIFICATION RESPONSIBILITY
	history of the area; that faunal material is identified as to species; and that specialty studies are completed, as appropriate. 3. The PI shall submit a Collections Management Plan to City Staff for review and approval for any project which results in a substantial collection of historical artifacts. C. Curation of artifacts: Accession Agreement and Acceptance Verification 1. The PI shall be responsible for ensuring that all artifacts associated with the survey, testing and/or data recovery for this project are permanently curated with an appropriate institution. This shall be completed in consultation with City Staff and the Native American representative, as applicable. 2. The PI shall include the Acceptance Verification from the curation institution in the Final Monitoring Report submitted to the RE or BI and City Staff. 3. When applicable to the situation, the PI shall include written verification from the Native American consultant/monitor indicating that Native American resources were treated in accordance with state law and/or applicable agreements. If the resources were reinterred, verification shall be provided to show what protective measures were taken to ensure no further disturbance in accordance with section IV – Discovery of Human Remains, subsection 5.(d). D. Final Monitoring Report(s) 1. The PI shall submit one copy of the approved Final Monitoring Report to the RE or BI as appropriate, and one copy to City Staff (even if negative), within 90 days after notification from City Staff that the draft report has been approved. 2. The RE shall, in no case, issue the Notice of Completion until receiving a copy of the approved Final Monitoring Report from City Staff which includes the Acceptance Verification from the curation institution.			

SIGNIFICANT IMPACT(S)	MITIGATION MEASURE(S)	IMPLEMENTATION TIME FRAME	IMPLEMENTATION RESPONSIBILITY	VERIFICATION RESPONSIBILITY
PALEONTOLOGICAL RESOURCES (PAL)				
Impact PAL-A.1: **Excavation in geologic formations with a moderate to high potential for paleontological resources could have an significant impact on these resources, if present. (Direct)**	***Mitigation Measure PAL-A.1-1:*** In the event the Secondary Study indicates the potential for significant paleontological resources, the following measures shall be implemented as determined appropriate by CCDC. **I. Prior to Permit Issuance** A. Construction Plan Check 1. Prior to Notice to Proceed (NTP) for any construction permits, including but not limited to, the first Grading Permit, Demolition Permits and Building Permits, but prior to the first preconstruction meeting, whichever is applicable, Centre City Development Corporation (CCDC) shall verify that the requirements for Paleontological Monitoring have been noted on the appropriate construction documents. B. Letters of Qualification have been submitted to CCDC 1. The applicant shall submit a letter of verification to CCDC identifying the Principal Investigator (PI) for the project and the names of all persons involved in the paleontological monitoring program, as defined in the City of San Diego Paleontology Guidelines. 2. CCDC will provide a letter to the applicant confirming the qualifications of the PI and all persons involved in the paleontological monitoring of the project. 3. Prior to the start of work, the applicant shall obtain approval from CCDC for any personnel changes associated with the monitoring program. **II. Prior to Start of Construction** A. Verification of Records Search 1. The PI shall provide verification to CCDC that a site-specific records search has been completed. Verification includes, but is not limited to a copy of a confirmation letter from San Diego Natural History Museum, other institution or, if the search was in-house, a letter of verification from the PI stating that the search was completed. 2. The letter shall introduce any pertinent information concerning			

SIGNIFICANT IMPACT(S)	MITIGATION MEASURE(S)	IMPLEMENTATION TIME FRAME	IMPLEMENTATION RESPONSIBILITY	VERIFICATION RESPONSIBILITY
	expectations and probabilities of discovery during trenching and/or grading activities. B. PI Shall Attend Precon Meetings 1. Prior to beginning any work that requires monitoring, the Applicant shall arrange a Precon Meeting that shall include the PI, Construction Manager (CM) and/or Grading Contractor, Resident Engineer (RE), Building Inspector (BI), if appropriate, and CCDC. The qualified paleontologist shall attend any grading/excavation related Precon Meetings to make comments and/or suggestions concerning the Paleontological Monitoring program with the Construction Manager and/or Grading Contractor. a. If the PI is unable to attend the Precon Meeting, the Applicant shall schedule a focused Precon Meeting with CCDC, the PI, RE, CM or BI, if appropriate, prior to the start of any work that requires monitoring. 2. Identify Areas to be Monitored a. Prior to the start of any work that requires monitoring, the PI shall submit a Paleontological Monitoring Exhibit (PME) based on the appropriate construction documents (reduced to 11x17) to CCDC identifying the areas to be monitored including the delineation of grading/excavation limits. The PME shall be based on the results of a site specific records search as well as information regarding existing known soil conditions (native or formation). 3. When Monitoring Will Occur a. Prior to the start of any work, the PI shall also submit a construction schedule to CCDC through the RE indicating when and where monitoring will occur. b. The PI may submit a detailed letter to CCDC prior to the start of work or during construction requesting a modification to the monitoring program. This request shall be based on relevant information such as review of final construction documents which indicate conditions such as depth of excavation and/or site graded to bedrock, presence or absence of fossil resources, etc., which may reduce or			

SIGNIFICANT IMPACT(S)	MITIGATION MEASURE(S)	IMPLEMENTATION TIME FRAME	IMPLEMENTATION RESPONSIBILITY	VERIFICATION RESPONSIBILITY
	increase the potential for resources to be present. **III. During Construction** A. Monitor Shall be Present During Grading/Excavation/Trenching 1. The monitor shall be present full-time during grading/excavation/trenching activities as identified on the PME that could result in impacts to formations with high and moderate resource sensitivity. The Construction Manager is responsible for notifying the RE, PI, and CCDC of changes to any construction activities. 2. The monitor shall document field activity via the Consultant Site Visit Record (CSVR). The CSVR's shall be faxed by the CM to the RE the first day of monitoring, the last day of monitoring, monthly (Notification of Monitoring Completion), and in the case of any discoveries. The RE shall forward copies to CCDC. 3. The PI may submit a detailed letter to CCDC during construction requesting a modification to the monitoring program when a field condition such as trenching activities that do not encounter formational soils as previously assumed, and/or when unique/unusual fossils are encountered, which may reduce or increase the potential for resources to be present. B. Discovery Notification Process 1. In the event of a discovery, the Paleontological Monitor shall direct the contractor to temporarily divert trenching activities in the area of discovery and immediately notify the RE or BI, as appropriate. 2. The Monitor shall immediately notify the PI (unless Monitor is the PI) of the discovery. 3. The PI shall immediately notify CCDC by phone of the discovery, and shall also submit written documentation to CCDC within 24 hours by fax or email with photos of the resource in context, if possible. C. Determination of Significance 1. The PI shall evaluate the significance of the resource. a. The PI shall immediately notify CCDC by phone to discuss significance determination and shall also submit a letter to CCDC indicating whether additional mitigation is required.			

SIGNIFICANT IMPACT(S)	MITIGATION MEASURE(S)	IMPLEMENTATION TIME FRAME	IMPLEMENTATION RESPONSIBILITY	VERIFICATION RESPONSIBILITY
	The determination of significance for fossil discoveries shall be at the discretion of the PI. b. If the resource is significant, the PI shall submit a Paleontological Recovery Program (PRP) and obtain written approval from CCDC. Impacts to significant resources must be mitigated before ground disturbing activities in the area of discovery will be allowed to resume. c. If resource is not significant (e.g., small pieces of broken common shell fragments or other scattered common fossils) the PI shall notify the RE, or BI as appropriate, that a non-significant discovery has been made. The Paleontologist shall continue to monitor the area without notification to CCDC unless a significant resource is encountered. d. The PI shall submit a letter to CCDC indicating that fossil resources will be collected, curated, and documented in the Final Monitoring Report. The letter shall also indicate that no further work is required. **IV. Night Work** A. If night work is included in the contract 1. When night work is included in the contract package, the extent and timing shall be presented and discussed at the precon meeting. 2. The following procedures shall be followed. a. No Discoveries (1) In the event that no discoveries were encountered during night work, The PI shall record the information on the CSVR and submit to CCDC via fax by 9am the following morning, if possible. b. Discoveries (1) All discoveries shall be processed and documented using the existing procedures detailed in Sections III - During Construction. c. Potentially Significant Discoveries (1) If the PI determines that a potentially significant discovery has been made, the procedures detailed under Section III - During Construction shall be followed.			

SIGNIFICANT IMPACT(S)	MITIGATION MEASURE(S)	IMPLEMENTATION TIME FRAME	IMPLEMENTATION RESPONSIBILITY	VERIFICATION RESPONSIBILITY
	d. The PI shall immediately contact CCDC, or by 8AM the following morning to report and discuss the findings as indicated in Section III-B, unless other specific arrangements have been made. B. If night work becomes necessary during the course of construction 1. The Construction Manager shall notify the RE, or BI, as appropriate, a minimum of 24 hours before the work is to begin. 2. The RE, or BI, as appropriate, shall notify CCDC immediately. C. All other procedures described above shall apply, as appropriate. **VI. Post Construction** A. Submittal of Draft Monitoring Report 1. The PI shall submit two copies of the Draft Monitoring Report (even if negative) which describes the results, analysis, and conclusions of all phases of the Paleontological Monitoring Program (with appropriate graphics) to CCDC for review and approval within 90 days following the completion of monitoring, a. For significant paleontological resources encountered during monitoring, the Paleontological Recovery Program shall be included in the Draft Monitoring Report. b. Recording Sites with the San Diego Natural History Museum (1) The PI shall be responsible for recording (on the appropriate forms) any significant or potentially significant fossil resources encountered during the Paleontological Monitoring Program in accordance with the City's Paleontological Guidelines, and submittal of such forms to the San Diego Natural History Museum with the Final Monitoring Report. 2. CCDC shall return the Draft Monitoring Report to the PI for revision or, for preparation of the Final Report. 3. The PI shall submit revised Draft Monitoring Report to CCDC for approval. 4. CCDC shall provide written verification to the PI of the approved report. 5. CCDC shall notify the RE or BI, as appropriate, of receipt of all			

SIGNIFICANT IMPACT(S)	MITIGATION MEASURE(S)	IMPLEMENTATION TIME FRAME	IMPLEMENTATION RESPONSIBILITY	VERIFICATION RESPONSIBILITY
	Draft Monitoring Report submittals and approvals. B. Handling of Fossil Remains 1. The PI shall be responsible for ensuring that all fossil remains collected are cleaned and catalogued. 2. The PI shall be responsible for ensuring that all fossil remains are analyzed to identify function and chronology as they relate to the geologic history of the area; that faunal material is identified as to species; and that specialty studies are completed, as appropriate C. Curation of fossil remains: Deed of Gift and Acceptance Verification 1. The PI shall be responsible for ensuring that all fossil remains associated with the monitoring for this project are permanently curated with an appropriate institution. 2. The PI shall include the Acceptance Verification from the curation institution in the Final Monitoring Report submitted to the RE or BI and CCDC. D. Final Monitoring Report(s) 1. The PI shall submit two copies of the Final Monitoring Report to CCDC (even if negative), within 90 days after notification from CCDC that the draft report has been approved. 2. The RE shall, in no case, issue the Notice of Completion until receiving a copy of the approved Final Monitoring Report from CCDC which includes the Acceptance Verification from the curation institution.			
SIGNIFICANT IMPACT(S)	**MITIGATION MEASURE(S)**	**IMPLEMENTATION TIME FRAME**	**IMPLEMENTATION RESPONSIBILITY**	**VERIFICATION RESPONSIBILITY**
AIR QUALITY (AQ)				
Impact AQ-B.1: **Dust and construction equipment engine emissions generated during grading and demolition would impact local and**	***Mitigation Measure AQ-B.1-1:*** Prior to approval of a Grading or Demolition Permit, the City shall confirm that the following conditions have been applied, as appropriate:	Prior to Demolition or Grading Permit (Design)	Developer	City

SIGNIFICANT IMPACT(S)	MITIGATION MEASURE(S)	IMPLEMENTATION TIME FRAME	IMPLEMENTATION RESPONSIBILITY	VERIFICATION RESPONSIBILITY
regional air quality. (Direct and Cumulative)	1. Exposed soil areas shall be watered twice per day. On windy days or when fugitive dust can be observed leaving the development site, additional applications of water shall be applied as necessary to prevent visible dust plumes from leaving the development site. When wind velocities are forecast to exceed 25 miles per hour, all ground disturbing activities shall be halted until winds that are forecast to abate below this threshold. 2. Dust suppression techniques shall be implemented including, but not limited to, the following: a. Portions of the construction site to remain inactive longer than a period of three months shall be seeded and watered until grass cover is grown or otherwise stabilized in a manner acceptable to the CCDC. b. On-site access points shall be paved as soon as feasible or watered periodically or otherwise stabilized. c. Material transported offsite shall be either sufficiently watered or securely covered to prevent excessive amounts of dust. d. The area disturbed by clearing, grading, earthmoving, or excavation operations shall be minimized at all times. 3. Vehicles on the construction site shall travel at speeds less than 15 miles per hour. 4. Material stockpiles subject to wind erosion during construction activities, which will not be utilized within three days, shall be covered with plastic, an alternative cover deemed equivalent to plastic, or sprayed with a nontoxic chemical stabilizer. 5. Where vehicles leave the construction site and enter adjacent public streets, the streets shall be swept daily or washed down at the end of the work day to remove soil tracked onto the paved surface. Any visible track-out extending for more than fifty (50) feet from the access point shall be swept or washed within thirty (30) minutes of deposition. 6. All diesel-powered vehicles and equipment shall be properly operated and maintained.			

SIGNIFICANT IMPACT(S)	MITIGATION MEASURE(S)	IMPLEMENTATION TIME FRAME	IMPLEMENTATION RESPONSIBILITY	VERIFICATION RESPONSIBILITY
	7. All diesel-powered vehicles and gasoline-powered equipment shall be turned off when not in use for more than five minutes, as required by state law. 8. The construction contractor shall utilize electric or natural gas-powered equipment in lieu of gasoline or diesel-powered engines, where feasible. 9. As much as possible, the construction contractor shall time the construction activities so as not to interfere with peak hour traffic. In order to minimize obstruction of through traffic lanes adjacent to the site, a flag-person shall be retained to maintain safety adjacent to existing roadways, if necessary. 10. The construction contractor shall support and encourage ridesharing and transit incentives for the construction crew. 11. Low VOC coatings shall be used as required by SDAPCD Rule 67. Spray equipment with high transfer efficiency, such as the high volume-low pressure (HPLV) spray method, or manual coatings application such as paint brush hand roller, trowel, spatula, dauber, rag, or sponge, shall be used to reduce VOC emissions, where feasible. 12. If construction equipment powered by alternative fuel sources (LPG/CNG) is available at comparable cost, the developer shall specify that such equipment be used during all construction activities on the development site. 13. The developer shall require the use of particulate filters on diesel construction equipment if use of such filters is demonstrated to be cost-competitive for use on this development. 14. During demolition activities, safety measures as required by City/County/State for removal of toxic or hazardous materials shall be utilized. 15. Rubble piles shall be maintained in a damp state to minimize dust generation. 16. During finish work, low-VOC paints and efficient transfer systems shall be utilized, to the extent possible.			

ATTACHMENT A
MITIGATION MONITORING AND REPORTING PROGRAM

SIGNIFICANT IMPACT(S)	MITIGATION MEASURE(S)	IMPLEMENTATION TIME FRAME	IMPLEMENTATION RESPONSIBILITY	VERIFICATION RESPONSIBILITY
	17. If alternative-fueled and/or particulate filter-equipped construction equipment is not feasible, construction equipment shall use the newest, least-polluting equipment, whenever possible.			

SIGNIFICANT IMPACT(S)	MITIGATION MEASURE(S)	IMPLEMENTATION TIME FRAME	IMPLEMENTATION RESPONSIBILITY	VERIFICATION RESPONSIBILITY
PALEONTOLOGICAL RESOURCES (PAL)				
Impact PAL-A.1: **Excavation in geologic formations with a moderate to high potential for paleontological resources could have an significant impact on these resources, if present. (Direct)**	***Mitigation Measure PAL-A.1-1:*** In the event the Secondary Study indicates the potential for significant paleontological resources, the following measures shall be implemented as determined appropriate by CCDC. **I. Prior to Permit Issuance** A. Construction Plan Check 1. Prior to Notice to Proceed (NTP) for any construction permits, including but not limited to, the first Grading Permit, Demolition Permits and Building Permits, but prior to the first preconstruction meeting, whichever is applicable, Centre City Development Corporation (CCDC) shall verify that the requirements for Paleontological Monitoring have been noted on the appropriate construction documents. B. Letters of Qualification have been submitted to CCDC 1. The applicant shall submit a letter of verification to CCDC identifying the Principal Investigator (PI) for the project and the names of all persons involved in the paleontological monitoring program, as defined in the City of San Diego Paleontology Guidelines. 2. CCDC will provide a letter to the applicant confirming the qualifications of the PI and all persons involved in the paleontological monitoring of the project. 3. Prior to the start of work, the applicant shall obtain approval from CCDC for any personnel changes associated with the monitoring program. **II. Prior to Start of Construction** A. Verification of Records Search 1. The PI shall provide verification to CCDC that a site-specific records search has been completed. Verification includes, but is not limited to a copy of a confirmation letter from San Diego Natural History Museum, other institution or, if the search was in-house, a letter of verification from the PI stating that the search was completed. 2. The letter shall introduce any pertinent information concerning	Prior to Demolition or Grading Permit (Design) Prior to Certificate of Occupancy (Implementation)	Developer	City Staff

SIGNIFICANT IMPACT(S)	MITIGATION MEASURE(S)	IMPLEMENTATION TIME FRAME	IMPLEMENTATION RESPONSIBILITY	VERIFICATION RESPONSIBILITY
	expectations and probabilities of discovery during trenching and/or grading activities. B. PI Shall Attend Precon Meetings 1. Prior to beginning any work that requires monitoring, the Applicant shall arrange a Precon Meeting that shall include the PI, Construction Manager (CM) and/or Grading Contractor, Resident Engineer (RE), Building Inspector (BI), if appropriate, and CCDC. The qualified paleontologist shall attend any grading/excavation related Precon Meetings to make comments and/or suggestions concerning the Paleontological Monitoring program with the Construction Manager and/or Grading Contractor. a. If the PI is unable to attend the Precon Meeting, the Applicant shall schedule a focused Precon Meeting with CCDC, the PI, RE, CM or BI, if appropriate, prior to the start of any work that requires monitoring. 2. Identify Areas to be Monitored a. Prior to the start of any work that requires monitoring, the PI shall submit a Paleontological Monitoring Exhibit (PME) based on the appropriate construction documents (reduced to 11x17) to CCDC identifying the areas to be monitored including the delineation of grading/excavation limits. The PME shall be based on the results of a site specific records search as well as information regarding existing known soil conditions (native or formation). 3. When Monitoring Will Occur a. Prior to the start of any work, the PI shall also submit a construction schedule to CCDC through the RE indicating when and where monitoring will occur. b. The PI may submit a detailed letter to CCDC prior to the start of work or during construction requesting a modification to the monitoring program. This request shall be based on relevant information such as review of final construction documents which indicate conditions such as depth of excavation and/or site graded to bedrock, presence or absence of fossil resources, etc., which may reduce or			

SIGNIFICANT IMPACT(S)	MITIGATION MEASURE(S)	IMPLEMENTATION TIME FRAME	IMPLEMENTATION RESPONSIBILITY	VERIFICATION RESPONSIBILITY
	increase the potential for resources to be present. **III. During Construction** A. Monitor Shall be Present During Grading/Excavation/Trenching 1. The monitor shall be present full-time during grading/excavation/trenching activities as identified on the PME that could result in impacts to formations with high and moderate resource sensitivity. The Construction Manager is responsible for notifying the RE, PI, and CCDC of changes to any construction activities. 2. The monitor shall document field activity via the Consultant Site Visit Record (CSVR). The CSVR's shall be faxed by the CM to the RE the first day of monitoring, the last day of monitoring, monthly (Notification of Monitoring Completion), and in the case of any discoveries. The RE shall forward copies to CCDC. 3. The PI may submit a detailed letter to CCDC during construction requesting a modification to the monitoring program when a field condition such as trenching activities that do not encounter formational soils as previously assumed, and/or when unique/unusual fossils are encountered, which may reduce or increase the potential for resources to be present. B. Discovery Notification Process 1. In the event of a discovery, the Paleontological Monitor shall direct the contractor to temporarily divert trenching activities in the area of discovery and immediately notify the RE or BI, as appropriate. 2. The Monitor shall immediately notify the PI (unless Monitor is the PI) of the discovery. 3. The PI shall immediately notify CCDC by phone of the discovery, and shall also submit written documentation to CCDC within 24 hours by fax or email with photos of the resource in context, if possible. C. Determination of Significance 1. The PI shall evaluate the significance of the resource. a. The PI shall immediately notify CCDC by phone to discuss significance determination and shall also submit a letter to CCDC indicating whether additional mitigation is required.			

SIGNIFICANT IMPACT(S)	MITIGATION MEASURE(S)	IMPLEMENTATION TIME FRAME	IMPLEMENTATION RESPONSIBILITY	VERIFICATION RESPONSIBILITY
	The determination of significance for fossil discoveries shall be at the discretion of the PI. b. If the resource is significant, the PI shall submit a Paleontological Recovery Program (PRP) and obtain written approval from CCDC. Impacts to significant resources must be mitigated before ground disturbing activities in the area of discovery will be allowed to resume. c. If resource is not significant (e.g., small pieces of broken common shell fragments or other scattered common fossils) the PI shall notify the RE, or BI as appropriate, that a non-significant discovery has been made. The Paleontologist shall continue to monitor the area without notification to CCDC unless a significant resource is encountered. d. The PI shall submit a letter to CCDC indicating that fossil resources will be collected, curated, and documented in the Final Monitoring Report. The letter shall also indicate that no further work is required. **IV. Night Work** A. If night work is included in the contract 1. When night work is included in the contract package, the extent and timing shall be presented and discussed at the precon meeting. 2. The following procedures shall be followed. a. No Discoveries (1) In the event that no discoveries were encountered during night work, The PI shall record the information on the CSVR and submit to CCDC via fax by 9am the following morning, if possible. b. Discoveries (1) All discoveries shall be processed and documented using the existing procedures detailed in Sections III - During Construction. c. Potentially Significant Discoveries (1) If the PI determines that a potentially significant discovery has been made, the procedures detailed under Section III - During Construction shall be followed.			

SIGNIFICANT IMPACT(S)	MITIGATION MEASURE(S)	IMPLEMENTATION TIME FRAME	IMPLEMENTATION RESPONSIBILITY	VERIFICATION RESPONSIBILITY
	d. The PI shall immediately contact CCDC, or by 8AM the following morning to report and discuss the findings as indicated in Section III-B, unless other specific arrangements have been made. B. If night work becomes necessary during the course of construction 1. The Construction Manager shall notify the RE, or BI, as appropriate, a minimum of 24 hours before the work is to begin. 2. The RE, or BI, as appropriate, shall notify CCDC immediately. C. All other procedures described above shall apply, as appropriate. **VI. Post Construction** A. Submittal of Draft Monitoring Report 1. The PI shall submit two copies of the Draft Monitoring Report (even if negative) which describes the results, analysis, and conclusions of all phases of the Paleontological Monitoring Program (with appropriate graphics) to CCDC for review and approval within 90 days following the completion of monitoring, a. For significant paleontological resources encountered during monitoring, the Paleontological Recovery Program shall be included in the Draft Monitoring Report. b. Recording Sites with the San Diego Natural History Museum (1) The PI shall be responsible for recording (on the appropriate forms) any significant or potentially significant fossil resources encountered during the Paleontological Monitoring Program in accordance with the City's Paleontological Guidelines, and submittal of such forms to the San Diego Natural History Museum with the Final Monitoring Report. 2. CCDC shall return the Draft Monitoring Report to the PI for revision or, for preparation of the Final Report. 3. The PI shall submit revised Draft Monitoring Report to CCDC for approval. 4. CCDC shall provide written verification to the PI of the approved report. 5. CCDC shall notify the RE or BI, as appropriate, of receipt of all			

SIGNIFICANT IMPACT(S)	MITIGATION MEASURE(S)	IMPLEMENTATION TIME FRAME	IMPLEMENTATION RESPONSIBILITY	VERIFICATION RESPONSIBILITY
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ATTACHMENT B

GREENHOUSE GAS MODELING ASSUMPTIONS

DECEMBER 2010

Urbemis 2007 Version 9.2.4

Combined Annual Emissions Reports (Tons/Year)

File Name: C:\Move to New Computer\Work\Projects\CCDC Secondary Studies\Horton Plaza\Second Round\Horton Plaza Existing.urb924

Project Name: CCDC Horton Plaza

Project Location: Riverside County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

AREA SOURCE EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (tons/year, unmitigated)	0.17	0.15	0.97	0.00	0.00	0.00	172.89

OPERATIONAL (VEHICLE) EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (tons/year, unmitigated)	3.95	7.01	47.59	0.04	7.83	1.57	4,613.51

SUM OF AREA SOURCE AND OPERATIONAL EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (tons/year, unmitigated)	4.12	7.16	48.56	0.04	7.83	1.57	4,786.40

Area Source Unmitigated Detail Report:

AREA SOURCE EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

Source	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
Natural Gas	0.01	0.14	0.12	0.00	0.00	0.00	171.35

Hearth	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Landscape	0.07	0.01	0.85	0.00	0.00	0.00	1.54
Consumer Products	0.00						
Architectural Coatings	0.09						
TOTALS (tons/year, unmitigated)	0.17	0.15	0.97	0.00	0.00	0.00	172.89

Area Source Changes to Defaults

Operational Unmitigated Detail Report:

OPERATIONAL EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

Source	ROG	NOX	CO	SO2	PM10	PM25	CO2
City park	0.03	0.06	0.41	0.00	0.07	0.01	39.25
Racquetball/health	0.30	0.49	3.32	0.00	0.55	0.11	321.81
Regnl shop. center	3.62	6.46	43.86	0.04	7.21	1.45	4,252.45
TOTALS (tons/year, unmitigated)	3.95	7.01	47.59	0.04	7.83	1.57	4,613.51

Operational Settings:

Does not include correction for passby trips

Does not include double counting adjustment for internal trips

Analysis Year: 2010 Season: Annual

Emfac: Version : Emfac2007 V2.3 Nov 1 2006

Summary of Land Uses

Land Use Type	Acreage	Trip Rate	Unit Type	No. Units	Total Trips	Total VMT

City park	50.00	acres	0.46	23.00	208.90
Racquetball/health	7.00	1000 sq ft	26.94	188.58	1,712.78
Regnl shop. center	46.73	1000 sq ft	54.00	2,523.42	22,642.65
				2,735.00	24,564.33

Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	45.8	1.1	98.7	0.2
Light Truck < 3750 lbs	9.6	2.1	91.7	6.2
Light Truck 3751-5750 lbs	21.7	0.5	99.5	0.0
Med Truck 5751-8500 lbs	12.0	0.8	98.4	0.8
Lite-Heavy Truck 8501-10,000 lbs	1.9	0.0	73.7	26.3
Lite-Heavy Truck 10,001-14,000 lbs	0.6	0.0	50.0	50.0
Med-Heavy Truck 14,001-33,000 lbs	0.8	0.0	12.5	87.5
Heavy-Heavy Truck 33,001-60,000 lbs	1.5	0.0	0.0	100.0
Other Bus	0.1	0.0	0.0	100.0
Urban Bus	0.0	0.0	0.0	0.0
Motorcycle	4.4	65.9	34.1	0.0
School Bus	0.1	0.0	0.0	100.0
Motor Home	1.5	0.0	86.7	13.3

Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Urban Trip Length (miles)	12.7	7.0	9.5	13.3	7.4	8.9
Rural Trip Length (miles)	17.6	12.1	14.9	15.4	9.6	12.6
Trip speeds (mph)	30.0	30.0	30.0	30.0	30.0	30.0

% of Trips - Residential	32.9	18.0	49.1			
% of Trips - Commercial (by land use)						
City park				5.0	2.5	92.5
Racquetball/health				5.0	2.5	92.5
Regnl shop. center				2.0	1.0	97.0

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Urbemis 2007 Version 9.2.4

Combined Annual Emissions Reports (Tons/Year)

File Name: C:\Move to New Computer\Work\Projects\CCDC Secondary Studies\Horton Plaza\Second Round\Horton Plaza Allowed.urb924

Project Name: CCDC Horton Plaza

Project Location: Riverside County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

AREA SOURCE EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (tons/year, unmitigated)	0.20	0.21	1.01	0.00	0.00	0.00	236.76

OPERATIONAL (VEHICLE) EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (tons/year, unmitigated)	5.41	9.60	65.17	0.06	10.71	2.15	6,318.45

SUM OF AREA SOURCE AND OPERATIONAL EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (tons/year, unmitigated)	5.61	9.81	66.18	0.06	10.71	2.15	6,555.21

Area Source Unmitigated Detail Report:

AREA SOURCE EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

Source	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
Natural Gas	0.01	0.20	0.16	0.00	0.00	0.00	235.22

Hearth	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Landscape	0.07	0.01	0.85	0.00	0.00	0.00	1.54
Consumer Products	0.00						
Architectural Coatings	0.12						
TOTALS (tons/year, unmitigated)	0.20	0.21	1.01	0.00	0.00	0.00	236.76

Area Source Changes to Defaults

Operational Unmitigated Detail Report:

OPERATIONAL EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

Source	ROG	NOX	CO	SO2	PM10	PM25	CO2
City park	0.03	0.06	0.41	0.00	0.07	0.01	39.25
Racquetball/health	0.30	0.49	3.32	0.00	0.55	0.11	321.81
Regnl shop. center	5.08	9.05	61.44	0.06	10.09	2.03	5,957.39
TOTALS (tons/year, unmitigated)	5.41	9.60	65.17	0.06	10.71	2.15	6,318.45

Operational Settings:

Does not include correction for passby trips

Does not include double counting adjustment for internal trips

Analysis Year: 2010 Season: Annual

Emfac: Version : Emfac2007 V2.3 Nov 1 2006

Summary of Land Uses

Land Use Type	Acreage	Trip Rate	Unit Type	No. Units	Total Trips	Total VMT

City park	50.00	acres	0.46	23.00	208.90
Racquetball/health	7.00	1000 sq ft	26.94	188.58	1,712.78
Regnl shop. center	42.00	1000 sq ft	84.17	3,535.14	31,720.81
				3,746.72	33,642.49

Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	45.8	1.1	98.7	0.2
Light Truck < 3750 lbs	9.6	2.1	91.7	6.2
Light Truck 3751-5750 lbs	21.7	0.5	99.5	0.0
Med Truck 5751-8500 lbs	12.0	0.8	98.4	0.8
Lite-Heavy Truck 8501-10,000 lbs	1.9	0.0	73.7	26.3
Lite-Heavy Truck 10,001-14,000 lbs	0.6	0.0	50.0	50.0
Med-Heavy Truck 14,001-33,000 lbs	0.8	0.0	12.5	87.5
Heavy-Heavy Truck 33,001-60,000 lbs	1.5	0.0	0.0	100.0
Other Bus	0.1	0.0	0.0	100.0
Urban Bus	0.0	0.0	0.0	0.0
Motorcycle	4.4	65.9	34.1	0.0
School Bus	0.1	0.0	0.0	100.0
Motor Home	1.5	0.0	86.7	13.3

Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Urban Trip Length (miles)	12.7	7.0	9.5	13.3	7.4	8.9
Rural Trip Length (miles)	17.6	12.1	14.9	15.4	9.6	12.6
Trip speeds (mph)	30.0	30.0	30.0	30.0	30.0	30.0

% of Trips - Residential	32.9	18.0	49.1			
% of Trips - Commercial (by land use)						
City park				5.0	2.5	92.5
Racquetball/health				5.0	2.5	92.5
Regnl shop. center				2.0	1.0	97.0

Urbemis 2007 Version 9.2.4

Combined Annual Emissions Reports (Tons/Year)

File Name: C:\Move to New Computer\Work\Projects\CCDC Secondary Studies\Horton Plaza\Second Round\Horton Plaza Proposed.urb924

Project Name: CCDC Horton Plaza

Project Location: Riverside County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

AREA SOURCE EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (tons/year, unmitigated)	0.07	0.02	0.86	0.00	0.00	0.00	10.01

OPERATIONAL (VEHICLE) EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (tons/year, unmitigated)	0.37	0.61	4.37	0.00	0.90	0.17	531.77

SUM OF AREA SOURCE AND OPERATIONAL EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (tons/year, unmitigated)	0.44	0.63	5.23	0.00	0.90	0.17	541.78

Area Source Unmitigated Detail Report:

AREA SOURCE EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

Source	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
Natural Gas	0.00	0.01	0.01	0.00	0.00	0.00	8.47

Hearth	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Landscape	0.07	0.01	0.85	0.00	0.00	0.00	1.54
Consumer Products	0.00						
Architectural Coatings	0.00						
TOTALS (tons/year, unmitigated)	0.07	0.02	0.86	0.00	0.00	0.00	10.01

Area Source Changes to Defaults

Operational Unmitigated Detail Report:

OPERATIONAL EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

Source	ROG	NOX	CO	SO2	PM10	PM25	CO2
City park	0.25	0.42	3.01	0.00	0.62	0.12	366.26
High turnover (sit-down) rest.	0.09	0.15	1.06	0.00	0.22	0.04	129.09
Regnl shop. center	0.03	0.04	0.30	0.00	0.06	0.01	36.42
TOTALS (tons/year, unmitigated)	0.37	0.61	4.37	0.00	0.90	0.17	531.77

Operational Settings:

Does not include correction for passby trips

Does not include double counting adjustment for internal trips

Analysis Year: 2013 Season: Annual

Emfac: Version : Emfac2007 V2.3 Nov 1 2006

Summary of Land Uses

Land Use Type	Acreage	Trip Rate	Unit Type	No. Units	Total Trips	Total VMT

City park	50.00	acres	4.29	214.50	1,948.20
High turnover (sit-down) rest.	27.00	1000 sq ft	2.80	75.60	686.64
Regnl shop. center	18.00	1000 sq ft	1.20	21.60	193.82
				311.70	2,828.66

Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	45.4	0.4	99.4	0.2
Light Truck < 3750 lbs	9.5	1.1	94.7	4.2
Light Truck 3751-5750 lbs	22.0	0.5	99.5	0.0
Med Truck 5751-8500 lbs	12.2	0.8	99.2	0.0
Lite-Heavy Truck 8501-10,000 lbs	1.9	0.0	78.9	21.1
Lite-Heavy Truck 10,001-14,000 lbs	0.6	0.0	50.0	50.0
Med-Heavy Truck 14,001-33,000 lbs	0.8	0.0	12.5	87.5
Heavy-Heavy Truck 33,001-60,000 lbs	1.5	0.0	0.0	100.0
Other Bus	0.1	0.0	0.0	100.0
Urban Bus	0.0	0.0	0.0	0.0
Motorcycle	4.5	53.3	46.7	0.0
School Bus	0.1	0.0	0.0	100.0
Motor Home	1.4	0.0	85.7	14.3

Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Urban Trip Length (miles)	12.7	7.0	9.5	13.3	7.4	8.9
Rural Trip Length (miles)	17.6	12.1	14.9	15.4	9.6	12.6
Trip speeds (mph)	30.0	30.0	30.0	30.0	30.0	30.0

% of Trips - Residential	32.9	18.0	49.1			
% of Trips - Commercial (by land use)						
City park				5.0	2.5	92.5
High turnover (sit-down) rest.				5.0	2.5	92.5
Regnl shop. center				2.0	1.0	97.0

Appendix Horton Plaza Revitalization GHG Calculations - Existing

Mobile-Source Emissions (Source: URBEMIS)

Operational Year 2010	4,613.51 tons	0.907 MT/ton	4,185 MT/yr	

Landscaping Emissions (Source: URBEMIS)

Operational Year 2010	1.54 tons	0.907 MT/ton	1 MT/yr	

Emissions from Energy Consumption [1]

Electricity

Total KWh	MWh	Region	Emission Factor (lb CO2/MWh)	GWP	Emission Factor (lb CH4/MWh)	GWP	Emission Factor (lb N2O/MWh)	GWP	Total CO2e (Metric Tons/year)
1,138,213	1,138	CALI	739.05	1	0.0302	23	0.0081	296	**383**

Natural Gas

Total Therms	MMBTU	Region	Emission Factor (kg CO2/MMBTU)	GWP	Emission Factor (kg CH4/MMBTU)	GWP	Emission Factor (kg N2O/MMBTU)	GWP	Total CO2e (Metric Tons/year)
3,724	372	California	53.06	1	0.005	23	0.0001	296	**20**

Indirect Emissions from Municipal Water Use (includes conveyance, treatment, distribution, and wastewater treatment) [2]

KWh/million gallons/year*	KWh/acre-ft/year	Gallons/Year	Total KWh	MWh	Region	Emission Factor (lb CO2/MWh)	GWP	Emission Factor (lb CH4/MWh)	GWP	Emission Factor (lb N2O/MWh)	GWP	Total CO2e (Metric Tons/year)
12,700	4138	4,691,111	59,577	60	CALI	739.05	1	0.0302	23	0.0081	296	**20**

*for Southern California

	Total CO2e (Metric Tons/year)
Emissions from Waste Generation	**173**

Total Direct & Indirect Emissions (MT CO2e/yr)	**4,781**

Sources:

1 California Climate Action Registry [CCAR] General Reporting Protocol v 3.1 January 2009

California Energy Commission [CEC] 2009. California Commercial End Use Survey. Available: http://capabilities.itron.com/CeusWeb/Chart.aspx; California Energy Commission [CEC] 2000. California Energy Demand Staff Report P200-00-002

2 California Energy Commission [CEC] 2007. California Energy - Water Relationship Staff Report CEC-999-2007-008. Available: http://www.energy.ca.gov/2007publications/CEC-999-2007-008/CEC-999-2007-008.PDF

Bay Area Air Quality Management District Greenhouse Gas Model 2010

Appendix Horton Plaza Revitalization GHG Calculations - Allowed Uses

Mobile-Source Emissions (Source: URBEMIS)

Operational Year 2010	6,318.45 tons	0.907 MT/ton	5,732 MT/yr	

Landscaping Emissions (Source: URBEMIS)

Operational Year 2010	1.54 tons	0.907 MT/ton	1 MT/yr	

Emissions from Energy Consumption [1]

Electricity

Total KWh	MWh	Region	Emission Factor (lb CO2/MWh)	GWP	Emission Factor (lb CH4/MWh)	GWP	Emission Factor (lb N2O/MWh)	GWP	Total CO2e (Metric Tons/year)
1,562,221	1,562	CALI	739.05	1	0.0302	23	0.0081	296	526

Natural Gas

Total Therms	MMBTU	Region	Emission Factor (kg CO2/MMBTU)	GWP	Emission Factor (kg CH4/MMBTU)	GWP	Emission Factor (kg N2O/MMBTU)	GWP	Total CO2e (Metric Tons/year)
5,111	511	California	53.06	1	0.005	23	0.0001	296	27

Indirect Emissions from Municipal Water Use (Includes conveyance, treatment, distribution, and wastewater treatment) [2]

KWh/million gallons/year*	KWh/acre-ft/year	Gallons/Year	Total KWh	MWh	Region	Emission Factor (lb CO2/MWh)	GWP	Emission Factor (lb CH4/MWh)	GWP	Emission Factor (lb N2O/MWh)	GWP	Total CO2e (Metric Tons/year)
12,700	4138	6,259,275	79,493	79	CALI	739.05	1	0.0302	23	0.0081	296	27

*for Southern California

	Total CO2e (Metric Tons/year)
Emissions from Waste Generation	232

Total Direct & Indirect Emissions (MT CO2e/yr)	**6,544**

Sources:

1 California Climate Action Registry [CCAR] General Reporting Protocol v 3.1 January 2009

California Energy Commission [CEC] 2009. California Commercial End Use Survey. Available: http://capabilities.itron.com/CeusWeb/Chart.aspx; California Energy Commission [CEC] 2000. California Energy Demand Staff Report P200-00-002

2 California Energy Commission [CEC] 2007. California Energy - Water Relationship Staff Report CEC-999-2007-008. Available: http://www.energy.ca.gov/2007publications/CEC-999-2007-008/CEC-999-2007-008.PDF

Bay Area Air Quality Management District Greenhouse Gas Model 2010

Appendix Horton Plaza Revitalization GHG Calculations

Mobile-Source Emissions (Source: URBEMIS)

Operational Year 2013	531.77	tons	0.907	MT/ton	**482** MT/yr

Landscaping Emissions (Source: URBEMIS)

Operational Year 2013	1.54	tons	0.907	MT/ton	**1** MT/yr

Electricity

Total KWh	MWh	Region	Emission Factor (lb CO2/MWh)	GWP	Emission Factor (lb CH4/MWh)	GWP	Emission Factor (lb N2O/MWh)	GWP	Total CO2e (Metric Tons/year)
116,100	116	CALI	739.05	1	0.0302	23	0.0081	296	**39**

Natural Gas

Total Therms	MMBTU	Region	Emission Factor (kg CO2/MMBTU)	GWP	Emission Factor (kg CH4/MMBTU)	GWP	Emission Factor (kg N2O/MMBTU)	GWP	Total CO2e (Metric Tons/year)
5,987	599	California	53.06	1	0.005	23	0.0001	296	**32**

Indirect Emissions from Municipal Water Use (Includes conveyance, treatment, distribution, and wastewater treatment)[2]

KWh/million gallons/year*	KWh/acre-ft/year	Gallons/Year	Total KWh	MWh	Region	Emission Factor (lb CO2/MWh)	GWP	Emission Factor (lb CH4/MWh)	GWP	Emission Factor (lb N2O/MWh)	GWP	Total CO2e (Metric Tons/year)
12,700	4138	2,433,683	30,908	31	CALI	739.05	1	0.0302	23	0.0081	296	**10**

*for Southern California

	Total CO2e (Metric
Emissions from Waste Generation	**3** Tons/year)

Total Direct & Indirect Emissions (MT CO2e/yr)	**567**

Sources:

1 California Climate Action Registry [CCAR] General Reporting Protocol v 3.1 January 2009

California Energy Commission [CEC] 2009. California Commercial End Use Survey. Available: http://capabilities.itron.com/CeusWeb/Chart.aspx; California Energy Commission [CEC] 2000. California Energy Demand Staff Report P200-00-002

2 California Energy Commission [CEC] 2007. California Energy - Water Relationship Staff Report CEC-999-2007-008. Available: http://www.energy.ca.gov/2007publications/CEC-999-2007-008/CEC-999-2007-008.PDF

Bay Area Air Quality Management District Greenhouse Gas Model 2010

GHG Emissions from Waste Generation

Landfilled Waste 400 tons/yr

Residential Waste Characterization*		Landfilled tons	MTCO2e
Mixed Garbage	5.3%	21	7.84
PCs	0.3%	1	0.05
Glass	4.0%	16	0.64
Ferrous (iron/steel)	4.6%	18	0.74
Plastic	8.8%	35	1.41
Organics (food waste)	45.0%	180	122.33
Mixed Paper	27.5%	110	41.78
C&D (Construction/Demolition waste)	4.5%	18	(1.98)
Total	100.0%	400	172.80

*commercial waste characterization assumed to be similar.

(Version 9.01, 3/09)

http://www.epa.gov/climatechange/wycd/waste/calculators/Warm_home.html#click

The emission factors presented in this table reflect national average landfill gas recovery practices and transportation distances.

Greenhouse Gas Emission Factors (MTCO2E per short ton)

Material	Source Reduction	Recycling	Landfilling, National Average	Landfilling, No Recovery	Landfilling, Flaring	Landfilling, Energy Recovery	Combustion	Composting
Aluminum Cans	-8.29	-13.67	0.04	0.04	0.04	0.04	0.06	N/A
Steel Cans	-3.19	-1.8	0.04	0.04	0.04	0.04	-1.54	N/A
Copper Wire	-7.41	-4.97	0.04	0.04	0.04	0.04	0.06	N/A
Glass	-0.58	-0.28	0.04	0.04	0.04	0.04	0.05	N/A
HDPE	-1.8	-1.4	0.04	0.04	0.04	0.04	0.91	N/A
LDPE	-2.29	-1.71	0.04	0.04	0.04	0.04	0.91	N/A
PET	-2.11	-1.55	0.04	0.04	0.04	0.04	1.07	N/A
Corrugated Box	-5.59	-3.11	0.33	1.49	-0.22	-0.46	-0.66	N/A
Magazines	-8.66	-3.07	-0.33	0.14	-0.55	-0.65	-0.48	N/A
Newspaper	-4.89	-2.8	-0.89	-0.48	-1.09	-1.18	-0.75	N/A
Office Paper	-8.01	-2.85	1.76	3.71	0.84	0.42	-0.63	N/A
Phonebook	-6.34	-2.66	-0.89	-0.48	-1.09	-1.18	-0.75	N/A
Textbook	-9.18	-3.11	1.76	3.71	0.84	0.42	-0.63	N/A
Dimensional Lumber	-2.02	-2.46	-0.52	0.07	-0.81	-0.93	-0.79	N/A
Fiberboard	-2.22	-2.47	-0.52	0.07	-0.81	-0.93	-0.79	N/A
Food Waste	N/A	N/A	0.68	1.43	0.33	0.16	-0.18	-0.2
Yard Waste	N/A	N/A	-0.34	0.06	-0.54	-0.62	-0.22	-0.2
Grass	N/A	N/A	0.15	0.51	-0.02	-0.1	-0.22	-0.2
Leaves	N/A	N/A	-0.58	-0.3	-0.72	-0.78	-0.22	-0.2
Branches	N/A	N/A	-0.52	0.07	-0.81	-0.93	-0.22	-0.2
Mixed Paper Board	N/A	-3.54	0.27	1.35	-0.24	-0.47	-0.66	N/A
Mixed Paper - Residential	N/A	-3.54	0.19	1.21	-0.3	-0.52	-0.66	N/A
Mixed Paper - Office	N/A	-3.42	0.38	1.43	-0.12	-0.34	-0.6	N/A
Mixed Metals	N/A	-5.26	0.04	0.04	0.04	0.04	-1.07	N/A
Mixed Plastics	N/A	-1.52	0.04	0.04	0.04	0.04	0.97	N/A
Mixed Recyclables	N/A	-2.88	0.08	0.93	-0.3	-0.47	-0.6	N/A
Mixed Organics	N/A	N/A	0.15	0.59	-0.24	-0.37	-0.2	-0.2
MixedMSW	N/A	N/A	0.37	1.34	-0.1	-0.31	-0.13	N/A
Carpets	-4.03	-7.23	0.04	0.04	0.04	0.04	0.37	N/A
PCs	-55.97	-2.27	0.04	0.04	0.04	0.04	-0.2	N/A
ClayBricks	-0.29	N/A	0.04	0.04	0.04	0.04	N/A	N/A
Aggregate	N/A	-0.01	0.04	0.04	0.04	0.04	N/A	N/A
FlyAsh	N/A	-0.87	0.04	0.04	0.04	0.04	N/A	N/A
Tires	-4.01	-1.84	0.04	0.04	0.04	0.04	0.09	N/A

GHG Emissions from Waste Generation

Landfilled Waste 537 tons/yr

Residential Waste Characterization*		Landfilled tons	**MTCO2e**
Mixed Garbage	5.3%	28	10.54
PCs	0.3%	2	0.06
Glass	4.0%	21	0.86
Ferrous (iron/steel)	4.6%	25	0.99
Plastic	8.8%	47	1.89
Organics (food waste)	45.0%	242	164.45
Mixed Paper	27.5%	148	56.16
C&D (Construction/Demolition waste)	4.5%	24	(2.66)
Total	**100.0%**	**537**	**232.29**

*commercial waste characterization assumed to be similar.

(Version 9.01, 3/09)

http://www.epa.gov/climatechange/wycd/waste/calculators/Warm_home.html#click

The emission factors presented in this table reflect national average landfill gas recovery practices and transportation distances.

Greenhouse Gas Emission Factors (MTCO2E per short ton)

Material	Source Reduction	Recycling	Landfilling, National Average	Landfilling, No Recovery	Landfilling, Flaring	Landfilling, Energy Recovery	Combustion	Composting
Aluminum Cans	-8.29	-13.67	0.04	0.04	0.04	0.04	0.06	N/A
Steel Cans	-3.19	-1.8	0.04	0.04	0.04	0.04	-1.54	N/A
Copper Wire	-7.41	-4.97	0.04	0.04	0.04	0.04	0.06	N/A
Glass	-0.58	-0.28	0.04	0.04	0.04	0.04	0.05	N/A
HDPE	-1.8	-1.4	0.04	0.04	0.04	0.04	0.91	N/A
LDPE	-2.29	-1.71	0.04	0.04	0.04	0.04	0.91	N/A
PET	-2.11	-1.55	0.04	0.04	0.04	0.04	1.07	N/A
Corrugated Box	-5.59	-3.11	0.33	1.49	-0.22	-0.46	-0.66	N/A
Magazines	-8.66	-3.07	-0.33	0.14	-0.55	-0.65	-0.48	N/A
Newspaper	-4.89	-2.8	-0.89	-0.48	-1.09	-1.18	-0.75	N/A
Office Paper	-8.01	-2.85	1.76	3.71	0.84	0.42	-0.63	N/A
Phonebook	-6.34	-2.66	-0.89	-0.48	-1.09	-1.18	-0.75	N/A
Textbook	-9.18	-3.11	1.76	3.71	0.84	0.42	-0.63	N/A
Dimensional Lumber	-2.02	-2.46	-0.52	0.07	-0.81	-0.93	-0.79	N/A
Fiberboard	-2.22	-2.47	-0.52	0.07	-0.81	-0.93	-0.79	N/A
Food Waste	N/A	N/A	0.68	1.43	0.33	0.16	-0.18	-0.2
Yard Waste	N/A	N/A	-0.34	0.06	-0.54	-0.62	-0.22	-0.2
Grass	N/A	N/A	0.15	0.51	-0.02	-0.1	-0.22	-0.2
Leaves	N/A	N/A	-0.58	-0.3	-0.72	-0.78	-0.22	-0.2
Branches	N/A	N/A	-0.52	0.07	-0.81	-0.93	-0.22	-0.2
Mixed Paper Board	N/A	-3.54	0.27	1.35	-0.24	-0.47	-0.66	N/A
Mixed Paper - Residential	N/A	-3.54	0.19	1.21	-0.3	-0.52	-0.66	N/A
Mixed Paper - Office	N/A	-3.42	0.38	1.43	-0.12	-0.34	-0.6	N/A
Mixed Metals	N/A	-5.26	0.04	0.04	0.04	0.04	-1.07	N/A
Mixed Plastics	N/A	-1.52	0.04	0.04	0.04	0.04	0.97	N/A
Mixed Recyclables	N/A	-2.88	0.08	0.93	-0.3	-0.47	-0.6	N/A
Mixed Organics	N/A	N/A	0.15	0.59	-0.24	-0.37	-0.2	-0.2
MixedMSW	N/A	N/A	0.37	1.34	-0.1	-0.31	-0.13	N/A
Carpets	-4.03	-7.23	0.04	0.04	0.04	0.04	0.37	N/A
PCs	-55.97	-2.27	0.04	0.04	0.04	0.04	-0.2	N/A
ClayBricks	-0.29	N/A	0.04	0.04	0.04	0.04	N/A	N/A
Aggregate	N/A	-0.01	0.04	0.04	0.04	0.04	N/A	N/A
FlyAsh	N/A	-0.87	0.04	0.04	0.04	0.04	N/A	N/A
Tires	-4.01	-1.84	0.04	0.04	0.04	0.04	0.09	N/A

GHG Emissions from Waste Generation

Landfilled Waste 8 tons/yr

Residential Waste Characterization*		Landfilled tons	MTCO2e
Mixed Garbage	5.3%	0	0.16
PCs	0.3%	0	0.00
Glass	4.0%	0	0.01
Ferrous (iron/steel)	4.6%	0	0.01
Plastic	8.8%	1	0.03
Organics (food waste)	45.0%	4	2.45
Mixed Paper	27.5%	2	0.84
C&D (Construction/Demolition waste)	4.5%	0	(0.04)
Total	**100.0%**	8	3.46

*commercial waste characterization assumed to be similar.

(Version 9.01, 3/09)

http://www.epa.gov/climatechange/wycd/waste/calculators/Warm_home.html#click

The emission factors presented in this table reflect national average landfill gas recovery practices and transportation distances.

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Copper Wire	-7.41	-4.97	0.04	0.04	0.04	0.04	0.06	N/A
Glass	-0.58	-0.28	0.04	0.04	0.04	0.04	0.05	N/A
HDPE	-1.8	-1.4	0.04	0.04	0.04	0.04	0.91	N/A
LDPE	-2.29	-1.71	0.04	0.04	0.04	0.04	0.91	N/A
PET	-2.11	-1.55	0.04	0.04	0.04	0.04	1.07	N/A
Corrugated Box	-5.59	-3.11	0.33	1.49	-0.22	-0.46	-0.66	N/A
Magazines	-8.66	-3.07	-0.33	0.14	-0.55	-0.65	-0.48	N/A
Newspaper	-4.89	-2.8	-0.89	-0.48	-1.09	-1.18	-0.75	N/A
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Dimensional Lumber	-2.02	-2.46	-0.52	0.07	-0.81	-0.93	-0.79	N/A
Fiberboard	-2.22	-2.47	-0.52	0.07	-0.81	-0.93	-0.79	N/A
Food Waste	N/A	N/A	0.68	1.43	0.33	0.16	-0.18	-0.2
Yard Waste	N/A	N/A	-0.34	0.06	-0.54	-0.62	-0.22	-0.2
Grass	N/A	N/A	0.15	0.51	-0.02	-0.1	-0.22	-0.2
Leaves	N/A	N/A	-0.58	-0.3	-0.72	-0.78	-0.22	-0.2
Branches	N/A	N/A	-0.52	0.07	-0.81	-0.93	-0.22	-0.2
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Mixed Metals	N/A	-5.26	0.04	0.04	0.04	0.04	-1.07	N/A
Mixed Plastics	N/A	-1.52	0.04	0.04	0.04	0.04	0.97	N/A
Mixed Recyclables	N/A	-2.88	0.08	0.93	-0.3	-0.47	-0.6	N/A
Mixed Organics	N/A	N/A	0.15	0.59	-0.24	-0.37	-0.2	-0.2
MixedMSW	N/A	N/A	0.37	1.34	-0.1	-0.31	-0.13	N/A
Carpets	-4.03	-7.23	0.04	0.04	0.04	0.04	0.37	N/A
PCs	-55.97	-2.27	0.04	0.04	0.04	0.04	-0.2	N/A
ClayBricks	-0.29	N/A	0.04	0.04	0.04	0.04	N/A	N/A
Aggregate	N/A	-0.01	0.04	0.04	0.04	0.04	N/A	N/A
FlyAsh	N/A	-0.87	0.04	0.04	0.04	0.04	N/A	N/A
Tires	-4.01	-1.84	0.04	0.04	0.04	0.04	0.09	N/A

APPENDIX H

Cultural Resources Test Plan

CULTURAL RESOURCE TEST PLAN FOR THE HORTON PLAZA PARK IMPROVEMENT PROJECT

CITY OF SAN DIEGO

Prepared for:

City of San Diego
Department of Development Services
1222 1st Avenue
San Diego, California 92101

And:

Center City Development Corporation
401 B Street, Suite 400
San Diego, California 92101

Prepared by:

Brian F. Smith, Principal Investigator
Signature: _____
Brian F. Smith and Associates, Inc.
14010 Poway Road, Suite A
Poway, California 92064

June 18, 2012

National Archaeological Data Base Information

Authors: Brian F. Smith and Tracy A. Stropes

Consulting Firm: Brian F. Smith and Associates, Inc.
14010 Poway Road, Suite A
Poway, California 92064

Report Date: June 18, 2012

Report Title: Cultural Resource Test Plan for the Horton Plaza Park Improvement Project

Submitted to: City of San Diego
Development Services Department
1222 1st Avenue
San Diego, California 92101

Submitted by: Brian F. Smith and Associates, Inc.
14010 Poway Road, Suite A
Poway, California 92064

Assessor's Parcel Numbers: 533-610-17

USGS Quadrangle: Township 17 South, Range 3 West of the *Point Loma*, California Quadrangle

Study Area: Approximately 20,000 square feet

Key Words: Archaeological test; historic; Horton Plaza; City of San Diego.

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1.0 MANAGEMENT SUMMARY/ABSTRACT

Brian F. Smith and Associates, Inc. (BFSA) has been retained by the Center City Development Corporation (CCDC) to provide historical and archaeological consulting services for the Horton Plaza Improvement Project located at the southwest corner of the intersection of Broadway and 4th Avenue in the City of San Diego, California (Figures 1.0–1, 1.0–2, and 1.0–3). The project area is also identified as Assessor's Parcel Number (APN) 533-610-17. The current scope for this test plan has been prepared to satisfy the requirement for environmental review of the Area of Potential Effect (APE) prior to the granting of a demolition and grading permit for the improvement of portions of the approximately 20,000-square-foot property for the improvement of portions of the historic Horton Plaza Park. The environmental review will be conducted in accordance with the Centre City Planned District Ordinance (PDO) and Downtown Community Plan Final Environmental Impact Report (FEIR) Mitigation Monitoring and Reporting Program (MMRP).

In accordance with the requirements for projects in the downtown area and following City of San Diego environmental guidelines, BFSA was requested to submit a test plan to address the potential for cultural resources within the project area. Should this effort result in the identification of significant resources, BFSA will provide measures to mitigate potential impacts generated by demolition and construction activities.

Historically, this property was developed by Alonzo Erastus Horton who had the land cleared in 1870 to build his Horton House hotel north of Broadway between Third and Fourth Streets. The space in front of the hotel (Horton Plaza Park) also was cleared which became a place for public gatherings. The plaza has evolved since that time, developing into its present state by the 1930s. This test plan will discuss the tasks to be completed as part of the assessment of cultural resources within the Horton Plaza Park Project. The tasks will essentially address the requirements of the City related to development projects in the downtown area, and will include completion of a site testing and resource evaluation program, and presentation of mitigation measures necessary to reduce potential impacts to any cultural resources that may exist.



Figure 1.0–1

General Location Map

The Horton Plaza Improvement Project

USGS Santa Ana and San Diego (1:250,000 series)

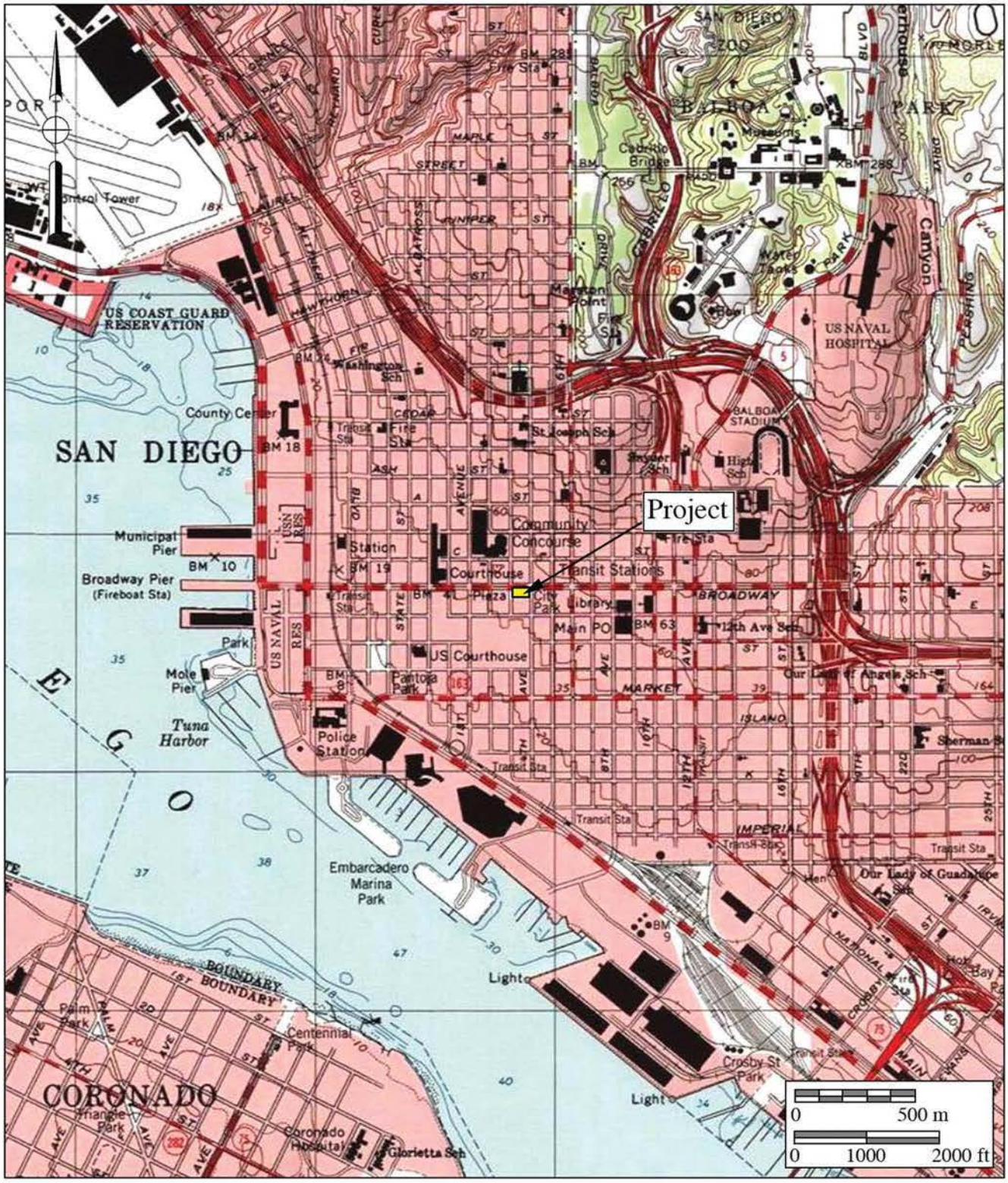


Figure 1.0–2

Project Location Map

The Horton Plaza Improvement Project

USGS Point Loma Quadrangle (7.5 minute series)

Figure 1.0–3

Project Location Map

The Horton Plaza Improvement Project

Shown on The City of San Diego 1" to 800' Scale Engineering Map

2.0 INTRODUCTION

The cultural resource test plan for the Horton Plaza Park Project was required by the City of San Diego in conformance with Section 21083.2 of the California Public Resources Code and the California Environmental Quality Act (CEQA), and was prepared in accordance with the Centre City PDO and Downtown Community Plan FEIR MMRP requirements, and the City's Historical Resources Guidelines. The proposed project consists of improvements related to the restoration of the existing historic park and rehabilitation of the existing historic fountain. The final goal of the overall project is to create a vital new urban open space and reactivate a historically significant community asset for the benefit of all San Diegans and visitors. Currently the APE is covered by existing structures (the fountain and planters) as well as cemented pavers. (Plate 2.0–1, Figure 2.0–1).



Plate 2.0–1: Aerial overview of current development at Horton Plaza Park.

An archaeological survey was not conducted prior to the test plan submittal, as the entire block is covered by hardscape. In lieu of a survey and in light of the historic significance of this location, a test program is considered to be an appropriate method to evaluate the potential for cultural resources for this project.

Preliminary background research for the property was conducted to evaluate the potential of the property to contain subsurface historic resources. Historic background studies indicate that the property has been continuously used by the public for well over a century. Prior to the clearing of the park area by Horton in 1870, little is known about the presence of any previous historic developments or prehistoric sites at the Horton Plaza Park location. It is clear however that the current configuration of the park has changed little since the 1930s with the exception of general municipal upkeep of the property. This test plan will discuss the tasks to be completed to search for buried cultural resources within the project boundary. The phases will essentially address the requirements of the City related to development projects in the downtown area. Testing will include controlled excavations by archaeologists within the planter areas to determine if cultural resources are present, and if so, evaluating these resources for significance in accordance with the Downtown Community Plan FEIR MMRP, CEQA, and City guidelines.

The test plan will be conducted prior to disturbance or construction improvements. This test plan does not directly affect the MMRP requirements for archaeological monitoring during

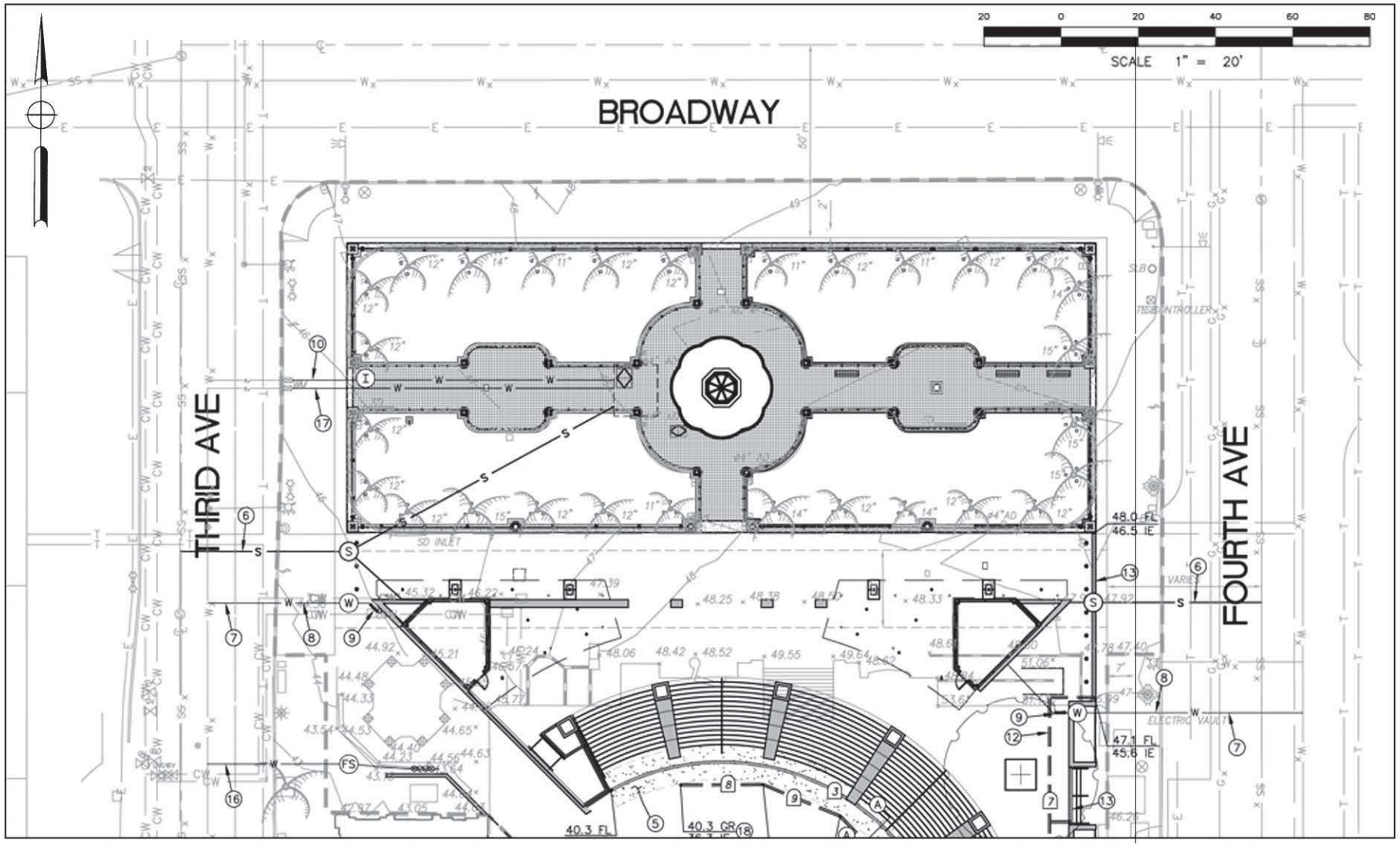


Figure 2.0–1

Project Development Map

The Horton Plaza Improvement Project

USGS Point Loma Quadrangle (7.5 minute series)

earthwork; however, if the archaeological testing does document significant cultural deposits, the test plan report may present mitigation measures to reduce adverse impacts.

3.0 SETTING

The project setting includes both physical and biological contexts of the proposed project, as well as the cultural setting of prehistoric and historic human activities in the general area.

3.1 Natural Setting

The project is situated on the northeast side of the downtown area of San Diego, California. The project lies on stratified sediments that includes the Linda Vista Formation, the San Diego Formation, and the Bay Point Formation, which is in turn underlain by an unnamed middle Pleistocene marine unit. All of the above are fossiliferous sedimentary deposits of Pleistocene age (Kennedy 2001; Kennedy 1975; Deméré and Walsh 1993), although the Linda Vista is the least productive in terms of fossils per cubic yard.

3.2 Cultural Setting

3.2.1 Prehistory of the Project Area

In prehistoric times, both the Archaic and Late Prehistoric people used this area. By Late Prehistoric times, a small wetland had developed where Switzer Creek entered San Diego Bay (about 10th Avenue). This wetland, as well as the marine resources available in the bay, made up a rich and varied food resource that was less subject to the debilitating effects of limited seasonal rainfall than were the inland areas of San Diego. At the time of the first European colonization (1769) and for a period of time thereafter, Native American people used resources of the bay and adjacent wetland areas (Gallegos and Kyle 1988). Early urban development of the area precluded any accurate assessment of prehistoric human use of this part of San Diego, but recent studies around the bay present a glimpse of what the settlement pattern might have been (Carrico 1991; Smith 1993).

The cultures that have been identified in the general vicinity of the project consist of a possible Paleo-Indian manifestation of the San Dieguito Complex, the Archaic and Early Milling Stone horizons represented by the La Jolla Complex, and the Late Prehistoric Kumeyaay culture. The area was used for ranching and farming following the Hispanic intrusion into the region and extending into the historic period. A brief discussion of the cultural elements in the project area is provided in the following subsections.

3.2.2 Paleoenvironment

Because of the close relationship between prehistoric settlement and subsistence patterns and the environment, it is necessary to understand the setting in which these systems operated. At the end of the final period of glaciation, approximately 11,000 to 10,000 years before the present (YBP), the sea level was considerably lower than it is now; the coastline at that time would have been two to two and one-half miles west of its present location (Smith and Moriarty 1985a, 1985b). At approximately 7,000 YBP, the sea level rose rapidly, filling in many coastal

canyons that had been dry during the glacial period. The period between 7,000 and 4,000 YBP was characterized by conditions that were drier and warmer than previously, followed by a cooler, moister environment, similar to the present-day climate (Robbins-Wade 1990). Changes in sea level and coastal topography are often manifested in archaeological sites through the types of shellfish that were utilized by prehistoric groups. Different species of shellfish prefer certain types of environments, and dated sites that contain shellfish remains reflect the setting that was exploited by the prehistoric occupants.

Unfortunately, pollen studies have not been conducted for this area of San Diego; however, studies in other areas of southern California, such as Santa Barbara, indicate that the coastal plains supported a pine forest between approximately 12,000 and 8,000 YBP (Robbins-Wade 1990). After 8,000 YBP, this environment was replaced by more open habitats, which supported oak and non-arboreal communities. The coastal sage scrub and chaparral environments of today appear to have become dominant after 2,200 YBP (Robbins-Wade 1990).

3.2.3 Prehistory

In general, the prehistoric record of San Diego County has been documented in many reports and studies, several of which represent the earliest scientific works concerning the recognition and interpretation of the archaeological manifestations present in this region. Geographer Malcolm Rogers initiated the recordation of sites in the area during the 1920s and 1930s, using his field notes to construct the first cultural sequences based upon artifact assemblages and stratigraphy (Rogers 1966). Subsequent scholars expanded the information gathered by Rogers and offered more academic interpretations of the prehistoric record. Moriarty (1966, 1967, 1969), Warren (1964, 1966), and True (1958, 1966) all produced seminal works that critically defined the various prehistoric cultural phenomena present in this region (Moratto 1984). Additional studies have sought to further refine these earlier works (Cardenas 1986; Moratto 1984; Moriarty 1966, 1967; True 1970, 1980, 1986; True and Beemer 1982; True and Pankey 1985; Waugh 1986). In sharp contrast, the current trend in San Diego prehistory has also resulted in a revisionist group that rejects the established cultural historical sequence for San Diego. This revisionist group (Warren et al. 1998) has replaced the concepts of La Jolla, San Dieguito, and all of their other manifestations with an extensive, all-encompassing, chronologically undifferentiated cultural unit that ranges from the initial occupation of southern California to around 1,000 A.D. (Bull 1983, 1987; Ezell 1983, 1987; Gallegos 1987; Kyle et al. 1990; Stropes 2007). For the present study, the prehistory of the region is divided into four major periods including: Early Man, Paleo-Indian, Early Archaic, and Late Prehistoric.

Early Man Period (Prior to 8,500 B.C.)

At the present time, there has been no concrete archaeological evidence to support the occupation of San Diego County prior to 10,500 YBP. Some archaeologists, such as Carter (1957, 1980) and Minshall (1976), have been proponents of Native American occupation of the

region as early 100,000 years ago. However, their evidence for such claims is sparse at best and has lost much support over the years as more precise dating techniques have become available for skeletal remains thought to represent early man in San Diego. In addition, many of the "artifacts" initially identified as products of early man in the region have since been rejected as natural products of geologic activity. Some of the local proposed Early Man Period sites include the Texas Street, Buchanan Canyon and Brown sites, as well as Mission Valley (San Diego River Valley), Del Mar and La Jolla (Bada et al. 1974; Carter 1957, 1980; Minshall 1976, 1989; Moriarty and Minshall 1972; Reeves 1985; Reeves et al. 1986).

Paleo-Indian Period (8,500–6,000 B.C.)

For the region, it is generally accepted that the earliest identifiable culture in the archaeological record is represented by the material remains of the Paleo-Indian Period San Dieguito Complex. The San Dieguito Complex was thought to represent the remains of a group of people who occupied sites in this region between 10,500 and 8,000 YBP, and who were related to or contemporaneous with groups in the Great Basin. As of yet, no absolute dates have been forthcoming to support the great age attributed to this cultural phenomenon. The artifacts recovered from San Dieguito Complex sites duplicate the typology attributed to the Western Pluvial Lakes Tradition (Moratto 1984; Davis et al. 1969). These artifacts generally include scrapers, choppers, large bifaces, and large projectile points, with few milling tools. Tools recovered from San Dieguito Complex sites, along with the general pattern of their site locations, led early researchers to believe that the San Dieguito Complex people were a wandering, hunting, and gathering society (Moriarty 1969; Rogers 1966).

The San Dieguito Complex is the least understood of the cultures that have inhabited the San Diego County region. This is because of an overall lack of stratigraphic information and/or datable materials recovered from sites identified as San Dieguito Complex. Currently, controversy exists among researchers regarding the relationship of the San Dieguito Complex and the subsequent cultural manifestation in the area, the La Jolla Complex. Firm evidence has not been recovered to indicate whether the San Dieguito Complex "evolved" into the La Jolla Complex, or if the people of the La Jolla Complex moved into the area and assimilated with the people of the San Dieguito Complex, or if the San Dieguito Complex people retreated from the area because of environmental or cultural pressures.

Early Archaic Period (6000 B.C.–0 A.D.)

Based on evidence suggesting climatic shifts and archaeologically observable changes in subsistence strategies, a new cultural pattern is believed to have emerged in the San Diego region around 6000 B.C. This Archaic Period pattern is believed by archaeologists to have evolved from or replaced the San Dieguito Complex culture resulting in a pattern referred to as the Encinitas Tradition. In San Diego, the Encinitas Tradition is believed to be represented by the coastal La Jolla Complex and its inland manifestation, the Pauma Complex. The La Jolla

Complex is best recognized for its pattern of shell middens and grinding tools closely associated with marine resources and flexed burials (Shumway et al. 1961; Smith and Moriarty 1985). Increasing numbers of inland sites have been identified as dating to the Archaic Period and have focused on terrestrial subsistence (Cardenas 1986; Smith 1996; Raven-Jennings and Smith 1999a and 1999b).

The tool typology of the La Jolla Complex displays a wide range of sophistication in the lithic manufacturing techniques used to create the tools found at their sites. Scrapers, the dominant flaked tool type, were created either by splitting cobbles or by finely flaking quarried material. Evidence suggests that after about 8,200 YBP, milling tools begin to appear in La Jolla Complex sites. Inland sites of the Encinitas Tradition (Pauma Complex) exhibit a reduced quantity of marine-related food refuse and contain large quantities of milling tools and food bone. The lithic tool assemblage shifts slightly to encompass the procurement and processing of terrestrial resources, suggesting seasonal migration from the coast to the inland valleys (Smith 1996). At the present time, the transition from the Archaic Period to the Late Prehistoric Period is not well understood. Many questions remain concerning cultural transformation between periods, possibilities of ethnic replacement, and/or a possible hiatus from the western portion of the County.

Late Prehistoric Period (0 A.D.–1769)

The transition into the Late Prehistoric Period in the project area is primarily represented by a marked change in archaeological patterning known as the Yuman Tradition. This tradition is primarily represented by the Cuyamaca Complex, which is believed to have derived from the mountains of southern San Diego County. The people of the Cuyamaca Complex are considered as ancestral to the ethnohistoricKumeyaay (Diegueño). Although several archaeologists consider the local Native American tribes to be relatively latecomers, the traditional stories and histories passed down through oral tradition by the local Native American groups both presently and ethnographically speak to their presence here as since the time of creation.

The Kumeyaay Native Americans were a seasonal hunting and gathering people, with cultural elements that were very distinct from the La Jolla Complex people. Noted variations in material culture include cremation, the use of bows and arrows, and adaptation to the use of the acorn as a main food staple (Moratto 1984). Along the coast, the Kumeyaay made use of marine resources by fishing and collecting shellfish for food. Plant food resources (including acorns) that were seasonally available and game were sources of nourishment for the Kumeyaay. By far the most important food resource for these people was the acorn. The acorn represented a storable surplus, which in turn allowed for seasonal sedentism and its attendant expansion of social phenomena.

Firm evidence has not been recovered to indicate whether the La Jolla Complex people were present when the Kumeyaay Native Americans migrated into the coastal zone. However, stratigraphic information recovered from site CA-SDI-4609 in Sorrento Valley may suggest a

hiatus of 650 ± 100 years between the occupation of the coastal area by the La Jolla Complex (1,730 ± 75 YBP is the youngest date for the La Jolla Complex inhabitants at CA-SDI-4609) and Late Prehistoric cultures (Smith and Moriarty 1983). More recently, a reevaluation of two prone burials at the Spindrift site excavated by Moriarty (1965) and radiocarbon dates of a pre-ceramic phase of Yuman occupation near the San Diego suburb of Santee suggests a comingling of the latest La Jolla Complex inhabitants and the earliest Yuman inhabitants about 2,000 YBP (Kyle and Gallegos 1993).

3.2.4 History

Exploration Period (1530–1769)

The historic period around San Diego Bay began with the landing of Juan Rodríguez Cabrillo and his men in 1542 (Chapman 1925). Sixty years after the Cabrillo expeditions (1602-1603), Sebastian Vizcaíno made an extensive and thorough exploration of the Pacific Coast. Although the voyage did not extend beyond the northern limits of the Cabrillo track, Vizcaíno had the most lasting effect on the nomenclature of the coast. Many of the names he gave to places have survived, whereas nearly every one of Cabrillo's has faded from use. Cabrillo gave the name of "San Miguel" to the first port at which he stopped in what is now the United States; sixty years later, Vizcaíno changed it to "San Diego" (Rolle 1969).

Spanish Colonial Period (1769–1821)

The Spanish occupation of the claimed territory of Alta California took place during the reign of King Carlos III of Spain (Engelhardt 1920). José de Gálvez, a powerful representative of the king in Mexico, conceived of the plan to colonize Alta California and thereby secure the area for the Spanish Crown (Rolle 1969). The effort involved both a military and religious contingent, where the overall intent of establishing forts and missions was to gain control of the land and the native inhabitants through conversion. Actual colonization of the San Diego area began on July 16, 1769 when a Spanish exploration party, commanded by Gaspar de Portolá (with Father Junípero Serra in charge of religious conversion of the native populations), arrived by the overland route to San Diego to secure California for the Spanish Crown (Palou 1926). The natural attraction of the harbor at San Diego and the establishment of a military presence in the area solidified the importance of San Diego to the Spanish colonization of the region and the growth of the civilian population. Missions were constructed from San Diego to as far north as San Francisco. The mission locations were based on a number of important territorial, military, and religious considerations. Grants of land were made to persons who applied, but many tracts reverted back to the government for lack of use. As an extension of territorial control by the Spanish Empire, each mission was placed so as to command as much territory and as large a population as possible. While primary access to California during the Spanish Period was by sea, the route of El Camino Real served as the land route for transportation, commercial, and military activities within the colony. This route was considered to be the most direct path

between the missions (Rolle 1969; Caughey 1970). As increasing numbers of Spanish and Mexican peoples, as well as the later Americans during the Gold Rush, settled in the area, the Native American populations diminished as they were displaced or decimated by disease (Carrico and Taylor 1983).

Mexican Period (1821–1846)

Father Miguel Hidalgo y Costilla and a group of Native American followers began a revolt against Spanish rule on September 16, 1810. Hidalgo did not succeed in the fight against the Spanish, and ultimately was executed. However, the revolt continued and the Spanish were finally defeated in 1821. Mexican Independence Day is celebrated on September 16 of each year in honor of Father Hidalgo's bravery. The revolution had repercussions in the northern territories as well, and by 1834 all of the mission lands in Alta California had been removed from the control of the Franciscan Order under the Acts of Secularization. Without proper maintenance, the missions quickly began to disintegrate. After 1836, missionaries ceased to make regular visits to the outlying Native American communities to minister their needs (Engelhardt 1920). Large tracts of land continued to be granted to persons who applied for them or who had gained favor with the Mexican government. Grants of land were also made to settle government debts. The Mexican government was also called upon to reaffirm some older Spanish land grants shortly before the Mexican-American War of 1846 (Moyer 1969).

Anglo-American Period (1846–Present)

California was invaded by United States troops during the Mexican-American War of 1846-1848. The acquisition of strategic Pacific ports and California land was one of the principal objectives of the war (Price 1967). At the time, the inhabitants of California were practically defenseless, and they quickly surrendered to the United States Navy in July 1847 (Bancroft 1886).

The cattle ranchers of the "counties" of southern California had prospered during the cattle boom of the early 1850s. They were able to "reap windfall profit…pay taxes and lawyer's bills…and generally live according to custom" (Pitt 1966). However, cattle ranching soon declined, contributing to the expansion of agriculture. With the passage of the "No Fence Act," San Diego's economy shifted from stock raising to farming (Robinson 1948). The act allowed for the expansion of unfenced farms, which was crucial in an area where fencing material was practically unavailable. Five years after its passage, most of the arable lands in San Diego County had been patented as either ranchos or homesteads, and growing grain crops replaced raising cattle in many of the County's inland valleys (Blick 1976; Elliott 1883).

By 1870, farmers had learned to dry-farm and were coping with some of the peculiarities of San Diego County's climate (*San Diego Union*, February 6, 1868; Van Dyke 1886). Between 1869 and 1871, the amount of cultivated acreage in the County rose from less than 5,000 acres to more than 20,000 (*San Diego Union*, January 2, 1872). Of course, droughts continued to hinder

the development of agriculture (Crouch 1915; *San Diego Union*, November 10, 1870; Shipek 1977). Large-scale farming in San Diego County was limited by a lack of water and the small size of arable valleys. The small urban population and poor roads also restricted commercial crop growing. Meanwhile, cattle continued to be grazed in parts of inland San Diego County. In the Otay Mesa area, for example, the "No Fence Act" had little effect on cattle farmers because ranches were spaced far apart and natural ridges kept the cattle out of nearby growing crops (Gordinier 1966).

During the first two decades of the twentieth century, the population of San Diego County continued to grow. The population of the inland portion of the County declined during the 1890s, but between 1900 and 1910, it rose by about 70 percent. The pioneering efforts were over, the railroads had broken the relative isolation of southern California, and life in San Diego County became similar to other communities throughout the west. After World War I, the history of San Diego County was primarily determined by the growth of San Diego Bay. In 1919, the United States Navy decided to make the bay the home base for the Pacific Fleet (Pourade 1967). During the 1920s, the aircraft industry also established itself at the bay (Heiges 1976). The establishment of these industries led to the growth of the County as a whole; however, most of the civilian population growth occurred in the coastal areas in the northern portion of the County where the population almost tripled between 1920 and 1930. During this time period, the history of inland San Diego County was subsidiary to that of the City of San Diego, which had become a Navy center and industrial city (Heiges 1976). In inland San Diego County, agriculture became specialized, and recreational areas were established in the mountain and desert areas. Just before World War II, urbanization began to spread to the inland parts of the County.

3.2.5 General History of the City of San Diego

Juan Rodriguez Cabrillo, commanding two Spanish exploring vessels on their way north from Mexico, arrived in the area known then as Alta (or 'Upper') California on September 28, 1542. Cabrillo named the harbor they arrived in "San Miguel" (Bolton 1959). The next arrival into the San Diego area by Europeans was not for another sixty years, when an expedition commanded by Sebastian Vizcaíno made an extensive and thorough exploration of the Pacific Coast and arrived at the bay in November of 1602 (Engstrand 1980). It was during this visit that Vizcaíno renamed the bay "San Diego" (Rolle 1969). Cabrillo's voyage gave cartographers the information they needed to begin defining the western shores of the unknown land located north of Mexico. Subsequent voyages added details to Cabrillo's information that, in time, permitted mapmakers to accurately depict the west coast.

For the next 167 years, following Vizcaíno's voyage, the Spanish made no other expeditions to Alta California. The Spanish eventually developed a plan for the occupation of the claimed territory of Alta California during the reign of King Carlos III of Spain. In 1769, a joint sea and land expedition set out from Mexico to meet up at San Diego Bay; Captain Vicente

Vila led three ships, and Gaspar de Portolá and Father Junípero Serra commanded the land expedition (Rolle 1969). Actual colonization of the San Diego area began on July 16, 1769 (Palou 1926). Only two of the three ships commanded by Captain Vila made it to San Diego; it is believed they anchored near what is now downtown San Diego, and that "Punta de los Muertos," or "Dead Man's Point" (an area located near the west end of H Street), derived its name from the burial of scurvy-stricken sailors at that location (MacMullen 1969).

The natural attraction of the harbor at San Diego and the establishment of a military presence in the area solidified the importance of San Diego to the Spanish colonization of the region and the growth of the civilian population. The initial colonization of San Diego began with the establishment of the San Diego Presidio and the Mission on Mission Hill overlooking Mission Bay and the San Diego River to the north. The location was chosen for its commanding view, defensive location, and proximity to the large Native American village of Cosoy, located directly north of the Presidio on the south side of the San Diego River. The camp was the first Spanish military establishment in California (Smythe 1908). As settlers arrived over time, grants of land were made to persons who filed an application, but many tracts reverted to the government due to lack of use. As an extension of territorial control by the Spanish Empire, each mission was placed so as to command as much territory and as large a population as possible. While primary access to California during the Spanish Period was by sea, the route of El Camino Real served as the land route for transportation, commercial, and military activities, linking all missions and military establishments (Rolle 1969).

The San Diego Mission was moved from the Presidio approximately six miles inland to its present location in 1773 due to the need for agricultural fields and to distance the mission from the military influence at the Presidio. As time progressed into the early 1800s, the Spanish soldiers at the Presidio could not rely on Mexico for regular supplies because of mounting resistance by Mexicans towards the Spanish rule. More and more, the military garrison relied on the self-sufficient San Diego Mission for food, supplies, and even workers. By 1817, the Presidio itself was in a ruinous condition, and the population of the Presidio dropped to only 55 men (Smythe 1908). About this time, residential and commercial development had started in what is now Old Town; in fact, most structures built outside the Presidio were constructed after 1820. By 1821, Mexico had gained independence from Spain, and the northern territories were subject to significant change.

While the Presidio and the Mission, and later Old Town itself, were established near the San Diego River, the area of downtown San Diego was primarily tidal flats and open shore. Neither Spanish nor Mexican citizens of San Diego prior to 1849 utilized this area. California was invaded by United States troops during the Mexican War of 1846-1848. The acquisition of strategic Pacific ports and California land was one of the principal objectives of the war (Price 1967). At the time, the inhabitants of California were practically defenseless, and they quickly surrendered to the United States Navy in July 1847 (Bancroft 1884).

In 1849, a survey party including William Heath Davis, a San Francisco businessman, and Andrew B. Gray identified the area known as "Punta de los Muertos" as a potential town site. However, one critical problem was the lack of fresh water supply to the area. Gray and Lieutenant T. D. Johns drew up plans for a town site at the old Spanish landfall of the Punta de los Muertos. The plans were presented to a group of San Diegans, who, on March 16, 1850, formed a partnership to buy and develop 160 acres of what is now downtown San Diego (County Recorder, Deed Book B). This area was bounded by present-day Broadway, Market Street, 1st Street, and Pacific Highway (Pourade 1963). At the time of the land purchase, about half of the new plots lay below the mean tide level.

The development of New Town began in the summer of 1850, when Davis, the most ambitious of the New Town developers, imported prefabricated houses for some lots in order to spur sales. The block bounded by present-day Columbia, India, F, and G Streets was made a public plaza. Soundings of the bay were taken in 1850 by Andrew Gray in order to determine the best location for San Diego's first deep-water wharf. Davis then designed and funded the construction of the wharf, the completion of which allowed off-loading of cargo and passengers at the pier, rather than requiring the use of lighters to ferry them to the shore (Rolle 1969; Brandes et al. 1985).

However, the New Town initially envisioned by Gray and greatly funded by Davis did not succeed. By the end of 1851, the army, as well as businesses, was leaving the area (Garcia 1975; Pourade 1963). Although a railroad terminus appears to have been planned early in the development of San Diego, the failure of the San Diego and Gila Railroad and the Southern Pacific and Arizona Railroad companies, along with the effects of the Civil War, led to the decline in New Town property values. In addition, a fire in San Francisco cost Davis $170,000, which made it difficult to invest in San Diego (Schaefer 1999). Only eight houses remained standing in New Town in 1856. In 1860, San Diego consisted primarily of the small settlement at Old Town, with a population of 459 non-Indian inhabitants (Schaefer 1999). During the 1860s, the deteriorating Davis warehouse and wharf was dismantled for fuel and firewood (MacMullen 1969).

The city was revitalized with the arrival of Alonzo E. Horton in 1867. He purchased approximately 1,000 acres, including most of the Pueblo lots that bordered New Town, and prompted the construction of a large wharf in an effort to attract the shipping industry to the area. Horton's efforts were focused east of Davis' New Town, emphasizing 5th Street running north to south, at the end of which the wharf was built. Horton had the property parceled, including a park, streets, blocks, and lots, and initially gave lots free to anyone who would build a permanent structure (Schaefer 1999). Another wharf was constructed by Stephen S. Culverwell in 1868 at the foot of F Street; this wharf extended 150 feet into the bay (MacMullen 1969). By 1869, 124 dwellings had been built, and by 1870, the population of the town was 2,300 (Schaefer 1999). During the 1860s and 1870s, tideland development companies worked to improve the intertidal real estate, although there were some legal issues involving rights to these lands. After years of

disputes between officials of Old Town and New Town, the county courts moved from Old San Diego to Horton's Addition in 1871. In the early 1870s, the focus of the commercial district was along the foot of 5th Street with easy access to Horton's Wharf. As the 1870s and 1880s progressed, the commercial district slowly expanded up 5th Street to Broadway as well as multiple blocks to the west and east.

With the population increase through the 1870s, clean reliable water sources and trash accumulation became considerable obstacles. Beginning in the mid-19thcentury and continuing into the 1870s, hand-dug wells and trucked water were the only sources of fresh water (San Diego Newspaper Index). In fact, several articles reporting hand-dug wells and cisterns, summarized in the San Diego Newspaper Index, are clustered in the late 1860s to the 1870s. One such editorial article from 1870 included the following statement:

> An Artesian Well: A good water supply is the most urgent necessity of San Diego. At present our citizens depend upon the bed of the San Diego River, in Old Town, and a very few good wells in New Town; but the tax is heavy upon ninety-nine one-hundredths of the people, who have to pay the water-carrier for a scanty supply (*San Diego Union,* June 23, 1870).

By the mid 1870s, a drilled well in the City Park (Balboa Park) and two reservoirs supplied the water needs of a growing city (San Diego Newspaper Index). In March 1874, the San Diego Union stated:

> About 18,000 feet of pipe will be put down for the present. Pipe now extends from the smaller reservoir down Eleventh and D, along D to Fifth, down Fifth to K, along K to Eleventh, and will also run through Ninth from D to K and from Fifth along J to Second. The supply from this well will be sufficient for 30,000 population and is seemingly inexhaustible (Smythe 1908).

The Boom Period of the mid-1880s saw San Diego's population grow at a tremendous rate, thus creating problems with the amount of available water. A number of water-related companies were formed throughout the 1880s and 1890s, including the San Diego Land and Town Company in 1881, the Otay Water Company in 1886, Linda Vista Irrigation District likely in 1886, the San Diego Flume Company in 1886, the Mount Tecarte Land and Water Company in 1897, the Pamo Water Company in 1888, and the Southern California Mountain Water Company in 1895 (Sholders 2002). The 1888 Sanborn Map described the public water supply system for San Diego as follows:

> Source of supply from 12 sunken wells in San Diego River, 1 Gaskill Pumping Engine, cap(acity) 2 million galls per 24 hrs, forces water to first mentioned

> reservoir a distance of 1400 ft. 1 Worthington Pumping Engine cap. 6000,000 galls per 24 hrs forces water to second mentioned reservoir, a distance of 1 1/2 miles. Water flows from this to Florence Heights reservoir, fall of 33 ft. 1 Worthington Pumping Engine 3 million galls. cap'c'y. per 24 hrs to be located at Old Town to force water to a stand pipe 125' high, diam. 30", on an elevation of 275' above high tide, distance from pump to stand pipe 2500 ft. Will be in operation about Aug 1st 1888. Average daily consumption 800,000 galls. Supply adequate. 70 hydrants. Pressure at D & 5th sts. 50 lbs. Gaskell Pumping Engine can be cut off from reservoir and force direct to mains, giving pressure of 110 lbs. 30 miles of water pipe 2" to 12" including pipes to Pacific Beach, University Heights, & 4 suburban additions (1888 Sanborn Map).

The 1888 Sanborn description identifies four reservoirs of the San Diego and Coronado Water Company being located at Old Town, two northeast of Old Town and one at Florence Heights between Grape and Hawthorn Streets. In addition, the City of San Diego owned a reservoir in the southern part of the City (Balboa) Park and a well nearby, and was planning on dams on the San Diego River for the future (San Diego Newspaper Index). These water supply elements were sufficient to preclude any need for private wells in downtown San Diego for household water supplies, especially in view of the superior quality of the piped-in water. A longtime resident recalled the water situation of that early period:

> When I first came here, water was procured by buckets full from a well at B and First Street and carted over town. The only virtue about that water was that it was wet and it could put out a fire if you could get enough of it, but you never could. In 1872 an artesian well was sunk at Eleventh and A Streets. It was sunk to a depth of 260 feet and, after the hole had been made big enough, it supplied fifty-four gallons an hour. This was our (public) water supply until 1885. Later, wells were sunk in Mission Valley and a pump installed to carry the water in pipes which were laid over the brow of the hill. Then the flume was built in 1889… (Philip Morse, *San Diego Union, August 3, 1912*).

The late 1880s through the 1890s would have seen the gradual abandonment of private wells; by 1905, no windmills could be seen in downtown photographs. Once the wells and cisterns were abandoned, they often became ready-made refuse pits.

Sewer disposal was also an issue that early San Diego had to deal with as population increased. Sewer lines were installed in portions of the city, including Bankers Hill, Middletown, East Village (then south San Diego) and Centre City, in 1887 with $400,000 provided by the City (City Ordinance 0-60 amended by 0-97 on July 9, 1887, Document No. 102921). This marked the beginning of residential privy abandonment. Garbage disposal, on the

other hand, is important in the sense that disposal in the backyard or on a vacant lot nearby was a habit developed during the first decades of settlement in downtown and, like all habits, required time and effort to change. As privy pits became full and outhouses were moved, the old pit had to be filled right away. Any handy refuse was often the first thing to go into the abandoned privy pit, before sand or soil was used to finish the backfilling.

Organized trash collection began sometime late in the nineteenth century, and for purposes of this report dates to the first mention of such activities in the local newspaper. In 1887, citizens complained of burning trash on block lots and in an unofficial dump at the end of B Street, north of Russ School (San Diego Newspaper Index). In those days, a refuse collector was called a scavenger, and he collected garbage, dead animals (such as horses), ashes, rubbish, and night soil. Night soil refers to solids from privy pits and cesspools. At about this time, the City began steps to reduce the objectionable odors and smoke from burning trash using a variety of mechanisms (Van Wormer 1988). It was not until 1908 that the City made it unlawful for anyone to dump garbage and waste matter inside the City Limits (City Ordinance No. 3180). That trash dumping continued widespread in the City into the late 1930s is documented in a 1938 City study of the practice (City of San Diego 1938).

During the 1870s and 1880s, along with the population, the shipping industry in San Diego continued to grow; by 1887, over 60,000 net tons of shipping was registered in the city (MacMullen 1969). Due to the harbor activities, the waterfront areas along the tidelands became desirable for the construction of shanties and low rent businesses; these same areas were not reliable for more permanent structures, and the landowners did little to discourage the shanties from encroaching. By the 1880s, the shanties were established all along the waterfront, serving as homes for laborers, sailors, and their families. The shanties were generally constructed of redwood and were built on pilings or stilts along the tidal area (Stewart 1965).

The mid-1880s saw a major construction boom in San Diego, with city crews paving streets, the introduction of gas and electricity, and the introduction of streetcar tracks. Horton and other speculators were finally successful in bringing the railroad to San Diego, via Los Angeles, in 1885 (Pourade 1963). Tourism in San Diego increased, and land speculators started buying up land with the anticipation of the completion of the railroad (Pourade 1963). The population of the city jumped from 7,500 in 1885 to 12,000 in 1886, and between 1886 and 1887, a total of 1,853 buildings were constructed (Schaefer 1999). Major wharves had been constructed by the late 1880s, including Culverwell's Wharf (later Jorres' Wharf) and the Babcock and Story Wharf, constructed at the foot of Atlantic Street (now Pacific Highway). John D. Spreckels, a wealthy ship line owner and sugar baron, realized the importance of the relationship between the harbor and the business and financial district, and made San Diego the focus of his business empire. Much of the capital financing for this period of San Diego's development came from Spreckels and his various companies. As early as October of 1887, the Spreckels Brothers' Commercial Company began the construction of a brick warehouse at the foot of Market Street. In January of 1888, their company commenced work on the pilings for a

new wharf, the completion of which would occur several years later (MacMullen 1969). Between the shipping and railroad industries, the Center City area became a focus for the sale and export of agricultural products (Schaefer 1999).

It was during the later 1880s that the neighboring communities outside San Diego were established. Towns such as Escondido, Coronado, Ocean Beach, El Cajon, Lakeside, and Ramona were established during this time (Pourade 1963). The Santa Fe coastal route from National City to Los Angeles, as well as the various trunk lines throughout San Diego County and the streetcar line that served the closer neighborhoods, aided the development of communities throughout the area (Schaefer 1999).

By 1888, the bottom had dropped out of the real estate market; many people found themselves holding overpriced property. The population of San Diego dropped from 35,000 to 16,000 in six months (Pourade 1963). Twenty towns had been started around San Diego by this time, some of which quickly disappeared. Several major fires destroyed hotels and other businesses, and most of the local steam railroads went out of business (Pourade 1963). Despite the economic depression San Diego was undergoing, a cable car system went into operation in 1889. Also in 1889, the first flume to bring mountain water to the coastal lands was completed (Pourade 1963). Although things had started looking up for the city, the problem of rail access still remained an issue. The connection between Los Angeles and San Diego was not direct enough to benefit San Diego. In 1905, a rail line from San Diego to Yuma, and thus to the rest of the country, was proposed. Although it was not completed until 1919, the anticipation of the new railroad, with its direct connection to areas to the east, spurred development in San Diego once again. In addition, three new piers were constructed along San Diego's waterfront at the foot of 6th, 7th, and 9th Streets (Schaefer 1999).

The first decade of the twentieth century started off with steady development in San Diego; however, by the end of the decade, announcements such as a direct rail connection to the east and plans to hold a World Exposition to celebrate the completion of the Panama Canal had increased the pace of development in the city. The population doubled from 17,700 to 39,578 over the course of the decade (U.S. Bureau of the Census), and a concern about a shortage of rental houses and cottages for either permanent residents or tourists (*San Diego Union*, February 1900) developed into a statement in 1907 that there actually were no residential vacancies left in the city. Lumber companies tried to match pace with the demand for housing. The Spreckels wharf at Pacific and Market Streets became the focus of commercial attention, and soon D Street (Broadway) replaced 5th Street to become the main thoroughfare into downtown. The East Village area and the immediately surrounding streets were dominated by warehouses, large mills, and residential dwellings.

After 1850, the control of the tidelands had been entrusted to the State of California for the purpose of promoting commerce (Smythe 1908). Control of the tidelands was a subject of increasing interest to politicians, investors, and developers alike at the turn of the century, as the value of the area for the commercial growth of San Diego became obvious. In 1911, the City of

San Diego, along with Los Angeles and Oakland, petitioned the state to grant the tidelands within the respective harbors to the cities for development. The authorizing of this transfer passed, provided that the City of San Diego made major improvements to the tideland area (Heilbron 1936), including a new bulkhead extending toward the bay and the filling of the tidelands.

During World War I, the wharf at the foot of 5th Street was dismantled. A new wharf was constructed at the west end of Broadway (previously D Street) in 1914 (Brownlee 1984). Anticipation of the opening of the Panama Canal, which would make San Diego the first port-of-call along the U.S. west coast, increased the city's reputation as an import/export hub. On February 18, 1908 headlines reported that construction would begin on a mammoth marine terminal for the San Diego and Arizona Railroad with two huge piers costing upwards of $200,000.

To celebrate the city's up-and-coming status, the Chamber of Commerce announced in 1909 that San Diego, with a smaller population than California's other major cities, would host a "Panama California Exposition" in 1915-16 to compete with San Francisco's World Fair. The next six years would see the building of bridges, the paving of roads, and more commercial areas developed. Even the Panic of 1907, which affected so much of the country, barely registered in San Diego. Lumber companies actively tried to keep up with housing demands.

The city continued to grow and attract residents as the Exposition approached. In 1912, the City Directory reported a growth rate of 1,000 people per month, with only two buildings available for rent; the next year, the directory reported a growth rate of 52 new residents per day. The years immediately following the California Panama Exposition witnessed a decrease in the building frenzy that preceded the event. During World War I, the military secured San Diego as a major hub and shipbuilding became a major industry.

The city entered the 1920s with an increasingly promising economy. In November 1919, John Spreckles drove the golden spike into the San Diego and Arizona Railway. After several decades, San Diego was finally connected to the east via rail. At the turn of the decade, realtors reported a shortage of office rooms and storage space in downtown San Diego, and an equal scarcity of homes for rent in the residential district. The paper reported that San Diego was "simply underbuilt" (*San Diego Union*, October 8 and 25, 1921). Meanwhile, established industries and companies continued to announce new buildings and expansions. In a desire to interest prospective investors in San Diego's industrial area, the Board of the Chamber of Commerce talked with kelp product companies, manufacturers of rope and twine, operators of cottonseed oil mills, and heavy farm machinery and steel vessel assembly plants to build up the city's marine industry (Brandis [Ballpark]). The emphasis of these businesses would be placed on the East Village area, adjacent to both the water and the railroad. Demand for supplies to build new dwellings was reflected in the city's lumber mills. In May 1925, the city directory reported that there were 25,077 single-family residences housing 84,282 people, 21,514 people

living in flats and apartments, and 7,645 hotel residents. The number of businesses had increased 62 percent in seven years.

The 1930s brought the Depression and a shift in industries to southern California. Development in San Diego was reduced during the thirties, although the city was not hit as hard as other U.S. cities. At the close of the decade, several of the old harbor and manufacturing industries gave way to a burgeoning aircraft industry, and San Diego's numerous naval installations began to prepare for the possibility of war. The U.S. Navy took control of the waterfront and all shipping. As the economy and job market improved, the city's increased population spread into the residential areas and the suburbs and away from downtown proper. The focus of downtown San Diego development shifted from a mixed residential and commercial area to primarily a commercial and industrial zone of warehouses and factories by World War II (Schaefer 1999). Residential use of downtown has reestablished itself only recently with the establishment of the City Center Redevelopment Corporation.

4.0 RESEARCH DESIGN

The questions outlined in the research design include relevant topics that help facilitate a greater understanding of what the residents of the project area did during the historic period of the late nineteenth and early twentieth centuries, and how they changed throughout time. Questions of how these residents related to the environment, how they arranged themselves in space, and how they made a living all contribute details to the story of the history of the development of San Diego. These studies contribute not only to reconstruction of local history, but also to broader research topics currently being pursued in the San Diego region and Southern California in general. These questions help to answer the larger anthropological questions regarding how people historically adapt to and organize themselves under different social, economic, and environmental conditions.

The testing program for the Horton Plaza Park Improvement Project will include a records search, historic research, test excavations (as outlined in Section 5) and the mapping of any features or artifacts, as well as locations of subsurface archaeological tests to be conducted. Primary objectives, such as the determination of the boundaries of any discoveries, depth of any archaeological deposits, stratigraphy, integrity, content, and spatial distribution of any subsurface artifacts and cultural ecofacts, is essential to the current test phase of the program. Normally, a research orientation transcends these goals by expanding the meaning of information extracted from a site through the use of archaeological questions important in current scientific research; regional and temporal research issues should be taken into consideration when posing such questions. However, because the presence of buried cultural resources is uncertain, the research design for the current project is limited in scope. The topics and associated research questions provided below address concerns specific to the project.

4.1 Historic Archival Results

The results of the preliminary archival research are presented primarily to provide the historical background for any deposits or features that may be encountered. Within the project area, the presence and contextual integrity of any potential deposits is unknown. However based on preliminary archival research, even disturbed samples can be verified and may be capable of supplying a reliable temporal range.

4.1.1 Historical Background

Based on archival research, structures on Block 42 first appear at the project location on the 1887 Sanborn Maps. Obviously, based on the history of the APE, development of Block 37 for the construction of the Horton House and the north portion of Block 42 broke ground by 1870. The structure and the associated plaza are present on the earliest Sanborn Map of the area in 1887. However, the presence of any structure on the property prior to that time is uncertain. Manuscripts from the original architect (Senator Bowers) indicate that just prior to the

construction of the hotel, the property "was covered with the native brush" (MacMullen 1956). The presence of any structures prior to 1870 on the block could not be definitely determined. By 1887, the Horton House, the early configuration of Horton Plaza Park, and multiple businesses surrounding the project APE are present (Figure 4.0–1). Review of the Sanborn Maps indicates that the arrangement of structures on the block appears to remain relatively consistent over time. The development of Horton Plaza Park clearly occurs prior to the development of other structures on the south portion of Block 42. The kinds of shops and businesses that developed within the vicinity of the project APE are primarily service related. Many of these shops (including a tailor, jeweler, and restaurants) are likely related to servicing the needs of visitors to the hotel. As a result of the development of Horton Plaza Park prior to these other structures, the north half of the block does not see any substantial development with the exception of the plaza itself. The original 1880 octagonal bandstand constructed by Jack Dodge and the City Guard Band appears on the 1887 and 1888 Sanborn Maps (see Figure 4.0–1). By 1906 however, the original octagon bandstand has been replaced with a rectangular bandstand that has been moved to the west and palm trees were planted. By 1909, with the dedication of the Horton Plaza Fountain, the plaza had a similar configuration to what is known today and this configuration was clearly illustrated on the 1921 Sanborn Maps.

The arrangement of the structures historically suggests that the majority of subsurface impacts that have occurred on the plaza have been the result of the development of the subterranean portion of the fountain, restrooms, the planting of several series of palm trees since the 1890's, and associated municipal improvement impacts over time.

4.2 Research Goals

The primary goal of the research design is to attempt to understand the way in which people have used the land and resources within the project area through time, as well as to aid in determination of resource significance. As the main objective of the investigation is to identify the presence/absence and potential site significance any cultural resources located within the designated impact areas, the goal of the research design is to investigate the role and importance of on-site cultural resources and determine if further mitigation measures are warranted. The following discussion presents relatively focused research questions that are guided by recent archaeological investigations that have been conducted in the San Diego area (Smith 2003; Pierson 2001; Pierson 2003). The discussion includes a consideration of the types of data that are necessary in order to address the relevant research questions pertaining to the historic/prehistoric use of the project area. Therefore, the archaeological test plans focused on determining the role of the project area and any identified cultural deposits within the context of the early development of New San Diego and the potential for any prehistoric archaeological deposits. Specifically, investigation of cultural remains focused on the origin, association, and content of the deposits themselves as related to the known history of the project area.

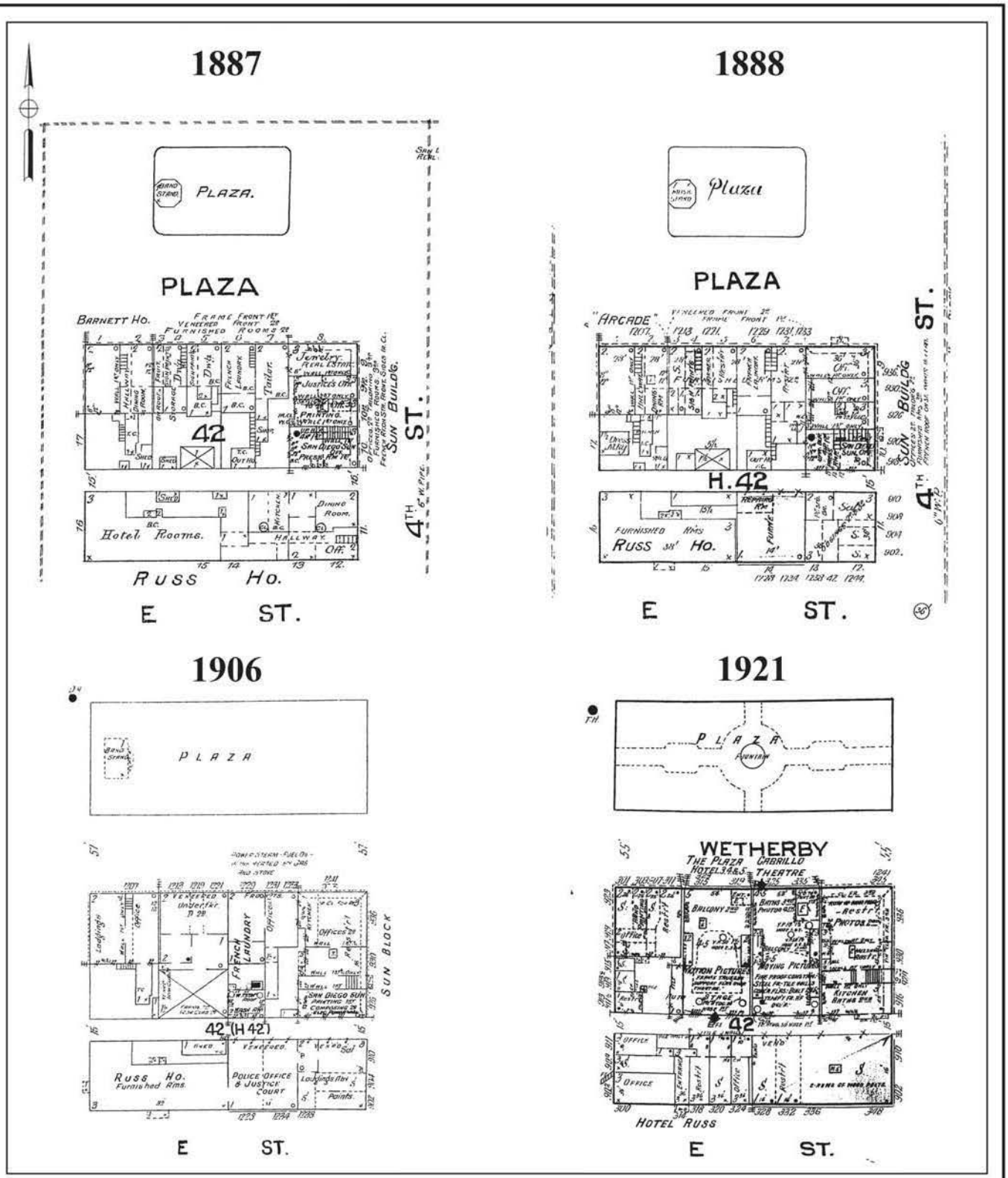


Figure 4.0–1

1887, 1888, 1906, and 1921 Sanborn Maps

The Horton Plaza Improvement Project

Research Questions:

- If artifact deposits are identified, under what circumstances was the material discarded, and can the deposition be attributed to the development of Horton Plaza Park, secondary deposition from the surrounding businesses, dumping prior to the development of the plaza, or the prehistoric occupation of the region?

- Do artifact deposits reflect specific information, such as gender, age, socioeconomic status, or ethnicity, regarding the people who lived or worked in the area?

- In terms of potential archaeological deposits identified within the impact areas of the subject parcel, can a distinction be made between domestic and commercial deposition on the property?

- If historic deposits are present, do they reflect neighborhood economic change through time or are they representative of a single economic level of deposition?

- If prehistoric deposits are present, do they reflect contact period sites or are they representative of earlier periods of occupation?

Integrity

In order for a site to be considered significant, it must be established that enough of the deposit remains within the impact areas in order for it to retain integrity. This is particularly truewhere previous construction across the project area may have had impacts to site integrity. According to the California Register of Historical Resources(CRHR), "*integrity"*is defined as"the authenticity of an historical resource's physical identity evidenced by the survival of characteristics that existed during the resource's period of significance."

Once the ground surface of the property is exposed, the area should be investigated for any evidence of previous grading or ground disturbances, perhaps resulting in uneven ground surfaces compared to adjacent lots, evidence of the movement of soil, or vehicle activity. All subsurface excavations should be thoroughly investigated and their profiles and soil descriptions compared to ascertain the existing state of the stratigraphy of the site. Any observed disturbances should be weighed against the quality and quantity of data that was gathered during the proposed testing program. Therefore the following research questions must be addressed with regards to site integrity:

Research Questions:

- How has the property and any archaeological deposits or features been disturbed?

- Does this portion of the site retain adequate integrity to yield important information?

- Are observed disturbances superficial or have they impacted the deposit to a greater depth?

- How does the existing topography compare to adjacent properties in terms of cut or fill?

- Have any disturbances compromised the ability to analyze material culture contextually?

The research questions presented here will be used to guide the accumulation of data at both the archival and archaeological levels, as well as the subsequent analysis of any recovered material. The results of the archival research, field investigation, and laboratory analysis will then be used to evaluate the significance of the identified deposits. The basic data requirements for the study of historic economic practices include site features and site assemblages, and archival information on the time and type of occupation, origin of deposits, household composition, ethnicity of occupants, technology, and land ownership.

4.3 Archaeological Data Needs

Should cultural deposits be encountered, archaeological field investigations will focus on the following information:

- Integrity of the deposit or feature is critically important when determining significance, particularly in urban settings when continued development has a significant impact on previously accumulated deposits.

Archaeological laboratory investigations may focus on the following information:

- The presence of discrete clusters of functionally-related items may indicate a variety of different economic activities, such as mercantile enterprises, bootlegging, and general household refuse.

- The presence and relative density of non-local items, such as Chinese coins (wens), ceramics with Asian maker's marks, ethnic-specific ornamental items, and religious jewelry such as crosses, may suggest different ethnic groups.

- The presence and relative density of personal items, such as women's jewelry, combs, brushes, curlers, needles, thimbles, and garter clips, or men's work boots and cufflinks may indicate gender.

- The presence and relative density of historic subsistence items, such as different types of tins, bottles, shell, and bone remains, may suggest economic status, food availability, or personal preference.

- The presence and relative density of personal items, such as marbles, porcelain doll fragments, toy cars, cap guns, toy china fragments, and toy banks, may indicate the presence of children.

- The types and quantities of food bone may reflect consumer trends and economic status.

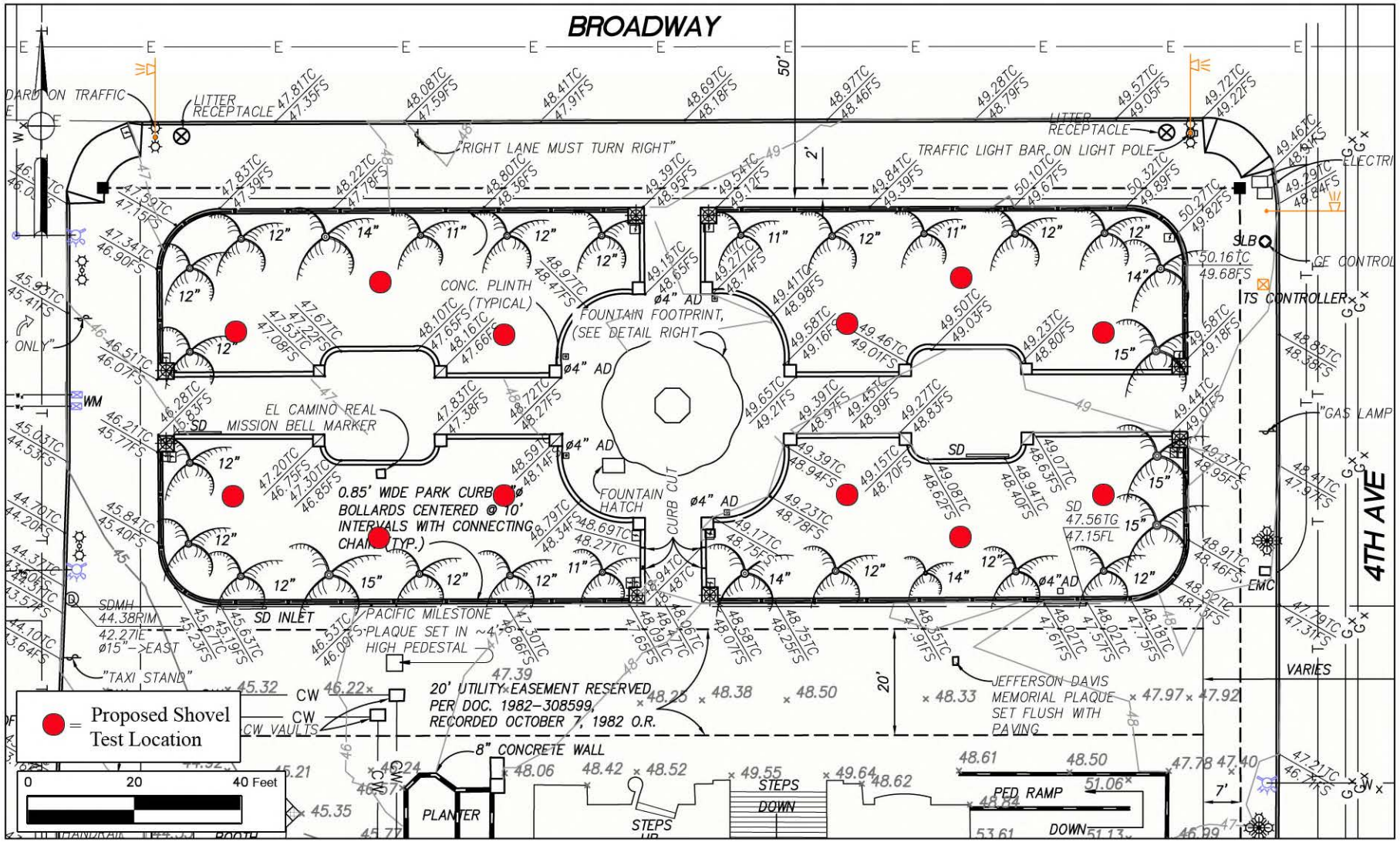
- The presence and relative density of luxury items, such as ornamental lamps, fine china, silverware, and perfume bottles, may indicate economic status.

5.0 TEST PLAN

The cultural resources test plan for the Horton Plaza Park Improvement Project will include tasks focused upon the investigation of masked or buried cultural resources that may be impacted by renovation of Horton Plaza Park. If archaeological features, deposits, or artifacts are discovered during testing, these shall be evaluated for significance in accordance with City guidelines and the Public Resources Code. Significant cultural resources would require the implementation of mitigation measures prior to construction.

- **Task 1:**
  a. Request a cultural resources records search to review records for all recorded cultural resources within the project vicinity.

- **Task 2:**
  a. The testing program will consist of a series of 12 shovel test pits (STPs) measuring 30 centimeters in diameter excavated in decimeter levels to a culturally sterile soil horizon or formational soil. As depicted in Figure 5.0–1, the STPs will be excavated within the planter areas to minimize impacts to any existing pavers or structural elements of the plaza.
  b. Should archaeological features or deposits be encountered which merit more intense investigations, hand-excavated test units will be included in the program to provide detailed information needed to address research potential and significance evaluations.
  c. The archaeological fieldwork will include detailed mapping and recordation of all historic elements encountered during the investigations, as required by City guidelines.
  d. Any artifacts recovered during the field investigations will be returned to the consultant's laboratory for analysis. All artifacts will be cleaned and catalogued, and all information will be included in the project's database. All artifacts or a representative sample of the collection from the project will be prepared for permanent curation at the San Diego Archaeological Center.
  e. If archaeological features or deposits are discovered, the discovery will be recorded as a cultural site and will be registered at the South Coastal Information Center at SDSU.
  f. A report of findings will be submitted to the City to detail the results of the findings of the field investigations. If historic resources are identified, the report will include significance evaluations and recommendations for mitigation of impacts.



5.0–2

Figure 5.0–1

Proposed Excavation Location Map

The Horton Plaza Improvement Project

Shown on The City of San Diego 1" to 800' Scale Engineering Map

This study will be conducted in conformance with the City of San Diego Historical Resources Guidelines, Section 21083.2 of the California Public Resources Code, California Environmental Quality Act (CEQA), and the Downtown Community Plan FEIR, MMRP requirements. Statutory requirements of CEQA (Section 15064.5) will be followed in evaluating the significance of each cultural resource. Specific definitions for archaeological resource type(s) used for the project are those established by SHPO (1995). All reportingwill follow the Office of Historic Preservation's (OHP) Archaeological Resource Management Report (ARMR) Guidelines (OHP 1990).

5.1 Field Methodology

5.1.1 Subsurface Testing

The testing program should provide sufficient information to determine the presence or absence of subsurface deposits, assess site significance if resources are present, and to evaluate potential impacts to those resources. The areas of high potential for subsurface deposits were defined based on review of historic maps and the limits of the property. Figure 4.0–1 illustrates the evolving pattern of Horton Plaza Park from 1887, 1888, 1906, and 1921 respectively. Proposed STPs are targeted to explore the potential for subsurface deposits within the unpaved areas of the property. A total of 12 STPs are planned as part of the archaeological investigation. The arrangement of STPs on Figure 5.0–1 will be employed to conduct the investigation of the plaza. Based on the uncertainty of buried deposits within the project, areas of potential impacts cannot be determined at this time. Rather, the excavation of STPs across the property will serve to identify buried deposits that may then be evaluated for significance. For the archaeological testing portion component, the location of the STPs correlates to the locations that will minimize impact to the project APE. Based on the noted considerations, the testing protocol for the historic refuse deposit includes the following procedures:

- Any surface artifacts exposed by the planned improvements will be mapped, recorded, and collected. A map will provide the general surface expressions of the site and the site boundaries. All of the mapping to be conducted will be accomplished using GPS units and data applicable to the project base maps.

- The field investigation will include the excavation of STPs at locations determined to have the least amount of impact to the Horton Park Plaza APE. The STPs will serve to identify the composition of any subsurface archaeological deposits encountered. Soil profiles and notes will be completed for the excavation trenches.

- Soils from the STP excavations will be sifted through one-eighth-inch screens to recover artifacts. In addition, all artifacts will also be collected to characterize the

sample. The quantity of soil sampled will be dependent upon factors of artifact density, disturbance, cobbles and fill, and depth.

- If the STP program identifies intact and potentially significant historic or prehistoric deposits, a more focused investigation will be initiated. Standard one meter square test unit excavations will be used to gather detailed information regarding potentially important cultural deposits. All test unit excavations will follow standard archaeological protocol for excavation, screening, recovery and recordation of test unit results.

- All cultural materials recovered from archaeological deposits will be returned to our laboratory for cleaning, cataloging, and analysis. Any artifacts that require special treatment for preservation will be handled in a manner consistent with standard archaeological techniques. A sample of artifacts will be prepared for permanent curation according to the guidelines of the San Diego Archaeological Center.

- All information gathered from the field, laboratory analysis, and research, will be incorporated into a technical report following the City of San Diego guidelines and requirements. The report will be submitted as a draft to the City for comment and review. A final report will be prepared incorporating all comments and will be submitted to the City at the conclusion of the site study.

5.2 Laboratory Analysis

Laboratory analysis any prehistoric or historic collected material will be initiated by taking an inventory of the collection. The collection will then be subjected to wet screening to remove as much of the dirt as possible from the artifacts. This process will help to facilitate the laboratory sorting and cataloging process.

5.2.1 Artifact Sorting and Analysis

The sorting technique will include the sorting, identification, and cataloging of all materials returned to the laboratory. The sorting process will be conducted at the BFSA laboratory. Bulk items, such as fragments of concrete, slag, and nondescript glass and metal, will be weighed and cataloged in mass, by material type, for each level. All remaining artifacts will be separated by class and type, and identified to the most specific level possible. The artifacts will be sorted and cataloged, including totals, materials, condition, weight, provenience, and unique artifact identification numbers.

If prehistoric lithic artifacts are recovered from the project they will be subjected to in-house analysis, that will include recordation of lithic material, critical measurements and weight, and inspection for evidence of use wear, retouch, patination, or stains. The recovered flakes will

be subjected to an analysis of attributes such as size, condition, type, termination, and material.

Non-lithic materials, such as ecofacts (shell, bone, wood), will be subjected to specialized analyses. The laboratory analysis of the column samples will include flotation procedures to remove seeds and other microfaunal remains from the soil, followed by the screening of the remainder through a one-sixteenth-inch mesh sieve. The recovered materials such as animal bone, fish bone, seeds, and charred plant remains will be sorted and subjected to further analysis by the appropriate personnel. Other specialized studies, which will be conducted if the appropriate materials are encountered include marine shell species identification, faunal analysis, otolith analysis (for seasonality), radiocarbon dating, obsidian sourcing and hydration, and blood residue and phytolith studies.

5.2.2 Historic Artifact Functional Categories

All historic artifacts will be prepared for cataloging according to standard laboratory practices. Items covered in dirt to the point of obscuring relevant characteristics will be dry brushed or wiped with a damp cloth in order to enhance the artifact description. Each catalog entry will be bagged in a two-millimeter thick, archival quality bag labeled with location and catalog number information. Information recorded about cataloged artifacts will include provenience and depth, material, quantity and/or weight, functional category, artifact type, and a brief description of the artifact(s), including any diagnostic information about manufacturing methods, brand or product marks, and manufacturers' marks. Artifacts sharing the same provenience, material, and color characteristics, but that were fragmentary, will be assigned a single catalog number. Artifacts will be classified by functional category for purposes of analysis.

5.3 Archival Research

Archival research will also be conducted in order to supplement the information generated by the archaeological testing program. Historical research for this phase will primarily be conducted at the BFSA reference library. These resources will be used to gather data regarding the history of the property, its place in the region and general trends in land use history within the project area.

5.4 Recordation and Curation

Any cultural resources identified as part of the cultural resource test will be recorded on the appropriate DPR site record forms and submitted to the SCIC. After cataloging, identification, and analysis, each cataloged entry will be marked with the appropriate provenience and catalog information. As stated in the required mitigation measures, any archaeological assemblage, or a sample of the collection, recovered from the Ariel Suites Project will be permanently curated at the SDAC. All notes, photos, and documents associated with the project will be housed at the office of BFSA in Poway, California.

6.0 BIBLIOGRAPHY

Bada, Jeffrey L., Roy A. Schroeder, and George F. Carter
1974 New Evidence for the Antiquity of Man in America Deduced from Aspartic Acid Racemization. *Science* 184:791-793.

Bancroft, Hubert Howe
1886 *History of California (Vol. II).* The History Company, San Francisco.

Bean, Lowell John and Katherine Siva Saubel
1972 *Temalpakh — Cahuilla Indian Knowledge and Usage of Plants*. Malki MuseumPress, Banning, California.

Beauchamp, R. Mitchel
1986 *A Flora of San Diego County, California*. Sweetwater River Press, National City, California.

Blick, J. D.
1976 Agriculture in San Diego County. In *San Diego – An Introduction to the Area*. Edited by Philip Pryde. Kendall/Hunt Publishing Company, Dubuque, Iowa.

Brandes, Ray, James R. Moriarty and Susan H. Carrico
1985 *New Town, San Diego, California.* San Diego Science Foundation.

Brian F. Smith and Associates
Various Dates Research Library holdings including Sanborn Maps, City Directories, Published Regional Histories, and Geologic and Paleontological References.

Bolton, Herbert Eugene (editor)
1959 *Spanish Explorations in the Southwest, 1542-1776,* edited by Herbert Eugene Bolton. Barnes and Noble, Inc., New York.

Bull, C.
1983 Shaking the Foundations: The Evidence for San Diego Prehistory. In *Cultural Resource Management Casual Papers 1(3):15-64*. Department of Anthropology, San Diego State University.

1987 A New Proposal: Some Suggestions for San Diego Prehistory. In *San Dieguito-La Jolla: Chronology and Controversy*, edited by Dennis Gallegos, pp. 35-42. San Diego County Archaeological Society Research Paper No. 1.

Cardenas, D. Sean
1986 Avocado Highlands: An Inland Late La Jolla and Preceramic Yuman Site from Southern San Diego County. In *Cultural Resource Management Casual Paper* 2(2). Department of Anthropology, San Diego State University.

Carrico, Richard L. and Clifford V. F. Taylor
1983 *Excavation of a Portion of Ystagua: A Coastal Valley Ipai Settlement.* On file, City of San Diego Planning Department, Environmental Quality Division.

Carrico, Richard, Theodore Cooley, and Joyce Clevenger
1991 Final Excavation at the Harris Site Complex, San Diego County, California. On file, South Coastal Information Center, San Diego State University, San Diego, California.

Carter, George F.
1957 *Pleistocene Man at San Diego*. Johns Hopkins Press, Baltimore.

1980 *Earlier than You Think: A Personal View of Man in America*. Texas A&M University Press, College Station.

Caughey, John W.
1970 *California: A Remarkable State's Life History (Third Edition).* Prentice–Hall, Englewood Cliffs, New Jersey.

Centre City Development Corporation
Downtown Community Plan

Downtown Community Plan FEIR

Centre City Planned District Ordinance (City of San Diego Land Development Code)

Chapman, Charles E.
1925 *A History of California: The Spanish Period*. The Macmillan Company, New York.

City of San Diego
Various Dates City Ordinances. San Diego City Clerk.

Historical Resource Guidelines. April 2001.

Historical Resources Regulation. January 2000.

Crouch, Herbert
1915 *Reminiscences, 1868-1915*. Unpublished manuscript, California Room, San Diego Public Library; and SDHS Library, Serra Museum.

Davis, E. L., C. W. Brott and D. L. Weide
1969 *The Western Lithic Co-Tradition.* San Diego Museum Papers (No. 6). San Diego Museum of Man, San Diego.

Deméré, Thomas A. and Stephen L. Walsh
1993 Paleontological Resources, County of San Diego. Department of Paleontology, San Diego Natural History Museum, San Diego, California.

Elliott, Wallace W.
1883 *History of San Bernardino and San Diego Counties (1965 Edition).* Riverside Museum Press, Riverside, California.

Engelhardt, Zephryn
1920 *San Diego Mission*. James M. Barry Company, San Francisco.

Engstrand, Iris Wilson
1980 *San Diego: California's Cornerstone*. Continental Heritage Press, Inc., Oklahoma.

Ezell, Paul H.
1983 *A New Look at the San Dieguito Culture.* Cultural Resource Management Casual Papers 1(3):103-109. Department of Anthropology, San Diego State University, San Diego.

Gallegos, Dennis R.
1987 A Review and Synthesis of Environmental and Cultural Material for the Batiquitos Lagoon Region. In *San Dieguito-La Jolla: Chronology and Controversy*, edited by D. Gallegos. San Diego County Archaeological Society Research Paper 1:23-34.

Garcia, Mario T.
1975 Merchants and Dons: San Diego's Attempt at Modernization, 1850-1860. *The Journal of San Diego Histor*y, Winter, Volume 21, Number 1.

Gordinier, Jerry G.
1966 *Problems of Settlement in the San Diego Foothills*. Thesis, San Diego State College, San Diego.

Heiges, Harvey
1976 The Economic Base of San Diego County. In *San Diego—An Introduction to the Region.* Edited by Philip Pryde. Kendall/Hunt Publishing Company, Dubuque, Iowa.

Heilbron, Carl H.
1936 *History of San Diego County*. The San Diego Press Club, San Diego, California.

Kennedy, George
2001 "Paleontological Mitigation Investigation, Rennaissance Park Project, Downtown District, city of San Diego, San Diego County, California. Report on file at Brian F. Smith and Associates.

Kennedy, Michael P.
1975 Geology of the Southern San Diego Metropolitan Area, California: Section A, Western San Diego Metropolitan Area. *Bulletin 200*. California Division of Mines and Geology, Williams & Heintz Map Corporation, Washington D. C.

Kyle, Carolyn E. and Dennis R. Gallegos
1988 *Five Thousand Years of Marine Substinence at Ballast Point Prehistoric Site SDI-48 (W-164) San Diego, California*. Unpublished report on file at SCIC.

Kyle, Carolyn, Adella Schroth, and Dennis R. Gallegos
1990 *Early Period Occupation at the Kuebler Ranch Site SDI-8,654 Otay Mesa, San Diego County, California.* Prepared for County of San Diego, Department of Public Works by ERCE Environmental and Energy Services Co., San Diego.

MacMullen, Jerry
1969 *TheyCame by Sea, A Pictorial History of San Diego Bay.* Ward Ritchie Press.

Minshall, Herbert L.
1976 *The Broken Stones.* Copley Books, San Diego.
1989 *Buchanan Canyon: Ancient Human Presence in the Americas*. Slawson Communications, San Marcos, California.

Moratto, Michael J.
1984 *California Archaeology*. Academic Press, New York.

Moriarty, James R., III
1965 Cosmogeny, Rituals, and Medical Practice Among the Diegueño Indians of Southern California. *Anthropological Journal of Canada* 3(3):2-14.

1966 Culture Phase Divisions Suggested by Topological Change Coordinated with Stratigraphically Controlled Radiocarbon Dating in San Diego. *Anthropological Journal of Canada* 4(4):20-30.

1967 *Transitional Pre-Desert Phase in San Diego, California*. Science 155(3762):553-336. Scripps Institution – UCSD Contribution NO. 2278.

1969 San Dieguito Complex: Suggested Environmental and Cultural Relationships. *Anthropological Journal of Canada* 7(3):2-18.

Moriarty, James R., III and Herbert L. Minshall
1972 A New Pre-Desert Site Discovered near Texas Street. *Anthropological Journal of Canada* 10(3):10-13.

Moyer, Cecil C.
1969 *Historic Ranchos of San Diego.* Edited by Richard F. Pourade. Union-Tribune Publishing Company, San Diego.

Palou, Fray Francisco
1926 *Historical Memoirs of New California.* Edited by Herbert Eugene Bolton (4 Volumes). University of California Press, Berkeley.

Pierson, Larry
2001 *An Archaeological Report for the Mitigation, Monitoring, and Reporting Program at the Renaissance Park Project: Centre City Development Corporation.* Unpublished report on file at SCIC.

2003 *An Archaeological Report for the Mitigation, Monitoring, and Reporting Program at the Acqua Vista Project.* Unpublished report on file at SCIC.

Pitt, Leonard
1966 *The Decline of the Californios*. University of California Press, Los Angeles.

Pourade, Richard F.
1963 *The Glory Years*. Union-Tribune Publishing Company, San Diego, California.
1967 *The Rising Tide: Southern California in the Twenties and Thirties*. Union-Tribune Publishing Company, San Diego.

Price, Glenn W.
1967 *Origins of the War with Mexico.* University of Texas Press, Austin.

Raven-Jennings, Shelly and Brian F. Smith
1999a *Final Report for Site SDI-8330/W-240 'Scraper Hill,' Escondido, California.* Unpublished report on file at SCIC.

1999b *Report of Excavations at CA-SDI-4608: Subsistence and Technology Transitions during the Mid-to-Late Holocene in San Diego County (Scripps Poway Parkway).* Unpublished report on file at SCIC.

Reeves, Brian O. K.
1985 Early Man in the Americas: Who, When, and Why. In *Woman, Poet, Scientist: Essays in New World Anthropology Honoring Dr. Emma Louise Davis*, edited by Thomas C. Blackburn, pp. 79-104. Ballena Press Anthropological Papers No. 29. Los Altos, California.

Reeves, Brian, John M. D. Pohl, and Jason W. Smith.
1986 The Mission Ridge Site and the Texas Street Question. In *New Evidence for the Pleistocene Peopling of the Americas*, edited by Alan Lyle Bryan, pp. 65-80. Center for the Study of Early Man, University of Maine, Orono.

Robinson, W. W.
1948 *Land in California*. University of California Press, Berkeley.

Robbins-Wade, Mary Judith
1990 *Prehistoric Settlement Pattern of Otay Mesa San Diego County, California*. Thesis, Department of Anthropology, San Diego State University.

Rogers, Malcolm
1966 *Ancient Hunters of the Far West.* Edited with contributions by H. M. Worthington, E. L. Davis, and Clark W. Brott. Union Tribune Publishing Company, San Diego.

Rolle, Andrew F.
1969 *California: A History (Second Edition).* Thomas Y. Crowell Company, New York.

Schaefer, Jerry
1999 *San Diego Ballpark Archaeology Management Plan*. Prepared for Centre City Development Corporation. ASM Affiliates, Inc., San Diego.

Sholders, Mike
2002 "Water Supply Development in San Diego and a Review of Related Outstanding Projects." *The Journal of San Diego History,* Volume 48, Number 1. San Diego Historical Society.

Shipek, Florence
1977 *A Strategy for Change: The Luiseño of Southern California*. Dissertation on file at the University of Hawaii.

Shumway, George, Carl L. Hubbs, and James R. Moriarty III
1961 Scripps Estate Site, San Diego, California: A La Jollan Site Dated 5,460-7,370 Years Before the Present.*Annals of the New York Academy of Sciences* 93(3).

Smith, Brian F.
1992 *Results of an Archaeological and Historical Study for the Ocean Beach Gateway Project.* Report on file at the City of San Diego, Environmental Quality Division.

1993 "A Cultural Resources Study for the Sewer Pump Station No. 5 Project." Unpublished report on file at SCIC.

1996 *The Results of a Cultural Resource Study at the 4S Ranch*. Unpublished report on file at SCIC.

2003 *Archaeology at the Ballpark, The San Diego Padres Downtown Ballpark Archaeological Mitigation Project.* Report on file at Brian F. Smith and Associates, San Diego, California.

Smith, Brian F. and James R. Moriarty III

1983 *An Archaeological Evaluation of a Drainage Channel Project at the South Sorrento Business Park.* Environmental Impact Report on file at the City of San Diego.

1985a *The Archaeological Excavations at Site W-20, Sierra Del Mar*. Unpublished report on file at SCIC.

1985b *The Archaeological Excavations at Batiquitos Pointe and Batiquitos Bluffs.* Unpublished report on file at the City of Carlsbad.

Smythe, William E.

1908 *History of San Diego 1542 to 1908: An Account of the Rise and Progress of the Pioneer Settlement on the Pacific Coast of the United States.*

Stewart, Don M.

1965 Frontier Port, A Chapter in San Diego's History. The Ward Ritchie Press, Los Angeles.

Stropes, Tracy A.

2007 *Nodule Industries of North Coastal San Diego: Understanding Change and Stasis in 10,000 Years of Lithic Technology*. Submitted to San Diego State University. Thesis on file at San Diego State University.

True, Delbert L.

1958 *An Early Complex in San Diego County, California*. American Antiquity 23(3).

1966 *Archaeological Differentiation of the Shoshonean and Yuman Speaking Groups in Southern California.* Dissertation, University of California Los Angeles.

1970 *Investigations of a Late Prehistoric Complex in Cuyamaca Rancho State Park, San Diego County, California.* Archaeological Survey Monograph. University of California, Los Angeles.

1980 The Pauma Complex in Northern San Diego County: 1978. *Journal of New World Archaeology* 3(4):1-39.

1986 Molpa, a Late Prehistoric Site in Northern San Diego County: The San Luis Rey Complex, 1983. In *Symposium: A New Look at Some Old Sites*, edited by Gary S. Breschini and Trudy Haversat, pp. 29-36. Coyote Press, Salinas.

True, D. L. and Eleanor Beemer.
1982 Two Milling Stone Inventories from Northern San Diego County, California. *Journal of California and Great Basin Anthropology* 4:233-261.

True, D. L. and R. Pankey.
1985 Radiocarbon Dates for the Pauma Complex Component at the Pankey Site, Northern San Diego County, California.*Journal of California and Great Basin Anthropology* 7:240-244.

Van Dyke, Theodore
1886 *Southern California*. Fords, Howard and Hulbert.

Van Wormer, Stephen R.
1988 Even The Kitchen Sink: Archaeological Investigations of SDI-10,258 The 1908-1913 San Diego City Dump. Manuscript on File at the South Coastal Information Center, San Diego State University.

Warren, Claude N.
1964 *Cultural Change and Continuity on the San Diego Coast.* Dissertation on file at the University of California, Los Angeles.

1966 The San Dieguito Type Site: Malcolm J. Roger's 1938 Excavation on the San Dieguito River. *San Diego Museum Papers* (6).

Warren, Claude L., Gretchen Siegler, and Frank Dittmer
1998 *Paleoindian and Early Archaic Periods, In Prehistoric and Historic Archaeology of Metropolitan San Diego: A Historical Properties Background Study (draft).* Prepared for and on file at ASM Affiliates, Inc., San Diego, California.

Waugh, Georgie
1986 *Intensification and Land-use: Archaeological Indication of Transition and Transformation in a Late Prehistoric Complex in Southern California.* Dissertation, Department of Anthropology, University of California, Davis

Winterrowd, Cathy L. and Sean Cardenas
1987 *An Archaeological Investigation of a Portion of the Village of La Rinconada de Jamo SDI-5017 (SDM-W-150).* Unpublished Report on file at SCIC at SDSU.

Newspapers
San Diego Union – August 4, 1970
San Diego Union – May 21, 1872
San Diego Union – July 31, 1872
San Diego Union – February 16, 1873
San Diego Union – March 18, 1873
San Diego Union – December 12, 1873

Sanborn Fire Insurance Maps

1887
1888
1906
1921
1949

APPENDIX A

Resumes of Key Personnel

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Education

Master of Arts, History, University of San Diego, California **1982**

Bachelor of Arts, History and Anthropology, University of San Diego, California **1975**

Experience

Principal Investigator **1977–Present**
Brian F. Smith and Associates, Inc.

Brian F. Smith is the owner and principal historical and archaeological consultant for Brian F. Smith and Associates. In the past 32 years, he has conducted over 2,500 cultural resource studies in California, Arizona, Nevada, Montana, and Texas. These studies include every possible aspect of archaeology from literature searches and large-scale surveys to intensive data recovery excavations. Reports prepared by Brian Smith have been submitted to all facets of local, state, and federal review agencies, including the US Army Crops of Engineers (USACE), the Bureau of Land Management (BLM), Bureau of Reclamation (BR), the Department of Defense (DOD), and Department of Homeland Security. In addition, Mr. Smith has conducted studies for utility companies (Sempra Energy) and state highway departments (CalTrans).

Professional Accomplishments

These selected major professional accomplishments represent research efforts which have added significantly to the body of knowledge concerning the prehistoric lifeways of cultures once present in the southern California area and historic settlement since the late 18th century. Mr. Smith has been principal investigator on the following select projects, except where noted.

Downtown San Diego Mitigation and Monitoring Reporting Programs: Large number of downtown San Diego mitigation and monitoring projects submitted to the Centre City Development Corporation, some of which included Strata (2008), Hotel Indigo (2008), Lofts at 707 10th Avenue Project (2007), Breeza (2007), Bayside at the Embarcadero (2007), Aria (2007), Icon (2007), Vantage Pointe (2007), Aperture (2007), Sapphire Tower (2007), Lofts at 655 Sixth Avenue (2007), Metrowork (2007), The Legend (2006), The Mark (2006), Smart Corner (2006), Lofts at 677 7th Avenue (2005), Aloft on Cortez Hill (2005), Front and Beech Apartments (2003), Bella Via Condominiums (2003), Acqua Vista Residential Tower (2003), Northblock Lofts (2003), Westin Park Place Hotel (2001), Parkloft Apartment Complex (2001), Renaissance Park (2001), and Laurel Bay Apartments (2001).

Archaeology at the Padres Ballpark: Involved the analysis of historic resources within a seven block area of the "East Village" area of San Diego, where occupation spanned a period from the 1870s to the 1940s. Over a period of two years, BFSA recovered over 200,000 artifacts and hundreds of pounds of metal,

construction debris, unidentified broken glass, and wood. Collectively, the Ballpark project and the other downtown mitigation and monitoring projects represent the largest historical archaeological program anywhere in the country in the past decade. 2000-2007.

The Navy Broadway Complex: Architectural and historical assessment of over 25 structures that comprise the Naval Supply Depot, many of which have been in use since World War I and were used extensively during World War II. The EIR/EIS which was prepared included National Register evaluations of all structures. The archaeological component of the project involved the excavation of backhoe trenches to search for evidence of the remains of elements of the historic waterfront features that characterized the bay front in the latter half of the 19th century. This study was successful in locating portions of wharves and shanties that existed on the site prior to capping of this area after construction of the sea wall in the early 20th century.

4S Ranch Archaeological and Historical Cultural Resources Study: Data recovery program consisted of the excavation of over 2,000 square meters of archaeological deposits that produced over one million artifacts, primarily prehistoric materials. The archaeological program at 4S Ranch is the largest archaeological study ever undertaken in the San Diego County area and has produced data that has exceeded expectations regarding the resolution of long-standing research questions and regional prehistoric settlement patterns.

Charles H. Brown Site: Attracted international attention to the discovery of evidence of the antiquity of man in North America. Site located in Mission Valley, in the City of San Diego.

Del Mar Man Site: Study of the now famous Early Man Site in Del Mar, California, for the San Diego Science Foundation and the San Diego Museum of Man, under the direction of Dr. Spencer Rogers and Dr. James R. Moriarty.

Old Town State Park Projects: Consulting Historical Archaeologist. Projects completed in the Old Town State Park involved development of individual lots for commercial enterprises. The projects completed in Old Town include Archaeological and Historical Site Assessment for the Great Wall Cafe (1992), Archaeological Study for the Old Town Commercial Project (1991), and Cultural Resources Site Survey at the Old San Diego Inn (1988).

Site W-20, Del Mar, California: A two-year-long investigation of a major prehistoric site in the Del Mar area of the City of San Diego. This research effort documented the earliest practice of religious/ceremonial activities in San Diego County (circa 6,000 years ago), facilitated the projection of major non-material aspects of the La Jolla Complex, and revealed the pattern of civilization at this site over a continuous period of 5,000 years. The report for the investigation included over 600 pages, with nearly 500,000 words of text, illustrations, maps, and photographs which document this major study.

City of San Diego Reclaimed Water Distribution System: A cultural resource study of nearly 400 miles of pipeline in the City and County of San Diego.

Master Environmental Assessment Project, City of Poway: Conducted for the City of Poway to produce a complete inventory of all recorded historic and prehistoric properties within the City. The information was used in conjunction with the City's General Plan Update to produce a map matrix of the City showing areas of high, moderate, and low potential for the presence of cultural resources. The effort also included the development of the City's Cultural Resource Guidelines, which were adopted as City policy.

Tracy A. Stropes, MA, RPA

Senior Project Archaeologist
Brian F. Smith and Associates, Inc.
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Education

Master of Arts, Anthropology, San Diego State University, California **2007**

Bachelor of Science, Anthropology, University of California, Riverside **2000**

Experience

Project Archaeologist **March 2009–Present**
Brian F. Smith and Associates, Inc.

Duties include project management of all phases of archaeological investigations for local, state and federal agencies; field supervisor of all phases of archaeological projects; lithic analysis; National Register of Historic Places (NRHP) and California Environmental Quality Act (CEQA) site evaluations; authoring and coauthoring of cultural resource management reports primarily for southern California.

Archaeological Principal Investigator **June 2008–February 2009**
TRC Solutions

Archaeological Principal Investigator for cultural resource segment of Natural Sciences and Permitting Division. Duties included management of all phases of archaeological investigations for private companies and local, state and federal agencies; personnel management, field supervision of all phases of archaeological projects; laboratory supervision; lithic analysis, Native American consultation, and reporting; National Register of Historic Places (NRHP) and California Environmental Quality Act (CEQA) site evaluations; authoring and coauthoring of cultural resource management reports primarily for southern California.

Principal Investigator and Project Archaeologist **June 2006–May 2008**
Archaeological Resource Analysts

As a sub consultant, served as Principal Investigator and Project Archaeologist for several projects for SRS Inc. Primary tasks included filed direction, project management, personnel management, lab analysis, and authorship of company reports throughout southern California.

Project Archaeologist **September 1996–June 2006**
Gallegos & Associates

Duties for Gallegos and Associates included project management, laboratory management, lithic analysis, field direction, Native American consultation, report authorship, and editing for several technical reports for various projects throughout southern California. In addition, composed several data recovery and preservation programs for sites throughout California for both CEQA and NEPA level compliance.

Project Archaeologist **September 1993–September 1996**
Macko Inc.

Duties for Macko Inc. included project management, laboratory management, lithic analysis, field supervision, report authorship, and editing for technical reports for various projects throughout southern California.

Archaeological Field Technician **January 1996–September 1993**
Chambers Group Inc.

Duties for Chambers Group Inc. included archaeological excavation, survey, monitoring, wet screen facilities management, and project logistics. —January 1993 – September 1993.

Archaeological Field Technician **May–September 1992**
John Minch and Associates

Duties for John Minch and Associates included archaeological excavation, survey, monitoring, wet screen facilities management, and project logistics.

Reports/Papers

Principal Author

2009 An Archaeological Assessment for the Rivera-Placentia Project, City of Riverside, California. Prepared for Riverside Construction Company.

2009 Cultural Resource Data Recovery Plan for the North Ocean Beach Gateway Project. Prepared for the City of San Diego and KTU+A.

2009 Cultural Resource Letter Report for the Borrego Substation Feasibility Study, Borrego Springs, California. Prepared for RBF Consulting.

2009 A Cultural Resource Study for the Gatto Residence Project, La Jolla, California. Prepared for Marengo Martin Architects Inc.

2008 Phase I Cultural Resource Survey for the 28220 Highridge Road Development Project, Rancho Palos Verdes, California. Prepared for REC Development.

2008 Wild Goose Expansion 3 Project Butte County, California Colusa County, California. Prepared for Niska Gas Storage LLC.

2008 Class III Cultural Resource Survey for the Burlington Northern Santa Fe Four Railway Bridge Renewal Project San Bernardino County, California. Prepared for BNSF Railway Company.

2008 I-80 Colfax Site Cultural Resource Records Search Report, Placer County California. Prepared for Granite Construction Company.

2008 I-80 Gold Run Site Cultural Resource Records Search Report, Placer County California. Prepared for Granite Construction Company.

APPENDIX I

Horton Park SWPPP

GENERAL CONSTRUCTION ACTIVITY
STORM WATER POLLUTION PREVENTION PLAN (SWPPP)

For:

Horton Plaza Park

Corner of 4th and Broadway, San Diego, CA 92101
San Diego, CA 92101-2417

WDID NO: 9 37C368989

Prepared For:

Owner / Legally Responsible Person:
City of San Diego, Public Works/Field Engineering
9485 Aero Drive
San Diego, CA 92123
Dave Zoumaras, (858) 627-3201
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QSP/Contractor:
Decatur Environmental, LLC
Caine Tsutsui, (909) 991-9369
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Prepared by:

QSD/Civil Engineer:
Nasland Engineering
4740 Ruffner Street
San Diego, CA 92111
Adam Podlich, (858) 292-7770
adamp@nasland.com

February 4, 2014
Amended February 24, 2014
In reference to former SWPPP (WDID 9 37C366490)

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Certification by Qualified SWPPP Developer (QSD)

Project Name: Horton Plaza Park
Corner of 4th and Broadway, San Diego, CA 92101

I certify that I meet the requirements set by the State of California "General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities", Order No. 2012-0006-DWQ to prepare this Storm water Pollution Prevention Plan and that it was prepared under my responsible charge.



2/24/2014
Date

QSD Signature

Adam Podlich , RCE 69298	(858) 292-7770
QSD Printed Name & Title	*QSD Telephone Number*

Certification by Legally Responsible Person (LRP)

Project Name: Horton Plaza Park

Corner of 4th and Broadway, San Diego, CA 92101

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system design to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, to the best of my knowledge and belief, the information submitted is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

_____	_____
LRP Signature	*Date*
_____	_____
LRP Printed Name & Title	*LRP Telephone Number*

SECTION 1 SWPPP Requirements

1.1 Introduction

This Storm Water Pollution Prevention Plan (SWPPP) is provided as a guidance document for use by the Owner/LRP and Contractor/QSP as a tool for the implementation of construction phase storm water treatment measures. The Owner/LRP and Contractor/QSP are to review this document prior to start of construction and provide all necessary data in the appropriate locations within the SWPPP guidance document. The QSP shall thoroughly read this SWPPP document and become familiar with all of the requirements herein as the QSP shall be responsible for the implementation of the SWPPP as well as inspections, monitoring, record keeping, sampling, reporting, and adjustments to BMP's as required during construction.

This SWPPP has been prepared to comply with California's General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (General Permit). A copy of the State Water Resources Control Board (SWRCB) Order No. 2009-0009-DWQ as amended by the 2010-0014-DWQ as amended by the 2012-0006-DWQ General Permit can be found in Appendix A.

The General Permit states that all projects must obtain coverage electronically by uploading Permit Registration Documents (PRDs) such as a Notice of Intent (NOI), Storm Water Pollution Prevention Plan (SWPPP), and other compliance related documents required by the General Permit to the State Water Board's Storm Water Multi-Application & Report Tracking System (SMARTS) website and mailing the appropriate permit fee to the State Water Board.

This SWPPP has been prepared to address following storm water objectives:

- All pollutants and their sources, including sources of sediment associated with construction, construction site erosion and all other activities associated with construction activity are controlled;
- Where not otherwise required to be under a Regional Water Quality Control Board (RWQCB) permit, all non-storm water discharges are identified and either eliminated, controlled, or treated;
- Site BMPs are effective and result in the reduction or elimination of pollutants in storm water discharges and authorized non-storm water discharges from construction activity to the Best Available Technology/Best Control Technology (BAT/BCT) standard;
- Calculations and design details as well as BMP controls for site run-on are complete and correct, and

- Stabilization BMPs installed to reduce or eliminate pollutants after construction are completed.

The additional SWPPP objectives:

- Identify post-construction BMPs, which are those measures to be installed during construction that are intended to reduce or eliminate pollutants after construction is completed. Note that post-construction BMPs should be developed early in the project planning/design process and reports or drawings related to permanent BMP design should be referenced as needed.
- Identify and provide methods to implement BMP inspection, visual monitoring, Rain Event Action Plan (REAP) and Construction Site Monitoring Program (CSMP) requirements to comply with the General Permit.

1.2 Permit Registration Documents

The Permit Registration Documents (PRDs) were submitted in February 2014. Copies of the PRDs uploaded to the SMART website are included in this SWPPP in Appendix B and include the following:

- Notice of Intent (NOI)
- Risk Assessment
- Site Map
- Annual Fee

This SWPPP is also required to be filed electronically and has been submitted to the SWRCB as a PRD.

1.3 SWPPP Availability and Implementation

The General Permit (*Section XIV.C*) requires the SWPPP be available at the construction site during working hours while construction is occurring and shall be made available upon request by a State or Municipal inspector. When the original SWPPP is retained by a crewmember in a construction vehicle and is not currently at the construction site, current copies of the BMPs and map/drawing will be left with the field crew and the original SWPPP shall be made available via a request by radio/telephone. The SWPPP shall be implemented concurrently with the start of ground disturbing activities.

1.4 SWPPP Amendments

If amendments to the SWPPP are necessary, the General Permit requires that the SWPPP be amended or revised by a QSD (*Section XIV.A*) and that the SWPPP include a listing of the date of initial preparation and the date of each amendment. Amendments must be signed by a QSD (*Section VII.B.6*). It is recommended that all amendments be

dated, directly attached to the SWPPP, and logged in SWPPP Appendix C. Amendments shall consist of significant changes to the project information, such as change of contractor, modification to construction duration, addition of project area, etc. Minor changes such as adjustments to the location of BMP's will not require an amendment, but shall be recorded in the inspection logs and indicated on the site map.

1.5 Retention of Records

The General Permit (*Sections I.J.69 and IV.G*) requires that all dischargers maintain a paper or electronic copy of all required records for three years from the date generated or date submitted, whichever is last. These records must be available at the construction site until construction is completed. The discharger shall furnish the RWQCB, SWRCB, or US Environmental Protection Agency (EPA), within a reasonable time, any requested information to determine compliance with this General Permit. Upon completion of construction, the Contractor/QSP shall supply the SWPPP and all associated documents to the Owner/LRP who will then be responsible for retaining the documents for the remaining duration of the three years.

1.6 Required Non-Compliance Reporting

The General Permit identifies several areas of non-compliance reporting. It is the responsibility of the permittee to properly document reportable discharges or other violations of the General Permit. Exceedances and violations should be reported using the SMARTS system and include the following:

- Numeric Action Level (NAL) exceedances (NAL Exceedance Report upon request of the RWQCB);
- Numeric Effluent Limitation (NEL) Violation Report
- Self-reporting of any other discharge violations or to comply with RWQCB enforcement actions; and
- Discharges which contain a hazardous substance in excess of reportable quantities established in 40 CFR §§ 117.3 and 302.4, unless a separate NPDES Permit has been issued to regulate those discharges.

In the event of the exceedance of a NAL, document the subsequent site evaluation in the SWPPP (*Section V.C.4*). Include the results of an NAL exceedance site evaluation along with other non-compliance events in Appendix I of this SWPPP.

1.7 Annual Report

The Annual Report requirement has a goal of making site personnel aware of required data collection and reporting elements. The General Permit requires that all permittees prepare, certify, and electronically submit an Annual Report no later than September 1 of each year and retain an electronic or paper copy of each Annual Report for a minimum

of three years after the date the Annual Report is filed. Reporting requirements are identified in Section XVI of the General Permit and include (but are not limited to) providing a summary of:

- Corrective actions and compliance activities, including those not implemented;
- Violations of the General Permit;
- Date, time, place, and name(s) of the inspector(s) for all sampling, inspections, and field measurement activities;
- Visual observation and sample collection exception records; and
- Training documentation of all personnel responsible for General Permit compliance activities.

The QSP shall be responsible for collecting, and coordinating all data required for the annual report. The information shall be provided to the LRP in advance of the September 1st deadline to allow for time to compile the information and upload to SMART's.

1.8 Changes to Permit Coverage

The General Permit (*Section II.C*) allows a permittee to reduce or increase the total acreage covered under the General Permit when a portion of the project is complete and/or conditions for termination of coverage have been met; when ownership of a portion of the project is sold to a different entity; or when new acreage is added to the project.

To change the acreage covered, the permittee must electronically file modifications to PRDs (revised NOI, site map, SWPPP revisions as appropriate, and certification that new landowners have been notified of applicable requirements to obtain permit coverage (including name, address, phone number, and e-mail address of new landowner) in accordance with requirements of the General Permit within 30 days of a reduction or increase in total disturbed area. Include any updates to PRDs submitted via SMARTS in Appendix E of this SWPPP. Document any related SWPPP revisions/amendments (*Section II.C.2*) in Appendix C of this SWPPP.

1.9 Notice of Termination

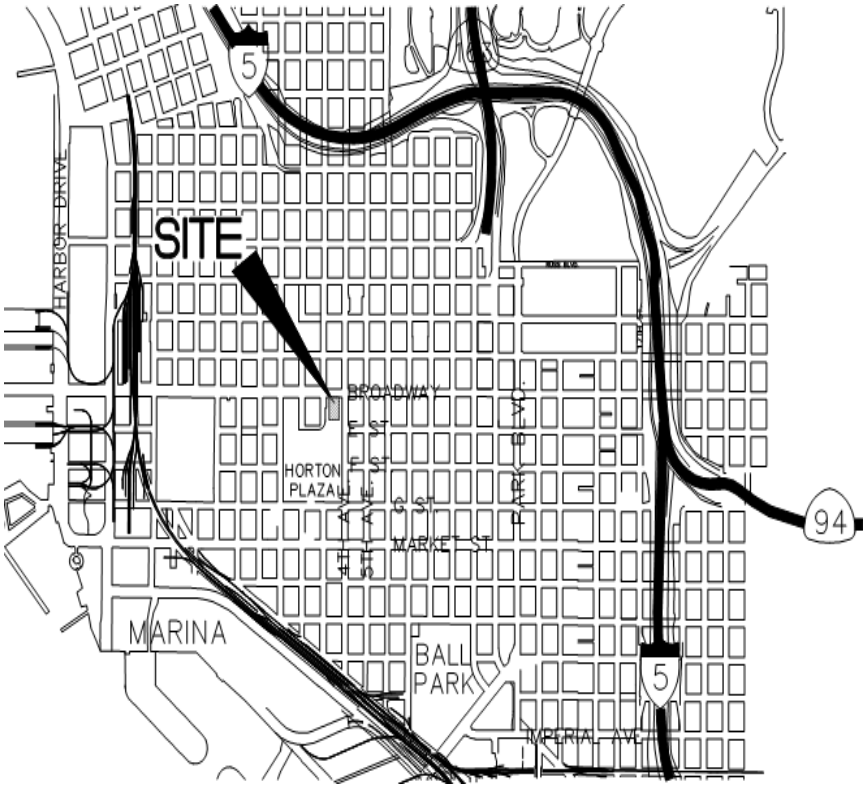
To terminate coverage under the General Permit, a Notice of Termination (NOT) must be submitted electronically via SMARTS. A “final site map” and photos are required to be submitted with the NOT. Filing a NOT certifies that all General Permit requirements have been met. The NOT is submitted when the construction project is complete and within 90 days of meeting all General Permit requirements for termination and final stabilization (*Section II.D*) including:

- The site will not pose any additional sediment discharge risk than it did prior to construction activity.
- All construction related equipment, materials and any temporary BMPs no longer needed are removed from the site.
- Post-construction storm water management measures are installed and a long-term maintenance plan that is designed for a minimum of five years has been developed.

The NOT must demonstrate through photos, Revised Universal Soil Loss Equation (RUSLE) results, or results of testing and analysis that the project meets all of the requirements of Section II.D.1 of the General Permit by one of the following methods:

- 70% final cover method (no computational proof required); or
- RUSLE/RUSLE2 method (computational proof required); or
- Custom method (discharger demonstrates that site complies with final stabilization).

SECTION 2 Project Information



2.1 Project and Site Description

The Horton Plaza Park is located in the Gaslamp District in the City of San Diego and is bounded by 4th Avenue, Broadway, and Broadway Circle. The existing 1.7 acre site is 100 percent developed with decorative paving, landscaping, a historic fountain, and the Robinson May Building (one multi story commercial building). The Park's existing pervious surfaces are four separated landscaped areas consuming approximately 13 percent of the project site. These landscaped areas are surrounded by concrete curb and are raised above the existing sidewalk grade preventing storm water from sheeting into them. The existing drainage pattern collects sheeting storm water through a variety of trench drains, catch basins, and curb inlets that ultimately discharges directly to the City of San Diego's public storm drain system.

The proposed project plans to renovate the existing Historic Horton Plaza Park to resemble the original layout of the park back in the early 1900's. The existing Robinson's May Building directly south of the historic park will be demolished in order to construct a public urban plaza. The plaza will consist of amphitheatre seating, landscaping, a water fountain, and three retail kiosks. Two of the kiosks will have public restrooms and underground storage. The Urban Plaza will be constructed mostly of pavers and hardscape. However, additional planters will act as self retaining areas, increasing the pervious area to 14 percent. Attenuation of the sites storm water

discharge can be attributed to this slight increase in pervious surfaces. Best management practices (BMPs) implemented on site will strategically employ source control throughout the site to prevent polluted storm water from discharging into the storm drain system. Treatment of storm water will be accomplished by a green roof located on the largest kiosk and media filters placed in all inlets. These BMPs satisfy the requirements set forth by the City of San Diego's Storm Water Standards, the County SUSMP, and meet the requirements set forth in LEED Credits 6.1 and 6.2 related to Storm water Quantity and Quality Control.

Receiving Water Information

According to the *San Diego Region 9 Water Quality Plan,* the Horton Plaza Park has receiving waters located within the following areas:

- Pueblo San Diego Hydrologic Unit (HU 908.00)
    - San Diego Mesa Hydrologic Area (HA 908.20)
        - Lindbergh Hydrologic Subarea (HSA 908.21)

The downstream body of water associated with this project is the San Diego Bay. The San Diego Bay is approximately 0.90 miles west of the site. The Section 303(d) list shows the following bodies of water as contaminated or stressed with.

The San Diego Bay (908.21) is polluted/stressed by the following contaminants (estimated size):

- Benthic Community Effects (9.9 acres)
- Indicator Bacteria (9.9 acres)
- Sediment Toxicity (9.9 acres)

Soils & Geologic Conditions

The existing topography of the project site is generally level and maintains a range of elevations between 39' to 50'. Per the Geotechnical Engineering Report prepared by URS dated January 20, 2011, the existing soil profile consists of undocumented fill and Bay Point Formation. The undocumented fill is expected to be around 3 to 4 feet below ground surface and consists of loose to moderately dense silty to clayey sand. The Bay Point Formation is expected to underlie the undocumented fill and consist mostly of dense to very dense silty sand, clayey sand, and/or very stiff sandy clay. Ground water for the site fluctuates depending on the tide but is typically found at depths of 30 to 40 feet below ground level. Groundwater is not expected to be encountered in this project.

2.2 Storm Water Run-On From Off Site Areas

There is no storm water run-on associated with this site. Off site runoff is captured and conveyed in the existing curb and gutter surrounding the site where it discharges into the public storm drain system.

2.3 Findings of the Construction Site Sediment and Receiving Water Risk Determination

This project has been identified as having a low sediment risk and a low receiving water risk. Therefore, the proposed construction site is Risk Level 1. This risk level was determined by utilizing the Risk Determination Worksheet provided in Appendix 1 of the General Permit and utilization of the online SMARTS calculator. Requirements associated with Risk Level 1 projects are provided in Attachment C of the General Permit, as well as in Appendix D of this SWPPP.

2.4 Construction Schedule

The proposed construction schedule is provided in Appendix F of this SWPPP. The schedule shall be updated by the QSP on a regular basis to show changes in start or completion dates. If the construction end date is beyond the date shown on the NOI, the LRP and QSD shall be notified so an amendment can be prepared.

2.5 Potential Construction Site Pollutant Sources

The types of construction activities and associated characteristic pollutants anticipated to be present at this construction site are discussed below and provided in Appendix G of this SWPPP. The QSP shall assess and, if necessary, amend this list as needed to include all activities and associated pollutants that are anticipated to occur on this construction site.

- Demolition activities (removal of existing infrastructure and buildings)
  - sediment
  - toxics (e.g. paint strippers, solvents, adhesives, vehicle fuels)
  - trace metals (e.g. galvanized metal, painted surfaces, preserved wood)
  - bacteria (disturbance to existing sewer systems)
  - trash/debris

- Utility services installation (surface grading, road construction, pipe laying)
  - sediment
  - toxics (equipment/vehicle fuels and lubricants, chlorinated water from utility line testing and flushing)
  - soil amendments (gypsum, lime, etc.)
  - bacteria (sewer lines)

- Facility construction (residential, commercial, or industrial development)
  - sediment
  - toxics (e.g. paint strippers, solvents, detergents, adhesives, fuels)
  - miscellaneous waste (concrete truck washout, runoff from material stockpiles)
  - trash/debris
  - bacteria (temporary bathroom facilities, disturbance to existing sewer lines)

- Park areas or habitat conservation (areas that will not contain structures)
  - sediment
  - nutrients (fertilizers)
  - bacteria (temporary bathroom facilities)

2.6 Identification of Non-Storm Water Discharges

This project will utilize non-storm water BMPs to control or eliminate all non-storm water discharges associated with construction activities such as:

- Vehicle/equipment fueling, cleaning, & maintenance
- Paving operations
- Concrete curing & concrete finishing

A list of BMPs to be used on this project is provided in Section 3.3 below.

SECTION 3 Best Management Practices

3.1 Schedule for BMP Implementation

This section contains a series of BMPs to eliminate or reduce pollutants in storm water runoff and authorized non-storm water discharges from the project site during construction. The General Permit prohibits the discharge of storm water that causes or threatens to cause pollution, contamination or nuisance. It also allows the Developer/Owner to choose the most economical, effective, and possibly innovative BMPs to reduce or eliminate pollutants in runoff. The BMPs described in this section are designed to meet the Best Available Technology Economically Achievable (BAT) and Best Conventional Pollutant Control Technology (BCT) standards to reduce or eliminate storm water pollution, as required by the regulations. BMPs must be implemented, modified, and maintained by the QSP to reflect the phase of construction and the weather conditions.

3.2 Erosion and Sediment Control

A system of erosion and sediment control practices and BMPs, designed to reduce or eliminate pollutants in storm water discharges and authorized non-storm water discharges from construction activity to the BAT/BCT standard, will be implemented on the site.

The following practices for effective temporary and final erosion control during construction will be implemented:

- Preserve existing vegetation where required and when feasible
- Apply temporary erosion control to remaining active and non-active areas as required by the California Storm water BMPs Handbook – Construction, and the contract documents. Reapply as necessary to maintain effectiveness.
- Implement temporary erosion control measure at regular intervals throughout the defined rainy season to achieve and maintain the contract's disturbed soil area requirements. Implement erosion control prior to the defined rainy season.
- Stabilize non-active areas as soon as feasible after the cessation of construction activities.
- Control erosion in concentrated flow paths by applying erosion control blankets, erosion control seeding, and lining swales as required in the contract documents.
- Apply seed to areas deemed substantially complete by the Owner/LRP during the defined rainy season.
- At completion of construction, apply permanent erosion control to all remaining disturbed soil areas.
- Minimize the length and steepness of slopes
- Keep runoff velocities low
- Prepare drainage ways and outlets to handle concentrated runoff until permanent drainage structures are constructed

- Trap sediment onsite
- Inspect and maintain control measures frequently
- Fit grading to the surrounding terrain
- Time grading operations to minimize soil exposure

BMPs identified in the CASQA Construction Handbook will be implemented to the BAT/BCT standard in order to provide erosion control, sediment control, tracking control, and wind erosion control on the site. Copies of anticipated applicable BMP fact sheets are included in Appendix H of this SWPPP. The QSP shall assess and, if necessary, utilize additional BMPs in order to cover all activities and associated pollutants that are anticipated to occur on this construction site. The QSP shall also markup any of the fact sheets that are utilized in order to more clearly indicate the exact methods being implemented. BMPs to be implemented on this site include but are not limited to: (see next page)

EROSION CONTROL BMPs					
BMP ID#	BMP NAME	USED?		IF USED OR NOT, STATE REASON	Phase
		YES	NO		
EC-1	Scheduling	X		Scheduled construction activities reduces the amount & duration of soil exposure	All
EC-2	Preservation of Existing Vegetation	X		Preserve existing vegetation to the maximum extent practicable	All
EC-3	Hydraulic Mulch		X	Use alternative erosion control BMP EC-3	N/A
EC-4	Hydroseeding	X		Per City of San Diego Municipal Code, if soil is to remain exposed for more than 90 days, apply non irrigative hydroseed to all exposed areas.	Grading/ delays
EC-5	Soil Binders		X	Use alternative erosion control BMP EC-4	N/A
EC-6	Straw Mulch		X	Use alternative erosion control BMP EC-4	N/A
EC-7	Geotextiles & Mats		X	Use alternative erosion control BMP EC-4	N/A
EC-8	Wood Mulching		X	Use alternative erosion control BMP EC-4	N/A
EC-9	Earth Dikes & Drainage Swales		X	Use alternative erosion control BMP EC-4	N/A
EC-10	Velocity Dissipation Devices		X	Use alternative erosion control BMP EC-4	N/A
EC-11	Slope Drains		X	Use of slope drains is not anticipated	N/A
EC-12	Stream bank Stabilization		X	Not applicable. There are no stream banks on project site	N/A
EC-13	Reserved		X	N/A	N/A
EC-14	Compost Blankets		X	Use alternative erosion control BMP EC-4	N/A
EC-15	Soil Preparation / Roughening		X	Use alternative erosion control BMP EC-4	N/A
EC-16	Non-Vegetative Stabilization		X	Use alternative erosion control BMP EC-4	N/A

TEMPORARY SEDIMENT CONTROL BMPS					
BMP ID#	BMP NAME	USED?		IF USED OR NOT, STATE REASON	SCHEDULE
		YES	NO		
SE-1	Silt Fence		X	Use alternative sediment control BMPs SE-4, & 6	N/A
SE-2	Sediment Basin		X	Use alternative sediment control BMPs SE-5 & 6	N/A
SE-3	Sediment Trap		X	Not anticipated, use SE-2	N/A
SE-4	Check Dams	X		Use at slopes, swales, or drainage channels on the project site	All
SE-5	Fiber Rolls	X		Apply along the edge of the construction fencing and 5' vertical contours as shown on the erosion control plan	All
SE-6	Gravel Bag Berm	X		Use in conjunction with or in place of SE-4, SE-5 and SE-10	All
SE-7	Street Sweeping & Vacuuming	X		Street sweep parking lots as needed to prevent the transportation of sediments by vehicles.	All
SE-8	Sandbag Barrier		X	Use alternative sediment control BMPs SE-4, 5 & 6	N/A
SE-9	Straw Bale Barrier		X	Use alternative sediment control BMPs SE-4, 5 & 6	N/A
SE-10	Temporary Drain Inlet Protection	X		Place around drain inlets on project site that have the potential to receive sediment run-on from construction	All
SE-11	Active Treatment Systems		X	Use alternative sediment control BMPs SE-4, 5 & 6	N/A
SE-12	Temporary Silt Dike		X	Place along the temporary construction fencing in all paved areas	N/A
SE-13	Compost Socks and Berms		X	Use alternative sediment control BMPs SE-4, 5 & 6	N/A
SE-14	Biofilter Bags		X	Use alternative sediment control BMPs SE-4, 5 & 6	N/A

TEMPORARY TRACKING CONTROL BMPS					
BMP ID#	BMP NAME	USED?		IF USED OR NOT, STATE REASON	SCHEDULE
		YES	NO		
TC-1	Stabilized Construction Entrance/Exit	X		Implement at construction site entrance/exit	All
TC-2	Stabilized Construction Roadway		X	Not applicable, site is located in a rural area.	N/A
TC-3	Entrance/Outlet Tire Wash	X		Use in conjunction with tracking control BMP TC-1	N/A

TEMPORARY WIND EROSION CONTROL BMPS					
BMP ID#	BMP NAME	USED?		IF USED OR NOT, STATE REASON	SCHEDULE
		YES	NO		
WE-1	Wind Erosion Control	X		Use on all areas of exposed soil	All

3.3 Non-Storm Water and Materials Management

A system of non-storm water and materials management BMPs, designed to effectively reduce pollutants associated with material storage, material use, and waste management will be implemented on the site. Copies of anticipated applicable BMP fact sheets are included in Appendix H of this SWPPP. The QSP shall assess and, if necessary, utilize additional BMPs in order to cover all activities and associated pollutants that are anticipated to occur on this construction site. The QSP shall also markup any of the fact sheets that are utilized in order to more clearly indicate the exact methods being utilized. BMPs to be implemented on this site include but are not limited to: (see next page)

NON-STORM WATER MANAGEMENT POLLUTION CONTROL BMPS				
BMP ID#	BMP NAME	USED?		IF USED OR NOT, STATE REASON
		YES	NO	
NS-1	Water Conservation Practices	X		Use to reduce or eliminate non-storm water discharges
NS-2	Dewatering Operations	X		Use at all areas of where ground water will be discharged.
NS-3	Paving and Grinding Operations	X		Use in all paving areas
NS-4	Temporary Stream Crossing		X	There are no streams in project vicinity
NS-5	Clear Water Diversion		X	There are no streams in project vicinity
NS-6	Illicit Connection & Illegal Discharge	X		Educate all employees to identify and report and illegal construction activities
NS-7	Potable Water/ Irrigation	X		Use at all areas of discharge from potable or irrigation water lines
NS-8	Vehicle and Equipment Cleaning	X		If necessary, wash in designated contained areas only. Train employees on proper cleaning procedures
NS-9	Vehicle and Equipment Fueling	X		If necessary, fuel in designated contained areas only. Enclose/cover stored fuel & implement spill control (WM-4). Train employees on proper fueling procedures
NS-10	Vehicle and Equipment Maintenance	X		If necessary, perform maintenance in designated contained areas only. Use in conjunction with NS-8 & NS-9. Locate maintenance areas a minimum of 50' from downstream drainage facilities and watercourses
NS-11	Pile Driving Operations		X	Pile Driving is not anticipated for this project
NS-12	Concrete Curing	X		Use at all areas that require curing compound removal
NS-13	Concrete Finishing	X		Use at all areas that require final surface finish appearances
NS-14	Material Over Water		X	There are no bodies of water in project vicinity
NS-15	Demolition Over or Adjacent to Water		X	The project is located approximately 200 feet from the San Diego Bay. Therefore, the project is not likely to directly impact water quality.
NS-16	Temporary Batch Plants		X	Batch plants not anticipated on site

WASTE MANAGEMENT & MATERIALS POLLUTION CONTROL BMPS				
BMP ID#	BMP NAME	USED?		IF USED OR NOT, STATE REASON
		YES	NO	
WM-1	Material Delivery and Storage	X		Train employees on the proper material delivery & storage practices
WM-2	Material Use	X		Minimize hazardous material use on-site. Train employees in proper material use
WM-3	Stockpile Management	X		During rainy season, stockpiles of soil & paving shall be covered with plastic & enclosed with fiber rolls
WM-4	Spill Prevention and Control	X		Train employees on proper spill cleanup procedures. Waste storage areas shall be kept clean & equipped with ample cleaning supplies
WM-5	Solid Waste Management	X		Train employees to handle construction waste & litter properly, and dump legally
WM-6	Hazardous Waste Management	X		Train employees to handle hazardous waste properly, and dump legally
WM-7	Contaminated Soil Management	X		Educate employees in identifying contaminated soils, as well as handling & disposal procedures. Contaminated soils are not anticipated.
WM-8	Concrete Waste Management	X		Concrete washout areas will be implemented on-site in a designated contained area
WM-9	Sanitary/Septic Waste Management	X		Portable sanitary facility will be located away from drainage & traffic circulation. Monitor at least weekly for good working order.
WM-10	Liquid Waste Management		X	There are no proposed drilling slurries or drilling fluids

3.4 Post-Construction Storm Water Management Measures

Once construction has been completed, activities at the site have an ongoing potential to cause storm water pollution. The General Permit and the Municipal Permit require that the SWPPP contain descriptions of activities, which may be potential sources of storm water pollution after the project is complete and post-construction BMPs that will reduce the potential for such pollution.

This section describes post-construction BMPs that will be implemented to provide protection of water quality, habitat, and flood control needs associated with the project development. The post-construction BMP system will be comprised of site design elements, source controls, and treatment controls. These BMPs are thoroughly discussed in the *Horton Plaza Park Storm Water Quality Technical Report,* prepared by Nasland Engineering, dated September, 2012). A brief summary of the post-construction BMPs that are to be implemented upon the completion of the project is shown below.

Site Design Elements:

Site design elements considered during the design of this project aim to maintain the pre-developed rainfall run-off characteristics. The following are incorporated:

- Construct impervious surfaces with permeable materials
- Minimize directly connected impervious areas
- Maximize water conservation

Source Controls:

The goal of source control best management practices is to prevent potential contamination of storm water run-off by site features. The following elements are incorporated:

- Use efficient irrigation and landscape design to prevent over watering and unnecessary irrigation runoff.
- Design trash storage areas to reduce pollutant introduction.
- Employ integrated pest management.
- Provide storm water conveyance system stamping and signing.
- Design new building fire sprinkler systems to enable discharge to sanitary sewer.
- Use of non toxic roofing materials.
- Manage air conditioning condensate.
- Provide trash receptacles throughout the site to prevent litter.

Treatment Controls:

In order to provide treatment for the project's primary pollutants of control, the following treatment control BMPs are proposed:

- Self Treating areas
- Green Roof
- Media Filter Inserts for inlets

Section XIII of the General Permit discusses Post-Construction Standards. This section states that three years from the adoption date of the new General Permit, the Executive Officer of the Regional Board may require that all dischargers comply with proposed runoff reduction requirements. During the course of this project, General Permit runoff reduction requirements will not be implemented; however, this project has been designed to reduce storm water runoff during the 1, 2, 10, and 100 year storm events as required by the local municipality. Information pertaining to pre and post run-off characteristics can be found in the *Horton Plaza Park Hydrology Study* prepared by Nasland Engineering, dated August, 2012.

SECTION 4 BMP Inspection, Maintenance, & Rain Event Action Plans (REAP)

4.1 Construction Site Monitoring Program

Risk Level 1 dischargers shall ensure that all inspection, maintenance, repair, and sampling activities at the project location shall be performed or supervised by a Qualified SWPPP Practitioner (QSP) representing the discharger. The QSP may delegate any or all of these activities to an employee trained to do the task(s) appropriately, but shall ensure adequate deployment.

Risk Level 1 dischargers shall perform weekly inspections and observations, and at least once each 24-hour period during extended storm events, to identify and record BMPs that need maintenance to operate effectively, that have failed, or that could fail to operate as intended. Inspectors shall be the QSP or be trained by the QSP. If warranted by the problem encountered, a SWPPP amendment should be prepared by the QSD.

Upon identifying failures or other shortcomings, as directed by the QSP, Risk Level 1 dischargers shall begin implementing repairs or design changes to BMPs within 72 hours of the identification and complete the changes as soon as possible.

For each inspection required, Risk Level 1 dischargers shall complete an inspection checklist which is provided in Appendix I of this SWPPP. After inspections are performed, completed inspection checklists shall also be attached in Appendix I or in an accompanying binder that is referenced within the SWPPP and readily accessible on site.

4.2 Rain Event Action Plans

The New General Permit does not require Risk Level 1 projects to provide a Rain Event Action Plan.

SECTION 5 Training

5.1 Training

The General Permit requires (*Section VII*) that all elements of the SWPPP be developed by a QSD and implemented by a QSP. The QSP may delegate tasks to trained employees provided adequate supervision and oversight is provided.

Personnel at the site shall receive training appropriate for individual roles and responsibilities on the project. Appropriate personnel shall receive training on SWPPP implementation, BMP inspection and maintenance, and record keeping. Document all training activities (formal and informal) and retained a record of training activities in SWPPP Appendix K. Training documentation must also be submitted in the Annual Report.

SECTION 6 Responsible Parties and Operators

6.1 Responsible Parties

A list of authorized representatives is provided in Appendix L in this SWPPP along with project site personnel who will be responsible for SWPPP activities, including the QSD and QSP. This list includes the names of the individuals granted authority to sign permit-related documents.

Copies of the written authorizations for duly authorized representatives are located in Appendix L. The appendix includes the name and contact information for the individual, their role on the project, date of training, and date of recorded entry as well as a copy of training certificates or other verification of training. If the QSP is changed during the project, the new QSP shall update the information in Appendix L and notify the LRP and QSD.

6.2 Contractor List

A list of names of all contractors, subcontractors, and individuals who will be directed by the QSP is provided in Appendix M of this SWPPP. The list includes telephone numbers, emergency contact numbers, work addresses and the specific areas of responsibility of each subcontractor. The QSP shall provide the information required and update the list as needed during construction.

APPENDIX A
CONSTRUCTION GENERAL PERMIT

APPENDIX B
SUBMITTED PERMIT REGISTRATION DOCUMENTS (PRDS)

State Water Resources Control Board

NOTICE OF INTENT

GENERAL PERMIT TO DISCHARGE STORM WATER
ASSOCIATED WITH CONSTRUCTION ACTIVITY
(WQ ORDER No. 2009-0009-DWQ)

WDID: 9 37C368989 **Risk Level:** Level1

Property Owner Information

Type:

Name:	City of San DiegoEngineering and Capital Projects Depart	Contact Name:	Dave Zoumaras
Address:	9485 Aero Dr	Title:	Deputy Director
Address 2:		Phone #:	858-627-3201
City/State/Zip:	San Diego CA 92123	Email:	dzoumaras@sandiego.gov

Contractor/Developer Information

Name:	Civic San Diego	Contact Name:	Daniel Kay
Address:	401 B Street 4th Floor	Title:	Snr Project Manager
Address 2:		Phone #:	619-533-7159
City/State/Zip:	San Diego CA 92101	Email:	kay@civicsd.com

Construction Site Information

Site Name:	Horton Plaza Park	Contact Name:	Caine Tsutsui
Address:	Corner of 4th and Broadway	Title:	QSP
City/State/Zip:	San Diego CA 92101	Site Phone #:	909-991-9369
County:	San Diego	Email:	caine.tsutsui@decatur-environmental.(
Latitude:	32.715036	Longitude:	-117.161494
Total Size of Construction Area:	1.7	Construction Start:	February 28, 2014
Total Area to be Disturbed:	1.7	Complete Grading:	December 31, 2014
		Final Stabilization:	September 01, 2015

Risk Values

R: 24.92 K: 0.32 LS: 1.47 Beneficial Uses/303(d): No

Type of Construction: *Commercial*Reconstruction*Utility: Storm Drain, Water, Sewer, Dry

Receiving Water: San Diego Bay

Qualified SWPPP Developer: Adam Podlich Certification #: 00477

RWQCB Jurisdiction: Region 9 - San Diego

Phone: 619-516-1990 Email: r9_stormwater@waterboards.ca.gov

Certification

Name Frank Gaines Date: February 10, 2014

Title: Senior Bridge Engineer

Approved Date: February 21, 2014

Dave Zoumaras
City of San DiegoEngineering and Capital Projects Department
9485 Aero Dr
San Diego CA 92123

RECEIPT OF YOUR NOTICE OF INTENT (NOI)

The State Water Resources Control Board (State Water Board) has received and processed your NOI to comply with the terms of the General Permit to Discharger Storm Water Associated with Construction Activity. Accordingly, you are required to comply with the permit requirements.

The Waste Discharger Identification (WDID) number is: **9 37C368989** . Please use this number in any future communication regarding this permit.

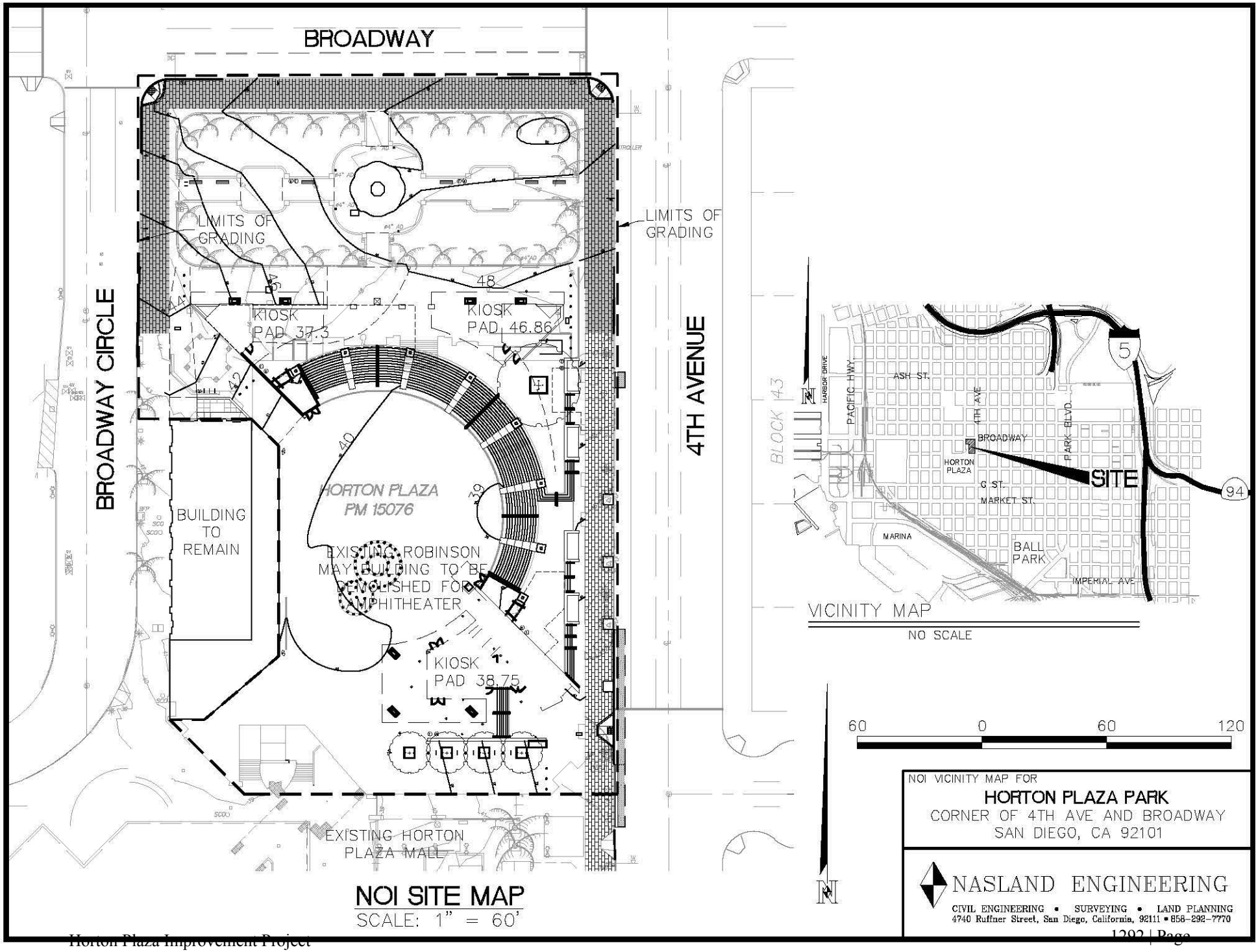
	SITE DESCRIPTION
OWNER:	City of San DiegoEngineering and Capital Projects Departme
DEVELOPER:	Civic San Diego
SITE INFORMATION:	Horton Plaza Park Corner of 4th and Broadway San Diego
TOTAL DISTURBED ACRES:	1.7
START DATE:	February 28, 2014
COMPLETION DATE:	September 01, 2015
COUNTY:	San Diego

When the Owner changes , a new NOI, site map, and fee must be submitted by the new Owner. As the previous owner, you are required to submit a Notice of Termination (NOT) to the local Regional Water Board stating you no longer own or operate the Site and coverage under the General Permit is not required. Unless notified, you will continue and are responsible to pay the annual fee invoiced each January.

If you have any questions regarding permit requirements, please contact your Regional Water Board at 619-516-1990 . Please visit the storm water web site at http://www.waterboards.ca.gov/water_issues/programs/stormwater/ to obtain an NOT and other storm water related information and forms.

Sincerely,

Storm Water Section
Division of Water Quality



NOI SITE MAP
SCALE: 1" = 60'

Rainfall Erosivity Factor

Region: 25 per Figure 1: Erosivity Index Zone Map

Rainfall Erosivity Factor:
R_{100}= 20 per Figure 4: Isoerodent Map of California

Erosivity Index
Construction Dates
Start: May 15, 2013
End: December 31, 2014

%EI February 28, 2014 = 37.6% per Table 1: Erosivity Index
%EI September 1, 2015 = 62.2%

Max Difference = 124.6%
%EI Used = 124.6%

Rainfall Erosivity Factor (R)
$R = R_{100}$*%EI
R = 20 * 124.6%
R = 24.92

Owner Info | Developer Info | Site Info | Addtl Site Info | Risk | Post Construction | Billing Info | Attachments | Certification | Print | Status History | Linked Users | NOTs | COIs

SEDIMENT RISK FACTOR WORKSHEET
Instructions: Enter R,K and LS factor values. System will calculate watershed erosion estimates and site sediment risk factor
A. Sediment Risk

A) R Factor Value:(What's this?)	24.92 * Instructions to Calculate the R-factor
B) K Factor Value (weighted average, by area, for all site soils)(What's this?) ***If not using the SWRCB map(Populate K Factor) upload your analysis on the Attachment Tab prior to submitting to the SWRCB.	0.32 * Populate K Factor
C) LS Factor (weighted average, by area, for all slopes)(What's this?) ***If not using the SWRCB map(Populate LS Factor) upload your analysis on the Attachment Tab prior to submitting to the SWRCB.	1.47 * Populate LS Factor
Watershed Erosion Estimate (=R*K*LS) in tons/acre	11.69
Site Sediment Risk Factor Low Sediment Risk: < 15 tons/acre Medium Sediment Risk: >/= 15 and <75 tons/acre High Sediment Risk: >/= 75 tons/acre	Low

RECEIVING WATER (RW) RISK FACTOR WORKSHEET
A. Watershed Characteristics

A.1.(a) Does the disturbed area discharge directly or indirectly to a 303(d) listed waterbody impaired by sediment? OR A.1.(b) Is the disturbed area located within a sub-watershed draining to a 303(d) listed waterbody impaired by sediment? OR A.2. Is the disturbed area located within a planning watershed draining to a waterbody with designated beneficial uses of COLD, SPAWN AND MIGRATORY?	Populate Receiving Water Risk; No * ; Yes = High, No = Low; Statewide Map of High Receiving Water Risk Watersheds	Low

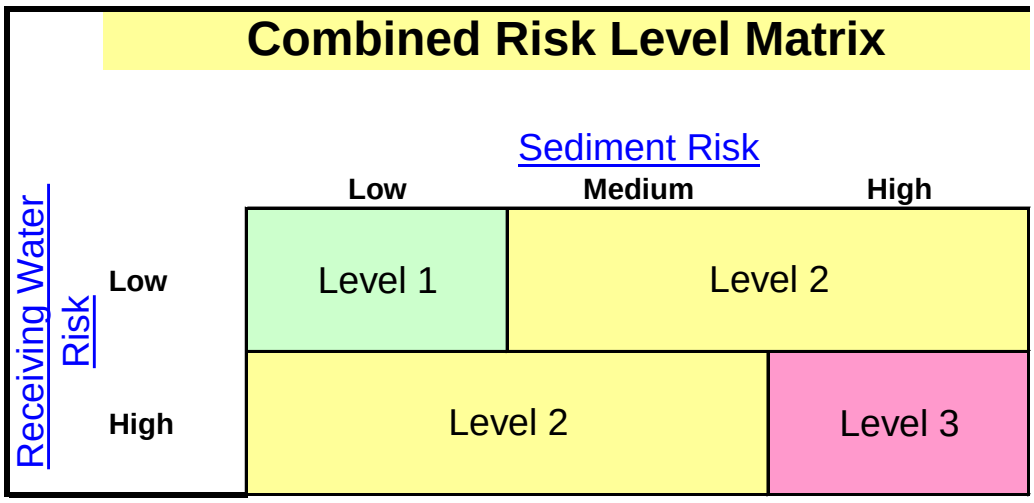
C. Combined Risk Level Matrix

Receiving Water Risk	Sediment Risk: Low	Medium	High
Low	Level1	Level2	
High	Level2		Level3

Project Sediment Risk:	Low
Project Receiving Water Risk:	Low
Project Combined Risk:	Level1

	A	B	C
1	**Sediment Risk Factor Worksheet**		**Entry**
2	**A) R Factor**		
3	Analyses of data indicated that when factors other than rainfall are held constant, soil loss is directly proportional to a rainfall factor composed of total storm kinetic energy (E) times the maximum 30-min intensity (I30) (Wischmeier and Smith, 1958). The numerical value of R is the average annual sum of EI30 for storm events during a rainfall record of at least 22 years. "Isoerodent" maps were developed based on R values calculated for more than 1000 locations in the Western U.S. Refer to the link below to determine the R factor for the project site.		
4	http://cfpub.epa.gov/npdes/stormwater/LEW/lewCalculator.cfm		
5	**R Factor Value**		24.97
6	**B) K Factor (weighted average, by area, for all site soils)**		
7	The soil-erodibility factor K represents: (1) susceptibility of soil or surface material to erosion, (2) transportability of the sediment, and (3) the amount and rate of runoff given a particular rainfall input, as measured under a standard condition. Fine-textured soils that are high in clay have low K values (about 0.05 to 0.15) because the particles are resistant to detachment. Coarse-textured soils, such as sandy soils, also have low K values (about 0.05 to 0.2) because of high infiltration resulting in low runoff even though these particles are easily detached. Medium-textured soils, such as a silt loam, have moderate K values (about 0.25 to 0.45) because they are moderately susceptible to particle detachment and they produce runoff at moderate rates. Soils having a high silt content are especially susceptible to erosion and have high K values, which can exceed 0.45 and can be as large as 0.65. Silt-size particles are easily detached and tend to crust, producing high rates and large volumes of runoff. Use Site-specific data must be submitted.		
8	Site-specific K factor guidance		
9	**K Factor Value**		0.32
10	**C) LS Factor (weighted average, by area, for all slopes)**		
11	The effect of topography on erosion is accounted for by the LS factor, which combines the effects of a hillslope-length factor, L, and a hillslope-gradient factor, S. Generally speaking, as hillslope length and/or hillslope gradient increase, soil loss increases. As hillslope length increases, total soil loss and soil loss per unit area increase due to the progressive accumulation of runoff in the downslope direction. As the hillslope gradient increases, the velocity and erosivity of runoff increases. Use the LS table located in separate tab of this spreadsheet to determine LS factors. Estimate the weighted LS for the site prior to construction.		
12	LS Table		
13	**LS Factor Value**		1.47
14			
15	**Watershed Erosion Estimate (=RxKxLS) in tons/acre**		11.745888
16	**Site Sediment Risk Factor**		**Low**
17	Low Sediment Risk: < 15 tons/acre		
18	Medium Sediment Risk: >=15 and <75 tons/acre		
19	High Sediment Risk: >= 75 tons/acre		
20			

Receiving Water (RW) Risk Factor Worksheet	Entry	Score
A. Watershed Characteristics	**yes/no**	
A.1. Does the disturbed area discharge (either directly or indirectly) to a **303(d)-listed waterbody impaired by sediment**? For help with impaired waterbodies please check the attached worksheet or visit the link below:	**no**	**Low**
2006 Approved Sediment-impared WBs Worksheet		
http://www.waterboards.ca.gov/water_issues/programs/tmdl/303d_lists2006_epa.shtml		
OR		
A.2. Does the disturbed area discharge to a waterbody with designated beneficial uses of SPAWN & COLD & MIGRATORY?		
http://www.ice.ucdavis.edu/geowbs/asp/wbquse.asp		



Project Sediment Risk:	**Low**
Project RW Risk:	**Low**
Project Combined Risk:	**Level 1**

Figure 1. Erosivity Index Zone Map

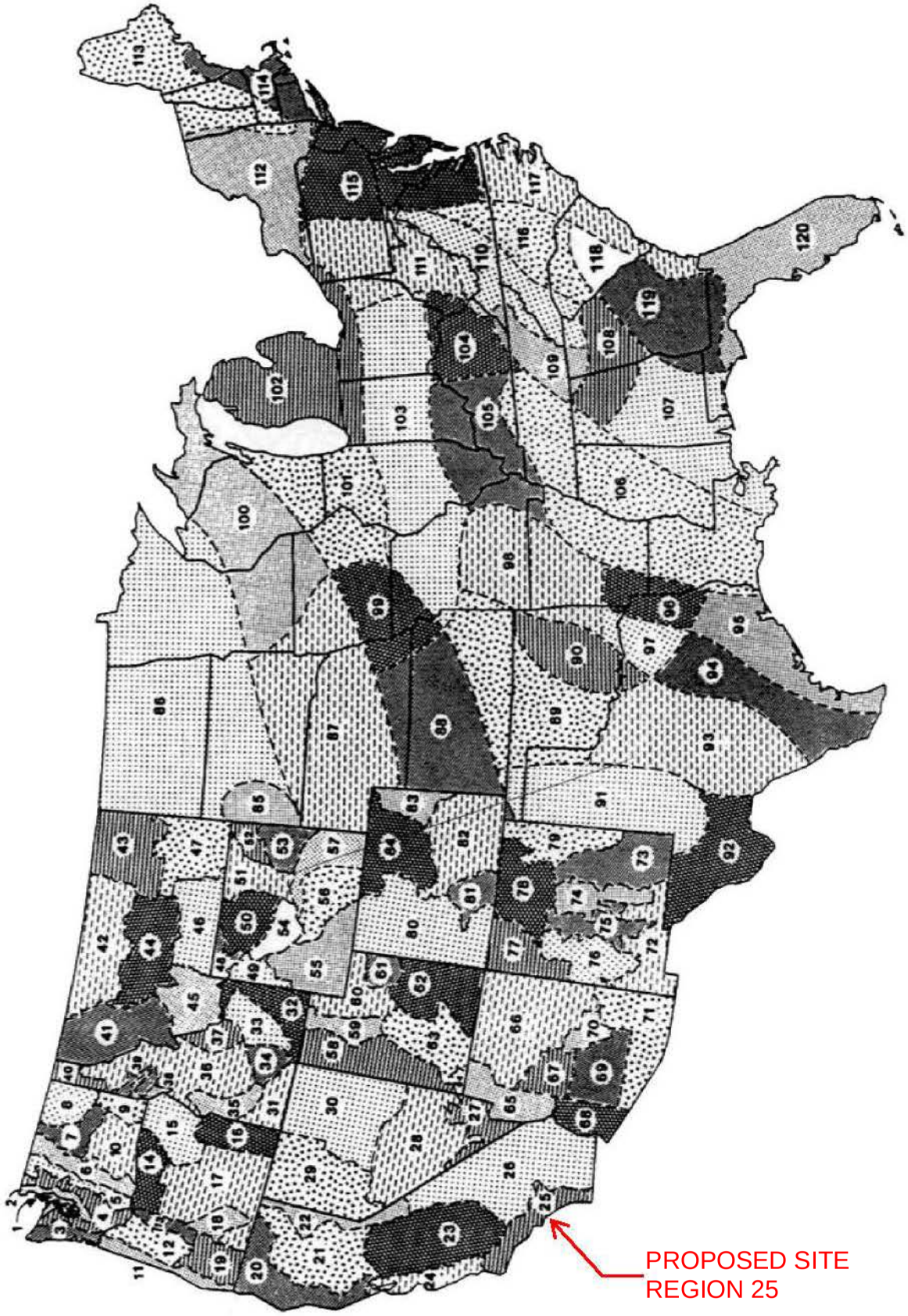
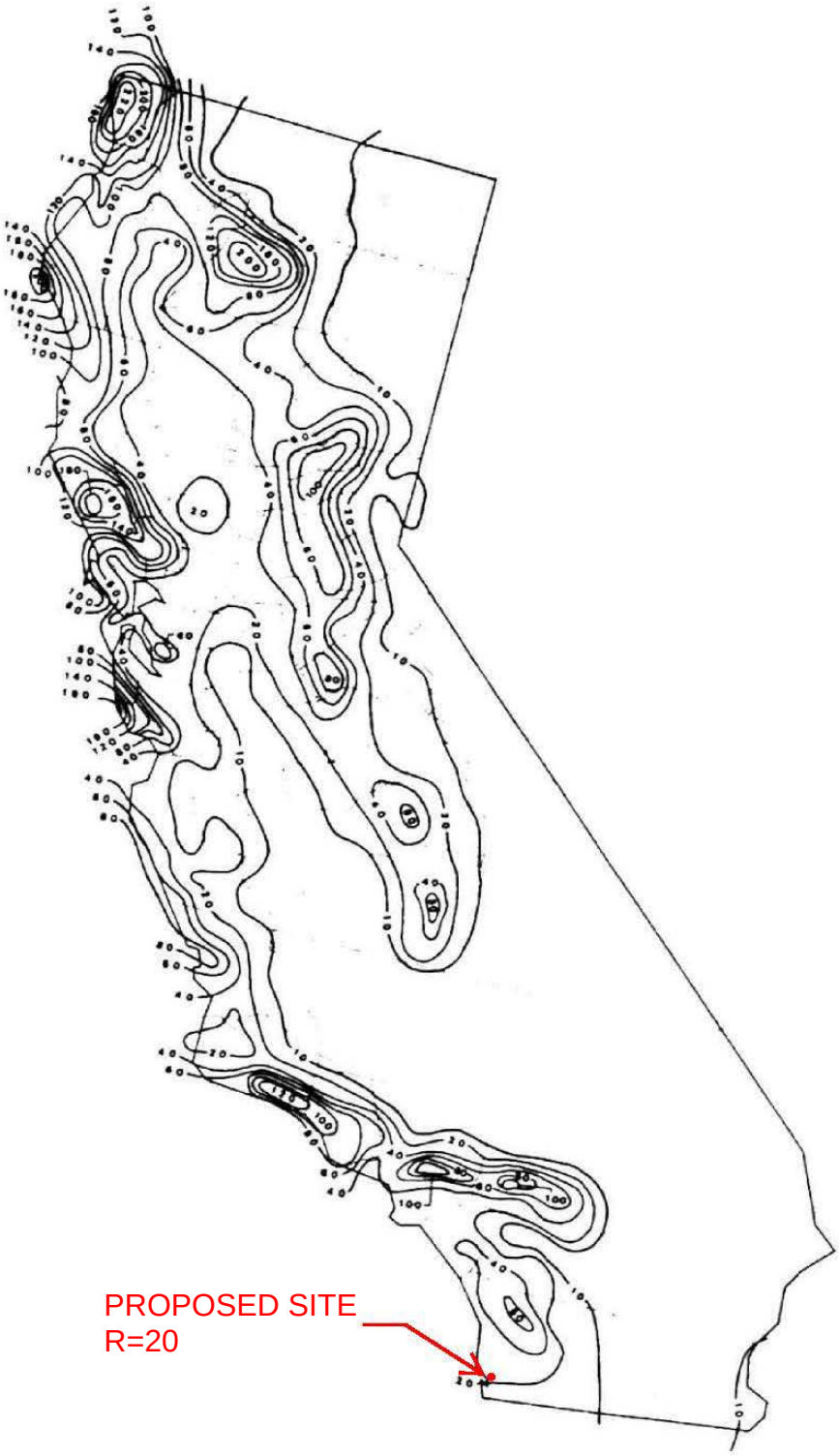


Figure 4. Isoerodent Map of California



Note: Units for all maps on this page are hundreds ft•tonf•in(ac•h•yr)$^{-1}$

Table 1. Erosivity Index (%EI Values extracted from USDA Manual 703)

All values are at the end of the day listed below - Linear interpolation between dates is acceptable.
EI as a percentage of Average Annual R Value Computed for Geographic Areas Shown in Figure 1

Month	Jan	Jan	Jan	Feb	Mar	Mar	Mar	Apr	Apr	May	May	Jun	Jun	Jul	Jul	Aug	Aug	Sept	Sept	Oct	Oct	Nov	Nov	Dec	Dec
Day	1	16	31	15	1	16	31	15	30	15	30	14	29	14	29	13	28	12	27	12	27	11	26	11	31
EI Zone																									
1	0	4.3	8.3	12.8	17.3	21.6	25.1	28	30.9	34.9	39.1	42.6	45.4	48.2	50.8	53	56	60.8	66.8	71	75.7	82	89.1	95.2	100
2	0	4.3	8.3	12.8	17.3	21.6	25.1	28.0	30.9	34.9	39.1	42.6	45.4	48.2	50.8	53.0	56.0	60.8	66.8	71.0	75.7	82.0	89.1	95.2	100
3	0	7.4	13.8	20.9	26.5	31.8	35.3	38.5	40.2	41.6	42.5	43.6	44.5	45.1	45.7	46.4	47.7	49.4	52.8	57.0	64.5	73.1	83.3	92.3	100
4	0	3.9	7.9	12.6	17.4	21.6	25.2	28.7	31.9	35.1	38.2	42.0	44.9	46.7	48.2	50.1	53.1	56.6	62.2	67.9	75.2	83.5	90.5	96.0	100
5	0	2.3	3.6	4.7	6.0	7.7	10.7	13.9	17.8	21.2	24.5	28.1	31.1	33.1	35.3	38.2	43.2	48.7	57.3	67.8	77.9	86.0	91.3	96.9	100
6	0	0.0	0.0	0.5	2.0	4.1	8.1	12.6	17.6	21.6	25.5	29.6	34.5	40.0	45.7	50.7	55.6	60.2	66.5	75.5	85.6	95.9	99.5	99.9	100
7	0	0.0	0.0	0.0	0.0	1.2	4.9	8.5	13.9	19.0	26.0	35.4	43.9	48.8	53.9	64.5	73.4	77.5	80.4	84.8	89.9	96.6	99.2	99.7	100
8	0	0.0	0.0	0.0	0.0	0.9	3.6	7.8	15.0	20.2	27.4	38.1	49.8	57.9	65.0	75.6	82.7	86.8	89.4	93.4	96.3	99.1	100.0	100.0	100
9	0	0.8	3.1	4.7	7.4	11.7	17.8	22.5	27.0	31.4	36.0	41.6	46.4	50.1	53.4	57.4	61.7	64.9	69.7	79.0	89.6	97.4	100.0	100.0	100
10	0	0.3	0.5	0.9	2.0	4.3	9.2	13.1	18.0	22.7	29.2	39.5	46.3	48.8	51.1	57.2	64.4	67.7	71.1	77.2	85.1	92.5	96.5	99.0	100
11	0	5.4	11.3	18.8	26.3	33.2	37.4	40.7	42.5	44.3	45.4	46.5	47.1	47.4	47.8	48.3	49.4	50.7	53.6	57.5	65.5	76.2	87.4	94.8	100
12	0	3.5	7.8	14.0	21.1	27.4	31.5	35.0	37.3	39.8	41.9	44.3	45.6	46.3	46.8	47.9	50.0	52.9	57.9	62.3	69.3	81.3	91.5	96.7	100
13	0	0.0	0.0	1.8	7.2	11.9	16.7	19.7	24.0	31.2	42.4	55.0	60.0	60.8	61.2	62.6	65.3	67.6	71.6	76.1	83.1	93.3	98.2	99.6	100
14	0	0.7	1.8	3.3	6.9	16.5	26.6	29.9	32.0	35.4	40.2	45.1	51.9	61.1	67.5	70.7	72.8	75.4	78.6	81.9	86.4	93.6	97.7	99.3	100
15	0	0.0	0.0	0.5	2.0	4.4	8.7	12.0	16.6	21.4	29.7	44.5	56.0	60.8	63.9	69.1	74.5	79.1	83.1	87.0	90.9	96.6	99.1	99.8	100
16	0	0.0	0.0	0.5	2.0	5.5	12.3	16.2	20.9	26.4	35.2	48.1	58.1	63.1	66.5	71.9	77.0	81.6	85.1	88.4	91.5	96.3	98.7	99.6	100
17	0	0.0	0.0	0.7	2.8	6.1	10.7	12.9	16.1	21.9	32.8	45.9	55.5	60.3	64.0	71.2	77.2	80.3	83.1	87.7	92.6	97.2	99.1	99.8	100
18	0	0.0	0.0	0.6	2.5	6.2	12.4	16.4	20.2	23.9	29.3	37.7	45.6	49.8	53.3	58.4	64.3	69.0	75.0	86.6	93.9	96.6	98.0	100.0	100
19	0	1.0	2.6	7.4	16.4	23.5	28.0	31.0	33.5	37.0	41.7	48.1	51.1	52.0	52.5	53.6	55.7	57.6	61.1	65.8	74.7	88.0	95.8	98.7	100
20	0	9.8	18.5	25.4	30.2	35.6	38.9	41.5	42.9	44.0	45.2	48.2	50.8	51.7	52.5	54.6	57.4	58.5	60.1	63.2	69.6	76.7	85.4	92.4	100
21	0	7.5	13.6	18.1	21.1	24.4	27.0	29.4	31.7	34.6	37.3	39.6	41.6	43.4	45.4	48.1	51.3	53.3	56.6	62.4	72.4	81.3	88.9	94.7	100
22	0	1.2	1.6	1.6	1.6	1.6	1.6	2.2	3.9	4.6	6.4	14.2	32.8	47.2	58.8	69.1	76.0	82.0	87.1	96.7	99.9	99.9	99.9	99.9	100
23	0	7.9	15.0	20.9	25.7	31.1	35.7	40.2	43.2	46.2	47.7	48.8	49.4	49.9	50.7	51.8	54.1	57.7	62.8	65.9	70.1	77.3	86.8	93.5	100
24	0	12.2	23.6	33.0	39.7	47.1	51.7	55.9	57.7	58.6	58.9	59.1	59.1	59.2	59.2	59.3	59.5	60.0	61.4	63.0	66.5	71.8	81.3	89.6	100
25	0	9.8	20.8	30.2	37.6	45.8	50.6	54.4	56.0	56.8	57.1	57.1	57.2	57.6	58.5	59.8	62.2	65.3	67.5	68.2	69.4	74.8	86.6	93.0	100
26	0	2.0	5.4	9.8	15.6	21.5	24.7	26.6	27.4	28.0	28.7	29.8	32.5	36.6	44.9	55.4	65.7	72.6	77.8	84.4	89.5	93.9	96.5	98.4	100
27	0	0.0	0.0	1.0	4.0	5.9	8.0	11.1	13.0	14.0	14.6	15.3	17.0	23.2	39.1	60.0	76.3	86.1	89.7	90.4	90.9	93.1	96.6	99.1	100
28	0	0.0	0.0	0.0	0.2	0.5	1.5	3.3	7.2	11.9	17.7	21.4	27.0	37.1	51.4	62.3	70.6	78.8	84.6	90.6	94.4	97.9	99.3	100.0	100
29	0	0.6	0.7	0.7	0.7	1.5	3.9	6.0	10.5	17.9	28.8	36.6	43.8	51.5	59.3	68.0	74.8	80.3	84.3	88.8	92.7	98.0	99.8	99.9	100
30	0	0.0	0.0	0.0	0.0	0.2	0.8	2.8	7.9	14.2	24.7	35.6	45.4	52.2	58.7	68.5	77.6	84.5	88.9	93.7	96.2	97.6	98.3	99.6	100
31	0	0.0	0.0	0.0	0.0	0.2	1.0	3.5	9.9	15.7	26.4	47.2	61.4	65.9	69.0	77.2	86.0	91.6	94.8	98.7	100.0	100.0	100.0	100.0	100
32	0	0.1	0.1	0.1	0.1	0.6	2.2	4.3	9.0	14.2	23.3	34.6	46.3	54.2	61.7	72.9	82.5	89.6	93.7	98.2	99.7	99.9	99.9	99.9	100
33	0	0.0	0.0	0.0	0.0	0.6	2.3	4.2	8.8	16.1	30.0	46.9	57.9	62.8	66.2	72.1	79.1	85.9	91.1	97.0	98.9	98.9	98.9	98.9	100
34	0	0.0	0.0	0.0	0.0	1.8	7.3	10.7	15.5	22.0	29.9	35.9	42.0	48.5	56.9	67.0	76.9	85.8	91.2	95.7	97.8	99.6	100.0	100.0	100
35	0	0.0	0.0	0.0	0.0	2.5	10.2	15.9	22.2	27.9	34.7	43.9	51.9	56.9	61.3	67.3	73.9	80.1	85.1	89.6	93.2	98.2	99.8	99.8	100

APPENDIX C
SWPPP AMENDMENT LOG

SWPPP Amendments for Horton Plaza Park

Amend-ment No.	Date	Brief Description	Prepared By
0	2/20/2013	Original SWPPP submited as WDID 9 37C366490	Adam Podlich, QSD
1	6/20/2013	Added WDID and added 4 Phases of Erosion Control Plans	Adam Podlich, QSD
2	2/4/2014	Property was sold to the City of San Diego. New NOI includes updated Owner and QSP information. **New WDID 9 37C368989**	Adam Podlich, QSD

SWPPP AMENDMENT #0

Project Name: Horton Plaza Park

Amendment Summary: Prepared Original SWPPP

WDID #: 9 37C366490

Preparer Certification of the
Storm Water Pollution Prevention Plan Amendment

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment for knowing violations.
Prepared under the supervision of

Signed  Date 2/20/2013

Adam Podlich ● R.C.E. 69298
Nasland Engineering ● (858) 292-7770

Owner's Authorized Representative Approval of the Storm Water Pollution Prevention Plan Amendment

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment for knowing violations.
Prepared under the supervision of

Signed_____ Date_____

Horton Plaza LLC, a Delaware Limited Liability Company
By: Horton Plaza REIT 1 LLC, a Delaware Limited Liability Company, its managing member
By: Horton Plaza 1 LP, a Delaware Limited partnership, its sole member
By: Westfield Horton Plaza GP LLC, a Delaware limited liability company, its general member
By: Horton Plaza Holding 2 LLC, a Delaware limited liability company, its sole member
By: Westfield America Limited Partnership, a Delaware limited Partnership, its sole member
By: Westfield U.S. Holdings, LLC, a Delaware limited liability company, its general partner

By: _____
Name

SWPPP AMENDMENT #1

Project Name: Horton Plaza Park

Amendment Summary: Added 4 Phases of Erosion Control Plans

WDID #: 9 37C366490

Preparer Certification of the
Storm Water Pollution Prevention Plan Amendment

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment for knowing violations.
Prepared under the supervision of

Signed  Date 6/20/2013

Adam Podlich ● R.C.E. 69298
Nasland Engineering ● (858) 292-7770

SWPPP AMENDMENT #2

Project Name: Horton Plaza Park

Amendment Summary: Submitted new NOI for new owners. Inclused updated owner information. New WDID Number

WDID #: 9 37C368989

Preparer Certification of the
Storm Water Pollution Prevention Plan Amendment

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment for knowing violations.
Prepared under the supervision of

Signed  Date 2/24/2014

Adam Podlich ● R.C.E. 69298
Nasland Engineering ● (858) 292-7770

Owner's Authorized Representative Approval of the Storm Water Pollution Prevention Plan Amendment

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment for knowing violations.

Prepared under the supervision of

Signed_____ Date_____

Dave Zoumaras ● Deputy Director
City of San Diego Field Engineering Department

APPENDIX D
RISK LEVEL 1 REQUIREMENTS

ATTACHMENT C
RISK LEVEL 1 REQUIREMENTS

A. Effluent Standards

[These requirements are the same as those in the General Permit order.]

1. Narrative – Risk Level 1 dischargers shall comply with the narrative effluent standards listed below:

   a. Storm water discharges and authorized non-storm water discharges regulated by this General Permit shall not contain a hazardous substance equal to or in excess of reportable quantities established in 40 C.F.R. §§ 117.3 and 302.4, unless a separate NPDES Permit has been issued to regulate those discharges.

   b. Dischargers shall minimize or prevent pollutants in storm water discharges and authorized non-storm water discharges through the use of controls, structures, and management practices that achieve BAT for toxic and non-conventional pollutants and BCT for conventional pollutants.

2. Numeric – Risk Level 1 dischargers are not subject to a numeric effluent standard.

B. Good Site Management "Housekeeping"

1. Risk Level 1 dischargers shall implement good site management (i.e., "housekeeping") measures for construction materials that could potentially be a threat to water quality if discharged. At a minimum, Risk Level 1 dischargers shall implement the following good housekeeping measures:

   a. Conduct an inventory of the products used and/or expected to be used and the end products that are produced and/or expected to be produced. This does not include materials and equipment that are designed to be outdoors and exposed to environmental conditions (i.e. poles, equipment pads, cabinets, conductors, insulators, bricks, etc.).

   b. Cover and berm loose stockpiled construction materials that are not actively being used (i.e. soil, spoils, aggregate, fly-ash, stucco, hydrated lime, etc.).

c. Store chemicals in watertight containers (with appropriate secondary containment to prevent any spillage or leakage) or in a storage shed (completely enclosed).

d. Minimize exposure of construction materials to precipitation. This does not include materials and equipment that are designed to be outdoors and exposed to environmental conditions (i.e. poles, equipment pads, cabinets, conductors, insulators, bricks, etc.).

e. Implement BMPs to prevent the off-site tracking of loose construction and landscape materials.

2. Risk Level 1 dischargers shall implement good housekeeping measures for waste management, which, at a minimum, shall consist of the following:

a. Prevent disposal of any rinse or wash waters or materials on impervious or pervious site surfaces or into the storm drain system.

b. Ensure the containment of sanitation facilities (e.g., portable toilets) to prevent discharges of pollutants to the storm water drainage system or receiving water.

c. Clean or replace sanitation facilities and inspecting them regularly for leaks and spills.

d. Cover waste disposal containers at the end of every business day and during a rain event.

e. Prevent discharges from waste disposal containers to the storm water drainage system or receiving water.

f. Contain and securely protect stockpiled waste material from wind and rain at all times unless actively being used.

g. Implement procedures that effectively address hazardous and non-hazardous spills.

h. Develop a spill response and implementation element of the SWPPP prior to commencement of construction activities. The SWPPP shall require that:

i. Equipment and materials for cleanup of spills shall be available on site and that spills and leaks shall be cleaned up immediately and disposed of properly; and

ii. Appropriate spill response personnel are assigned and trained.

i. Ensure the containment of concrete washout areas and other washout areas that may contain additional pollutants so there is no discharge into the underlying soil and onto the surrounding areas.

3. Risk Level 1 dischargers shall implement good housekeeping for vehicle storage and maintenance, which, at a minimum, shall consist of the following:

   a. Prevent oil, grease, or fuel to leak in to the ground, storm drains or surface waters.

   b. Place all equipment or vehicles, which are to be fueled, maintained and stored in a designated area fitted with appropriate BMPs.

   c. Clean leaks immediately and disposing of leaked materials properly.

4. Risk Level 1 dischargers shall implement good housekeeping for landscape materials, which, at a minimum, shall consist of the following:

   a. Contain stockpiled materials such as mulches and topsoil when they are not actively being used.

   b. Contain fertilizers and other landscape materials when they are not actively being used.

   c. Discontinue the application of any erodible landscape material within 2 days before a forecasted rain event or during periods of precipitation.

   d. Apply erodible landscape material at quantities and application rates according to manufacture recommendations or based on written specifications by knowledgeable and experienced field personnel.

   e. Stack erodible landscape material on pallets and covering or storing such materials when not being used or applied.

5. Risk Level 1 dischargers shall conduct an assessment and create a list of potential pollutant sources and identify any areas of the site where additional BMPs are necessary to reduce or prevent pollutants in storm water discharges and authorized non-storm water discharges. This potential pollutant list shall be kept with the SWPPP and shall identify

all non-visible pollutants which are known, or should be known, to occur on the construction site. At a minimum, when developing BMPs, Risk Level 1 dischargers shall do the following:

a. Consider the quantity, physical characteristics (e.g., liquid, powder, solid), and locations of each potential pollutant source handled, produced, stored, recycled, or disposed of at the site.

b. Consider the degree to which pollutants associated with those materials may be exposed to and mobilized by contact with storm water.

c. Consider the direct and indirect pathways that pollutants may be exposed to storm water or authorized non-storm water discharges. This shall include an assessment of past spills or leaks, non-storm water discharges, and discharges from adjoining areas.

d. Ensure retention of sampling, visual observation, and inspection records.

e. Ensure effectiveness of existing BMPs to reduce or prevent pollutants in storm water discharges and authorized non-storm water discharges.

6. Risk Level 1 dischargers shall implement good housekeeping measures on the construction site to control the air deposition of site materials and from site operations. Such particulates can include, but are not limited to, sediment, nutrients, trash, metals, bacteria, oil and grease and organics.

C. Non-Storm Water Management

1. Risk Level 1 dischargers shall implement measures to control all non-storm water discharges during construction.

2. Risk Level 1 dischargers shall wash vehicles in such a manner as to prevent non-storm water discharges to surface waters or MS4 drainage systems.

3. Risk Level 1 dischargers shall clean streets in such a manner as to prevent unauthorized non-storm water discharges from reaching surface water or MS4 drainage systems.

D. Erosion Control

1. Risk Level 1 dischargers shall implement effective wind erosion control.

2. Risk Level 1 dischargers shall provide effective soil cover for inactive[1] areas and all finished slopes, open space, utility backfill, and completed lots.

3. Risk Level 1 dischargers shall limit the use of plastic materials when more sustainable, environmentally friendly alternatives exist. Where plastic materials are deemed necessary, the discharger shall consider the use of plastic materials resistant to solar degradation.

E. Sediment Controls

1. Risk Level 1 dischargers shall establish and maintain effective perimeter controls and stabilize all construction entrances and exits to sufficiently control erosion and sediment discharges from the site.

2. On sites where sediment basins are to be used, Risk Level 1 dischargers shall, at minimum, design sediment basins according to the method provided in CASQA's Construction BMP Guidance Handbook.

F. Run-on and Runoff Controls

Risk Level 1 dischargers shall effectively manage all run-on, all runoff within the site and all runoff that discharges off the site. Run-on from off site shall be directed away from all disturbed areas or shall collectively be in compliance with the effluent limitations in this General Permit.

G. Inspection, Maintenance and Repair

1. Risk Level 1 dischargers shall ensure that all inspection, maintenance repair and sampling activities at the project location shall be performed or supervised by a Qualified SWPPP Practitioner (QSP) representing the discharger. The QSP may delegate any or all of these activities to an employee trained to do the task(s) appropriately, but shall ensure adequate deployment.

2. Risk Level 1 dischargers shall perform weekly inspections and observations, and at least once each 24-hour period during extended

[1] Inactive areas of construction are areas of construction activity that have been disturbed and are not scheduled to be re-disturbed for at least 14 days.

storm events, to identify and record BMPs that need maintenance to operate effectively, that have failed, or that could fail to operate as intended. Inspectors shall be the QSP or be trained by the QSP.

3. Upon identifying failures or other shortcomings, as directed by the QSP, Risk Level 1 dischargers shall begin implementing repairs or design changes to BMPs within 72 hours of identification and complete the changes as soon as possible.

4. For each inspection required, Risk Level 1 dischargers shall complete an inspection checklist, using a form provided by the State Water Board or Regional Water Board or in an alternative format.

5. Risk Level 1 dischargers shall ensure that checklists shall remain onsite with the SWPPP and at a minimum, shall include:

   a. Inspection date and date the inspection report was written.

   b. Weather information, including presence or absence of precipitation, estimate of beginning of qualifying storm event, duration of event, time elapsed since last storm, and approximate amount of rainfall in inches.

   c. Site information, including stage of construction, activities completed, and approximate area of the site exposed.

   d. A description of any BMPs evaluated and any deficiencies noted.

   e. If the construction site is safely accessible during inclement weather, list the observations of all BMPs: erosion controls, sediment controls, chemical and waste controls, and non-storm water controls. Otherwise, list the results of visual inspections at all relevant outfalls, discharge points, downstream locations and any projected maintenance activities.

   f. Report the presence of noticeable odors or of any visible sheen on the surface of any discharges.

   g. Any corrective actions required, including any necessary changes to the SWPPP and the associated implementation dates.

   h. Photographs taken during the inspection, if any.

   i. Inspector's name, title, and signature.

H. Rain Event Action Plan

Not required for Risk Level 1 dischargers.

I. Risk Level 1 Monitoring and Reporting Requirements

Table 1- Summary of Monitoring Requirements

Risk Level	Visual Inspections					Sample Collection	
	Quarterly Non-storm Water Discharge	Pre-storm Event		Daily Storm BMP	Post Storm	Storm Water Discharge	Receiving Water
		Baseline	REAP				
1	X	X		X	X		

1. **Construction Site Monitoring Program Requirements**

   a. Pursuant to Water Code Sections 13383 and 13267, all dischargers subject to this General Permit shall develop and implement a written site-specific Construction Site Monitoring Program (CSMP) in accordance with the requirements of this Section. The CSMP shall include all monitoring procedures and instructions, location maps, forms, and checklists as required in this section. The CSMP shall be developed prior to the commencement of construction activities, and revised as necessary to reflect project revisions. The CSMP shall be a part of the Storm Water Pollution Prevention Plan (SWPPP), included as an appendix or separate SWPPP chapter.

   b. Existing dischargers registered under the State Water Board Order No. 99-08-DWQ shall make and implement necessary revisions to their Monitoring Programs to reflect the changes in this General Permit in a timely manner, but no later than July 1, 2010. Existing dischargers shall continue to implement their existing Monitoring Programs in compliance with State Water Board Order No. 99-08-DWQ until the necessary revisions are completed according to the schedule above.

   c. When a change of ownership occurs for all or any portion of the construction site prior to completion or final stabilization, the new discharger shall comply with these requirements as of the date the ownership change occurs.

2. **Objectives**

   The CSMP shall be developed and implemented to address the following objectives:

   a. To demonstrate that the site is in compliance with the Discharge Prohibitions;

b. To determine whether non-visible pollutants are present at the construction site and are causing or contributing to exceedances of water quality objectives;

c. To determine whether immediate corrective actions, additional Best Management Practice (BMP) implementation, or SWPPP revisions are necessary to reduce pollutants in storm water discharges and authorized non-storm water discharges; and

d. To determine whether BMPs included in the SWPPP are effective in preventing or reducing pollutants in storm water discharges and authorized non-storm water discharges.

3. **Risk Level 1 - Visual Monitoring (Inspection) Requirements for Qualifying Rain Events**

a. Risk Level 1 dischargers shall visually observe (inspect) storm water discharges at all discharge locations within two business days (48 hours) after each qualifying rain event.

b. Risk Level 1 dischargers shall visually observe (inspect) the discharge of stored or contained storm water that is derived from and discharged subsequent to a qualifying rain event producing precipitation of ½ inch or more at the time of discharge. Stored or contained storm water that will likely discharge after operating hours due to anticipated precipitation shall be observed prior to the discharge during operating hours.

c. Risk Level 1 dischargers shall conduct visual observations (inspections) during business hours only.

d. Risk Level 1 dischargers shall record the time, date and rain gauge reading of all qualifying rain events.

e. Within 2 business days (48 hours) prior to each qualifying rain event, Risk Level 1 dischargers shall visually observe (inspect):

i. All storm water drainage areas to identify any spills, leaks, or uncontrolled pollutant sources. If needed, the discharger shall implement appropriate corrective actions.

ii. All BMPs to identify whether they have been properly implemented in accordance with the SWPPP. If needed, the discharger shall implement appropriate corrective actions.

iii. Any storm water storage and containment areas to detect leaks and ensure maintenance of adequate freeboard.

f. For the visual observations (inspections) described in e.i and e.iii above, Risk Level 1 dischargers shall observe the presence or absence of floating and suspended materials, a sheen on the surface, discolorations, turbidity, odors, and source(s) of any observed pollutants.

g. Within two business days (48 hours) after each qualifying rain event, Risk Level 1 dischargers shall conduct post rain event visual observations (inspections) to (1) identify whether BMPs were adequately designed, implemented, and effective, and (2) identify additional BMPs and revise the SWPPP accordingly.

h. Risk Level 1 dischargers shall maintain on-site records of all visual observations (inspections), personnel performing the observations, observation dates, weather conditions, locations observed, and corrective actions taken in response to the observations.

4. **Risk Level 1 – Visual Observation Exemptions**

a. Risk Level 1 dischargers shall be prepared to conduct visual observation (inspections) until the minimum requirements of Section I.3 above are completed. Risk Level 1 dischargers are not required to conduct visual observation (inspections) under the following conditions:

i. During dangerous weather conditions such as flooding and electrical storms.

ii. Outside of scheduled site business hours.

b. If no required visual observations (inspections) are collected due to these exceptions, Risk Level 1 dischargers shall include an explanation in their SWPPP and in the Annual Report documenting why the visual observations (inspections) were not conducted.

5. **Risk Level 1 – Monitoring Methods**

Risk Level 1 dischargers shall include a description of the visual observation locations, visual observation procedures, and visual observation follow-up and tracking procedures in the CSMP.

6. **Risk Level 1 – Non-Storm Water Discharge Monitoring Requirements**

a. Visual Monitoring Requirements:

   i. Risk Level 1 dischargers shall visually observe (inspect) each drainage area for the presence of (or indications of prior) unauthorized and authorized non-storm water discharges and their sources.

   ii. Risk Level 1 dischargers shall conduct one visual observation (inspection) quarterly in each of the following periods: January-March, April-June, July-September, and October-December. Visual observation (inspections) are only required during daylight hours (sunrise to sunset).

   iii. Risk Level 1 dischargers shall ensure that visual observations (inspections) document the presence or evidence of any non-storm water discharge (authorized or unauthorized), pollutant characteristics (floating and suspended material, sheen, discoloration, turbidity, odor, etc.), and source. Risk Level 1 dischargers shall maintain on-site records indicating the personnel performing the visual observation (inspections), the dates and approximate time each drainage area and non-storm water discharge was observed, and the response taken to eliminate unauthorized non-storm water discharges and to reduce or prevent pollutants from contacting non-storm water discharges.

7. **Risk Level 1 – Non-Visible Pollutant Monitoring Requirements**

   a. Risk Level 1 dischargers shall collect one or more samples during any breach, malfunction, leakage, or spill observed during a visual inspection which could result in the discharge of pollutants to surface waters that would not be visually detectable in storm water.

   b. Risk Level 1 dischargers shall ensure that water samples are large enough to characterize the site conditions.

   c. Risk Level 1 dischargers shall collect samples at all discharge locations that can be safely accessed.

   d. Risk Level 1 dischargers shall collect samples during the first two hours of discharge from rain events that occur during business hours and which generate runoff.

   e. Risk Level 1 dischargers shall analyze samples for all non-visible pollutant parameters (if applicable) - parameters indicating the

presence of pollutants identified in the pollutant source assessment required (Risk Level 1 dischargers shall modify their CSMPs to address these additional parameters in accordance with any updated SWPPP pollutant source assessment).

f. Risk Level 1 dischargers shall collect a sample of storm water that has not come in contact with the disturbed soil or the materials stored or used on-site (uncontaminated sample) for comparison with the discharge sample.

g. Risk Level 1 dischargers shall compare the uncontaminated sample to the samples of discharge using field analysis or through laboratory analysis.[2]

h. Risk Level 1 dischargers shall keep all field /or analytical data in the SWPPP document.

8. **Risk Level 1 – Particle Size Analysis for Project Risk Justification**

Risk Level 1 dischargers justifying an alternative project risk shall report a soil particle size analysis used to determine the RUSLE K-Factor. ASTM D-422 (Standard Test Method for Particle-Size Analysis of Soils), as revised, shall be used to determine the percentages of sand, very fine sand, silt, and clay on the site.

9. **Risk Level 1 – Records**

Risk Level 1 dischargers shall retain records of all storm water monitoring information and copies of all reports (including Annual Reports) for a period of at least three years. Risk Level 1 dischargers shall retain all records on-site while construction is ongoing. These records include:

a. The date, place, time of facility inspections, sampling, visual observation (inspections), and/or measurements, including precipitation.

b. The individual(s) who performed the facility inspections, sampling, visual observation (inspections), and or measurements.

c. The date and approximate time of analyses.

d. The individual(s) who performed the analyses.

[2] For laboratory analysis, all sampling, sample preservation, and analyses must be conducted according to test procedures under 40 CFR Part 136. Field discharge samples shall be collected and analyzed according to the specifications of the manufacturer of the sampling devices employed.

e. A summary of all analytical results from the last three years, the method detection limits and reporting units, and the analytical techniques or methods used.

f. Rain gauge readings from site inspections.

g. Quality assurance/quality control records and results.

h. Non-storm water discharge inspections and visual observation (inspections) and storm water discharge visual observation records (see Sections I.3 and I.6 above).

i. Visual observation and sample collection exception records (see Section I.4 above).

j. The records of any corrective actions and follow-up activities that resulted from analytical results, visual observation (inspections), or inspections.

APPENDIX E
SUBMITTED CHANGES TO PRDS

Uploaded Changes to PRDs

Amendment No.	Change to PRD	Prepared By

ATTACHMENT B
PERMIT REGISTRATION DOCUMENTS (PRDs) TO COMPLY WITH THE TERMS OF THE GENERAL PERMIT TO DISCHARGE STORM WATER ASSOCIATED WITH CONSTRUCTION ACTIVITY

GENERAL INSTRUCTIONS

A. All Linear Construction Projects shall comply with the PRD requirements in Attachment A.2 of this Order.

B. Who Must Submit

Discharges of storm water associated with construction that results in the disturbance of one acre or more of land must apply for coverage under the General Construction Storm Water Permit (General Permit). Any construction activity that is a part of a larger common plan of development or sale must also be permitted, regardless of size. (For example, if 0.5 acre of a 20-acre subdivision is disturbed by the construction activities of discharger A and the remaining 19.5 acres is to be developed by discharger B, discharger A must obtain a General Storm Water Permit for the 0.5 acre project).

Other discharges from construction activities that are covered under this General Permit can be found in the General Permit Section II.B.

It is the LRP's responsibility to obtain coverage under this General Permit by electronically submitting complete PRDs (Permit Registration Documents).

In all cases, the proper procedures for submitting the PRDs must be completed before construction can commence.

C. Construction Activity Not Covered By This General Permit

Discharges from construction that are not covered under this General Permit can be found in the General Permit Sections II.A &B..

D. Annual Fees and Fee Calculation

Annual fees are calculated based upon the total area of land to be disturbed not the total size of the acreage owned. However, the calculation includes all acres to be disturbed during the duration of the project. For example, if 10 acres are scheduled to be disturbed the first year and 10 in each subsequent year for 5 years, the annual fees would be based upon 50 acres of disturbance. The State Water Board will evaluate adding acreage to an existing Permit Waste Discharge Identification (WDID) number on a case-by-case basis. In general, any acreage to be considered must be contiguous to the permitted land area and the existing

SWPPP must be appropriate for the construction activity and topography of the acreage under consideration. As acreage is built out and stabilized or sold, the Change of Information (COI) form enables the applicant to remove those acres from inclusion in the annual fee calculation. Checks should be made payable to: State Water Board.

The Annual fees are established through regulations adopted by the State Water Board. The total annual fee is the current base fee plus applicable surcharges for all construction sites submitting an NOI, based on the total acreage to be disturbed during the life of the project. Annual fees are subject to change by regulation.

Dischargers that apply for and satisfy the Small Construction Erosivity Wavier requirements shall pay a fee of $200.00 plus an applicable surcharge, see the General Permit Section II.B.7.

E. When to Apply

LRP's proposing to conduct construction activities subject to this General Permit must submit their PRDs prior to the commencement of construction activity.

F. Requirements for Completing Permit Registration Documents (PRDs)

All dischargers required to comply with this General Permit shall electronically submit the required PRDs for their type of construction as defined below.

G. Standard PRD Requirements (All Dischargers)

1. Notice of Intent
2. Risk Assessment (Standard or Site-Specific)
3. Site Map
4. SWPPP
5. Annual Fee
6. Certification

H. Additional PRD Requirements Related to Construction Type

1. Discharger in unincorporated areas of the State (not covered under an adopted Phase I or II SUSMP requirements) and that are not a linear project shall also submit a completed:
   a. Post-Construction Water Balance Calculator (Appendix 2).

2. Dischargers who are proposing to implement ATS shall submit:
   a. Complete ATS Plan in accordance with Attachment F at least 14 days prior to the planned operation of the ATS and a paper copy shall be available onsite during ATS operation.

b. Certification proof that design done by a professional in accordance with Attachment F.

3. Dischargers who are proposing an alternate Risk Justification:
   a. Particle Size Analysis.

I. Exceptions to Standard PRD Requirements

Construction sites with an R value less than 5 as determined in the Risk Assessment are not required to submit a SWPPP.

J. Description of PRDs

1. Notice of Intent (NOI)

2. Site Map(s) Includes:
   a. The project's surrounding area (vicinity)
   b. Site layout
   c. Construction site boundaries
   d. Drainage areas
   e. Discharge locations
   f. Sampling locations
   g. Areas of soil disturbance (temporary or permanent)
   h. Active areas of soil disturbance (cut or fill)
   i. Locations of all runoff BMPs
   j. Locations of all erosion control BMPs
   k. Locations of all sediment control BMPs
   l. ATS location (if applicable)
   m. Locations of sensitive habitats, watercourses, or other features which are not to be disturbed
   n. Locations of all post-construction BMPs
   o. Locations of storage areas for waste, vehicles, service, loading/unloading of materials, access (entrance/exits) points to construction site, fueling, and water storage, water transfer for dust control and compaction practices

3. **SWPPPs**
   A site-specific SWPPP shall be developed by each discharger and shall be submitted with the PRDs.

4. **Risk Assessment**
   All dischargers shall use the Risk Assessment procedure as describe in the General Permit Appendix 1.

   a. The Standard Risk Assessment includes utilization of the following:
      i. Receiving water Risk Assessment interactive map

ii. EPA Rainfall Erosivity Factor Calculator Website
iii. Sediment Risk interactive map
iv. Sediment sensitive water bodies list

b. The Site-Specific Risk Assessment includes the completion of the hand calculated R value Risk Calculator

5. **Post-Construction Water Balance Calculator**
All dischargers subject to this requirement shall complete the Water Balance Calculator (in Appendix 2) in accordance with the instructions.

6. **ATS Design Document and Certification**
All dischargers using ATS must submit electronically their system design (as well as any supporting documentation) and proof that the system was designed by a qualified ATS design professional (See Attachment F).

To obtain coverage under the General Permit PRDs must be included and completed. If any of the required items are missing, the PRD submittal is considered incomplete and will be rejected. Upon receipt of a complete PRD submittal, the State Water Board will process the application package in the order received and assign a (WDID) number.

Questions?

If you have any questions on completing the PRDs please email stormwater@waterboards.ca.gov or call (866) 563-3107.

APPENDIX F
CONSTRUCTION SCHEDULE

Contractor to remove this page and replace with an estimated construction schedule. The construction schedule should outline when specific tasks are to begin and end. The schedule should be updated monthly.

APPENDIX G
CONSTRUCTION ACTIVITIES, MATERIALS USED & ASSOCIATED POLLUTANTS

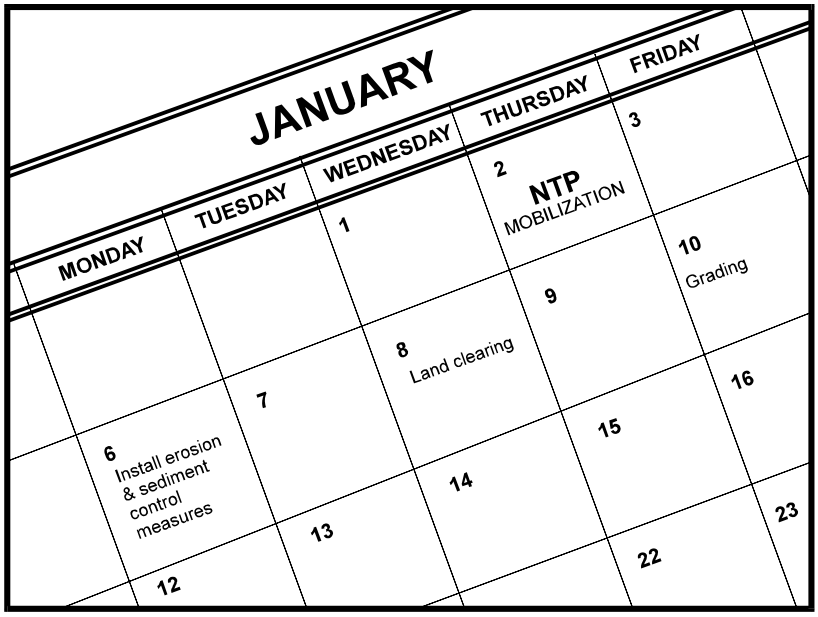
Construction Activities

Construction Activities	Materials Used*	Associated Pollutants
Demolition Activities: *Removal of existing asphalt road and various pieces of concrete structures including curb and gutter, sidewalks, and driveways*		1. Sediment 2. Trace Metals (painted surfaces or preserved wood) 3. Litter
Utility Services Installation: *Proposed sewer services and storm drain. Site grading and installation of pervious stabilized surface.*		1. Sediment 2. Toxics (equipment/vehicle fuels, chlorine from line testing) 3. Bacteria (sewer lines)
Facility Construction: *Construction of new curb and gutter, colored sidewalks, crosswalks, ped ramps, and AC paving.*		1. Sediment 2. Toxics (paint strippers, solvents, detergents, adhesives, fuels) 3. Miscellaneous (concrete washout, runoff from material stockpiles) 4. Litter 5. Bacteria (temporary bathroom facilities, disturbed sewer lines)
Landscape Areas: *These are areas that will not contain structures.*		1. Sediment 2. Nutrients (fertilizers) 3. Bacteria (temporary bathroom facilities, disturbed sewer lines)
Additional Activities: *If necessary, Contractor shall list additional activities to be performed, materials used and associated pollutants.*		

*Note: Materials Used shall be determined and filled in by the Contractor.

APPENDIX H
CASQA BMP HANDBOOK FACT SHEETS

Scheduling EC-1



Categories

EC	Erosion Control	☑
SE	Sediment Control	☒
TC	Tracking Control	☒
WE	Wind Erosion Control	☒
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:
☑ **Primary Objective**
☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

Description and Purpose

Scheduling is the development of a written plan that includes sequencing of construction activities and the implementation of BMPs such as erosion control and sediment control while taking local climate (rainfall, wind, etc.) into consideration. The purpose is to reduce the amount and duration of soil exposed to erosion by wind, rain, runoff, and vehicle tracking, and to perform the construction activities and control practices in accordance with the planned schedule.

Suitable Applications

Proper sequencing of construction activities to reduce erosion potential should be incorporated into the schedule of every construction project especially during rainy season. Use of other, more costly yet less effective, erosion and sediment control BMPs may often be reduced through proper construction sequencing.

Limitations

- Environmental constraints such as nesting season prohibitions reduce the full capabilities of this BMP.

Implementation

- Avoid rainy periods. Schedule major grading operations during dry months when practical. Allow enough time before rainfall begins to stabilize the soil with vegetation or physical means or to install sediment trapping devices.
- Plan the project and develop a schedule showing each phase

of construction. Clearly show how the rainy season relates to soil disturbing and re-stabilization activities. Incorporate the construction schedule into the SWPPP.

- Include on the schedule, details on the rainy season implementation and deployment of:
  - Erosion control BMPs
  - Sediment control BMPs
  - Tracking control BMPs
  - Wind erosion control BMPs
  - Non-stormwater BMPs
  - Waste management and materials pollution control BMPs
- Include dates for activities that may require non-stormwater discharges such as dewatering, sawcutting, grinding, drilling, boring, crushing, blasting, painting, hydro-demolition, mortar mixing, pavement cleaning, etc.
- Work out the sequencing and timetable for the start and completion of each item such as site clearing and grubbing, grading, excavation, paving, foundation pouring utilities installation, etc., to minimize the active construction area during the rainy season.
  - Sequence trenching activities so that most open portions are closed before new trenching begins.
  - Incorporate staged seeding and re-vegetation of graded slopes as work progresses.
  - Schedule establishment of permanent vegetation during appropriate planting time for specified vegetation.
- Non-active areas should be stabilized as soon as practical after the cessation of soil disturbing activities or one day prior to the onset of precipitation.
- Monitor the weather forecast for rainfall.
- When rainfall is predicted, adjust the construction schedule to allow the implementation of soil stabilization and sediment treatment controls on all disturbed areas prior to the onset of rain.
- Be prepared year round to deploy erosion control and sediment control BMPs. Erosion may be caused during dry seasons by un-seasonal rainfall, wind, and vehicle tracking. Keep the site stabilized year round, and retain and maintain rainy season sediment trapping devices in operational condition.
- Apply permanent erosion control to areas deemed substantially complete during the project's defined seeding window.

Costs

Construction scheduling to reduce erosion may increase other construction costs due to reduced economies of scale in performing site grading. The cost effectiveness of scheduling techniques should be compared with the other less effective erosion and sedimentation controls to achieve a cost effective balance.

Inspection and Maintenance

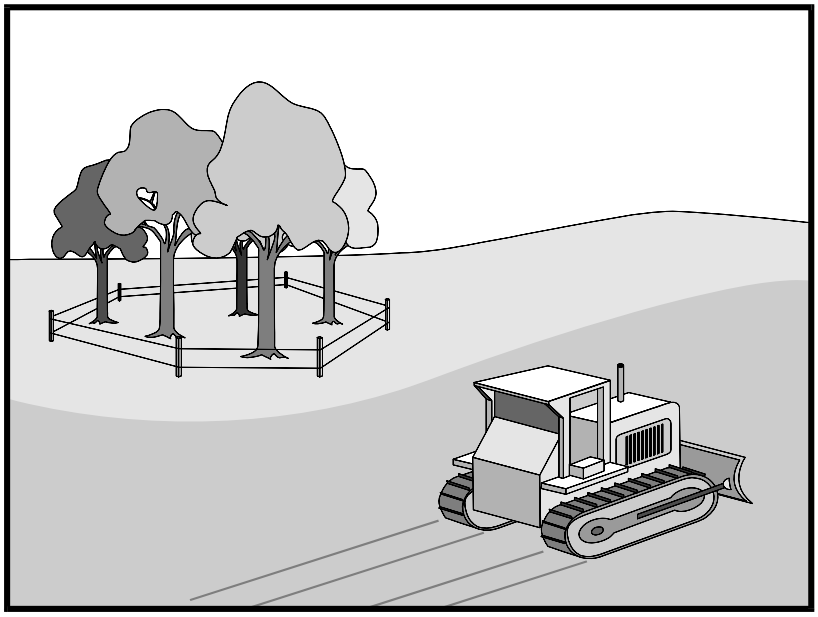
- Verify that work is progressing in accordance with the schedule. If progress deviates, take corrective actions.
- Amend the schedule when changes are warranted.
- Amend the schedule prior to the rainy season to show updated information on the deployment and implementation of construction site BMPs.

References

Stormwater Quality Handbooks Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities Developing Pollution Prevention Plans and Best Management Practices (EPA 832-R-92-005), U.S. Environmental Protection Agency, Office of Water, September 1992.

Preservation Of Existing Vegetation EC-2



Categories

EC	Erosion Control	☑
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

Description and Purpose

Carefully planned preservation of existing vegetation minimizes the potential of removing or injuring existing trees, vines, shrubs, and grasses that protect soil from erosion.

Suitable Applications

Preservation of existing vegetation is suitable for use on most projects. Large project sites often provide the greatest opportunity for use of this BMP. Suitable applications include the following:

- Areas within the site where no construction activity occurs, or occurs at a later date. This BMP is especially suitable to multi year projects where grading can be phased.
- Areas where natural vegetation exists and is designated for preservation. Such areas often include steep slopes, watercourse, and building sites in wooded areas.
- Areas where local, state, and federal government require preservation, such as vernal pools, wetlands, marshes, certain oak trees, etc. These areas are usually designated on the plans, or in the specifications, permits, or environmental documents.
- Where vegetation designated for ultimate removal can be temporarily preserved and be utilized for erosion control and sediment control.

Limitations

- Requires forward planning by the owner/developer,

contractor, and design staff.

- Limited opportunities for use when project plans do not incorporate existing vegetation into the site design.

- For sites with diverse topography, it is often difficult and expensive to save existing trees while grading the site satisfactory for the planned development.

Implementation

The best way to prevent erosion is to not disturb the land. In order to reduce the impacts of new development and redevelopment, projects may be designed to avoid disturbing land in sensitive areas of the site (e.g., natural watercourses, steep slopes), and to incorporate unique or desirable existing vegetation into the site's landscaping plan. Clearly marking and leaving a buffer area around these unique areas during construction will help to preserve these areas as well as take advantage of natural erosion prevention and sediment trapping.

Existing vegetation to be preserved on the site must be protected from mechanical and other injury while the land is being developed. The purpose of protecting existing vegetation is to ensure the survival of desirable vegetation for shade, beautification, and erosion control. Mature vegetation has extensive root systems that help to hold soil in place, thus reducing erosion. In addition, vegetation helps keep soil from drying rapidly and becoming susceptible to erosion. To effectively save existing vegetation, no disturbances of any kind should be allowed within a defined area around the vegetation. For trees, no construction activity should occur within the drip line of the tree.

Timing

- Provide for preservation of existing vegetation prior to the commencement of clearing and grubbing operations or other soil disturbing activities in areas where no construction activity is planned or will occur at a later date.

Design and Layout

- Mark areas to be preserved with temporary fencing. Include sufficient setback to protect roots.
  - Orange colored plastic mesh fencing works well.
  - Use appropriate fence posts and adequate post spacing and depth to completely support the fence in an upright position.
- Locate temporary roadways, stockpiles, and layout areas to avoid stands of trees, shrubs, and grass.
- Consider the impact of grade changes to existing vegetation and the root zone.
- Maintain existing irrigation systems where feasible. Temporary irrigation may be required.
- Instruct employees and subcontractors to honor protective devices. Prohibit heavy equipment, vehicular traffic, or storage of construction materials within the protected area.

Costs

There is little cost associated with preserving existing vegetation if properly planned during the project design, and these costs may be offset by aesthetic benefits that enhance property values. During construction, the cost for preserving existing vegetation will likely be less than the cost of applying erosion and sediment controls to the disturbed area. Replacing vegetation inadvertently destroyed during construction can be extremely expensive, sometimes in excess of $10,000 per tree.

Inspection and Maintenance

During construction, the limits of disturbance should remain clearly marked at all times. Irrigation or maintenance of existing vegetation should be described in the landscaping plan. If damage to protected trees still occurs, maintenance guidelines described below should be followed:

- Verify that protective measures remain in place. Restore damaged protection measures immediately.
- Serious tree injuries shall be attended to by an arborist.
- Damage to the crown, trunk, or root system of a retained tree shall be repaired immediately.
- Trench as far from tree trunks as possible, usually outside of the tree drip line or canopy. Curve trenches around trees to avoid large roots or root concentrations. If roots are encountered, consider tunneling under them. When trenching or tunneling near or under trees to be retained, place tunnels at least 18 in. below the ground surface, and not below the tree center to minimize impact on the roots.
- Do not leave tree roots exposed to air. Cover exposed roots with soil as soon as possible. If soil covering is not practical, protect exposed roots with wet burlap or peat moss until the tunnel or trench is ready for backfill.
- Cleanly remove the ends of damaged roots with a smooth cut.
- Fill trenches and tunnels as soon as possible. Careful filling and tamping will eliminate air spaces in the soil, which can damage roots.
- If bark damage occurs, cut back all loosened bark into the undamaged area, with the cut tapered at the top and bottom and drainage provided at the base of the wood. Limit cutting the undamaged area as much as possible.
- Aerate soil that has been compacted over a trees root zone by punching holes 12 in. deep with an iron bar, and moving the bar back and forth until the soil is loosened. Place holes 18 in. apart throughout the area of compacted soil under the tree crown.
- Fertilization
  - Fertilize stressed or damaged broadleaf trees to aid recovery.
  - Fertilize trees in the late fall or early spring.

- Apply fertilizer to the soil over the feeder roots and in accordance with label instructions, but never closer than 3 ft to the trunk. Increase the fertilized area by one-fourth of the crown area for conifers that have extended root systems.

- Retain protective measures until all other construction activity is complete to avoid damage during site cleanup and stabilization.

References

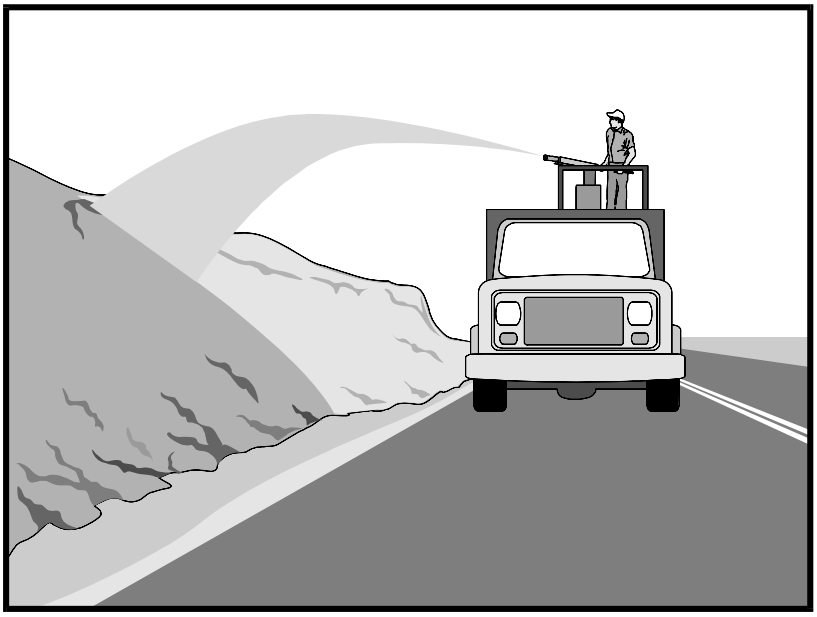
County of Sacramento Tree Preservation Ordinance, September 1981.

Stormwater Quality Handbooks Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management of the Puget Sound Basin, Technical Manual, Publication #91-75, Washington State Department of Ecology, February 1992.

Water Quality Management Plan for The Lake Tahoe Region, Volume II, Handbook of Management Practices, Tahoe Regional Planning Agency, November 1988.

Hydraulic Mulch EC-3



Categories

EC	Erosion Control	☑
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	☒
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:
☑ **Primary Category**
☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

EC-4 Hydroseeding
EC-5 Soil Binders
EC-6 Straw Mulch
EC-7 Geotextiles and Mats
EC-8 Wood Mulching
EC-14 Compost Blanket
EC-16 Non-Vegetative Stabilization

Description and Purpose

Hydraulic Mulch consists of various types of fibrous materials mixed with water and sprayed onto the soil surface in slurry form to provide a layer of temporary protection from wind and water erosion.

Suitable Applications

Hydraulic mulch as a temporary, stand alone, erosion control BMP is suitable for disturbed areas that require temporary protection from wind and water erosion until permanent soil stabilization activities commence. Examples include:

- Rough-graded areas that will remain inactive for longer than permit-required thresholds (e.g., 14 days) or otherwise require stabilization to minimize erosion or prevent sediment discharges.
- Soil stockpiles.
- Slopes with exposed soil between existing vegetation such as trees or shrubs.
- Slopes planted with live, container-grown vegetation or plugs.
- Slopes burned by wildfire.

Hydraulic mulch can also be applied to augment other erosion control BMPs such as:

- In conjunction with straw mulch (see EC-6 Straw Mulch) where the rate of hydraulic mulch is reduced to 100-500 lbs per acre and the slurry is applied over the straw as a tackifying agent to hold the straw in place.
- Supplemental application of soil amendments, such as fertilizer, lime, gypsum, soil bio-stimulants or compost.

Limitations

In general, hydraulic mulch is not limited by slope length, gradient or soil type. However, the following limitations typically apply:

- Most hydraulic mulch applications, particularly bonded fiber matrices (BFMs), require at least 24 hours to dry before rainfall occurs.
- Temporary applications (i.e., without a vegetative component) may require a second application in order to remain effective for an entire rainy season.
- Treatment areas must be accessible to hydraulic mulching equipment.
- Availability of water sources in remote areas for mixing and application.
- As a stand-alone temporary BMP, hydraulic mulches may need to be re-applied to maintain their erosion control effectiveness, typically after 6-12 months depending on the type of mulch used.
- Availability of hydraulic mulching equipment may be limited just prior to the rainy season and prior to storms due to high demand.
- Cellulose fiber mulches alone may not perform well on steep slopes or in course soils.

Implementation

- Where feasible, it is preferable to prepare soil surfaces prior to application by roughening embankments and fill areas with a crimping or punching type roller or by track walking.
- The majority of hydraulic mulch applications do not necessarily require surface/soil preparation (See EC-15 Soil Preparation) although in almost every case where re-vegetation is included as part of the practice, soil preparation can be beneficial. One of the advantages of hydraulic mulch over other erosion control methods is that it can be applied in areas where soil preparation is precluded by site conditions, such as steep slopes, rocky soils, or inaccessibility.
- Avoid mulch over spray onto roads, sidewalks, drainage channels, existing vegetation, etc.
- Hydraulic mulching is generally performed utilizing specialized machines that have a large water-holding/mixing tank and some form of mechanical agitation or other recirculation method to keep water, mulch and soil amendments in suspension. The mixed hydraulic slurry can be applied from a tower sprayer on top of the machine or by extending a hose to areas remote from the machine.

- Where possible apply hydraulic mulch from multiple directions to adequately cover the soil. Application from a single direction can result in shadowing, uneven coverage and failure of the BMP.
- Hydraulic mulch can also include a vegetative component, such as seed, rhizomes, or stolons (see EC-4 Hydraulic Seed).
- Typical hydraulic mulch application rates range from 2,000 pounds per acre for standard mulches (SMs) to 3,500 pounds per acre for BFMs. However, the required amount of hydraulic mulch to provide adequate coverage of exposed topsoil may appear to exceed the standard rates when the roughness of the soil surface is changed due to soil preparation methods (see EC-15 Soil Preparation) or by slope gradient.
- Other factors such as existing soil moisture and soil texture can have a profound effect on the amount of hydraulic mulch required (i.e. application rate) applied to achieve an erosion-resistant covering.
- Avoid use of mulch without a tackifier component, especially on slopes.
- Mulches used in the hydraulic mulch slurry can include:
  - Cellulose fiber
  - Thermally-processed wood fibers
  - Cotton
  - Synthetics
  - Compost (see EC-14, Compost Blanket)
- Additional guidance on the comparison and selection of temporary slope stabilization methods is provided in Appendix F of the Handbook.

Categories of Hydraulic Mulches

Standard Hydraulic Mulch (SM)

Standard hydraulic mulches are generally applied at a rate of 2,000 pounds per acre and are manufactured containing around 5% tackifier (i.e. soil binder), usually a plant-derived guar or psyllium type. Most standard mulches are green in color derived from food-color based dyes.

Hydraulic Matrices (HM) and Stabilized Fiber Matrices (SFM)

Hydraulic matrices and stabilized fiber matrices are slurries which contain increased levels of tackifiers/soil binders; usually 10% or more by weight. HMs and SFMs have improved performance compared to a standard hydraulic mulch (SM) because of the additional percentage of tackifier and because of their higher application rates, typically 2,500 – 4,000 pounds per acre. Hydraulic matrices can include a mixture of fibers, for example, a 50/50 blend of paper and wood fiber. In the case of an SFM, the tackifier/soil binder is specified as a polyacrylamide (PAM).

Bonded Fiber Matrix (BFM)

Bonded fiber matrices (BFMs) are hydraulically-applied systems of fibers, adhesives (typically guar based) and chemical cross-links. Upon drying, the slurry forms an erosion-resistant blanket that prevents soil erosion and promotes vegetation establishment. The cross-linked adhesive in the BFM should be biodegradable and should not dissolve or disperse upon re-wetting. BFMs are typically applied at rates from 3,000 to 4,000 lbs/acre based on the manufacturer's recommendation. BFMs should not be applied immediately before, during or immediately after rainfall or if the soil is saturated. Depending on the product, BFMs typically require 12 to 24 hours to dry and become effective.

Mechanically-Bonded Fiber Matrices (MBFM)

Mechanically-bonded fiber matrices (MBFMs) are hydraulically applied systems similar to BFM that use crimped synthetic fibers and PAM and are typically applied to a slope at a higher application rate than a standard BFM.

Hydraulic Compost Matrix (HCM)

Hydraulic compost matrix (HCM) is a field-derived practice whereby finely graded or sifted compost is introduced into the hydraulic mulch slurry. A guar-type tackifier can be added for steeper slope applications as well as any specified seed mixtures. A HCM can help to accelerate seed germination and growth. HCMs are particularly useful as an in-fill for three-dimensional re-vegetation geocomposites, such as turf reinforcement mats (TRM) (see EC-7 Geotextiles and Mats).

Costs

Average installed costs for hydraulic mulch categories are is provided in Table 1, below.

Table 1
HYDRAULIC MULCH BMPs
INSTALLED COSTS

BMP	Installed Cost/Acre
Standard Hydraulic Mulching (SM)	$1,700 - $3,600 per acre
Hydraulic Matrices (HM) and Stabilized Fiber Matrices	
Guar-based	$2,000 - $4,000 per acre
PAM-based	$2,500 - $5,610 per acre
Bonded Fiber Matrix (BFM)	$3,900 - $6,900 per acre
Mechanically Bonded Fiber Matrix (MBFM)	$4,500 - $6,000 per acre
Hydraulic Compost Matrix (HCM)	$3,000 - $3,500 per acre

Source: Caltrans Soil Stabilization BMP Research for Erosion and Sediment Controls, July 2007

Inspection and Maintenance

- Maintain an unbroken, temporary mulched ground cover throughout the period of construction when the soils are not being reworked.
- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected

weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.

- Areas where erosion is evident should be repaired and BMPs re-applied as soon as possible. Care should be exercised to minimize the damage to protected areas while making repairs, as any area damaged will require re-application of BMPs.
- Compare the number of bags or weight of applied mulch to the area treated to determine actual application rates and compliance with specifications.

References

Soil Stabilization BMP Research for Erosion and Sediment Controls: Cost Survey Technical Memorandum, State of California Department of Transportation (Caltrans), July 2007.

Controlling Erosion of Construction Sites, Agricultural Information #347, U.S. Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS) (formerly Soil Conservation Service – SCS).

Guides for Erosion and Sediment Control in California, USDA Soils Conservation Service, January 1991.

Manual of Standards of Erosion and Sediment Control Measures, Association of Bay Area Governments, May 1995.

Sedimentation and Erosion Control, An Inventory of Current Practices Draft, US EPA, April 1990.

Soil Erosion by Water, Agriculture Information Bulletin #513, U.S. Department of Agriculture, Soil Conservation Service.

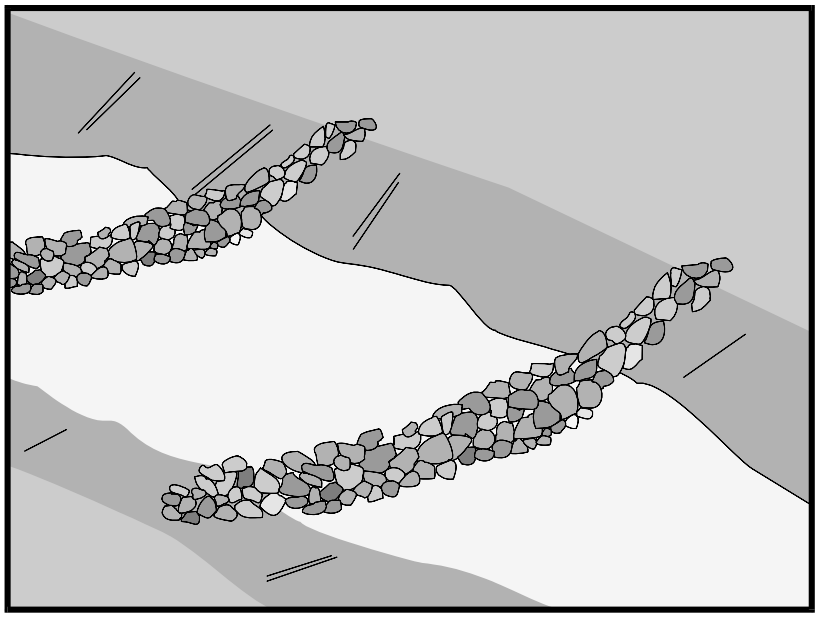
Stormwater Quality Handbooks Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Guidance Document: Soil Stabilization for Temporary Slopes, State of California Department of Transportation (Caltrans), November 1999

Stormwater Management of the Puget Sound Basin, Technical Manual, Publication #91-75, Washington State Department of Ecology, February 1992.

Water Quality Management Plan for the Lake Tahoe Region, Volume II, Handbook of Management Practices, Tahoe Regional Planning Agency, November 1988.

Check Dams SE-4



Categories

EC	Erosion Control	☒
SE	Sediment Control	☑
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:
☑ **Primary Category**
☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

SE-5 Fiber Rolls

SE-6 Gravel Bag Berm

SE-8 Sandbag Barrier

SE-14 Biofilter Bags

Description and Purpose

A check dam is a small barrier constructed of rock, gravel bags, sandbags, fiber rolls, or other proprietary products, placed across a constructed swale or drainage ditch. Check dams reduce the effective slope of the channel, thereby reducing scour and channel erosion by reducing flow velocity and increasing residence time within the channel, allowing sediment to settle.

Suitable Applications

Check dams may be appropriate in the following situations:

- To promote sedimentation behind the dam.
- To prevent erosion by reducing the velocity of channel flow in small intermittent channels and temporary swales.
- In small open channels that drain 10 acres or less.
- In steep channels where stormwater runoff velocities exceed 5 ft/s.
- During the establishment of grass linings in drainage ditches or channels.
- In temporary ditches where the short length of service does not warrant establishment of erosion-resistant linings.
- To act as a grade control structure.

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Limitations

- Not to be used in live streams or in channels with extended base flows.
- Not appropriate in channels that drain areas greater than 10 acres.
- Not appropriate in channels that are already grass-lined unless erosion potential or sediment-laden flow is expected, as installation may damage vegetation.
- Require extensive maintenance following high velocity flows.
- Promotes sediment trapping which can be re-suspended during subsequent storms or removal of the check dam.
- Do not construct check dams with straw bales or silt fence.
- Water suitable for mosquito production may stand behind check dams, particularly if subjected to daily non-stormwater discharges.

Implementation

General

Check dams reduce the effective slope and create small pools in swales and ditches that drain 10 acres or less. Using check dams to reduce channel slope reduces the velocity of stormwater flows, thus reducing erosion of the swale or ditch and promoting sedimentation. Thus, check dams are dual-purpose and serve an important role as erosion controls as well as as sediment controls. Note that use of 1-2 isolated check dams for sedimentation will likely result in little net removal of sediment because of the small detention time and probable scour during longer storms. Using a series of check dams will generally increase their effectiveness. A sediment trap (SE-3) may be placed immediately upstream of the check dam to increase sediment removal efficiency.

Design and Layout

Check dams work by decreasing the effective slope in ditches and swales. An important consequence of the reduced slope is a reduction in capacity of the ditch or swale. This reduction in capacity should be considered when using this BMP, as reduced capacity can result in overtopping of the ditch or swale and resultant consequences. In some cases, such as a "permanent" ditch or swale being constructed early and used as a "temporary" conveyance for construction flows, the ditch or swale may have sufficient capacity such that the temporary reduction in capacity due to check dams is acceptable. When check dams reduce capacities beyond acceptable limits, either:

- Don't use check dams. Consider alternative BMPs, or.
- Increase the size of the ditch or swale to restore capacity.

Maximum slope and velocity reduction is achieved when the toe of the upstream dam is at the same elevation as the top of the downstream dam (see "Spacing Between Check Dams" detail at the end of this fact sheet). The center section of the dam should be lower than the edge sections (at least 6 inches), acting as a spillway, so that the check dam will direct flows to the center of

the ditch or swale (see "Typical Rock Check Dam" detail at the end of this fact sheet). Bypass or side-cutting can occur if a sufficient spillway is not provided in the center of the dam.

Check dams are usually constructed of rock, gravel bags, sandbags, and fiber rolls. A number of products can also be used as check dams (e.g. HDPE check dams, temporary silt dikes (SE-12)), and some of these products can be removed and reused. Check dams can also be constructed of logs or lumber, and have the advantage of a longer lifespan when compared to gravel bags, sandbags, and fiber rolls. Check dams should not be constructed from straw bales or silt fences, since concentrated flows quickly wash out these materials.

Rock check dams are usually constructed of 8 to 12 in. rock. The rock is placed either by hand or mechanically, but never just dumped into the channel. The dam should completely span the ditch or swale to prevent washout. The rock used should be large enough to stay in place given the expected design flow through the channel. It is recommended that abutments be extended 18 in. into the channel bank. Rock can be graded such that smaller diameter rock (e.g. 2-4 in) is located on the upstream side of larger rock (holding the smaller rock in place); increasing residence time.

Log check dams are usually constructed of 4 to 6 in. diameter logs, installed vertically. The logs should be embedded into the soil at least 18 in. Logs can be bolted or wired to vertical support logs that have been driven or buried into the soil.

See fiber rolls, SE-5, for installation of fiber roll check dams.

Gravel bag and sand bag check dams are constructed by stacking bags across the ditch or swale, shaped as shown in the drawings at the end of this fact sheet (see "Gravel Bag Check Dam" detail at the end of this fact sheet).

Manufactured products, such as temporary silt dikes (SE-12), should be installed in accordance with the manufacturer's instructions. Installation typically requires anchoring or trenching of products, as well as regular maintenance to remove accumulated sediment and debris.

If grass is planted to stabilize the ditch or swale, the check dam should be removed when the grass has matured (unless the slope of the swales is greater than 4%).

The following guidance should be followed for the design and layout of check dams:

- Install the first check dam approximately 16 ft from the outfall device and at regular intervals based on slope gradient and soil type.
- Check dams should be placed at a distance and height to allow small pools to form between each check dam.
- For multiple check dam installation, backwater from a downstream check dam should reach the toes of the upstream check dam.
- A sediment trap provided immediately upstream of the check dam will help capture sediment. Due to the potential for this sediment to be resuspended in subsequent storms, the sediment trap should be cleaned following each storm event.

- High flows (typically a 2-year storm or larger) should safely flow over the check dam without an increase in upstream flooding or damage to the check dam.
- Where grass is used to line ditches, check dams should be removed when grass has matured sufficiently to protect the ditch or swale.

Materials

- Rock used for check dams should typically be 8-12 in rock and be sufficiently sized to stay in place given expected design flows in the channel. Smaller diameter rock (e.g. 2 to 4 in) can be placed on the upstream side of larger rock to increase residence time.
- Gravel bags used for check dams should conform to the requirements of SE-6, Gravel Bag Berms.
- Sandbags used for check dams should conform to SE-8, Sandbag Barrier.
- Fiber rolls used for check dams should conform to SE-5, Fiber Rolls.
- Temporary silt dikes used for check dams should conform to SE-12, Temporary Silt Dikes.

Installation

- Rock should be placed individually by hand or by mechanical methods (no dumping of rock) to achieve complete ditch or swale coverage.
- Tightly abut bags and stack according to detail shown in the figure at the end of this section (pyramid approach). Gravel bags and sandbags should not be stacked any higher than 3 ft.
- Upper rows or gravel and sand bags shall overlap joints in lower rows.
- Fiber rolls should be trenched in, backfilled, and firmly staked in place.
- Install along a level contour.
- HDPE check dams, temporary silt dikes, and other manufactured products should be used and installed per manufacturer specifications.

Costs

Cost consists of labor costs if materials are readily available (such as gravel on-site). If material must be imported, costs will increase. For other material and installation costs, see SE-5, SE-6, SE-8, SE-12, and SE-14.

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Replace missing rock, bags, rolls, etc. Replace bags or rolls that have degraded or have become damaged.

- If the check dam is used as a sediment capture device, sediment that accumulates behind the BMP should be periodically removed in order to maintain BMP effectiveness. Sediment should be removed when the sediment accumulation reaches one-third of the barrier height.
- If the check dam is used as a grade control structure, sediment removal is not required as long as the system continues to control the grade.
- Inspect areas behind check dams for pools of standing water, especially if subjected to daily non-stormwater discharges.
- Remove accumulated sediment prior to permanent seeding or soil stabilization.
- Remove check dam and accumulated sediment when check dams are no longer needed.

References

Draft – Sedimentation and Erosion Control, and Inventory of Current Practices, USEPA, April 1990.

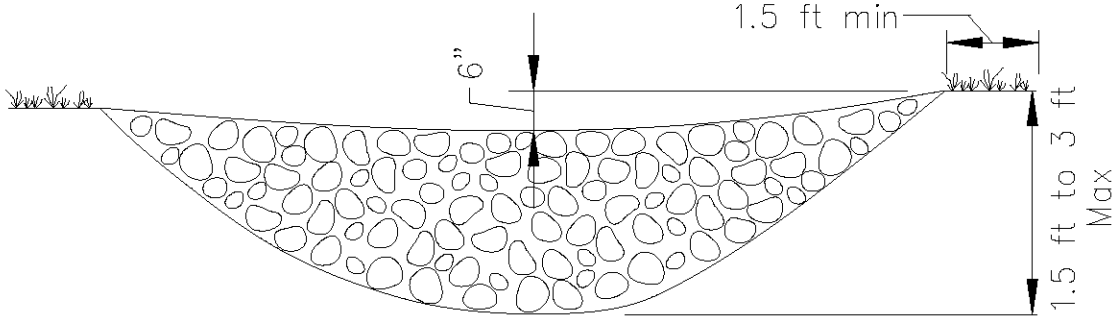
Manual of Standards of Erosion and Sediment Control Measures, Association of Bay Area Governments, May 1995.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

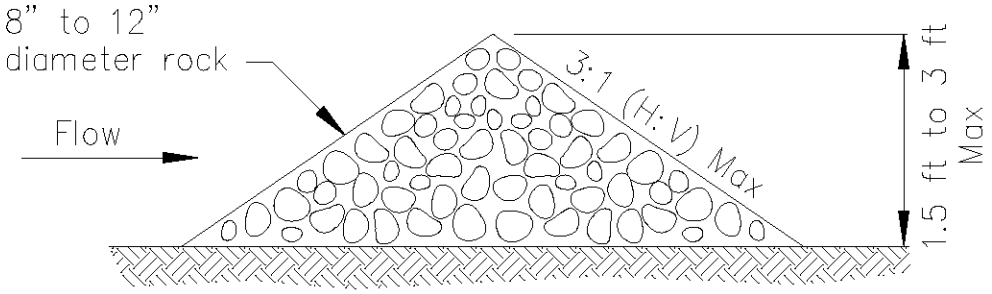
Stormwater Management of the Puget Sound Basin, Technical Manual, Publication #91-75, Washington State Department of Ecology, February 1992.

Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.

Metzger, M.E. 2004. Managing mosquitoes in stormwater treatment devices. University of California Division of Agriculture and Natural Resources, Publication 8125. On-line: http://anrcatalog.ucdavis.edu/pdf/8125.pdf

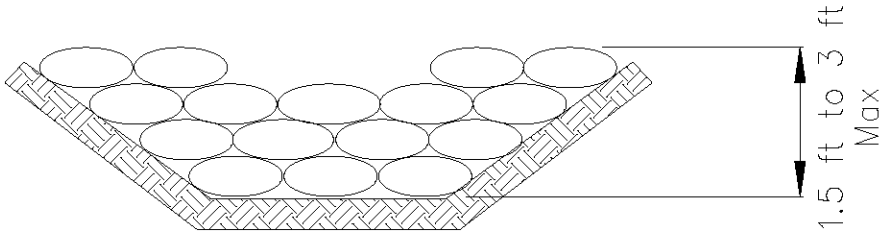


ELEVATION

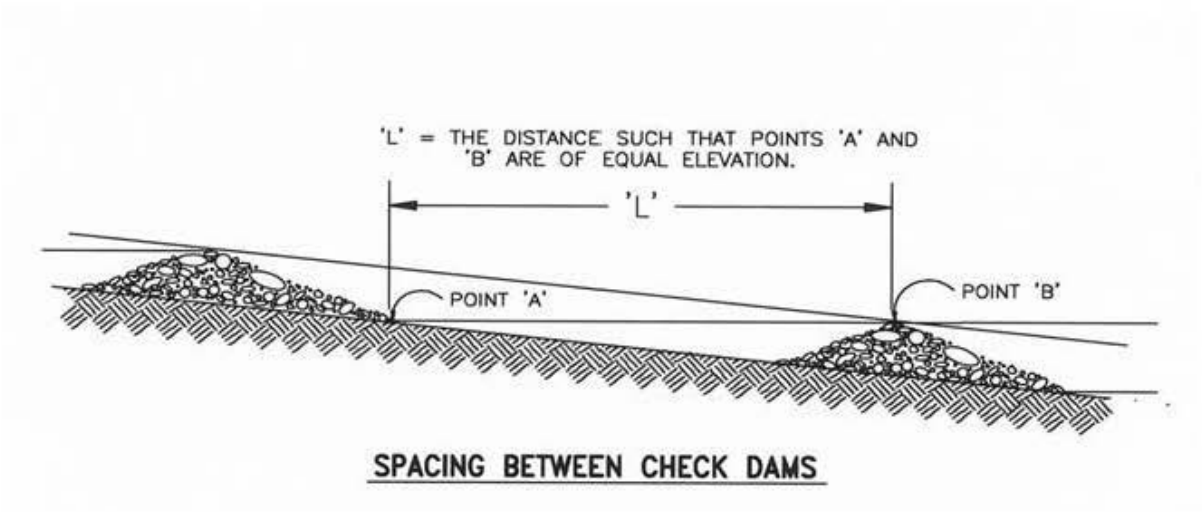


TYPICAL ROCK CHECK DAM SECTION

ROCK CHECK DAM
NOT TO SCALE

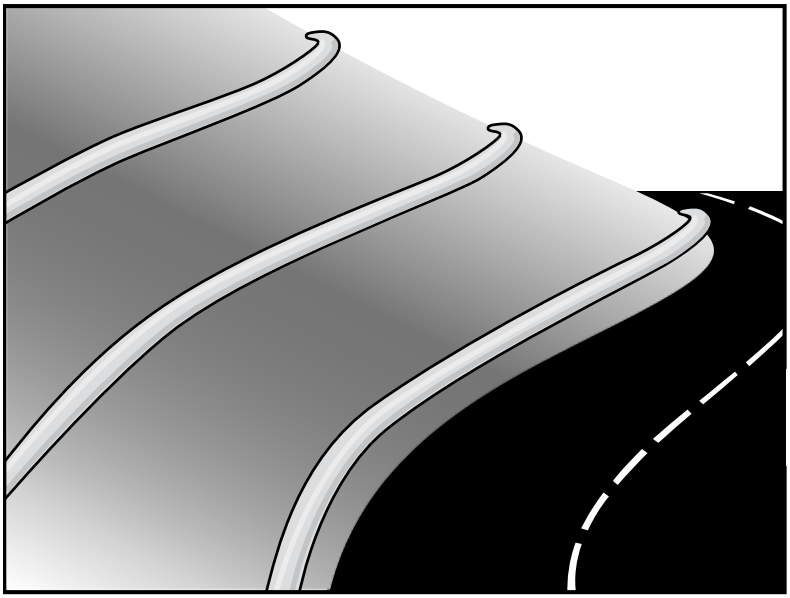


GRAVEL BAG CHECK DAM ELEVATION
NOT TO SCALE



SPACING BETWEEN CHECK DAMS

Fiber Rolls SE-5



Categories

EC	Erosion Control	☒
SE	Sediment Control	☑
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:
☑ **Primary Category**
☒ **Secondary Category**

Description and Purpose

A fiber roll consists of straw, coir, or other biodegradable materials bound into a tight tubular roll wrapped by netting, which can be photodegradable or natural. Additionally, gravel core fiber rolls are available, which contain an imbedded ballast material such as gravel or sand for additional weight when staking the rolls are not feasible (such as use as inlet protection). When fiber rolls are placed at the toe and on the face of slopes along the contours, they intercept runoff, reduce its flow velocity, release the runoff as sheet flow, and provide removal of sediment from the runoff (through sedimentation). By interrupting the length of a slope, fiber rolls can also reduce sheet and rill erosion until vegetation is established.

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

SE-1 Silt Fence

SE-6 Gravel Bag Berm

SE-8 Sandbag Barrier

SE-14 Biofilter Bags

Suitable Applications

Fiber rolls may be suitable:

- Along the toe, top, face, and at grade breaks of exposed and erodible slopes to shorten slope length and spread runoff as sheet flow.
- At the end of a downward slope where it transitions to a steeper slope.
- Along the perimeter of a project.
- As check dams in unlined ditches with minimal grade.
- Down-slope of exposed soil areas.
- At operational storm drains as a form of inlet protection.

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- Around temporary stockpiles.

Limitations

- Fiber rolls are not effective unless trenched in and staked.
- Not intended for use in high flow situations.
- Difficult to move once saturated.
- If not properly staked and trenched in, fiber rolls could be transported by high flows.
- Fiber rolls have a very limited sediment capture zone.
- Fiber rolls should not be used on slopes subject to creep, slumping, or landslide.
- Rolls typically function for 12-24 months depending upon local conditions.

Implementation

Fiber Roll Materials

- Fiber rolls should be prefabricated.
- Fiber rolls may come manufactured containing polyacrylamide (PAM), a flocculating agent within the roll. Fiber rolls impregnated with PAM provide additional sediment removal capabilities and should be used in areas with fine, clayey or silty soils to provide additional sediment removal capabilities. Monitoring may be required for these installations.
- Fiber rolls are made from weed free rice straw, flax, or a similar agricultural material bound into a tight tubular roll by netting.
- Typical fiber rolls vary in diameter from 9 in. to 20 in. Larger diameter rolls are available as well.

Installation

- Locate fiber rolls on level contours spaced as follows:
  - Slope inclination of 4:1 (H:V) or flatter: Fiber rolls should be placed at a maximum interval of 20 ft.
  - Slope inclination between 4:1 and 2:1 (H:V): Fiber Rolls should be placed at a maximum interval of 15 ft. (a closer spacing is more effective).
  - Slope inclination 2:1 (H:V) or greater: Fiber Rolls should be placed at a maximum interval of 10 ft. (a closer spacing is more effective).
- Prepare the slope before beginning installation.
- Dig small trenches across the slope on the contour. The trench depth should be ¼ to 1/3 of the thickness of the roll, and the width should equal the roll diameter, in order to provide area to backfill the trench.

- It is critical that rolls are installed perpendicular to water movement, and parallel to the slope contour.
- Start building trenches and installing rolls from the bottom of the slope and work up.
- It is recommended that pilot holes be driven through the fiber roll. Use a straight bar to drive holes through the roll and into the soil for the wooden stakes.
- Turn the ends of the fiber roll up slope to prevent runoff from going around the roll.
- Stake fiber rolls into the trench.
  - Drive stakes at the end of each fiber roll and spaced 4 ft maximum on center.
  - Use wood stakes with a nominal classification of 0.75 by 0.75 in. and minimum length of 24 in.
- If more than one fiber roll is placed in a row, the rolls should be overlapped, not abutted.
- See typical fiber roll installation details at the end of this fact sheet.

Removal

- Fiber rolls can be left in place or removed depending on the type of fiber roll and application (temporary vs. permanent installation). Typically, fiber rolls encased with plastic netting are used for a temporary application because the netting does not biodegrade. Fiber rolls used in a permanent application are typically encased with a biodegradeable material and are left in place. Removal of a fiber roll used in a permanent application can result in greater disturbance.
- Temporary installations should only be removed when up gradient areas are stabilized per General Permit requirements, and/or pollutant sources no longer present a hazard. But, they should also be removed before vegetation becomes too mature so that the removal process does not disturb more soil and vegetation than is necessary.

Costs

Material costs for regular fiber rolls range from $20 - $30 per 25 ft roll.

Material costs for PAM impregnated fiber rolls range between 7.00-$9.00 per linear foot, based upon vendor research.

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Repair or replace split, torn, unraveling, or slumping fiber rolls.
- If the fiber roll is used as a sediment capture device, or as an erosion control device to maintain sheet flows, sediment that accumulates in the BMP should be periodically removed

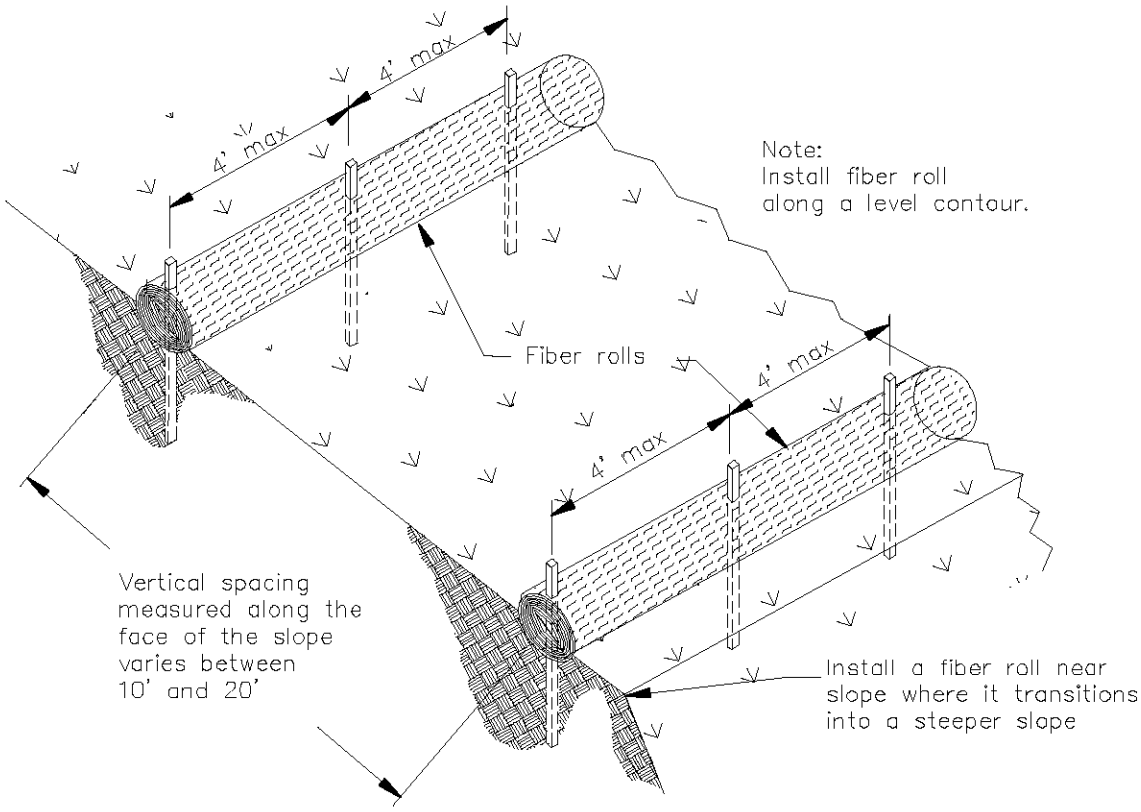
in order to maintain BMP effectiveness. Sediment should be removed when sediment accumulation reaches one-third the designated sediment storage depth.

- If fiber rolls are used for erosion control, such as in a check dam, sediment removal should not be required as long as the system continues to control the grade. Sediment control BMPs will likely be required in conjunction with this type of application.
- Repair any rills or gullies promptly.

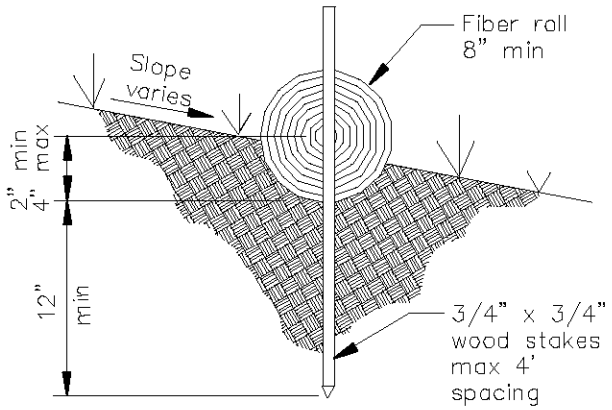
References

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.

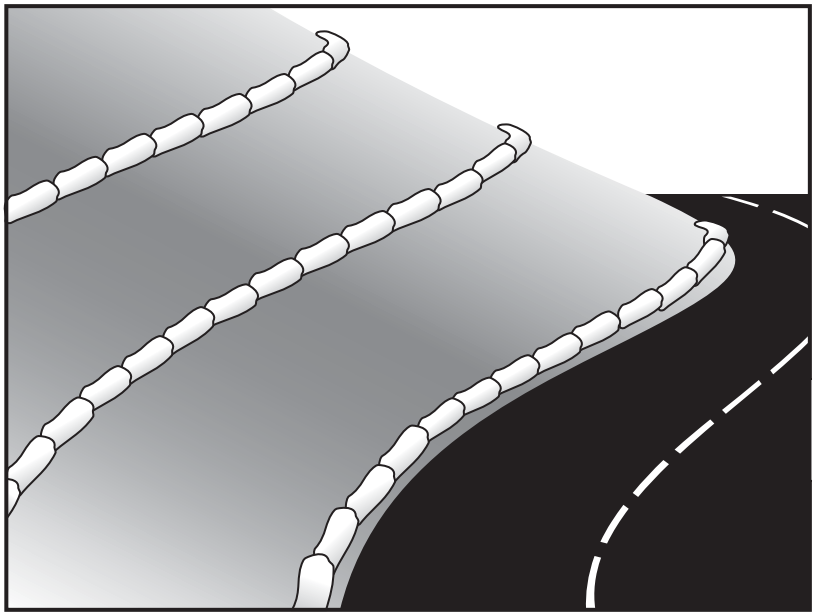


TYPICAL FIBER ROLL INSTALLATION
N.T.S.



ENTRENCHMENT DETAIL
N.T.S.

Gravel Bag Berm SE-6



Description and Purpose

A gravel bag berm is a series of gravel-filled bags placed on a level contour to intercept sheet flows. Gravel bags pond sheet flow runoff, allowing sediment to settle out, and release runoff slowly as sheet flow, preventing erosion.

Suitable Applications

Gravel bag berms may be suitable:

- As a linear sediment control measure:
  - Below the toe of slopes and erodible slopes
  - As sediment traps at culvert/pipe outlets
  - Below other small cleared areas
  - Along the perimeter of a site
  - Down slope of exposed soil areas
  - Around temporary stockpiles and spoil areas
  - Parallel to a roadway to keep sediment off paved areas
  - Along streams and channels
- As a linear erosion control measure:
  - Along the face and at grade breaks of exposed and erodible slopes to shorten slope length and spread runoff as sheet flow.

Categories

EC	Erosion Control	☒
SE	Sediment Control	☑
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:
☑ **Primary Category**
☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

SE-1 Silt Fence
SE-5 Fiber Roll
SE-8 Sandbag Barrier
SE-14 Biofilter Bags

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- At the top of slopes to divert runoff away from disturbed slopes.
- As chevrons (small check dams) across mildly sloped construction roads. For use check dam use in channels, see SE-4, Check Dams.

Limitations

- Gravel berms may be difficult to remove.
- Removal problems limit their usefulness in landscaped areas.
- Gravel bag berm may not be appropriate for drainage areas greater than 5 acres.
- Runoff will pond upstream of the berm, possibly causing flooding if sufficient space does not exist.
- Degraded gravel bags may rupture when removed, spilling contents.
- Installation can be labor intensive.
- Durability of gravel bags is somewhat limited and bags may need to be replaced when installation is required for longer than 6 months.
- Easily damaged by construction equipment.
- When used to detain concentrated flows, maintenance requirements increase.

Implementation

General

A gravel bag berm consists of a row of open graded gravel-filled bags placed on a level contour. When appropriately placed, a gravel bag berm intercepts and slows sheet flow runoff, causing temporary ponding. The temporary ponding allows sediment to settle. The open graded gravel in the bags is porous, which allows the ponded runoff to flow slowly through the bags, releasing the runoff as sheet flows. Gravel bag berms also interrupt the slope length and thereby reduce erosion by reducing the tendency of sheet flows to concentrate into rivulets, which erode rills, and ultimately gullies, into disturbed, sloped soils. Gravel bag berms are similar to sand bag barriers, but are more porous. Generally, gravel bag berms should be used in conjunction with temporary soil stabilization controls up slope to provide effective erosion and sediment control.

Design and Layout

- Locate gravel bag berms on level contours.
- When used for slope interruption, the following slope/sheet flow length combinations apply:
  - Slope inclination of 4:1 (H:V) or flatter: Gravel bags should be placed at a maximum interval of 20 ft, with the first row near the slope toe.
  - Slope inclination between 4:1 and 2:1 (H:V): Gravel bags should be placed at a maximum interval of 15 ft. (a closer spacing is more effective), with the first row near the slope toe.

Slope inclination 2:1 (H:V) or greater: Gravel bags should be placed at a maximum interval of 10 ft. (a closer spacing is more effective), with the first row near the slope toe.

- Turn the ends of the gravel bag barriers up slope to prevent runoff from going around the berm.
- Allow sufficient space up slope from the gravel bag berm to allow ponding, and to provide room for sediment storage.
- For installation near the toe of the slope, gravel bag barriers should be set back from the slope toe to facilitate cleaning. Where specific site conditions do not allow for a set-back, the gravel bag barrier may be constructed on the toe of the slope. To prevent flows behind the barrier, bags can be placed perpendicular to a berm to serve as cross barriers.
- Drainage area should not exceed 5 acres.
- In Non-Traffic Areas:
  - Height = 18 in. maximum
  - Top width = 24 in. minimum for three or more layer construction
  - Top width = 12 in. minimum for one or two layer construction
  - Side slopes = 2:1 (H:V) or flatter
- In Construction Traffic Areas:
  - Height = 12 in. maximum
  - Top width = 24 in. minimum for three or more layer construction.
  - Top width = 12 in. minimum for one or two layer construction.
  - Side slopes = 2:1 (H:V) or flatter.
- Butt ends of bags tightly.
- On multiple row, or multiple layer construction, overlap butt joints of adjacent row and row beneath.
- Use a pyramid approach when stacking bags.

Materials

- ***Bag Material:*** Bags should be woven polypropylene, polyethylene or polyamide fabric or burlap, minimum unit weight of 4 ounces/yd^2, Mullen burst strength exceeding 300 lb/in^2 in conformance with the requirements in ASTM designation D3786, and ultraviolet stability exceeding 70% in conformance with the requirements in ASTM designation D4355.

- ***Bag Size:*** Each gravel-filled bag should have a length of 18 in., width of 12 in., thickness of 3 in., and mass of approximately 33 lbs. Bag dimensions are nominal, and may vary based on locally available materials.

- ***Fill Material:*** Fill material should be 0.5 to 1 in. crushed rock, clean and free from clay, organic matter, and other deleterious material, or other suitable open graded, non-cohesive, porous gravel.

Costs

Material costs for gravel bags are average and are dependent upon material availability. $2.50-3.00 per filled gravel bag is standard based upon vendor research.

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.

- Gravel bags exposed to sunlight will need to be replaced every two to three months due to degrading of the bags.

- Reshape or replace gravel bags as needed.

- Repair washouts or other damage as needed.

- Sediment that accumulates in the BMP should be periodically removed in order to maintain BMP effectiveness. Sediment should be removed when the sediment accumulation reaches one-third of the barrier height.

- Remove gravel bag berms when no longer needed and recycle gravel fill whenever possible and properly dispose of bag material. Remove sediment accumulation and clean, re-grade, and stabilize the area.

References

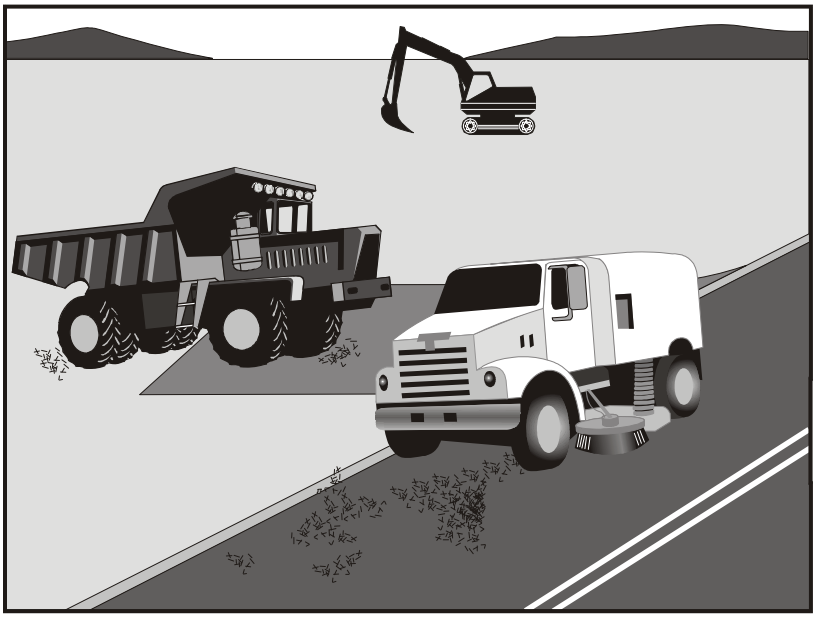
Handbook of Steel Drainage and Highway Construction, American Iron and Steel Institute, 1983.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Stormwater Pollution Plan Handbook, First Edition, State of California, Department of Transportation Division of New Technology, Materials and Research, October 1992.

Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.

Street Sweeping and Vacuuming SE-7



Categories		
EC	Erosion Control	
SE	Sediment Control	☒
TC	Tracking Control	☑
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:
☑ **Primary Objective**
☒ **Secondary Objective**

Targeted Constituents	
Sediment	☑
Nutrients	
Trash	☑
Metals	
Bacteria	
Oil and Grease	☑
Organics	

Potential Alternatives

None

Description and Purpose

Street sweeping and vacuuming includes use of self-propelled and walk-behind equipment to remove sediment from streets and roadways, and to clean paved surfaces in preparation for final paving. Sweeping and vacuuming prevents sediment from the project site from entering storm drains or receiving waters.

Suitable Applications

Sweeping and vacuuming are suitable anywhere sediment is tracked from the project site onto public or private paved streets and roads, typically at points of egress. Sweeping and vacuuming are also applicable during preparation of paved surfaces for final paving.

Limitations

Sweeping and vacuuming may not be effective when sediment is wet or when tracked soil is caked (caked soil may need to be scraped loose).

Implementation

- Controlling the number of points where vehicles can leave the site will allow sweeping and vacuuming efforts to be focused, and perhaps save money.
- Inspect potential sediment tracking locations daily.
- Visible sediment tracking should be swept or vacuumed on a daily basis.
- Do not use kick brooms or sweeper attachments. These tend to spread the dirt rather than remove it.

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- If not mixed with debris or trash, consider incorporating the removed sediment back into the project

Costs

Rental rates for self-propelled sweepers vary depending on hopper size and duration of rental. Expect rental rates from $58/hour (3 yd^3 hopper) to $88/hour (9 yd^3 hopper), plus operator costs. Hourly production rates vary with the amount of area to be swept and amount of sediment. Match the hopper size to the area and expect sediment load to minimize time spent dumping.

Inspection and Maintenance

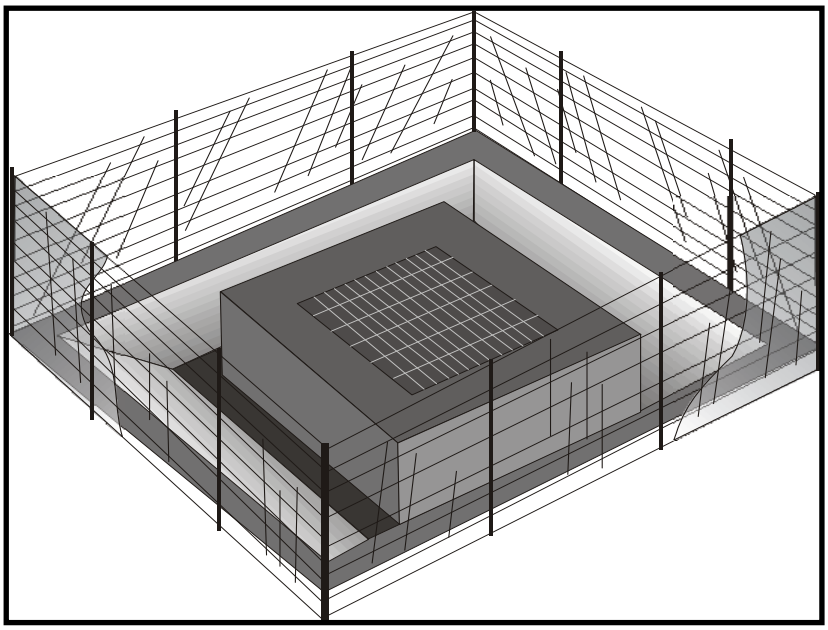
- Inspect BMPs prior to forecast rain, daily during extended rain events, after rain events, weekly during the rainy season, and at two-week intervals during the non-rainy season.
- When actively in use, points of ingress and egress must be inspected daily.
- When tracked or spilled sediment is observed outside the construction limits, it must be removed at least daily. More frequent removal, even continuous removal, may be required in some jurisdictions.
- Be careful not to sweep up any unknown substance or any object that may be potentially hazardous.
- Adjust brooms frequently; maximize efficiency of sweeping operations.
- After sweeping is finished, properly dispose of sweeper wastes at an approved dumpsite.

References

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Labor Surcharge and Equipment Rental Rates, State of California Department of Transportation (Caltrans), April 1, 2002 – March 31, 2003.

Storm Drain Inlet Protection SE-10



Categories

EC	Erosion Control	
SE	Sediment Control	☑
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:
☑ **Primary Category**
☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	☒
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

SE-1 Silt Fence
SE-5 Fiber Rolls
SE-6 Gravel Bag Berm
SE-8 Sandbag Barrier
SE-14 Biofilter Bags

Description and Purpose

Storm drain inlet protection consists of a sediment filter or an impounding area in, around or upstream of a storm drain, drop inlet, or curb inlet. Storm drain inlet protection measures temporarily pond runoff before it enters the storm drain, allowing sediment to settle. Some filter configurations also remove sediment by filtering, but usually the ponding action results in the greatest sediment reduction. Temporary geotextile storm drain inserts attach underneath storm drain grates to capture and filter storm water.

Suitable Applications

Every storm drain inlet receiving runoff from unstabilized or otherwise active work areas should be protected. Inlet protection should be used in conjunction with other erosion and sediment controls to prevent sediment-laden stormwater and non-stormwater discharges from entering the storm drain system.

Limitations

- Drainage area should not exceed 1 acre.
- In general straw bales should not be used as inlet protection.
- Requires an adequate area for water to pond without encroaching into portions of the roadway subject to traffic.

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- Sediment removal may be inadequate to prevent sediment discharges in high flow conditions or if runoff is heavily sediment laden. If high flow conditions are expected, use other onsite sediment trapping techniques in conjunction with inlet protection.
- Frequent maintenance is required.
- Limit drainage area to 1 acre maximum. For drainage areas larger than 1 acre, runoff should be routed to a sediment-trapping device designed for larger flows. See BMPs SE-2, Sediment Basin, and SE-3, Sediment Traps.
- Excavated drop inlet sediment traps are appropriate where relatively heavy flows are expected, and overflow capability is needed.

Implementation

General

Inlet control measures presented in this handbook should not be used for inlets draining more than one acre. Runoff from larger disturbed areas should be first routed through SE-2, Sediment Basin or SE-3, Sediment Trap and/or used in conjunction with other drainage control, erosion control, and sediment control BMPs to protect the site. Different types of inlet protection are appropriate for different applications depending on site conditions and the type of inlet. Alternative methods are available in addition to the methods described/shown herein such as prefabricated inlet insert devices, or gutter protection devices.

Design and Layout

Identify existing and planned storm drain inlets that have the potential to receive sediment-laden surface runoff. Determine if storm drain inlet protection is needed and which method to use.

- The key to successful and safe use of storm drain inlet protection devices is to know where runoff that is directed toward the inlet to be protected will pond or be diverted as a result of installing the protection device.
  - Determine the acceptable location and extent of ponding in the vicinity of the drain inlet. The acceptable location and extent of ponding will influence the type and design of the storm drain inlet protection device.
  - Determine the extent of potential runoff diversion caused by the storm drain inlet protection device. Runoff ponded by inlet protection devices may flow around the device and towards the next downstream inlet. In some cases, this is acceptable; in other cases, serious erosion or downstream property damage can be caused by these diversions. The possibility of runoff diversions will influence whether or not storm drain inlet protection is suitable; and, if suitable, the type and design of the device.
- The location and extent of ponding, and the extent of diversion, can usually be controlled through appropriate placement of the inlet protection device. In some cases, moving the inlet protection device a short distance upstream of the actual inlet can provide more efficient sediment control, limit ponding to desired areas, and prevent or control diversions.

- Six types of inlet protection are presented below. However, it is recognized that other effective methods and proprietary devices exist and may be selected.

  - Silt Fence: Appropriate for drainage basins with less than a 5% slope, sheet flows, and flows under 0.5 cfs.

  - Excavated Drop Inlet Sediment Trap: An excavated area around the inlet to trap sediment (SE-3).

  - Gravel bag barrier: Used to create a small sediment trap upstream of inlets on sloped, paved streets. Appropriate for sheet flow or when concentrated flow may exceed 0.5 cfs, and where overtopping is required to prevent flooding.

  - Block and Gravel Filter: Appropriate for flows greater than 0.5 cfs.

  - Temporary Geotextile Storm drain Inserts: Different products provide different features. Refer to manufacturer details for targeted pollutants and additional features.

  - Biofilter Bag Barrier: Used to create a small retention area upstream of inlets and can be located on pavement or soil. Biofilter bags slowly filter runoff allowing sediment to settle out. Appropriate for flows under 0.5 cfs.

- Select the appropriate type of inlet protection and design as referred to or as described in this fact sheet.

- Provide area around the inlet for water to pond without flooding structures and property.

- Grates and spaces around all inlets should be sealed to prevent seepage of sediment-laden water.

- Excavate sediment sumps (where needed) 1 to 2 ft with 2:1 side slopes around the inlet.

Installation

- ***DI Protection Type 1 - Silt Fence -*** Similar to constructing a silt fence; see BMP SE-1, Silt Fence. Do not place fabric underneath the inlet grate since the collected sediment may fall into the drain inlet when the fabric is removed or replaced and water flow through the grate will be blocked resulting in flooding. See typical Type 1 installation details at the end of this fact sheet.

  1. Excavate a trench approximately 6 in. wide and 6 in. deep along the line of the silt fence inlet protection device.

  2. Place 2 in. by 2 in. wooden stakes around the perimeter of the inlet a maximum of 3 ft apart and drive them at least 18 in. into the ground or 12 in. below the bottom of the trench. The stakes should be at least 48 in.

  3. Lay fabric along bottom of trench, up side of trench, and then up stakes. See SE-1, Silt Fence, for details. The maximum silt fence height around the inlet is 24 in.

  4. Staple the filter fabric (for materials and specifications, see SE-1, Silt Fence) to wooden stakes. Use heavy-duty wire staples at least 1 in. in length.

5. Backfill the trench with gravel or compacted earth all the way around.

- ***DI Protection Type 2 - Excavated Drop Inlet Sediment Trap -*** Install filter fabric fence in accordance with DI Protection Type 1. Size excavated trap to provide a minimum storage capacity calculated at the rate 67 yd^3/acre of drainage area. See typical Type 2 installation details at the end of this fact sheet.

- ***DI Protection Type 3 - Gravel bag -*** Flow from a severe storm should not overtop the curb. In areas of high clay and silts, use filter fabric and gravel as additional filter media. Construct gravel bags in accordance with SE-6, Gravel Bag Berm. Gravel bags should be used due to their high permeability. See typical Type 3 installation details at the end of this fact sheet.

  1. Construct on gently sloping street.

  2. Leave room upstream of barrier for water to pond and sediment to settle.

  3. Place several layers of gravel bags – overlapping the bags and packing them tightly together.

  4. Leave gap of one bag on the top row to serve as a spillway. Flow from a severe storm (e.g., 10 year storm) should not overtop the curb.

- ***DI Protection Type 4 – Block and Gravel Filter -*** Block and gravel filters are suitable for curb inlets commonly used in residential, commercial, and industrial construction. See typical Type 4 installation details at the end of this fact sheet.

  1. Place hardware cloth or comparable wire mesh with 0.5 in. openings over the drop inlet so that the wire extends a minimum of 1 ft beyond each side of the inlet structure. If more than one strip is necessary, overlap the strips. Place woven geotextile over the wire mesh.

  2. Place concrete blocks lengthwise on their sides in a single row around the perimeter of the inlet, so that the open ends face outward, not upward. The ends of adjacent blocks should abut. The height of the barrier can be varied, depending on design needs, by stacking combinations of blocks that are 4 in., 8 in., and 12 in. wide. The row of blocks should be at least 12 in. but no greater than 24 in. high.

  3. Place wire mesh over the outside vertical face (open end) of the concrete blocks to prevent stone from being washed through the blocks. Use hardware cloth or comparable wire mesh with 0.5 in. opening.

  4. Pile washed stone against the wire mesh to the top of the blocks. Use 0.75 to 3 in.

- ***DI Protection Type 5 – Temporary Geotextile Insert (proprietary) –*** Many types of temporary inserts are available. Most inserts fit underneath the grate of a drop inlet or inside of a curb inlet and are fastened to the outside of the grate or curb. These inserts are removable and many can be cleaned and reused. Installation of these inserts differs between manufacturers. Please refer to manufacturer instruction for installation of proprietary devices.

- ***DI Protection Type 6 - Biofilter bags*** – Biofilter bags may be used as a substitute for gravel bags in low-flow situations. Biofilter bags should conform to specifications detailed in SE-14, Biofilter bags.

    1. Construct in a gently sloping area.
    2. Biofilter bags should be placed around inlets to intercept runoff flows.
    3. All bag joints should overlap by 6 in.
    4. Leave room upstream for water to pond and for sediment to settle out.
    5. Stake bags to the ground as described in the following detail. Stakes may be omitted if bags are placed on a paved surface.

Costs

- Average annual cost for installation and maintenance of DI Type 1-4 and 6 (one year useful life) is $200 per inlet.
- Temporary geotextile inserts are proprietary and cost varies by region. These inserts can often be reused and may have greater than 1 year of use if maintained and kept undamaged. Average cost per insert ranges from $50-75 plus installation, but costs can exceed $100. This cost does not include maintenance.

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Silt Fences. If the fabric becomes clogged, torn, or degrades, it should be replaced. Make sure the stakes are securely driven in the ground and are in good shape (i.e., not bent, cracked, or splintered, and are reasonably perpendicular to the ground). Replace damaged stakes. At a minimum, remove the sediment behind the fabric fence when accumulation reaches one-third the height of the fence or barrier height.
- Gravel Filters. If the gravel becomes clogged with sediment, it should be carefully removed from the inlet and either cleaned or replaced. Since cleaning gravel at a construction site may be difficult, consider using the sediment-laden stone as fill material and put fresh stone around the inlet. Inspect bags for holes, gashes, and snags, and replace bags as needed. Check gravel bags for proper arrangement and displacement.
- Sediment that accumulates in the BMP should be periodically removed in order to maintain BMP effectiveness. Sediment should be removed when the sediment accumulation reaches one-third of the barrier height.
- Inspect and maintain temporary geotextile insert devices according to manufacturer's specifications.
- Remove storm drain inlet protection once the drainage area is stabilized.

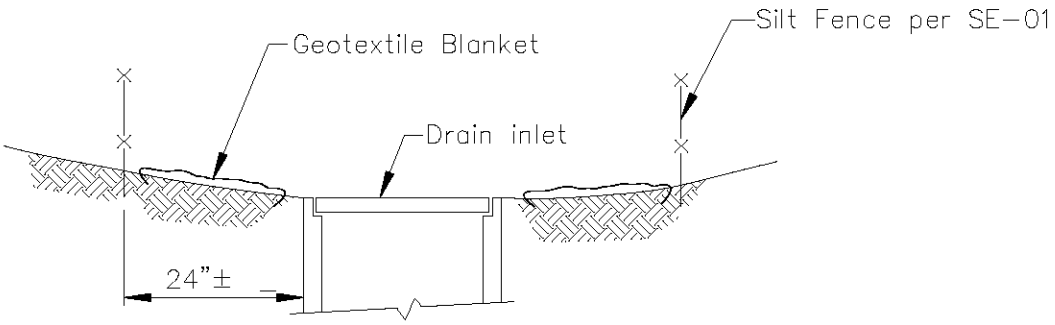
- Clean and regrade area around the inlet and clean the inside of the storm drain inlet, as it should be free of sediment and debris at the time of final inspection.

References

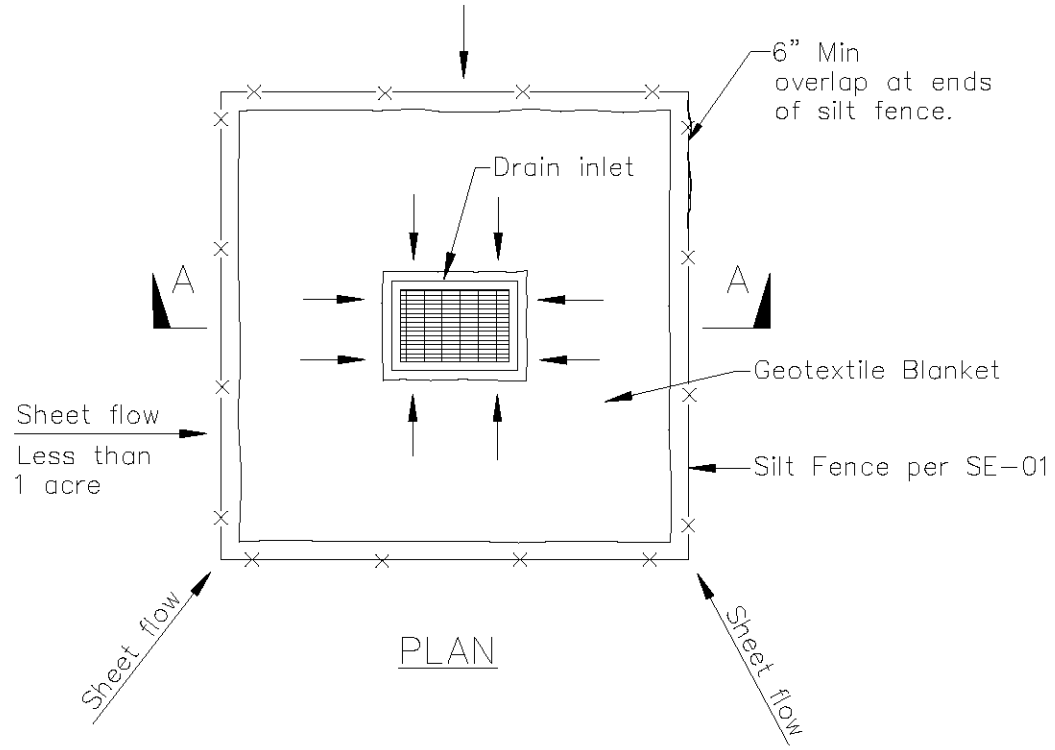
Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Stormwater Management Manual for The Puget Sound Basin, Washington State Department of Ecology, Public Review Draft, 1991.

Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.



SECTION A–A

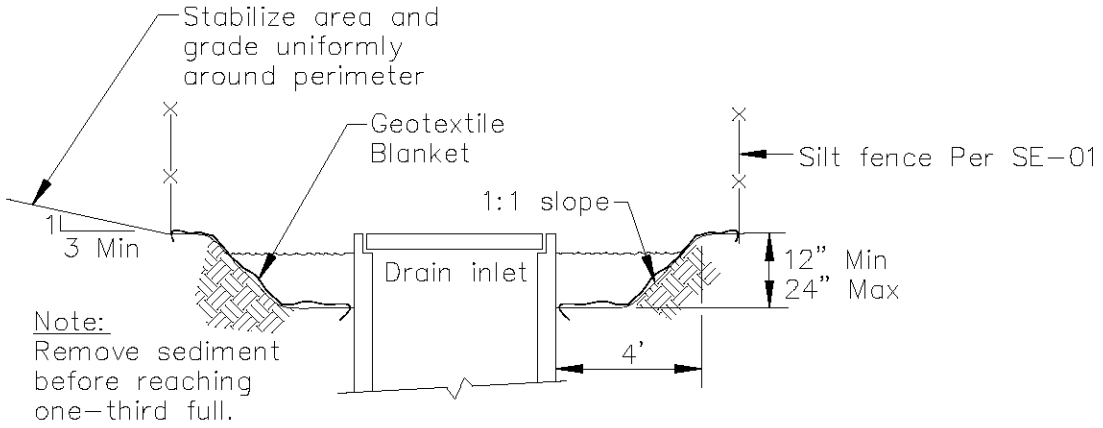


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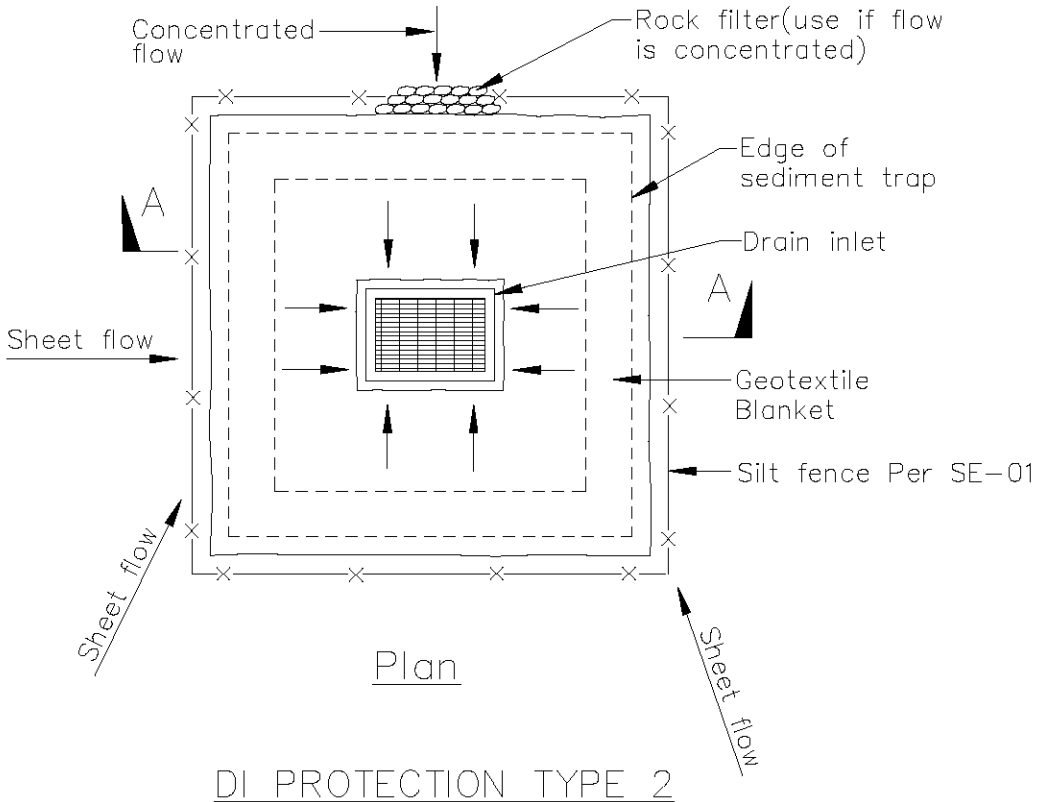
DI PROTECTION TYPE 1
NOT TO SCALE

NOTES:

1. For use in areas where grading has been completed and final soil stabilization and seeding are pending.
2. Not applicable in paved areas.
3. Not applicable with concentrated flows.



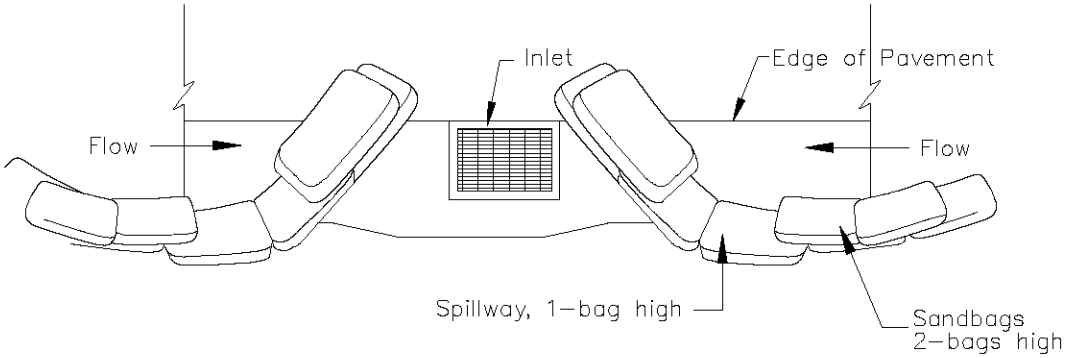
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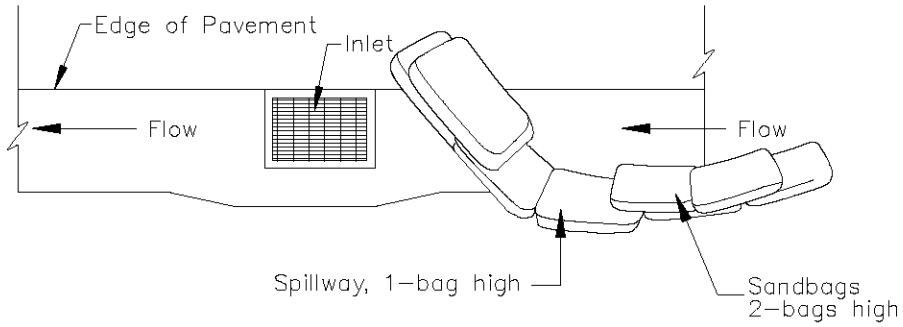
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DI PROTECTION TYPE 2
NOT TO SCALE

Notes
1. For use in cleared and grubbed and in graded areas.
2. Shape basin so that longest inflow area faces longest length of trap.
3. For concentrated flows, shape basin in 2:1 ratio with length oriented towards direction of flow.



TYPICAL PROTECTION FOR INLET ON SUMP

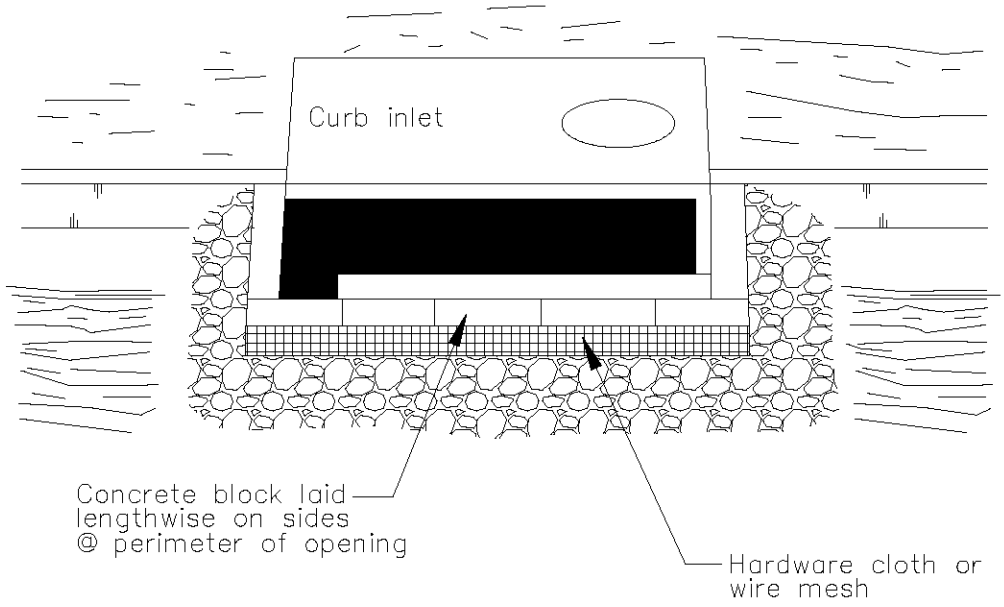


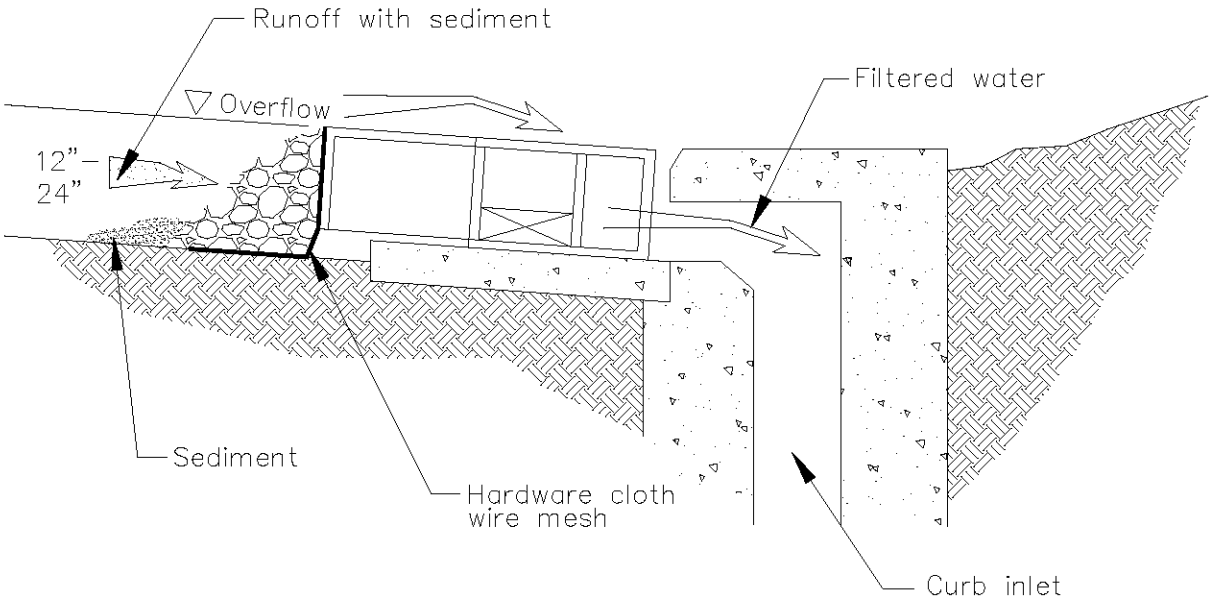
TYPICAL PROTECTION FOR INLET ON GRADE

NOTES:

1. Intended for short–term use.
2. Use to inhibit non–storm water flow.
3. Allow for proper maintenance and cleanup.
4. Bags must be removed after adjacent operation is completed
5. Not applicable in areas with high silts and clays without filter fabric.

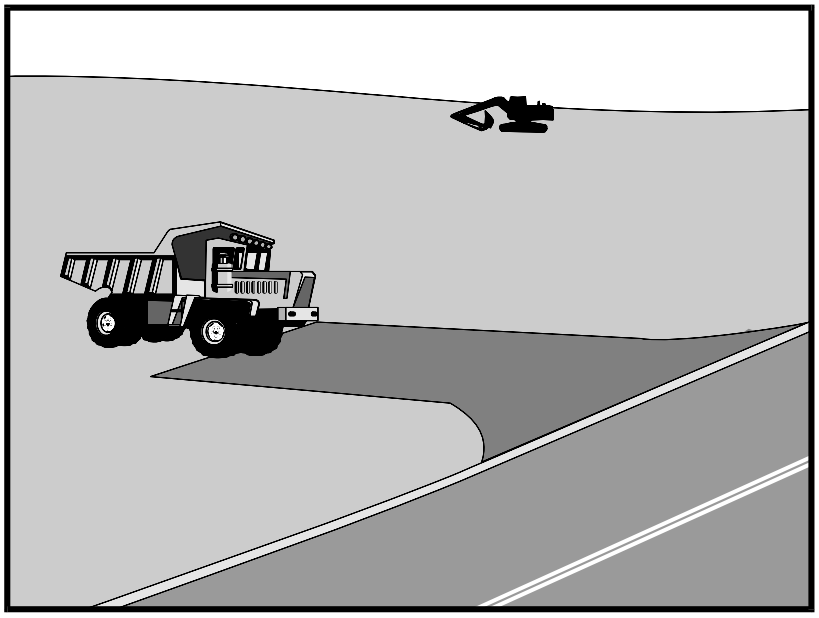
DI PROTECTION TYPE 3
NOT TO SCALE





DI PROTECTION – TYPE 4
NOT TO SCALE

Stabilized Construction Entrance / Exit TC-1



Categories

EC	Erosion Control	☒
SE	Sediment Control	☒
TC	Tracking Control	☑
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

Description and Purpose

A stabilized construction access is defined by a point of entrance/exit to a construction site that is stabilized to reduce the tracking of mud and dirt onto public roads by construction vehicles.

Suitable Applications

Use at construction sites:

- Where dirt or mud can be tracked onto public roads.
- Adjacent to water bodies.
- Where poor soils are encountered.
- Where dust is a problem during dry weather conditions.

Limitations

- Entrances and exits require periodic top dressing with additional stones.
- This BMP should be used in conjunction with street sweeping on adjacent public right of way.
- Entrances and exits should be constructed on level ground only.
- Stabilized construction entrances are rather expensive to construct and when a wash rack is included, a sediment trap of some kind must also be provided to collect wash water

runoff.

Implementation

General

A stabilized construction entrance is a pad of aggregate underlain with filter cloth located at any point where traffic will be entering or leaving a construction site to or from a public right of way, street, alley, sidewalk, or parking area. The purpose of a stabilized construction entrance is to reduce or eliminate the tracking of sediment onto public rights of way or streets. Reducing tracking of sediments and other pollutants onto paved roads helps prevent deposition of sediments into local storm drains and production of airborne dust.

Where traffic will be entering or leaving the construction site, a stabilized construction entrance should be used. NPDES permits require that appropriate measures be implemented to prevent tracking of sediments onto paved roadways, where a significant source of sediments is derived from mud and dirt carried out from unpaved roads and construction sites.

Stabilized construction entrances are moderately effective in removing sediment from equipment leaving a construction site. The entrance should be built on level ground. Advantages of the Stabilized Construction Entrance/Exit is that it does remove some sediment from equipment and serves to channel construction traffic in and out of the site at specified locations. Efficiency is greatly increased when a washing rack is included as part of a stabilized construction entrance/exit.

Design and Layout

- Construct on level ground where possible.
- Select 3 to 6 in. diameter stones.
- Use minimum depth of stones of 12 in. or as recommended by soils engineer.
- Construct length of 50 ft minimum, and 30 ft minimum width.
- Rumble racks constructed of steel panels with ridges and installed in the stabilized entrance/exit will help remove additional sediment and to keep adjacent streets clean.
- Provide ample turning radii as part of the entrance.
- Limit the points of entrance/exit to the construction site.
- Limit speed of vehicles to control dust.
- Properly grade each construction entrance/exit to prevent runoff from leaving the construction site.
- Route runoff from stabilized entrances/exits through a sediment trapping device before discharge.
- Design stabilized entrance/exit to support heaviest vehicles and equipment that will use it.

Stabilized Construction Entrance/Exit TC-1

- Select construction access stabilization (aggregate, asphaltic concrete, concrete) based on longevity, required performance, and site conditions. Do not use asphalt concrete (AC) grindings for stabilized construction access/roadway.
- If aggregate is selected, place crushed aggregate over geotextile fabric to at least 12 in. depth, or place aggregate to a depth recommended by a geotechnical engineer. A crushed aggregate greater than 3 in. but smaller than 6 in. should be used.
- Designate combination or single purpose entrances and exits to the construction site.
- Require that all employees, subcontractors, and suppliers utilize the stabilized construction access.
- Implement SE-7, Street Sweeping and Vacuuming, as needed.
- All exit locations intended to be used for more than a two-week period should have stabilized construction entrance/exit BMPs.

Inspection and Maintenance

- Inspect and verify that activity–based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMPs are under way, inspect weekly during the rainy season and of two-week intervals in the non-rainy season to verify continued BMP implementation.
- Inspect local roads adjacent to the site daily. Sweep or vacuum to remove visible accumulated sediment.
- Remove aggregate, separate and dispose of sediment if construction entrance/exit is clogged with sediment.
- Keep all temporary roadway ditches clear.
- Check for damage and repair as needed.
- Replace gravel material when surface voids are visible.
- Remove all sediment deposited on paved roadways within 24 hours.
- Remove gravel and filter fabric at completion of construction

Costs

Average annual cost for installation and maintenance may vary from $1,200 to $4,800 each, averaging $2,400 per entrance. Costs will increase with addition of washing rack, and sediment trap. With wash rack, costs range from $1,200 - $6,000 each, averaging $3,600 per entrance.

References

Manual of Standards of Erosion and Sediment Control Measures, Association of Bay Area Governments, May 1995.

National Management Measures to Control Nonpoint Source Pollution from Urban Areas, USEPA Agency, 2002.

Proposed Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters, Work Group Working Paper, USEPA, April 1992.

Stormwater Quality Handbooks Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

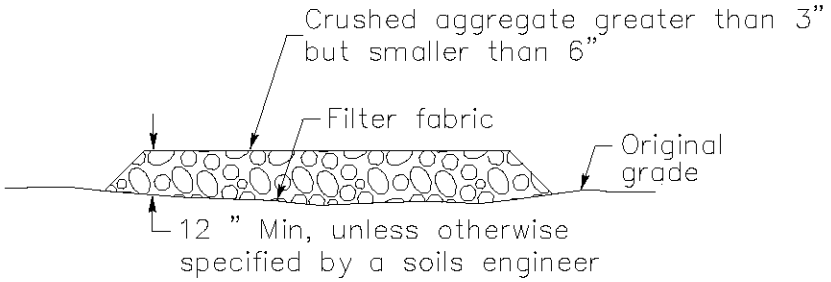
Stormwater Management of the Puget Sound Basin, Technical Manual, Publication #91-75, Washington State Department of Ecology, February 1992.

Virginia Erosion and Sedimentation Control Handbook, Virginia Department of Conservation and Recreation, Division of Soil and Water Conservation, 1991.

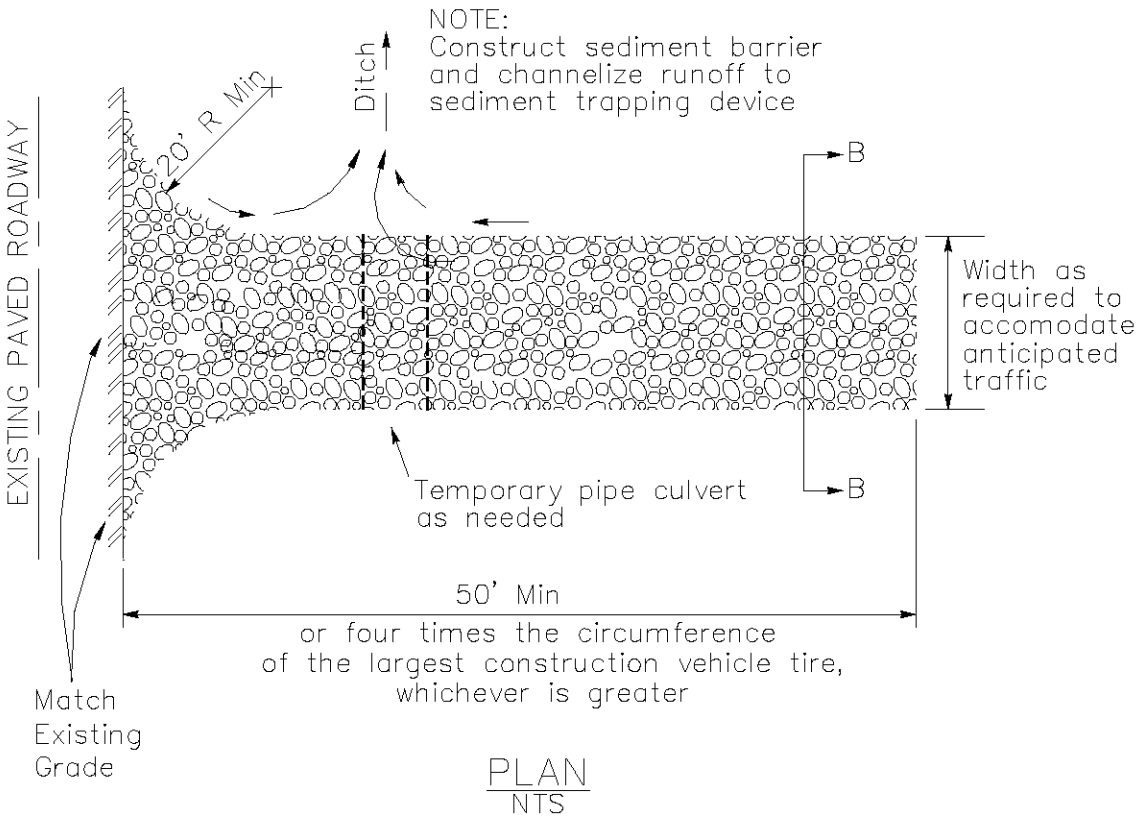
Guidance Specifying Management Measures for Nonpoint Pollution in Coastal Waters, EPA 840-B-9-002, USEPA, Office of Water, Washington, DC, 1993.

Water Quality Management Plan for the Lake Tahoe Region, Volume II, Handbook of Management Practices, Tahoe Regional Planning Agency, November 1988.

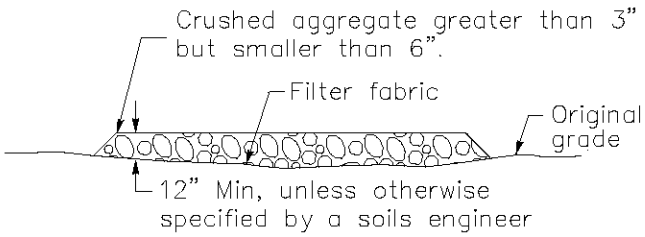
Stabilized Construction Entrance / Exit TC-1



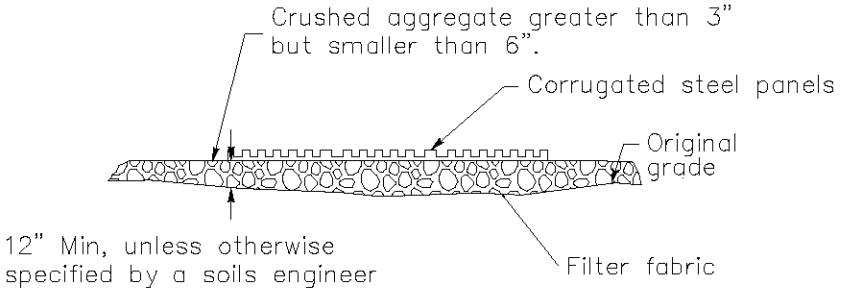
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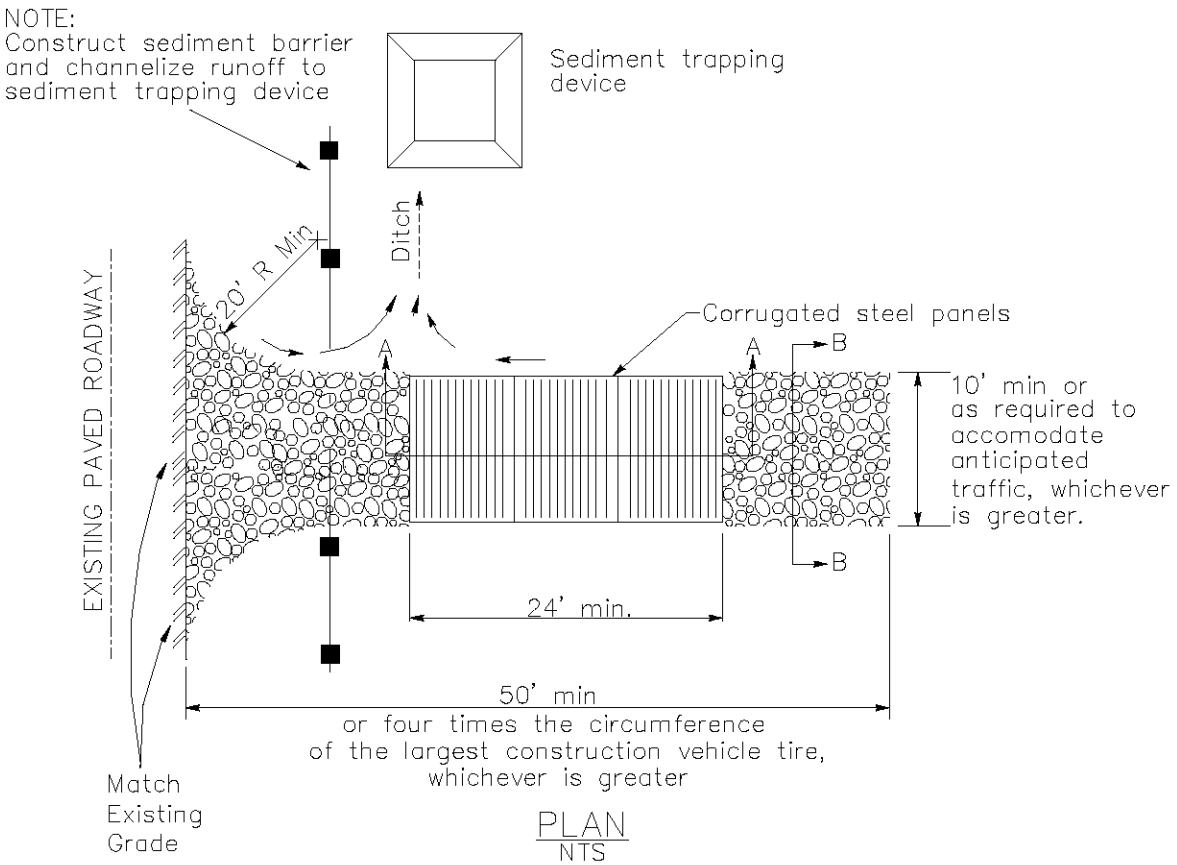
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SECTION B–B
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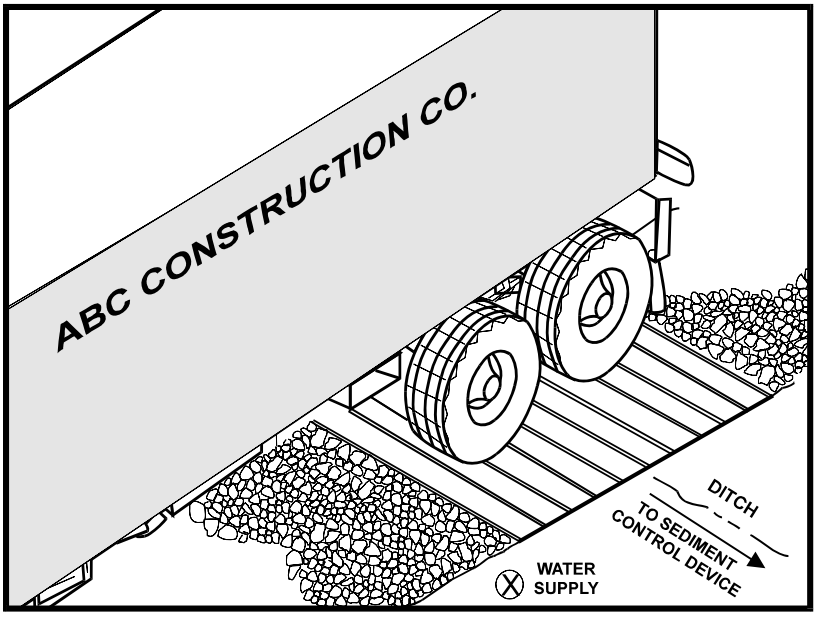


SECTION A–A
NOT TO SCALE



PLAN
NTS

Entrance/Outlet Tire Wash TC-3



Categories

EC	Erosion Control	
SE	Sediment Control	☒
TC	Tracking Control	☑
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

TC-1 Stabilized Construction Entrance/Exit

Description and Purpose

A tire wash is an area located at stabilized construction access points to remove sediment from tires and under carriages and to prevent sediment from being transported onto public roadways.

Suitable Applications

Tire washes may be used on construction sites where dirt and mud tracking onto public roads by construction vehicles may occur.

Limitations

- The tire wash requires a supply of wash water.
- A turnout or doublewide exit is required to avoid having entering vehicles drive through the wash area.
- Do not use where wet tire trucks leaving the site leave the road dangerously slick.

Implementation

- Incorporate with a stabilized construction entrance/exit. See TC-1, Stabilized Construction Entrance/Exit.
- Construct on level ground when possible, on a pad of coarse aggregate greater than 3 in. but smaller than 6 in. A geotextile fabric should be placed below the aggregate.
- Wash rack should be designed and constructed/manufactured for anticipated traffic loads.

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- Provide a drainage ditch that will convey the runoff from the wash area to a sediment trapping device. The drainage ditch should be of sufficient grade, width, and depth to carry the wash runoff.
- Use hoses with automatic shutoff nozzles to prevent hoses from being left on.
- Require that all employees, subcontractors, and others that leave the site with mud caked tires and undercarriages to use the wash facility.
- Implement SC-7, Street Sweeping and Vacuuming, as needed.

Costs

Costs are low for installation of wash rack.

Inspection and Maintenance

- Inspect and verify that activity–based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect weekly during the rainy season and of two-week intervals in the non-rainy season to verify continued BMP implementation.
- Inspect BMPs subject to non-stormwater discharge daily while non-stormwater discharges occur.
- Remove accumulated sediment in wash rack and/or sediment trap to maintain system performance.
- Inspect routinely for damage and repair as needed.

References

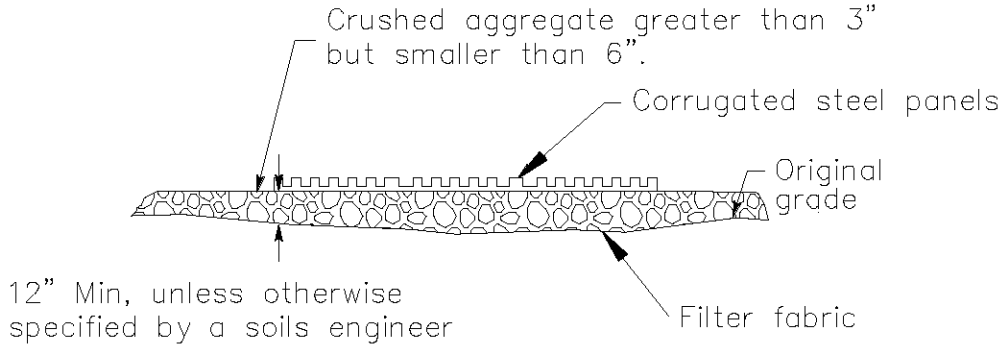
Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Coastal Nonpoint Pollution Control Program; Program Development and Approval Guidance, Working Group, Working Paper; USEPA, April 1992.

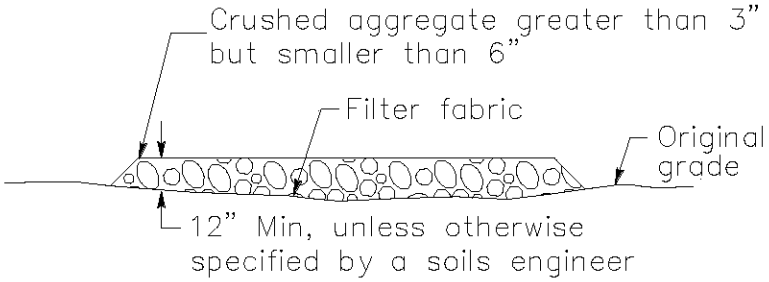
Manual of Standards of Erosion and Sediment Control Measures, Association of Bay Area Governments, May 1995.

Stormwater Quality Handbooks Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

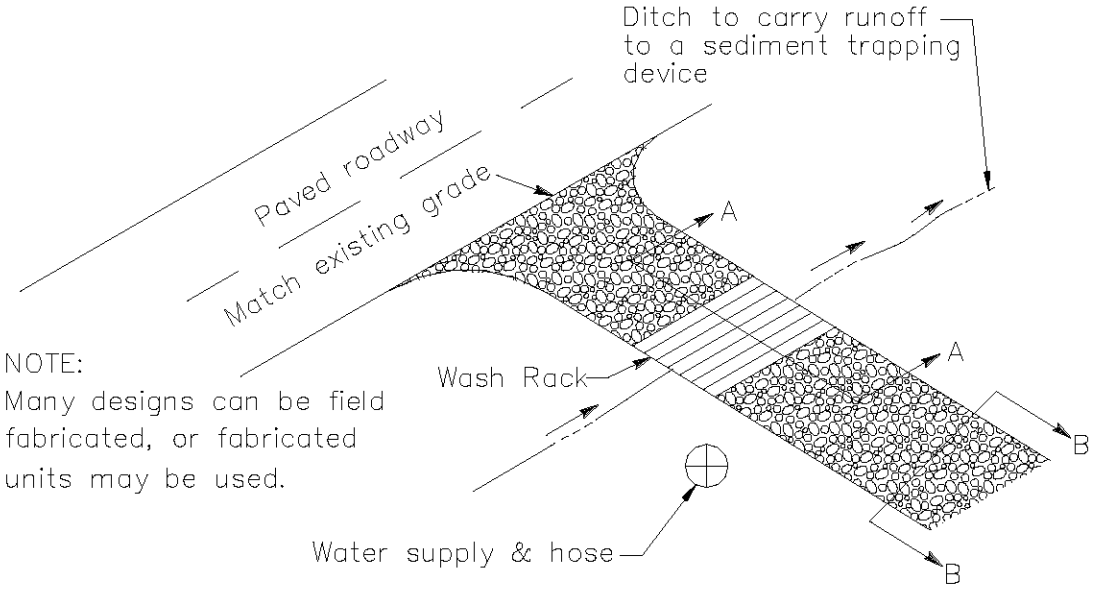
Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.



SECTION A–A
NOT TO SCALE

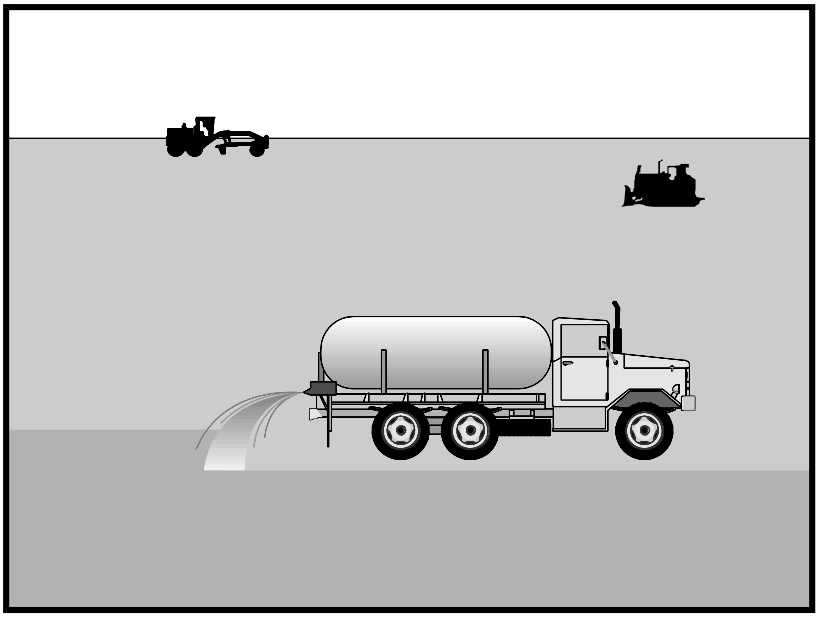


SECTION B–B
NTS



TYPICAL TIRE WASH
NOT TO SCALE

Wind Erosion Control WE-1



Categories		
EC	Erosion Control	
SE	Sediment Control	☒
TC	Tracking Control	
WE	Wind Erosion Control	☑
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:
☑ **Primary Category**
☒ **Secondary Category**

Targeted Constituents	
Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

EC-5 Soil Binders

Description and Purpose

Wind erosion or dust control consists of applying water or other chemical dust suppressants as necessary to prevent or alleviate dust nuisance generated by construction activities. Covering small stockpiles or areas is an alternative to applying water or other dust palliatives.

California's Mediterranean climate, with a short "wet" season and a typically long, hot "dry" season, allows the soils to thoroughly dry out. During the dry season, construction activities are at their peak, and disturbed and exposed areas are increasingly subject to wind erosion, sediment tracking and dust generated by construction equipment. Site conditions and climate can make dust control more of an erosion problem than water based erosion. Additionally, many local agencies, including Air Quality Management Districts, require dust control and/or dust control permits in order to comply with local nuisance laws, opacity laws (visibility impairment) and the requirements of the Clean Air Act. Wind erosion control is required to be implemented at all construction sites greater than 1 acre by the General Permit.

Suitable Applications

Most BMPs that provide protection against water-based erosion will also protect against wind-based erosion and dust control requirements required by other agencies will generally meet wind erosion control requirements for water quality protection. Wind erosion control BMPs are suitable during the following construction activities:

- Construction vehicle traffic on unpaved roads
- Drilling and blasting activities
- Soils and debris storage piles
- Batch drop from front-end loaders
- Areas with unstabilized soil
- Final grading/site stabilization

Limitations

- Watering prevents dust only for a short period (generally less than a few hours) and should be applied daily (or more often) to be effective.
- Over watering may cause erosion and track-out.
- Oil or oil-treated subgrade should not be used for dust control because the oil may migrate into drainageways and/or seep into the soil.
- Chemical dust suppression agents may have potential environmental impacts. Selected chemical dust control agents should be environmentally benign.
- Effectiveness of controls depends on soil, temperature, humidity, wind velocity and traffic.
- Chemical dust suppression agents should not be used within 100 feet of wetlands or water bodies.
- Chemically treated subgrades may make the soil water repellant, interfering with long-term infiltration and the vegetation/re-vegetation of the site. Some chemical dust suppressants may be subject to freezing and may contain solvents and should be handled properly.
- In compacted areas, watering and other liquid dust control measures may wash sediment or other constituents into the drainage system.
- If the soil surface has minimal natural moisture, the affected area may need to be pre-wetted so that chemical dust control agents can uniformly penetrate the soil surface.

Implementation

Dust Control Practices

Dust control BMPs generally stabilize exposed surfaces and minimize activities that suspend or track dust particles. The following table presents dust control practices that can be applied to varying site conditions that could potentially cause dust. For heavily traveled and disturbed areas, wet suppression (watering), chemical dust suppression, gravel asphalt surfacing, temporary gravel construction entrances, equipment wash-out areas, and haul truck covers can be employed as dust control applications. Permanent or temporary vegetation and mulching can be employed for areas of occasional or no construction traffic. Preventive measures include minimizing surface areas to be disturbed, limiting onsite vehicle traffic to 15 mph or less, and controlling the number and activity of vehicles on a site at any given time.

Chemical dust suppressants include: mulch and fiber based dust palliatives (e.g. paper mulch with gypsum binder), salts and brines (e.g. calcium chloride, magnesium chloride), non-petroleum based organics (e.g. vegetable oil, lignosulfonate), petroleum based organics (e.g. asphalt emulsion, dust oils, petroleum resins), synthetic polymers (e.g. polyvinyl acetate, vinyls, acrylic), clay additives (e.g. bentonite, montimorillonite) and electrochemical products (e.g. enzymes, ionic products).

Site Condition	Dust Control Practices							
	Permanent Vegetation	Mulching	Wet Suppression (Watering)	Chemical Dust Suppression	Gravel or Asphalt	Temporary Gravel Construction Entrances/Equipment Wash Down	Synthetic Covers	Minimize Extent of Disturbed Area
Disturbed Areas not Subject to Traffic	x	x	x	x	x			x
Disturbed Areas Subject to Traffic			x	x	x	x		x
Material Stockpiles		x	x	x			x	x
Demolition			x			x	x	
Clearing/ Excavation			x	x				x
Truck Traffic on Unpaved Roads			x	x	x	x	x	
Tracking					x	x		

Additional preventive measures include:

- Schedule construction activities to minimize exposed area (see EC-1, Scheduling).
- Quickly treat exposed soils using water, mulching, chemical dust suppressants, or stone/gravel layering.
- Identify and stabilize key access points prior to commencement of construction.
- Minimize the impact of dust by anticipating the direction of prevailing winds.
- Restrict construction traffic to stabilized roadways within the project site, as practicable.
- Water should be applied by means of pressure-type distributors or pipelines equipped with a spray system or hoses and nozzles that will ensure even distribution.
- All distribution equipment should be equipped with a positive means of shutoff.
- Unless water is applied by means of pipelines, at least one mobile unit should be available at all times to apply water or dust palliative to the project.
- If reclaimed waste water is used, the sources and discharge must meet California Department of Health Services water reclamation criteria and the Regional Water Quality

Control Board (RWQCB) requirements. Non-potable water should not be conveyed in tanks or drain pipes that will be used to convey potable water and there should be no connection between potable and non-potable supplies. Non-potable tanks, pipes, and other conveyances should be marked, "NON-POTABLE WATER - DO NOT DRINK."

- Pave or chemically stabilize access points where unpaved traffic surfaces adjoin paved roads.
- Provide covers for haul trucks transporting materials that contribute to dust.
- Provide for rapid clean up of sediments deposited on paved roads. Furnish stabilized construction road entrances and wheel wash areas.
- Stabilize inactive areas of construction sites using temporary vegetation or chemical stabilization methods.

For chemical stabilization, there are many products available for chemically stabilizing gravel roadways and stockpiles. If chemical stabilization is used, the chemicals should not create any adverse effects on stormwater, plant life, or groundwater and should meet all applicable regulatory requirements.

Costs

Installation costs for water and chemical dust suppression vary based on the method used and the length of effectiveness. Annual costs may be high since some of these measures are effective for only a few hours to a few days.

Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities.
- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Check areas protected to ensure coverage.
- Most water-based dust control measures require frequent application, often daily or even multiple times per day. Obtain vendor or independent information on longevity of chemical dust suppressants.

References

Best Management Practices and Erosion Control Manual for Construction Sites, Flood Control District of Maricopa County, Arizona, September 1992.

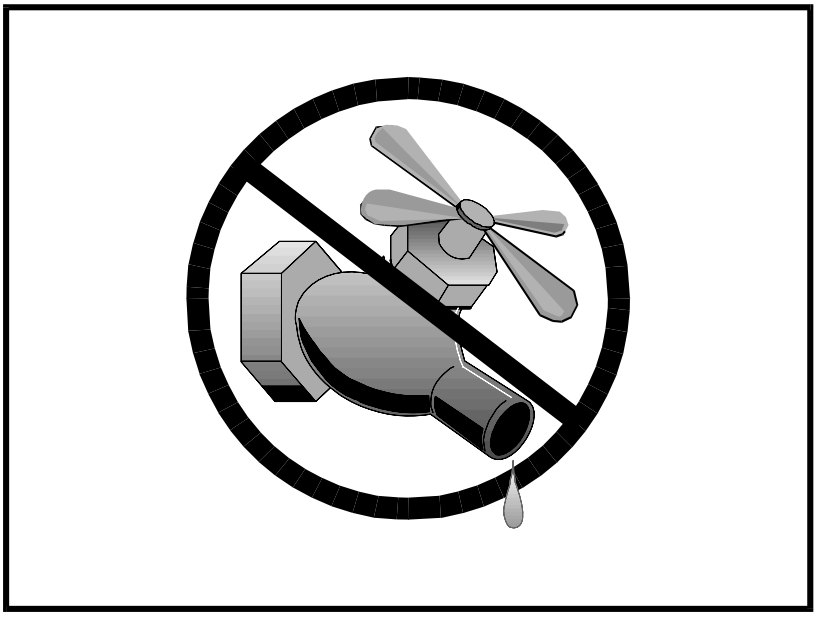
California Air Pollution Control Laws, California Air Resources Board, updated annually.

Construction Manual, Chapter 4, Section 10, "Dust Control"; Section 17, "Watering"; and Section 18, "Dust Palliative", California Department of Transportation (Caltrans), July 2001.

Prospects for Attaining the State Ambient Air Quality Standards for Suspended Particulate Matter (PM10), Visibility Reducing Particles, Sulfates, Lead, and Hydrogen Sulfide, California Air Resources Board, April 1991.

Stormwater Quality Handbooks Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Water Conservation Practices NS-1



Categories		
EC	Erosion Control	☒
SE	Sediment Control	☒
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☑
WM	Waste Management and Materials Pollution Control	

Legend:
☑ **Primary Objective**
☒ **Secondary Objective**

Targeted Constituents	
Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

Description and Purpose

Water conservation practices are activities that use water during the construction of a project in a manner that avoids causing erosion and the transport of pollutants offsite. These practices can reduce or eliminate non-stormwater discharges.

Suitable Applications

Water conservation practices are suitable for all construction sites where water is used, including piped water, metered water, trucked water, and water from a reservoir.

Limitations

- None identified.

Implementation

- Keep water equipment in good working condition.
- Stabilize water truck filling area.
- Repair water leaks promptly.
- Washing of vehicles and equipment on the construction site is discouraged.
- Avoid using water to clean construction areas. If water must be used for cleaning or surface preparation, surface should be swept and vacuumed first to remove dirt. This will minimize amount of water required.
- Direct construction water runoff to areas where it can soak

into the ground or be collected and reused.

- Authorized non-stormwater discharges to the storm drain system, channels, or receiving waters are acceptable with the implementation of appropriate BMPs.
- Lock water tank valves to prevent unauthorized use.

Costs

The cost is small to none compared to the benefits of conserving water.

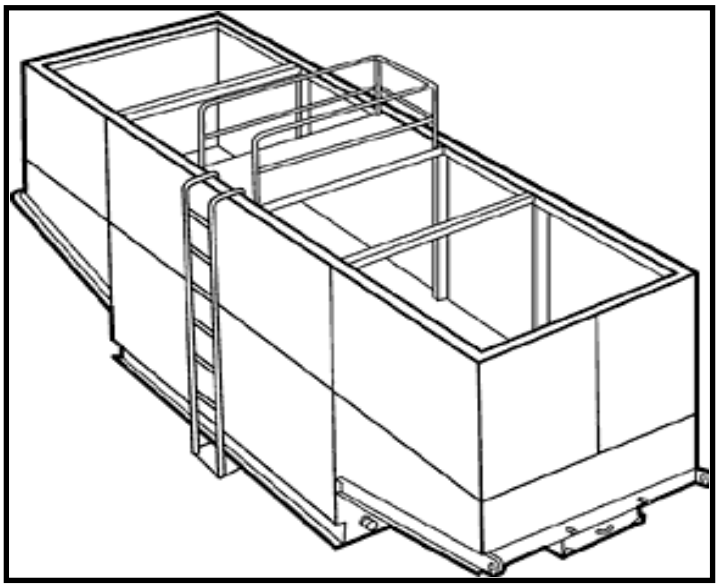
Inspection and Maintenance

- Inspect and verify that activity based BMPs are in place prior to the commencement of authorized non-stormwater discharges.
- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges are occuring.
- Repair water equipment as needed to prevent unintended discharges.
  - Water trucks
  - Water reservoirs (water buffalos)
  - Irrigation systems
  - Hydrant connections

References

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Dewatering Operations NS-2



Categories		
EC	Erosion Control	
SE	Sediment Control	☒
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☑
WM	Waste Management and Materials Pollution Control	

Legend:
☑ **Primary Category**
☒ **Secondary Category**

Targeted Constituents	
Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	☑
Organics	

Potential Alternatives

SE-5: Fiber Roll

SE-6: Gravel Bag Berm

Description and Purpose

Dewatering operations are practices that manage the discharge of pollutants when non-stormwater and accumulated precipitation (stormwater) must be removed from a work location to proceed with construction work or to provide vector control.

The General Permit incorporates Numeric Effluent Limits (NEL) and Numeric Action Levels (NAL) for turbidity (see Section 2 of this handbook to determine your project's risk level and if you are subject to these requirements).

Discharges from dewatering operations can contain high levels of fine sediment that, if not properly treated, could lead to exceedences of the General Permit requirements.

Suitable Applications

These practices are implemented for discharges of non-stormwater from construction sites. Non-stormwaters include, but are not limited to, groundwater, water from cofferdams, water diversions, and waters used during construction activities that must be removed from a work area to facilitate construction.

Practices identified in this section are also appropriate for implementation when managing the removal of accumulated precipitation (stormwater) from depressed areas at a construction site.

Stormwater mixed with non-stormwater should be managed as non-stormwater.

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Limitations

- Dewatering operations will require, and should comply with applicable local and project-specific permits and regulations. In some areas, all dewatering activities, regardless of the discharge volume, require a dewatering permit.
- Site conditions will dictate design and use of dewatering operations.
- The controls discussed in this fact sheet primarily address sediment. Other secondary pollutant removal benefits are discussed where applicable.
- The controls detailed in this fact sheet only allow for minimal settling time for sediment particles. Use only when site conditions restrict the use of the other control methods.
- Avoid dewatering discharges where possible by using the water for dust control.

Implementation

- A Construction Site Monitoring Plan (CSMP) should be included in the project Stormwater Pollution Prevention Plan (SWPPP).
- Regional Water Quality Control Board (RWQCB) Regions may require notification and approval prior to any discharge of water from construction sites.
- The destination of discharge from dewatering activities will typically determine the type of permit required by the discharger. For example, when discharging to a water of the U.S., a groundwater extraction permit will be required through the site's governing RWQCB. When discharging to a sanitary sewer or Municipal Separate Storm Sewer System (MS4), a permit may need to be obtained through the owner of the sanitary sewer or MS4 in addition to obtaining an RWQCB dewatering permit. Additional permits or permissions from other agencies may be required for dewatering cofferdams or diversions.
- Dewatering discharges should not cause erosion at the discharge point. Appropriate BMPs should be implemented to maintain compliance with all applicable permits.
- Maintain dewatering records in accordance with all local and project-specific permits and regulations.

Sediment Treatment

A variety of methods can be used to treat water during dewatering operations. Several devices are presented below and provide options to achieve sediment removal. The sediment particle size and permit or receiving water limitations on sediment are key considerations for selecting sediment treatment option(s); in some cases, the use of multiple devices may be appropriate. Use of other enhanced treatment methods (i.e., introduction of chemicals or electric current to enhance flocculation and removal of sediment) must comply with: 1) for storm drain or surface water discharges, the requirements for Active Treatment Systems (SE-11); or 2) for sanitary sewer discharges, the requirements of applicable sanitary sewer discharge permits.

Sediment Basin (see also SE-2)

Description:

- A sediment basin is a temporary basin with a controlled release structure that is formed by excavation or construction of an embankment to detain sediment-laden runoff and allow sediment to settle out before discharging. Sediment basins are generally larger than Sediment Traps (SE-3) and have a designed outlet structure.

Appropriate Applications:

- Effective for the removal of trash, gravel, sand, silt, some metals that settle out with the sediment.

Implementation:

- Excavation and construction of related facilities is required.
- Temporary sediment basins should be fenced if safety is a concern.
- Outlet protection is required to prevent erosion at the outfall location.

Maintenance:

- Maintenance is required for safety fencing, vegetation, embankment, inlet and outlet, as well as other features.
- Removal of sediment is required when the storage volume is reduced by one-third.

Sediment Trap (See also SE-3)

Description:

- A sediment trap is a temporary basin formed by excavation and/or construction of an earthen embankment across a waterway or low drainage area to detain sediment-laden runoff and allow sediment to settle out before discharging. Sediment traps are generally smaller than Sediment Basins (SE-2) and do not have a designed outlet (but do have a spillway or overflow).

Appropriate Applications:

Effective for the removal of large and medium sized particles (sand and gravel) and some metals that settle out with the sediment.

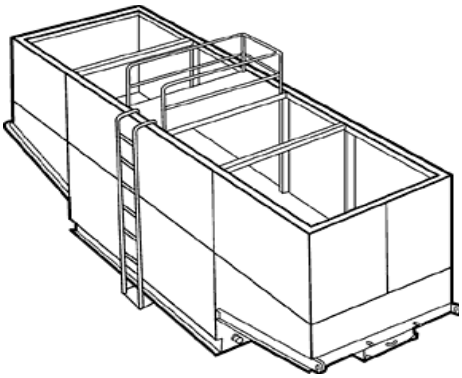
Implementation:

- Excavation and construction of related facilities is required.
- Trap inlets should be located to maximize the travel distance to the trap outlet.
- Use rock or vegetation to protect the trap outlets against erosion.

Maintenance:

- Maintenance is required for vegetation, embankment, inlet and outfall structures, as well as other features.
- Removal of sediment is required when the storage volume is reduced by one-third.

Weir Tanks



Description:

- A weir tank separates water and waste by using weirs. The configuration of the weirs (over and under weirs) maximizes the residence time in the tank and determines the waste to be removed from the water, such as oil, grease, and sediments.

Appropriate Applications:

- The tank removes trash, some settleable solids (gravel, sand, and silt), some visible oil and grease, and some metals (removed with sediment). To achieve high levels of flow, multiple tanks can be used in parallel. If additional treatment is desired, the tanks can be placed in series or as pre-treatment for other methods.

Implementation:

- Tanks are delivered to the site by the vendor, who can provide assistance with set-up and operation.
- Tank size will depend on flow volume, constituents of concern, and residency period required. Vendors should be consulted to appropriately size tank.
- Treatment capacity (i.e., volume and number of tanks) should provide at a minimum the required volume for discrete particle settling for treatment design flows.

Maintenance:

- Periodic cleaning is required based on visual inspection or reduced flow.
- Oil and grease disposal should be conducted by a licensed waste disposal company.

Dewatering Tanks



Description:

- A dewatering tank removes debris and sediment. Flow enters the tank through the top, passes through a fabric filter, and is discharged through the bottom of the tank. The filter separates the solids from the liquids.

Appropriate Applications:

- The tank removes trash, gravel, sand, and silt, some visible oil and grease, and some metals (removed with sediment). To achieve high levels of flow, multiple tanks can be used in parallel. If additional treatment is desired, the tanks can be placed in series or as pre-treatment for other methods.

Implementation:

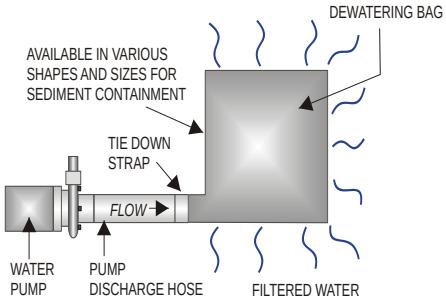
- Tanks are delivered to the site by the vendor, who can provide assistance with set-up and operation.
- Tank size will depend on flow volume, constituents of concern, and residency period required. Vendors should be consulted to appropriately size tank.

Maintenance:

- Periodic cleaning is required based on visual inspection or reduced flow.
- Oil and grease disposal should be conducted by licensed waste disposal company.

Gravity Bag Filter





Description:

- A gravity bag filter, also referred to as a dewatering bag, is a square or rectangular bag made of non-woven geotextile fabric that collects gravel, sand, silt, and fines.

Appropriate Applications:

- Effective for the removal of sediments (gravel, sand, silt, and fines). Some metals are removed with the sediment.

Implementation:

- Water is pumped into one side of the bag and seeps through the top, bottom, and sides of the bag.
- Place filter bag on pavement or a gravel bed or paved surface. Avoid placing a dewatering bag on unprotected bare soil. If placing the bag on bare soil is unavoidable, a secondary barrier should be used, such as a rock filter bed placed beneath and beyond the edges of the bag to, prevent erosion and capture sediments that escape the bag.
- Perimeter control around the downstream end of the bag should be implemented. Secondary sediment controls are important especially in the initial stages of discharge, which tend to allow fines to pass through the bag.

Maintenance:

- Inspection of the flow conditions, bag condition, bag capacity, and the secondary barrier (as applicable) is required.
- Replace the bag when it no longer filters sediment or passes water at a reasonable rate.
- Caution should be taken when removing and disposing of the bag, to prevent the release of captured sediment
- Properly dispose of the bag offsite. If sediment is removed from the bag prior to disposal (bags can potentially be reused depending upon their condition), dispose of sediment in accordance with the general maintenance procedures described at the end of this BMP Fact Sheet.

Sand Media Particulate Filter





Description:

- Water is treated by passing it through canisters filled with sand media. Generally, sand filters provide a final level of treatment. They are often used as a secondary or higher level of treatment after a significant amount of sediment and other pollutants have been removed using other methods.

Appropriate Applications:

- Effective for the removal of trash, gravel, sand, and silt and some metals, as well as the reduction of biochemical oxygen demand (BOD) and turbidity.
- Sand filters can be used for stand-alone treatment or in conjunction with bag and cartridge filtration if further treatment is required.
- Sand filters can also be used to provide additional treatment to water treated via settling or basic filtration.

Implementation:

- The filters require delivery to the site and initial set up. The vendor can provide assistance with installation and operation.

Maintenance:

- The filters require regular service to monitor and maintain the level of the sand media. If subjected to high loading rates, filters can plug quickly.
- Venders generally provide data on maximum head loss through the filter. The filter should be monitored daily while in use, and cleaned when head loss reaches target levels.
- If cleaned by backwashing, the backwash water may need to be hauled away for disposal, or returned to the upper end of the treatment train for another pass through the series of dewatering BMPs.

Pressurized Bag Filter





Description:

- A pressurized bag filter is a unit composed of single filter bags made from polyester felt material. The water filters through the unit and is discharged through a header. Vendors provide bag filters in a variety of configurations. Some units include a combination of bag filters and cartridge filters for enhanced contaminant removal.

Appropriate Applications:

- Effective for the removal of sediment (sand and silt) and some metals, as well as the reduction of BOD, turbidity, and hydrocarbons. Oil absorbent bags are available for hydrocarbon removal.

- Filters can be used to provide secondary treatment to water treated via settling or basic filtration.

Implementation:

- The filters require delivery to the site and initial set up. The vendor can provide assistance with installation and operation.

Maintenance:

- The filter bags require replacement when the pressure differential equals or exceeds the manufacturer's recommendation.

Cartridge Filter



Description:

- Cartridge filters provide a high degree of pollutant removal by utilizing a number of individual cartridges as part of a larger filtering unit. They are often used as a secondary or higher (polishing) level of treatment after a significant amount of sediment and other pollutants are removed. Units come with various cartridge configurations (for use in series with bag filters) or with a larger single cartridge filtration unit (with multiple filters within).

Appropriate Applications:

- Effective for the removal of sediment (sand, silt, and some clays) and metals, as well as the reduction of BOD, turbidity, and hydrocarbons. Hydrocarbons can effectively be removed with special resin cartridges.

- Filters can be used to provide secondary treatment to water treated via settling or basic filtration.

Implementation:

- The filters require delivery to the site and initial set up. The vendor can provide assistance.

Maintenance:

- The cartridges require replacement when the pressure differential equals or exceeds the manufacturer's recommendation.

Costs

- Sediment control costs vary considerably depending on the dewatering and sediment treatment system that is selected. Pressurized filters tend to be more expensive than gravity settling, but are often more effective. Simple tanks are generally rented on a long-term basis (one or more months) and can range from $360 per month for a 1,000 gallon tank to $2,660 per month for a 10,000 gallon tank. Mobilization and demobilization costs vary considerably.

Inspection and Maintenance

- Inspect and verify that dewatering BMPs are in place and functioning prior to the commencement of activities requiring dewatering.

- Inspect dewatering BMPs daily while dewatering activities are being conducted.

- Inspect all equipment before use. Monitor dewatering operations to ensure they do not cause offsite discharge or erosion.
- Sample dewatering discharges as required by the General Permit.
- Unit-specific maintenance requirements are included with the description of each unit.
- Sediment removed during the maintenance of a dewatering device may be either spread onsite and stabilized, or disposed of at a disposal site as approved by the owner.
- Sediment that is commingled with other pollutants should be disposed of in accordance with all applicable laws and regulations and as approved by the owner.

References

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

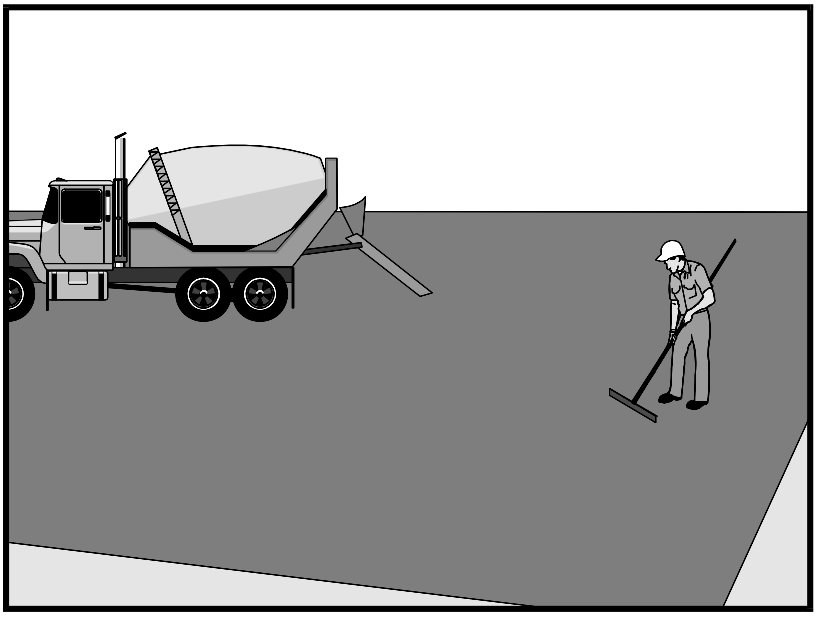
Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003; Updated March 2004.

Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

Labor Surcharge & Equipment Rental Rates, April 1, 2002 through March 31, 2003, California Department of Transportation (Caltrans).

Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.

Paving and Grinding Operations NS-3



Categories		
EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☑
WM	Waste Management and Materials Pollution Control	☒

Legend:
☑ **Primary Category**
☒ **Secondary Category**

Targeted Constituents	
Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	☑
Organics	

Potential Alternatives

None

Description and Purpose

Prevent or reduce the discharge of pollutants from paving operations, using measures to prevent runon and runoff pollution, properly disposing of wastes, and training employees and subcontractors.

The General Permit incorporates Numeric Effluent Limits (NEL) and Numeric Action Levels (NAL) for pH and turbidity (see Section 2 of this handbook to determine your project's risk level and if you are subject to these requirements).

Many types of construction materials associated with paving and grinding operations, including mortar, concrete, and cement and their associated wastes have basic chemical properties that can raise pH levels outside of the permitted range. Additional care should be taken when managing these materials to prevent them from coming into contact with stormwater flows, which could lead to exceedances of the General Permit requirements.

Suitable Applications

These procedures are implemented where paving, surfacing, resurfacing, or sawcutting, may pollute stormwater runoff or discharge to the storm drain system or watercourses.

Limitations

- Paving opportunities may be limited during wet weather.
- Discharges of freshly paved surfaces may raise pH to environmentally harmful levels and trigger permit violations.

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Implementation

General

- Avoid paving during the wet season when feasible.
- Reschedule paving and grinding activities if rain is forecasted.
- Train employees and sub-contractors in pollution prevention and reduction.
- Store materials away from drainage courses to prevent stormwater runon (see WM-1, Material Delivery and Storage).
- Protect drainage courses, particularly in areas with a grade, by employing BMPs to divert runoff or to trap and filter sediment.
- Stockpile material removed from roadways away from drain inlets, drainage ditches, and watercourses. These materials should be stored consistent with WM-3, Stockpile Management.
- Disposal of PCC (Portland cement concrete) and AC (asphalt concrete) waste should be in conformance with WM-8, Concrete Waste Management.

Saw Cutting, Grinding, and Pavement Removal

- Shovel or vacuum saw-cut slurry and remove from site. Cover or barricade storm drains during saw cutting to contain slurry.
- When paving involves AC, the following steps should be implemented to prevent the discharge of grinding residue, uncompacted or loose AC, tack coats, equipment cleaners, or unrelated paving materials:
  - AC grindings, pieces, or chunks used in embankments or shoulder backing should not be allowed to enter any storm drains or watercourses. Install inlet protection and perimeter controls until area is stabilized (i.e. cutting, grinding or other removal activities are complete and loose material has been properly removed and disposed of)or permanent controls are in place. Examples of temporary perimeter controls can be found in EC-9, Earth Dikes and Drainage Swales; SE-1, Silt Fence; SE-5, Fiber Rolls, or SE-13 Compost Socks and Berms
  - Collect and remove all broken asphalt and recycle when practical. Old or spilled asphalt should be recycled or disposed of properly.
- Do not allow saw-cut slurry to enter storm drains or watercourses. Residue from grinding operations should be picked up by a vacuum attachment to the grinding machine, or by sweeping, should not be allowed to flow across the pavement, and should not be left on the surface of the pavement. See also WM-8, Concrete Waste Management, and WM-10, Liquid Waste Management.
- Pavement removal activities should not be conducted in the rain.
- Collect removed pavement material by mechanical or manual methods. This material may be recycled for use as shoulder backing or base material.

- If removed pavement material cannot be recycled, transport the material back to an approved storage site.

Asphaltic Concrete Paving

- If paving involves asphaltic cement concrete, follow these steps:

  - Do not allow sand or gravel placed over new asphalt to wash into storm drains, streets, or creeks. Vacuum or sweep loose sand and gravel and properly dispose of this waste by referring to WM-5, Solid Waste Management.

  - Old asphalt should be disposed of properly. Collect and remove all broken asphalt from the site and recycle whenever possible.

Portland Cement Concrete Paving

- Do not wash sweepings from exposed aggregate concrete into a storm drain system. Collect waste materials by dry methods, such as sweeping or shoveling, and return to aggregate base stockpile or dispose of properly. Allow aggregate rinse to settle. Then, either allow rinse water to dry in a temporary pit as described in WM-8, Concrete Waste Management, or pump the water to the sanitary sewer if authorized by the local wastewater authority.

Sealing Operations

- During chip seal application and sweeping operations, petroleum or petroleum covered aggregate should not be allowed to enter any storm drain or water courses. Apply temporary perimeter controls until structure is stabilized (i.e. all sealing operations are complete and cured and loose materials have been properly removed and disposed).

- Inlet protection (SE-10, Storm Drain Inlet Protection) should be used during application of seal coat, tack coat, slurry seal, and fog seal.

- Seal coat, tack coat, slurry seal, or fog seal should not be applied if rainfall is predicted to occur during the application or curing period.

Paving Equipment

- Leaks and spills from paving equipment can contain toxic levels of heavy metals and oil and grease. Place drip pans or absorbent materials under paving equipment when not in use. Clean up spills with absorbent materials and dispose of in accordance with the applicable regulations. See NS-10, Vehicle and Equipment Maintenance, WM-4, Spill Prevention and Control, and WM-10, Liquid Waste Management.

- Substances used to coat asphalt transport trucks and asphalt spreading equipment should not contain soap and should be non-foaming and non-toxic.

- Paving equipment parked onsite should be parked over plastic to prevent soil contamination.

- Clean asphalt coated equipment offsite whenever possible. When cleaning dry, hardened asphalt from equipment, manage hardened asphalt debris as described in WM-5, Solid Waste Management. Any cleaning onsite should follow NS-8, Vehicle and Equipment Cleaning.

Thermoplastic Striping

- Thermoplastic striper and pre-heater equipment shutoff valves should be inspected to ensure that they are working properly to prevent leaking thermoplastic from entering drain inlets, the stormwater drainage system, or watercourses.
- Pre-heaters should be filled carefully to prevent splashing or spilling of hot thermoplastic. Leave six inches of space at the top of the pre-heater container when filling thermoplastic to allow room for material to move.
- Do not pre-heat, transfer, or load thermoplastic near drain inlets or watercourses.
- Clean truck beds daily of loose debris and melted thermoplastic. When possible, recycle thermoplastic material.

Raised/Recessed Pavement Marker Application and Removal

- Do not transfer or load bituminous material near drain inlets, the stormwater drainage system, or watercourses.
- Melting tanks should be loaded with care and not filled to beyond six inches from the top to leave room for splashing.
- When servicing or filling melting tanks, ensure all pressure is released before removing lids to avoid spills.
- On large-scale projects, use mechanical or manual methods to collect excess bituminous material from the roadway after removal of markers.

Costs

- All of the above are low cost measures.

Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of paving and grinding operations.
- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Sample stormwater runoff required by the General Permit.
- Keep ample supplies of drip pans or absorbent materials onsite.
- Inspect and maintain machinery regularly to minimize leaks and drips.

References

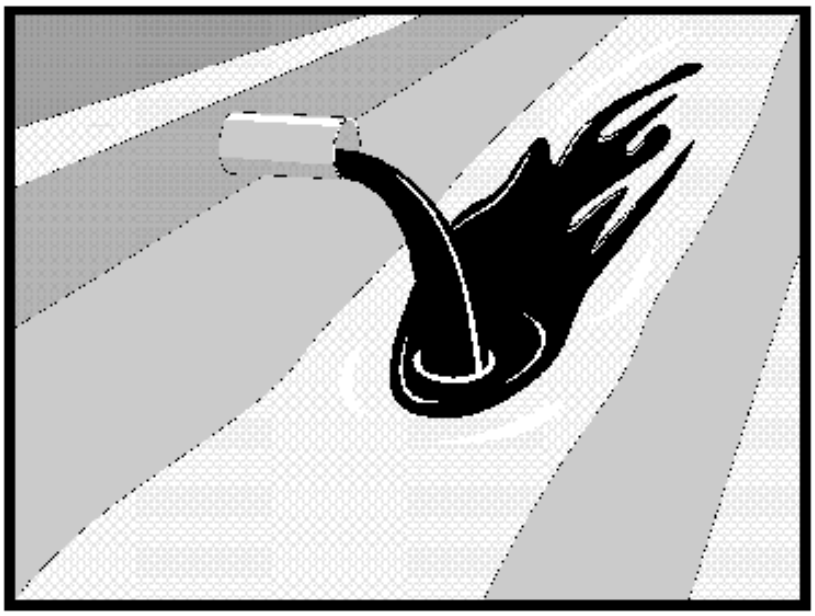
Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Hot Mix Asphalt-Paving Handbook AC 150/5370-14, Appendix I, U.S. Army Corps of Engineers, July 1991.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.

Illicit Connection / Discharge NS-6



Categories		
EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☑
WM	Waste Management and Materials Pollution Control	

Legend:
☑ **Primary Objective**
☒ **Secondary Objective**

Targeted Constituents	
Sediment	
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	☑
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

Description and Purpose

Procedures and practices designed for construction contractors to recognize illicit connections or illegally dumped or discharged materials on a construction site and report incidents.

Suitable Applications

This best management practice (BMP) applies to all construction projects. Illicit connection/discharge and reporting is applicable anytime an illicit connection or discharge is discovered or illegally dumped material is found on the construction site.

Limitations

Illicit connections and illegal discharges or dumping, for the purposes of this BMP, refer to discharges and dumping caused by parties other than the contractor. If pre-existing hazardous materials or wastes are known to exist onsite, they should be identified in the SWPPP and handled as set forth in the SWPPP.

Implementation

Planning

- Review the SWPPP. Pre-existing areas of contamination should be identified and documented in the SWPPP.
- Inspect site before beginning the job for evidence of illicit connections, illegal dumping or discharges. Document any pre-existing conditions and notify the owner.
- Inspect site regularly during project execution for evidence

of illicit connections, illegal dumping or discharges.

- Observe site perimeter for evidence for potential of illicitly discharged or illegally dumped material, which may enter the job site.

Identification of Illicit Connections and Illegal Dumping or Discharges

- **General –** unlabeled and unidentifiable material should be treated as hazardous.
- **Solids** - Look for debris, or rubbish piles. Solid waste dumping often occurs on roadways with light traffic loads or in areas not easily visible from the traveled way.
- **Liquids** - signs of illegal liquid dumping or discharge can include:
  - Visible signs of staining or unusual colors to the pavement or surrounding adjacent soils
  - Pungent odors coming from the drainage systems
  - Discoloration or oily substances in the water or stains and residues detained within ditches, channels or drain boxes
  - Abnormal water flow during the dry weather season
- **Urban Areas** - Evidence of illicit connections or illegal discharges is typically detected at storm drain outfall locations or at manholes. Signs of an illicit connection or illegal discharge can include:
  - Abnormal water flow during the dry weather season
  - Unusual flows in sub drain systems used for dewatering
  - Pungent odors coming from the drainage systems
  - Discoloration or oily substances in the water or stains and residues detained within ditches, channels or drain boxes
  - Excessive sediment deposits, particularly adjacent to or near active offsite construction projects
- **Rural Areas** - Illicit connections or illegal discharges involving irrigation drainage ditches are detected by visual inspections. Signs of an illicit discharge can include:
  - Abnormal water flow during the non-irrigation season
  - Non-standard junction structures
  - Broken concrete or other disturbances at or near junction structures

Reporting

Notify the owner of any illicit connections and illegal dumping or discharge incidents at the time of discovery. For illicit connections or discharges to the storm drain system, notify the local stormwater management agency. For illegal dumping, notify the local law enforcement agency.

Cleanup and Removal

The responsibility for cleanup and removal of illicit or illegal dumping or discharges will vary by location. Contact the local stormwater management agency for further information.

Costs

Costs to look for and report illicit connections and illegal discharges and dumping are low. The best way to avoid costs associated with illicit connections and illegal discharges and dumping is to keep the project perimeters secure to prevent access to the site, to observe the site for vehicles that should not be there, and to document any waste or hazardous materials that exist onsite before taking possession of the site.

Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect weekly during the rainy season and at two-week intervals in the non-rainy season to verify continued BMP implementation.
- Inspect the site regularly to check for any illegal dumping or discharge.
- Prohibit employees and subcontractors from disposing of non-job related debris or materials at the construction site.
- Notify the owner of any illicit connections and illegal dumping or discharge incidents at the time of discovery.

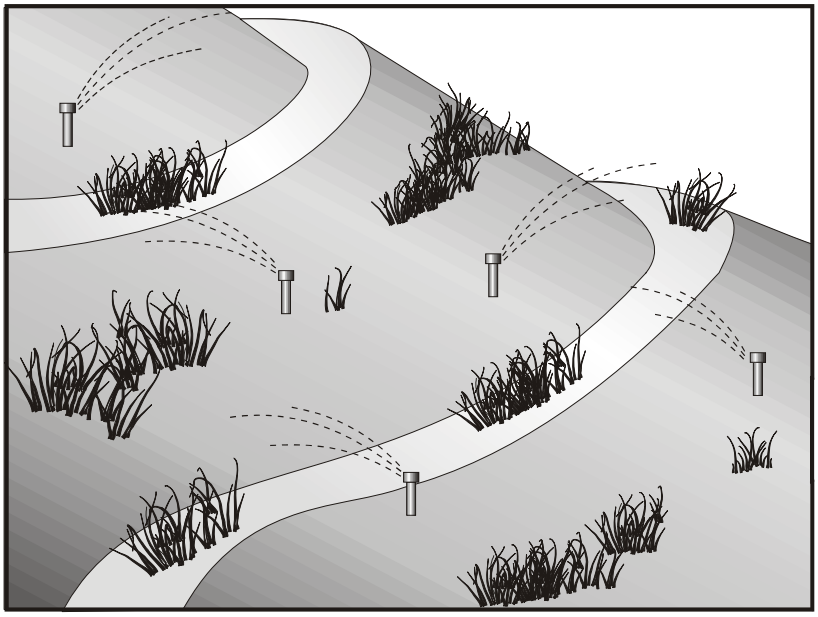
References

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

Potable Water/Irrigation NS-7



Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☑
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	☑
Trash	
Metals	☑
Bacteria	
Oil and Grease	
Organics	☑

Potential Alternatives

None

Description and Purpose

Potable Water/Irrigation consists of practices and procedures to manage the discharge of potential pollutants generated during discharges from irrigation water lines, landscape irrigation, lawn or garden watering, planned and unplanned discharges from potable water sources, water line flushing, and hydrant flushing.

Suitable Applications

Implement this BMP whenever potable water or irrigation water discharges occur at or enter a construction site.

Limitations

None identified.

Implementation

- Direct water from offsite sources around or through a construction site, where feasible, in a way that minimizes contact with the construction site.
- Discharges from water line flushing should be reused for landscaping purposes where feasible.
- Shut off the water source to broken lines, sprinklers, or valves as soon as possible to prevent excess water flow.
- Protect downstream stormwater drainage systems and watercourses from water pumped or bailed from trenches excavated to repair water lines.
- Inspect irrigated areas within the construction limits for

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excess watering. Adjust watering times and schedules to ensure that the appropriate amount of water is being used and to minimize runoff. Consider factors such as soil structure, grade, time of year, and type of plant material in determining the proper amounts of water for a specific area.

Costs

Cost to manage potable water and irrigation are low and generally considered to be a normal part of related activities.

Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect weekly during the rainy season and at two-week intervals in the non-rainy season to verify continued BMP implementation.
- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges occur.
- Repair broken water lines as soon as possible.
- Inspect irrigated areas regularly for signs of erosion and/or discharge.

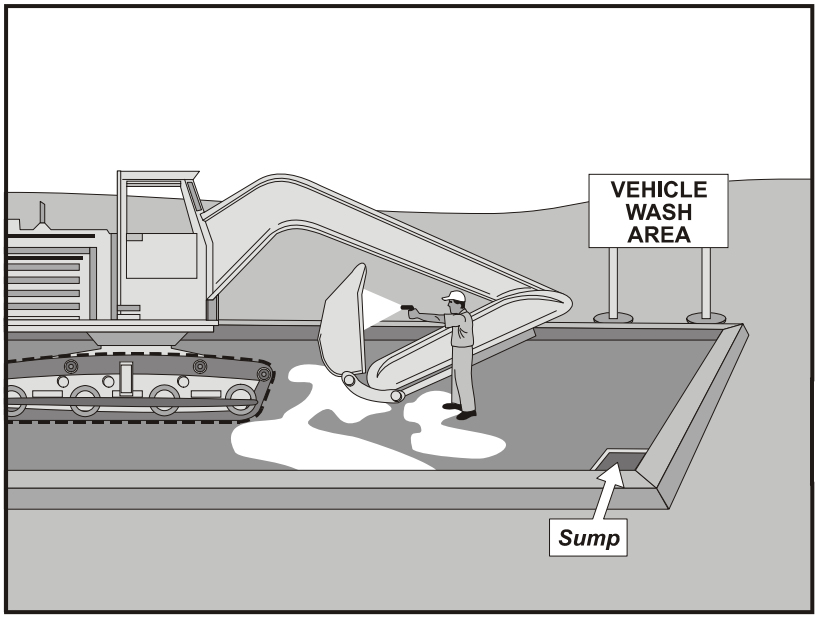
References

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

Vehicle and Equipment Cleaning NS-8



Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☑
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	☑
Trash	
Metals	
Bacteria	
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

Description and Purpose

Vehicle and equipment cleaning procedures and practices eliminate or reduce the discharge of pollutants to stormwater from vehicle and equipment cleaning operations. Procedures and practices include but are not limited to: using offsite facilities; washing in designated, contained areas only; eliminating discharges to the storm drain by infiltrating the wash water; and training employees and subcontractors in proper cleaning procedures.

Suitable Applications

These procedures are suitable on all construction sites where vehicle and equipment cleaning is performed.

Limitations

Even phosphate-free, biodegradable soaps have been shown to be toxic to fish before the soap degrades. Sending vehicles/equipment offsite should be done in conjunction with TC-1, Stabilized Construction Entrance/Exit.

Implementation

Other options to washing equipment onsite include contracting with either an offsite or mobile commercial washing business. These businesses may be better equipped to handle and dispose of the wash waters properly. Performing this work offsite can also be economical by eliminating the need for a separate washing operation onsite.

If washing operations are to take place onsite, then:

- Use phosphate-free, biodegradable soaps.
- Educate employees and subcontractors on pollution prevention measures.
- Do not permit steam cleaning onsite. Steam cleaning can generate significant pollutant concentrates.
- Cleaning of vehicles and equipment with soap, solvents or steam should not occur on the project site unless resulting wastes are fully contained and disposed of. Resulting wastes should not be discharged or buried, and must be captured and recycled or disposed according to the requirements of WM-10, Liquid Waste Management or WM-6, Hazardous Waste Management, depending on the waste characteristics. Minimize use of solvents. Use of diesel for vehicle and equipment cleaning is prohibited.
- All vehicles and equipment that regularly enter and leave the construction site must be cleaned offsite.
- When vehicle and equipment washing and cleaning must occur onsite, and the operation cannot be located within a structure or building equipped with appropriate disposal facilities, the outside cleaning area should have the following characteristics:
  - Located away from storm drain inlets, drainage facilities, or watercourses
  - Paved with concrete or asphalt and bermed to contain wash waters and to prevent runon and runoff
  - Configured with a sump to allow collection and disposal of wash water
  - No discharge of wash waters to storm drains or watercourses
  - Used only when necessary
- When cleaning vehicles and equipment with water:
  - Use as little water as possible. High-pressure sprayers may use less water than a hose and should be considered
  - Use positive shutoff valve to minimize water usage
  - Facility wash racks should discharge to a sanitary sewer, recycle system or other approved discharge system and must not discharge to the storm drainage system, watercourses, or to groundwater

Costs

Cleaning vehicles and equipment at an offsite facility may reduce overall costs for vehicle and equipment cleaning by eliminating the need to provide similar services onsite. When onsite cleaning is needed, the cost to establish appropriate facilities is relatively low on larger, long-duration projects, and moderate to high on small, short-duration projects.

Inspection and Maintenance

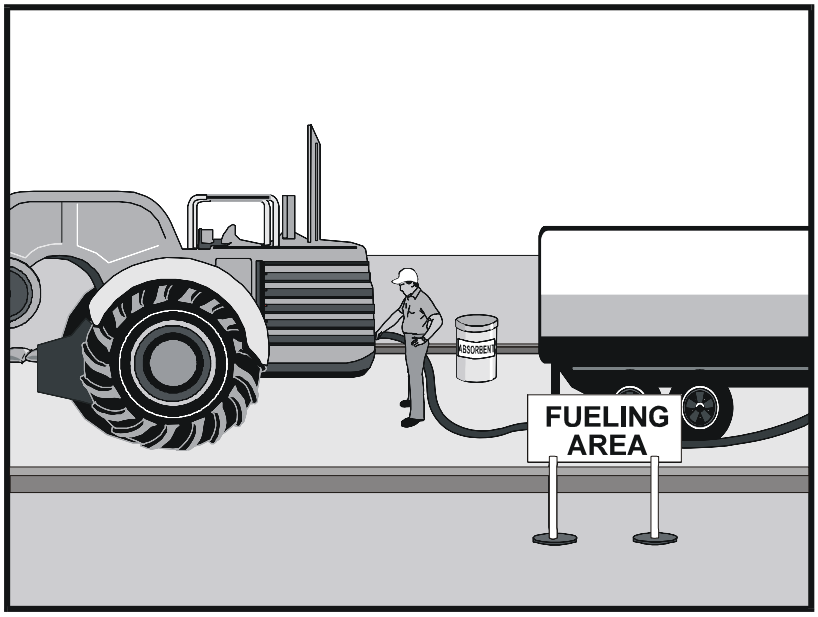
- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect weekly during the rainy season and at two-week intervals in the non-rainy season to verify continued BMP implementation.
- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges occur.
- Inspection and maintenance is minimal, although some berm repair may be necessary.
- Monitor employees and subcontractors throughout the duration of the construction project to ensure appropriate practices are being implemented.
- Inspect sump regularly and remove liquids and sediment as needed.
- Prohibit employees and subcontractors from washing personal vehicles and equipment on the construction site.

References

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Swisher, R.D. Surfactant Biodegradation, Marcel Decker Corporation, 1987.

Vehicle and Equipment Fueling NS-9



Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☑
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	☑
Organics	

Potential Alternatives

None

Description and Purpose

Vehicle equipment fueling procedures and practices are designed to prevent fuel spills and leaks, and reduce or eliminate contamination of stormwater. This can be accomplished by using offsite facilities, fueling in designated areas only, enclosing or covering stored fuel, implementing spill controls, and training employees and subcontractors in proper fueling procedures.

Suitable Applications

These procedures are suitable on all construction sites where vehicle and equipment fueling takes place.

Limitations

Onsite vehicle and equipment fueling should only be used where it is impractical to send vehicles and equipment offsite for fueling. Sending vehicles and equipment offsite should be done in conjunction with TC-1, Stabilized Construction Entrance/ Exit.

Implementation

- Use offsite fueling stations as much as possible. These businesses are better equipped to handle fuel and spills properly. Performing this work offsite can also be economical by eliminating the need for a separate fueling area at a site.
- Discourage "topping-off" of fuel tanks.
- Absorbent spill cleanup materials and spill kits should be available in fueling areas and on fueling trucks, and should

be disposed of properly after use.

- Drip pans or absorbent pads should be used during vehicle and equipment fueling, unless the fueling is performed over an impermeable surface in a dedicated fueling area.
- Use absorbent materials on small spills. Do not hose down or bury the spill. Remove the adsorbent materials promptly and dispose of properly.
- Avoid mobile fueling of mobile construction equipment around the site; rather, transport the equipment to designated fueling areas. With the exception of tracked equipment such as bulldozers and large excavators, most vehicles should be able to travel to a designated area with little lost time.
- Train employees and subcontractors in proper fueling and cleanup procedures.
- When fueling must take place onsite, designate an area away from drainage courses to be used. Fueling areas should be identified in the SWPPP.
- Dedicated fueling areas should be protected from stormwater runon and runoff, and should be located at least 50 ft away from downstream drainage facilities and watercourses. Fueling must be performed on level-grade areas.
- Protect fueling areas with berms and dikes to prevent runon, runoff, and to contain spills.
- Nozzles used in vehicle and equipment fueling should be equipped with an automatic shutoff to control drips. Fueling operations should not be left unattended.
- Use vapor recovery nozzles to help control drips as well as air pollution where required by Air Quality Management Districts (AQMD).
- Federal, state, and local requirements should be observed for any stationary above ground storage tanks.

Costs

- All of the above measures are low cost except for the capital costs of above ground tanks that meet all local environmental, zoning, and fire codes.

Inspection and Maintenance

- Vehicles and equipment should be inspected each day of use for leaks. Leaks should be repaired immediately or problem vehicles or equipment should be removed from the project site.
- Keep ample supplies of spill cleanup materials onsite.
- Immediately clean up spills and properly dispose of contaminated soil and cleanup materials.

References

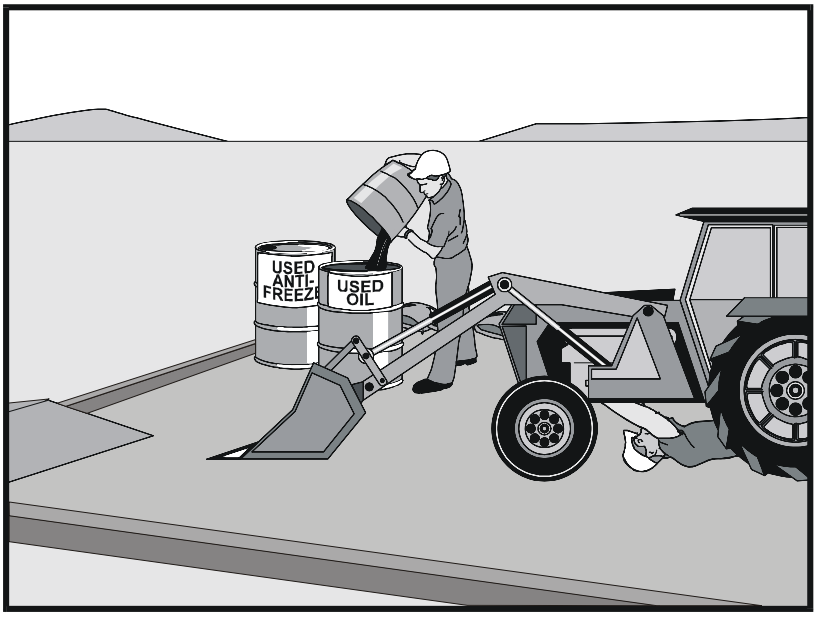
Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance, Working Group Working Paper; USEPA, April 1992.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

Vehicle & Equipment Maintenance NS-10



Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☑
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	
Nutrients	☑
Trash	☑
Metals	
Bacteria	
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

Description and Purpose

Prevent or reduce the contamination of stormwater resulting from vehicle and equipment maintenance by running a "dry and clean site". The best option would be to perform maintenance activities at an offsite facility. If this option is not available then work should be performed in designated areas only, while providing cover for materials stored outside, checking for leaks and spills, and containing and cleaning up spills immediately. Employees and subcontractors must be trained in proper procedures.

Suitable Applications

These procedures are suitable on all construction projects where an onsite yard area is necessary for storage and maintenance of heavy equipment and vehicles.

Limitations

Onsite vehicle and equipment maintenance should only be used where it is impractical to send vehicles and equipment offsite for maintenance and repair. Sending vehicles/equipment offsite should be done in conjunction with TC-1, Stabilized Construction Entrance/Exit.

Outdoor vehicle or equipment maintenance is a potentially significant source of stormwater pollution. Activities that can contaminate stormwater include engine repair and service, changing or replacement of fluids, and outdoor equipment storage and parking (engine fluid leaks). For further information on vehicle or equipment servicing, see NS-8, Vehicle and Equipment Cleaning, and NS-9, Vehicle and

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Equipment Fueling.

Implementation

- Use offsite repair shops as much as possible. These businesses are better equipped to handle vehicle fluids and spills properly. Performing this work offsite can also be economical by eliminating the need for a separate maintenance area.
- If maintenance must occur onsite, use designated areas, located away from drainage courses. Dedicated maintenance areas should be protected from stormwater runon and runoff, and should be located at least 50 ft from downstream drainage facilities and watercourses.
- Drip pans or absorbent pads should be used during vehicle and equipment maintenance work that involves fluids, unless the maintenance work is performed over an impermeable surface in a dedicated maintenance area.
- Place a stockpile of spill cleanup materials where it will be readily accessible.
- All fueling trucks and fueling areas are required to have spill kits and/or use other spill protection devices.
- Use adsorbent materials on small spills. Remove the absorbent materials promptly and dispose of properly.
- Inspect onsite vehicles and equipment daily at startup for leaks, and repair immediately.
- Keep vehicles and equipment clean; do not allow excessive build-up of oil and grease.
- Segregate and recycle wastes, such as greases, used oil or oil filters, antifreeze, cleaning solutions, automotive batteries, hydraulic and transmission fluids. Provide secondary containment and covers for these materials if stored onsite.
- Train employees and subcontractors in proper maintenance and spill cleanup procedures.
- Drip pans or plastic sheeting should be placed under all vehicles and equipment placed on docks, barges, or other structures over water bodies when the vehicle or equipment is planned to be idle for more than 1 hour.
- For long-term projects, consider using portable tents or covers over maintenance areas if maintenance cannot be performed offsite.
- Consider use of new, alternative greases and lubricants, such as adhesive greases, for chassis lubrication and fifth-wheel lubrication.
- Properly dispose of used oils, fluids, lubricants, and spill cleanup materials.
- Do not place used oil in a dumpster or pour into a storm drain or watercourse.
- Properly dispose of or recycle used batteries.
- Do not bury used tires.

- Repair leaks of fluids and oil immediately.

Listed below is further information if you must perform vehicle or equipment maintenance onsite.

Safer Alternative Products

- Consider products that are less toxic or hazardous than regular products. These products are often sold under an "environmentally friendly" label.
- Consider use of grease substitutes for lubrication of truck fifth-wheels. Follow manufacturers label for details on specific uses.
- Consider use of plastic friction plates on truck fifth-wheels in lieu of grease. Follow manufacturers label for details on specific uses.

Waste Reduction

Parts are often cleaned using solvents such as trichloroethylene, trichloroethane, or methylene chloride. Many of these cleaners are listed in California Toxic Rule as priority pollutants. These materials are harmful and must not contaminate stormwater. They must be disposed of as a hazardous waste. Reducing the number of solvents makes recycling easier and reduces hazardous waste management costs. Often, one solvent can perform a job as well as two different solvents. Also, if possible, eliminate or reduce the amount of hazardous materials and waste by substituting non-hazardous or less hazardous materials. For example, replace chlorinated organic solvents with non-chlorinated solvents. Non-chlorinated solvents like kerosene or mineral spirits are less toxic and less expensive to dispose of properly. Check the list of active ingredients to see whether it contains chlorinated solvents. The "chlor" term indicates that the solvent is chlorinated. Also, try substituting a wire brush for solvents to clean parts.

Recycling and Disposal

Separating wastes allows for easier recycling and may reduce disposal costs. Keep hazardous wastes separate, do not mix used oil solvents, and keep chlorinated solvents (like,-trichloroethane) separate from non-chlorinated solvents (like kerosene and mineral spirits). Promptly transfer used fluids to the proper waste or recycling drums. Don't leave full drip pans or other open containers lying around. Provide cover and secondary containment until these materials can be removed from the site.

Oil filters can be recycled. Ask your oil supplier or recycler about recycling oil filters.

Do not dispose of extra paints and coatings by dumping liquid onto the ground or throwing it into dumpsters. Allow coatings to dry or harden before disposal into covered dumpsters.

Store cracked batteries in a non-leaking secondary container. Do this with all cracked batteries, even if you think all the acid has drained out. If you drop a battery, treat it as if it is cracked. Put it into the containment area until you are sure it is not leaking.

Costs

All of the above are low cost measures. Higher costs are incurred to setup and maintain onsite maintenance areas.

Vehicle & Equipment Maintenance NS-10

Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect weekly during the rainy season and at two-week intervals in the non-rainy season to verify continued BMP implementation.
- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges occur.
- Keep ample supplies of spill cleanup materials onsite.
- Maintain waste fluid containers in leak proof condition.
- Vehicles and equipment should be inspected on each day of use. Leaks should be repaired immediately or the problem vehicle(s) or equipment should be removed from the project site.
- Inspect equipment for damaged hoses and leaky gaskets routinely. Repair or replace as needed.

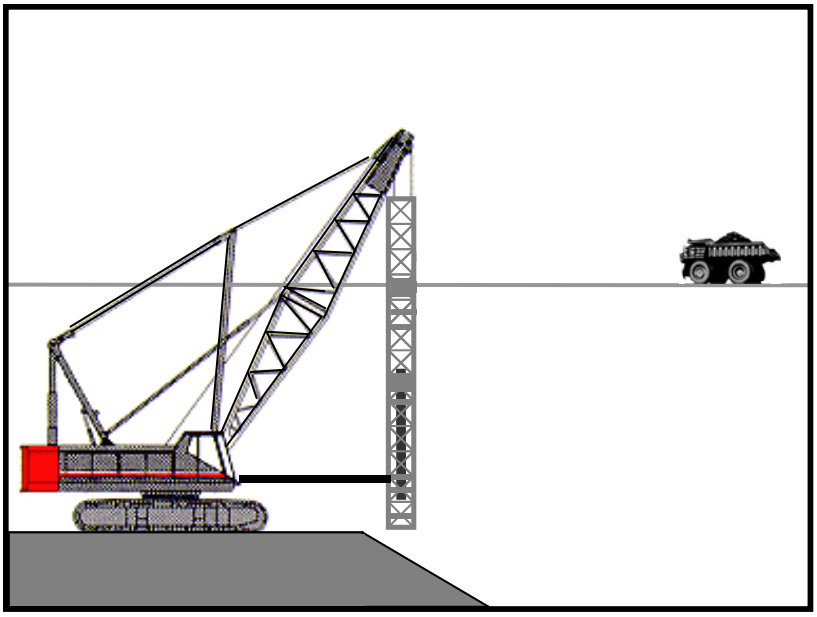
References

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Coastal Nonpoint Pollution Control Program; Program Development and Approval Guidance, Working Group, Working Paper; USEPA, April 1992.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Pile Driving Operations NS-11



Categories		
EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☑
WM	Waste Management and Materials Pollution Control	

Legend:
☑ **Primary Objective**
☒ **Secondary Objective**

Targeted Constituents	
Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	☑
Organics	

Potential Alternatives

None

Description and Purpose

The construction and retrofit of bridges and retaining walls often include driving piles for foundation support and shoring operations. Driven piles are typically constructed of precast concrete, steel, or timber. Driven sheet piles are also used for shoring and cofferdam construction. Proper control and use of equipment, materials, and waste products from pile driving operations will reduce or eliminate the discharge of potential pollutants to the storm drain system, watercourses, and waters of the United States.

Suitable Applications

These procedures apply to all construction sites near or adjacent to a watercourse or groundwater where permanent and temporary pile driving (impact and vibratory) takes place, including operations using pile shells as well as construction of cast-in-steel-shell and cast-in-drilled-hole piles.

Limitations

None identified.

Implementation

- Use drip pans or absorbent pads during vehicle and equipment operation, maintenance, cleaning, fueling, and storage. Refer to NS-8, Vehicle and Equipment Cleaning, NS-9, Vehicle and Equipment Fueling, and NS-10, Vehicle and Equipment Maintenance.
- Have spill kits and cleanup materials available at all locations of pile driving. Refer to WM-4, Spill Prevention

and Control.

- Equipment that is stored or in use in streambeds, or on docks, barges, or other structures over water bodies should be kept leak free.
- Park equipment over plastic sheeting or equivalent where possible. Plastic is not a substitute for drip pans or absorbent pads. The storage or use of equipment in streambeds or other bodies of water must comply with all applicable permits.
- Implement other BMPs as applicable, such as NS-2, Dewatering Operations, WM-5, Solid Waste Management, WM-6, Hazardous Waste Management, and WM-10, Liquid Waste Management.
- When not in use, store pile-driving equipment away from concentrated flows of stormwater, drainage courses, and inlets. Protect hammers and other hydraulic attachments from runon and runoff by placing them on plywood and covering them with plastic or a comparable material prior to the onset of rain.
- Use less hazardous products, e.g., vegetable oil, when practicable.

Costs

All of the above measures can be low cost.

Inspection and Maintenance

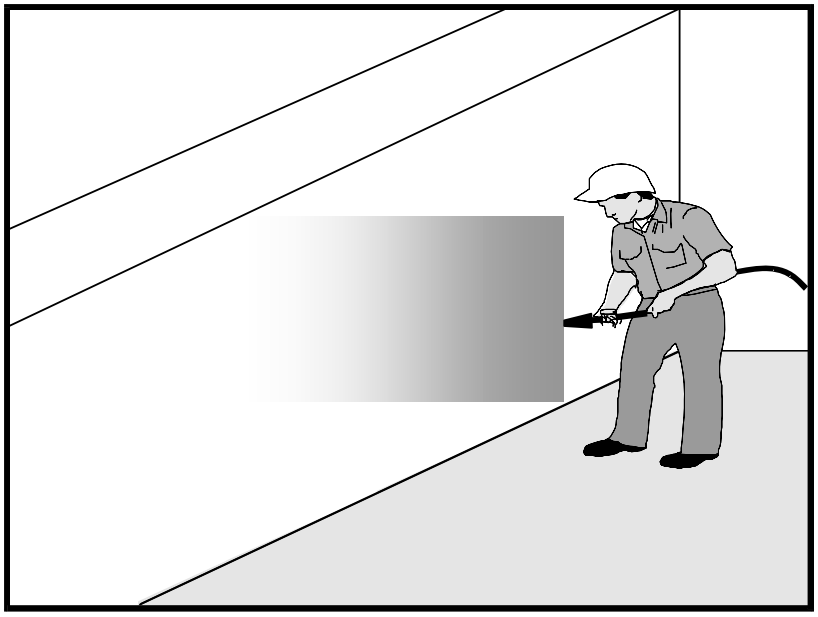
- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect weekly during the rainy season and at two-week intervals in the non-rainy season to verify continued BMP implementation.
- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges occur.
- Inspect equipment every day at startup and repair equipment as needed (i.e., worn or damaged hoses, fittings, and gaskets). Recheck equipment at shift changes or at the end of the day and scheduled repairs as needed.

References

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

Concrete Curing NS-12



Categories		
EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☑
WM	Waste Management and Materials Pollution Control	☑

Legend:
☑ **Primary Category**
☒ **Secondary Category**

Targeted Constituents	
Sediment	☑
Nutrients	
Trash	
Metals	☑
Bacteria	
Oil and Grease	☑
Organics	

Potential Alternatives

None

Description and Purpose

Concrete curing is used in the construction of structures such as bridges, retaining walls, pump houses, large slabs, and structured foundations. Concrete curing includes the use of both chemical and water methods.

Concrete and its associated curing materials have basic chemical properties that can raise the pH of water to levels outside of the permitted range. Discharges of stormwater and non-stormwater exposed to concrete during curing may have a high pH and may contain chemicals, metals, and fines. The General Permit incorporates Numeric Effluent Limits (NEL) and Numeric Action Levels (NAL) for pH (see Section 2 of this handbook to determine your project's risk level and if you are subject to these requirements).

Proper procedures and care should be taken when managing concrete curing materials to prevent them from coming into contact with stormwater flows, which could result in a high pH discharge.

Suitable Applications

Suitable applications include all projects where Portland Cement Concrete (PCC) and concrete curing chemicals are placed where they can be exposed to rainfall, runoff from other areas, or where runoff from the PCC will leave the site.

Limitations

- Runoff contact with concrete waste can raise pH levels in the water to environmentally harmful levels and trigger permit violations.

Implementation

Chemical Curing

- Avoid over spray of curing compounds.
- Minimize the drift by applying the curing compound close to the concrete surface. Apply an amount of compound that covers the surface, but does not allow any runoff of the compound.
- Use proper storage and handling techniques for concrete curing compounds. Refer to WM-1, Material Delivery and Storage.
- Protect drain inlets prior to the application of curing compounds.
- Refer to WM-4, Spill Prevention and Control.

Water Curing for Bridge Decks, Retaining Walls, and other Structures

- Direct cure water away from inlets and watercourses to collection areas for evaporation or other means of removal in accordance with all applicable permits. See WM-8 Concrete Waste Management.
- Collect cure water at the top of slopes and transport to a concrete waste management area in a non-erosive manner. See EC-9 Earth Dikes and Drainage Swales, EC-10, Velocity Dissipation Devices, and EC-11, Slope Drains.
- Utilize wet blankets or a similar method that maintains moisture while minimizing the use and possible discharge of water.

Education

- Educate employees, subcontractors, and suppliers on proper concrete curing techniques to prevent contact with discharge as described herein.
- Arrange for the QSP or the appropriately trained contractor's superintendent or representative to oversee and enforce concrete curing procedures.

Costs

All of the above measures are generally low cost.

Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities.
- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.

- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges occur.
- Sample non-stormwater discharges and stormwater runoff that contacts uncured and partially cured concrete as required by the General Permit.
- Ensure that employees and subcontractors implement appropriate measures for storage, handling, and use of curing compounds.
- Inspect cure containers and spraying equipment for leaks.

References

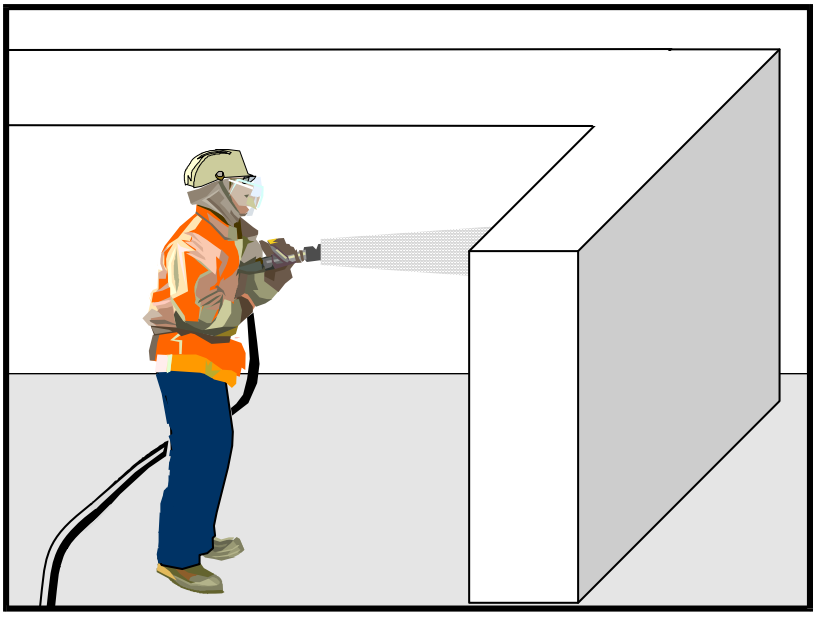
Blue Print for a Clean Bay-Construction-Related Industries: Best Management Practices for Stormwater Pollution Prevention; Santa Clara Valley Non Point Source Pollution Control Program, 1992.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.

Concrete Finishing NS-13



Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☑
WM	Waste Management and Materials Pollution Control	☑

Legend:

☑ **Primary Category**

☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	☑
Bacteria	
Oil and Grease	
Organics	☑

Potential Alternatives

None

Description and Purpose

Concrete finishing methods are used for bridge deck rehabilitation, paint removal, curing compound removal, and final surface finish appearances. Methods include sand blasting, shot blasting, grinding, or high pressure water blasting. Stormwater and non-stormwater exposed to concrete finishing by-products may have a high pH and may contain chemicals, metals, and fines. Proper procedures and implementation of appropriate BMPs can minimize the impact that concrete-finishing methods may have on stormwater and non-stormwater discharges.

The General Permit incorporates Numeric Effluent Limits (NEL) and Numeric Action Levels (NAL) for pH (see Section 2 of this handbook to determine your project's risk level and if you are subject to these requirements).

Concrete and its associated curing materials have basic chemical properties that can raise pH levels outside of the permitted range. Additional care should be taken when managing these materials to prevent them from coming into contact with stormwater flows, which could lead to exceedances of the General Permit requirements.

Suitable Applications

These procedures apply to all construction locations where concrete finishing operations are performed.

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Limitations

- Runoff contact with concrete waste can raise pH levels in the water to environmentally harmful levels and trigger permit violations.

Implementation

- Collect and properly dispose of water from high-pressure water blasting operations.
- Collect contaminated water from blasting operations at the top of slopes. Transport or dispose of contaminated water while using BMPs such as those for erosion control. Refer to EC-9, Earth Dikes and Drainage Swales, EC-10, Velocity Dissipation Devices, and EC-11, Slope Drains.
- Direct water from blasting operations away from inlets and watercourses to collection areas for infiltration or other means of removal (dewatering). Refer to NS-2 Dewatering Operations.
- Protect inlets during sandblasting operations. Refer to SE-10, Storm Drain Inlet Protection.
- Refer to WM-8, Concrete Waste Management for disposal of concrete debris.
- Minimize the drift of dust and blast material as much as possible by keeping the blasting nozzle close to the surface.
- When blast residue contains a potentially hazardous waste, refer to WM-6, Hazardous Waste Management.

Education

- Educate employees, subcontractors, and suppliers on proper concrete finishing techniques to prevent contact with discharge as described herein.
- Arrange for the QSP or the appropriately trained contractor's superintendent or representative to oversee and enforce concrete finishing procedures.

Costs

These measures are generally of low cost.

Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities.
- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges occur.
- Sample non-stormwater discharges and stormwater runoff that contacts concrete dust and debris as required by the General Permit.

- Sweep or vacuum up debris from sandblasting at the end of each shift.
- At the end of each work shift, remove and contain liquid and solid waste from containment structures, if any, and from the general work area.
- Inspect containment structures for damage prior to use and prior to onset of forecasted rain.

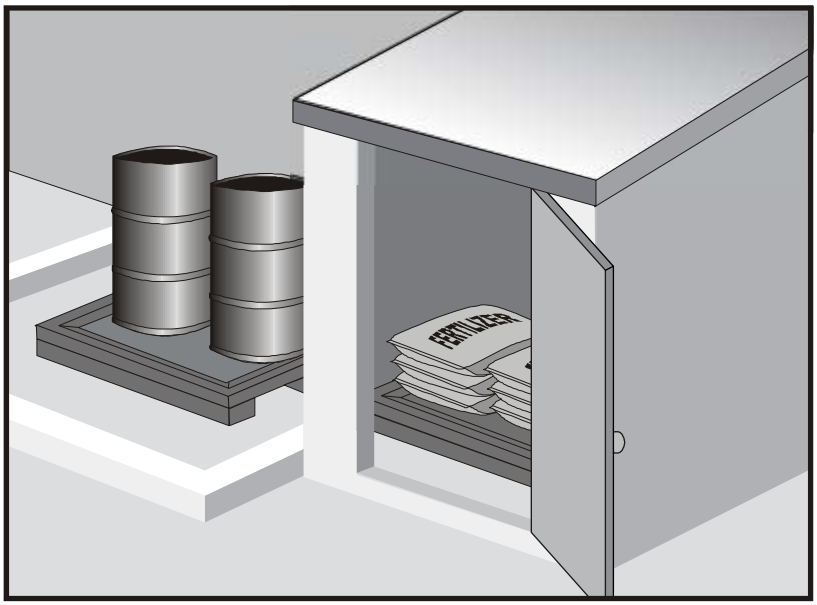
References

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

Material Delivery and Storage WM-1



Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	☑

Legend:

☑ **Primary Category**

☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

Description and Purpose

Prevent, reduce, or eliminate the discharge of pollutants from material delivery and storage to the stormwater system or watercourses by minimizing the storage of hazardous materials onsite, storing materials in watertight containers and/or a completely enclosed designated area, installing secondary containment, conducting regular inspections, and training employees and subcontractors.

This best management practice covers only material delivery and storage. For other information on materials, see WM-2, Material Use, or WM-4, Spill Prevention and Control. For information on wastes, see the waste management BMPs in this section.

Suitable Applications

These procedures are suitable for use at all construction sites with delivery and storage of the following materials:

- Soil stabilizers and binders
- Pesticides and herbicides
- Fertilizers
- Detergents
- Plaster
- Petroleum products such as fuel, oil, and grease

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- Asphalt and concrete components
- Hazardous chemicals such as acids, lime, glues, adhesives, paints, solvents, and curing compounds
- Concrete compounds
- Other materials that may be detrimental if released to the environment

Limitations

- Space limitation may preclude indoor storage.
- Storage sheds often must meet building and fire code requirements.

Implementation

The following steps should be taken to minimize risk:

- Chemicals must be stored in water tight containers with appropriate secondary containment or in a storage shed.
- When a material storage area is located on bare soil, the area should be lined and bermed.
- Use containment pallets or other practical and available solutions, such as storing materials within newly constructed buildings or garages, to meet material storage requirements.
- Stack erodible landscape material on pallets and cover when not in use.
- Contain all fertilizers and other landscape materials when not in use.
- Temporary storage areas should be located away from vehicular traffic.
- Material Safety Data Sheets (MSDS) should be available on-site for all materials stored that have the potential to effect water quality.
- Construction site areas should be designated for material delivery and storage.
- Material delivery and storage areas should be located away from waterways, if possible.
  - Avoid transport near drainage paths or waterways.
  - Surround with earth berms or other appropriate containment BMP. See EC-9, Earth Dikes and Drainage Swales.
  - Place in an area that will be paved.
- Storage of reactive, ignitable, or flammable liquids must comply with the fire codes of your area. Contact the local Fire Marshal to review site materials, quantities, and proposed storage area to determine specific requirements. See the Flammable and Combustible Liquid Code, NFPA30.
- An up to date inventory of materials delivered and stored onsite should be kept.

- Hazardous materials storage onsite should be minimized.
- Hazardous materials should be handled as infrequently as possible.
- Keep ample spill cleanup supplies appropriate for the materials being stored. Ensure that cleanup supplies are in a conspicuous, labeled area.
- Employees and subcontractors should be trained on the proper material delivery and storage practices.
- Employees trained in emergency spill cleanup procedures must be present when dangerous materials or liquid chemicals are unloaded.
- If significant residual materials remain on the ground after construction is complete, properly remove and dispose of materials and any contaminated soil. See WM-7, Contaminated Soil Management. If the area is to be paved, pave as soon as materials are removed to stabilize the soil.

Material Storage Areas and Practices

- Liquids, petroleum products, and substances listed in 40 CFR Parts 110, 117, or 302 should be stored in approved containers and drums and should not be overfilled. Containers and drums should be placed in temporary containment facilities for storage.
- A temporary containment facility should provide for a spill containment volume able to contain precipitation from a 25 year storm event, plus the greater of 10% of the aggregate volume of all containers or 100% of the capacity of the largest container within its boundary, whichever is greater.
- A temporary containment facility should be impervious to the materials stored therein for a minimum contact time of 72 hours.
- A temporary containment facility should be maintained free of accumulated rainwater and spills. In the event of spills or leaks, accumulated rainwater and spills should be collected and placed into drums. These liquids should be handled as a hazardous waste unless testing determines them to be non-hazardous. All collected liquids or non-hazardous liquids should be sent to an approved disposal site.
- Sufficient separation should be provided between stored containers to allow for spill cleanup and emergency response access.
- Incompatible materials, such as chlorine and ammonia, should not be stored in the same temporary containment facility.
- Materials should be covered prior to, and during rain events.
- Materials should be stored in their original containers and the original product labels should be maintained in place in a legible condition. Damaged or otherwise illegible labels should be replaced immediately.

- Bagged and boxed materials should be stored on pallets and should not be allowed to accumulate on the ground. To provide protection from wind and rain throughout the rainy season, bagged and boxed materials should be covered during non-working days and prior to and during rain events.
- Stockpiles should be protected in accordance with WM-3, Stockpile Management.
- Materials should be stored indoors within existing structures or completely enclosed storage sheds when available.
- Proper storage instructions should be posted at all times in an open and conspicuous location.
- An ample supply of appropriate spill clean up material should be kept near storage areas.
- Also see WM-6, Hazardous Waste Management, for storing of hazardous wastes.

Material Delivery Practices

- Keep an accurate, up-to-date inventory of material delivered and stored onsite.
- Arrange for employees trained in emergency spill cleanup procedures to be present when dangerous materials or liquid chemicals are unloaded.

Spill Cleanup

- Contain and clean up any spill immediately.
- Properly remove and dispose of any hazardous materials or contaminated soil if significant residual materials remain on the ground after construction is complete. See WM-7, Contaminated Soil Management.
- See WM-4, Spill Prevention and Control, for spills of chemicals and/or hazardous materials.
- If spills or leaks of materials occur that are not contained and could discharge to surface waters, non-visible sampling of site discharge may be required. Refer to the General Permit or to your project specific Construction Site Monitoring Plan to determine if and where sampling is required.

Cost

- The largest cost of implementation may be in the construction of a materials storage area that is covered and provides secondary containment.

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Keep storage areas clean and well organized, including a current list of all materials onsite.
- Inspect labels on containers for legibility and accuracy.

- Repair or replace perimeter controls, containment structures, covers, and liners as needed to maintain proper function.

References

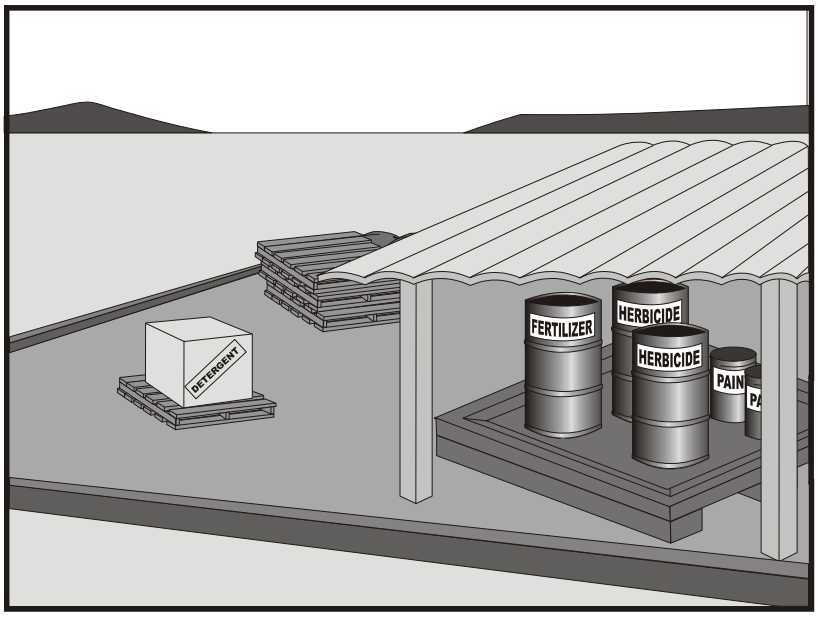
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Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance, Working Group Working Paper; USEPA, April 1992.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.

Material Use WM-2



Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	☑

Legend:
☑ **Primary Category**
☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

Description and Purpose

Prevent or reduce the discharge of pollutants to the storm drain system or watercourses from material use by using alternative products, minimizing hazardous material use onsite, and training employees and subcontractors.

Suitable Applications

This BMP is suitable for use at all construction projects. These procedures apply when the following materials are used or prepared onsite:

- Pesticides and herbicides
- Fertilizers
- Detergents
- Petroleum products such as fuel, oil, and grease
- Asphalt and other concrete components
- Other hazardous chemicals such as acids, lime, glues, adhesives, paints, solvents, and curing compounds
- Other materials that may be detrimental if released to the environment

Limitations

Safer alternative building and construction products may not be available or suitable in every instance.

Implementation

The following steps should be taken to minimize risk:

- Minimize use of hazardous materials onsite.
- Follow manufacturer instructions regarding uses, protective equipment, ventilation, flammability, and mixing of chemicals.
- Train personnel who use pesticides. The California Department of Pesticide Regulation and county agricultural commissioners license pesticide dealers, certify pesticide applicators, and conduct onsite inspections.
- The preferred method of termiticide application is soil injection near the existing or proposed structure foundation/slab; however, if not feasible, soil drench application of termiticides should follow EPA label guidelines and the following recommendations (most of which are applicable to most pesticide applications):
  - Do not treat soil that is water-saturated or frozen.
  - Application shall not commence within 24-hours of a predicted precipitation event with a 40% or greater probability. Weather tracking must be performed on a daily basis prior to termiticide application and during the period of termiticide application.
  - Do not allow treatment chemicals to runoff from the target area. Apply proper quantity to prevent excess runoff. Provide containment for and divert stormwater from application areas using berms or diversion ditches during application.
  - Dry season: Do not apply within 10 feet of storm drains. Do not apply within 25 feet of aquatic habitats (such as, but not limited to, lakes; reservoirs; rivers; permanent streams; marshes or ponds; estuaries; and commercial fish farm ponds).
  - Wet season: Do not apply within 50 feet of storm drains or aquatic habitats (such as, but not limited to, lakes; reservoirs; rivers; permanent streams; marshes or ponds; estuaries; and commercial fish farm ponds) unless a vegetative buffer is present (if so, refer to dry season requirements).
  - Do not make on-grade applications when sustained wind speeds are above 10 mph (at application site) at nozzle end height.
  - Cover treatment site prior to a rain event in order to prevent run-off of the pesticide into non-target areas. The treated area should be limited to a size that can be backfilled and/or covered by the end of the work shift. Backfilling or covering of the treated area shall be done by the end of the same work shift in which the application is made.
  - The applicator must either cover the soil him/herself or provide written notification of the above requirement to the contractor on site and to the person commissioning the

application (if different than the contractor). If notice is provided to the contractor or the person commissioning the application, then they are responsible under the Federal Insecticide Fungicide, and Rodenticide Act (FIFRA) to ensure that: 1) if the concrete slab cannot be poured over the treated soil within 24 hours of application, the treated soil is covered with a waterproof covering (such as polyethylene sheeting), and 2) the treated soil is covered if precipitation is predicted to occur before the concrete slab is scheduled to be poured.

- Do not over-apply fertilizers, herbicides, and pesticides. Prepare only the amount needed. Follow the recommended usage instructions. Over-application is expensive and environmentally harmful. Unless on steep slopes, till fertilizers into the soil rather than hydraulic application. Apply surface dressings in several smaller applications, as opposed to one large application, to allow time for infiltration and to avoid excess material being carried offsite by runoff. Do not apply these chemicals before predicted rainfall.
- Train employees and subcontractors in proper material use.
- Supply Material Safety Data Sheets (MSDS) for all materials.
- Dispose of latex paint and paint cans, used brushes, rags, absorbent materials, and drop cloths, when thoroughly dry and are no longer hazardous, with other construction debris.
- Do not remove the original product label; it contains important safety and disposal information. Use the entire product before disposing of the container.
- Mix paint indoors or in a containment area. Never clean paintbrushes or rinse paint containers into a street, gutter, storm drain, or watercourse. Dispose of any paint thinners, residue, and sludge(s) that cannot be recycled, as hazardous waste.
- For water-based paint, clean brushes to the extent practicable, and rinse to a drain leading to a sanitary sewer where permitted, or contain for proper disposal off site. For oil-based paints, clean brushes to the extent practicable, and filter and reuse thinners and solvents.
- Use recycled and less hazardous products when practical. Recycle residual paints, solvents, non-treated lumber, and other materials.
- Use materials only where and when needed to complete the construction activity. Use safer alternative materials as much as possible. Reduce or eliminate use of hazardous materials onsite when practical.
- Document the location, time, chemicals applied, and applicator's name and qualifications.
- Keep an ample supply of spill clean up material near use areas. Train employees in spill clean up procedures.
- Avoid exposing applied materials to rainfall and runoff unless sufficient time has been allowed for them to dry.
- Discontinue use of erodible landscape material within 2 days prior to a forecasted rain event and materials should be covered and/or bermed.

- Provide containment for material use areas such as masons' areas or paint mixing/preparation areas to prevent materials/pollutants from entering stormwater.

Costs

All of the above are low cost measures.

Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities.
- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Ensure employees and subcontractors throughout the job are using appropriate practices.

References

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

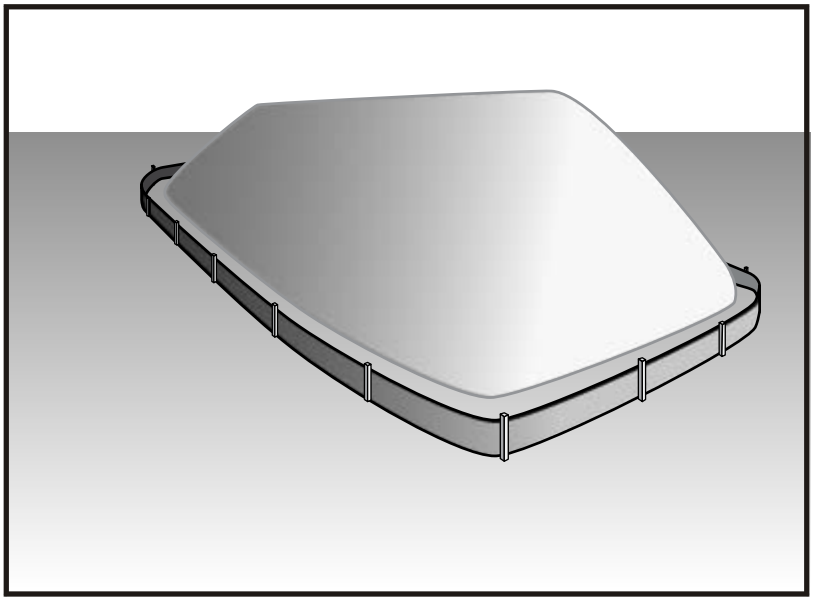
Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance, Working Group Working Paper; USEPA, April 1992.

Comments on Risk Assessments Risk Reduction Options for Cypermethrin: Docket No. OPP–2005–0293; California Stormwater Quality Association (CASQA) letter to USEPA, 2006.Environmental Hazard and General Labeling for Pyrethroid Non-Agricultural Outdoor Products, EPA-HQ-OPP-2008-0331-0021; USEPA, 2008.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.

Stockpile Management WM-3



Categories		
EC	Erosion Control	
SE	Sediment Control	☒
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☒
WM	Waste Management and Materials Pollution Control	☑

Legend:
☑ **Primary Category**
☒ **Secondary Category**

Targeted Constituents	
Sediment	☑
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

Description and Purpose

Stockpile management procedures and practices are designed to reduce or eliminate air and stormwater pollution from stockpiles of soil, soil amendments, sand, paving materials such as portland cement concrete (PCC) rubble, asphalt concrete (AC), asphalt concrete rubble, aggregate base, aggregate sub base or pre-mixed aggregate, asphalt minder (so called "cold mix" asphalt), and pressure treated wood.

Suitable Applications

Implement in all projects that stockpile soil and other loose materials.

Limitations

- Plastic sheeting as a stockpile protection is temporary and hard to manage in windy conditions. Where plastic is used, consider use of plastic tarps with nylon reinforcement which may be more durable than standard sheeting.
- Plastic sheeting can increase runoff volume due to lack of infiltration and potentially cause perimeter control failure.
- Plastic sheeting breaks down faster in sunlight.
- The use of Plastic materials and photodegradable plastics should be avoided.

Implementation

Protection of stockpiles is a year-round requirement. To properly manage stockpiles:

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- On larger sites, a minimum of 50 ft separation from concentrated flows of stormwater, drainage courses, and inlets is recommended.
- All stockpiles are required to be protected immediately if they are not scheduled to be used within 14 days.
- Protect all stockpiles from stormwater runon using temporary perimeter sediment barriers such as compost berms (SE-13), temporary silt dikes (SE-12), fiber rolls (SE-5), silt fences (SE-1), sandbags (SE-8), gravel bags (SE-6), or biofilter bags (SE-14). Refer to the individual fact sheet for each of these controls for installation information.
- Implement wind erosion control practices as appropriate on all stockpiled material. For specific information, see WE-1, Wind Erosion Control.
- Manage stockpiles of contaminated soil in accordance with WM-7, Contaminated Soil Management.
- Place bagged materials on pallets and under cover.
- Ensure that stockpile coverings are installed securely to protect from wind and rain.
- Some plastic covers withstand weather and sunlight better than others. Select cover materials or methods based on anticipated duration of use.

Protection of Non-Active Stockpiles

Non-active stockpiles of the identified materials should be protected further as follows:

Soil stockpiles

- Soil stockpiles should be covered or protected with soil stabilization measures and a temporary perimeter sediment barrier at all times.
- Temporary vegetation should be considered for topsoil piles that will be stockpiled for extended periods.

Stockpiles of Portland cement concrete rubble, asphalt concrete, asphalt concrete rubble, aggregate base, or aggregate sub base

- Stockpiles should be covered and protected with a temporary perimeter sediment barrier at all times.

Stockpiles of "cold mix"

- Cold mix stockpiles should be placed on and covered with plastic sheeting or comparable material at all times and surrounded by a berm.

Stockpiles of fly ash, stucco, hydrated lime

- Stockpiles of materials that may raise the pH of runoff (i.e., basic materials) should be covered with plastic and surrounded by a berm.

Stockpiles/Storage of wood (Pressure treated with chromated copper arsenate or ammoniacal copper zinc arsenate

- Treated wood should be covered with plastic sheeting or comparable material at all times and surrounded by a berm.

Protection of Active Stockpiles

Active stockpiles of the identified materials should be protected as follows:

- All stockpiles should be covered and protected with a temporary linear sediment barrier prior to the onset of precipitation.
- Stockpiles of "cold mix" and treated wood, and basic materials should be placed on and covered with plastic sheeting or comparable material and surrounded by a berm prior to the onset of precipitation.
- The downstream perimeter of an active stockpile should be protected with a linear sediment barrier or berm and runoff should be diverted around or away from the stockpile on the upstream perimeter.

Costs

For cost information associated with stockpile protection refer to the individual erosion or sediment control BMP fact sheet considered for implementation (For example, refer to SE-1 Silt Fence for installation of silt fence around the perimeter of a stockpile.)

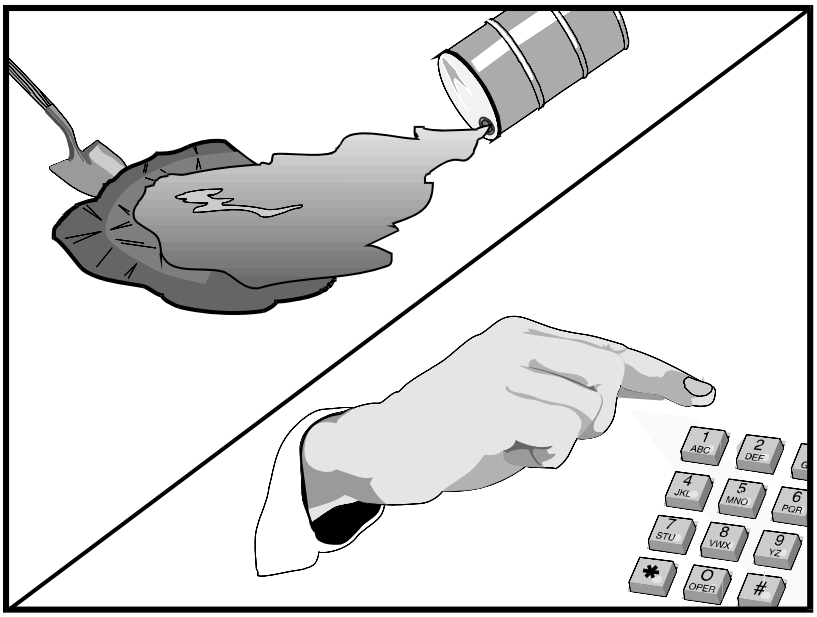
Inspection and Maintenance

- Stockpiles must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- It may be necessary to inspect stockpiles covered with plastic sheeting more frequently during certain conditions (for example, high winds or extreme heat).
- Repair and/or replace perimeter controls and covers as needed to keep them functioning properly.
- Sediment shall be removed when it reaches one-third of the barrier height.

References

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Spill Prevention and Control WM-4



Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	☑

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

Description and Purpose

Prevent or reduce the discharge of pollutants to drainage systems or watercourses from leaks and spills by reducing the chance for spills, stopping the source of spills, containing and cleaning up spills, properly disposing of spill materials, and training employees.

This best management practice covers only spill prevention and control. However, WM-1, Materials Delivery and Storage, and WM-2, Material Use, also contain useful information, particularly on spill prevention. For information on wastes, see the waste management BMPs in this section.

Suitable Applications

This BMP is suitable for all construction projects. Spill control procedures are implemented anytime chemicals or hazardous substances are stored on the construction site, including the following materials:

- Soil stabilizers/binders
- Dust palliatives
- Herbicides
- Growth inhibitors
- Fertilizers
- Deicing/anti-icing chemicals

- Fuels
- Lubricants
- Other petroleum distillates

Limitations

- In some cases it may be necessary to use a private spill cleanup company.
- This BMP applies to spills caused by the contractor and subcontractors.
- Procedures and practices presented in this BMP are general. Contractor should identify appropriate practices for the specific materials used or stored onsite

Implementation

The following steps will help reduce the stormwater impacts of leaks and spills:

Education

- Be aware that different materials pollute in different amounts. Make sure that each employee knows what a "significant spill" is for each material they use, and what is the appropriate response for "significant" and "insignificant" spills.
- Educate employees and subcontractors on potential dangers to humans and the environment from spills and leaks.
- Hold regular meetings to discuss and reinforce appropriate disposal procedures (incorporate into regular safety meetings).
- Establish a continuing education program to indoctrinate new employees.
- Have contractor's superintendent or representative oversee and enforce proper spill prevention and control measures.

General Measures

- To the extent that the work can be accomplished safely, spills of oil, petroleum products, substances listed under 40 CFR parts 110,117, and 302, and sanitary and septic wastes should be contained and cleaned up immediately.
- Store hazardous materials and wastes in covered containers and protect from vandalism.
- Place a stockpile of spill cleanup materials where it will be readily accessible.
- Train employees in spill prevention and cleanup.
- Designate responsible individuals to oversee and enforce control measures.
- Spills should be covered and protected from stormwater runon during rainfall to the extent that it doesn't compromise clean up activities.
- Do not bury or wash spills with water.

- Store and dispose of used clean up materials, contaminated materials, and recovered spill material that is no longer suitable for the intended purpose in conformance with the provisions in applicable BMPs.
- Do not allow water used for cleaning and decontamination to enter storm drains or watercourses. Collect and dispose of contaminated water in accordance with WM-10, Liquid Waste Management.
- Contain water overflow or minor water spillage and do not allow it to discharge into drainage facilities or watercourses.
- Place proper storage, cleanup, and spill reporting instructions for hazardous materials stored or used on the project site in an open, conspicuous, and accessible location.
- Keep waste storage areas clean, well organized, and equipped with ample cleanup supplies as appropriate for the materials being stored. Perimeter controls, containment structures, covers, and liners should be repaired or replaced as needed to maintain proper function.

Cleanup

- Clean up leaks and spills immediately.
- Use a rag for small spills on paved surfaces, a damp mop for general cleanup, and absorbent material for larger spills. If the spilled material is hazardous, then the used cleanup materials are also hazardous and must be sent to either a certified laundry (rags) or disposed of as hazardous waste.
- Never hose down or bury dry material spills. Clean up as much of the material as possible and dispose of properly. See the waste management BMPs in this section for specific information.

Minor Spills

- Minor spills typically involve small quantities of oil, gasoline, paint, etc. which can be controlled by the first responder at the discovery of the spill.
- Use absorbent materials on small spills rather than hosing down or burying the spill.
- Absorbent materials should be promptly removed and disposed of properly.
- Follow the practice below for a minor spill:
  - Contain the spread of the spill.
  - Recover spilled materials.
  - Clean the contaminated area and properly dispose of contaminated materials.

Semi-Significant Spills

- Semi-significant spills still can be controlled by the first responder along with the aid of other personnel such as laborers and the foreman, etc. This response may require the cessation of all other activities.

- Spills should be cleaned up immediately:
  - Contain spread of the spill.
  - Notify the project foreman immediately.
  - If the spill occurs on paved or impermeable surfaces, clean up using "dry" methods (absorbent materials, cat litter and/or rags). Contain the spill by encircling with absorbent materials and do not let the spill spread widely.
  - If the spill occurs in dirt areas, immediately contain the spill by constructing an earthen dike. Dig up and properly dispose of contaminated soil.
  - If the spill occurs during rain, cover spill with tarps or other material to prevent contaminating runoff.

Significant/Hazardous Spills

- For significant or hazardous spills that cannot be controlled by personnel in the immediate vicinity, the following steps should be taken:
  - Notify the local emergency response by dialing 911. In addition to 911, the contractor will notify the proper county officials. It is the contractor's responsibility to have all emergency phone numbers at the construction site.
  - Notify the Governor's Office of Emergency Services Warning Center, (916) 845-8911.
  - For spills of federal reportable quantities, in conformance with the requirements in 40 CFR parts 110,119, and 302, the contractor should notify the National Response Center at (800) 424-8802.
  - Notification should first be made by telephone and followed up with a written report.
  - The services of a spills contractor or a Haz-Mat team should be obtained immediately. Construction personnel should not attempt to clean up until the appropriate and qualified staffs have arrived at the job site.
  - Other agencies which may need to be consulted include, but are not limited to, the Fire Department, the Public Works Department, the Coast Guard, the Highway Patrol, the City/County Police Department, Department of Toxic Substances, California Division of Oil and Gas, Cal/OSHA, etc.

Reporting

- Report significant spills to local agencies, such as the Fire Department; they can assist in cleanup.
- Federal regulations require that any significant oil spill into a water body or onto an adjoining shoreline be reported to the National Response Center (NRC) at 800-424-8802 (24 hours).

Use the following measures related to specific activities:

Vehicle and Equipment Maintenance

- If maintenance must occur onsite, use a designated area and a secondary containment, located away from drainage courses, to prevent the runon of stormwater and the runoff of spills.
- Regularly inspect onsite vehicles and equipment for leaks and repair immediately
- Check incoming vehicles and equipment (including delivery trucks, and employee and subcontractor vehicles) for leaking oil and fluids. Do not allow leaking vehicles or equipment onsite.
- Always use secondary containment, such as a drain pan or drop cloth, to catch spills or leaks when removing or changing fluids.
- Place drip pans or absorbent materials under paving equipment when not in use.
- Use absorbent materials on small spills rather than hosing down or burying the spill. Remove the absorbent materials promptly and dispose of properly.
- Promptly transfer used fluids to the proper waste or recycling drums. Don't leave full drip pans or other open containers lying around
- Oil filters disposed of in trashcans or dumpsters can leak oil and pollute stormwater. Place the oil filter in a funnel over a waste oil-recycling drum to drain excess oil before disposal. Oil filters can also be recycled. Ask the oil supplier or recycler about recycling oil filters.
- Store cracked batteries in a non-leaking secondary container. Do this with all cracked batteries even if you think all the acid has drained out. If you drop a battery, treat it as if it is cracked. Put it into the containment area until you are sure it is not leaking.

Vehicle and Equipment Fueling

- If fueling must occur onsite, use designate areas, located away from drainage courses, to prevent the runon of stormwater and the runoff of spills.
- Discourage "topping off" of fuel tanks.
- Always use secondary containment, such as a drain pan, when fueling to catch spills/ leaks.

Costs

Prevention of leaks and spills is inexpensive. Treatment and/ or disposal of contaminated soil or water can be quite expensive.

Inspection and Maintenance

- Inspect and verify that activity–based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect weekly during the rainy season and of two-week intervals in the non-rainy season to verify continued BMP implementation.
- Inspect BMPs subject to non-stormwater discharge daily while non-stormwater discharges occur.

- Keep ample supplies of spill control and cleanup materials onsite, near storage, unloading, and maintenance areas.
- Update your spill prevention and control plan and stock cleanup materials as changes occur in the types of chemicals onsite.

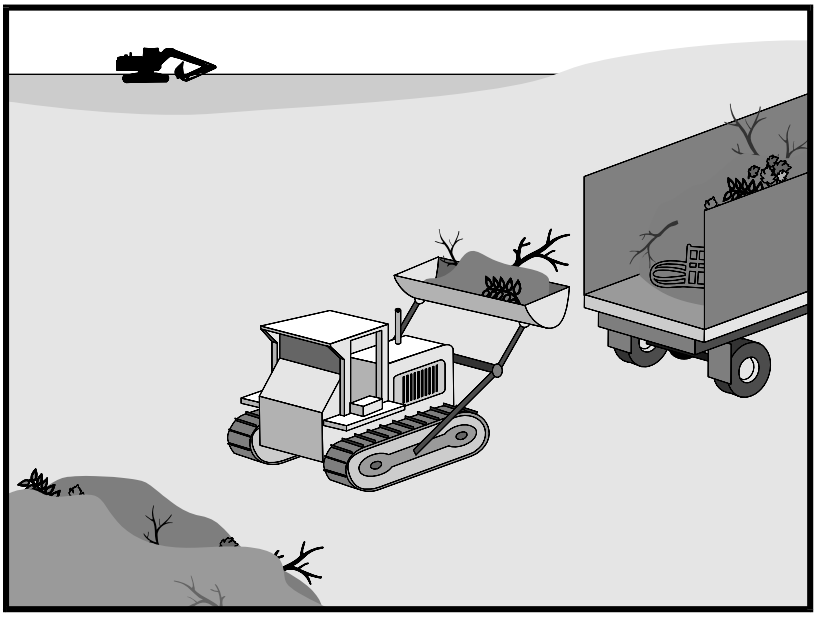
References

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.

Solid Waste Management WM-5



Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	☑

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

Description and Purpose

Solid waste management procedures and practices are designed to prevent or reduce the discharge of pollutants to stormwater from solid or construction waste by providing designated waste collection areas and containers, arranging for regular disposal, and training employees and subcontractors.

Suitable Applications

This BMP is suitable for construction sites where the following wastes are generated or stored:

- Solid waste generated from trees and shrubs removed during land clearing, demolition of existing structures (rubble), and building construction
- Packaging materials including wood, paper, and plastic
- Scrap or surplus building materials including scrap metals, rubber, plastic, glass pieces and masonry products
- Domestic wastes including food containers such as beverage cans, coffee cups, paper bags, plastic wrappers, and cigarettes
- Construction wastes including brick, mortar, timber, steel and metal scraps, pipe and electrical cuttings, non-hazardous equipment parts, styrofoam and other materials used to transport and package construction materials
- Highway planting wastes, including vegetative material,

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plant containers, and packaging materials

Limitations

Temporary stockpiling of certain construction wastes may not necessitate stringent drainage related controls during the non-rainy season or in desert areas with low rainfall.

Implementation

The following steps will help keep a clean site and reduce stormwater pollution:

- Select designated waste collection areas onsite.
- Inform trash-hauling contractors that you will accept only watertight dumpsters for onsite use. Inspect dumpsters for leaks and repair any dumpster that is not watertight.
- Locate containers in a covered area or in a secondary containment.
- Provide an adequate number of containers with lids or covers that can be placed over the container to keep rain out or to prevent loss of wastes when it is windy.
- Plan for additional containers and more frequent pickup during the demolition phase of construction.
- Collect site trash daily, especially during rainy and windy conditions.
- Remove this solid waste promptly since erosion and sediment control devices tend to collect litter.
- Make sure that toxic liquid wastes (used oils, solvents, and paints) and chemicals (acids, pesticides, additives, curing compounds) are not disposed of in dumpsters designated for construction debris.
- Do not hose out dumpsters on the construction site. Leave dumpster cleaning to the trash hauling contractor.
- Arrange for regular waste collection before containers overflow.
- Clean up immediately if a container does spill.
- Make sure that construction waste is collected, removed, and disposed of only at authorized disposal areas.

Education

- Have the contractor's superintendent or representative oversee and enforce proper solid waste management procedures and practices.
- Instruct employees and subcontractors on identification of solid waste and hazardous waste.
- Educate employees and subcontractors on solid waste storage and disposal procedures.
- Hold regular meetings to discuss and reinforce disposal procedures (incorporate into regular safety meetings).

- Require that employees and subcontractors follow solid waste handling and storage procedures.
- Prohibit littering by employees, subcontractors, and visitors.
- Minimize production of solid waste materials wherever possible.

Collection, Storage, and Disposal

- Littering on the project site should be prohibited.
- To prevent clogging of the storm drainage system, litter and debris removal from drainage grates, trash racks, and ditch lines should be a priority.
- Trash receptacles should be provided in the contractor's yard, field trailer areas, and at locations where workers congregate for lunch and break periods.
- Litter from work areas within the construction limits of the project site should be collected and placed in watertight dumpsters at least weekly, regardless of whether the litter was generated by the contractor, the public, or others. Collected litter and debris should not be placed in or next to drain inlets, stormwater drainage systems, or watercourses.
- Dumpsters of sufficient size and number should be provided to contain the solid waste generated by the project.
- Full dumpsters should be removed from the project site and the contents should be disposed of by the trash hauling contractor.
- Construction debris and waste should be removed from the site biweekly or more frequently as needed.
- Construction material visible to the public should be stored or stacked in an orderly manner.
- Stormwater runon should be prevented from contacting stored solid waste through the use of berms, dikes, or other temporary diversion structures or through the use of measures to elevate waste from site surfaces.
- Solid waste storage areas should be located at least 50 ft from drainage facilities and watercourses and should not be located in areas prone to flooding or ponding.
- Except during fair weather, construction and highway planting waste not stored in watertight dumpsters should be securely covered from wind and rain by covering the waste with tarps or plastic.
- Segregate potentially hazardous waste from non-hazardous construction site waste.
- Make sure that toxic liquid wastes (used oils, solvents, and paints) and chemicals (acids, pesticides, additives, curing compounds) are not disposed of in dumpsters designated for construction debris.
- For disposal of hazardous waste, see WM-6, Hazardous Waste Management. Have hazardous waste hauled to an appropriate disposal and/or recycling facility.

- Salvage or recycle useful vegetation debris, packaging and surplus building materials when practical. For example, trees and shrubs from land clearing can be used as a brush barrier, or converted into wood chips, then used as mulch on graded areas. Wood pallets, cardboard boxes, and construction scraps can also be recycled.

Costs

All of the above are low cost measures.

Inspection and Maintenance

- Inspect and verify that activity–based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect weekly during the rainy season and of two-week intervals in the non-rainy season to verify continued BMP implementation.
- Inspect BMPs subject to non-stormwater discharge daily while non-stormwater discharges occur
- Inspect construction waste area regularly.
- Arrange for regular waste collection.

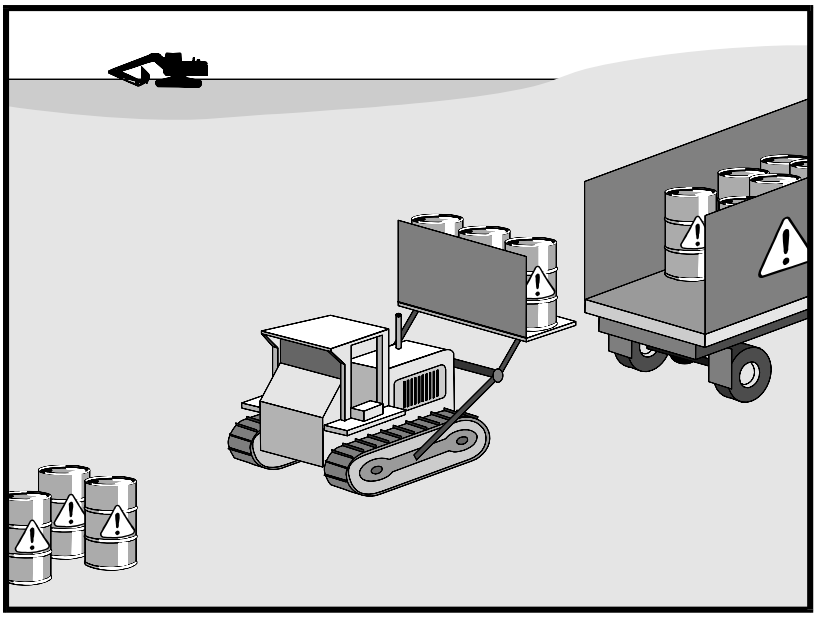
References

Processes, Procedures and Methods to Control Pollution Resulting from All Construction Activity, 430/9-73-007, USEPA, 1973.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.

Hazardous Waste Management WM-6



Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	☑

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	☑
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

Description and Purpose

Prevent or reduce the discharge of pollutants to stormwater from hazardous waste through proper material use, waste disposal, and training of employees and subcontractors.

Suitable Applications

This best management practice (BMP) applies to all construction projects. Hazardous waste management practices are implemented on construction projects that generate waste from the use of:

- Petroleum Products
- Asphalt Products
- Concrete Curing Compounds
- Pesticides
- Palliatives
- Acids
- Septic Wastes
- Paints
- Stains
- Solvents
- Wood Preservatives
- Roofing Tar
- Any materials deemed a hazardous waste in California, Title 22 Division 4.5, or listed in 40 CFR Parts 110, 117, 261, or 302

In addition, sites with existing structures may contain wastes, which must be disposed of in accordance with federal, state, and local regulations. These wastes include:

- Sandblasting grit mixed with lead-, cadmium-, or chromium-based paints
- Asbestos
- PCBs (particularly in older transformers)

Limitations

- Hazardous waste that cannot be reused or recycled must be disposed of by a licensed hazardous waste hauler.
- Nothing in this BMP relieves the contractor from responsibility for compliance with federal, state, and local laws regarding storage, handling, transportation, and disposal of hazardous wastes.
- This BMP does not cover aerially deposited lead (ADL) soils. For ADL soils refer to WM-7, Contaminated Soil Management.

Implementation

The following steps will help reduce stormwater pollution from hazardous wastes:

Material Use

- Wastes should be stored in sealed containers constructed of a suitable material and should be labeled as required by Title 22 CCR, Division 4.5 and 49 CFR Parts 172, 173, 178, and 179.
- All hazardous waste should be stored, transported, and disposed as required in Title 22 CCR, Division 4.5 and 49 CFR 261-263.
- Waste containers should be stored in temporary containment facilities that should comply with the following requirements:
  - Temporary containment facility should provide for a spill containment volume equal to 1.5 times the volume of all containers able to contain precipitation from a 25 year storm event, plus the greater of 10% of the aggregate volume of all containers or 100% of the capacity of the largest tank within its boundary, whichever is greater.
  - Temporary containment facility should be impervious to the materials stored there for a minimum contact time of 72 hours.
  - Temporary containment facilities should be maintained free of accumulated rainwater and spills. In the event of spills or leaks, accumulated rainwater and spills should be placed into drums after each rainfall. These liquids should be handled as a hazardous waste unless testing determines them to be non-hazardous. Non-hazardous liquids should be sent to an approved disposal site.
  - Sufficient separation should be provided between stored containers to allow for spill cleanup and emergency response access.

  - Incompatible materials, such as chlorine and ammonia, should not be stored in the same temporary containment facility.

  - Throughout the rainy season, temporary containment facilities should be covered during non-working days, and prior to rain events. Covered facilities may include use of plastic tarps for small facilities or constructed roofs with overhangs.

- Drums should not be overfilled and wastes should not be mixed.

- Unless watertight, containers of dry waste should be stored on pallets.

- Do not over-apply herbicides and pesticides. Prepare only the amount needed. Follow the recommended usage instructions. Over application is expensive and environmentally harmful. Apply surface dressings in several smaller applications, as opposed to one large application. Allow time for infiltration and avoid excess material being carried offsite by runoff. Do not apply these chemicals just before it rains. People applying pesticides must be certified in accordance with federal and state regulations.

- Paint brushes and equipment for water and oil based paints should be cleaned within a contained area and should not be allowed to contaminate site soils, watercourses, or drainage systems. Waste paints, thinners, solvents, residues, and sludges that cannot be recycled or reused should be disposed of as hazardous waste. When thoroughly dry, latex paint and paint cans, used brushes, rags, absorbent materials, and drop cloths should be disposed of as solid waste.

- Do not clean out brushes or rinse paint containers into the dirt, street, gutter, storm drain, or stream. "Paint out" brushes as much as possible. Rinse water-based paints to the sanitary sewer. Filter and reuse thinners and solvents. Dispose of excess oil-based paints and sludge as hazardous waste.

- The following actions should be taken with respect to temporary contaminant:

  - Ensure that adequate hazardous waste storage volume is available.

  - Ensure that hazardous waste collection containers are conveniently located.

  - Designate hazardous waste storage areas onsite away from storm drains or watercourses and away from moving vehicles and equipment to prevent accidental spills.

  - Minimize production or generation of hazardous materials and hazardous waste on the job site.

  - Use containment berms in fueling and maintenance areas and where the potential for spills is high.

  - Segregate potentially hazardous waste from non-hazardous construction site debris.

  - Keep liquid or semi-liquid hazardous waste in appropriate containers (closed drums or similar) and under cover.

- Clearly label all hazardous waste containers with the waste being stored and the date of accumulation.
- Place hazardous waste containers in secondary containment.
- Do not allow potentially hazardous waste materials to accumulate on the ground.
- Do not mix wastes.
- Use all of the product before disposing of the container.
- Do not remove the original product label; it contains important safety and disposal information.

Waste Recycling Disposal

- Select designated hazardous waste collection areas onsite.
- Hazardous materials and wastes should be stored in covered containers and protected from vandalism.
- Place hazardous waste containers in secondary containment.
- Do not mix wastes, this can cause chemical reactions, making recycling impossible and complicating disposal.
- Recycle any useful materials such as used oil or water-based paint.
- Make sure that toxic liquid wastes (used oils, solvents, and paints) and chemicals (acids, pesticides, additives, curing compounds) are not disposed of in dumpsters designated for construction debris.
- Arrange for regular waste collection before containers overflow.
- Make sure that hazardous waste (e.g., excess oil-based paint and sludge) is collected, removed, and disposed of only at authorized disposal areas.

Disposal Procedures

- Waste should be disposed of by a licensed hazardous waste transporter at an authorized and licensed disposal facility or recycling facility utilizing properly completed Uniform Hazardous Waste Manifest forms.
- A Department of Health Services certified laboratory should sample waste to determine the appropriate disposal facility.
- Properly dispose of rainwater in secondary containment that may have mixed with hazardous waste.
- Attention is directed to "Hazardous Material", "Contaminated Material", and "Aerially Deposited Lead" of the contract documents regarding the handling and disposal of hazardous materials.

Education

- Educate employees and subcontractors on hazardous waste storage and disposal procedures.
- Educate employees and subcontractors on potential dangers to humans and the environment from hazardous wastes.
- Instruct employees and subcontractors on safety procedures for common construction site hazardous wastes.
- Instruct employees and subcontractors in identification of hazardous and solid waste.
- Hold regular meetings to discuss and reinforce hazardous waste management procedures (incorporate into regular safety meetings).
- The contractor's superintendent or representative should oversee and enforce proper hazardous waste management procedures and practices.
- Make sure that hazardous waste is collected, removed, and disposed of only at authorized disposal areas.
- Warning signs should be placed in areas recently treated with chemicals.
- Place a stockpile of spill cleanup materials where it will be readily accessible.
- If a container does spill, clean up immediately.

Costs

All of the above are low cost measures.

Inspection and Maintenance

- Inspect and verify that activity–based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect weekly during the rainy season and of two week intervals in the non-rainy season to verify continued BMP implementation.
- Inspect BMPs subject to non-stormwater discharge daily while non-stormwater discharges occur
- Hazardous waste should be regularly collected.
- A foreman or construction supervisor should monitor onsite hazardous waste storage and disposal procedures.
- Waste storage areas should be kept clean, well organized, and equipped with ample cleanup supplies as appropriate for the materials being stored.
- Perimeter controls, containment structures, covers, and liners should be repaired or replaced as needed to maintain proper function.
- Hazardous spills should be cleaned up and reported in conformance with the applicable Material Safety Data Sheet (MSDS) and the instructions posted at the project site.

- The National Response Center, at (800) 424-8802, should be notified of spills of federal reportable quantities in conformance with the requirements in 40 CFR parts 110, 117, and 302. Also notify the Governors Office of Emergency Services Warning Center at (916) 845-8911.

- A copy of the hazardous waste manifests should be provided.

References

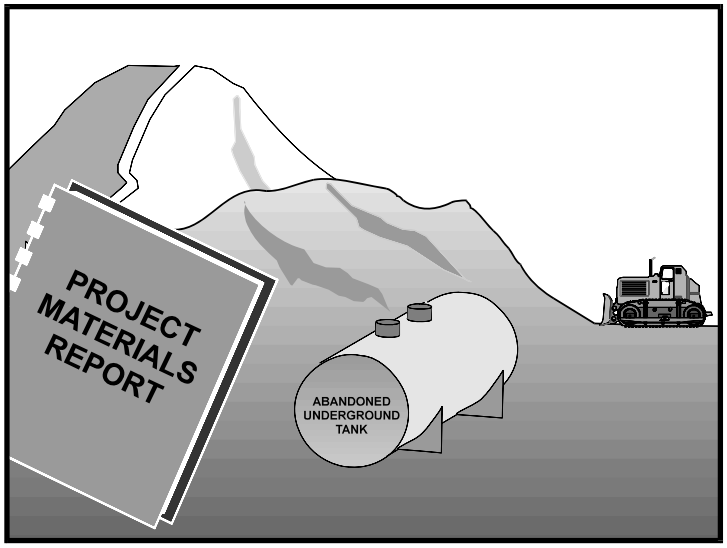
Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Processes, Procedures and Methods to Control Pollution Resulting from All Construction Activity, 430/9-73-007, USEPA, 1973.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.

Contaminated Soil Management WM-7



Categories		
EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	☑

Legend:
☑ **Primary Objective**
☒ **Secondary Objective**

Description and Purpose

Prevent or reduce the discharge of pollutants to stormwater from contaminated soil and highly acidic or alkaline soils by conducting pre-construction surveys, inspecting excavations regularly, and remediating contaminated soil promptly.

Suitable Applications

Contaminated soil management is implemented on construction projects in highly urbanized or industrial areas where soil contamination may have occurred due to spills, illicit discharges, aerial deposition, past use and leaks from underground storage tanks.

Limitations

Contaminated soils that cannot be treated onsite must be disposed of offsite by a licensed hazardous waste hauler. The presence of contaminated soil may indicate contaminated water as well. See NS-2, Dewatering Operations, for more information.

The procedures and practices presented in this BMP are general. The contractor should identify appropriate practices and procedures for the specific contaminants known to exist or discovered onsite.

Implementation

Most owners and developers conduct pre-construction environmental assessments as a matter of routine. Contaminated soils are often identified during project planning and development with known locations identified in the plans, specifications and in the SWPPP. The contractor should review applicable reports and investigate appropriate call-outs in the

Targeted Constituents	
Sediment	
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	☑
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

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plans, specifications, and SWPPP. Recent court rulings holding contractors liable for cleanup costs when they unknowingly move contaminated soil highlight the need for contractors to confirm a site assessment is completed before earth moving begins.

The following steps will help reduce stormwater pollution from contaminated soil:

- Conduct thorough, pre-construction inspections of the site and review documents related to the site. If inspection or reviews indicated presence of contaminated soils, develop a plan before starting work.
- Look for contaminated soil as evidenced by discoloration, odors, differences in soil properties, abandoned underground tanks or pipes, or buried debris.
- Prevent leaks and spills. Contaminated soil can be expensive to treat and dispose of properly. However, addressing the problem before construction is much less expensive than after the structures are in place.
- The contractor may further identify contaminated soils by investigating:
  - Past site uses and activities
  - Detected or undetected spills and leaks
  - Acid or alkaline solutions from exposed soil or rock formations high in acid or alkaline forming elements
  - Contaminated soil as evidenced by discoloration, odors, differences in soil properties, abandoned underground tanks or pipes, or buried debris.
  - Suspected soils should be tested at a certified laboratory.

Education

- Have employees and subcontractors complete a safety training program which meets 29 CFR 1910.120 and 8 CCR 5192 covering the potential hazards as identified, prior to performing any excavation work at the locations containing material classified as hazardous.
- Educate employees and subcontractors in identification of contaminated soil and on contaminated soil handling and disposal procedures.
- Hold regular meetings to discuss and reinforce disposal procedures (incorporate into regular safety meetings).

Handling Procedures for Material with Aerially Deposited Lead (ADL)

- Materials from areas designated as containing (ADL) may, if allowed by the contract special provisions, be excavated, transported, and used in the construction of embankments and/or backfill.
- Excavation, transportation, and placement operations should result in no visible dust.
- Caution should be exercised to prevent spillage of lead containing material during transport.

- Quality should be monitored during excavation of soils contaminated with lead.

Handling Procedures for Contaminated Soils

- Minimize onsite storage. Contaminated soil should be disposed of properly in accordance with all applicable regulations. All hazardous waste storage will comply with the requirements in Title 22, CCR, Sections 66265.250 to 66265.260.
- Test suspected soils at an approved certified laboratory.
- Work with the local regulatory agencies to develop options for treatment or disposal if the soil is contaminated.
- Avoid temporary stockpiling of contaminated soils or hazardous material.
- Take the following precautions if temporary stockpiling is necessary:
  - Cover the stockpile with plastic sheeting or tarps.
  - Install a berm around the stockpile to prevent runoff from leaving the area.
  - Do not stockpile in or near storm drains or watercourses.
- Remove contaminated material and hazardous material on exteriors of transport vehicles and place either into the current transport vehicle or into the excavation prior to the vehicle leaving the exclusion zone.
- Monitor the air quality continuously during excavation operations at all locations containing hazardous material.
- Procure all permits and licenses, pay all charges and fees, and give all notices necessary and incident to the due and lawful prosecution of the work, including registration for transporting vehicles carrying the contaminated material and the hazardous material.
- Collect water from decontamination procedures and treat or dispose of it at an appropriate disposal site.
- Collect non-reusable protective equipment, once used by any personnel, and dispose of at an appropriate disposal site.
- Install temporary security fence to surround and secure the exclusion zone. Remove fencing when no longer needed.
- Excavate, transport, and dispose of contaminated material and hazardous material in accordance with the rules and regulations of the following agencies (the specifications of these agencies supersede the procedures outlined in this BMP):
  - United States Department of Transportation (USDOT)
  - United States Environmental Protection Agency (USEPA)
  - California Environmental Protection Agency (CAL-EPA)

- California Division of Occupation Safety and Health Administration (CAL-OSHA)
- Local regulatory agencies

Procedures for Underground Storage Tank Removals

- Prior to commencing tank removal operations, obtain the required underground storage tank removal permits and approval from the federal, state, and local agencies that have jurisdiction over such work.
- To determine if it contains hazardous substances, arrange to have tested, any liquid or sludge found in the underground tank prior to its removal.
- Following the tank removal, take soil samples beneath the excavated tank and perform analysis as required by the local agency representative(s).
- The underground storage tank, any liquid or sludge found within the tank, and all contaminated substances and hazardous substances removed during the tank removal and transported to disposal facilities permitted to accept such waste.

Water Control

- All necessary precautions and preventive measures should be taken to prevent the flow of water, including ground water, from mixing with hazardous substances or underground storage tank excavations. Such preventative measures may consist of, but are not limited to, berms, cofferdams, grout curtains, freeze walls, and seal course concrete or any combination thereof.
- If water does enter an excavation and becomes contaminated, such water, when necessary to proceed with the work, should be discharged to clean, closed top, watertight transportable holding tanks, treated, and disposed of in accordance with federal, state, and local laws.

Costs

Prevention of leaks and spills is inexpensive. Treatment or disposal of contaminated soil can be quite expensive.

Inspection and Maintenance

- Inspect and verify that activity–based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect weekly during the rainy season and of two-week intervals in the non-rainy season to verify continued BMP implementation.
- Arrange for contractor's Water Pollution Control Manager, foreman, and/or construction supervisor to monitor onsite contaminated soil storage and disposal procedures.
- Monitor air quality continuously during excavation operations at all locations containing hazardous material.
- Coordinate contaminated soils and hazardous substances/waste management with the appropriate federal, state, and local agencies.

- Implement WM-4, Spill Prevention and Control, to prevent leaks and spills as much as possible.

References

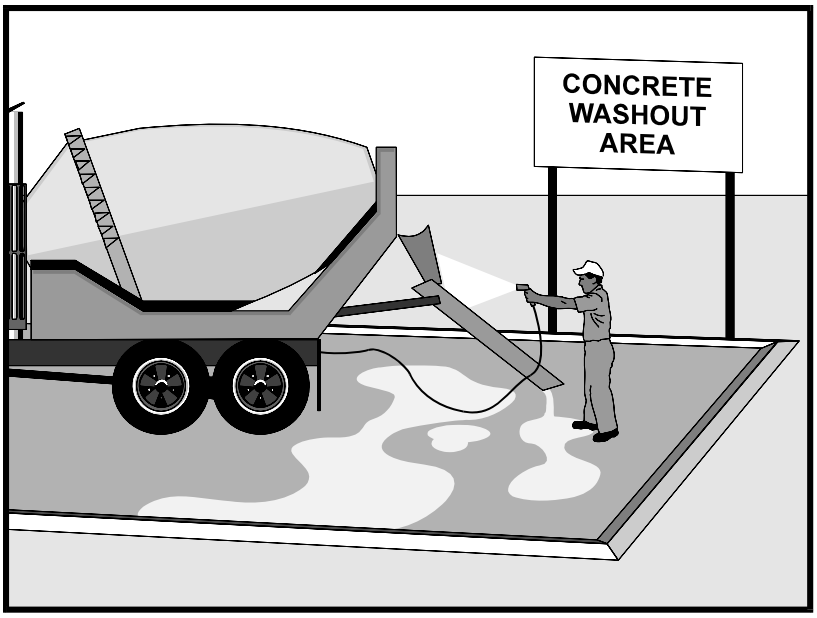
Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Processes, Procedures and Methods to Control Pollution Resulting from All Construction Activity, 430/9-73-007, USEPA, 1973.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.

Concrete Waste Management WM-8



Categories		
EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☒
WM	Waste Management and Materials Pollution Control	☑

Legend:
☑ **Primary Category**
☒ **Secondary Category**

Targeted Constituents	
Sediment	☑
Nutrients	
Trash	
Metals	☑
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

Description and Purpose

Prevent the discharge of pollutants to stormwater from concrete waste by conducting washout onsite or offsite in a designated area, and by employee and subcontractor training.

The General Permit incorporates Numeric Effluent Limits (NEL) and Numeric Action Levels (NAL) for pH (see Section 2 of this handbook to determine your project's risk level and if you are subject to these requirements).

Many types of construction materials, including mortar, concrete, stucco, cement and block and their associated wastes have basic chemical properties that can raise pH levels outside of the permitted range. Additional care should be taken when managing these materials to prevent them from coming into contact with stormwater flows and raising pH to levels outside the accepted range.

Suitable Applications

Concrete waste management procedures and practices are implemented on construction projects where:

- Concrete is used as a construction material or where concrete dust and debris result from demolition activities.
- Slurries containing portland cement concrete (PCC) are generated, such as from saw cutting, coring, grinding, grooving, and hydro-concrete demolition.

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- Concrete trucks and other concrete-coated equipment are washed onsite.
- Mortar-mixing stations exist.
- Stucco mixing and spraying .
- See also NS-8, Vehicle and Equipment Cleaning.

Limitations

- Offsite washout of concrete wastes may not always be possible.
- Multiple washouts may be needed to assure adequate capacity and to allow for evaporation.

Implementation

The following steps will help reduce stormwater pollution from concrete wastes:

- Incorporate requirements for concrete waste management into material supplier and subcontractor agreements.
- Store dry and wet materials under cover, away from drainage areas. Refer to WM-1, Material Delivery and Storage for more information.
- Avoid mixing excess amounts of concrete.
- Perform washout of concrete trucks in designated areas only, where washout will not reach stormwater.
- Do not wash out concrete trucks into storm drains, open ditches, streets, streams or onto the ground. Trucks should always be washed out into designated facilities.
- Do not allow excess concrete to be dumped onsite, except in designated areas.
- For onsite washout:
  - On larger sites, it is recommended to locate washout areas at least 50 feet from storm drains, open ditches, or water bodies. Do not allow runoff from this area by constructing a temporary pit or bermed area large enough for liquid and solid waste.
  - Washout wastes into the temporary washout where the concrete can set, be broken up, and then disposed properly.
  - Washout should be lined so there is no discharge into the underlying soil.
- Do not wash sweepings from exposed aggregate concrete into the street or storm drain. Collect and return sweepings to aggregate base stockpile or dispose in the trash.
- See typical concrete washout installation details at the end of this fact sheet.

Education

- Educate employees, subcontractors, and suppliers on the concrete waste management techniques described herein.

- Arrange for contractor's superintendent or representative to oversee and enforce concrete waste management procedures.
- Discuss the concrete management techniques described in this BMP (such as handling of concrete waste and washout) with the ready-mix concrete supplier before any deliveries are made.

Concrete Demolition Wastes

- Stockpile concrete demolition waste in accordance with BMP WM-3, Stockpile Management.
- Dispose of or recycle hardened concrete waste in accordance with applicable federal, state or local regulations.

Concrete Slurry Wastes

- PCC and AC waste should not be allowed to enter storm drains or watercourses.
- PCC and AC waste should be collected and disposed of or placed in a temporary concrete washout facility (as described in Onsite Temporary Concrete Washout Facility, Concrete Transit Truck Washout Procedures, below).
- A foreman or construction supervisor should monitor onsite concrete working tasks, such as saw cutting, coring, grinding and grooving to ensure proper methods are implemented.
- Saw-cut concrete slurry should not be allowed to enter storm drains or watercourses. Residue from grinding operations should be picked up by means of a vacuum attachment to the grinding machine or by sweeping. Saw cutting residue should not be allowed to flow across the pavement and should not be left on the surface of the pavement. See also NS-3, Paving and Grinding Operations; and WM-10, Liquid Waste Management.
- Concrete slurry residue should be disposed in a temporary washout facility (as described in Onsite Temporary Concrete Washout Facility, Concrete Transit Truck Washout Procedures, below) and allowed to dry. Dispose of dry slurry residue in accordance with WM-5, Solid Waste Management.

Onsite Temporary Concrete Washout Facility, Transit Truck Washout Procedures

- Temporary concrete washout facilities should be located a minimum of 50 ft from storm drain inlets, open drainage facilities, and watercourses. Each facility should be located away from construction traffic or access areas to prevent disturbance or tracking.
- A sign should be installed adjacent to each washout facility to inform concrete equipment operators to utilize the proper facilities.
- Temporary concrete washout facilities should be constructed above grade or below grade at the option of the contractor. Temporary concrete washout facilities should be constructed and maintained in sufficient quantity and size to contain all liquid and concrete waste generated by washout operations.

- Temporary washout facilities should have a temporary pit or bermed areas of sufficient volume to completely contain all liquid and waste concrete materials generated during washout procedures.
- Temporary washout facilities should be lined to prevent discharge to the underlying ground or surrounding area.
- Washout of concrete trucks should be performed in designated areas only.
- Only concrete from mixer truck chutes should be washed into concrete wash out.
- Concrete washout from concrete pumper bins can be washed into concrete pumper trucks and discharged into designated washout area or properly disposed of or recycled offsite.
- Once concrete wastes are washed into the designated area and allowed to harden, the concrete should be broken up, removed, and disposed of per WM-5, Solid Waste Management. Dispose of or recycle hardened concrete on a regular basis.
- Temporary Concrete Washout Facility (Type Above Grade)
  - Temporary concrete washout facility (type above grade) should be constructed as shown on the details at the end of this BMP, with a recommended minimum length and minimum width of 10 ft; however, smaller sites or jobs may only need a smaller washout facility. With any washout, always maintain a sufficient quantity and volume to contain all liquid and concrete waste generated by washout operations.
  - Materials used to construct the washout area should conform to the provisions detailed in their respective BMPs (e.g., SE-8 Sandbag Barrier).
  - Plastic lining material should be a minimum of 10 mil in polyethylene sheeting and should be free of holes, tears, or other defects that compromise the impermeability of the material.
  - Alternatively, portable removable containers can be used as above grade concrete washouts. Also called a “roll-off”; this concrete washout facility should be properly sealed to prevent leakage, and should be removed from the site and replaced when the container reaches 75% capacity.
- Temporary Concrete Washout Facility (Type Below Grade)
  - Temporary concrete washout facilities (type below grade) should be constructed as shown on the details at the end of this BMP, with a recommended minimum length and minimum width of 10 ft. The quantity and volume should be sufficient to contain all liquid and concrete waste generated by washout operations.
  - Lath and flagging should be commercial type.
  - Plastic lining material should be a minimum of 10 mil polyethylene sheeting and should be free of holes, tears, or other defects that compromise the impermeability of the material.

- The base of a washout facility should be free of rock or debris that may damage a plastic liner.

Removal of Temporary Concrete Washout Facilities

- When temporary concrete washout facilities are no longer required for the work, the hardened concrete should be removed and properly disposed or recycled in accordance with federal, state or local regulations. Materials used to construct temporary concrete washout facilities should be removed from the site of the work and properly disposed or recycled in accordance with federal, state or local regulations..

- Holes, depressions or other ground disturbance caused by the removal of the temporary concrete washout facilities should be backfilled and repaired.

Costs

All of the above are low cost measures. Roll-0ff concrete washout facilities can be more costly than other measures due to removal and replacement; however, provide a cleaner alternative to traditional washouts. The type of washout facility, size, and availability of materials will determine the cost of the washout.

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.

- Temporary concrete washout facilities should be maintained to provide adequate holding capacity with a minimum freeboard of 4 in. for above grade facilities and 12 in. for below grade facilities. Maintaining temporary concrete washout facilities should include removing and disposing of hardened concrete and returning the facilities to a functional condition. Hardened concrete materials should be removed and properly disposed or recycled in accordance with federal, state or local regulations.

- Washout facilities must be cleaned, or new facilities must be constructed and ready for use once the washout is 75% full.

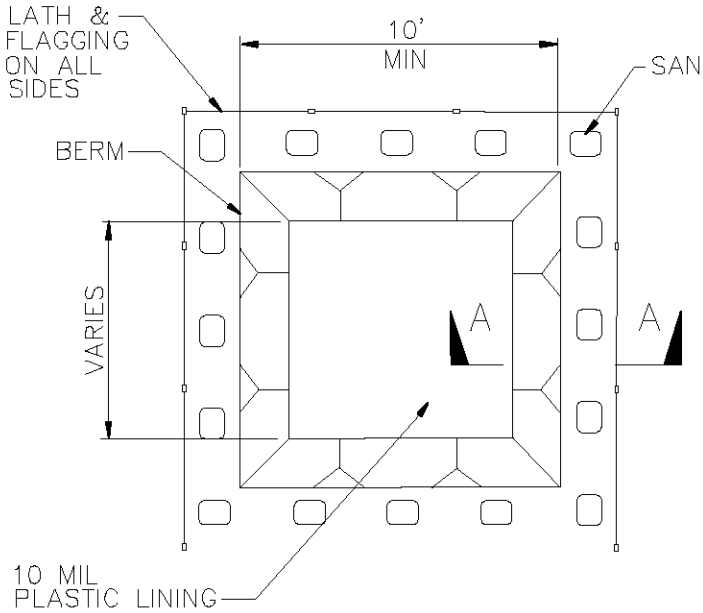
- Inspect washout facilities for damage (e.g. torn liner, evidence of leaks, signage, etc.). Repair all identified damage.

References

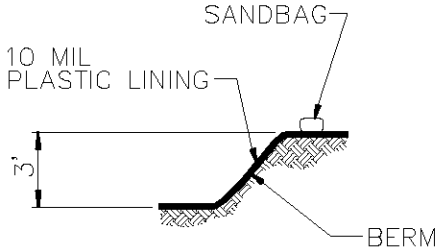
Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000, Updated March 2003.

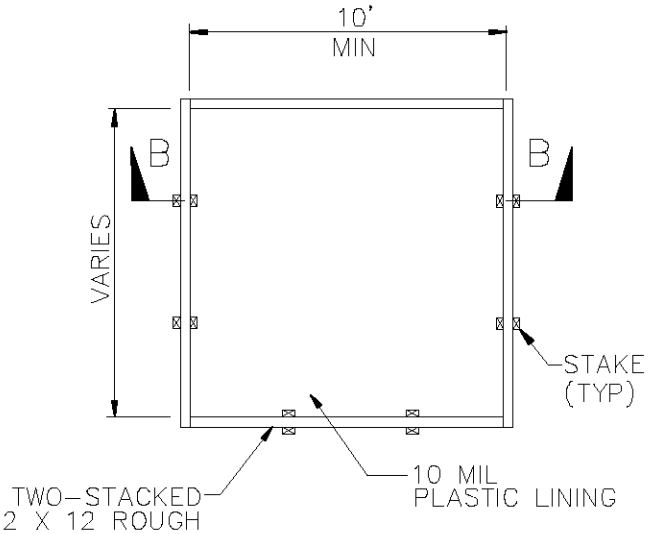
Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.



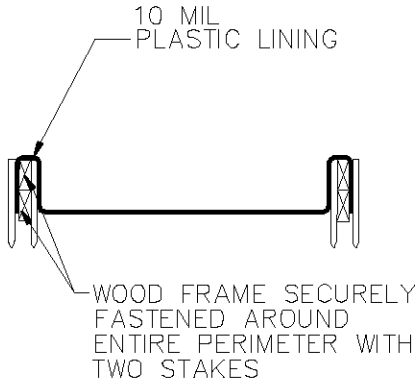
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NOT TO SCALE
TYPE "BELOW GRADE"



SECTION A–A
NOT TO SCALE



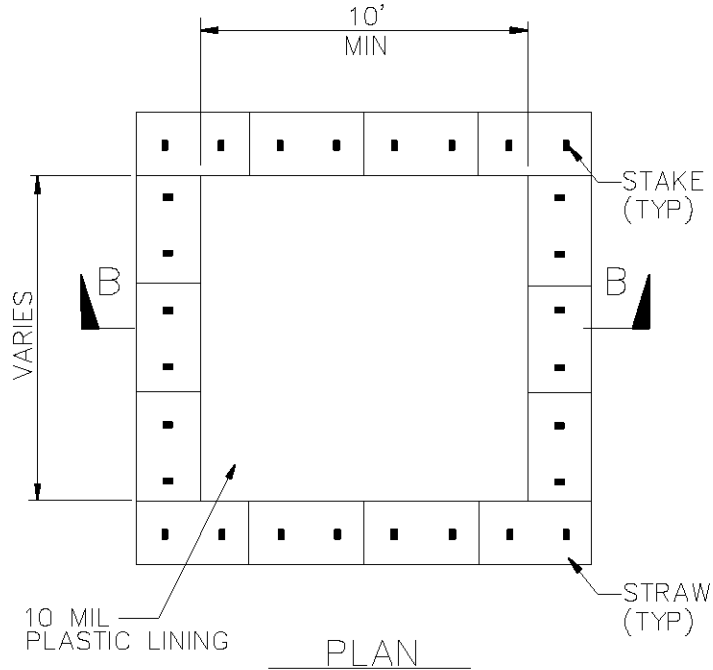
PLAN
NOT TO SCALE
TYPE "ABOVE GRADE"



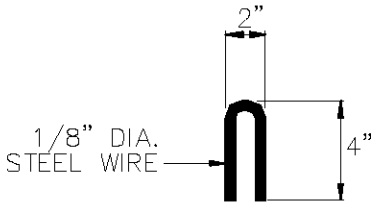
SECTION B–B
NOT TO SCALE

NOTES

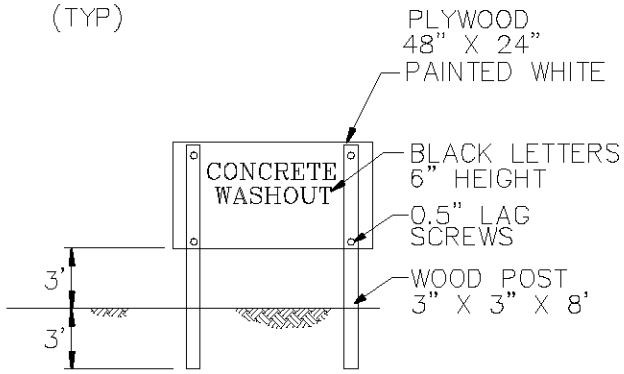
1. ACTUAL LAYOUT DETERMINED IN FIELD.
2. THE CONCRETE WASHOUT SIGN SHALL BE INSTALLED WITHIN 30 FT. OF THE TEMPORARY CONCRETE WASHOUT FACILITY.



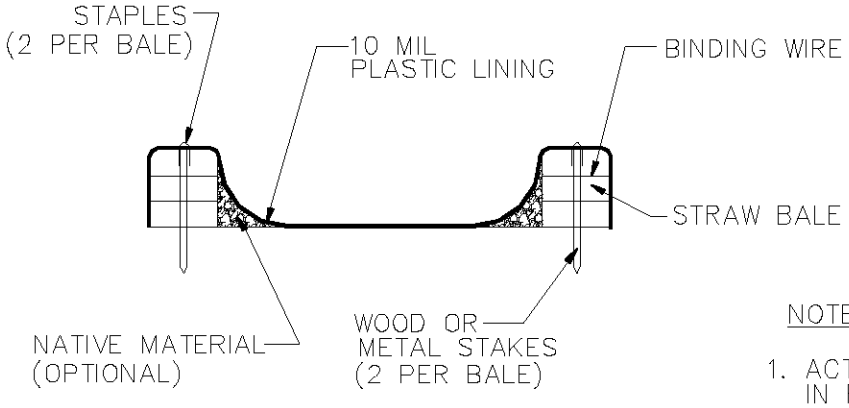
PLAN
NOT TO SCALE
TYPE "ABOVE GRADE"
WITH STRAW BALES



STAPLE DETAIL



CONCRETE WASHOUT
SIGN DETAIL
(OR EQUIVALENT)

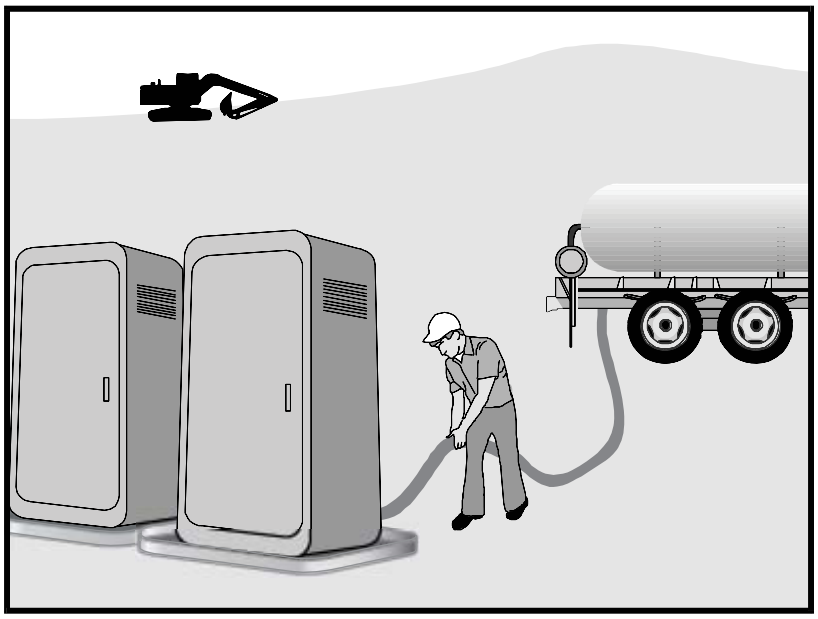


SECTION B–B
NOT TO SCALE

NOTES

1. ACTUAL LAYOUT DETERMINED IN FIELD.
2. THE CONCRETE WASHOUT SIGN SHALL BE INSTALLED WITHIN 30 FT. OF THE TEMPORARY CONCRETE WASHOUT FACILITY.

Sanitary/Septic Waste Management WM-9



Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	☑

Legend:

☑ **Primary Category**

☒ **Secondary Category**

Targeted Constituents

Sediment	
Nutrients	☑
Trash	☑
Metals	
Bacteria	☑
Oil and Grease	
Organics	☑

Potential Alternatives

None

Description and Purpose

Proper sanitary and septic waste management prevent the discharge of pollutants to stormwater from sanitary and septic waste by providing convenient, well-maintained facilities, and arranging for regular service and disposal.

Suitable Applications

Sanitary septic waste management practices are suitable for use at all construction sites that use temporary or portable sanitary and septic waste systems.

Limitations

None identified.

Implementation

Sanitary or septic wastes should be treated or disposed of in accordance with state and local requirements. In many cases, one contract with a local facility supplier will be all that it takes to make sure sanitary wastes are properly disposed.

Storage and Disposal Procedures

- Temporary sanitary facilities should be located away from drainage facilities, watercourses, and from traffic circulation. If site conditions allow, place portable facilities a minimum of 50 feet from drainage conveyances and traffic areas. When subjected to high winds or risk of high winds, temporary sanitary facilities should be secured to prevent overturning.

- Temporary sanitary facilities must be equipped with containment to prevent discharge of pollutants to the stormwater drainage system of the receiving water.
- Consider safety as well as environmental implications before placing temporary sanitary facilities.
- Wastewater should not be discharged or buried within the project site.
- Sanitary and septic systems that discharge directly into sanitary sewer systems, where permissible, should comply with the local health agency, city, county, and sewer district requirements.
- Only reputable, licensed sanitary and septic waste haulers should be used.
- Sanitary facilities should be located in a convenient location.
- Temporary septic systems should treat wastes to appropriate levels before discharging.
- If using an onsite disposal system (OSDS), such as a septic system, local health agency requirements must be followed.
- Temporary sanitary facilities that discharge to the sanitary sewer system should be properly connected to avoid illicit discharges.
- Sanitary and septic facilities should be maintained in good working order by a licensed service.
- Regular waste collection by a licensed hauler should be arranged before facilities overflow.
- If a spill does occur from a temporary sanitary facility, follow federal, state and local regulations for containment and clean-up.

Education

- Educate employees, subcontractors, and suppliers on sanitary and septic waste storage and disposal procedures.
- Educate employees, subcontractors, and suppliers of potential dangers to humans and the environment from sanitary and septic wastes.
- Instruct employees, subcontractors, and suppliers in identification of sanitary and septic waste.
- Hold regular meetings to discuss and reinforce the use of sanitary facilities (incorporate into regular safety meetings).
- Establish a continuing education program to indoctrinate new employees.

Costs

All of the above are low cost measures.

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Arrange for regular waste collection.
- If high winds are expected, portable sanitary facilities must be secured with spikes or weighed down to prevent over turning.
- If spills or leaks from sanitary or septic facilities occur that are not contained and discharge from the site, non-visible sampling of site discharge may be required. Refer to the General Permit or to your project specific Construction Site Monitoring Plan to determine if and where sampling is required.

References

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.

APPENDIX I
CONSTRUCTION SITE INSPECTION FORM

Risk Level 1, 2, 3
Visual Inspection Field Log Sheet

Date and Time of Inspection:				Report Date:		
Inspection Type:	☐ Weekly	☐ Before Predicted Rain	☐ During Rain Event	☐ Following Qualifying Rain Event	☐ Contained Stormwater Release	☐ Quartely Non-Stormwater

Site Information

Construction Site Name:	
Construction Stage and Completed Activites:	Approximate Area of Exposed Site:

Weather and Observations

Date Rain Predicted to Occur:		Predicted % chance of rain:	
Estimate Storm Beginning: _____ (date and time)	Estimate Storm Duration: _____ (hours)	Estimate time since last storm:_____ (days or hours)	Rain gauge reading: _____ (inches)

Observations: If yes, identify location		
Odors	Yes ☐	No ☐
Floating Material	Yes ☐	No ☐
Suspended Material	Yes ☐	No ☐
Sheen	Yes ☐	No ☐
Discolorations	Yes ☐	No ☐
Turbidity	Yes ☐	No ☐

Site Inspections

Outfall of BMPs Evaluated	Deficiencies Noted
(add additional sheets or attached detailed BMP Inspection Checklists)	

Photos Taken:	Yes ☐ No ☐	Photo Reference IDs:

Corrective Actions Identified (note if SWPPP/REAP change is needed)

Inspector Information

Inspector Name:	Inspector Title:
Signature:	Date:

APPENDIX J
SITE SPECIFIC RAIN EVENT ACTION PLAN
(NOT APPLICABLE)

APPENDIX K
TRAINING REPORTING FORM

Training Reporting Form

Project Name: Horton Plaza Park

Project Number/Location: WDID# **9 37C368989** / San Diego, CA

Storm Water Management Topic: (check as appropriate)

- ❑ Erosion Control
- ❑ Sediment Control
- ❑ Wind Erosion Control
- ❑ Tracking Control
- ❑ Non-storm water management
- ❑ Waste Management and Materials Pollution Control
- ❑ Storm Water Sampling

Specific Training Objective: _____

Location: _____ Date: _____

Instructor: _____ Telephone: _____

Course Length (hours): _____

Attendee Roster (attach additional forms if necessary)

Name	Company	Phone

COMMENTS:

_____

_____

APPENDIX L
RESPONSIBLE PARTIES

RESPONSIBLE PARTIES FOR

HORTON PLAZA PARK
Corner of 4th Avenue and Broadway
San Diego, CA 92101

WDID# 9 37C368989

Legally Responsible Person (LRP)

Dave Zoumaras
Deputy Director
dzoumaras@sandiego.gov, (858) 627-3201

City of San Diego, Public Works/Field Engineering Division
9485 Aero Drive
San Diego, CA 92123

Qualified SWPPP Practitioner (QSP):

Caine Tsutsui
Pre Construction Director
Caine.tsutsui@decatur-environmental.com, (909) 991-9369

Decatur Environmental, LLC
5620 Friars Road
San Diego, CA 92110

Qualified SWPPP Developer (QSD):

Adam Podlich
Project Manager
adamp@nasland.com, (858) 292-7770

Nasland Engineering
4740 Ruffner Street
San Diego, CA 92111

APPENDIX M
CONTRACTORS & SUBCONTRACTORS

Contractor to remove this page and replace with a list of contractors and subcontractors. The list should include the company name, contact person, address, phone number, and scope of work.

APPENDIX N
CONSTRUCTION SITE MONITORING PROGRAM

CONSTRUCTION SITE MONITORING PROGRAM

For:

Horton Plaza Park

Corner of 4th Avenue and Broadway
San Diego, CA 92101

WDID NO: 9 37C368989

Prepared For:

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SECTION 1 Construction Site Monitoring Program

1.1 Purpose

A Construction Site Monitoring Program (CSMP) has been developed to meet the specific requirements and objectives, as set forth in Attachment C of the General Permit, associated with a Risk Level 1 project.

1.2 Applicability of Permit Requirements

General Permit monitoring requirements for storm water and non-storm water visual observations; storm water and non-storm water sample collection; and receiving water monitoring for a Risk Level 1 project are described in Appendix C of the General Permit and summarized below.

Visual Observations

- Non-Stormwater Inspection
  - Perform quarterly at each drainage area
- Qualifying rain event; pre-rain inspection
  - Perform in all drainage areas, BMPs, and stormwater containments within two business days of each qualifying rain event.
- Qualifying rain event; post-rain inspection
  - Perform al all discharge locations within two business days after each qualifying rain event. Visually observe discharge of contained stormwater when discharged
- During rain inspection
  - Perform BMP inspections weekly and every 24 hours during extended storm events.

Sample Collection

- Non-visible pollutants (Spills, BMP failures based on pollutant source assessment)
  - Perform sampling within first two hours of discharge from site. Collect samples of runoff affected by the spilled or released material(s) and runoff that is unaffected by the spilled or released material(s).
- Particle Size
  - Perform when sediment basins are used. If needed to justify site specific sediment risk using the Revised Universal Soil Loss Equation (RUSLE).

1.3 Monitoring Locations

In situations where a breach, malfunction, leakage, or spill has occurred, Risk Level 1 dischargers must collect a sample of runoff that has come into contact with the materials and must also collect a runoff sample that has not come into contact with the materials for comparison.

1.4 Safety

Dischargers are not required to physically collect samples or conduct visual observations during dangerous weather conditions (flooding, electrical storms, etc) or outside of scheduled construction site business hours. An explanation must be provided in the Annual Report if a project was unable to collect required samples or visual observations because of dangerous weather conditions.

1.5 Visual Monitoring (Inspections)

Risk Level 1 projects, such as this project, are required to conduct visual monitoring. Visual monitoring includes inspections of BMPs, inspections before and after qualifying rain events, and inspection of non-stormwater dischargers. Visual inspections are required for the duration of the project with the goal of confirming that appropriately selected BMPs have been implemented, are being maintained, and are effective in preventing potential pollutants from coming into contact with stormwater.

BMP Inspections

The General Permit requires that BMPs be inspected weekly and once each 24-hour period during extended storm events. The purpose of these inspections is to identify BMPs that need maintenance to operate effectively; have failed; or could fail to operate as intended.

If deficiencies are identified during BMP inspections, repairs or design changes to BMPs must be initiated within 72 hours of identification and need to be completed as soon as possible. All BMP inspections must be documented on an inspection checklist such as the checklist included in Appendix I of this SWPPP.

Qualifying Rain Event Inspections

The General Permit requires that the construction site be inspected within two days prior to a predicted qualifying rain event and within two days after a qualifying rain event. These inspections are only required during normal business hours of the construction site. The General Permit defines a qualifying rain event as one that produces ½ inch or more of precipitation with a 48 hour or greater period between rain events.

The General Permit requires that dischargers only use weather forecasts from the National Oceanographic and Atmospheric Administration (NOAA). Pre-project inspections should be initiated after consulting NOAA for a qualifying rain event with 50% or greater probability of precipitation (PoP). These forecasts can be obtained at http://www.srh.noaa.gov/.

All Qualifying Rain Event Inspections must be documented on an inspection checklist such as the checklist included in Appendix I of this SWPPP.

Pre-Rain Event Inspection

The purpose of the pre-rain event inspection is to make sure the site and the BMPs are ready for the predicted rain. The pre-rain event inspection needs to cover:

- All storm water drainage areas to identify any spills, leaks, or uncontrolled pollutant sources;
- All BMPs to identify whether they have been properly implemented per the SWPPP and/or REAP;
- Storm water storage and containment areas to detect leaks and ensure maintenance of adequate freeboard; and
- The presence or absence of floating and suspended materials, a sheen on the surface, discolorations, turbidity, odors, and source(s) of any observed pollutants within stored stormwater.

Post-Rain Event Inspection

The purpose of the post-rain event inspection is to observe the discharge locations and the discharge of any stored or contained rainwater; determine if BMPs functioned as designed; and identify if any additional BMPs are required. The post-rain event inspection needs to cover:

- All stormwater discharge locations;
- The discharge of stored or contained stormwater that is derived from and discharged subsequent to a qualifying rain event; and
- All BMPs to determine if they were adequately designed, implemented, and effective. After assessing BMPs it should be noted on the inspection form whether the BMPs need maintenance.

Non-Stormwater Discharges Inspections

The General Permit requires that construction sites, regardless of risk level, be inspected quarterly for the presence of non-stormwater discharges. Records must be kept of all inspections and must be maintained on site. Non-stormwater discharge inspections are only required during normal business hours of the construction site. The

purpose of these inspections is to detect unauthorized non-stormwater discharges and observe authorized non-stormwater discharges. Quarterly inspections need to include each drainage area of the project. All Non-Stormwater Discharges Inspections must be documented on an inspection checklist such as the checklist included in Appendix I of this SWPPP.

1.6 Water Quality Sampling and Analysis

Risk Level 1 projects, such as this project, are only required to collect water quality samples if there is a BMP breach, malfunction, leakage, or spill. Water quality samples should be taken for nonvisible pollutants that may have been discharged from the site as identified in the sections below.

Sediment and Turbidity

Conditions or areas at a construction site that may cause sediment, silt, and/or turbidity in site runoff include:

- Exposed soil areas with inadequate erosion control measures;
- Areas of active grading;
- Poorly stabilized slopes;
- Lack of perimeter sediment controls;
- Areas of concentrated flow on unprotected soils;
- Poorly maintained erosion and sediment control measures;
- Tracking sediment onto roads and paved surfaces;
- Unprotected soil stockpiles; and
- Failure of an erosion or sediment control measure.

High pH

Conditions or areas at a construction site that may cause high pH in site discharges include:

- Concrete pours and curing;
- Concrete waste management areas;
- Soil amendments (e.g. fly ash and lime); and
- Mortar and stucco mixing, application, and waste management areas.

Non-Visible Pollutants

Risk Level 1 projects, such as this project, are only required to collect water quality samples if there is a BMP breach, malfunction, leakage, or spill. Water quality samples should be taken for nonvisible pollutants that may have been discharged from the site as identified in the sections below.

- Risk Level 1 dischargers shall collect one or more samples during any breach, malfunction, leakage, or spill observed during a visual inspection which could result in the discharge of pollutants to surface waters that would not be visually detectable in stormwater.
- Dischargers shall ensure that water samples are large enough to characterize site conditions and are taken from all discharge locations that can be safely accessed.
- Risk Level 1 dischargers shall collect samples during the first two hours of discharge from rain events that occur during business hours and which generate runoff.
- Risk Level 1 dischargers shall collect a sample of stormwater that has not come into contact with the disturbed soil or the materials stored or used on-site for comparison with the discharge sample.
- Risk Level 1 dischargers shall compare the uncontaminated sample to the samples of discharge using field analysis or through laboratory analysis.
- Risk Level 1 dischargers shall keep all field/or analytical data in the SWPPP document.

Sample Collection and Handling

It is important to use the correct methods to collect and handle samples to ensure the samples are valid. While the handling requirements apply primarily to grab samples collected for laboratory analysis, field measurements can be affected by sample collection procedures.

The General Permit requires dischargers to designate and train personnel to collect, maintain, and ship water quality samples in accordance with the Surface Water Ambient Monitoring Program (SWAMP) 2008 Quality Assurance Program Plan (QAPrP), which is available at http://www.swrcb.ca.gov/water_issues/programs/swamp/tools.shtml#qa. Sampling methods, handling procedures, and locations should be identified in advance of the sampling event in order to provide sufficient time to gather the supplies and equipment necessary to sample and plan for safe access by the sampling crew(s). Adherence to SWAMP sampling guidance and proper development of a sampling plan provides for consistent, reproducible, and accurate results. For some constituents, especially trace metals, trace organics, and organic carbon, sampling protocols are very important as contamination of samples due to incorrect sampling protocols is possible. Design of the field sampling procedures should carefully consider contamination potential from sample location (e.g., sediment disturbances, equipment exhaust), sampling techniques, and sample handling. Field crews should be trained in the appropriate site specific methods specified in the sampling plan. “Clean sampling” based

on the US Environmental Protection Agency (EPA) Method 1669 should be used when sufficiently low detection concentrations are expected for at least trace metals and mercury. However, it is recommended that all sampling plans incorporate a “clean technique” approach including the following protocols:

- Samples (for laboratory analysis) are collected only in analytical laboratory-provided sample containers;
- Clean, powder-free nitrile gloves should be worn for collection of samples
- Gloves are changed whenever something not known to be clean has been touched
- Decontaminate all equipment (e.g. bucket, tubing) except laboratory provided sample containers, prior to sample collection using a trisodium phosphate (TSP)-soapy water wash, distilled water rinse, and final rinse with distilled water. (Dispose of wash and rinse water appropriately, i.e., do not discharge to storm drain or receiving water)
- To reduce potential contamination, sample collection personnel must adhere to the following rules while collecting samples:
    - No smoking
    - Never sample near a running vehicle
    - Do not park vehicles in the immediate sample collection area (even non-running vehicles)
    - Do not eat or drink during sample collection
    - Do not breath, sneeze, or cough in the direction of an open sample container

Water quality samples should be collected in appropriate sample containers and be of adequate volume to conduct the required measurements or laboratory analyses.
The most important aspect of grab sampling it to make sure that the sample best represents the entire runoff stream. Typically, samples are collected by dipping the collection container in the runoff flow paths and streams as noted below. Note, however that depending upon the specific test that is required, some bottles may contain preservatives. These bottler should never be dipped into the stream, but filled indirectly from the collection container

- For small streams and flow paths, simply dip the bottle facing upstream until full
- For larger streams that can be safely accessed, collect a sample in the middle of the flow stream by directly dipping the mouth of the bottle. Once again making sure that the opening of the bottle is facing upstream as to avoid any contamination by the sampler
- For larger streams that cannot be safely waded, pole-samplers may be needed to access the representative flow.
- Avoid collecting samples from ponded, sluggish or stagnant water.

- Avoid collecting samples directly downstream from a bridge as samples can be affected by the bridge structure or runoff from the road surface.

All sampling and sample preservation must be in accordance with the current edition of Standard Methods for the Examination of Water and Wastewater (American Public Health Association).

SSC samples should be taken as a normal grab sample, where the bottle is submerged facing upstream and filled. SSC samples need to be collected in a separate bottle because the analysis requires the entire volume of the bottle. Many grab samples can be partitioned out of a larger container used to collect the samples for various analyses but that is not the case for SSC.

All samples must be maintained between 0-6 degrees Celsius during delivery to the laboratory. Samples must be kept on ice, or refrigerated, from sample collection through delivery to the laboratory. Shipped samples should be placed inside coolers with ice. Make sure the sample bottles are well packaged to prevent breakage and secure cooler lids with packaging tape.

Ship samples that will be laboratory analyzed to the analytical laboratory right away. Many analytical methods have short hold-times before which the analysis must be started. Hold times are measured from the time the sample is collected to the time the sample is analyzed. The General Permit requires that samples be received by the analytical laboratory within 48 hours of the physical sampling (unless otherwise required by the analytical laboratory).

Most sites will require the use of some sort of field meter to measure turbidity and pH. Some field meters can be placed directly in the flow of water and gather instantaneous data. Meters with probes that can be directly placed into the flow are ideal, however low flow conditions may not allow for this type of measurement. In this case, grab samples can be collected and placed within the field meter's recording container. Section 7.0 of this guidance document provides step-by-step instructions using an example field meter.

All monitoring instruments and equipment (including a discharger's own field instruments for measuring pH and turbidity) should be calibrated and maintained in accordance with manufacturers' specifications to ensure accurate measurements. Many manufacturers provide step-by-step instructions for the use and calibration of their meters and these instructions should be followed.

If using field meters, pH and turbidity measurements should be conducted immediately (i.e. samples should not be stored for later measurement).

Collect proper information regarding time and sampling conditions, appropriately label the bottles, and fill out the required chain of custody forms and field logs.

1.7 Watershed Monitoring Option

This project is not participating in the Watershed Monitoring Option.

1.8 Quality Assurance and Quality Control

An effective QA/QC plan will be implemented as part of the CSMP to ensure that analytical data can be used with confidence. QA/QC procedures to be initiated include the following:

- Field logs
- Clean sampling techniques
- Sample Chains of Custody (COCs)
- Data verification

Each of these procedures is discussed in more detail in the following sections.

Field Logs

The purpose of field logs is to record sampling information and field observations during monitoring that may explain any uncharacteristic analytical results. Sampling information to be included in the field log include the date and time of water quality sample collection, sampling personnel, sample container identification numbers, and types of samples that were collected. Field observations should be noted in the field log for any abnormalities at the sampling location (color, odor, BMPs, etc.). Field measurements for pH and turbidity should also be recorded in a field log such as the checklist included in Appendix I of this SWPPP.

Clean Sampling Techniques

Clean sampling techniques involve the use of certified clean containers for sample collection and clean powder-free nitrile gloves during sample collection and handling. As discussed previously, adoption of a clean sampling approach will minimize the chance of field contamination and questionable data results.

Sample Chain-of-Custody

The sample COC is an important documentation step that tracks samples from collection through analysis to ensure the validity of the sample. Sample COC procedures include the following:

- Proper labeling of samples
- Use of COC forms for all samples
- Prompt sample delivery to the analytical laboratory

Analytical laboratories usually provide COC forms to be filled out for sample containers.

Data Verification

After analytical results are received from the analytical laboratory, the data should be verified to ensure that it is complete, accurate, and the appropriate QA/QC requirements were met. Data should be verified as soon as the data reports are received.

The COC and laboratory reports need to be checked to make sure all requested analysis were performed and all samples are accounted for in the reports.

Check laboratory reports to make sure hold times were met and that the reporting levels meet or are lower than the reporting levels agreed to in the contract.

Check data for outlier values and follow up with the laboratory. Occasionally typographical errors, unit reporting errors, or incomplete results are reported and should be easily detected. These errors need to be identified, clarified, and corrected quickly by the laboratory. Attention should be paid to data that is an order of magnitude or more different than similar locations, or is inconsistent with previous data from the same location.

For laboratory analyses, EPA establishes QA/QC checks and acceptable criteria. These data are typically reported along with the sample results. Data reviewers should evaluate the reported QA/QC data to check for contamination (look at method, field, and equipment blanks), precision (laboratory matrix spike duplicates), and accuracy (matrix spikes and laboratory control samples). When QA/QC checks are outside acceptable ranges, the laboratory must flag the data, and usually provides an explanation of the potential impact to the sample results.

Check the data set for outlier values and, accordingly, confirm results and re-analyze samples where appropriate. Sample re-analysis should only be undertaken when it appears that some part of the QA/QC resulted in a value out of the expected range. Initial data, even if outside the expected range may not be discounted unless the analytical laboratory identifies the required QA/QC criteria were not met. If this occurs, the project should obtain a written statement from the analytical laboratory regarding the validity of the sample result. Similarly, field data needs to be checked as soon as possible to identify potential errors.

Reported data and observations should be verified to ensure that it is complete and accurate and as soon as the field logs are received.

Field logs should be checked to make sure all required measurements were completed and appropriately documented. Crews may occasionally miss-record a value. Reported values that appear out of the typical range or inconsistent, should be followed up on immediately to identify potential reporting or equipment problems.

Equipment calibration notations should be verified for outlier data, and if appropriate equipment calibrations should be checked after sampling. Observations noted on the field logs can also help to identify potential interferences. Notations should be made of any errors and actions taken to correct the equipment or recording errors.

When using a field meter it is important to record the value and then make note of any possible meter failures or interferences that could have led to an exceedance. Some possible instrument problems may include the need to recalibrate; the need to replace the battery; problems with the sample container (such as scratches on glass or plastic optical sample cells or particles on the outside of the optical sample cells); or fouled probes.

1.9 Reporting Requirements and Records Retention

Annual Report

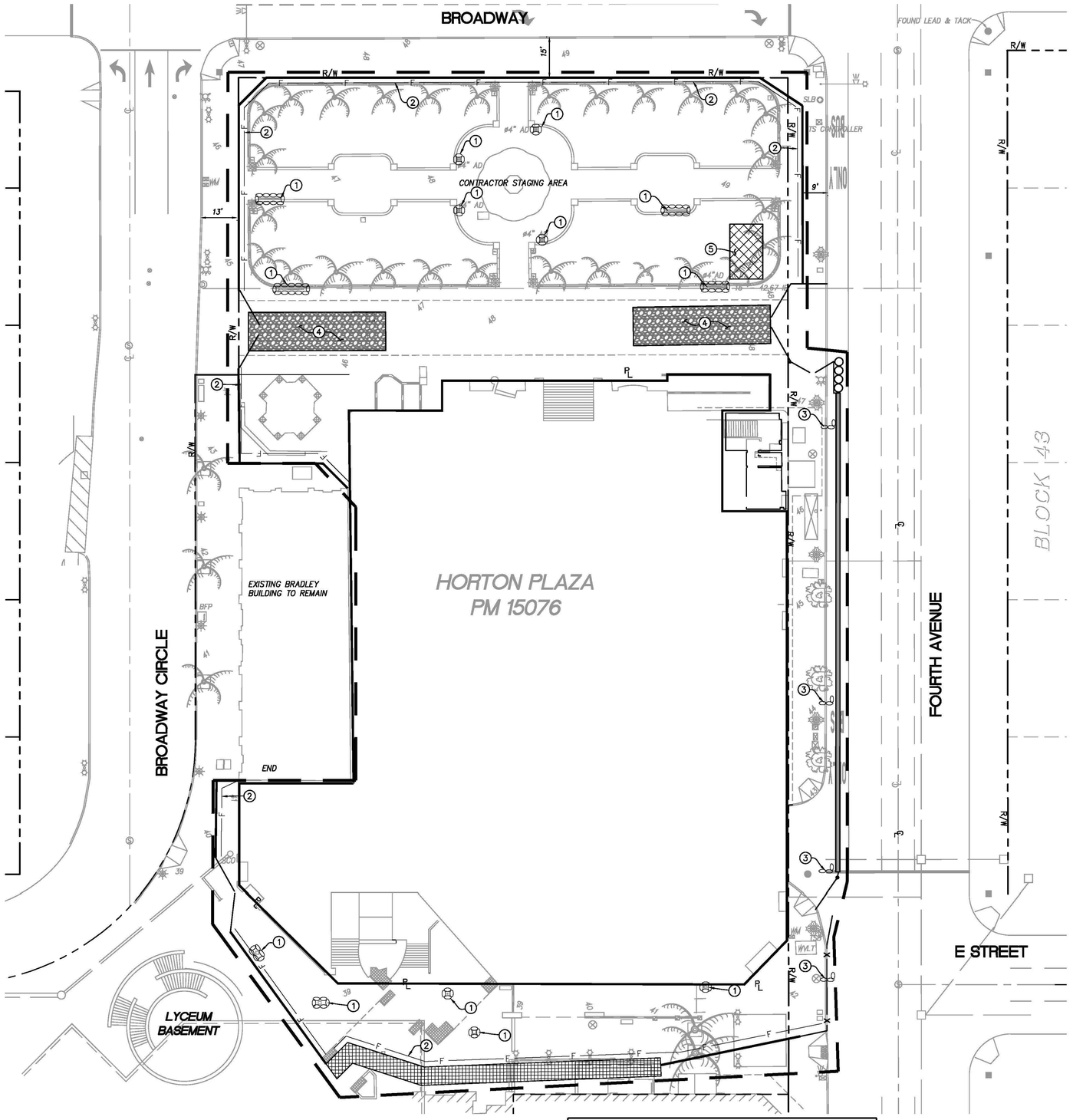
All dischargers are required to prepare and electronically submit an Annual Report no later than September 1 each year. The Annual Reports must be certified in accordance with the Special Provisions in the General Permit. The Annual Report must include the following stormwater monitoring information:

- A summary and evaluation of all sampling and analysis results, including original laboratory reports
- The analytical method(s), method reporting unit(s), and MDL(s) of each analytical parameter (analytical results that are less than the MDL must be reported as "less than the MDL" or "<MDL")
- A summary of all corrective actions taken during the compliance year;
- Identification of any compliance activities or corrective actions that were not implemented
- A summary of all violations of the General Permit
- The individual(s) who performed facility inspections, sampling, visual observation (inspections), and/or measurements
- The date, place, time of facility inspections, sampling, visual observation (inspections), and/or measurements, including precipitation (rain gauge)
- The visual observations and sample collection exception records and reports.

Records Retention

Dischargers must retain records of all stormwater monitoring information and copies of all reports (including Annual Reports) for a period of at least three years from date of submittal or longer if required by the RWQCB. Records are to be kept on site while construction is ongoing and transferred to Owner/LRP after construction is complete.

APPENDIX 0
EROSION & SEDIMENTATION CONTROL PLAN



CONSTRUCTION NOTES:

1. INSTALL INLET PROTECTION PER DETAIL 3 ON SHEET 1.
2. INSTALL FIBER ROLL ALONG THE PERIMETER OF THE FENCE PER DETAIL 1 SHEET 1.
3. INSTALL GRAVEL BAG CHECK DAMS PER DETAIL 4 ON SHEET 1.
4. INSTALL CONSTRUCTION ENTRANCE PER DETAIL 5 ON SHEET 1.
5. INSTALL VEHICLE WASH AREA (IF REQUIRED) PER DETAIL 6 ON SHEET 1.

EROSION CONTROL CONSTRUCTION LEGEND:

EROSION CONTROL LIMITS	
GRAVEL BAG BERM	
FIBER ROLL	F F F
TEMPORARY CHAIN LINK FENCE WITH GREEN MESH (BY OTHERS)	X X X
TEMPORARY CHAIN LINK GATE WITH GREEN MESH (BY OTHERS)	
CONSTRUCTION ENTRANCE	
VEHICLE WASH AND FUELING STATION	

TEMPORARY DRAINAGE NOTES:

THE CONTRACTOR SHALL BE RESPONSIBLE FOR PUMPING ANY COLLECTED WATER ON THE SITE AND TRANSPORTING IT TO AN OFF-SITE LOCATION FOR TREATMENT AND DISPOSAL.

EROSION CONTROL PLAN - PHASE 1

SCALE 1" = 20'

-BUILDING DEMOLITION

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20 0 20 40 60 80

SCALE 1" = 20'

HORTON PLAZA PARK
PARCEL 4 OF PARCEL MAP 15076

CITY OF SAN DIEGO, CALIFORNIA
DEVELOPMENT SERVICES DEPARTMENT
SHEET 2 OF 4 SHEETS

I.O. NO. 24003214
PROJECT NO. 294306

FOR CITY ENGINEER _____ DATE _____

V.T.M. _____

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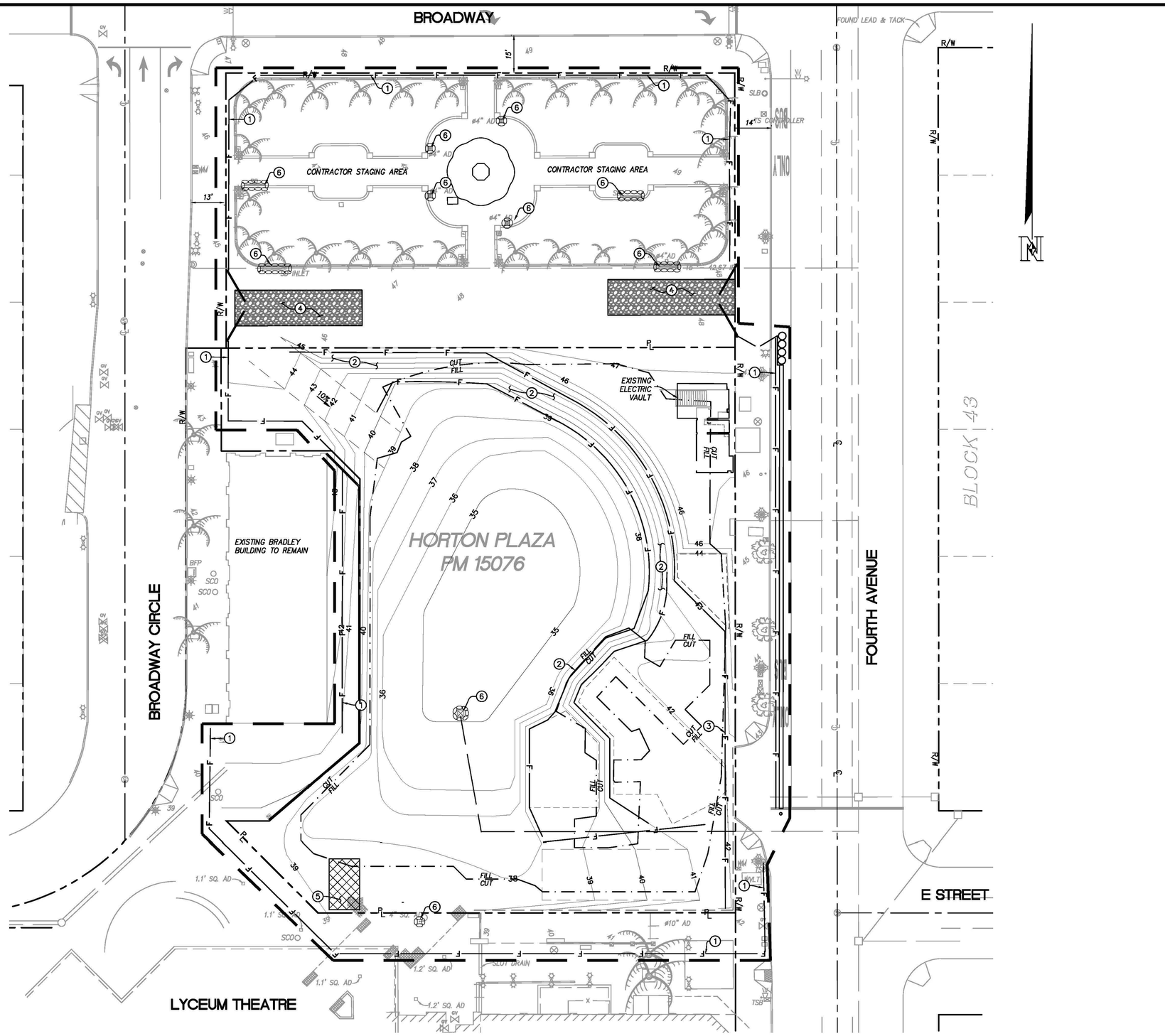
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200-1719 LAMBERT COORDINATES

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INSPECTOR _____ DATE COMPLETED _____

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CONSTRUCTION NOTES:

1. INSTALL FIBER ROLL ALONG THE PERIMETER OF THE FENCE PER DETAIL 1 SHEET 3.
2. INSTALL FIBER ROLLS ALONG SLOPE CONTOURS PER DETAIL 2 ON SHEET 1.
3. WRAP INLET WITH 2 LAYERS OF FILTER PAPER AND CONSTRUCT DEBRIS RACK PER DETAIL SHEET 1.
4. INSTALL CONSTRUCTION ENTRANCE PER DETAIL 5 ON SHEET 1.
5. INSTALL VEHICLE WASH AREA PER DETAIL 6 ON SHEET 1.
6. INSTALL INLET PROTECTION PER DETAIL 3 ON SHEET 1.
7.
8.

EROSION CONTROL CONSTRUCTION LEGEND:

- EROSION CONTROL LIMITS
- GRAVEL BAG BERM
- FIBER ROLL
- TEMPORARY CHAIN LINK GATE WITH GREEN MESH (BY OTHERS)
- CONSTRUCTION ENTRANCE
- VEHICLE WASH AND FUELING STATION

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EROSION CONTROL PLAN – PHASE 2

SCALE 1" = 20'

– ROUGH GRADING
– PARK DEMOLITION

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SCALE 1" = 20'

EROSION CONTROL FOR:
HORTON PLAZA PARK
PARCEL 4 OF PARCEL MAP 15076

CITY OF SAN DIEGO, CALIFORNIA
DEVELOPMENT SERVICES DEPARTMENT
SHEET 3 OF 4 SHEETS

I.O. NO. 24003214
PROJECT NO. 294306

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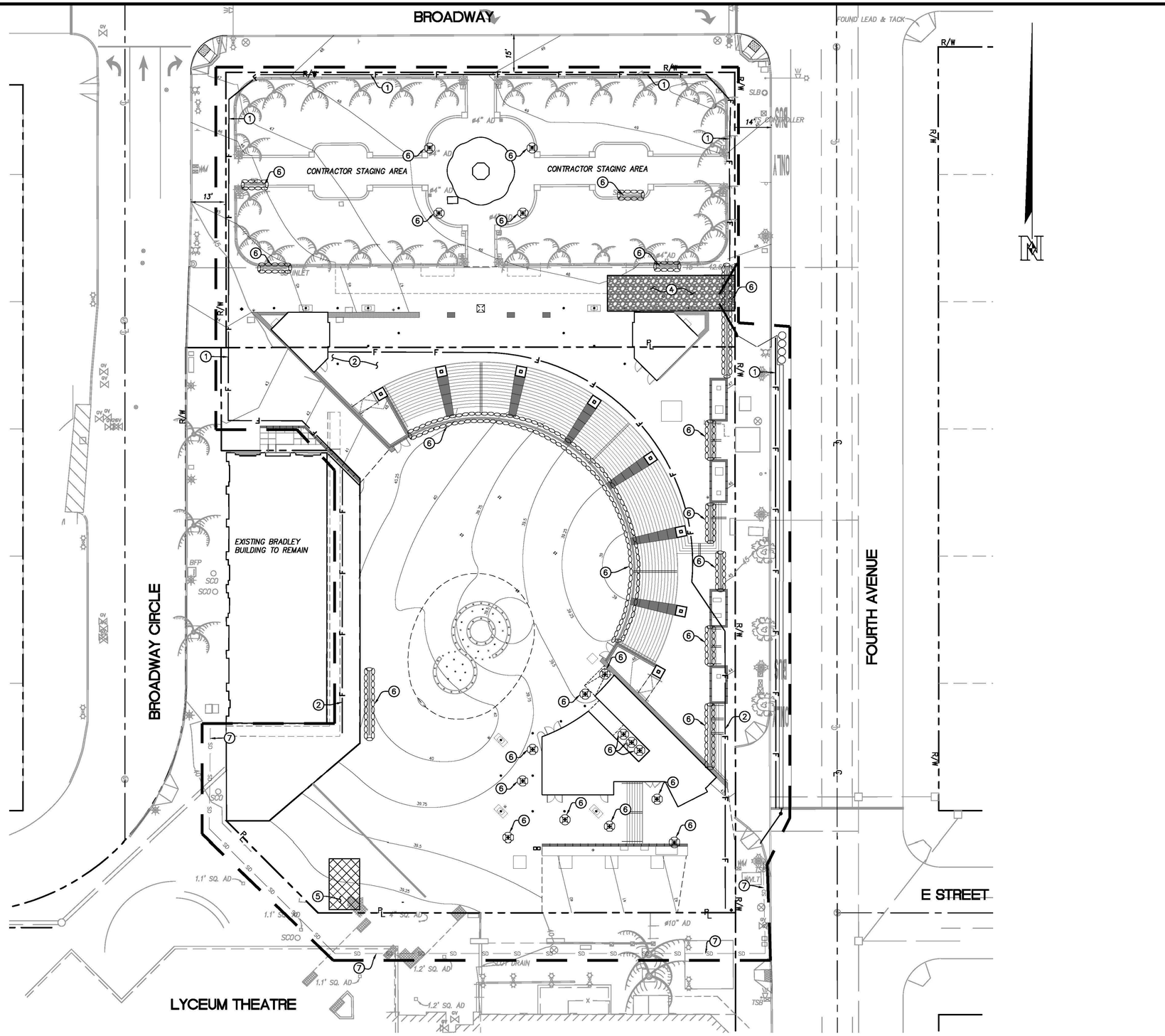
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INSPECTOR _____ DATE COMPLETED _____

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CONSTRUCTION NOTES:

1. INSTALL FIBER ROLL ALONG THE PERIMETER OF THE FENCE PER DETAIL 1 SHEET 3.
2. INSTALL FIBER ROLLS ALONG SLOPE CONTOURS PER DETAIL 2 SHEET ON 1.
3. WRAP INLET WITH 2 LAYERS OF FILTER PAPER AND CONSTRUCT DEBRIS RACK PER DETAIL SHEET 4
4. INSTALL CONSTRUCTION ENTRANCE PER DETAIL 5 ON SHEET 1.
5. INSTALL VEHICLE WASH AREA PER DETAIL 6 ON SHEET 1.
6. INSTALL INLET PROTECTION PER DETAIL 3 ON SHEET 1.
7. INSTALL SILT DIKE ON PAVEMENT PER DETAIL 8 ON SHEET 1.

EROSION CONTROL CONSTRUCTION LEGEND:

- EROSION CONTROL LIMITS
- GRAVEL BAG BERM
- FIBER ROLL
- TEMPORARY CHAIN LINK FENCE WITH GREEN MESH (BY OTHERS)
- SILT DIKE ON PAVEMENT
- TEMPORARY CHAIN LINK GATE WITH GREEN MESH (BY OTHERS)
- CONSTRUCTION ENTRANCE
- VEHICLE WASH AND FUELING STATION

EROSION CONTROL PLAN - PHASE 3

SCALE 1" = 20'

- BUILDING CONSTRUCTION
- PARK RENOVATION

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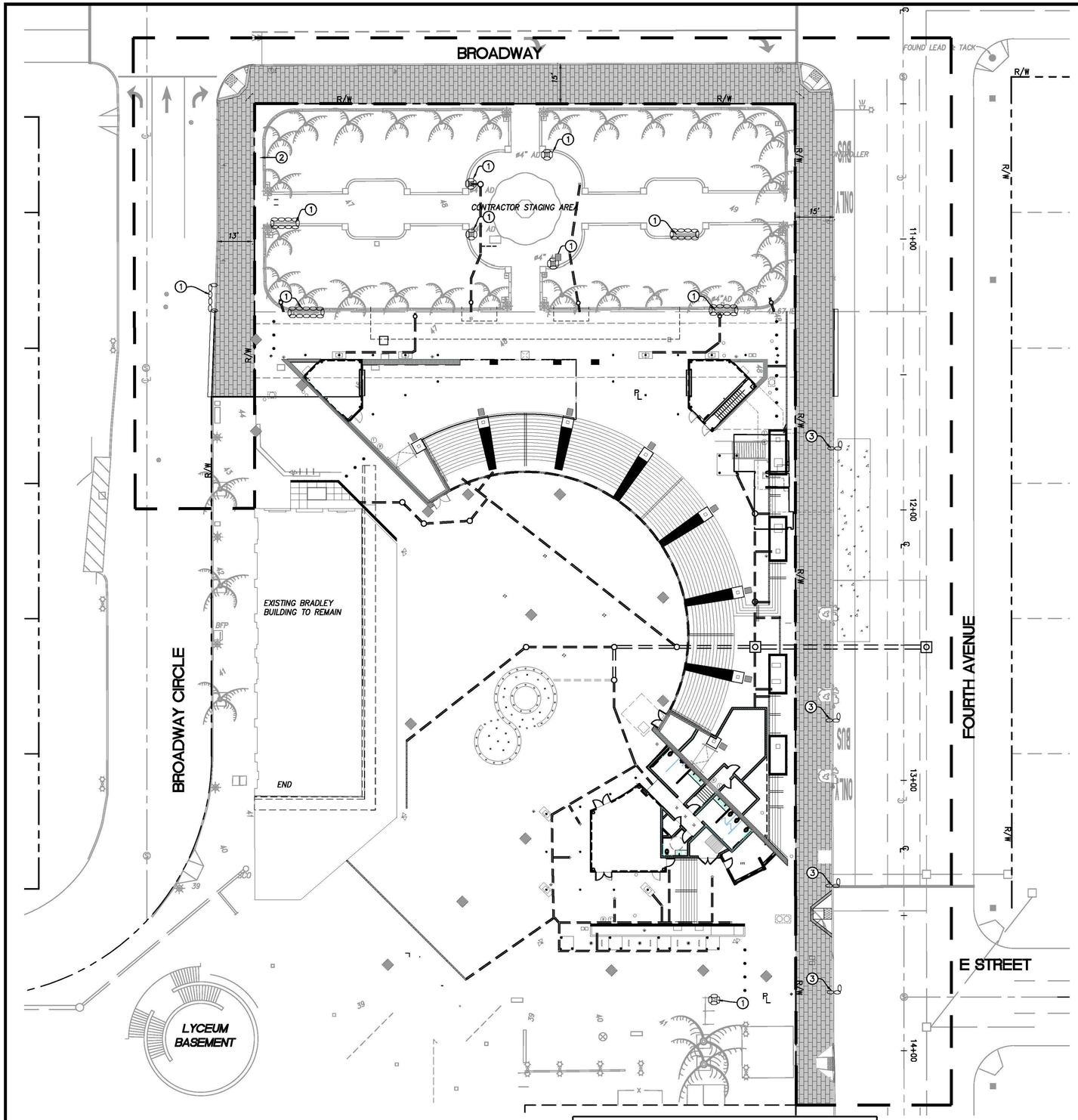
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CONTRACTOR _____ DATE STARTED _____

INSPECTOR _____ DATE COMPLETED _____

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CONSTRUCTION NOTES:

(1) INSTALL INLET PROTECTION PER DETAIL 3 ON SHEET 1.

(3) INSTALL GRAVEL BAG CHECK DAMS PER DETAIL 4 ON SHEET 1.

EROSION CONTROL CONSTRUCTION LEGEND:

EROSION CONTROL LIMITS	
GRAVEL BAG BERM	
FIBER ROLL	F F F
TEMPORARY CHAIN LINK FENCE WITH GREEN MESH (BY OTHERS)	X X X
TEMPORARY CHAIN LINK GATE WITH GREEN MESH (BY OTHERS)	
CONSTRUCTION ENTRANCE	
VEHICLE WASH AND FUELING STATION	

TEMPORARY DRAINAGE NOTES:

THE CONTRACTOR SHALL BE RESPONSIBLE FOR PUMPING ANY COLLECTED WATER ON THE SITE AND TRANSPORTING IT TO AN OFF-SITE LOCATION FOR TREATMENT AND DISPOSAL.

EROSION CONTROL PLAN - PHASE 4

SCALE 1" = 20'

– ROW UTILITY CONSTRUCTION
– ROW SIDEWALK AND PAVING CONSTRUCTION

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INSPECTOR _____ DATE COMPLETED _____

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APPENDIX J

Site Map & Plan Rendering

THE US GRANT

BROADWAY

PLAZA STREET

BROADWAY CIRCLE

BRADLEY BUILDING

4TH AVENUE

E STREET

E STREET

LYCEUM

WESTFIELD RETAIL CENTER

BALBOA THEATRE

NBC BUILDING

APPENDIX K

Aerial Rendering



ATTACHMENT F

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City of San Diego, solely in its capacity as the designated Successor Agency to the Redevelopment Agency of the City of San Diego, a former public body, corporate and politic, herein referred to as

Successor Agency

CITY CONTACT: Damian Singleton, Contract Specialist, Email: DSingleton@sandiego.gov
Phone No. (619) 533-3482, Fax No. (619) 533-3633

ADDENDUM "A"

FOR

HORTON PLAZA IMPROVEMENT PROJECT

BID NO.: K-14-6120-DBB-3
SAP NO. (WBS/IO/CC): 24002919
CLIENT DEPARTMENT: 1714
COUNCIL DISTRICT: 3
PROJECT TYPE: BE/GA

BID DUE DATE:
2:00 PM
MAY 1, 2014
CITY OF SAN DIEGO
PUBLIC WORKS CONTRACTING GROUP
1010 SECOND AVENUE, 14th FLOOR, MS 614C
SAN DIEGO, CA 92101

ENGINEER OF WORK

The technical content of the engineering Specifications and Special Provisions contained herein has been prepared by or under the direction of the following Professional Engineer and Architect:

1) Registered Architect, Douglas Macy 3/20/14 Date Seal:



The contractual content of the engineering Specifications and Special Provisions contained herein has been reviewed by the following Professional Engineer:

2) Registered Project Engineer, Daniel Kay 3/20/14 Date Seal:



A. CHANGES TO CONTRACT DOCUMENTS

The following changes to the Contract Documents are hereby made effective as though originally issued with the bid package. Bidders are reminded that all previous requirements to this solicitation remain in full force and effect.

THE SUBMITTAL DATE FOR THIS PROJECT HAS BEEN **EXTENDED AS STATED ON THE COVER PAGE.**

B. VOLUME 1

1. To Notice Inviting Bids, page 5, Item 5, **PRE-BID MEETING**, Sub-items 5.1. and 5.2., **DELETE** in their entirety and **SUBSTITUTE** with the following:

   5.1. There will be a Pre-Bid Meeting to discuss the scope of the Project, bidding requirements, pre-qualification process, and Equal Opportunity Contracting Program requirements and reporting procedures in the Public Works Contracting Group, Conference Room at 1010 Second Avenue, 14th Floor, San Diego, CA 92101 **at 10:00 AM, on APRIL 10, 2014.**

   5.2. **The Pre-Bid Meeting has been designated as MANDATORY. All potential bidders are required to attend.** Bid will be declared **non-responsive** if the Bidder fails to attend the Pre-Bid Meeting when specified to be mandatory. Attendance at the Pre-Bid Meeting will be evidenced by the representative's signature on the attendance roster. It shall be the responsibility of the Bidder's representative to complete and sign the attendance roster. **No Bidder will be admitted after the specified start time of the mandatory Pre-Bid Meeting.**

2. To Notice Inviting Bids, page 5, Item 7, **PRE-BID SITE VISIT**, **DELETE** in its entirety and **SUBSTITUTE** with the following:

   7. **PRE-BID SITE VISIT:** The prospective Bidders are encouraged to visit the Work Site with the Engineer. The purpose of the Site visit is to acquaint Bidders with the Site conditions. To request a sign language or oral interpreter for this visit, call the Public Works Contracting Group at (619) 533-3450 at least 5 Working Days prior to the meeting to ensure availability. A Pre-Bid Site Visit is offered when the details are provided as follows:

   Time: **11:00 AM**
   Date: **APRIL 10, 2014**
   Location: **900 4th Avenue, San Diego CA 92101**

3. To Attachment A, Scope of Work, page 28, Item 5, **CONTRACTOR'S LICENSE CLASSIFICATION**, Sub-item 5.1., **DELETE** in its entirety and **SUBSTITUTE** with the following:

5.1. The Successor Agency has determined the following licensing classification(s) for this contract:

Option	Classification(s)
1	CLASS A
2	CLASS B

5.2. The Bidder shall satisfy the licensing requirement by meeting **at least** one of the listed options.

James Nagelvoort, Director
Public Works Department

Dated: *March 24, 2014*
San Diego, California

JN/BD/egz

City of San Diego, solely in its capacity as the designated Successor Agency to the Redevelopment Agency of the City of San Diego, a former public body, corporate and politic, herein referred to as

Successor Agency

CITY CONTACT: Damian Singleton, Contract Specialist, Email: DSingleton@sandiego.gov
Phone No. (619) 533-3482, Fax No. (619) 533-3633

ADDENDUM "B"

FOR

HORTON PLAZA IMPROVEMENT PROJECT

BID NO.:	K-14-6120-DBB-3
SAP NO. (WBS/IO/CC):	24002919
CLIENT DEPARTMENT:	1714
COUNCIL DISTRICT:	3
PROJECT TYPE:	BE/GA

BID DUE DATE:

2:00 PM
MAY 8, 2014
CITY OF SAN DIEGO
PUBLIC WORKS CONTRACTING GROUP
1010 SECOND AVENUE, 14TH FLOOR, MS 614C
SAN DIEGO, CA 92101

A. CHANGES TO CONTRACT DOCUMENTS

The following changes to the Contract Documents are hereby made effective as though originally issued with the bid package. Bidders are reminded that all previous requirements to this solicitation remain in full force and effect.

THE SUBMITTAL DATE FOR THIS PROJECT HAS BEEN **EXTENDED AS STATED ON THE COVER PAGE.**

B. CLARIFICATIONS

1. RFI questions shall be submitted no later than end of business day April 24, 2014.

James Nagelvoort, Director
Public Works Department

Dated: *April 22, 2014*
San Diego, California

JN/BD/egz/lji

City of San Diego, solely in its capacity as the designated Successor Agency to the Redevelopment Agency of the City of San Diego, a former public body, corporate and politic, herein referred to as

Successor Agency

CITY CONTACT: Damian Singleton, Contract Specialist, Email: DSingleton@sandiego.gov
Phone No. (619) 533-3482, Fax No. (619) 533-3633

ADDENDUM "C"

FOR

HORTON PLAZA IMPROVEMENT PROJECT

BID NO.: K-14-6120-DBB-3
SAP NO. (WBS/IO/CC): 24002919
CLIENT DEPARTMENT: 1714
COUNCIL DISTRICT: 3
PROJECT TYPE: BE/GA

BID DUE DATE:

2:00 PM
MAY 14, 2014
CITY OF SAN DIEGO
PUBLIC WORKS CONTRACTING GROUP
1010 SECOND AVENUE, 14th FLOOR, MS 614C
SAN DIEGO, CA 92101

ENGINEER OF WORK

The technical content of the engineering Specifications and Special Provisions contained herein has been prepared by or under the direction of the following Professional Engineer and Architect:

1) Registered Architect, Douglas Macy — Date: 5/1/14 — Seal:



The contractual content of the engineering Specifications and Special Provisions contained herein has been reviewed by the following Professional Engineer:

2) Registered Project Engineer, Daniel Kay — Date: 5/1/14 — Seal:



A. CHANGES TO CONTRACT DOCUMENTS

The following changes to the Contract Documents are hereby made effective as though originally issued with the bid package. Bidders are reminded that all previous requirements to this solicitation remain in full force and effect.

THE SUBMITTAL DATE FOR THIS PROJECT HAS BEEN **EXTENDED AS STATED ON THE COVER PAGE.**

B. BIDDER's QUESTIONS

Q1. In spec section 12 9300-3 Item 4. C. 1 That model number is for powder coat, however it says stainless after. Please confirm the bike racks are to be stainless steel.

A1. The bike racks are to be stainless steel. The product callout for Section 12 9300-3 Item 4.C.1 shall be WCR02-SF-SS

Q2. Supplementary Special Provisions, Paragraph 7-5 (permits, fees and notices) states: ……"the contractor is responsible for any fees associated with the transfer of the permit (general building Permit". How much is the transfer fees?

A2. Please disregard this statement. The Successor Agency will pay for the transfer fees associated with the transfer of the permit. See item D.1 of this addendum for clarification to the contract documents.

Q3. Sheet L8.11, detail 3, Concrete Planter Wall, states: see Specs for color and finish. Specification section 03 3000-4, paragraph 2.7 –A states: color to be selected by the Architect. Since price of concrete colors vary significantly depending on the color, please specify the color.

A3. The intended color is to be Davis 'Sierra 61078'. For bidding purposes, please use Davis 'Sierra 61078'.

Q4. On Sheet L6, the plant counts for the Green Roof 4" pots (eq #s of Echevaria and Sedums specified) are not provided. Please provide required quantities

A4. Please note, plant totals are provided for reference only. Contractor shall verify all plant totals. Please revise succulent plant totals as follows:

AEONIUM URBICUM – 82
ALOE CAMERONI – 213
ECHEVERIA MIX – 914 TOTAL

Q5. Please provide a specification for the fire sprinkler system as none was provided.

A5. The fire sprinkler system is to be designed and submitted by the contractor. The fire sprinkler system requirements are listed on Sheet A2.0

Q6. Detail 4/L6.1 (as noted in the green roof 4" plant materials), calls for mulch to be used, but to be kept 2-3" from the trunk of the groundcover. If the plants are spaced at 4" oc as specified, there will be no remaining space for mulch. Should mulch not be used?

A6. Yes, mulch should be used on the green roof, even within groundcover areas. Please remove note "A" from Groundcover Planting detail 4/L6.1, which currently states: "Keep mulch 2-3" from trunk of trees, shrub, or groundcover, typ.". Note, mulch on green roof shall be rock mulch per callout #7, detail B, L-6.2.

Q7. Please provide a specification for the skylights as one was not included in the bid documents (including manufacturer and material requirements).

A7. Skylight specification Section attached.

Q8. Per attachment E Supplementary Special Provisions, Paragraph 2.6 4.B. - 9.5" dia. columns are required at the South Pavilion. The 9.5" column is a custom size, and would be just as costly as the tapered column. A 10" is available as a standard size. Please confirm if this is acceptable, or if the 9.5" is required.

A8. The column needs to be the 9.5" diameter so that the tops of the shorter columns are the same dimension as the taller columns. This is based on the tapered columns which are still critical to the design intent. A 10" diameter column is not approved for use as a substitution.

Q9. The bid form base bid items do not include a line item for division 10 (i.e. toilet compartments & accessories, fire extinguishers) per the NAICS codes listed. Please clarify which bid item should include division 10.

A9. For bidding purposes the bidders may include Division 10 in bid item number 13 – Finishes. The Contractor will be required to submit a Schedule of Values per Section 9-2.2.1 of the Whitebook to encompass all items of work.

Q10. Specifications sections 33 3000, paragraph 3.12B and 33 4000, paragraph 3.16B require videotaping of sewer and storm drain pipes. Would this apply to small pipe sizes, 4" and 6" diameter?

A10. Yes.

Q11. Please confirm the locations (buildings, basements) requiring an automatic fire sprinkler system. The cover plan sheet refers to this project as both construction types V-B Fully Sprinklered and V-B Non-sprinklered.

A11. Refer to Dwg A2.0, NE and NW Pavillions are Construction type VB non-sprinklered and South Pavillion is Construction Type VB fully sprinklered as indicated on the Area Analysis.

Q12. Regarding the Permaloc edging specified on Detail B, Sheet L6.2: The permaloc product specified is not an "L" shaped bracket as shown in the drawing and as it uses stakes to secure into substrate, it is not appropriate for use on a living roof

(where there is not a suitable substrate below to drive a stake into). It does not appear that Permaloc has a product that meets the dimensions required by the drawings, but their Geo Edge product seems closest. Please clarify conditions / products at edging (especially along slopes where depth will vary).

A12. Metal edging is intended to be straight, not "L" shaped. Heavy dashed "L" shaped line is filter fabric; please refer to detail C, LC6.2 for enlargement which shows the edging in relationship to the filter fabric. The intent is to secure edging in the lightweight soil mix with stakes. Stake depth should be modified if needed so not to touch the waterproofing layer below.

Q13. The greenroof products (by HydroTech) on Detail 1 / Sheet A9.11 are not readily supplied to San Diego in small quantities (as needed in this project)- incurring unnecessary freight charges. Several more readily available alternates are available such as products by Colbond and Carlisle. Would equivalent products from these alternate suppliers be acceptable?

A13. Yes.

Q14. Per plan sheet P0.1 Fixture Schedule, the shower is a deductive alternate. This is not reflected on the bid form. Please clarify.

A14. The shower is part of the fountain construction and shall be considered part of the additive alternate. Sheet P0.1 and P2.2A have been revised to accurately reflect this condition.

Q15. Project Specifications, table of contents. Division 31, Section 31 1000, Site Clearing is missing.

A15. Section 31 1000 – Site Clearing has been added to the contract documents.

Q16. Geotechnical Report, Section 4.2.2 Site Preparation. Second paragraph states "We anticipate about 4 feet of fill will need to be removed and replaced as properly compacted fill across the entire site". Was this removal and replacement done as part of the rough grading or it is under the scope of work of this contract?

A16. The removal and replacement of 4 feet of fill was previously performed during the rough grading and is not part of this contract.

Q17. The Instruction for Bidders lists "broadcast solicitation is acceptable." What form of median does "Broadcast" mean?

A17. Broadcast would be reaching more than one potential interested bidders. An example would be a mass email, an ad in newspaper, business or professional that targets SLBE/ELBE subs. Remember that each firm must be identifiable.

Bidders must provide copies of ALL solicitations with one of the following forms of verification that the solicitations were sent: a) If mailed: provide copies of the metered envelopes or certified mail receipts b) If faxed: provide

copies of the fax transmittal confirmation sheets (s) c) If emailed provide copies of the email delivery confirmation sheets(s). No credit shall be given for error messages, busy; cancelled, undeliverable, etc.

Q18. The detail (9/A9.1) and specification (083326) for the overhead coiling grille are provided, yet they cannot be found on any of the elevations. Please clarify the buildings/locations where the grilles are located.

A18. The overhead coiling grille is shown on sheets A2.1, Detail 3 and A4.2B, Detail D.

Q19. Specification section 31 0000, paragraph 3.20 refers to the over-excavation of building pad areas as recommended by the Geotechnical Engineer. The Geotechnical Report does not make any specific recommendations about the over-excavation of the building pads. Please advise.

A19. Over excavation of the building pads areas are not required as this was previously performed during the rough grading phase of this project.

Q20. Sheet S2.2A, the dividing line between the 5” and 9” slab is not shown.

A20. The transition occurs at the ramp at the belvedere, see L5.0 for the location of the ramp, see 9/S5.1 for the detail of the slab transition.

Q21. Drawing sheet E2.3 detail "Luminaria Electric Light" Note #4 indicates that the Luminaria fabricator is responsible for providing all components and hardware as required to produce a complete and functioning system. Please confirm that the electrical responsibility is limited to the connection of power to this pre assembled unit as described in the note.

A21. The luminaire Vendor will need to fabricate, wire, and assemble components in conformance to applicable Codes and Standards. All connections/terminations from the components provided by the Luminaire Vendor to field power and data sources shall be the responsibility of the Electrical Contractor. This is also the case for both power and data connections/terminations at the base of the Luminaire. The Luminaire shall be fabricated and tested in the factory by the Vendor, and shall be shipped to the site in pieces, as necessary to ensure there is no damage to the luminaire in transit, and will need to be assembled in the field by the contractor based on the assembly and installation instructions provided by the Vendor. It is up to the contractor to determine final divisions of scope to ensure appropriate checks and balances are in place through submittal and shop drawing reviews.

Q22. Noticed during review of the plans and specs that the was a major section of work not indicated in the specification index (page 81) SECURITY CAMERA SYSTEM 281000

A22. The specifications section 281000 is included in the bid package and has been added to the table of contents.

Q23. Plan sheet HA1.1, keynote 7 and 20 call for replicated concrete curbs and strips. Are these items to be precast, to match the color of the other replicated items, or field cast in place items, with color to match the other replicated items?

A23. Per detail 4/HA6.1 continuous rebar suggests the curb is best cast in place with color to match the other replicated items.

Q24. Sheet HA1.1 keynote 20 references detail HA6.1. Keynote 26 references detail 3, 4/HA6.1 and is immediately adjacent to the keynote 20 curb strip. Are these 2 details mutually exclusive, so that everywhere the detail 20 concrete strip occurs a detail 26 mow strip will occur also?

A24. Per plan HA1.1, keynote 20 (2/HA6.1) occurs at the perimeter of the park only. Keynote 26 (3/HA6.1) should only occur at the interior walkway. Keynote 26 references the use of D.G. Dusting, not the style of curb, note it references two details. For clarification keynote 26 is deleted from the perimeter at the east and west ends. Detail 2/HA6.1 is revised to include the D.G. dusting. See attached revised drawings.

Q25. Sheet HA1.1, along the new interior replicated pavers, keynote 13, there are 4 areas where the pavers bump out. The bump outs have keynote 6 and 26 at each location. Will these areas require a detail 6, low curb and a detail 26, mow strip at each location, or just one or the other?

A25. Per plans, detail 3/HA6.1, occurs at the “bump-outs”, keynote 26 references the use of D.G. Dusting, not the style of curb, note it references two details.

Q26. Specification section 01 3591 Historic Treatment Procedures, item 1.9.E.1 notes a full time supervisor to be onsite during the onsite historic treatment works in progress. Can this be the qualified supervision of the selected qualified historic treatment subcontractor or must it be a separate and independent conservator/supervisor other than the selected qualified historic treatment contractor’s onsite supervision?

A26. Per Specification 01 3591 1.5B A conservator is defined as a person with advanced training in science, studio arts and art history, and with experience in applying manual skills…” Specification 01 3591 1.9E.1 A Conservator may have a Field Supervisor under his supervision with the qualifications listed. Note the Field Supervisor is supportive to paragraph E. The intent of the “Conservator” is to have one separate “experienced firm” on the contractor’s team that is knowledgeable of the scope of the historic preservation processes as required in paragraph E. A “historic treatment subcontractor’s supervisor” rarely meets the qualifications as defined and lacks the autonomous ability to uphold the American Institute for Conservation of Historic and Artistic Works per specification 01 3591 1.3A10 above financial or schedule related pressures. In addition to the qualified Conservator’s listed in specification 01 3591-1.9G-1 as qualified conservator may be considered: Silverlake Conservation, 5368 W. Pico Blvd., Los Angeles, CA 90019, (323) 936-9519 Amy Green at amygreen@mindspring.com

Q27. Can you provide date and any project coordination information for the other projects at Horton Plaza?

A27. Specific dates on the other projects are not available at this time. Information about the other projects and coordination requirements are located under section 2-14.2 of the SSP.

Q28. Are there any time or date restrictions within downtown San Diego for concrete pours or deliveries?

A28. Construction activity Moratoriums are specified under Section 6-2.1 of the SSP.

Q29. Specification 32-1440 Stone Paving: 2.2 Stone for Paving C and, 2.3 Stone for Steps and Seat Terraces, A and, 2.4 Stone for Fountain Jets and Nozzles, A. All referenced specifications require material properties of bulk density and other properties which are beyond reported test results we believe the resource can produce. This creates the potential for rejection of material otherwise suitable for the intended use, based on non compliance with the stated specification values. Our suggestion would be that based on evaluation and concurrence by the design professionals, a range of physical property values between those stated and 10% below those stated would remove that issue.

A29. Please find the revised Section 32 1440 – STONE PAVING of this addendum.

Q30. A few questions regarding the Bid Form... Page 13 has a field for "Business Address", and also has fields for "Place of Business" and "Place of Residence" - can you let me know what we are to include in the "Place of Business" field? Also Note "A" only mentions "Additive Alternate A" - Will "Alternate B" not be considered for determination of low Bid by the City? Should "Alternate B" be listed as well?

A30. The “Place of Business” is the firm’s physical address. This may differ from the “Business Address” in cases where a PO Box is used for correspondence. Enter in the “Place of Business” space your firm’s physical address. Alternate B will not be considered when determining the low bid.

Q31. After checking out the plans, I was a bit concerned that the EM1300 is too large for the flow rate which will destroy a lot of chlorine that they are using as the primary disinfectant. UV is for secondary disinfection and our EM600 should be sufficient to handle the extra 60-90gpm and still do its job properly. Also the EM300 is a bit large for the other unit as well and our EM130-1000 will be sufficient. Oversizing with UV units destroys chlorine. We have other units that will come closer to the actual flow rates.

A31. The Health department will not allow a UV unit that is rated for a flow rate less than the pump can handle. Substitution of the medium pressure UV units with low pressure UV unit will be allowed. The following are the models that can be substituted:

Pop Jet UV Unit: ‘Chlorking’ SAG 240-A, rated at 144 gpm for outdoor use, or ‘Delta UV’ ELP38 HDPE, rated at 116 gpm

Leaper Jet UV Unit: ‘Chlorking’ SAG 240-A, rated at 144 gpm for outdoor use, or ‘Delta UV’ ELP38 HDPE, rated at 116 gpm

Aerator Jet UV Unit: 'Chlorking' SAG 720-A, rated at 850 gpm for outdoor use, or 'Delta UV' ELP314/3AM, rated for 695 gpm

Each unit shall have an audible alarm and auto shut-off relay as provided by the manufacturer

Q32. Spec section 057513 part 2, 2.4.A. The type 316 stainless steel door stop is not available for the provider shown, would type 304 stainless steel be O.K.?

A32. Type 304 for this hinge is acceptable, or propose an equal product per specifications.

Q33. Spec section 057513 part 2.10 stainless-steel finishes section C. The Mechanical non-directional finish applied to the 12 gage type 316 stainless steel 2B sheet –for the luminaria panels as seen in 2/L8.15, is there a sample available, or a specific vendor / supplier for the finish. Not sure if you are looking for an orbital finish / angel hair or a random swirl pattern? The non directional finish can be interpreted many ways. Also, is finish required on both sides of the luminaria panels? The finish used is the same on all, as seen in spec section 057513 part 2, 2.10.A correct? Is it acceptable to apply non directional finish after water jetting / laser cutting & passivating of luminaria panels? Or does finish of the panels need to happen prior to passivating?

A33. Non-directional is an industry standard finish that is produced by fine grit orbital sanding on #2b stainless steel and finish is described further for required appearance in Section 05 7513, 2.10.C. Angel hair and random swirl will not be accepted. The finish is not required on both sides where the interior is not visible except through perforations. Finishing could be limited to the top 1/3 of the luminaria. The finish is the same for all. Execution means and methods for finishing and passivation are left to the contractor/fabricator to follow industry standard that achieves the desired finish and leaves the steel in a passive state achieving the highest degree of corrosion resistance.

Q34. The luminaria panels as seen in 2/L8.15 – Many of the luminaria panels exceed max lengths that can be fabricated. Would it be O.K. to add a butt joint horizontally? (see spec section 057513 part 2, 2.8 section C) Would this section apply here? This would help in the laser cutting / water jetting portion, passivating of the parts, and any brakeforming required, if parts/panels are shorter than 144".

A34. Butt jointing on the luminaria will not be accepted.

Q35. Are the luminaria panels to be removable for access to lighting, electrical etc? If so, are exposed fasteners O.K. here? Per spec section 057513 part 2, 2.7.D-exposed fasteners are not allowed? Tamperproof screws may be an option here.

A35. Luminaria panels are not to be removed. Exposed fasteners are not acceptable.

Q36. Structural steel @ inside of luminaries – I see a note on 1/L8.15 says something about "WELD TO COLUMN PRIOR TO GALV" – Are the structural steel bases and structural pole portion to be hot dipped galvanized?

A36. See S1.0, Note M.7, Galvanizing is specified.

Q37. In details 1/L8.15 & 5/L8.20 – Looks as if lighting may penetrate luminaria panels – is this correct? Do provisions need to be provided here by panel fabricator? If so, is there a detail? And will an exact placement/location be provided later?

A37. The lighting does not penetrate the luminaria and is only shown graphically in the details as overlapping. Lighting projects in the gaps at the top of luminaria only. No provisions for lighting beyond those detailed need to be included.

Q38. Stainless steel support arms between structural steel and luminaria panels are O.K. to be mechanically fastened as seen on 3/S5.4. But if manufacture wanted to weld the stainless steel support arms directly to galvanized structural post would it be O.K. to do so, and touch up area of weld with a cold galvanized spray product?

A38. See Note 4, sheet number S5.4, Detail 3.

Q39. What is the wall thickness of the 12" x 12" structural tube required at the luminaries as seen in details 3 & 4/S5.4

A39. These columns are HSS 12x12x5/8, designated at column C8 on the structural plan sheets and on the column schedule.

C. CLARIFICATION

1. The proposed changes to the building plans are for bidding purposes only. Proposed changes will be processed and approved through Development Services Department.

D. VOLUME 1

1. To Attachment E, Supplementary Special Provisions, page 49, Item 7-5, "Permits, Fees, and Notices", Second paragraph, **DELETE** last sentence, "The Contractor is responsible for any fees associated with the transfer of the permit" in its entirety.

2. To Attachment E, Technicals, **ADD** Section 08 6200 – Unit Skylights, pages 14 through 19 of this Addendum.

3. To Attachment E, Technicals, **ADD** Section 31 1000 – Site Clearing, pages 20 through 26 of this Addendum.

4. To Attachment E, Technicals, Specification Table of Contents, pages 78 through 81, **DELETE** in their entirety and **SUBSTITUTE** with pages 27 through 30 of this Addendum.

5. To Attachment E, Technicals, Section 12 9300 - Site Furnishings, Part 2 – Products, page 469, 2.1, Site Furnishings, Item A, Products, Sub-item 4, Bike Racks, Sub-part c, Palmer Group LLC, San Francisco, CA, Tele: 415 333 6428, Sub-part 1) Model: WCR02-SF-P Stainless, **DELETE** in its entirety and **SUBSTITUTE** with the following:

   1) Model: WCR02-SF-SS.

6. To Attachment E, Technicals, Section 13 1206 – Water Feature Waterproofing, Part 2 – Products, page 524, 2.2, Materials, Item A, Waterproofing Material – Cement Waterproofing, Sub-item 1, Product, **DELETE** in its entirety and **SUBSTITUTE** with the following:

    1. Product: AQUAFIN-2K/M or Xypex two coat crystalline waterproofing or Hycrete W500.

7. To Attachment E, Technicals, Section 26 0533 - Raceway & Boxes For Electrical Systems, page 608, 3.5, Direct Burial Installation, Item A, Sub-item 4, Sub-parts a and b, **DELETE** in their entirety and **SUBSTITUTE** with the following:

    a. Not less than 18 inches below finish grade

    b. Not less than 24 inches below road and other paved surfaces

8. To Attachment E, Technicals, Section 32 1440 – STONE PAVING, pages 744 through 756, **DELETE** in their entirety and **SUBSTITUTE** with pages 31 through 42 of this Addendum.

9. To Attachment E, Supplementary Special Provisions Appendices, **ADD "**Appendix L, Addenda to the Geotechnical Investigation and Fault Hazard Assessment, pages 43 through 53 of this Addendum.

E. PLANS

1. To Building Plans (37342-D), page 1, Cover Sheet, **DELETE** in its entirety and **REPLACE** with page 54 of this Addendum.

2. To Building Plans (37342-D), page 6, Sheet C00, **DELETE** in its entirety and **REPLACE** with page 55 of this Addendum.

3. To Building Plans (37342-D), page 7, Sheet C100, **DELETE** in its entirety and **REPLACE** with page 56 of this Addendum.

4. To Building Plans (37342-D), page 19, Sheet L4.3, **DELETE** in its entirety and **REPLACE** with page 57 of this Addendum.

5. To Building Plans (37342-D), page 31, Sheet L5.1, **DELETE** in its entirety and **REPLACE** with page 58 of this Addendum.

6. To Building Plans (37342-D), page 56, Sheet L8.12, **DELETE** in its entirety and **REPLACE** with page 59 of this Addendum.

7. To Building Plans (37342-D), page 67, Sheet L9.0, **DELETE** in its entirety and **REPLACE** with page 60 of this Addendum.

8. To Building Plans (37342-D), page 69, Sheet HA1.1, **DELETE** in its entirety and **REPLACE** with page 61 of this Addendum.

9. To Building Plans (37342-D), page 77, Sheet HA6.1, **DELETE** in its entirety and **REPLACE** with page 62 of this Addendum.

10. To Building Plans (37342-D), page 88, Sheet A2.2, **DELETE** in its entirety and **REPLACE** with page 63 of this Addendum.

11. To Building Plans (37342-D), page 90, Sheet A3.1A, **DELETE** in its entirety and **REPLACE** with page 64 of this Addendum.

12. To Building Plans (37342-D), page 91, Sheet A3.1B, **DELETE** in its entirety and **REPLACE** with page 65 of this Addendum.

13. To Building Plans (37342-D), page 92, Sheet A3.2A, **DELETE** in its entirety and **REPLACE** with page 66 of this Addendum.

14. To Building Plans (37342-D), page 93, Sheet A3.2B, **DELETE** in its entirety and **REPLACE** with page 67 of this Addendum.

15. To Building Plans (37342-D), page 94, Sheet A3.3A, **DELETE** in its entirety and **REPLACE** with page 68 of this Addendum.

16. To Building Plans (37342-D), page 95, Sheet A3.3B, **DELETE** in its entirety and **REPLACE** with page 69 of this Addendum.

17. To Building Plans (37342-D), page 96, Sheet A3.4A, **DELETE** in its entirety and **REPLACE** with page 70 of this Addendum.

18. To Building Plans (37342-D), page 97, Sheet A4.1A, **DELETE** in its entirety and **REPLACE** with page 71 of this Addendum.

19. To Building Plans (37342-D), page 98, Sheet A4.1B, **DELETE** in its entirety and **REPLACE** with page 72 of this Addendum.

20. To Building Plans (37342-D), page 99, Sheet A4.2A, **DELETE** in its entirety and **REPLACE** with page 73 of this Addendum.

21. To Building Plans (37342-D), page 100, Sheet A4.2B, **DELETE** in its entirety and **REPLACE** with page 74 of this Addendum.

22. To Building Plans (37342-D), page 103, Sheet A9.0, **DELETE** in its entirety and **REPLACE** with page 75 of this Addendum.

23. To Building Plans (37342-D), page 107, Sheet A9.4, **DELETE** in its entirety and **REPLACE** with page 76 of this Addendum.

24. To Building Plans (37342-D), **ADD** sheet A9.4.1, page 77 of this Addendum.

25. To Building Plans (37342-D), page 122, Sheet S1.4, **DELETE** in its entirety and **REPLACE** with page 78 of this Addendum.

26. To Building Plans (37342-D), page 127, Sheet S2.2A, **DELETE** in its entirety and **REPLACE** with page 79 of this Addendum.

27. To Building Plans (37342-D), page 130, Sheet S2.3A, **DELETE** in its entirety and **REPLACE** with page 80 of this Addendum.

28. To Building Plans (37342-D), page 131, Sheet S2.3B, **DELETE** in its entirety and **REPLACE** with page 81 of this Addendum.

29. To Building Plans (37342-D), page 132, Sheet S2.3C, **DELETE** in its entirety and **REPLACE** with page 82 of this Addendum.

30. To Building Plans (37342-D), page 143, Sheet S5.3, **DELETE** in its entirety and **REPLACE** with page 83 of this Addendum.

31. To Building Plans (37342-D), page 147, Sheet S5.7, **DELETE** in its entirety and **REPLACE** with page 84 of this Addendum.

32. To Building Plans (37342-D), page 148, Sheet S5.8, **DELETE** in its entirety and **REPLACE** with page 85 of this Addendum.

33. To Building Plans (37342-D), page 149, Sheet E1.1, **DELETE** in its entirety and **REPLACE** with page 86 of this Addendum.

34. To Building Plans (37342-D), **ADD** sheet RE1.3.1, page 87 of this Addendum.

35. To Building Plans (37342-D), page 152, Sheet E1.4, **DELETE** in its entirety and **REPLACE** with page 88 of this Addendum.

36. To Building Plans (37342-D), page 157, Sheet E2.4, **DELETE** in its entirety and **REPLACE** with page 89 of this Addendum.

37. To Building Plans (37342-D), page 168, Sheet M2.2, **DELETE** in its entirety and **REPLACE** with page 90 of this Addendum.

38. To Building Plans (37342-D), page 172, Sheet P0.1, **DELETE** in its entirety and **REPLACE** with page 91 of this Addendum.

39. To Building Plans (37342-D), page 175, Sheet P2.2A, **DELETE** in its entirety and **REPLACE** with page 92 of this Addendum.

40. To Building Plans (37342-D), page 176, Sheet P2.2B, **DELETE** in its entirety and **REPLACE** with page 93 of this Addendum.

James Nagelvoort, Director
Public Works Department

Dated: *May 2, 2014*
San Diego, California

JN/BD/lji

SECTION 08 6200 – SKYLIGHTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Self-flashing unit skylights with integral curb.

B. Related Sections:
1. Division 07 Section "Sheet Metal Flashing and Trim" for flashing at unit skylights.

1.2 PERFORMANCE REQUIREMENTS

A. AAMA/WDMA Performance Designation: Provide unit skylights capable of complying with performance requirements indicated, based on testing manufacturer's unit skylights that are representative of those specified and that are of minimum test size indicated below:
1. Size: Indicated on Drawings .

B. Test Performance Criteria: Provide unit skylights capable of complying with performance requirements indicated, based on testing manufacturer's unit skylights that are representative of those specified.

1. Structural Performance: Provide unit skylights, including glazing and anchorage, capable of withstanding the effects of the following design loads:

a. Positive Pressure or Inward Load: As indicated.
b. Negative Pressure or Uplift Load: As indicated .

2. Air Infiltration: Provide unit skylights with maximum air leakage through assembly of 0.3 cfm/sq. ft. when tested according to ASTM E 283 at a minimum static-air-pressure difference of 6.24 lbf/sq. ft..
3. Water Penetration: Provide unit skylights that do not evidence water penetration through assembly when tested according to ASTM E 331 at a zero static-air-pressure difference across unit.

C. Windborne-Debris-Impact-Resistance Performance: Provide unit skylights that pass missile-impact and cyclic-pressure tests when tested according to ASTM E 1886 and testing information in ASTM E 1996 .

1. Large-Missile Impact: For unit skylights located within 30 feet of grade.
2. Small-Missile Impact: For unit skylights located more than 30 feet above grade.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of unit skylight indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for unit skylights.

B. Shop Drawings: For unit skylight work. Include plans, elevations, sections, details, and connections to supporting structure and other adjoining work.

1. Unit Skylight Operating System: Show locations, mounting, and details for installing operator components and controls.

1.4 INFORMATIONAL SUBMITTALS

A. Product Test Reports: Based on evaluation of comprehensive tests performed within the last four years by a qualified testing agency for each type, performance class, performance grade, and size of unit skylight. Test results based on use of downsized test units will not be accepted.

B. Field quality-control reports.

C. Warranty: Sample of special warranty.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For unit skylights to include in maintenance manuals.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: A manufacturer capable of fabricating unit skylights that meet or exceed performance requirements indicated and of documenting this performance by inclusion in lists and by labels, test reports, and calculations.

B. Installer Qualifications: An installer acceptable to unit skylight manufacturer for installation of units required for this Project.

C. Source Limitations: Obtain unit skylights from single source from single manufacturer.

D. Unit Skylight Standard: Comply with AAMA/WDMA 101/I.S.2/NAFS, "North American Fenestration Standard Voluntary Performance Specification for Windows, Skylights and Glass Doors," for minimum standards of performance, materials, components, accessories, and fabrication. Comply with more stringent requirements if indicated.

1. Provide AAMA-certified unit skylights with an attached label.

E. Preinstallation Conference: Conduct conference in conjunction with roofing preinstallation conference at Project site.

1.7 COORDINATION

A. Coordinate unit skylight flashing requirements with roofing system.

B. Coordinate sizes and locations of prefabricated curbs with actual unit skylights provided.

C. Provide anchors and inserts to be placed in adjacent construction in proper sequence so as not to delay the Work.

1.8 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of unit skylights that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Uncontrolled water leakage.
b. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
c. Deterioration of insulating-glass hermetic seal.

2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Bristolite Skylights.
2. Glazed Structures Inc.
3. Naturalite Skylight Systems; Vistawall Group (The).
4. VELUX America (Basis-of-Design).

2.2 MATERIALS

A. Aluminum Components:

1. Sheets: ASTM B 209, alloy and temper to suit forming operations and finish requirements but with not less than the strength and durability of alclad Alloy 3005-H25.
2. Extruded Shapes: ASTM B 221, alloy and temper to suit structural and finish requirements but with not less than the strength and durability of Alloy 6063-T52.

B. Fasteners: Same metal as metal being fastened, nonmagnetic stainless steel, or other noncorrosive metal as recommended by manufacturer. Finish exposed fasteners to match material being fastened.

1. Where removal of exterior exposed fasteners might allow access to building, provide nonremovable fastener heads.

2.3 GLAZING

A. Insulating Glass: Clear, sealed units that comply with Division 08 Section "Glazing" in manufacturer's standard overall thickness.

1. Exterior Lite: 1/4-inch clear laminatedfully tempered glass.
2. Interior Lite:

a. Laminated glass; 2 plies of 1/8-inch clear heat-strengthened glass with 0.030-inch clear polyvinyl butyral interlayer.

3. Interspace Content: Air.
4. Low-Emissivity Coating: Manufacturer's standard.

B. Glazing Gaskets: Manufacturer's standard .

2.4 INSTALLATION MATERIALS

A. Bituminous Coating: SSPC-Paint 12, solvent-type, bituminous mastic, nominally free of sulfur and containing no asbestos fibers, formulated for 15-mil dry film thickness per coating.

B. Joint Sealants: As specified in Division 07 Section "Joint Sealants."

C. Mastic Sealant: Polyisobutylene; nonhardening, nonskinning, nondrying, nonmigrating sealant.

D. Roofing Cement: ASTM D 4586, asbestos free, designed for trowel application or other adhesive compatible with roofing system.

2.5 UNIT SKYLIGHTS

A. General: Provide factory-assembled unit skylights that include glazing, extruded-aluminum glazing retainers, gaskets, and inner frames and that are capable of withstanding performance requirements indicated.

B. Integral Curb: Extruded-aluminum, self-flashing type.

1. Height: 8 inches minimum.
2. Construction: Double wall.
3. Insulation: Manufacturer's standard rigid or semirigid type.

C. Unit Shape and Size: As indicated on Drawings .

D. Condensation Control: Fabricate unit skylights with integral internal gutters and nonclogging weeps to collect and drain condensation to the exterior.

E. Thermal Break: Fabricate unit skylights with thermal barrier separating exterior and interior metal framing.

F. Operable Unit Skylight System: Equip vent-type unit skylights with manufacturer's standard hinges, chain-driven operating hardware, and weather-sealing gaskets.

1. Manual Operator: Manufacturer's standard, rotary-crank extension device.

a. Pole Operator: Manual, telescoping to 144 inches.

2.6 GENERAL FINISH REQUIREMENTS

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.7 ALUMINUM FINISHES

A. High-Performance Organic Finish: 3-coat fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

1. Color and Gloss: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with unit skylight installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Coordinate installation of unit skylight with installation of substrates, vapor retarders, roof insulation, roofing membrane, and flashing as required to ensure that each element of the Work performs properly and that combined elements are waterproof and weathertight.

B. Comply with recommendations in AAMA 1607 and with manufacturer's written instructions for installing unit skylights.

C. Install unit skylights level, plumb, and true to line, without distortion.

D. Anchor unit skylights securely to supporting substrates.

E. Where metal surfaces of unit skylights will contact incompatible metal or corrosive substrates, including preservative-treated wood, apply bituminous coating on concealed metal surfaces, or provide other permanent separation recommended in writing by unit skylight manufacturer.

F. Set unit skylight flanges in thick bed of roofing cement to form a seal unless otherwise indicated.

G. Where cap flashing is indicated, install to produce waterproof overlap with roofing or roof flashing. Seal with thick bead of mastic sealant except where overlap is indicated to be left open for ventilation.

3.3 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. After completion of installation and nominal curing of sealant and glazing compounds but before installation of interior finishes, test for water leaks according to AAMA 501.2.

C. Perform test for total area of each unit skylight.

D. Work will be considered defective if it does not pass tests and inspections.

E. Additional testing and inspections, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.4 CLEANING

A. Clean exposed unit skylight surfaces according to manufacturer's written instructions. Touch up damaged metal coatings and finishes.

B. Remove excess sealants, glazing materials, dirt, and other substances.

C. Remove and replace glazing that has been broken, chipped, cracked, abraded, or damaged during construction period.

D. Protect unit skylight surfaces from contact with contaminating substances resulting from construction operations.

END OF SECTION 08 62 00

SECTION 31 1000 - SITE CLEARING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Protecting existing trees to remain.
2. Removing existing trees shrubs groundcovers plants and grass.
3. Clearing and grubbing.
4. Stripping and stockpiling topsoil.
5. Removing above- and below-grade site improvements including but not limited to pavements, structures and other appurtenances.
6. Disconnecting, capping or sealing, and abandoning site utilities in place and removing site utilities where indicated.
7. Temporary erosion and sedimentation control measures.
8. Alleviation or prevention of dust nuisance.

B. Related Sections include the following:

1. Drawings and general provisions of the Contract, including Part 1- “General Provisions” of the Greenbook and Whitebook apply to this Section.
2. Greenbook/Whitebook 2012 for all temporary facilities, utilities and site controls requirements.
3. Division 02 Section "Selective Structure Demolition" for partial demolition of buildings or structures undergoing alterations.
4. Division 31 Section "Earthwork" for soil materials, excavating, backfilling, and site grading.
5. Greenbook/Whitebook Specification Section 212-1.1-2 “Topsoil” for soil materials and amendments.
6. Greenbook/Whitebook Specification Section 308-4 "Planting" for tree and shrub planting, and tree support systems.

1.2 DEFINITION

A. Clearing is defined as removal of debris, trees, brush, vines, sod, and other vegetative growth at or above the ground surface.

B. Grubbing is defined as removal of vegetative growth or natural wooden items at or below ground surface, which remain after clearing work.

C. Demolition is defined as removal of fences, portion of structures, pavements, utilities, and other such manmade items at or below the ground surface. Salvage and deliver to Owner items noted in plans or as directed by Owner’s Representative.

D. Disposal is defined as removal of refuse resulting from clearing, grubbing, and demolition work.

E. Tree Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction, and defined by the drip line of individual trees or the perimeter drip line of groups of trees, unless otherwise indicated.

1.3 OWNERSHIP OF MATERIALS

A. Unless otherwise shown, specified, indicated to remain or designated for salvage, all materials resulting from the grubbing, clearing and demolition Work shall become the property of the Contractor and shall be disposed of off-site in a lawful manner. All topsoil material is to remain on the site and be stockpiled at approved location during grading. Care shall be taken not to contaminate existing topsoil.

1.4 SUBMITTALS

A. Photographs or videotape, sufficiently detailed, of existing conditions of trees and plantings, adjoining construction, and site improvements that might be misconstrued as damage caused by site clearing.

1.5 Record drawings: Identify and accurately locate capped utilities and other subsurface structural, electrical, and mechanical conditions.

1.6 QUALITY ASSURANCE

A. Preinstallation Conference: Conduct conference at Project site to comply with requirements of Greenbook/Whitebook.

1.7 PROJECT CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
2. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.
3. Provide flaggers as needed to ensure public safety.

B. Improvements on Adjoining Property: Authority for performing site clearing indicated on property adjoining Owner's property will be obtained by Owner before award of Contract.

1. Do not proceed with work on adjoining property until directed by Owner’s Representative.

C. Salvable Improvements: Carefully remove items indicated to be salvaged and store on the Owner’s premises where indicated.

D. Do not commence site clearing operations until temporary erosion and sedimentation control measures are in place.

1.8 EXISTING UTILITIES

A. Contractor shall be responsible for determining which utility agencies, public or private, have underground or surface facilities. Contact Owner to obtain copies of Record Documents for existing on-site utilities.

B. Utility Locator Service: Notify utility locator service for area where Project is located before site clearing. Call Dig Alert at 811.

C. Locate and identify, with visible marking, existing underground utilities in the areas of Work. If utilities are to remain in place, provide adequate means of protection during excavation operations.

D. Should uncharted piping or other utilities be encountered during excavation, consult the utility owner immediately for directions. Cooperate with the owner and public and private utility companies in keeping their respective services and facilities in operation. Repair damaged utilities to the satisfaction of the utility owner. The cost of repairing charted utilities shall be paid by the Contractor.

E. Do not interrupt existing utilities service facilities occupied and used by the owner or others, except when permitted in writing by the Owner's Representative and then only after acceptable temporary utility services have been provided.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. Satisfactory Soil Materials: Requirements for satisfactory soil materials are specified in Division 31 Section "Earthwork."

1. Obtain approved borrow soil materials off-site when satisfactory soil materials are not available on-site.

2.2 WATER

A. Contractor may use water source located on site if approved by and coordinated with the Owner. If temporary water meter is required, Contractor is responsible for this expense at no additional cost to the Owner.

B. Water used in dust control shall be free of silts and other materials deleterious to the quality of the material to which it is applied or with which it is mixed.

C. Unless otherwise specified in the Special Provisions, make all necessary arrangements for obtaining water and pay all costs involved in its procurement. Provide and maintain equipment necessary to pump, haul and place the water. Maintain an adequate supply of water at all times.

PART 3 - EXECUTION

3.1 INSPECTION OF SITE

A. Prior to commencement of Work under this section, the Owner's Representatives shall inspect the site to fully determine the extent of work requirements and limitations.

B. Mark or flag improvements to be removed prior to the inspection.

3.2 PREPARATION

A. Protect and maintain benchmarks and survey control points from disturbance during construction.

B. Locate and clearly flag trees and vegetation to remain or to be relocated. Do not use paint to mark trees to remain.

C. Protect existing site improvements to remain from damage during construction.

1. Restore damaged improvements to their original condition, as acceptable to the Owner or Owner' Representative at no additional cost to the Owner.

3.3 TEMPORARY EROSION AND SEDIMENTATION CONTROL

A. Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to requirements of authorities having jurisdiction and erosion and sediment control Drawings.

B. Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.

C. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.4 PLANT PROTECTION

A. Protect all trees, shrubbery, and grass areas not designated for removal under this Contract. Temporary, continuous barriers shall be erected where necessary to assure their safety. Repair any trees, vegetation or grass areas damaged as a result of Work under this section in an approved manner.

B. Erect and maintain temporary fencing around plant protection zones before starting site clearing. Remove fence when construction is complete.

1. Do not store construction materials, debris, or excavated material within fenced area.
2. Do not permit vehicles, equipment, or foot traffic within fenced area.
3. Maintain fenced area free of weeds and trash.

C. Do not excavate within tree protection zones, unless otherwise indicated.

D. Where excavation for new construction is required within tree protection zones, hand clear and excavate to minimize damage to root systems. Use narrow-tine spading forks, comb soil to expose roots, and cleanly cut roots as close to excavation as possible.

1. Cover exposed roots with burlap and water regularly.
2. Temporarily support and protect roots from damage until they are permanently redirected and covered with soil.
3. Coat cut faces of roots more than 1-1/2 inches in diameter with emulsified asphalt or other approved coating formulated for use on damaged plant tissues.
4. Backfill with soil as soon as possible.

E. Repair or replace trees and vegetation indicated to remain that are damaged by construction operations, in a manner approved by Owner's Representative.

1. Employ an arborist, licensed in jurisdiction where Project is located, to submit details of proposed repairs and to repair damage to trees and shrubs.
2. Replace trees that cannot be repaired and restored to full-growth status, as determined by Owner's Representative.

3.5 UTILITIES

A. Existing Utilities: Do not interrupt utilities serving facilities occupied by the Owner, leasors or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

1. Notify Owner's Representative not less than two days in advance of proposed utility interruptions.
2. Do not proceed with utility interruptions without written permission of the Owner's Representative.

B. Excavate and remove underground utilities indicated to be removed on the Drawings. Disconnect existing service lines to be abandoned and cap exposed service lines to be maintained.

3.6 DUST CONTROL

A. Contractor shall provide a dust control media, such as water, to control on-site dust and to prevent dust from leaving the site. Failure may result in Owner providing dust control measures at Contractor's expense.

B. The watering Work shall be subject to the control of the Owner's Representative. Watering shall be done only when and where directed by the Owner's Representative. The rates of application shall be as directed, and the manner of application shall be as approved by the Owner's Representative.

C. Watering shall be performed at any hour of the day and on any day of the week that the Owner's Representative may determine necessary for adequate alleviation of dust nuisance. Wastage of water or watering which is detrimental to other Work shall be avoided and such operations ceased until the Owner's Representative determines what corrective measures shall be taken.

D. Watering shall be by means of tank trucks equipped with spray bars, by hose and nozzle or by other means, any and all of which shall insure uniform and controlled application.

3.7 CLEARING AND GRUBBING

A. Remove obstructions, trees, shrubs, grass, and other vegetation to permit installation of new construction.

1. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated.
2. Cut minor roots and branches of trees indicated to remain in a clean and careful manner where such roots and branches obstruct installation of new construction.
3. Grind stumps and remove roots larger than one inch in diameter, obstructions, and debris extending to a depth of 24 inches below exposed subgrade.
4. Use only hand methods for grubbing within tree protection zone.
5. Chip removed tree branches and stockpile or spread onto areas approved by Owner's Representative.

B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material unless further excavation or earthwork is indicated.

1. Place fill material in horizontal layers not exceeding a loose depth of 8 inches, and compact each layer to a density equal to adjacent original ground.

3.8 TOPSOIL STRIPPING

A. Remove sod and grass before stripping topsoil.

B. Strip topsoil to whatever depths are encountered in a manner to prevent intermingling with underlying subsoil or other waste materials.

1. Remove subsoil and nonsoil materials from topsoil, including trash, debris, weeds, roots, and other waste materials.

C. Stockpile topsoil materials away from edge of excavations without intermixing with subsoil. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust.

1. Limit height of topsoil stockpiles to 72 inches.
2. Do not stockpile topsoil within tree protection zones.
3. Dispose of excess topsoil as specified for waste material disposal.

3.9 SITE IMPROVEMENTS DEMOLITION

A. Remove existing above- and below-grade improvements as indicated on the Drawings and as necessary to facilitate new construction.

B. Remove slabs, paving, curbs, gutters, and aggregate base as indicated on the Drawings.

1. Unless existing full-depth joints coincide with line of demolition, neatly saw-cut length of existing pavement to remain at the nearest control joint before removing existing pavement. Saw-cut faces vertically.
2. Paint cut ends of steel reinforcement in concrete to remain to prevent corrosion.

C. Remove all structures or portions of structures shown, specified, or required to be removed in areas of Work. For salvage items, deliver to Owner or as noted on Drawings for reuse. Remove all debris from the demolition work from the site as specified in this section.

1. The removal of debris, construction materials, loose rocks and other materials at or below grade encountered while grading is considered incidental to the site preparation work.

2. Fencing - dispose of existing fences off-site as specified for waste material disposal unless otherwise noted.

3.10 DISPOSAL OF WASTE MATERIAL

A. Disposal: Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, cleared vegetation, and waste materials including trash and debris, and legally dispose of them off Owner's property.
1. Separate recyclable materials produced during site clearing from other nonrecyclable materials. Store or stockpile without intermixing with other materials and transport them to recycling facilities.

END OF SECTION 31 1000

HORTON PLAZA IMPROVEMENT PROJECT

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SECTION 32 1440 – STONE PAVING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Stone pavers set in mortar setting bed.
2. Stone at seating terraces set in mortar setting bed.
3. Stone at stairs set in mortar bed.

B. Related Sections include the following:

1. Drawings and general provisions of the Contract, including Part 1- “General Provisions” of the Greenbook and Whitebook apply to this Section.
2. Division 32 Section “Concrete Paving” for joint types, expansion joint filler, backer rod and joint sealant.
3. Division 03 Section "Cast in Place Concrete" for concrete slabs under stone pavers.
4. Division 04 Section “Adhered Stone Veneer” for mortared stone wall cladding.
5. Division 04 Section “Exterior Stone Cladding” for stone panels mechanically anchored to concrete substrate.
6. Division 07 Section “Joint Sealants” for sealants used with stone paving.

1.2 SUBMITTALS

A. Product Data: For the following:

1. Stone pavers.
2. Stone at seating terraces.
3. Stone at stairs.
4. Mortar materials.
5. Grout materials.
6. Expansion Joint Material including backer rod and sealant.
7. Sealer.
8. Epoxy Adhesive

B. Samples for Verification: The following stone shall be submitted to show the color, texture, and pattern specified, showing the full range of variations expected in the completed work for pavers, risers, treads and seat terraces.
1. A minimum of three (3) for each stone type specified.
    a. Paver samples shall be 12 inches x 12 inches in size. Submit one sample showing each finish type. Apply the specified sealer to one half of each sample.
    b. Riser samples shall be a minimum of 5 inches in length and full scale height and depth and shall include warning grooves with a range of light gray to black lithichrome paint.
    c. Tread samples shall be 12 inches x 12 inches in size.

C. Coefficient of Friction Test Reports: Provide test reports for each specified stone type and finish to be used for paving in pedestrian and vehicular areas of the site, for stair treads and risers and for seat terrace seating surfaces and risers. All finishes must meet a minimum .8 Coefficient of Friction in areas which may be wet at any time.

D. Shop Drawings: **Provide all shop drawings in English and with all dimensioning in Standard (not metric) units of measurement.** Indicating fabrication and installation details for stone including layout, dimensions, thicknesses, jointing, anchors, and connections with other work.

E. Grout Samples for Initial Selection: Submit manufacturer's color charts showing the full range of colors for selection by the Architect.

F. Grout Samples for Verification: Submit three (3) four inch long product samples of the colored grout selected by Architect installed between stone pavers or as required to show the full range of colors to be expected in the finish work.

G. Compatibility and Adhesion Test Reports: From latex-additive manufacturer indicating the following:

1. Mortar and grout containing latex additives have been tested with pavers and slabs for compatibility and adhesion.
2. Interpretation of test results relative to mortar and grout performance and written recommendations for installation practices needed for adhesion.

H. Certification: Submit a letter of certification from the stone fabricator, stating the material being furnished is the specified material and there are sufficient reserves available to supply the project and furnish replacements as needed.

1. Provide track record for stone including quarry name and location.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer with a minimum of 12 years successful in-service performance. The installer shall have completed stone paving installations similar in material, design, and extent to that indicated for this Project and whose work has resulted in a construction record of successful in-service performance. Past work must include a minimum of three (3) projects with stone in a water feature setting.

B. Source Limitations: Obtain each type of stone paver, joint material, and setting material from one source with resources to provide materials and products of consistent quality in appearance and physical properties.

C. Preconstruction Compatibility and Adhesion Testing: Submit to latex-additive manufacturer, for testing indicated below, samples of paving materials that will contact or affect mortar and grout that contain latex additives.

1. Use manufacturer's standard test methods to determine whether mortar and grout materials are required to obtain optimum adhesion with, and will be nonstaining to installed pavers and other materials constituting paver installation.

2. Submit a sufficient number of pavers and other materials involved in installation to allow comprehensive testing.
3. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
4. For materials failing tests, obtain mortar and grout manufacturer's written instructions for corrective measures, including the use of alternative materials to obtain optimum bond and prevent staining.

D. Mockups: Before installing stone, build mockups of the size indicated below, on the project site, for each form and pattern of stone pavers, stone stairs, and seating terrace to verify selections made under sample submittals and to demonstrate aesthetic effects and qualities of materials and execution. Build mockups to comply with the following requirements, using materials indicated for the completed Work, including same base construction, special features for expansion joints, grouted joints with colored grout, sealer application and contiguous work as indicated.

1. Provide mockups in a location as directed by Owner’s Representative for each of the following:
   a. Construct a 12 foot x 12 foot mockup of the Fine Grain paving pattern.
   b. Construct a 24 foot x 24 foot mockup of the Course Grain paving pattern.
   c. Construct a six (6) foot length of the stone seating terrace including a minimum of two (2) risers and two (2) seating surfaces. Include warning groove detail.
   d. Construct a six (6) foot length of a stone stair including a minimum of two (2) risers and two (2) treads. Include warning groove detail.
2. Notify Owner’s Representative seven days in advance of dates and times when mockups will be constructed.
3. Demonstrate the proposed range of aesthetic effects and workmanship.
4. Obtain Architect's approval of mockups before starting stone paving installation.
5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
6. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Protect all stone and aggregate during storage and construction against soiling or contamination from earth and other materials.

1. Cover stone with plastic or use other packaging materials that will prevent rust marks from steel strapping.

B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

1.5 PROJECT CONDITIONS

A. Cold-Weather Protection: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen subgrade or setting beds. Remove and replace stone paver work damaged by frost or freezing.

B. Hot Weather Protection: In hot weather, masonry shall be protected to prevent excessive evaporation of setting beds and grout. Artificial shade, wind breaks and cooled materials shall be used as required.

C. Weather Limitations for Mortar and Grout: Comply with the following requirements:

1. Maintain ambient temperatures between 50-100 degrees Fahrenheit during installation and for minimum 7 days after completion. Verify substrate, ambient and material at least 37 degrees Fahrenheit for installation of Latex-modified mortars. Maintain surface between 60 to 90 degrees Fahrenheit during installation of epoxy grouts. Protect mortars and grouts until cured to prevent premature evaporation of moisture.

PART 2 - PRODUCTS

2.1 STONE FOR PAVING

A. Stone thickness for use in Vehicular areas identified on the drawings shall be three (3) inch thickness, in Pedestrian Areas stone thickness shall be two (2) inches. Stone for attachment to utility access covers shall be ¾" thickness and be contiguous with the surrounding pattern unless indicated otherwise, verify location and number of stone filled utility hatches identified on drawings. Provide the Owner with ten (10) additonal pavers of each specified size, finish and thickness for future use.

B. Stone Manufacturer: Nelson Architectural Inc., 10691 SE Jason Lane, Happy Valley, OR 97086. Tele: 503 810 9898. Or approved equal.

C. Stone Strength shall meet the following ~~minimum~~ criteria:

1. Tiger Yellow Granite
   a. Density: 177 lbs/cf, +/- 10%
   b. Absorption: Less than 0.58%
   c. Compressive Strength: 13,202 psi min.
   d. Flexural Strength: 2,429 psi min.
   e. Hardness: HS89

D. Stone shall not include any large veining, pockets or deposits of iron or other materials that may cause deterioration of stone when exposed to moisture.

E. Stone color range 'Tiger Yellow' shall be medium-grained granite with yellow-cream, gray-cream colored background and golden coloration with black, gray, and slight salmon patterns and flecks. Stone will have natural variations in color and pattern range.

F. Face dimensions of paving stone shall be no smaller than 1 1/2 inches in any single dimension.

G. Stone Types:

1. Stone Type 1A:

a. Style: Pattern Cut with indicated finish on top and saw-cut edges, to match Architect's sample.
b. Finish: Lychee
c. Size: 8-5/8" x 11-5/8".
d. Thickness: 3 inch.
e. Color: Tiger Yellow Granite
f. Location: Coarse Grain paving areas.

2. Stone Type 1B:
   a. Style: Pattern Cut with indicated finish on top and saw-cut edges, to match Architect's sample.
   b. Finish: Adze (Direction of finish shall be perpendicular to long dimension)
   c. Size: 4-1/8" x 11-5/8"
   d. Thickness: 3 inch
   e. Color: Tiger Yellow Granite
   f. Location: Coarse Grain paving areas.

3. Stone Type 1C:
   a. Style: Pattern Cut with indicated finish on top and saw-cut edges, to match Architect's sample.
   b. Finish: Lychee
   c. Sizes: 4-1/8" x 11-5/8"
   d. Thickness: 3 inch
   e. Color: Tiger Yellow Granite
   f. Location: Coarse Grain paving areas

4. Stone Type 1D & 1D-T:
   a. Style: Pattern Cut with indicated finish on top and saw-cut edges, to match Architect's sample.
   b. Finish: Lychee
   c. Sizes: 8-5/8" x 17-5/8"
   d. Thickness: Type 1D: 3 inches, Type 1D-T: 2 inches.
   e. Color: Tiger Yellow Granite
   f. Location: Fine Grain paving areas

5. Stone Type 2A:
   a. Style: Pattern Cut with indicated finish on top and saw-cut edges, to match Architect's sample.
   b. Finish: Bladestalk (Direction of finish shall be perpendicular to long dimension)
   c. Sizes: 4-1/8" x 11-5/8"
   d. Thickness: 3 inches
   e. Color: Tiger Yellow Granite
   f. Location: Coarse Grain paving areas

6. Stone Type 2B & 2B-T:
   a. Style: Pattern Cut with indicated finish on top and saw-cut edges, to match Architect's sample.
   b. Finish: Bladestalk (Direction of finish shall be perpendicular to long dimension)
   c. Sizes: 5-5/8" x 17-5/8"
   d. Thickness: Type 2B: 3 inches, Type 2B-T: 2 inches.

e. Color: Tiger Yellow Granite
f. Location: Fine Grain paving areas

2.2 STONE FOR STEPS AND SEAT TERRACES

A. Stone Strength shall meet the following ~~minimum~~ criteria:
1. Density: 177 lbs/cf, +/- 10%
2. Absorption: Less than 0.58%
3. Compressive Strength: 13,202 psi min.
4. Flexural Strength: 2,429 psi min.
5. Hardness: HS89

B. Stone shall not include any large veining, pockets or deposits of iron or other materials that may cause deterioration of stone when exposed to moisture.

C. Stone color range 'Tiger Yellow' shall be medium-grained granite with yellow-cream, gray-cream colored background and golden coloration with black, gray, and slight salmon patterns and flecks. Stone will have natural variations in color and pattern range.

D. Manufacturer: Nelson Architectural Inc., 10691 SE Jason Lane, Happy Valley, OR 97086. Tele: 503 810 9898. Or approved equal.

E. Stone Types:

1. Stone Stair Treads and Seat Terrace seating surface:
   a. Style: Pattern Cut with indicated finish on top with saw-cut edges to match Architect's sample.
   b. Finish: Lychee
   c. Size: As shown
   d. Thickness: 2 inches
   e. Color: Tiger Yellow Granite
   f. Pattern: As Shown

2. Risers for Stone Stairs and Seat Terrace:
   a. Style: Pattern Cut with indicated finish on exposed surfaces and saw-cut back and bottom, to match Architect's sample.
   b. Finish: Lychee
   c. Size: As shown
   d. Thickness: 3-5/8 inches
   e. Color: Tiger Yellow Granite
   f. Pattern: As Shown
   g. Apply lithichrome paint of approved color to the bottom and vertical sides of all warning grooves.

2.3 SETTING and GROUT MATERIALS

A. Cementitious Material:

1. Portland cement shall be ASTM-C 150, Type I of natural color or white, as required to produce the required color of mortar or grout.

B. Latex Additive Manufacturer:

1. Laticrete International, Inc.

C. Slurry Bond Coat: Laticrete 254 Platinum, meeting ANSI A118.4 and ANSI A118.11.

D. Thick-set Mortar Leveling Bed: Laticrete 3701 Fortified Mortar Bed .Weather, frost, shock resistant.

E. Thin-set (Paver Bond Coat) Mortar Bed: Laticrete 254 Platinum, meeting ANSI A118.4 and ANSI A118.11.

F. Substitutions: For approval of other Manufacturers and Products, a substitution request shall be submitted prior to the Bid date.

1. Mortar and Grout additives shall be compatible and from one manufacturer.

G. Aggregate for Mortar and Grout: ASTM C 144, graded to comply with latex-additive manufacturer's requirements.

H. Grout Materials:

1. Latex-Modified Portland Cement Grout: Laticrete PermaColor Grout. Color to be selected by Architect.

I. The mortar and grout shall meet ANSI 118.7 and be weather, frost, shock and chemical resistant and meet the following requirements:

1. Thick-set mortar bed
   a. Compressive strength, 4000-5000 psi.
   b. Flexural strength, 1100-1200 psi.
2. Thin-set paver bed bond strength, 500 psi.

J. All materials shall be delivered to the job site in the original containers with the manufacturer’s identification on each package.

K. Mortar and Grout Mixes General: Comply with referenced standards and with manufacturers' written instructions for mix proportions, mixing equipment, mixer speeds, mixing containers, mixing times, and other procedures needed to produce setting-bed and joint materials of uniform quality and with optimum performance characteristics. Discard mortars and grout when they have reached their initial set. Mortar and Grouts used for Water Feature applications shall be formulated to be high strength, minimum shrinkage, chemically resistant and have very low water absorption.

L. Slurry Bond Coat: Mix bond coat to a consistency similar to that of thick cream, consisting of material indicated for “Slurry Bond Coat” subparagraph in “Setting and Grout Materials” Article.

M. Thin-set (Paver Bond Coat) Mortar Bed: Proportion and mix for setting bed to comply with directions of latex-additive manufacturer and as necessary to produce stiff mixture with a moist surface when bed is ready to receive pavers.

N. Latex-Modified Portland Cement Grout: Mix in proportion and concentration recommended by latex-additive manufacturer. For vertical installation include and mix in non sag additive per manufacturer's instructions.

2.4 GROUT COLORS AND TEXTURES

A. Colors and Textures: As selected by Architect from manufacturer's full range.

2.5 ACCESSORIES

A. Bond Breaker (Concrete Slab): 15 pound asphalt impregnated felt.

1. Comply with ASTM 15
2. Cut into 18 inch wide strips.
3. Install centered over contraction joints in concrete slab.

B. Spacers: Resilient plastic, nonstaining to stone, sized to suit joint thicknesses.

C. Stone and Grout Sealer: Colorless, slip- and stain-resistant sealer that does not affect color or physical properties of stone surfaces, as recommended by stone producer for application indicated.

1. Stand Off Stain Barrier by ProSoCo, Lawrence, KS, or approved equal.

D. Reinforcing Wire Fabric: Galvanized, welded wire fabric, 2 by 2 inches by 0.108-inch (12 gauge) diameter; comply with ASTM A 185 and ASTM A 82 except for minimum wire size.

E. Epoxy Adhesive for attachment of stone to Utility Access Hatches: ASTM C 881, two-component material suitable for use on dry or damp surfaces. Provide material "Type," "Grade," and "Class" to suit project requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas indicated to receive paving, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

B. Verify that concrete base is sloped for drainage and is free of standing water, dust, oil, grease, paint, wax, curing compounds, primer, sealers, form release agents, or any deleterious substances and debris which may prevent or reduce bonding. Conduct moisture tests to verify that concrete surfaces are completely cured, free from hydrostatic pressure and having a moisture content of less than 5%.

3.2 PREPARATION

A. Vacuum clean concrete substrates to remove dirt, dust, debris, and loose particles.

A. Remove substances, from concrete substrates, that could impair mortar bond, including curing and sealing compounds, form oil, and laitance. This may require mechanical grinding and scarifying of the surface. Neutralize any trace of strong acid or alkali from the substrate prior to mortar application.

3.3 INSTALLATION, GENERAL

A. Do not use stone with chips, cracks, voids, discolorations, and other defects that might be visible or cause staining in finished work.

B. **NOTE:** The stone paving has been designed to be a seamless and contiguous pattern covering the Horton Plaza, the Westfield Site Improvements and Public Improvements which surround the Historic Park. All three sites share a common point of origin at the center of the Horton Plaza site for stone paving layout. Whole paver units should be used to span the junctures between individual projects to maintain pattern continuity.

C. Joint Pattern: As shown in Drawings. Install stone in 24 foot square or 12 foot square segments with special attention to changes in the pattern as indicated on drawings.

D. Mix stone pavers from several pallets or cubes, as they are placed, to produce uniform blend of colors and textures.

E. Cut stone pavers with motor-driven masonry saw equipment to provide clean, sharp, unchipped edges. Cut to provide pattern indicated and to fit adjoining work neatly. Use full units without cutting where possible. Hammer cutting is not acceptable.

1. Thickness of Stone Paving, stone risers and stone treads: As indicated in this section.
2. Ease cut stone edges.
3. Cut stone to produce uniform joints to widths and in locations as indicated.
4. Clean sawed backs of stones to remove rust stains and iron particles.

F. Tolerances: do not exceed 1/16-inch paver to paver offset from flush (lippage) or 1/8 inch in 24 inches and 1/4 inch in 10 feet from level, or indicated slope, for finished surface of paving. All surfaces shall be free of standing water, ie. no“bird baths”.

G. Isolation and Control Joints: Provide for sealant-filled joints at locations and of widths indicated. Provide joint filler and backer rod for sealant-filled joints where indicated. Install joint filler before setting pavers.

1. Install isolation joints at all vertical surfaces including building walls and foundations, site walls and curbs.

H. Provide seating terraces and stairs made of stone as indicated. Install stone seating terraces before installing adjacent pavers.

3.4 MORTAR SETTING-BED APPLICATIONS

A. Saturate concrete subbase with clean water several hours before placing setting bed. Remove surface water about one hour before placing setting bed.

B. Apply cement-paste bond coat over surface of concrete subbase about 15 minutes before placing setting bed. Limit area of bond coat to avoid its drying out before placing setting bed. Do not exceed 1/16-inch thickness for bond coat.

1. Place reinforcing wire fabric over concrete, lapped at joints by at least one full mesh and supported so mesh becomes embedded in middle of setting bed. Hold edges back from vertical surfaces approximately 1/2 inch.

C. Apply mortar bed over bond coat immediately after applying bond coat. Spread and screed setting bed to uniform thickness at subgrade elevations required for accurate setting of pavers to finished grades indicated.

D. Mix and place only that amount of mortar bed that can be covered with pavers before initial set. Cut back, bevel edge, remove, and discard setting-bed material that have reached initial set before placing pavers.

E. Place pavers before initial set of cement occurs. Immediately before placing pavers on setting bed, apply uniform 1/16-inch- thick, slurry bond coat to bed or to back of each paver with a flat trowel.

F. Tamp or beat pavers with a wooden block or rubber mallet to obtain full contact with setting bed and to bring finished surfaces within indicated tolerances. Set each paver in a single operation before initial set of mortar; do not return to areas already set and disturb pavers for purposes of realigning finished surfaces or adjusting joints.

G. Rake out joints to depth required to receive grout as units are set.

H. Spaced Joint Widths: Provide 3/8 inch nominal joint width unless indicated otherwise, with variations not exceeding plus or minus 1/16 inch

3.5 STONE TERRACE SEATING INSTALLATION

A. Install stone terrace seating to comply with "Mortar Setting Bed Applications" Article.

3.6 STONE INSTALLATION AT WATER FEATURE JETS

A. Install stone as indicated on water feature jet details. Jets shall be in place prior to paving installation.

B. Core drill stone pavers at water jet locations. Maintain tolerances indicated on stone shop drawings.

C. Apply the specified joint sealant per the manufacturer’s recommendations after stone installation.

3.7 GROUTING OF STONE PAVING

A. Grout stone joints to comply with ANSI A108.10 and manufacturer's written instructions.

B. Grout joints as soon as possible after initial set of setting bed. Force grout into joints, taking care not to smear grout on adjoining stone and other surfaces. After initial set of grout, finish joints by tooling to produce a slightly concave polished joint, free of drying cracks.

C. Cure grout by maintaining in a damp condition for seven days except as otherwise recommended by latex-additive manufacturer.

3.8 ADJUSTING AND CLEANING

A. Remove and replace stone paving and flooring of the following description:

1. Broken, chipped, stained, or otherwise damaged stone. Stone may be repaired if methods and results are approved by Owner’s Representative.
2. Defective joints.
3. Stone paving and joints not matching approved samples and mockups.
4. Stone paving not complying with other requirements indicated.

B. Replace in a manner that results in stone paving matching approved samples and mockups, complying with other requirements, and showing no evidence of replacement.

C. In-Progress Cleaning: Clean stone paving, steps and terraces as work progresses. Remove mortar fins and smears before tooling joints.

D. Clean stone paving, steps and terraces after setting and grouting are complete. Use procedures recommended by stone fabricator for types of application.

3.9 PROTECTION

A. Prohibit traffic from installed stone for a minimum of 72 hours.

B. Protect stone paving, stairs and terraces during construction with non staining kraft paper. Where adjoining areas require construction work access, cover stone surfaces with a minimum of 3/4-inch untreated plywood over nonstaining kraft paper.

3.10 REPAIR, POINTING, CLEANING, AND PROTECTION

A. Remove and replace stone pavers, stairs or terraces that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units as intended. Provide new full sized units to match adjoining units and install in same manner as original units, with same joint treatment and with no evidence of replacement.

B. Pointing: During tooling of joints, enlarge voids or holes and completely fill with mortar or grout. Point up joints at sealant joints to provide a neat, uniform appearance, properly prepared for sealant application.

C. Cleaning: Remove excess grout from exposed surfaces of stone; wash and scrub clean.

3.11 PAVER AND GROUT SEALER

A. After pavers are thoroughly cleaned and joint sealant has been installed apply sealer to the tops of pavers, stone stair treads and risers, seat terrace risers, seat surfaces and grout joints. Apply sealer only after grout and mortar beds have fully set, do not apply to wet conditions.

1. Apply sealer according to manufacturer's written instructions.
2. After sealer is applied, protect area from traffic for a minimum of 24 hours.

END OF SECTION 32 1440

APPENDIX L

Addenda to the Geotechnical Investigation and Fault Hazard Assessment

URS

April 11, 2013
Revised July 22, 2013

Mr. David Reitz
Vice-President of Project Management and Technical Design
Westfield LLC
11601 Wilshire Blvd, 11th Floor
Los Angeles, CA 90025

Subject: Addendum No. 1
Geotechnical Investigation and Fault Hazard Assessment
New Urban Plaza at Horton Plaza
City of San Diego, California
URS Project No.27661311.10000

Dear Mr. Reitz:

In accordance with your request, URS Corporation Americas (URS) has prepared this letter to respond to geotechnical related comments by the City of San Diego Development Services (City) dated April 4, 2013 (Building Development Review – Geology) for the above referenced project. We have revised this letter following review of a revision to drawing A3, Section and Details.

URS completed the geotechnical investigation for the project and prepared a report titled, "Geotechnical Investigation and Fault Hazard Assessment, Rehabilitation of Historic Park and Construction of New Urban Plaza at Horton Plaza, City of San Diego, California (URS Project No. 27661138.10000)," and dated April 11, 2012. This report was prepared for Civic San Diego (formerly Central City Development Corporation). This letter serves as Addendum No. 1 to that report.

To prepare this response, we have reviewed the Horton Urban Plaza, Sales Parcel Demo/Civic San Diego, Phase V, Electrical RM & Vault Access, architectural plans prepared by Carrier Johnson + Culture and structural plans prepared by Hope Engineering dated March 5, 2013, along with a revision to drawing A3, Section and Details dated April 3, 2013. These documents are for construction of a permanent below grade access stair and new underground electrical room to maintain uninterrupted access to a SDG&E transformer vault located at the site proposed for the New Urban Plaza at Horton Plaza.

RESPONSES

The following sections provide the comment made by the City followed by our response in italics.

URS Corporation
4225 Executive Square, Suite 1600
La Jolla, CA 92037
Tel: 858.812.9292
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3. The project's geotechnical consultant must review the plans and indicate if the proposed construction will destabilize or result in settlement of adjacent structures or the Right of Way.

The plans do not include details for temporary slopes and/or temporary shoring. The temporary excavations for construction of below grade structures should conform to the recommendations presented in Section 5.3 Temporary Excavations. Properly designed, maintained and monitored, temporary slopes and/or shoring should not destabilize or cause settlement of adjacent structures or the Right of Way.

4. The project's geotechnical consultant must indicate if the plans are in accordance with their recommendations.

The referenced plans are in accordance with the referenced geotechnical report.

5. The project's consultants could note that a NPDES permit may be required for subsurface water discharged through basement wall drains and pumped to a storm water conveyance system. Check with LDR-Drainage and Grades on the requirements for discharges to the municipal storm drain system.

Keynote 10 on drawing A3.0 indicates the foundation drain will daylight to an existing storm drain system or sump pump.

Where the drain cannot daylight using gravity flow to an existing storm drain, a wall drain that is connected to a base drain (or geocomposite panel drain that is connected to a geocomposite base drain) can be allowed to infiltrate into the natural soils at the bottom of the wall. The base drain and outlet should be detailed and installed to allow the water to infiltrate away from the wall footing. Infiltration of transient subsurface water near the footings should not compromise their ability to support the structure, considering the relatively dense condition of the materials at these levels. This subsurface drainage system may be adopted in lieu of draining to a sump with pumping to an existing storm drain.

The waterproofing of subterranean walls should consider exposure to subsurface water if the transient subsurface water is collected in the wall/base drain and then allowed to infiltrate into the ground below the base drain. The Project Architect and qualified Waterproofing Consultant should review and select waterproofing requirements.

CLOSURE

The discussions, conclusions and recommendations presented in this letter are subject to the same uncertainty and limitations stated in Section 6 of our April 11, 2012 geotechnical report. This letter should be bound with that report on future submittals. We appreciate the opportunity to assist Westfield LLC on this project.

If you have questions regarding this response /addendum letter, or if we can be of further service, please contact us.

Sincerely,

URS CORPORATION

Charles Robin (Rob) Stroop, G.E. 2298
Senior Project Geotechnical Engineer

CRS:



URS

April 18, 2013

Mr. David Reitz
Vice-President of Project Management and Technical Design
Westfield LLC
11601 Wilshire Blvd, 11th Floor
Los Angeles, CA 90025

Subject: Addendum No. 2
Geotechnical Investigation and Fault Hazard Assessment
New Urban Plaza at Horton Plaza
City of San Diego, California
URS Project No.27661311.10000

Dear Mr. Reitz:

In accordance with your request, URS Corporation Americas (URS) has prepared this letter to respond to geotechnical related comments by the City of San Diego Development Services (City) dated February 15, 2013 (Land Development Review – Geology) for the above referenced project.

URS completed the geotechnical investigation for the project and prepared a report titled, "Geotechnical Investigation and Fault Hazard Assessment, Rehabilitation of Historic Park and Construction of New Urban Plaza at Horton Plaza, City of San Diego, California (URS Project No. 27661138.10000)," and dated April 11, 2012. This report was prepared for Civic San Diego (formerly Central City Development Corporation). This letter serves as Addendum No. 2 to that report.

To prepare this response, we have reviewed the Grading and Improvement Plans for Horton Plaza Park, prepared by Nasland Engineering undated (their project no. 11-227.1). These plans are for rough grading of the site proposed for the New Urban Plaza at Horton Plaza.

RESPONSES

The following sections provide the comment made by the City followed by our response in italics.

3. Submit the geotechnical investigation report prepared by URS dated December 9, 2011 referenced on the grading plans.

The geotechnical report dated April 11, 2012 is the most current report and it should be referenced on the grading plans.

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5. Provide a geologic/geotechnical map that uses the proposed grading plan as a base map. Circumscribe the limits of recommended remedial grading and indicate estimated removal depths on the map.

See attached Figure No. 1.

6. Provide representative cross sections that show existing and proposed grades. Show the estimated limits and depth of remedial grading.

See attached Figure No. 2.

7. If URS Corporation relies on geologic or geotechnical information prepared by another geotechnical consultant, URS must reference the reports containing the information and indicate that they agree with the findings and conclusions contained in those reports. Alternatively, URS may conduct an independent site investigation.

URS agrees with the findings in the reports as referenced and discussed in Section 2, Previous Studies of the April 11, 2012 geotechnical report.

8. The project's geotechnical consultant must review the plans and indicated if the proposed construction will destabilize or result in settlement of adjacent structures or the Right of Way.

The plans do not include details for temporary slopes and/or temporary shoring. The temporary excavations for construction of below grade structures should conform to the recommendations presented in Section 5.3 Temporary Excavations. Properly designed, maintained and monitored, temporary slopes and/or shoring should not destabilize or cause settlement of adjacent structures or the Right of Way.

9. If permanent storm water BMPs are proposed that involve active or passive infiltration or percolation, the project's geotechnical consultant must provide input in accordance with Appendix F of the City's "Guidelines for Geotechnical Reports."

URS has reviewed the eleven (11) requirements for LID BMP considerations as stated in Section 4.1.4 of The City Storm Water Guidelines, dated January 14, 2011. Based on our knowledge of the general subsurface conditions and our interpretation of the site conditions from previous studies, the site does not conform to two requirements pertaining to site soils as discussed below:

- *The site is underlain by soils that have fines content (silts and clays) greater than 40 percent. As discussed earlier, the underlying Bay Point Formation consists of intermittent layers of dense to very dense silty or clayey sand and very stiff to hard sandy clay.*

- *In our opinion, on-site native soils should possess infiltration rates of less than 0.52 inches per hour (3.7×10^{-4} cm/sec).*

We understand that if even one of the eleven requirements is not met, The City recommends against infiltration and infiltration-based facilities. Hence in our opinion, the site is not considered suitable for LID BMPs.

CLOSURE

The discussions, conclusions and recommendations presented in this letter are subject to the same uncertainty and limitations stated in Section 6 of our April 11, 2012 geotechnical report. This letter should be bound with that report on future submittals. We appreciate the opportunity to assist Westfield LLC on this project.

If you have questions regarding this response /addendum letter, or if we can be of further service, please contact us.

Sincerely,

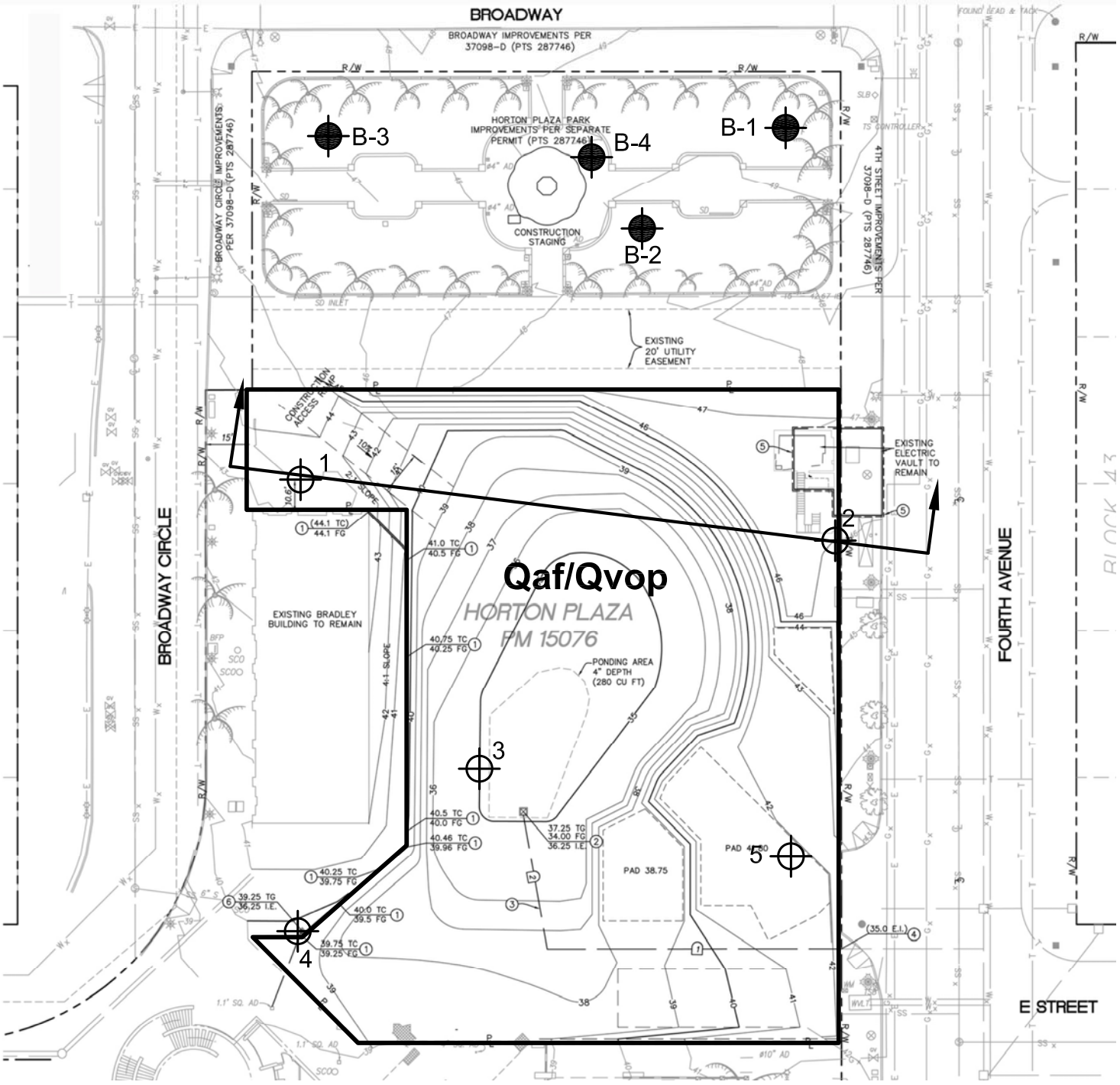
URS CORPORATION

Charles Robin (Rob) Stroop, G.E. 2298
Senior Project Geotechnical Engineer



CRS:

Attachments



LEGEND

- Previous Test Boring (Geocon, 1984)
- Previous Test Boring (L&A, 1980)
- Generalized Geologic Cross Section
- **Qaf/Qvop** Artificial fill over very old paralic deposits
- Estimated limits of remedial grading

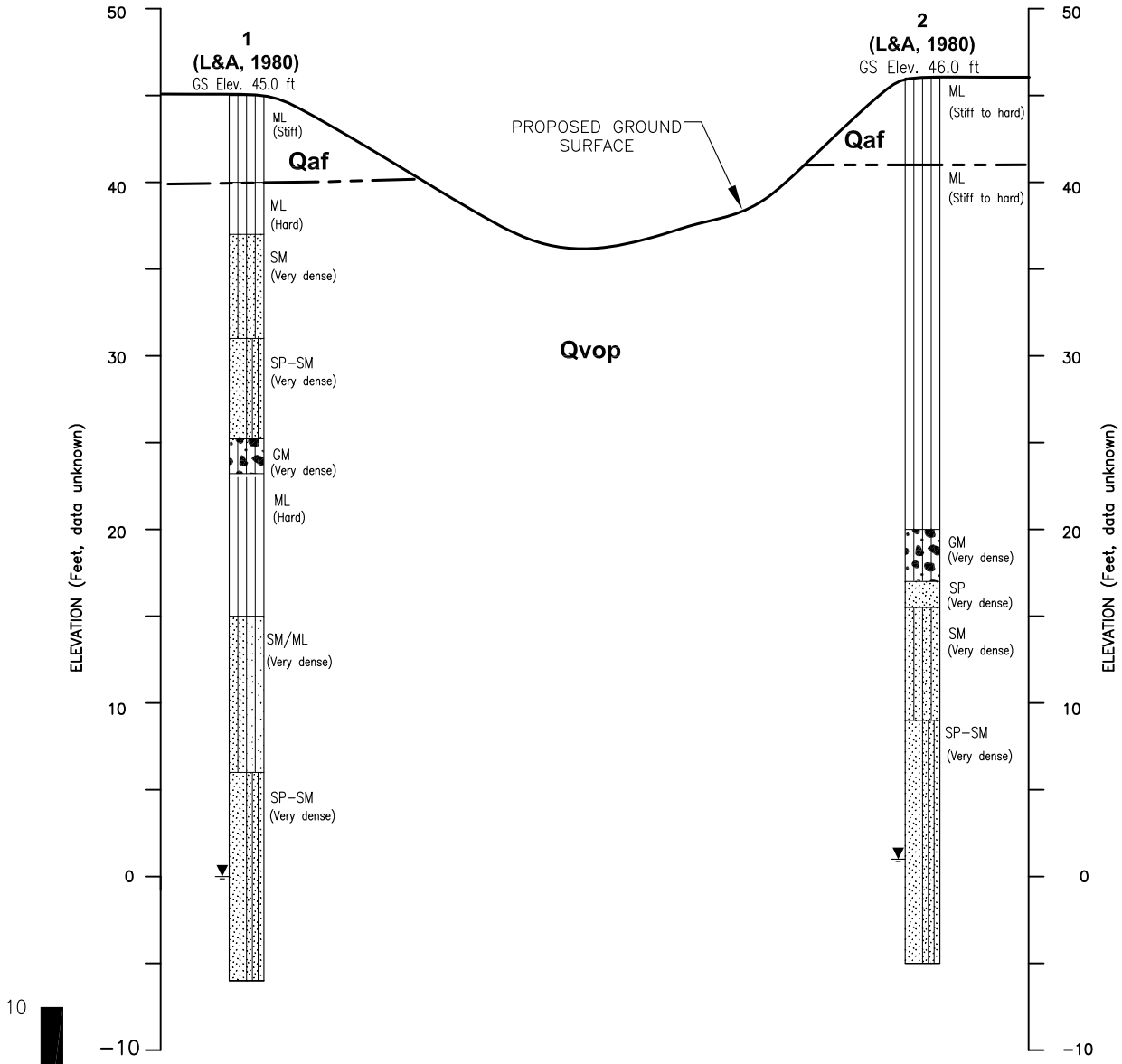
REFERENCE: Grading Plan for Horton Plaza Park, Parcel 4 of Parcel Map 15076, sheet 5 of 17.

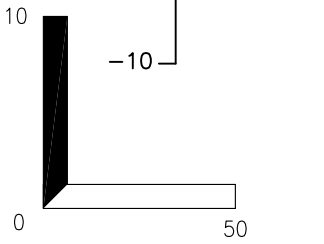
NOTE:
Removal depths to be determined during grading (estimated to be 1 to 4 feet).

SITE PLAN AND GEOLOGIC MAP
WESTFIELD - HORTON PLAZA
CITY OF SAN DIEGO, CALIFORNIA

URS	30 0 30 60 Feet SCALE: 1"= 60'	CHECKED BY: KS	DATE: 04-18-13
		PM: CRS	PROJ. NO: 27661311.10000

FIG. NO: 1





LEGEND

TYPICAL MATERIAL GRAPHIC SYMBOLS

- Silty SAND (SM)
- Poorly graded SAND with silt (SP–SM)
- Poorly graded SAND with silt (SP–SM)
- Silty SAND to sandy SILT (SM/ML)
- SILT (ML)
- Silty GRAVEL (GM)

OTHER GRAPHIC SYMBOLS

- Geologic contact
- **Qaf** Artificial fill
- **Qvop** Very old paralic deposits
- First water encountered at time of drilling and sampling (ATD)

NOTE:
Removal depths to be determined during grading (estimated to be 1 to 4 feet).

GEOLOGIC CROSS SECTION
WESTFIELD - HORTON PLAZA
CITY OF SAN DIEGO, CALIFORNIA

URS	CHECKED BY: KS	DATE: 04–18–13	FIG. NO: 2
	PM: CRS	PROJ. NO: 27661311.10000	

URS

July 23, 2013

Mr. David Reitz
Vice-President of Project Management and Technical Design
Westfield LLC
11601 Wilshire Blvd, 11th Floor
Los Angeles, CA 90025

Subject: Addendum No. 3
Geotechnical Investigation and Fault Hazard Assessment
New Urban Plaza at Horton Plaza
City of San Diego, California
URS Project No.27661311.10000

Dear Mr. Reitz:

URS Corporation Americas (URS) has prepared this letter to revise the site preparation recommendations contained in the original geotechnical report following our review of grading plans for the development of Horton Plaza provided to URS by Westfield LLC. URS completed the geotechnical investigation for the project and prepared a report titled, "Geotechnical Investigation and Fault Hazard Assessment, Rehabilitation of Historic Park and Construction of New Urban Plaza at Horton Plaza, City of San Diego, California (URS Project No. 27661138.10000)," and dated April 11, 2012. This report was prepared for Civic San Diego (formerly Central City Development Corporation). This letter serves as Addendum No. 3 to that report.

Rough and interim grading plans, prepared by Paller-Roberts Engineering, Inc. and dated December 1982 and November 1983 respectively have the following notes on the plans.

- All earthwork operations shall be inspected and observed by a qualified soils engineer employed by the owner.
- The site has previously been rough graded under a separate subcontract. An "As-Graded Report of Rough Grading," dated 4-1-83, has prepared for the owner by Leighton and Associates, Inc. A copy of this report is available to the contractor upon request.

Therefore, Sections 3.1.1 and 4.2.2 of the above reference geotechnical report are revised as follows:

3.3.1 FILL (ENGINEERED AND UNDOCUMENTED)

Fill is expected to exist over most of the site to depths of 3 to 4 feet, although there may be areas with deeper fill. The fill should consist of medium dense silty to clayey sand. Based on our review of the grading plans for the development of Horton Plaza, the fill should have been properly processed,

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placed and compacted as engineered fill. However, in this urbanized setting, there may be localized zones of undocumented fill. Undocumented fill is soils placed with no records of observation and compaction testing by a Geotechnical Engineer. It is often characterized by a loose/soft relative density/consistency; organics, trash and other debris; oversize rock; and evidence of large lift thicknesses.

4.2.2 SITE PREPARATION

Weeds, grass, trees, shrubs, structures, abandoned utilities and construction debris within areas that are to be graded should be cleared and properly disposed of off-site. Roots and other vegetative matter should be removed and disposed either offsite or stockpiled for reuse in landscape areas. Existing infrastructure should be properly demolished and disposed at an appropriate facility offsite.

Subgrades for structural improvements (e.g., foundations, slabs-on-grade, pavements and other forms of hardscaping) should be proof rolled. The proof rolling should be observed by a Geotechnical Engineer or their field designate. Probing by the Geotechnical Engineer or their field designate may be performed as an alternative where there is limited access. Any loose or soft areas encountered should be removed, scarified and recompacted to the satisfaction of the Geotechnical Engineer.

Following the clearing of vegetation and debris and the removal of soils considered to be unsuitable, the surface within areas to receive fill should be scarified, moisture conditioned as necessary, and compacted prior to fill placement. Areas temporarily vacated during earthwork should be similarly scarified, moisture conditioned and reworked to the satisfaction of a Geotechnical Engineer before placing additional fill.

CLOSURE

The discussions, conclusions and recommendations presented in this letter are subject to the same uncertainty and limitations stated in Section 6 of our April 11, 2012 geotechnical report. This letter should be bound with that report on future submittals. We appreciate the opportunity to assist Westfield LLC on this project. If you have questions regarding this response /addendum letter, or if we can be of further service, please contact us.

Sincerely,
URS CORPORATION

Charles Robin (Rob) Stroop, G.E. 2298
Senior Project Geotechnical Engineer

CRS:



Horton Plaza Improvement Project

San Diego CA

SEPTEMBER 27, 2013

100% CONSTRUCTION DOCUMENTS
PERMIT REVIEW SET

PTS#288741 37342-D

Civic San Diego

401 B STREET, SUITE 400
SAN DIEGO, CA 92101
(619-235-2200)

Project Manager: Daniel Kay
kay@civicsd.com
(619)533-7159

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cmccann@walkermacy.com

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jamundson@hopeengineering.com

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San Diego, CA 92128
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Contact: Paul Stanzione
pstanzione@compview.com

WATER FEATURE DESIGN
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Carlsbad, CA 92008
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Contact: Randy Mendioroz
rmendioroz@aquaticdesigngroup.com

ELECTRICAL ENGINEERING
KANRAD Engineering
9750 Miramar Road
San Diego, CA 92126
(858) 547-1100
Contact: Tony Kan
tony@kanrad.net

SECURITY CAMERAS
Case Global Inc.
11454 San Vicente Blvd
Los Angeles, CA 90049
(310) 820-2274
Contact: Guy Zukerman
guy@caseglobal.com

City of San Diego Park & Recreation

Horton Plaza Park

12/12/13

Park and Recreation Dept. Director: Date:

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SECURITY
SEC0.0-SEC3.1 (5 SHEETS)

1 ADD-C

1 ADD-C

EXISTING LEGAL DESCRIPTION

BLOCK 42 (LOTS A,B,I,K) OF HORTON'S ADDITION DEED BOOK 13-522 IN THE CITY OF SAN DIEGO, COUNTY OF SAN DIEGO, STATE OF CA.

CONSTRUCTION INFORMATION

THE DESIGN HAS BEEN PROPOSED IN ACCORDANCE WITH THE 2010 CALIFORNIA BUILDING CODE (CBC).

- CONSTRUCTION TYPES: TYPE V-B FULLY FIRE SPRINKLERED
  ****** TYPE V-B NON SPRINKLERED
- OCCUPANCY GROUPS:
  NORTH PAVILION BUILDING:
  PRIMARY: M MERCANTILE
  S-2 STORAGE
  SOUTH PAVILION BUILDING:
  PRIMARY: B BUSINESS
  S-2 STORAGE
- OCCUP. SEPARATION: NON-SEPARATED OCCUPANCIES
  CBC 508.3.

NORTHWEST PAVILION BUILDING (900 4TH AVE. FSU-3) AREA ANALYSIS:

BASIC ALLOWABLE (At): CBC TABLE 503:	9,000 SF (GROUP M)
TOTAL ALLOWABLE AREA:	9,000 SF
ACTUAL:	
LEVEL 1:	348 SF
BASEMENT:	2,654 SF (CBC 506.5 BASEMENT NOT INCLUDED IN TOTAL AREA)
TOTAL ACTUAL AREA:	348 SF
BUILDING HEIGHT:	CBC TABLE 503
BASIC ALLOWABLE:	1-STORY / 40'
ACTUAL:	1 STORY WITH BASEMENT / 12'-3"

NORTHEAST PAVILION BUILDING (900 4TH AVE. FSU-2) AREA ANALYSIS:

BASIC ALLOWABLE (At): CBC TABLE 503:	9,000 SF (GROUP M)
TOTAL ALLOWABLE AREA:	9,000 SF
ACTUAL:	
LEVEL 1:	461 SF
BASEMENT:	234 SF (CBC 506.5 BASEMENT NOT INCLUDED IN TOTAL AREA)
TOTAL ACTUAL AREA:	461 SF
BUILDING HEIGHT:	CBC TABLE 503
BASIC ALLOWABLE:	1-STORY / 40'
ACTUAL:	1 STORY / 12'-3"

CONSTRUCTION INFORMATION, CONT.

SOUTH PAVILION BUILDING (900 4TH AVE. FSU-1A & FSU-1B) AREA ANALYSIS:

BASIC ALLOWABLE (At): CBC TABLE 503:	9,000 SF (GROUP B)
AUTO. SPRINKLER SYSTEM INCREASE (CBC 504.2)	X2
TOTAL ALLOWABLE AREA:	18,000 SF
ACTUAL:	
LEVEL 1:	1,840 SF
BASEMENT:	633 SF (CBC 506.5 BASEMENT NOT INCLUDED IN TOTAL AREA)
TOTAL ACTUAL AREA:	1,840 SF
BUILDING HEIGHT:	CBC TABLE 503
BASIC ALLOWABLE: W/ AUTO. SPRINKLER	2-STORIES / 40'
SYSTEM INCREASE:	3-STORIES / 60'
ACTUAL:	1 STORY WITH BASEMENT / 19'-0"

LANDSCAPE AREA = 9,404 SF

ZONING DESIGNATION

CCPD

WORK TO BE DONE

- 58,640sf total site area to be developed as an open plaza for community events.
- The existing site includes the Robinson's May building, to be demolished under a separate permit by the current owner.
- Project includes 3 shell pavilion buildings and support storage for the pavilions and events.
- The northern portion of the site is the Horton Plaza Park, which will be refurbished in this project.
- The Electric Fountain, located in the Horton Plaza Park will be restored.
- A new zero-depth water feature is planned for the southern portion of the plaza.

TOPOGRAPHY SOURCE

Nasland Engineering
4740 Ruffner St.
San Diego, CA 92111

BASIS OF BEARINGS

The Basis of Bearings for this survey is the southernly line of Plaza Street (Vacated) per Parcel Map 15803. I.E. North 86°46'47" East

ZONING DESIGNATION

CCPD

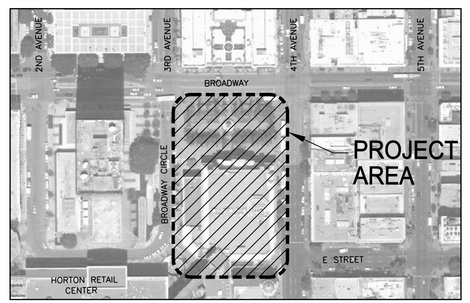
STORM WATER PROTECTION NOTES

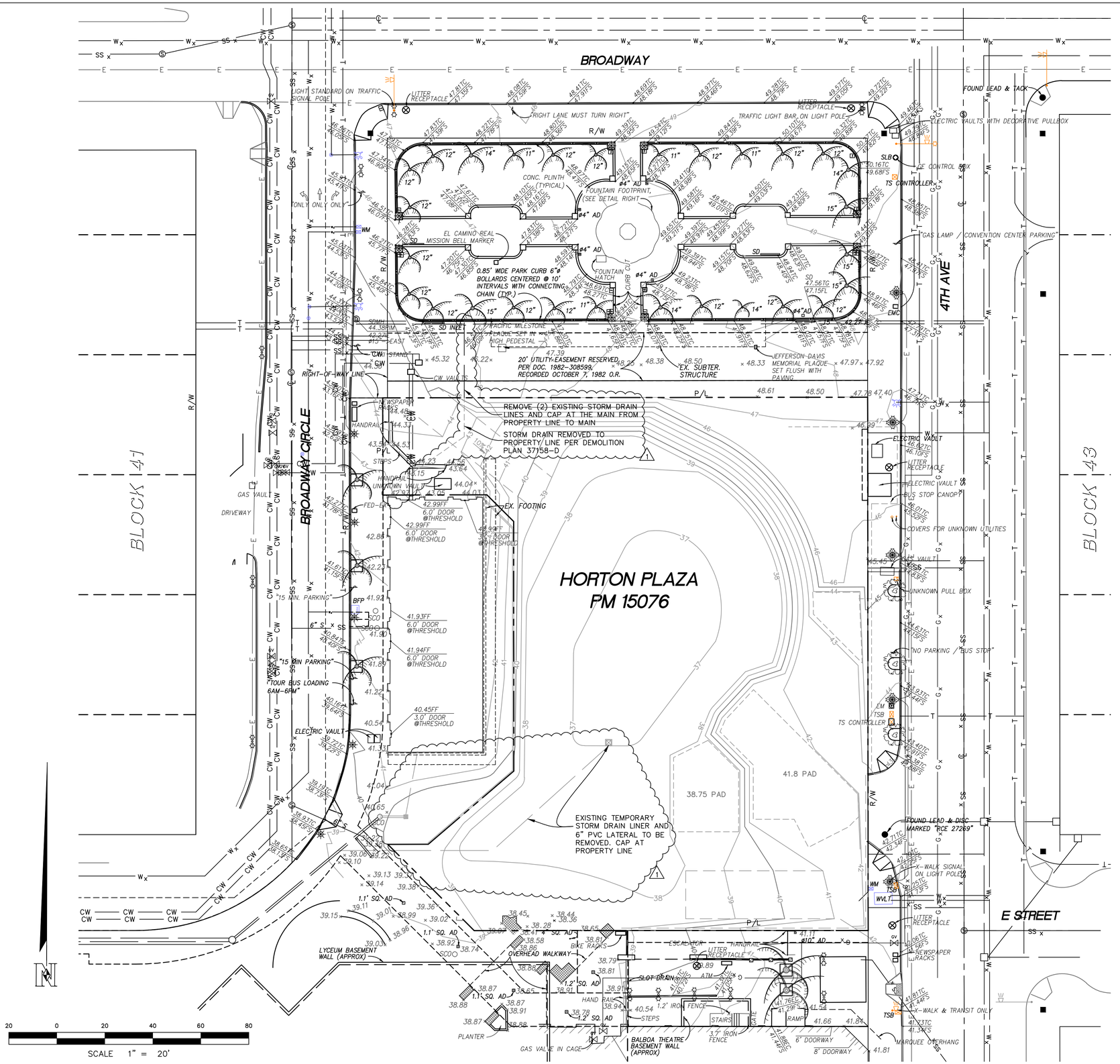
1. THIS PROJECT IS SUBJECT TO MUNICIPAL STORM WATER PERMIT ORDER NO. R9-2007-0001; AND RISK LEVEL/TYPE: CHECK ONE BELOW
   - ☐ WPCP
   - ☐ CGP RISK LEVEL 1 ☐ CGP LUP TYPE 1
   - ☒ CGP RISK LEVEL 2 ☐ CGP LUP TYPE 2
   - ☐ CGP RISK LEVEL 3 ☐ CGP LUP TYPE 3
2. CHECK ONE
   - ☒ THIS PROJECT WILL EXCEED THE MAXIMUM DISTURBED AREA LIMIT, THEREFORE A WEATHER TRIGGERED ACTION PLAN (WTAP) IS REQUIRED.
   - ☐ THIS PROJECT WILL FOLLOW PHASED GRADING NOT TO EXCEED FIVE (5) ACRES PER PHASE.
   - ☐ NOT APPLICABLE
3. THE CONTRACTOR SHALL COMPLY WITH THE REQUIREMENTS OF THE WPCP OR SWPPP AS APPLICABLE.

CONSTRUCTION SITE
STORM WATER PRIORITY: MEDIUM

WDID NUMBER: 9 37C366490

VICINITY MAP



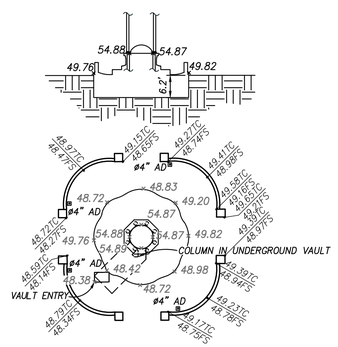


EXISTING CONDITIONS PLAN

SCALE 1" = 20'

LEGEND

AD	AREA DRAIN
BFP	BACK FLOW PREVENTER
	BUILDING FOOTPRINT
	BUILDING SUPPORT COLUMN
	CENTERLINE
CW	CHILLED WATER LINE
ø	DIAMAETER
EC	EDGE OF CONCRETE
EU	ELECTRIC LINE
EM	ELECTRIC METER
EMC	ELECTRIC METER CABINET
EPB	ELECTRIC PULLBOX
X	FENCE LINE
FF	FINISH FLOOR
FS	FINISH SURFACE
	FIRE HYDRANT
FL	FLOW LINE
	FOUND LEAD & DISC MARKED "SDCE"
	FOUND MONUMENT AS NOTED
G	GAS LINE
GV	GAS VALVE
	LIGHT STANDARD
	LIGHT STANDARD – MULTIPLE GLOBES (# VARIES)
	LINK CHAIN & ø6" BOLLARD
	OFFSET LINE
	RIGHT-OF-WAY LINE
RD	ROOF DRAIN
SCO	SEWER CLEAN OUT
SS	SEWER LINE
	SIGN
SD	SLOT DRAIN
SDCB	STORM DRAIN CATCH BASIN
	STORM DRAIN LINE
SDMH	STORM DRAIN MANHOLE
SLB	STREET LIGHT BOX
TC	TOP OF CURB
	TRAFFIC LIGHT
W	TRAFFIC SIGNAL
TSB	TRAFFIC SIGNAL BOX
	TREE – MISCELLANEOUS
	TREE – PALM
W	WATER LINE
WM	WATER METER



FOUNTAIN DETAIL & SECTION VIEW

NOT TO SCALE

Civic San Diego
401 B STREET, SUITE 400
SAN DIEGO, CA 92101

City of San Diego
Park & Recreation Department

Park and Recreation Department Director: [signature]
Date: 12/12/13
Contractor:
Date Completed:
Date Started:
As-Builts By:
As-Builts Approved By:

WALKER MACY

Civil Engineer
NASLAND ENGINEERING
CIVIL ENGINEERING • SURVEYING
LAND PLANNING
4740 Ruffner Street, San Diego, CA, 92111
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FAX • 858-571-3241
NE JOB# 110-228.1

HORTON PLAZA IMPROVEMENT PROJECT

SAN DIEGO, CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER ADAM EUGENE [illegible] 69291 EXP. 6-30-14 CIVIL STATE OF CALIFORNIA

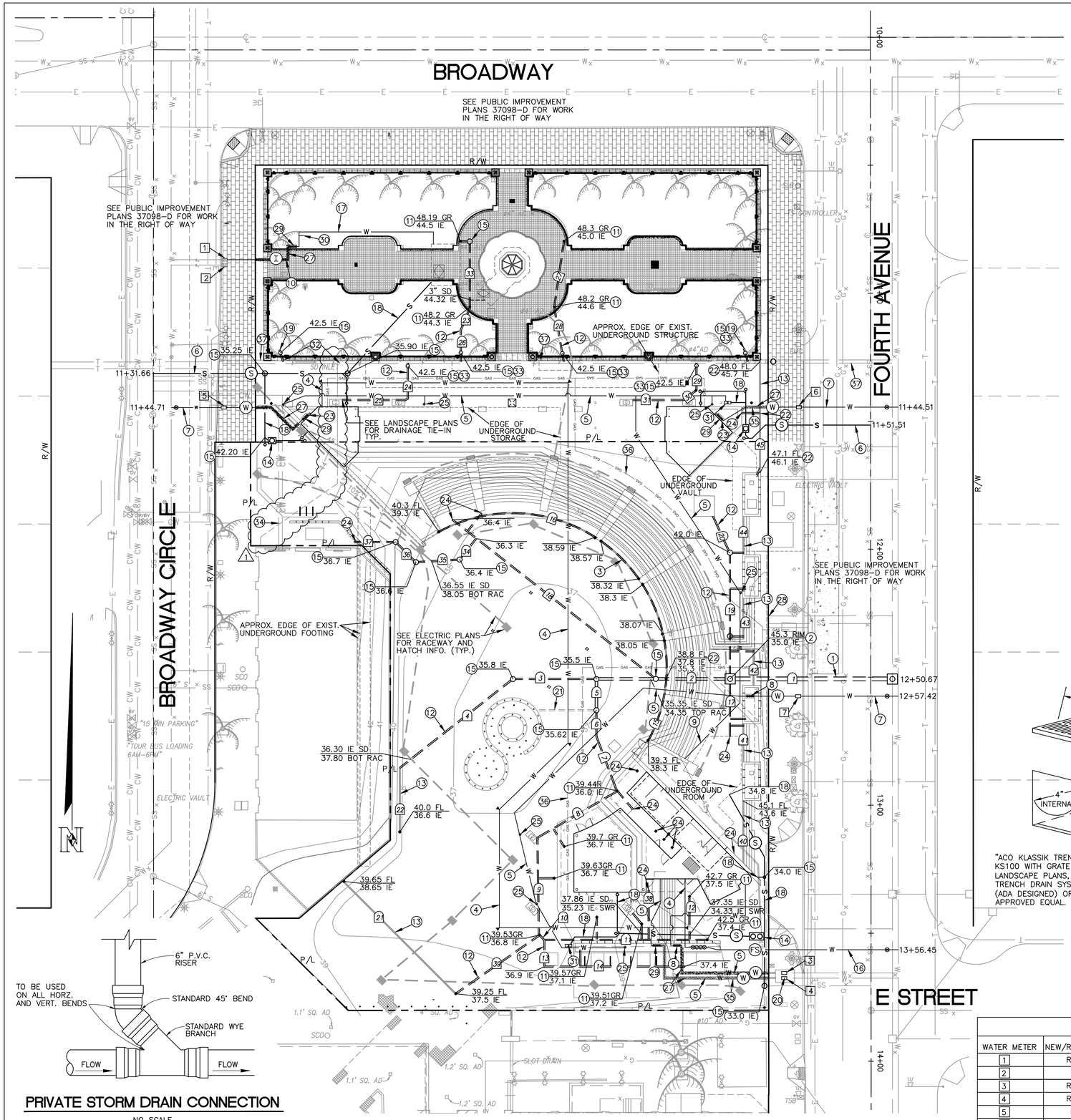
PROJECT NUMBER: WM-1103
DRAWN BY: REVIEWED BY:

PHASE:
100% CONSTRUCTION DOCUMENTS
PERMIT REVIEW SET
ISSUE DATE:
09/27/2013
REVISIONS:
ADDENDUM C, 4/28/14

PTS#288741 37342-D

EXIST. CONDITIONS

C00



CONSTRUCTION NOTES:

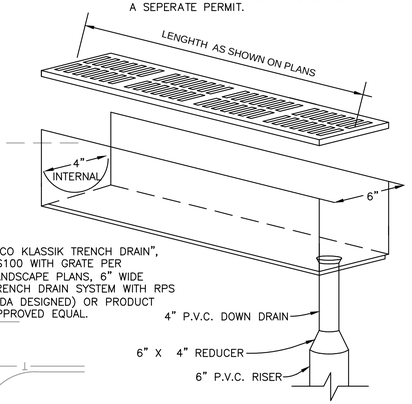
ALL CONFLICTING EXISTING UTILITIES SHOULD BE REMOVED, ABANDONED, OR CAPPED AT R/W. IF CONTRACTOR LOCATES AN UNDOCUMENTED WATER SERVICE, IT SHALL BE KILLED AT THE MAIN.

1. INSTALL PUBLIC 18" RCP STORM DRAIN AND CLEANOUT PER SD IMPROVEMENT PLAN 37098-D.
2. INSTALL PRIVATE TYPE A-4 CLEANOUT PER S.D.R.S.D. D-9.
3. INSTALL RADIUS TRENCH DRAIN WITH FOSSIL FILTER (BMP), DETAIL PER LANDSCAPE PLANS.
4. INSTALL 6" PVC WATER PIPE (CLASS 200) (FIRE) PER S.D.R.S.D. SDW-110.
5. INSTALL 1" PVC WATER PIPE (CLASS 150) PER S.D.R.S.D SDW-110.
6. INSTALL SEWER LATERAL SEE CITY OF SD IMPROVEMENT PLAN 37098-D.
7. INSTALL WATER SERVICE PER CITY OF SD IMPROVEMENT PLAN 37098-D.
8. INSTALL PRIVATE 2" REDUCED PRESSURE BACK FLOW PREVENTOR PER S.D.R.S.D. SDW-155.
9. INSTALL 1 1/2" PVC WATER PIPE (CLASS 150) PER S.D.R.S.D SDW-110.
10. INSTALL 1 1/2" PVC (CLASS 150) IRRIGATION SERVICE FROM EXISTING 2" WATER METER.
11. INSTALL 9"x9" PRIVATE BOX INLET WITH FOSSIL FILTER (BMP), DETAIL PER LANDSCAPE PLANS.
12. INSTALL 6" PVC STORM DRAIN.
13. INSTALL 6" TRENCH DRAIN WITH FOSSIL FILTER (BMP), DETAIL PER THIS SHEET AND LANDSCAPE PLANS.
14. CONNECT TO PROPOSED GREASE TRAP, SEE PLUMBING PLAN P1.0 FOR MORE INFORMATION & CONTINUATION.
15. INSTALL PRIVATE CLEANOUT PER S.D.R.S.D. SC-01.
16. INSTALL 6" FIRE SERVICE PER PER CITY OF SD IMPROVEMENT PLAN 37098-D, 6" BACKFLOW 23' FROM R/W.
17. INSTALL 1" PVC WATER PIPE (CLASS 150) FOR FOUNTAIN WATER SUPPLY.
18. INSTALL 4" PVC SEWER PIPE (SDR 35).
19. INSTALL 6" PVC PIPE (CLASS 150), CONNECT TO LANDSCAPE SUBDRAIN, SEE LANDSCAPE PLANS.
20. PROTECT THE OUTER 2 – 2" EXISTING WATER METERS/SERVICES IN VAULT. REMOVE EX. 3" MANIFOLD AND REMOVE THE MIDDLE WATER SERVICE AND METER. CONNECT A 2" WATER SERVICE TO THE NORTHERN 2" METER AND A 1 1-2" WATER SERVICE WITH REDUCER TO THE OTHER 2" METER. DEMOLISH THE EXISTING VAULT LID AND VAULT WALLS. INSTALL NEW WATER BOXES PER S.D.R.S.D. SDW-137 AROUND THE 2 REMAINING METERS. COMPACT OVER THE EXISTING VAULT FLOOR SLAB.
21. SEE FOUNTAIN PLANS FOR UTILITY CONNECTION INFORMATION.
22. CONNECT TRENCH DRAIN TO STORM DRAIN.
23. INSTALL BACK FLOW PADS ADJACENT TO BUILDING AS SHOWN. SEE LANDSCAPE PLAN FOR MORE DETAIL.
24. SEE PLUMBING PLAN AND/OR STRUCTURAL DETAILS FOR CONNECTION INFORMATION.
25. INSTALL IN-GROUND ZURN BOX HYDRANT MODEL Z1360 OR APPROVED EQUAL.
26. INSTALL 2" PVC WATER PIPE (CLASS 150) PER S.D.R.S.D SDW-110.
27. INSTALL CONCRETE ENCASEMENT OF PRIVATE WATER LINE FROM R/W TO BACKFLOW PER S.D.R.S.D. SDS-112.
28. CONNECT NEW SUB SURFACE DRAIN FROM VAULT TO EXISTING STORM DRAIN LATERAL.
29. INSTALL PRIVATE 1 1/2" REDUCED PRESSURE BACK FLOW PREVENTOR PER S.D.R.S.D. SDW-155.
30. SEE IRRIGATION PLANS FOR CONNECTION INFORMATION.
31. CONNECT WATER TO DRINKING FOUNTAIN, SEE ARCHITECTS PLAN FOR FOUNTAIN DETAIL.
32. REMOVE AND REPLACE DAMAGED PORTION OF EXISTING 15" RCP STORM DRAIN (APPROX. 25'). INSTALL CONCRETE COLLAR PER S.D.R.S.D. D-62 AT EXISTING CONNECTION POINTS.
33. INSTALL CONCRETE LUG AT CONNECTION INTO EX. RCP PER MODIFIED (6" TO 15") S.D.R.S.D. SDD-113.
34. CHILLED WATER RELOCATION PER SEPERATE PLAN.
35. INSTALL WATER LINE AT DEPTH 48" TO ALLOW 12" SEPERATION BETWEEN BOLLARD AND WATER LINE.
36. SEE MECHANICAL/PLUMBING PLAN FOR GAS INFO.
37. PROTECT EXISTING 15" STORM DRAIN IN PLACE.

NOTE: CONTRACTOR TO COORDINATE THE INSTALLATION OF THE FIRE SPRINKLER LINES WITH THE SITE LANDSCAPE DESIGN ELEMENTS SUCH AS WALLS AND FOUNDATIONS. THE ENGINEER SHALL BE MADE AWARE OF ANY POTENTIAL ISSUES PRIOR TO CONSTRUCTION.

NOTE: THE FIRE LINES AND RESTRAINTS ARE A DEFFERED SUBMITTAL AND SHALL BE DONE IN FULL BY CONTRACTOR PER A SEPERATE PERMIT.

STORM DRAIN DATA				
NO	BEARING/DELTA	RADIUS	LENGTH	NOTE
1	N90°00'00"E	--	59.34'	18" RCP
2	N90°00'00"E	--	49.35'	12" PVC
3	N90°00'00"E	--	31.75'	6" PVC
4	N51°47'16"E	--	56.29'	6" PVC
5	N00°00'00"E	--	10.45'	12" PVC
6	N00°00'00"E	--	9.28'	6" PVC
7	N20°27'03"W	--	22.28'	6" PVC
8	N59°43'05"E	--	35.78'	6" PVC
9	N00°53'03"W	--	37.59'	6" PVC
10	N53°37'21"W	--	3.07'	6" PVC
11	N89°58'25"W	--	62.23'	6" PVC
12	S0°01'35"E	--	16.15'	6" PVC
13	N00°01'35"W	--	9.9'	6" PVC
14	N90°00'00"W	--	55.16'	6" PVC
15	24°43'31"	60.25'	26.00'	TRENCH
16	123°19'51"	60.25'	129.69'	TRENCH
17	N00°00'00"E	--	22.42'	6" PVC
18	N50°31'31"W	--	100.8'	6" PVC
19	S00°00'00"E	--	49.31'	6" PVC
20	N27°48'54"W	--	15.7'	6" PVC
21	N44°58'56"W	--	62.5'	TRENCH
22	N00°00'00"E	--	25'	TRENCH
23	N22°15'37"E	--	9.3'	6" PVC
24	N00°00'00"W	--	12.2'	6" PVC
25	N90°00'00"E	--	24.44'	6" PVC
26	S00°00'00"E	--	7.9'	6" PVC
27	S08°26'17"W	--	25.2'	6" PVC
28	S09°52'25"E	--	17.36'	6" PVC
29	N00°00'00"E	--	8.8'	6" PVC
30	N53°14'31"E	--	5.60'	6" PVC
31	N90°00'00"E	--	19.67'	6" PVC
32	S74°35'57"E	--	12.84'	6" PVC
33	S00°00'00"E	--	25.72'	6" PVC
34	S38°32'45"W	--	10.40'	6" PVC
35	S86°31'55"W	--	17.05'	6" PVC
36	N45°10'57"W	--	11.18'	6" PVC
37	N90°00'00"W	--	17.44'	6" PVC
38	S0°01'35"E	--	19.00'	6" PVC
39	N55°03'58"E	--	39.37'	6" PVC
40	N00°00'00"E	--	24.7'	TRENCH
41	N00°00'00"E	--	15'	TRENCH
42	N00°00'00"E	--	14'	TRENCH
43	N00°00'00"E	--	16'	TRENCH
44	N00°00'00"E	--	15'	TRENCH
45	N00°00'00"E	--	43.7'	TRENCH



TRENCH DRAIN DETAIL

NO SCALE

PRIVATE STORM DRAIN CONNECTION

NO SCALE

20 0 20 40 60 80

SCALE 1" = 20'

THE UTILITIES SHOWN ARE DIAGRAMATIC AND THE CONTRACTOR SHALL SUBMIT A SHOP DRAWING WITH SUFFICIENT INFORMATION TO PROTECT AGAINST CONFLICTS WITH THE PLACEMENT OF UTILITIES.

UTILITY PLAN

SCALE 1" = 20'

S.D.R.S.D. REFERS TO THE STANDARD DRAWINGS FOR PUBLIC WORKS CONSTRUCTION (CITY OF SAN DIEGO PUBLIC WORKS DEPARTMENT)

WATER METER TABLE						
WATER METER	NEW/REUSE/KILL	SIZE	METER #	ADDRESS	SERVICES	DISTANCE FROM BACKFLOW TO METER
1	REUSE	2"	58799243	965 BROADWAY CIRCLE	HISTORIC PARK FOUNTAIN & SITE IRRIGATION	29' (CONCRETE ENCASED)
2	KILL	1"	UNKNOWN	UNKNOWN		N/A
3	REUSE	2"	94686725	888 4TH AVENUE	S/E RESTROOMS	50' (CONCRETE ENCASED)
4	REUSE	2"	90784442	890 4TH AVENUE	S/E PAVILLION	60' (CONCRETE ENCASED)
5	NEW	1 1-2"	N/A	900 4TH AVE. FSU 3	N/W PAVILLION	30' (CONCRETE ENCASED)
6	NEW	1 1-2"	N/A	900 4TH AVE. FSU 2	N/E PAVILLION	29' (CONCRETE ENCASED)
7	NEW	2"	N/A	N/A	INTERACTIVE FOUNTAIN & FLUSH HYDRANT BOXES	16'

-NOTE FOR ALL WATER METER CONSTRUCTION, SEE IMPROVEMENT PLANS 37098-D

Civic San Diego
401 B STREET, SUITE 400
SAN DIEGO, CA 92101

City of San Diego
Park & Recreation Department

Park and Recreation Department Director: [signature]
Date: 12/12/13

Contractor:
Date Completed:
Date Started:
As-Builts By:
As-Builts Approved By:

WALKER | MACY

Civil Engineer
NASLAND ENGINEERING

CIVIL ENGINEERING • SURVEYING
LAND PLANNING

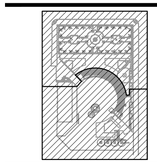
4740 Ruffner Street, San Diego, CA, 92111
PH • 858-292-7770
FAX • 858-571-3241

NE JOB# 110-228.1

HORTON PLAZA IMPROVEMENT PROJECT

SAN DIEGO, CALIFORNIA





PROJECT NUMBER: WM-1103

DRAWN BY: | REVIEWED BY:

PHASE:
100% CONSTRUCTION DOCUMENTS
PERMIT REVIEW SET

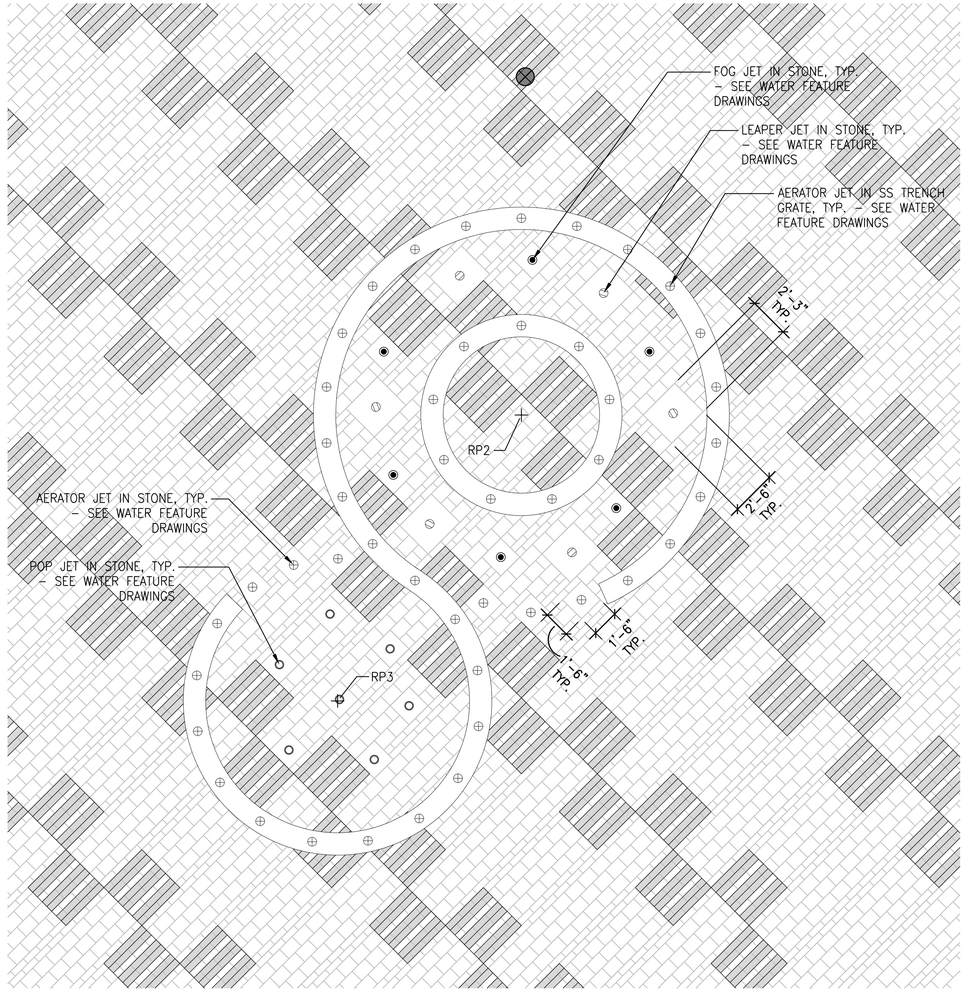
ISSUE DATE:
09/27/2013

REVISIONS:
ADDENDUM C, 4/28/14

PTS#288741 37342-D

UTILITY PLAN

C100



1 ENLARGEMENT – WATER FEATURE STONE PAVING (DEDUCT–ALT)
SCALE: 1/4" = 1'–0" PLAN

LEGEND

- LIMIT OF WORK
- BASELINE
- CENTERLINE
- EXTENSION OF BUILDING FACE
- IJ — ISOLATION JOINT
- DIJ — DOWELLED ISOLATION JOINT

B	BEARING
C	CHORD LENGTH
EQ	EQUAL
L	LENGTH OF CURVE
OC	ON CENTER
POB	POINT OF BEGINNING
PC	POINT OF CURVATURE
PCC	POINT OF COMPOUND CURVATURE
PRC	POINT OF REVERSE CURVATURE
PI	POINT OF INTERSECTION
PT	POINT OF TANGENCY
R	RADIUS
RP	RADIUS CENTER POINT
SP	SPACES
VIF	VERIFY IN FIELD

- ALIGN

LAYOUT NOTES

1. SITE SURVEY WAS PREPARED BY NASLAND ENGINEERING ON JUNE 3, 2011. ALL COORDINATES SHOWN ON THE DRAWINGS ARE BASED UPON THE COORDINATE SYSTEM ESTABLISHED BY THE SURVERYOR. SURVEY INFORMATION IS PROVIDED FOR REFERENCE ONLY.
2. DO NOT SCALE FROM THE DRAWINGS. THE LOCATION OF FEATURES NOT SPECIFICALLY DIMENSIONED MAY NOT BE DETERMINED BY SCALE. IF CONFLICTS ARISE IN THE FIELD, CONTACT OWNER'S REPRESENTATIVE FOR RESOLUTION.
3. SEE WATER FEATURE SHEETS FOR LAYOUT OF JET NOZZLES, TRENCHES, TRENCH GRATES AND THICKENED SLAB CONDITIONS AT WATER FEATURE
4. ALL STONE DIMENSIONS MEASURE FROM CENTERLINE TO CENTERLINE OF JOINTS.
5. COORDINATE LOCATION OF CAP STONES AND PENETRATIONS FOR JET NOZZLES WITH ACTUAL LOCATION OF JETS IN THE FIELD. ADJUST AS NEEDED TO MINIMIZE DISRUPTION TO THE PAVING PATTERN.
6. PROVIDE OVERSIZED STONES FOR USE IN PLACES WHERE THE PAVING PATTERN MEETS SITE FEATURES SUCH AS TRENCH DRAINS, WALLS, EQUIPMENT, AND STAIRS IN A MANNER THAT LEAVES SMALL SLIVERS OF STONE LESS THAN 1.5" LONG OR WIDE.

COORDINATE DATA

	NORTHING IN FEET	EASTING IN FEET
RP2	1841138.41	6281296.42
RP3	1841122.42	6281286.15

FOUNTAIN JET STONE PAVER–QUANTITIES

LEAPER JETS	6
FOG JETS	6
POP JETS	7
AERATOR WATER JETS	6

*SEE SPECS FOR STONE SIZES

N

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401 B STREET, SUITE 400
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As-Builts Approved By:

WALKER | MACY

HORTON PLAZA IMPROVEMENT PROJECT

SAN DIEGO, CALIFORNIA

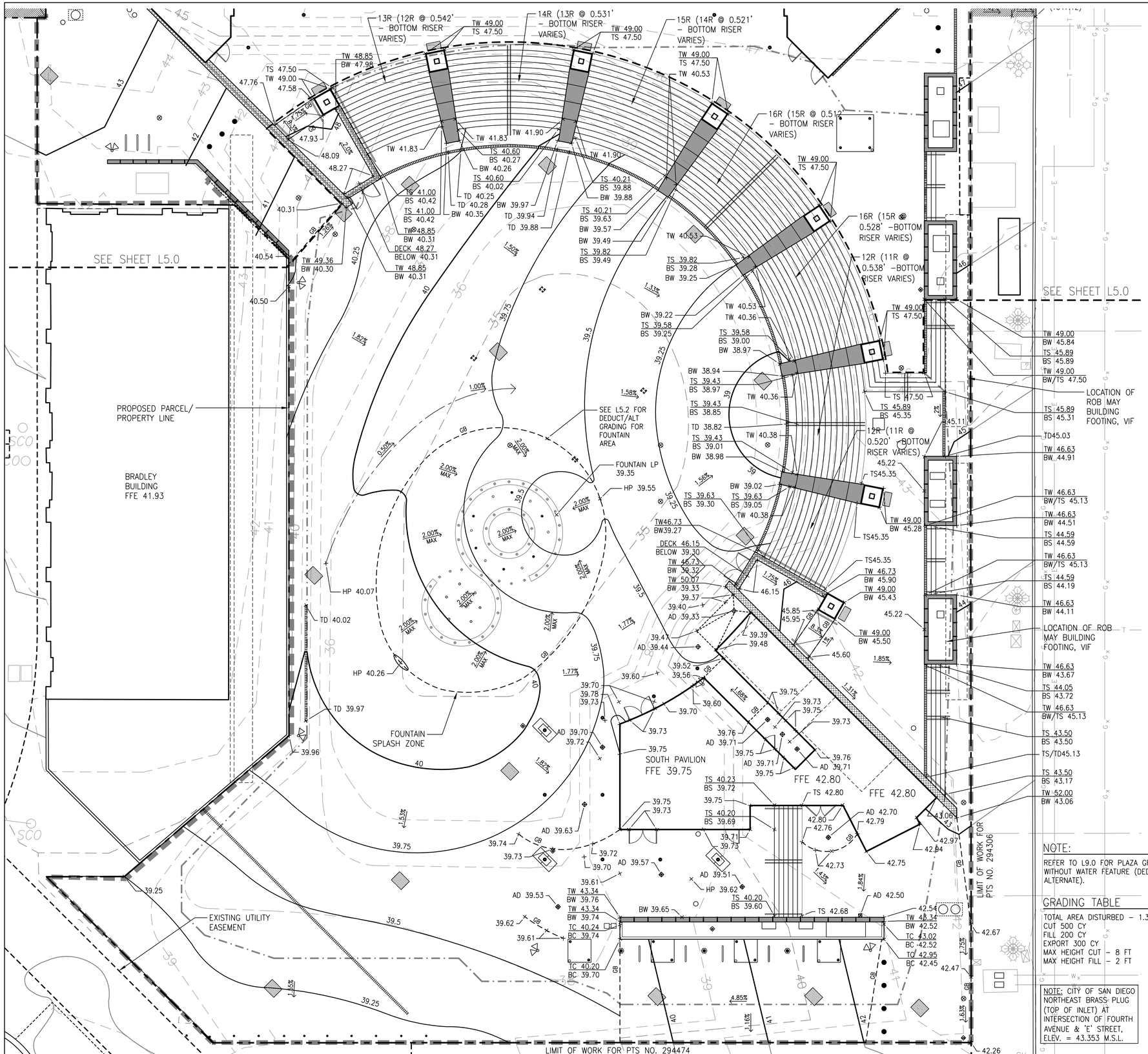
LICENSED LANDSCAPE ARCHITECT — DOUGLAS WALKER MACY — STATE OF CALIFORNIA — August 31, 2013 Renewal Date — June 29, 2013 Done

PROJECT NUMBER: WM-1103
DRAWN BY: NK | REVIEWED BY: CMc, DO
PHASE: 100% CONSTRUCTION DOCUMENTS PERMIT REVIEW SET
ISSUE DATE: 09/27/2013
REVISIONS:
1 ADDENDUM C, 4/28/14

PTS#288741 37342-D

SITE LAYOUT PLAN - FOUNTAIN PAVING (ADDITIVE-ALT)

L4.3 1 ADD–C



LEGEND

- PROPERTY LINE
- LIMIT OF WORK
- LIMIT OF WORK FOR ROW IMPROVEMENT; PTS NO. 287746, REF. NO. 37098-D
- 40 — PROPOSED CONTOUR
- (40) — EXISTING CONTOUR
- 40.72 — PROPOSED SPOT ELEVATION
- (40.70) — EXISTING SPOT ELEVATION
- GB — GRADE BREAK
- FLOW LINE
- MATCH — MATCH EXISTING ELEVATION
- 4:1 4.9% — DIRECTION AND PERCENTAGE OR H:V RATIO OF SLOPE
- CUT/FILL LINE

AD	AREA DRAIN
FC	FLUSH CURB
FFE	FINISH FLOOR ELEVATION
FL	FLOW LINE
HP	HIGH POINT
LP	LOW POINT
BC	BOTTOM OF CURB
TC	TOP OF CURB
BR	BOTTOM OF RAMP
TR	TOP OF RAMP
BS	BOTTOM OF STEP
TS	TOP OF STEP
BW	BOTTOM OF WALL (AT FG OF PAVING)
TW	TOP OF WALL
TD	TRENCH DRAIN
VIF	VERIFY IN FIELD

GRADING NOTES

1. 3 INCH CONTOURS PROVIDED IN LOWER PLAZA FOR CLARITY. CONTOURS IN OTHER AREAS HAVE 1 FOOT INTERVALS.
2. VERIFY ACCURACY OF EXISTING GRADES AND INTERPOLATED ELEVATIONS PRIOR TO BEGINNING WORK. NOTIFY OWNER'S REPRESENTATIVE OF ANY DISCREPANCY PRIOR TO BEGINNING WORK.
3. PROTECT ALL TREES INDICATED TO REMAIN.
4. ALL PROPOSED GRADES ARE TO MEET AND BLEND IN WITH EXISTING GRADING AT PROJECT LIMIT, PROPERTY LINES, BUILDING LINES AND EXISTING CURBS.
5. 'ROUND OFF' ALL SHARP RIDGES EXISTING ON SITE WHETHER OR NOT SUCH CONDITIONS ARE INDICATED ON PLANS.
6. NOTIFY THE OWNER'S REPRESENTATIVE TO REVIEW ROUGH GRADES PRIOR TO PLACEMENT OF TOPSOIL; AND FINE GRADING PRIOR TO PLANTING.
7. ALL AREAS SHALL HAVE POSITIVE DRAINAGE TO APPROVED DRAINAGE STRUCTURES OR CONVEYANCES.
8. PROVIDE POSITIVE DRAINAGE AWAY FROM BUILDINGS AT 0.5% SLOPE, MINIMUM.
9. ALL WALKWAYS AND PAVED AREAS SHALL HAVE SMOOTH AND CONTINUOUS ELEVATION CHANGES.
10. SET STRAIGHT GRADES BETWEEN GIVEN ELEVATIONS. UNLESS OTHERWISE INDICATED.
11. PROVIDE 2% MAX. SLOPE, PERPENDICULAR TO DIRECTION OF TRAVEL, ON ALL PAVED PEDESTRIAN SURFACES, UNLESS NOTED OTHERWISE.
12. GRADE BREAK LINES ARE SHOWN GRAPHICALLY TO ILLUSTRATE DRAINAGE PATTERNS AND ARE NOT TO BE INSTALLED AS ACTUAL JOINT LINES, EXCEPT WHERE THEY COINCIDE WITH PAVING JOINTS.
13. INSTALL DRAINS IN PAVING, SQUARE WITH AND ALIGNING TO PAVING JOINTS AS SHOWN. DOES NOT APPLY TO TRENCH DRAIN CONDITIONS.
14. VERIFY IN FIELD THAT AS–BUILT CONDITIONS MATCH PRECISE ELEVATIONS INDICATED ON PLANS.
15. SITE SURVEY WAS PREPARED BY NASLAND ENGINEERING ON JUNE 3, 2011. ALL GRADES SHOWN ON THE DRAWINGS ARE BASED UPON THE DATUM ESTABLISHED BY THE SURVEYOR. SURVEY INFORMATION IS PROVIDED FOR REFERENCE ONLY. NOT ALL SURVEYED SPOT ELEVATIONS ARE SHOWN.
16. WHERE MEETING A SLOPING GRADE, HEIGHT OF BOTTOM RISER MAY VARY DUE TO GRADE, SEE SPOT ELEVATIONS. ALL OTHER RISERS TO BE CONSISTANT HEIGHT.
17. SEE SHEET C100 FOR ALL STORMWATER UTILITIES.
18. FFE OF BRADLEY BLDG. VARIES ALONG BROADWAY CIRCLE. SEE SITE SURVEY.

NOTE:

REFER TO L9.0 FOR PLAZA GRADING WITHOUT WATER FEATURE (DEDUCT ALTERNATE).

GRADING TABLE

TOTAL AREA DISTURBED – 1.3 ACRES
CUT 500 CY
FILL 200 CY
EXPORT 300 CY
MAX HEIGHT CUT – 8 FT
MAX HEIGHT FILL – 2 FT

NOTE: CITY OF SAN DIEGO NORTHEAST BRASS PLUG (TOP OF INLET) AT INTERSECTION OF FOURTH AVENUE & 'E' STREET, ELEV. = 43.353 M.S.L.

0 2.5 5 10 20

N

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401 B STREET, SUITE 400
SAN DIEGO, CA 92101

City of San Diego
Park & Recreation Department

Park and Recreation Department Director: Date: 12/12/13

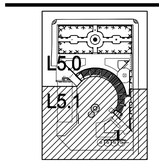
Contractor:
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Date Started:
As-Builts By:
As-Builts Approved By:

WALKER MACY

HORTON PLAZA IMPROVEMENT PROJECT

SAN DIEGO, CALIFORNIA

LICENSED LANDSCAPE ARCHITECT NICHOLAS T. KAY AMERICAN SOCIETY OF LANDSCAPE ARCHITECTS 5161 STATE OF CALIFORNIA
August 31, 2013 Renewal Date
June 28, 2012 Date

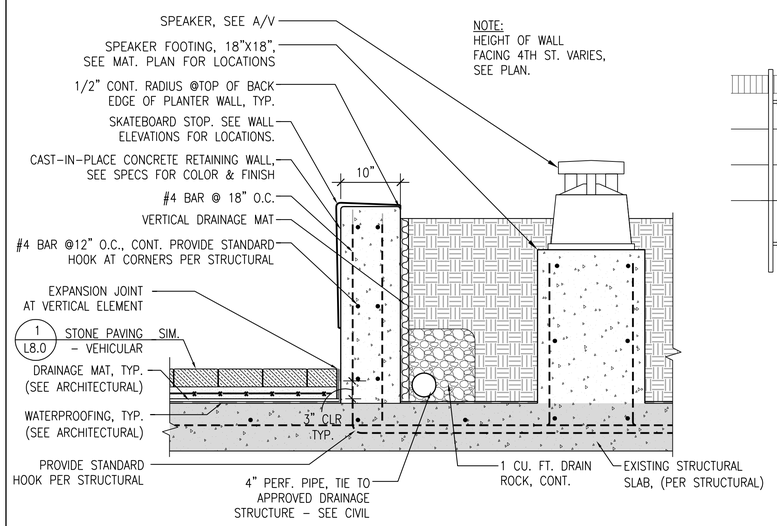


PROJECT NUMBER: WM-1103
DRAWN BY: NK, CMc
REVIEWED BY: DO
PHASE: 100% CONSTRUCTION DOCUMENTS PERMIT REVIEW SET
ISSUE DATE: 09/27/2013
REVISIONS:
1 ADDENDUM C, 4/28/14

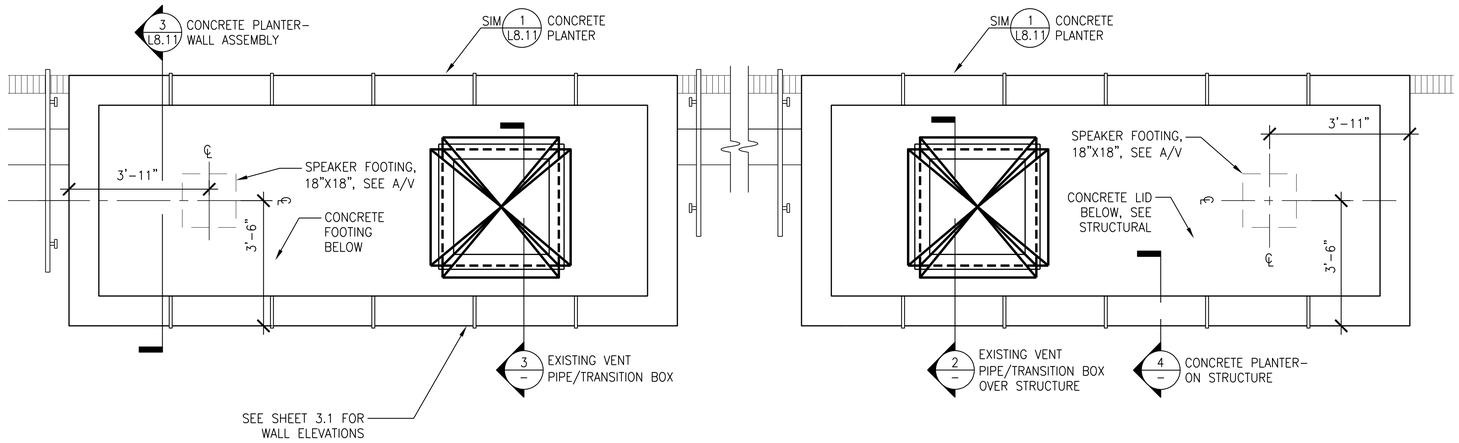
PTS#288741 37342-D

SITE GRADING PLAN - SOUTH (ADDITIVE-ALT)

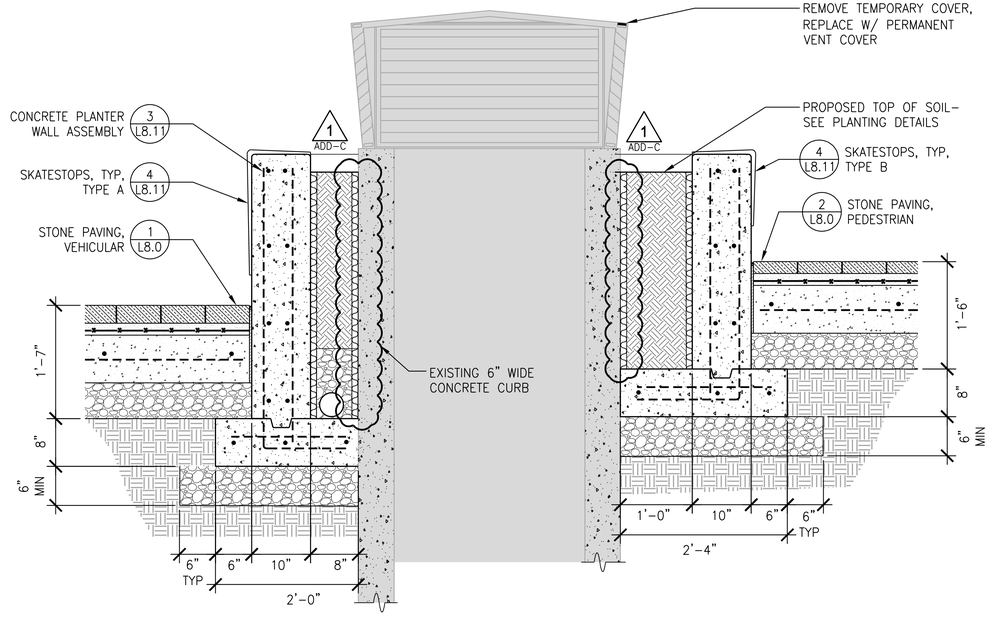
1 ADD–C L5.1



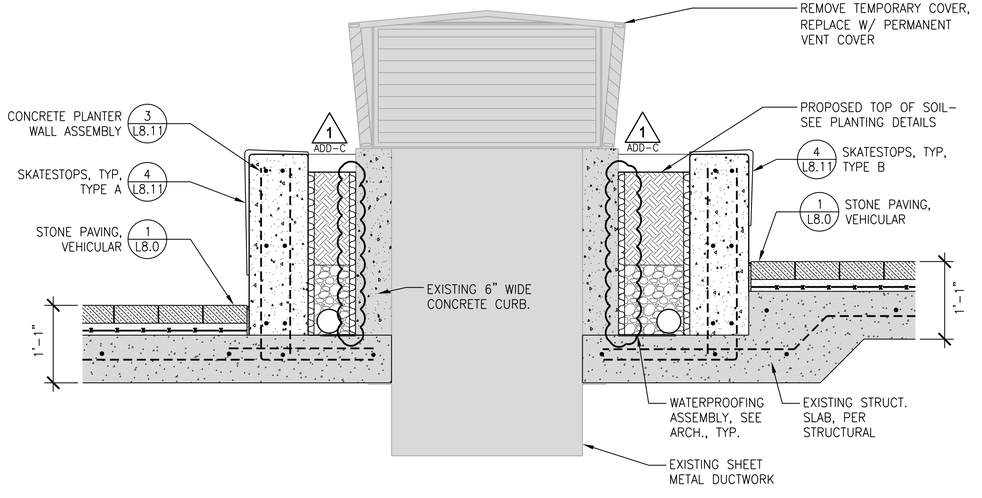
4 CONCRETE PLANTER - ON STRUCTURE
SCALE: 1" = 1'-0" SECTION



1 17' CONCRETE PLANTERS W/VENT
SCALE: 1/2" = 1'-0" PLAN



3 CONCRETE PLANTER - W/EXISTING VENT UNIT
SCALE: 1" = 1'-0" SECTION



2 CONCRETE PLANTER - W/EXISTING VENT UNIT, ON STRUCTURE
SCALE: 1" = 1'-0" SECTION

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401 B STREET, SUITE 400
SAN DIEGO, CA 92101

City of San Diego
Park & Recreation Department

Park and Recreation Department Director: _____ Date: 12/12/13

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WALKER MACY

HORTON PLAZA IMPROVEMENT PROJECT

SAN DIEGO, CALIFORNIA

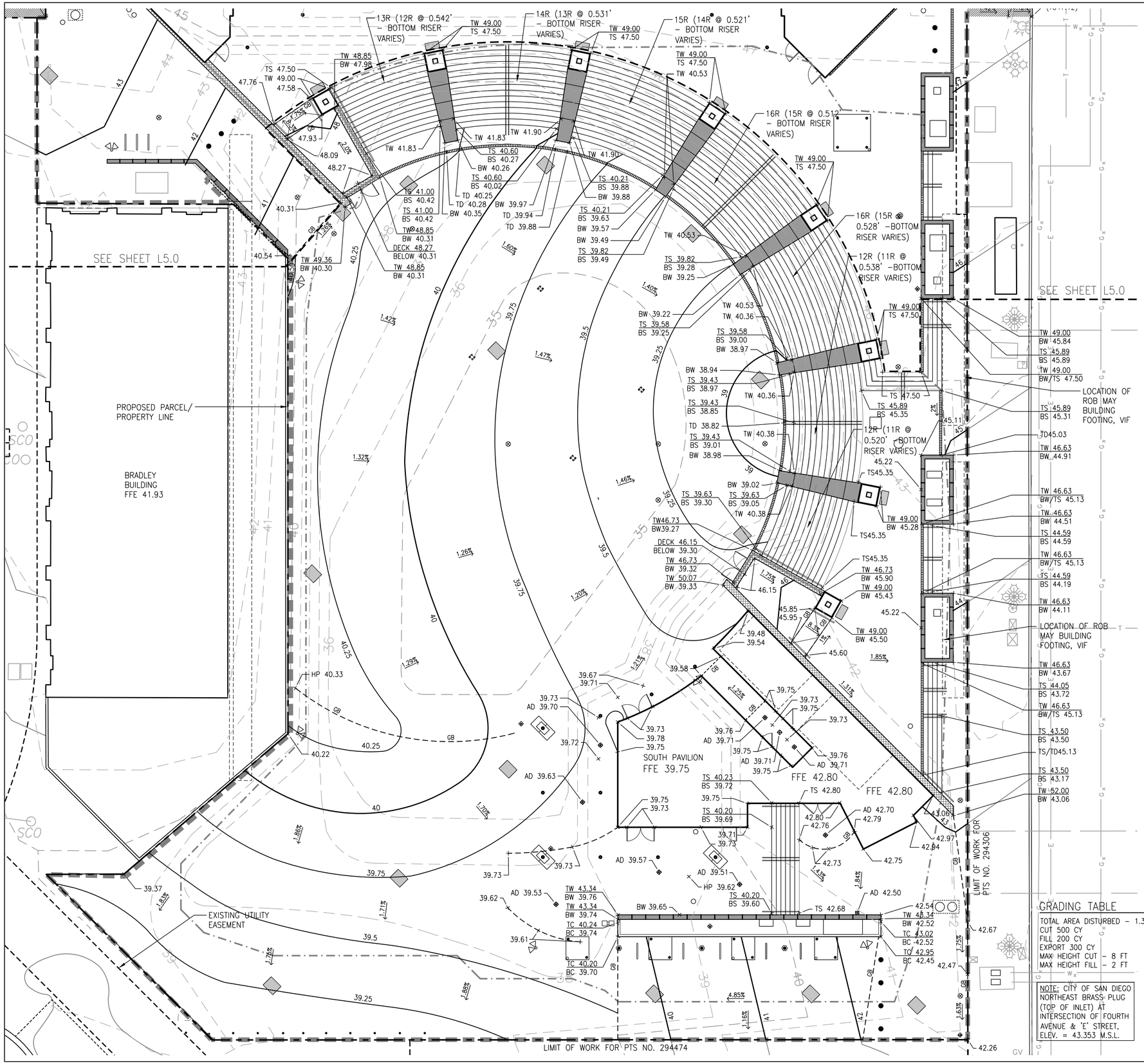
LICENSED LANDSCAPE ARCHITECT — NICHOLAS K. MACY — No. 5961 — August 31, 2013 Renewal Date — June 26, 2012 Date — STATE OF CALIFORNIA

PROJECT NUMBER: WM-1103
DRAWN BY: DB, NK, PW
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1 ADDENDUM C, 4/28/14

PTS#288741 37342-D

SITE DETAILS

L8.12



LEGEND

- PROPERTY LINE
- LIMIT OF WORK
- LIMIT OF WORK FOR ROW IMPROVEMENT; PTS NO. 287746, REF. NO. 37098-D
- 40 — PROPOSED CONTOUR
- (40) — EXISTING CONTOUR
- 40.72 — PROPOSED SPOT ELEVATION
- (40.70) — EXISTING SPOT ELEVATION
- GB — GRADE BREAK
- FLOW LINE
- MATCH — MATCH EXISTING ELEVATION
- 4:1 / 4.9% — DIRECTION AND PERCENTAGE OR H:V RATIO OF SLOPE
- CUT/FILL LINE

AD	AREA DRAIN
FC	FLUSH CURB
FFE	FINISH FLOOR ELEVATION
FL	FLOW LINE
HP	HIGH POINT
LP	LOW POINT
BC	BOTTOM OF CURB
TC	TOP OF CURB
BR	BOTTOM OF RAMP
TR	TOP OF RAMP
BS	BOTTOM OF STEP
TS	TOP OF STEP
BW	BOTTOM OF WALL (AT FG OF PAVING)
TW	TOP OF WALL
TD	TRENCH DRAIN

GRADING NOTES

1. 3 INCH CONTOURS PROVIDED IN LOWER PLAZA FOR CLARITY. CONTOURS IN OTHER AREAS HAVE 1 FOOT INTERVALS.
2. VERIFY ACCURACY OF EXISTING GRADES AND INTERPOLATED ELEVATIONS PRIOR TO BEGINNING WORK. NOTIFY OWNER'S REPRESENTATIVE OF ANY DISCREPANCY PRIOR TO BEGINNING WORK.
3. PROTECT ALL TREES INDICATED TO REMAIN.
4. ALL PROPOSED GRADES ARE TO MEET AND BLEND IN WITH EXISTING GRADING AT PROJECT LIMIT, PROPERTY LINES, BUILDING LINES AND EXISTING CURBS.
5. 'ROUND OFF' ALL SHARP RIDGES EXISTING ON SITE WHETHER OR NOT SUCH CONDITIONS ARE INDICATED ON PLANS.
6. NOTIFY THE OWNER'S REPRESENTATIVE TO REVIEW ROUGH GRADES PRIOR TO PLACEMENT OF TOPSOIL; AND FINE GRADING PRIOR TO PLANTING.
7. ALL AREAS SHALL HAVE POSITIVE DRAINAGE TO APPROVED DRAINAGE STRUCTURES OR CONVEYANCES.
8. PROVIDE POSITIVE DRAINAGE AWAY FROM BUILDINGS AT 0.5% SLOPE, MINIMUM.
9. ALL WALKWAYS AND PAVED AREAS SHALL HAVE SMOOTH AND CONTINUOUS ELEVATION CHANGES.
10. SET STRAIGHT GRADES BETWEEN GIVEN ELEVATIONS. UNLESS OTHERWISE INDICATED.
11. PROVIDE 2% MAX. SLOPE, PERPENDICULAR TO DIRECTION OF TRAVEL, ON ALL PAVED PEDESTRIAN SURFACES, UNLESS NOTED OTHERWISE.
12. GRADE BREAK LINES ARE SHOWN GRAPHICALLY TO ILLUSTRATE DRAINAGE PATTERNS AND ARE NOT TO BE INSTALLED AS ACTUAL JOINT LINES, EXCEPT WHERE THEY COINCIDE WITH PAVING JOINTS.
13. INSTALL DRAINS IN PAVING, SQUARE WITH AND ALIGNING TO PAVING JOINTS AS SHOWN. DOES NOT APPLY TO TRENCH DRAIN CONDITIONS.
14. VERIFY IN FIELD THAT AS-BUILT CONDITIONS MATCH PRECISE ELEVATIONS INDICATED ON PLANS.
15. SITE SURVEY WAS PREPARED BY NASLAND ENGINEERING ON JUNE 3, 2011. ALL GRADES SHOWN ON THE DRAWINGS ARE BASED UPON THE DATUM ESTABLISHED BY THE SURVEYOR. SURVEY INFORMATION IS PROVIDED FOR REFERENCE ONLY. NOT ALL SURVEYED SPOT ELEVATIONS ARE SHOWN.
16. WHERE MEETING A SLOPING GRADE, HEIGHT OF BOTTOM RISER MAY VARY DUE TO GRADE, SEE SPOT ELEVATIONS. ALL OTHER RISERS TO BE CONSISTANT HEIGHT.
17. SEE SHEET C100 FOR ALL STORMWATER UTILITIES.
18. FFE OF BRADLEY BLDG. VARIES ALONG BROADWAY CIRCLE. SEE SITE SURVEY.

GRADING TABLE

TOTAL AREA DISTURBED – 1.3 ACRES
CUT 500 CY
FILL 200 CY
EXPORT 300 CY
MAX HEIGHT CUT – 8 FT
MAX HEIGHT FILL – 2 FT

NOTE: CITY OF SAN DIEGO NORTHEAST BRASS PLUG (TOP OF INLET) AT INTERSECTION OF FOURTH AVENUE & 'E' STREET, ELEV. = 43.353 M.S.L.

0 2.5 5 10 20

N

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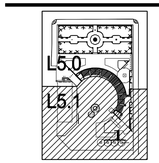
City of San Diego
Park & Recreation Department
Park and Recreation Department Director: Date: 12/12/13
Contractor:
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As-Builts Approved By:

WALKER MACY

HORTON PLAZA IMPROVEMENT PROJECT

SAN DIEGO, CALIFORNIA

LICENSED LANDSCAPE ARCHITECT NICHOLAS KAY JAMES No. 5854 August 31, 2013 Renewal Date June 28, 2012 Date STATE OF CALIFORNIA

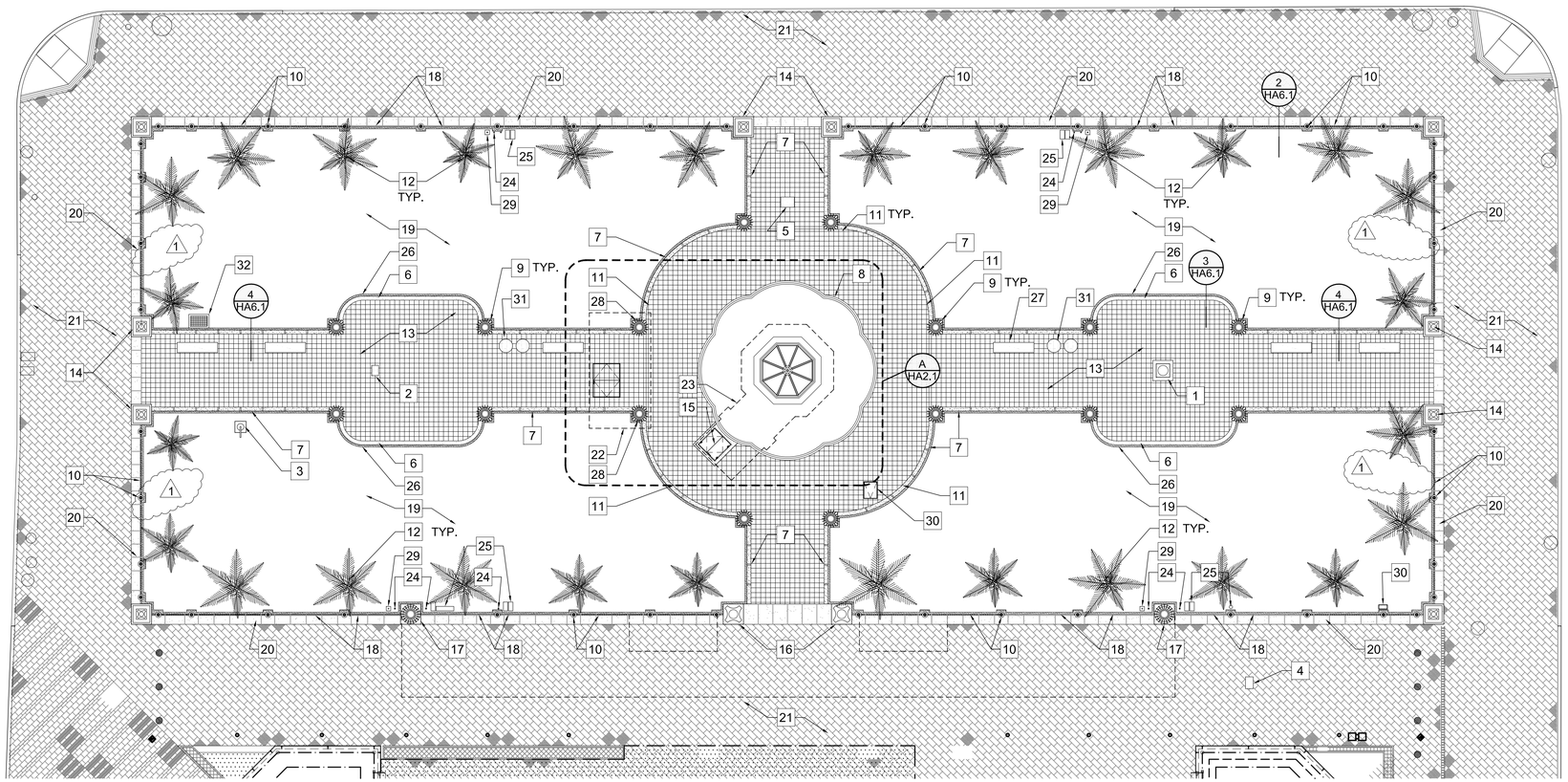


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SITE GRADING PLAN - SOUTH

1 ADD-C L9.0



NEW SITE PLAN

SCALE: 1" = 10'-0"

0 1 3 5 10 20

N



PHOTO 1

PACIFIC MILESTONE / OLD SPANISH TRAIL MONUMENT
SEE KEYNOTE 1 THIS SHEET
1. PHOTOGRAPH SHOWS MARKER AS VIEWED FROM THE EAST (4TH AVENUE SIDE)
2. ORIENT MARKER WITH THE SHIELD OF THE LEE HIGHWAY ON THE EAST SIDE AND ON THE WEST SIDE THE TABLET HONORING COL. FLETCHER.

KEY NOTES

1. RETURN, REINSTALL, CLEAN "PACIFIC MILESTONE/OLD SPANISH TRAIL" MONUMENT PER DTL 15/HA6.3 - SEE PHOTO 1 THIS SHEET.
2. RETURN AND REINSTALL "DAUGHTERS OF THE CONFEDERACY" PLAQUE PER DTL 13/HA6.3 ORIENT PLAQUE AS TO BE READ FROM 3RD AVENUE.
3. RETURN AND REINSTALL EL CAMINO REAL BELL PER DTL 14/HA6.3 ORIENT BELL TOWARDS THE WALKWAY.
4. RETURN AND REINSTALL SALVATION ARMY PLAQUE PER DTL 13/HA6.3, ORIENT PLAQUE TO BE READ FROM 4TH AVENUE.
5. RETURN AND REINSTALL SOHO PLAQUE PER DTL 13/HA6.3, ORIENT PLAQUE TO BE READ FROM BROADWAY.
6. NEW TINTED CONCRETE LOW CURB, SEE DTL 3/HA6.1
7. NEW REPLICATED TINTED CONCRETE CURB WITH SCUPPERS, SEE DTL 4/HA6.1
8. GILL FOUNTAIN - FULL RESTORATION
9. NEW REPLICATED TINTED CAST-STONE PLANTER URN, SEE DTL 1-4/HA6.2
10. RETURN AND REINSTALL STANCHION AND CHAINS PER 9 /HA6.3 PRIME & PAINT SEMI-GLOSS BLACK.
11. DRAIN INLET PER C100
12. EXISTING QUEEN PALM. SEE LANDSCAPE DRAWINGS
13. NEW REPLICATED PAVERS OVER NEW SUB-SLAB PER 7/HA6.1 TILE AREA 3,364 S.F.
14. NEW REPLICATED LIGHT STANDARD & FDN, SEE DTL 12/HA6.2
15. NEW ACCESS HATCH WITH SLIP RESISTANT STEEL COVER
16. NEW REPLICATED ENTRY LIGHT STANDARD& FDN, SEE DTL 8/HA6.2
17. NEW REPLICATED TINTED CONC. PLINTH WITH PLANTER URN, SEE DTL 14/HA6.2
18. NO CHAIN AT THIS BAY
19. NEW LAWN & IRRIGATION, SEE L6.0
20. NEW REPLICATED PERIMETER TINTED CONCRETE STRIP, SEE DTL 2/HA6.1
21. NEW SIDEWALK PAVING AND SUBSLAB SEE CIVIL AND LANDSCAPE DRAWINGS FOR INFORMATION
22. EXTENTS OF NEW PUMP STATION BELOW
23. EXTENTS OF HISTORIC FOUNTAIN VAULT BELOW
24. IRRIGATION VALVE - SEE 2/L7.2
25. IRRIGATION VALVE BOX
26. NEW TINTED CONCRETE MOW STRIP WITH D.G. DUSTING PER DTL 3,4/HA6.1
27. NEW PARK BENCH, SEE L2.0
28. PLINTH WITH VAULT VENT. SEE DTL 1,2/HA6.2
29. QUICK COUPLING VALVE - SEE 4/L7.1
30. ELECTRICAL ACCESS BOX, SEE L2.0
31. TRASH AND RECYCLING RECEPTACLES, SEE LANDSCAPE DRAWINGS
32. BACKFLOW PREVENTOR WITH CAGE ENCLOSURE, PAINT SEMI-GLOSS BLACK.

GENERAL NOTES

1. REFER TO SHEET HA1.2 FOR JOINT LAYOUT PLAN AND SCUPPER LOCATIONS
2. NOT ALL ELECTRICAL DRAINAGE, AND IRRIGATION FEATURES ARE SHOWN ON THIS PLAN, COORDINATE WORK WITH THE OTHER DISCIPLINES.
3. ALL SURFACES AND TRANSITIONS BETWEEN SURFACES MUST COMPLY WITH CALIFORNIA ACCESSIBILITY REQUIREMENTS. ANY DEVIATION FROM CBC ACCESSIBILITY STANDARDS WILL BE REMOVED AND REINSTALLED AT CONTRACTOR'S EXPENSE.
4. ALL WALKING SURFACES SHALL MEET CBC ACCESSIBILITY SLIP RESISTANCE STANDARDS.
5. ALL SITE FURNITURE SHALL BE SECURED TO PAVING.
6. ALIGN FEATURES SET IN PAVING WITH THE PAVING JOINTS. SET ALL OBJECTS SQUARE WITH PAVING JOINTS. MISALIGNED OBJECTS WILL BE REMOVED AND SET SQUARELY. WHEN A FEATURE DOES NOT NEATLY ALIGN WITH PAVING JOINTS, CENTER THE OBJECT IN PAVING GRID TO THE CLOSEST JOINTS.

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SAN DIEGO, CA 92101

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WALKER | MACY

HERITAGE ARCHITECTURE & PLANNING
625 BROADWAY, SUITE 800
SAN DIEGO CALIFORNIA 92101
(619) 239-7888 FAX (619) 234-6286

HORTON PLAZA IMPROVEMENT PROJECT

SAN DIEGO, CALIFORNIA

LICENSED ARCHITECT
PAUL DAVID MARSHALL
C-24785
3-31-13
REN.
STATE OF CALIFORNIA

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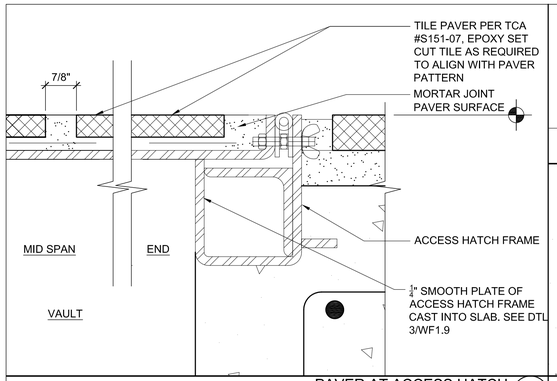
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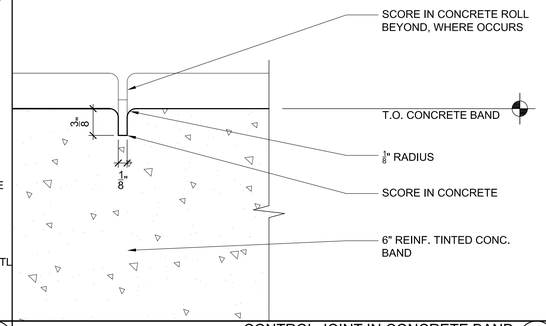
PTS#288741 37342-D

SITE PLAN NEW

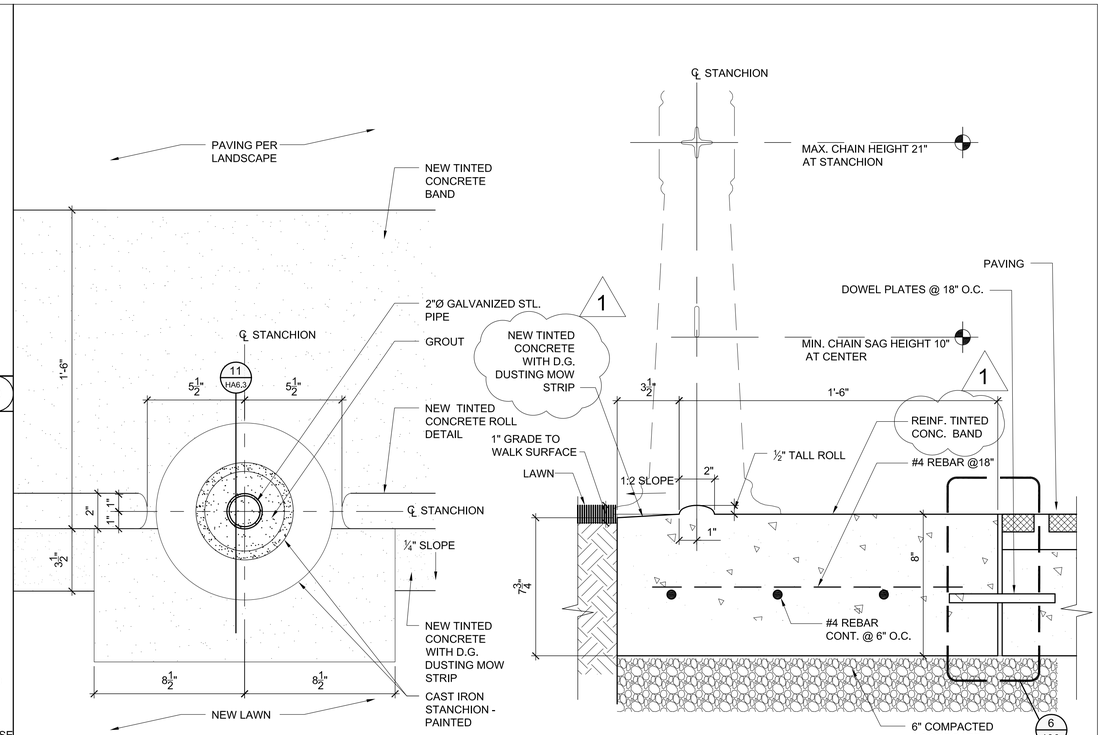
HA1.1



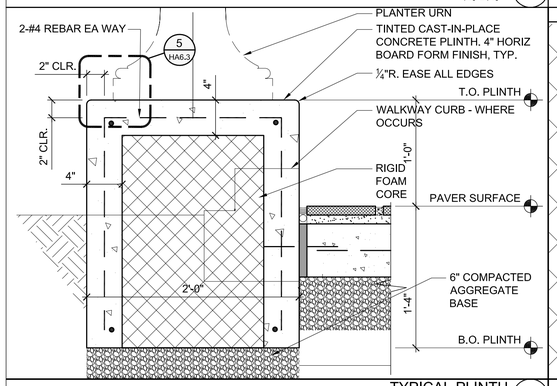
PAVER AT ACCESS HATCH 13
1'-0"=1'-0"



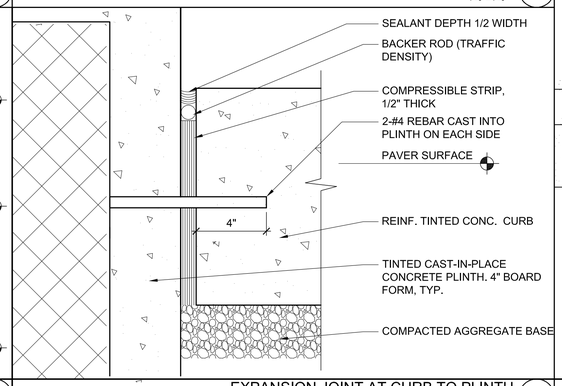
CONTROL JOINT IN CONCRETE BAND 9
1'-0"=1'-0"



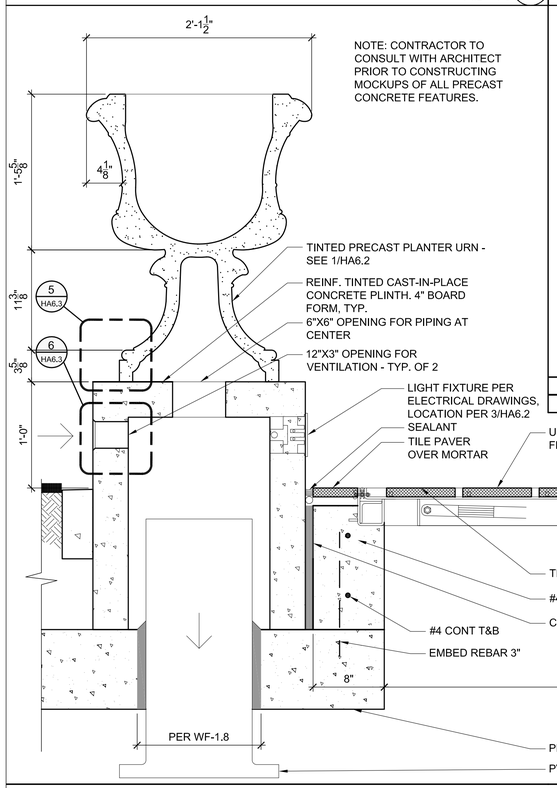
HISTORIC SIDEWALK ROLL (MODIFIED) - SECTION AND PLAN 2
3" = 1'-0"



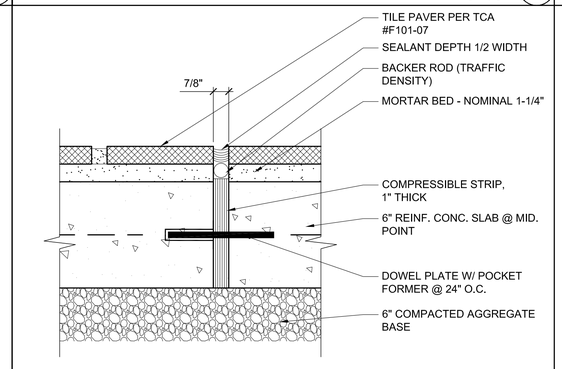
TYPICAL PLINTH 14
1-1/2" = 1'-0"



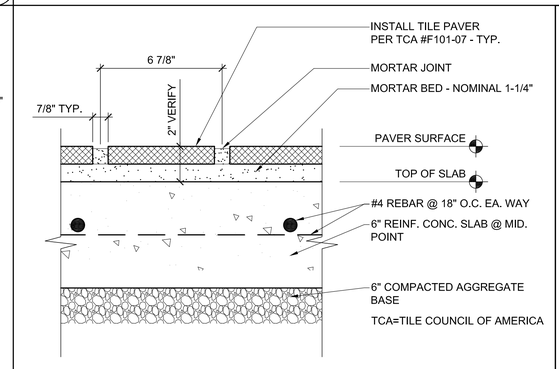
EXPANSION JOINT AT CURB TO PLINTH 10
3" = 1'-0"



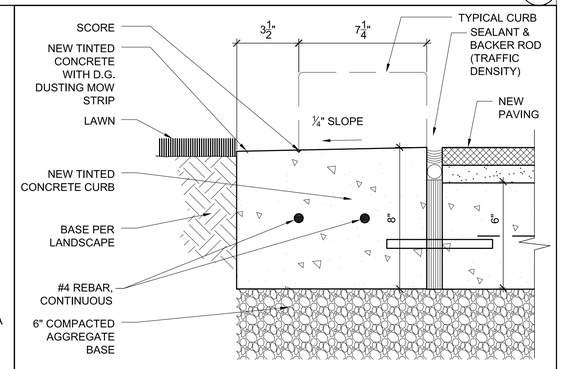
VAULT HATCH DETAIL 12
1-1/2" = 1'-0"



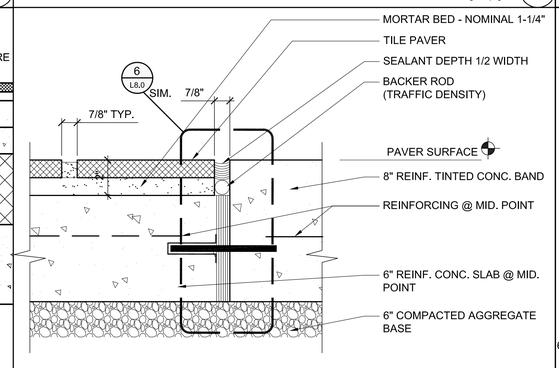
TYPICAL DOWELLED ISOLATION JOINT (DIJ) 11
3" = 1'-0"



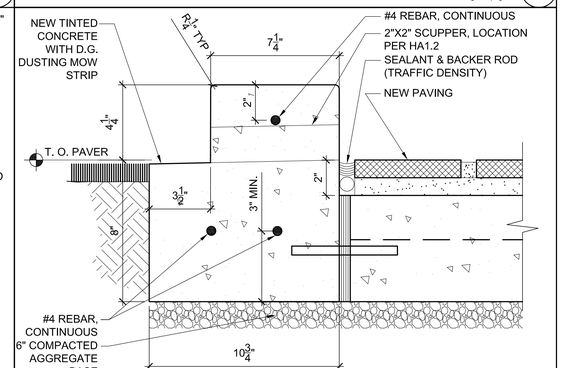
TYPICAL TILE PAVER SLAB 7
3" = 1'-0"



LOW CURB AT NODES 3
3" = 1'-0"



TYPICAL EXPANSION JOINT (EJ) 8
3" = 1'-0"



TYPICAL CURB 4
3" = 1'-0"

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625 BROADWAY, SUITE 800
SAN DIEGO CALIFORNIA 92101
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HORTON PLAZA IMPROVEMENT PROJECT

SAN DIEGO, CALIFORNIA

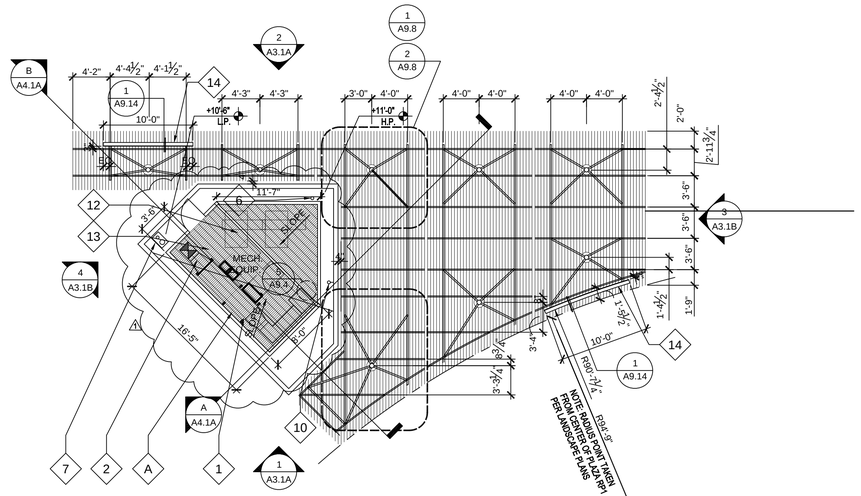
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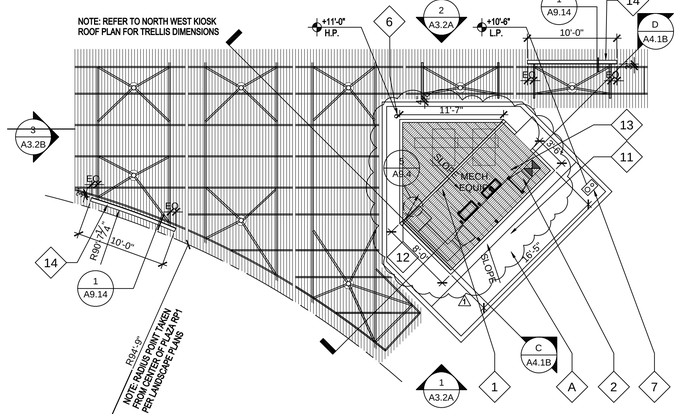
SITE DETAILS

HA6.1



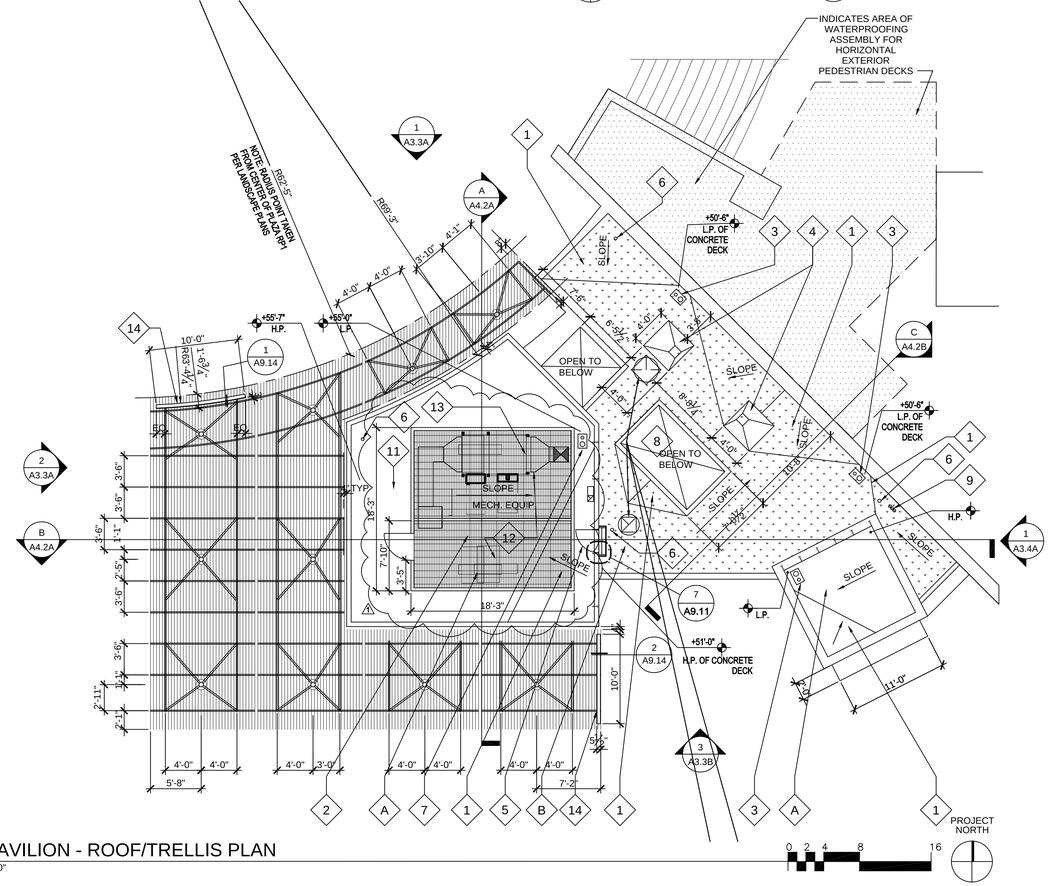
1 NORTHWEST PAVILION - ROOF/TRELLIS PLAN
SCALE : 1/8" = 1'-0"

PROJECT NORTH



2 NORTHEAST PAVILION - ROOF/TRELLIS PLAN
SCALE : 1/8" = 1'-0"

PROJECT NORTH



3 SOUTH PAVILION - ROOF/TRELLIS PLAN
SCALE : 1/8" = 1'-0"

PROJECT NORTH

GENERAL NOTES

FIRE CLASSIFICATION:
CLASS X, LISTED AND IDENTIFIED BY AN APPROVED TESTING AGENCY (CBC 1505).

ROOF INSULATION:
R-XX RIGID INSULATION.

ROOF SLOPE:
TYPICAL ROOF SLOPE IS 1:24 (4% SLOPE) MINIMUM U.O.N.
CRICKETS SLOPE IS 1:48 (2% SLOPE) MINIMUM.

FLASHING LOCATIONS:
AT THE JUNCTURE OF THE ROOF AND VERTICAL SURFACES, PARAPETS, ROOF EDGES, ROOF PENETRATIONS, ETC., FLASHING AND COUNTERFLASHING SHALL BE PROVIDED PER THE ROOF MANUFACTURER'S RECOMMENDATIONS AND, WHEN OF METAL, SHALL NOT BE LESS THAN NO. 26 GALVANIZED SHEET GAGE CORROSION-RESISTANT METAL. (CBC 1503) ALL ROOF FLASHINGS SHALL CONFORM TO SMACNA AND NRCA STANDARDS. FLASHING AND COUNTERFLASHING SHALL BE PAINTED U.O.N.

OVERFLOW DRAINS AND SCUPPERS:
WHERE ROOF DRAINS ARE REQUIRED, OVERFLOW DRAINS HAVING THE SAME SIZE AS THE ROOF DRAINS SHALL BE INSTALLED WITH THE WATER INLET FLOW LINE LOCATED 2 INCHES ABOVE THE LOW POINT OF THE ROOF, OR OVERFLOW SCUPPERS HAVING THREE TIMES THE SIZE OF THE ROOF DRAINS AND HAVING A MINIMUM OPENING HEIGHT OF 4 INCHES MAY BE INSTALLED IN THE ADJACENT PARAPET WALLS WITH THE INLET FLOW LINE LOCATED 2 INCHES ABOVE THE LOW POINT OF THE ADJACENT ROOF. OVERFLOW DRAINS SHALL DISCHARGE TO AN APPROVED LOCATION AND SHALL NOT BE CONNECTED TO ROOF DRAIN LINES.

OVER PUBLIC PROPERTY:
ROOF DRAINAGE WATER FROM A BUILDING SHALL NOT BE PERMITTED TO FLOW OVER PUBLIC PROPERTY.

MAINTENANCE ACCESS:
ACCESS SHALL BE PROVIDED TO ALL MECHANICAL EQUIPMENT LOCATED ON THE ROOF AS REQUIRED BY THE MECHANICAL CODE.

COORDINATION:
CONTRACTOR SHALL VERIFY LOCATIONS AND COORDINATE SIZES FOR ALL ROOF OPENINGS, CURBS, CONCRETE PADS, AND ATTACHMENT REQUIREMENTS W/ MANUFACTURER FOR ACTUAL MECHANICAL EQUIPMENT SUBMITTED.

ROOF ASSEMBLY TYPES

- A — PVC ROOFING OVER RIGID INSULATION (R-30 MINIMUM) OVER ¾" DENSDECK OVER METAL DECK SLOPED TO DRAIN
- B — COMPLETE MONOLITHIC RUBBERIZED-ASPHALT FIBER-REINFORCED WATERPROOFING ASSEMBLY WITH PROTECTION LAYERS, FLASHINGS, DRAINAGE LAYERS (WHERE INDICATED), ROOT BARRIER, INSULATION (WHERE INDICATED) AND OTHER ITEMS BELOW VEGETATED ROOF ASSEMBLIES

KEYNOTES

1. CRICKET
2. MECHANICAL EQUIPMENT SCREEN WALL
3. ROOF DRAIN & OVERFLOW WITH INSPECTION CHAMBER. SEE DETAIL 4/A9.11
4. CURB-MOUNTED SKYLIGHT - SEE DET. 5/A9.12
5. PARAPET LADDER & GATE (2'-6" WIDE) - 3 & 7/A9.11
6. PLUMBING VTR - SEE DET. 12/A9.11 AND 7/A9.12
7. ROOF DRAIN & OVERFLOW - SEE DETAIL 11/A9.4
8. ROOF EXHAUST. SEE MECHANICAL DRAWINGS AND 3/A9.12
9. IRRIGATION SYSTEM. SEE PLUMBING.
10. WEATHER STATION. ROUTE CONDUIT INSIDE ALONG THIS WALL TO IRRIGATION CONTROLLER IN ELECTRIC ROOM, V103. SEE LANDSCAPE PLAN. SEE DETAIL 7/A9.12 SIMILAR.
11. MECHANICAL SCREEN DOOR
12. MECHANICAL EQUIPMENT CURB. SEE DETAIL 12/A9.4
13. REMOVABLE ALUMINUM BAR GRATE SCREENING
14. METAL ANGLE SUPPORT FOR TENANT SIGN. SEE DETAILS SHEET A9.14

LEGEND

- XXX H.P. — HIGH POINT ELEVATION
- XXX L.P. — LOW POINT ELEVATION

Civic San Diego
401 B STREET, SUITE 400
SAN DIEGO, CA 92101

City of San Diego
Park & Recreation Department

Park and Recreation Department Director: _____
Date: 12/12/13
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As-Builts By: _____
As-Builts Approved By: _____

WALKER | MACY

carrierjohnson + CULTURE
1301 third avenue , san diego , ca . 92101
phone 619.239.2353 | fax 619.239.6227

HORTON PLAZA IMPROVEMENT PROJECT

SAN DIEGO, CALIFORNIA

LICENSED ARCHITECT — REG. No. C-24987 — CIVIL — STRUCTURAL — MECHANICAL — ELECTRICAL — PLUMBING — FIRE PROTECTION — PROJECT MANAGEMENT — CONSTRUCTION MANAGEMENT — FEB. 28 2014 — STATE OF CALIFORNIA

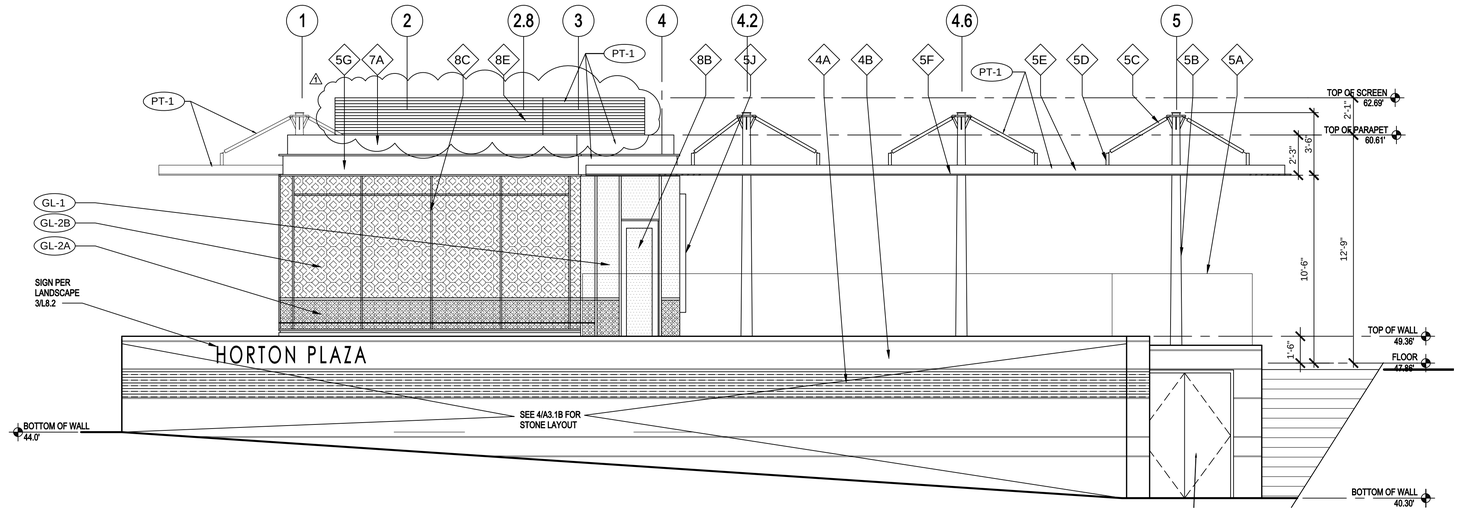
PROJECT NUMBER: WM-1103
DRAWN BY: | REVIEWED BY:

PHASE: 100% CONSTRUCTION DOCUMENTS PERMIT REVIEW SET
ISSUE DATE: 09/27/2013
REVISIONS:
1 ADDENDUM C, 4/28/14

PTS#288741 37342-D

PAVILION ROOF/TRELLIS PLANS

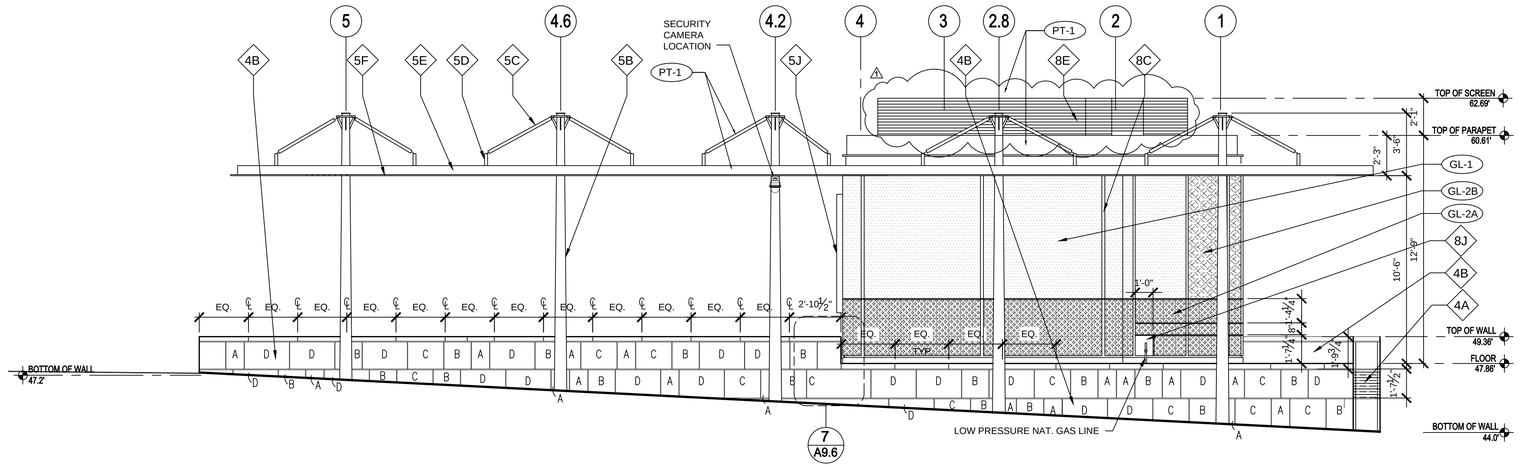
A2.2



1 SOUTH ELEVATION

SCALE : 1/4" = 1'-0"

0 4 8



2 NORTH ELEVATION

SCALE : 1/4" = 1'-0"

0 4 8

FINISH LEGEND

PT-1	EXTERIOR PAINTED STEEL AND ALUMINUM SURFACES	
	MANUFACTURER:	PRECISION COATINGS, INC.
	PRODUCT:	PC3v100
	COLOR NAME.:	SNOW WHITE 3080
	FINISH:	SATIN
PT-2	INTERIOR STRUCTURAL COLUMNS & MISC METALS	
	MANUFACTURER:	PRECISION COATINGS, INC.
	PRODUCT:	PC3v100
	COLOR NAME.:	GRAY METALLIC 2480
	FINISH:	SATIN
PT-3	PAINTED DOORS	
	MANUFACTURER:	PRECISION COATINGS, INC.
	PRODUCT:	PC3v100
	COLOR NAME.:	TREASURE GOLD 4520
	FINISH:	SATIN
MP-1	INTERIOR METAL SOFFIT	
	MANUFACTURER:	VM ZINC
	PRODUCT:	VMZ FLAT LOCK PANEL
	COLOR NAME.:	QUARTZ-ZINC

STONE VENEER SIZES–TABLE

A	12" WIDTH
B	18" WIDTH
C	24" WIDTH
D	30" WIDTH

NOTE: WHERE NO MENTION OF STONE SIZE BASED ON TABLE ABOVE, A CUSTOM SIZE IS IN PLACE.

ALTERNATE GLASS TYPE SPECIFICATION	GL-2A	1" INSULATING PANEL WITH 1/4" CLEAR TEXTURED GLASS AT OUTSIDE AND 1/4" PLATE MIRROR AT INSIDE. PATTERN: NATHAN ALLEN "BINARY"
	GL-2B	1" INSULATING PANEL WITH 1/4" CLEAR TEXTURED GLASS AT OUTSIDE AND 1/4" PLATE MIRROR AT INSIDE. PATTERN: NATHAN ALLEN "PARADIGM"

NOTE: PROVIDE TEMPERED SAFETY GLAZING AS FOLLOWS: (CBC SECTION 2406)
A. GLAZING IN DOORS
B. FIXED GLAZING WITHIN 24" OF DOORS
C. GLAZING ADJACENT TO A WALKING SURFACE WITH BOTTOM EDGE LESS THAN 18"AFF AND TOP EDGE GREATER THAN 36" AFF.

GENERAL NOTES

REFERENCE POINTS:
VERTICAL DIMENSIONS ARE TO THE TOP OF JOINTS AND REVEALS, U.O.N.

INSULATION:
PROVIDE THE FOLLOWING R-VALUES AT EXTERIOR WALLS AND ROOF CONSTRUCTION SURROUNDING CONDITIONED SPACES IN THE BUILDING ENVELOPE U.O.N., ROOFS: R-30, WALLS: R-19, FLOOR OVERHANGS: R-19

WEATHER-TIGHTNESS:
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8D	PRE FINISHED ALUMINUM CAP - COLOR TO MATCH WINDOW SYSTEM	076200
8E	PRE FINISHED METAL EQUIPMENT SCREEN - PAINT	074213
8F	PRE-FINISHED OPERABLE WINDOW - COLOR TO MATCH WINDOW SYSTEM	084113
8G	GL-4 GLASS WITH STAINLESS STEEL STAND OFFS	088000
8H	GL-5 POLYCARBONATE TRANSACTION WINDOW WITH DIP TRAY	131500
8J	PRE-FINISHED ALUMINUM BREAK METAL - COLOR TO MATCH WINDOW SYSTEM	076200
8I	GL-3 ALL GLASS ENTRY DOOR	084113
10A	PREFINISHED ALUMINUM WALL LOUVERS - COLOR TO MATCH STONE, REFER TO MECH. DWGS. FOR SIZES	099600
10B	DEVICE PER ELECTRICAL, SEE 10/A9.9 AND 13/A9.3	088900
10C	OVERFLOW ROOF DRAIN TO DAYLIHGT 6" A.F.F. SEE DETAIL 7/A9.10 AND PLUMBING PLANS.	-
10D	STAINLESS STEEL TRANSACTION COUNTER	055000
16A	LIGHT POLE	-
5F	BRUSHED STAINLESS STEEL TRELLIS FRAMING	051213
5G	PAINTED STEEL CHANNEL AESS - COLOR	051213
5H	PAINTED STEEL COLUMN AESS	051213
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5K	PAINTED STEEL ROD AESS	051213
7A	METAL WALL PANEL	074213
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7C	WATERPROOFING ASSEMBLY FOR HORIZONTAL EXTERIOR PEDESTRIAN DECKS WITH PAVING	071413
9A	PAINTED HOLLOW METAL DOOR/FRAME	081113
8B	GL-1 PRE-FINISHED ALUMINUM STOREFRONT DOOR - COLOR TO MATCH WINDOW SYSTEM	084113
8C	PRE-FINISHED ALUMINUM WINDOW SYSTEM	084113

ELEVATION / SECTION KEYNOTES

		SPEC SECTION
3A	ARCHITECTURAL C.I.P. CONCRETE W/ INTEGRAL COLOR	033300
4A	STONE VENEER- SPLIT FACED KINARO TAN LIMESTONE. GROUT COLOR- CUSTOM BUILDING PRODUCTS 333 ALABASTER SANDED. REFER TO 8/A9.9.	044300
4B	STONE VENEER- LYCHEE KINARO TAN LIMESTONE. GROUT COLOR- CUSTOM BUILDING PRODUCTS 333 ALABASTER SANDED. REFER TO 8/A9.9.	044300
4C	STONE VENEER-KINARO TAN LIMESTONE; LIGHT LYCHEE FINISH. GROUT COLOR- CUSTOM BUILDING PRODUCTS 333 ALABASTER NON SANDED. REFER TO 12/A9.9	044300
5A	GUARDRAIL PER LANDSCAPE AND STRUCTURAL	057300
5B	TAPERED STEEL COLUMN WITH SILVER HEXCEL TEXALIUM CLADDING (9 1/2" DIA AT BASE AT THE SOUTH PAVILION, 8" DIA. AT BASE AT THE NORTH PAVILIONS)	051213
5C	PAINTED STEEL BRACING SUPPORTS	051213
5D	PAINTED STEEL MAIN MEMBERS	051213
5E	PAINTED STEEL INTERMEDIATE MEMBERS	051213

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SYMBOL	DESCRIPTION	
	GL-1	1" CLEAR LOW IRON INSULATING PANEL
	GL-2A	1" INSULATING PANEL WITH 1/2" CLEAR TEXTURED LAMINATED GLASS AT OUTSIDE AND 1/4" PLATE MIRROR AT INSIDE. PATTERN: PULP STUDIOS #159 + #150 OR APPROVED EQUAL
	GL-2B	1" INSULATING PANEL WITH 1/2" CLEAR TEXTURED LAMINATED GLASS AT OUTSIDE AND 1/4" PLATE MIRROR AT INSIDE. PATTERN: PULP STUDIOS #159 + #501 OR APPROVED EQUAL
	GL-3	CLEAR TEMPERED GLASS FOR ALL-GLASS ENTRANCE DOORS
	GL-4	9/16" LAMINATED SKYLIGHT GLASS WITH TRANSLUCENT FINISH
	GL-5	POLYCARBONATE GLAZING FOR TRANSACTION WINDOWS

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HORTON PLAZA IMPROVEMENT PROJECT

SAN DIEGO, CALIFORNIA

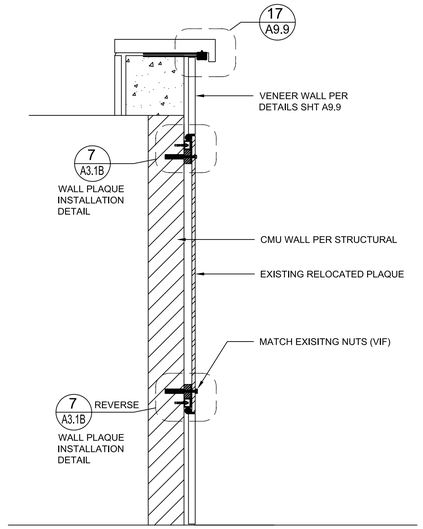
LICENSED LANDSCAPE ARCHITECT
No. 5445
FEB 28 2015
STATE OF CALIFORNIA

PROJECT NUMBER: WM-1103
DRAWN BY: REVIEWED BY:
PHASE: 100% CONSTRUCTION DOCUMENTS PERMIT REVIEW SET
ISSUE DATE: 09/27/2013
REVISIONS:
1 ADDENDUM C, 4/28/14

PTS#288741 37342-D

NW PAVILION ELEVATIONS

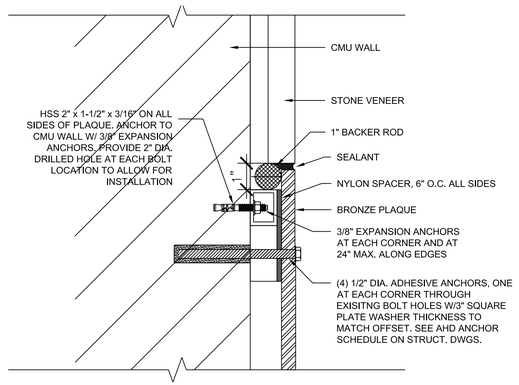
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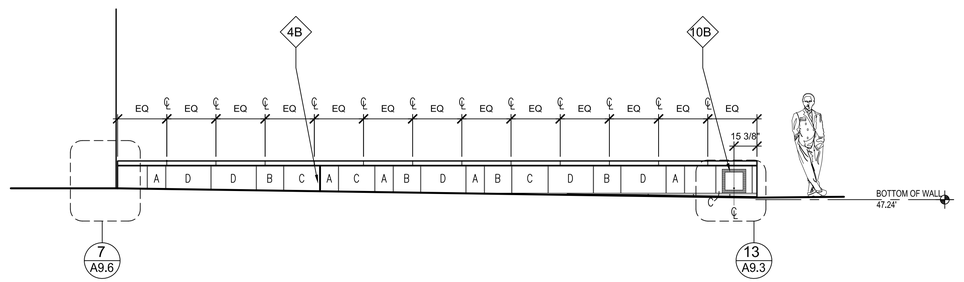
8 WALL SECTION
SCALE : 3/4" = 1'-0"

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A	12" WIDTH
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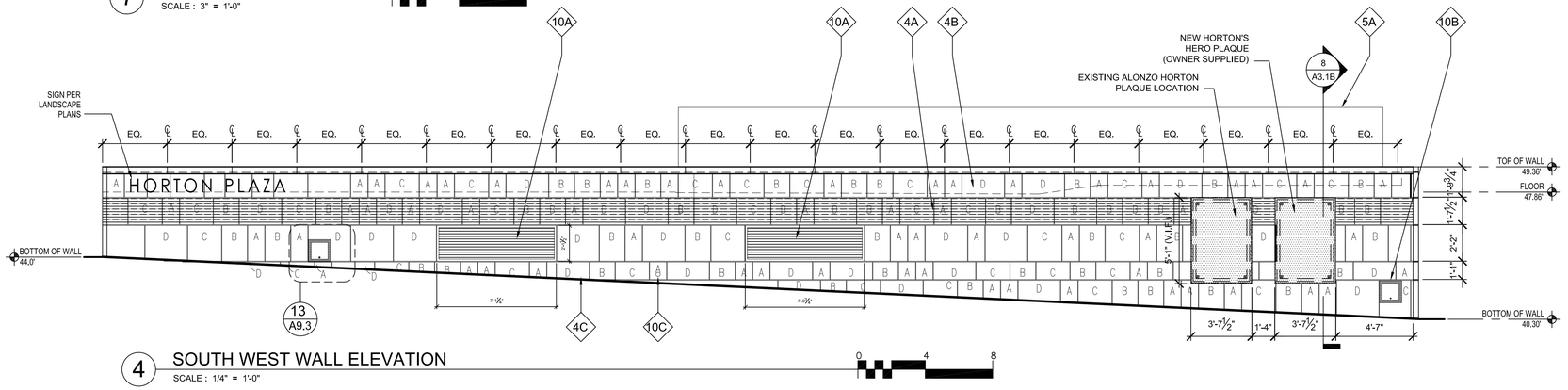
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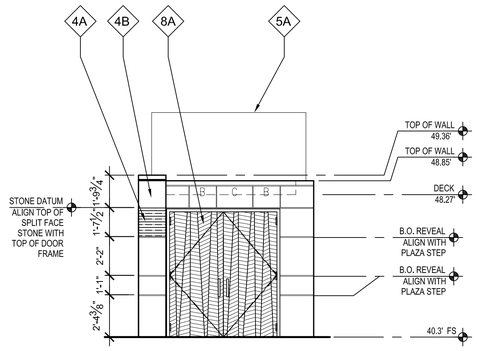
7 ATTACHMENT DETAIL
SCALE : 3" = 1'-0"



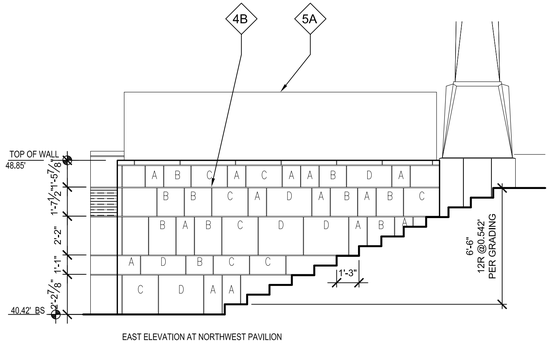
6 NORTH WALL ELEVATION
SCALE : 1/4" = 1'-0"



4 SOUTH WEST WALL ELEVATION
SCALE : 1/4" = 1'-0"



5 DOOR ELEVATION
SCALE : 1/4" = 1'-0"



EAST ELEVATION AT NORTHWEST PAVILION

3A EAST ELEVATION
SCALE : 1/4" = 1'-0"



3 EAST ELEVATION
SCALE : 1/4" = 1'-0"

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10C	OVERFLOW ROOF DRAIN TO DAYLIHGT 6" A.F.F. SEE DETAIL 7/A9.10 AND PLUMBING PLANS.	-
10D	STAINLESS STEEL TRANSACTION COUNTER	055000
16A	LIGHT POLE	-

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5G	PAINTED STEEL CHANNEL AESS - COLOR	051213
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ELEVATION / SECTION KEYNOTES

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GLASS TYPE LEGEND

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HORTON PLAZA IMPROVEMENT PROJECT

SAN DIEGO, CALIFORNIA

LICENSED ARCHITECT
REG. No. C-24067
FEB 28 2015
STATE OF CALIFORNIA

PROJECT NUMBER: WM-1103
DRAWN BY: | REVIEWED BY:
PHASE: 100% CONSTRUCTION DOCUMENTS PERMIT REVIEW SET
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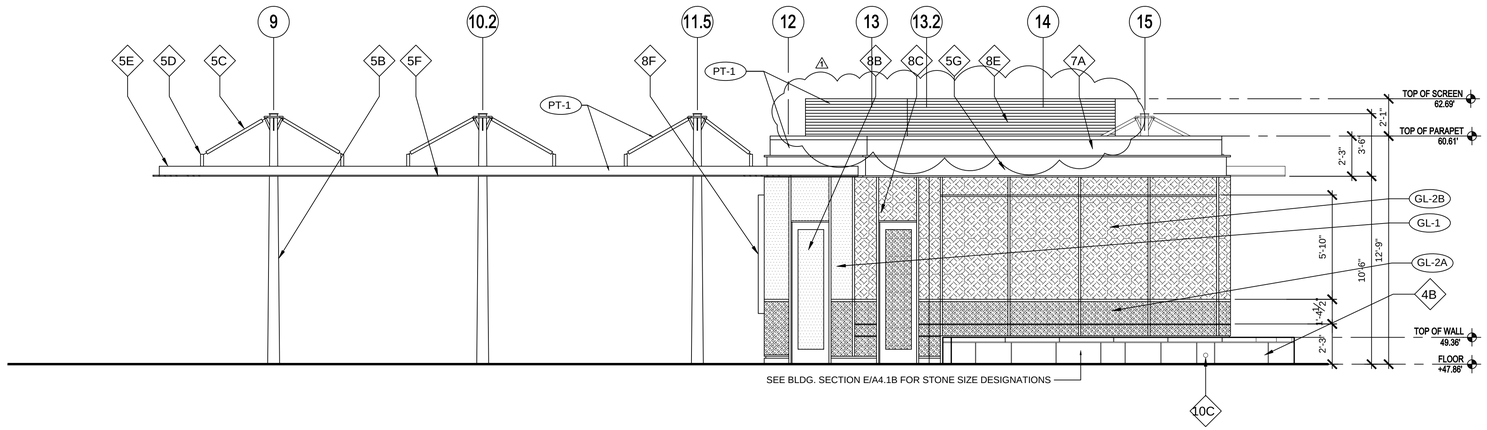
PTS#288741 37342-D

NW PAVILION ELEVATIONS

A3.1B

FINISH LEGEND

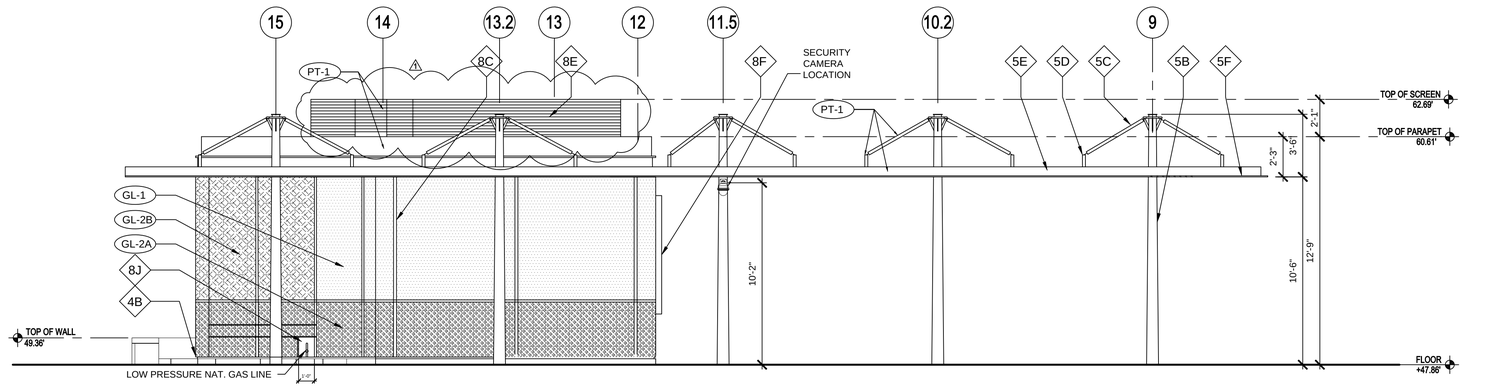
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	MANUFACTURER:	PRECISION COATINGS, INC.
	PRODUCT:	PC3v100
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	FINISH:	SATIN
PT-3	PAINTED DOORS	
	MANUFACTURER:	PRECISION COATINGS, INC.
	PRODUCT:	PC3v100
	COLOR NAME.:	TREASURE GOLD 4520
	FINISH:	SATIN
MP-1	INTERIOR METAL SOFFIT	
	MANUFACTURER:	VM ZINC
	PRODUCT:	VMZ FLAT LOCK PANEL
	COLOR NAME.:	QUARTZ-ZINC



1 SOUTH ELEVATION

SCALE : 1/4" = 1'-0"

0 4 8



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8H	GL-5 POLYCARBONATE TRANSACTION WINDOW WITH DIP TRAY	131500
8J	PRE-FINISHED ALUMINUM BREAK METAL - COLOR TO MATCH WINDOW SYSTEM	076200
8I	GL-3 ALL GLASS ENTRY DOOR	084113
10A	PREFINISHED ALUMINUM WALL LOUVERS - COLOR TO MATCH STONE, REFER TO MECH. DWGS. FOR SIZES	099600
10B	DEVICE PER ELECTRICAL, SEE 10/A9.9 AND 13/A9.3	088900
10C	OVERFLOW ROOF DRAIN TO DAYLIHGT 6" A.F.F. SEE DETAIL 7/A9.10 AND PLUMBING PLANS.	-
10D	STAINLESS STEEL TRANSACTION COUNTER	055000
16A	LIGHT POLE	-

5F	BRUSHED STAINLESS STEEL TRELLIS FRAMING	051213
5G	PAINTED STEEL CHANNEL AESS - COLOR	051213
5H	PAINTED STEEL COLUMN AESS	051213
5J	STAINLESS STEEL PLATE SURROUND	051213
5K	PAINTED STEEL ROD AESS	051213
7A	METAL WALL PANEL	074213
7B	WATERPROOFING ASSEMBLY FOR BELOW GRADE VERTICAL WALLS	071413
7C	WATERPROOFING ASSEMBLY FOR HORIZONTAL EXTERIOR PEDESTRIAN DECKS WITH PAVING	071413
8A	PAINTED HOLLOW METAL DOOR/FRAME	081113
8B	GL-1 PRE-FINISHED ALUMINUM STOREFRONT DOOR - COLOR TO MATCH WINDOW SYSTEM	084113
8C	PRE-FINISHED ALUMINUM WINDOW SYSTEM	084113

ELEVATION / SECTION KEYNOTES

		SPEC SECTION
3A	ARCHITECTURAL C.I.P. CONCRETE W/ INTEGRAL COLOR	033300
4A	STONE VENEER- SPLIT FACED KINARO TAN LIMESTONE. GROUT COLOR- CUSTOM BUILDING PRODUCTS 333 ALABASTER SANDED. REFER TO 8/A9.9.	044300
4B	STONE VENEER- LYCHEE KINARO TAN LIMESTONE. GROUT COLOR- CUSTOM BUILDING PRODUCTS 333 ALABASTER SANDED. REFER TO 8/A9.9.	044300
4C	STONE VENEER-KINARO TAN LIMESTONE; LIGHT LYCHEE FINISH. GROUT COLOR- CUSTOM BUILDING PRODUCTS 333 ALABASTER NON SANDED. REFER TO 12/A9.9	044300
5A	GUARDRAIL PER LANDSCAPE AND STRUCTURAL	057300
5B	TAPERED STEEL COLUMN WITH SILVER HEXCEL TEXALIUM CLADDING (9 1/2" DIA AT BASE AT THE SOUTH PAVILION, 8" DIA. AT BASE AT THE NORTH PAVILIONS)	051213
5C	PAINTED STEEL BRACING SUPPORTS	051213
5D	PAINTED STEEL MAIN MEMBERS	051213
5E	PAINTED STEEL INTERMEDIATE MEMBERS	051213

GLASS TYPE LEGEND

SYMBOL	DESCRIPTION	
	GL-1	1" CLEAR LOW IRON INSULATING PANEL
	GL-2A	1" INSULATING PANEL WITH 1/2" CLEAR TEXTURED LAMINATED GLASS AT OUTSIDE AND 1/4" PLATE MIRROR AT INSIDE. PATTERN: PULP STUDIOS #159 + #150 OR APPROVED EQUAL
	GL-2B	1" INSULATING PANEL WITH 1/2" CLEAR TEXTURED LAMINATED GLASS AT OUTSIDE AND 1/4" PLATE MIRROR AT INSIDE. PATTERN: PULP STUDIOS #159 + #501 OR APPROVED EQUAL
	GL-3	CLEAR TEMPERED GLASS FOR ALL-GLASS ENTRANCE DOORS
	GL-4	9/16" LAMINATED SKYLIGHT GLASS WITH TRANSLUCENT FINISH
	GL-5	POLYCARBONATE GLAZING FOR TRANSACTION WINDOWS

Civic San Diego
401 B STREET, SUITE 400
SAN DIEGO, CA 92101

City of San Diego
Park & Recreation Department

Park and Recreation Department Director: _____
Date: 12/12/13

Contractor: _____
Date Completed: _____
Date Started: _____
As-Builts By: _____
As-Builts Approved By: _____

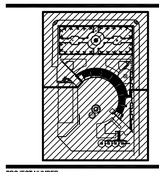
WALKER | MACY

carrierjohnson + CULTURE
1301 third avenue , san diego , ca . 92101
phone 619.239.2353 | fax 619.239.6227

HORTON PLAZA IMPROVEMENT PROJECT

SAN DIEGO, CALIFORNIA

LICENSED TO PRACTICE ARCHITECTURE
LIC. NO. C-24587
FEB 28 2015
EXPIRES
STATE OF CALIFORNIA

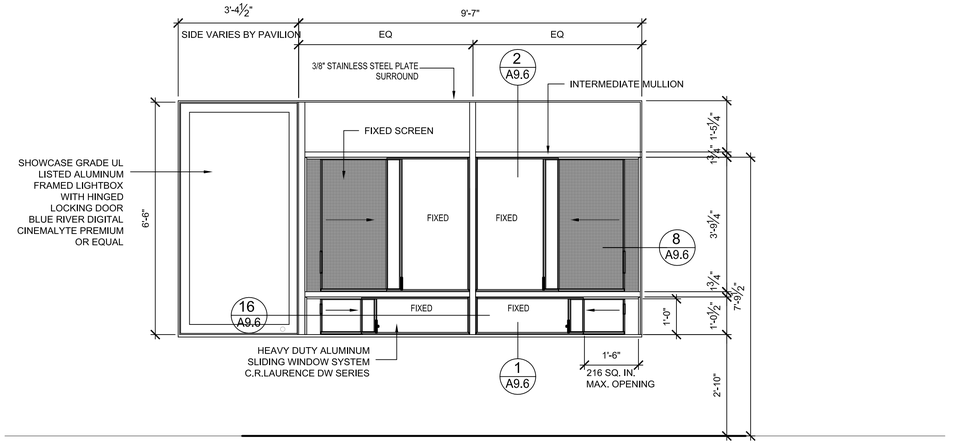


PROJECT NUMBER: WM-1103
DRAWN BY: | REVIEWED BY:
PHASE: 100% CONSTRUCTION DOCUMENTS PERMIT REVIEW SET
ISSUE DATE: 09/27/2013
REVISIONS:
1 ADDENDUM C, 4/28/14

PTS#288741 37342-D

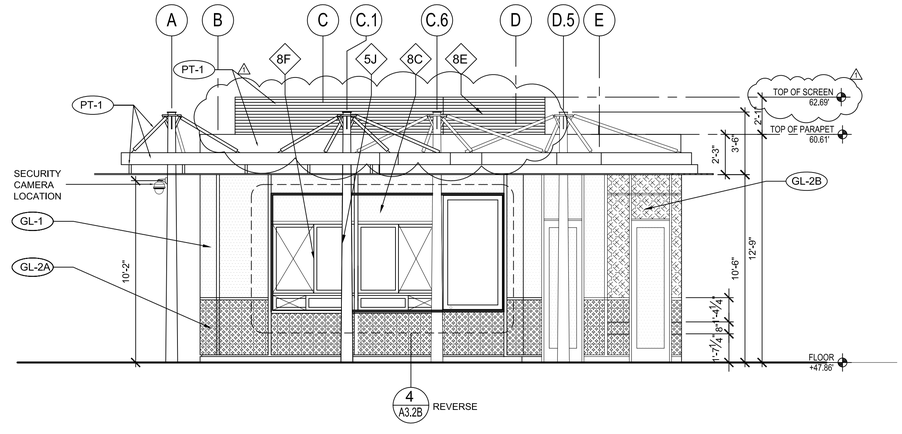
NE PAVILION ELEVATIONS

A3.2A



4 OPERABLE WINDOW ELEVATION

SCALE : 1/2" = 1'-0"



3 WEST ELEVATION

SCALE : 1/4" = 1'-0"

0 4 8

FINISH LEGEND

PT-1 EXTERIOR PAINTED STEEL AND ALUMINUM SURFACES
MANUFACTURER: PRECISION COATINGS, INC.
PRODUCT: PC3v100
COLOR NAME.: SNOW WHITE 3080
FINISH: SATIN

PT-2 INTERIOR STRUCTURAL COLUMNS & MISC METALS
MANUFACTURER: PRECISION COATINGS, INC.
PRODUCT: PC3v100
COLOR NAME.: GRAY METALLIC 2480
FINISH: SATIN

PT-3 PAINTED DOORS
MANUFACTURER: PRECISION COATINGS, INC.
PRODUCT: PC3v100
COLOR NAME.: TREASURE GOLD 4520
FINISH: SATIN

MP-1 INTERIOR METAL SOFFIT
MANUFACTURER: VM ZINC
PRODUCT: VMZ FLAT LOCK PANEL
COLOR NAME.: QUARTZ-ZINC

ALTERNATE GLASS TYPE SPECIFICATION		
	GL-2A	1" INSULATING PANEL WITH 1/4" CLEAR TEXTURED GLASS AT OUTSIDE AND 1/4" PLATE MIRROR AT INSIDE. PATTERN: NATHAN ALLEN "BINARY"
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NOTE: PROVIDE TEMPERED SAFETY GLAZING AS FOLLOWS: (CBC SECTION 2406)
A. GLAZING IN DOORS
B. FIXED GLAZING WITHIN 24" OF DOORS
C. GLAZING ADJACENT TO A WALKING SURFACE WITH BOTTOM EDGE LESS THAN 18"AFF AND TOP EDGE GREATER THAN 36" AFF.

GENERAL NOTES

REFERENCE POINTS:
VERTICAL DIMENSIONS ARE TO THE TOP OF JOINTS AND REVEALS, U.O.N.

INSULATION:
PROVIDE THE FOLLOWING R-VALUES AT EXTERIOR WALLS AND ROOF CONSTRUCTION SURROUNDING CONDITIONED SPACES IN THE BUILDING ENVELOPE U.O.N., ROOFS: R-30; WALLS: R-19, FLOOR OVERHANGS: R-19

WEATHER-TIGHTNESS:
ALL EXTERIOR JOINTS AND OPENINGS IN THE BUILDING ENVELOPE THAT ARE OBSERVABLE SOURCES OF AIR LEAKAGE SHALL BE CAULKED, GASKETED, WEATHER-STRIPPED, OR OTHERWISE SEALED.

PREMISES IDENTIFICATION:
ADDRESS NUMERALS SHALL BE PLACED IN SUCH A POSITION AS TO BE PLAINLY VISIBLE AND LEGIBLE FROM THE STREET OR ROAD FRONTING THE PROPERTY. NUMBERS SHALL CONTRAST WITH THEIR BACKGROUND. 12" HIGH NUMERALS WITH ½" WIDE STROKE WIDTH U.O.N.

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Civic San Diego
401 B STREET, SUITE 400
SAN DIEGO, CA 92101

City of San Diego
Park & Recreation Department

Park and Recreation Department Director: _____
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WALKER | MACY

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HORTON PLAZA IMPROVEMENT PROJECT

SAN DIEGO, CALIFORNIA

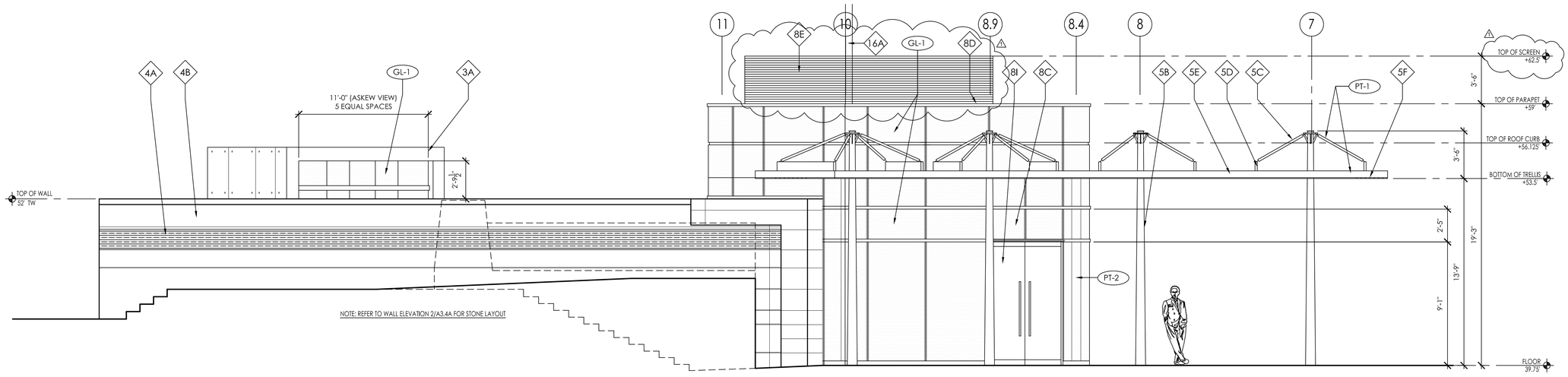
LICENSED ARCHITECT
No. C-30987
REN. 2 8 2015
STATE OF CALIFORNIA

PROJECT NUMBER: WM-1103
DRAWN BY: REVIEWED BY:
PHASE: 100% CONSTRUCTION DOCUMENTS PERMIT REVIEW SET
ISSUE DATE: 09/27/2013
REVISIONS:
1 ADDENDUM C, 4/28/14

PTS#288741 37342-D

NE PAVILION ELEVATIONS

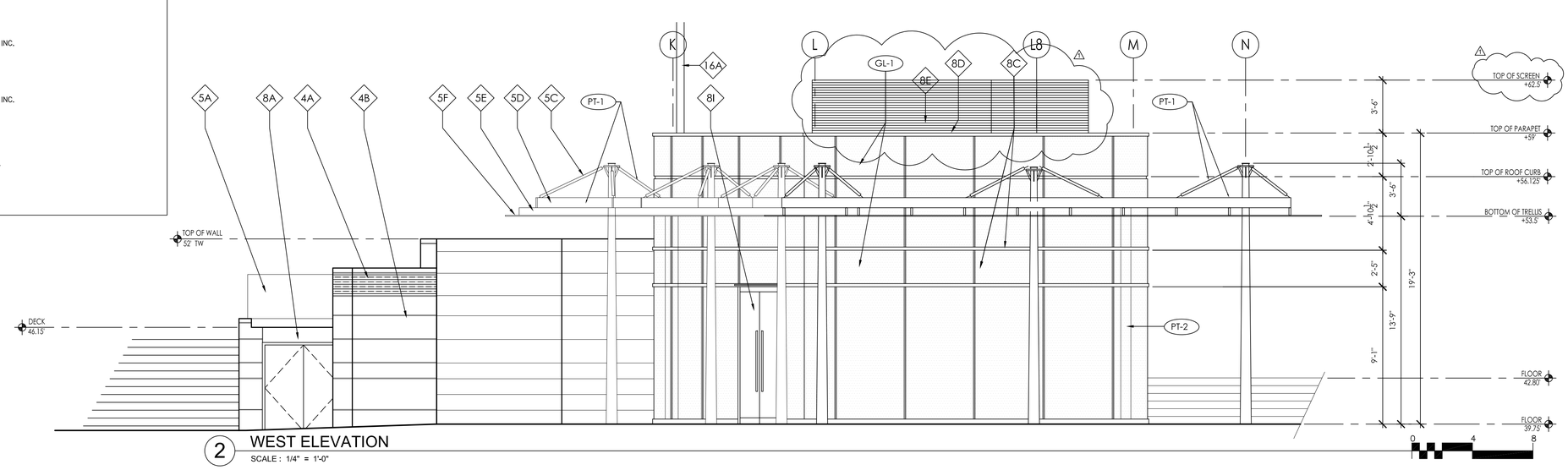
A3.2B



1 NORTH ELEVATION

SCALE : 1/4" = 1'-0"

0 4 8



2 WEST ELEVATION

SCALE : 1/4" = 1'-0"

0 4 8

FINISH LEGEND

PT-1 EXTERIOR PAINTED STEEL AND ALUMINUM SURFACES
MANUFACTURER: PRECISION COATINGS, INC.
PRODUCT: PC3v100
COLOR NAME.: SNOW WHITE 3080
FINISH: SATIN

PT-2 INTERIOR STRUCTURAL COLUMNS & MISC METALS
MANUFACTURER: PRECISION COATINGS, INC.
PRODUCT: PC3v100
COLOR NAME.: GRAY METALLIC 2480
FINISH: SATIN

PT-3 PAINTED DOORS
MANUFACTURER: PRECISION COATINGS, INC.
PRODUCT: PC3v100
COLOR NAME.: TREASURE GOLD 4520
FINISH: SATIN

MP-1 INTERIOR METAL SOFFIT
MANUFACTURER: VM ZINC
PRODUCT: VMZ FLAT LOCK PANEL
COLOR NAME.: QUARTZ-ZINC

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GLASS TYPE LEGEND

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Civic San Diego
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Park & Recreation Department

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phone 619.239.2353 | fax 619.239.6227

HORTON PLAZA IMPROVEMENT PROJECT

SAN DIEGO, CALIFORNIA

LICENSED ARCHITECT
JOHN MARK WALKER
No. C-30987
REN. 08/31/2015
FEB 28 2014
STATE OF CALIFORNIA

PROJECT NUMBER: WM-1103
DRAWN BY: REVIEWED BY:
PHASE: 100% CONSTRUCTION DOCUMENTS PERMIT REVIEW SET
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1 ADDENDUM C, 4/28/14

PTS#288741 37342-D

SOUTH PAVILION ELEVATIONS

A3.3A

FINISH LEGEND

PT-1
EXTERIOR PAINTED STEEL AND ALUMINUM SURFACES
MANUFACTURER: PRECISION COATINGS, INC.
PRODUCT: PC3v100
COLOR NAME.: SNOW WHITE 3080
FINISH: SATIN

PT-2
INTERIOR STRUCTURAL COLUMNS & MISC METALS
MANUFACTURER: PRECISION COATINGS, INC.
PRODUCT: PC3v100
COLOR NAME.: GRAY METALLIC 2480
FINISH: SATIN

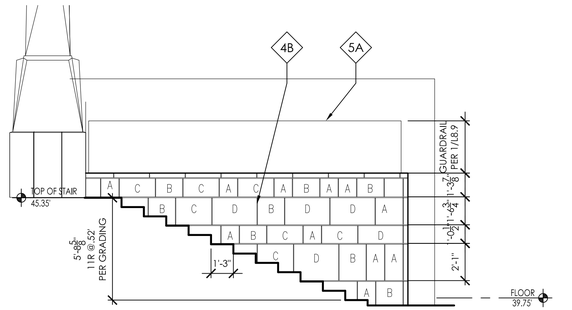
PT-3
PAINTED DOORS
MANUFACTURER: PRECISION COATINGS, INC.
PRODUCT: PC3v100
COLOR NAME.: TREASURE GOLD 4520
FINISH: SATIN

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INTERIOR METAL SOFFIT
MANUFACTURER: VM ZINC
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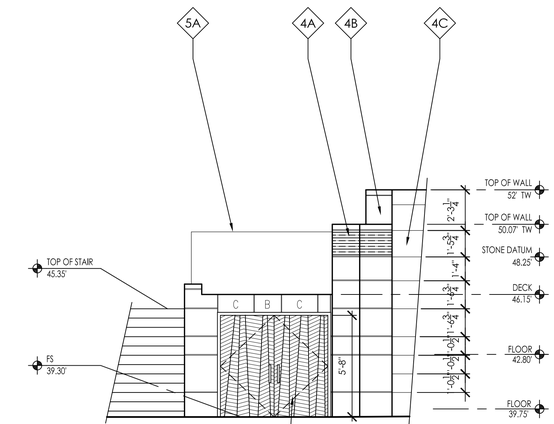
STONE VENEER SIZES–TABLE

A	12" WIDTH
B	18" WIDTH
C	24" WIDTH
D	30" WIDTH

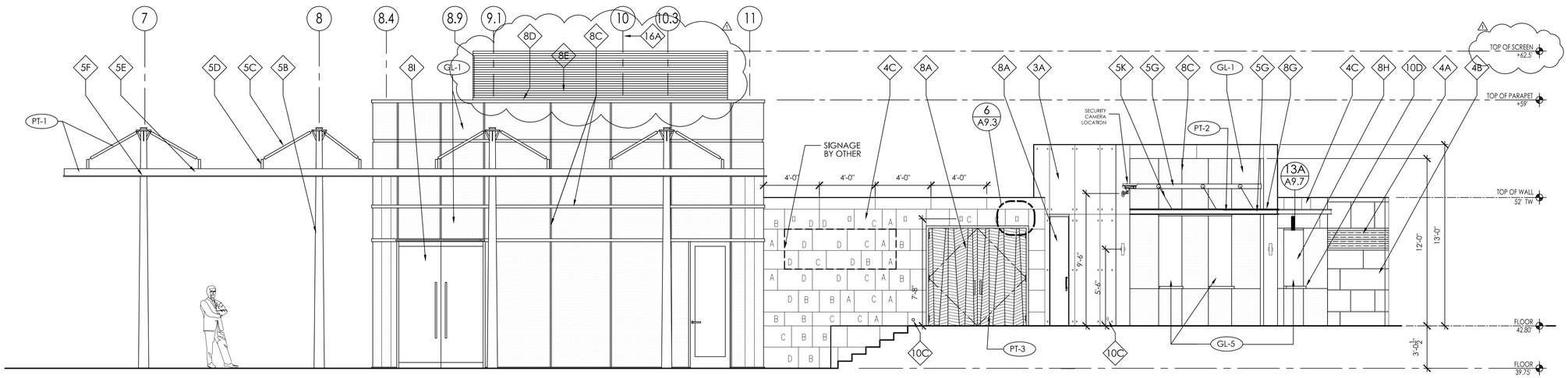
NOTE: WHERE NO MENTION OF STONE SIZE BASED ON TABLE ABOVE, A CUSTOM SIZE IS IN PLACE.



5 PARTIAL SOUTH ELEVATION
SCALE : 1/4" = 1'-0"



4 PARTIAL NORTH ELEVATION
SCALE : 1/4" = 1'-0"



3 SOUTH ELEVATION
SCALE : 1/4" = 1'-0"

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8E	PRE FINISHED METAL EQUIPMENT SCREEN - PAINT	074213
8F	PRE-FINISHED OPERABLE WINDOW - COLOR TO MATCH WINDOW SYSTEM	084113
8G	GL-4 GLASS WITH STAINLESS STEEL STAND OFFS	088000
8H	GL-5 POLYCARBONATE TRANSACTION WINDOW WITH DIP TRAY	131500
8J	PRE-FINISHED ALUMINUM BREAK METAL - COLOR TO MATCH WINDOW SYSTEM	076200
8I	GL-3 ALL GLASS ENTRY DOOR	084113
10A	PREFINISHED ALUMINUM WALL LOUVERS - COLOR TO MATCH STONE, REFER TO MECH. DWGS. FOR SIZES	099600
10B	DEVICE PER ELECTRICAL, SEE 10/A9.9 AND 13/A9.3	088900
10C	OVERFLOW ROOF DRAIN TO DAYLIHGT 6" A.F.F. SEE DETAIL 7/A9.10 AND PLUMBING PLANS.	-
10D	STAINLESS STEEL TRANSACTION COUNTER	055000
16A	LIGHT POLE	-

5F	BRUSHED STAINLESS STEEL TRELLIS FRAMING	051213
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8A	PAINTED HOLLOW METAL DOOR/FRAME	081113
8B	GL-1 PRE-FINISHED ALUMINUM STOREFRONT DOOR - COLOR TO MATCH WINDOW SYSTEM	084113
8C	PRE-FINISHED ALUMINUM WINDOW SYSTEM	084113

ELEVATION / SECTION KEYNOTES

		SPEC SECTION
3A	ARCHITECTURAL C.I.P. CONCRETE W/ INTEGRAL COLOR	033300
4A	STONE VENEER- SPLIT FACED KINARO TAN LIMESTONE, GROUT COLOR- CUSTOM BUILDING PRODUCTS 333 ALABASTER SANDED. REFER TO 8/A9.9.	044300
4B	STONE VENEER- LYCHEE KINARO TAN LIMESTONE, GROUT COLOR- CUSTOM BUILDING PRODUCTS 333 ALABASTER SANDED. REFER TO 8/A9.9.	044300
4C	STONE VENEER-KINARO TAN LIMESTONE; LIGHT LYCHEE FINISH. GROUT COLOR- CUSTOM BUILDING PRODUCTS 333 ALABASTER NON SANDED. REFER TO 12/A9.9	044300
5A	GUARDRAIL PER LANDSCAPE AND STRUCTURAL	057300
5B	TAPERED STEEL COLUMN WITH SILVER HEXCEL TEXALIUM CLADDING (9 1/2" DIA AT BASE AT THE SOUTH PAVILION, 8" DIA. AT BASE AT THE NORTH PAVILIONS)	051213
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GLASS TYPE LEGEND

SYMBOL	DESCRIPTION	
	GL-1	1" CLEAR LOW IRON INSULATING PANEL
	GL-2A	1" INSULATING PANEL WITH 1/2" CLEAR TEXTURED LAMINATED GLASS AT OUTSIDE AND 1/4" PLATE MIRROR AT INSIDE. PATTERN: PULP STUDIOS #159 + #150 OR APPROVED EQUAL
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Civic San Diego
401 B STREET, SUITE 400
SAN DIEGO, CA 92101

City of San Diego
Park & Recreation Department

Park and Recreation Department Director:
Date: 12/12/13

Contractor:
Date Completed:
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As-Builts By:
As-Builts Approved By:

WALKER | MACY

carrierjohnson + CULTURE
1301 third avenue , san diego , ca . 92101
phone 619.239.2353 | fax 619.239.6227

HORTON PLAZA IMPROVEMENT PROJECT

SAN DIEGO, CALIFORNIA

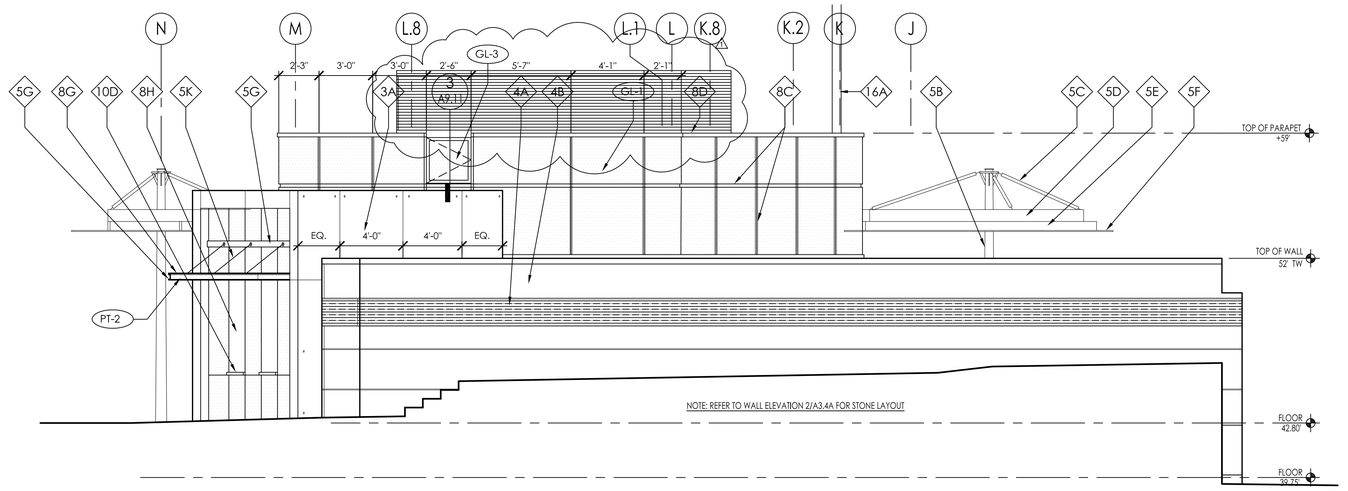
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Expires: 8/31/2015
FEB 28 2014
STATE OF CALIFORNIA

PROJECT NUMBER: WM-1103
DRAWN BY:
REVIEWED BY:
PHASE: 100% CONSTRUCTION DOCUMENTS PERMIT REVIEW SET
ISSUE DATE: 09/27/2013
REVISIONS:
1 ADDENDUM C, 4/28/14

PTS#288741 37342-D

SOUTH PAVILION ELEVATIONS

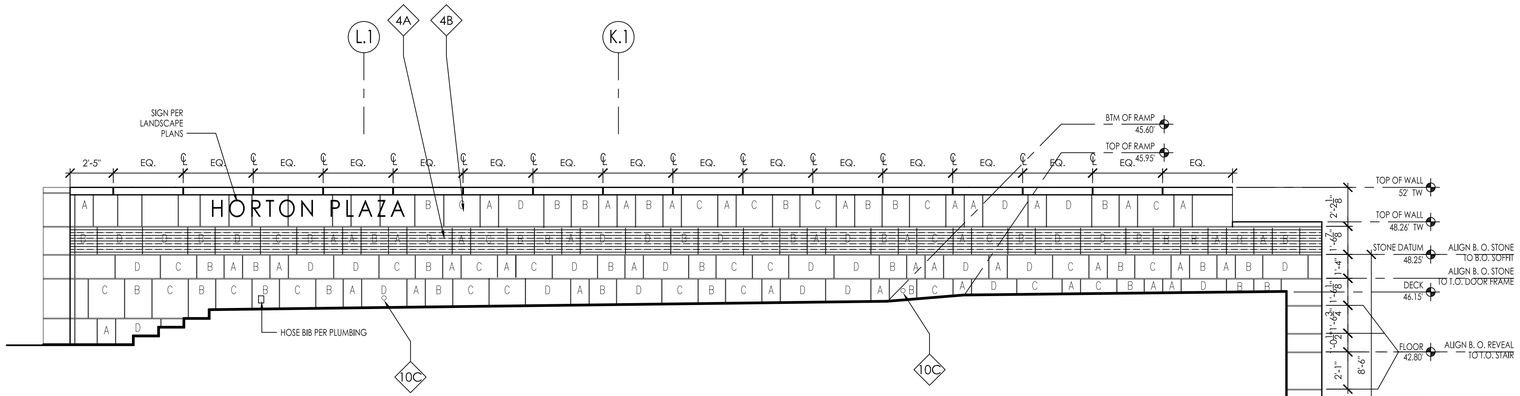
A3.3B



1 EAST ELEVATION

SCALE : 1/4" = 1'-0"

0 4 8



2 NORTH EAST WALL ELEVATION

SCALE : 1/4" = 1'-0"

0 4 8

FINISH LEGEND

EXTERIOR PAINTED STEEL AND ALUMINUM SURFACES

PT-1
MANUFACTURER: PRECISION COATINGS, INC.
PRODUCT: PC3v100
COLOR NAME.: SNOW WHITE 3080
FINISH: SATIN

INTERIOR STRUCTURAL COLUMNS & MISC METALS

PT-2
MANUFACTURER: PRECISION COATINGS, INC.
PRODUCT: PC3v100
COLOR NAME.: GRAY METALLIC 2480
FINISH: SATIN

PAINTED DOORS

PT-3
MANUFACTURER: PRECISION COATINGS, INC.
PRODUCT: PC3v100
COLOR NAME.: TREASURE GOLD 4520
FINISH: SATIN

INTERIOR METAL SOFFIT

MP-1
MANUFACTURER: VM ZINC
PRODUCT: VMZ FLAT LOCK PANEL
COLOR NAME.: QUARTZ-ZINC

STONE VENEER SIZES–TABLE

A	12" WIDTH
B	18" WIDTH
C	24" WIDTH
D	30" WIDTH

NOTE: WHERE NO MENTION OF STONE SIZE BASED ON TABLE ABOVE, A CUSTOM SIZE IS IN PLACE.

ALTERNATE GLASS TYPE SPECIFICATION

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WALKER | MACY

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HORTON PLAZA IMPROVEMENT PROJECT

SAN DIEGO, CALIFORNIA

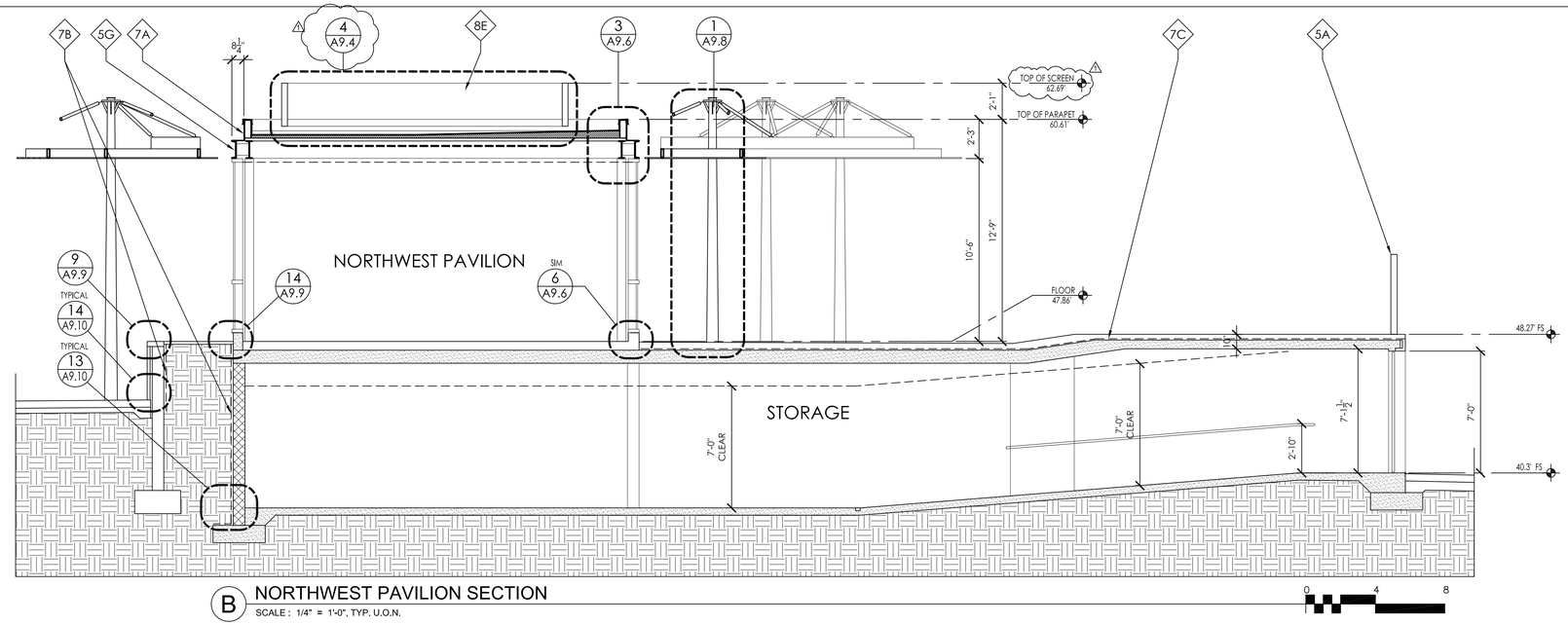
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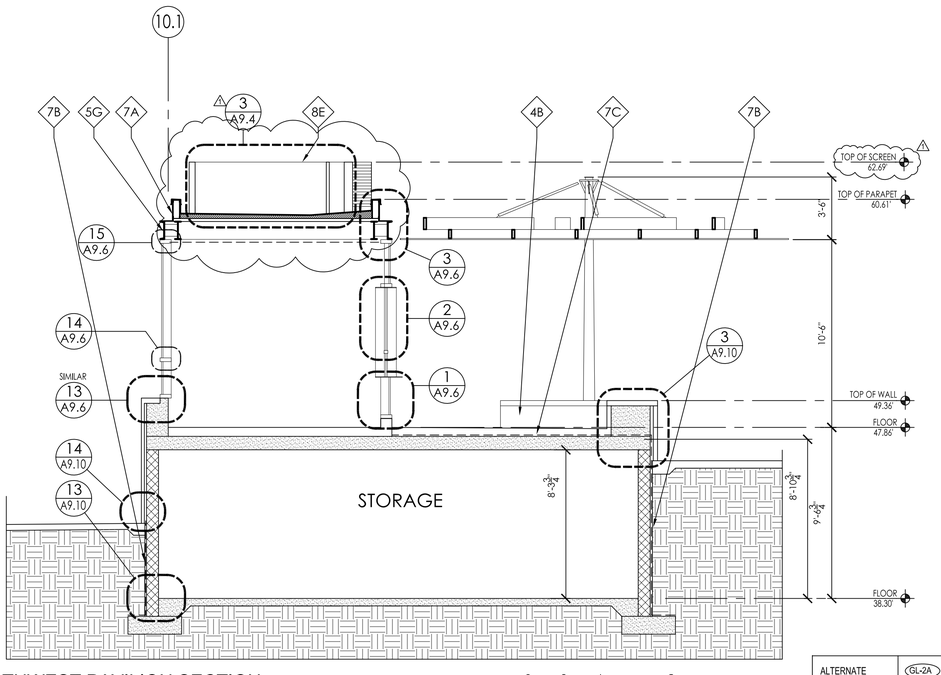
SOUTH PAVILION ELEVATIONS

A3.4A



B NORTHWEST PAVILION SECTION

SCALE : 1/4" = 1'-0", TYP. U.O.N.



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SAN DIEGO, CALIFORNIA

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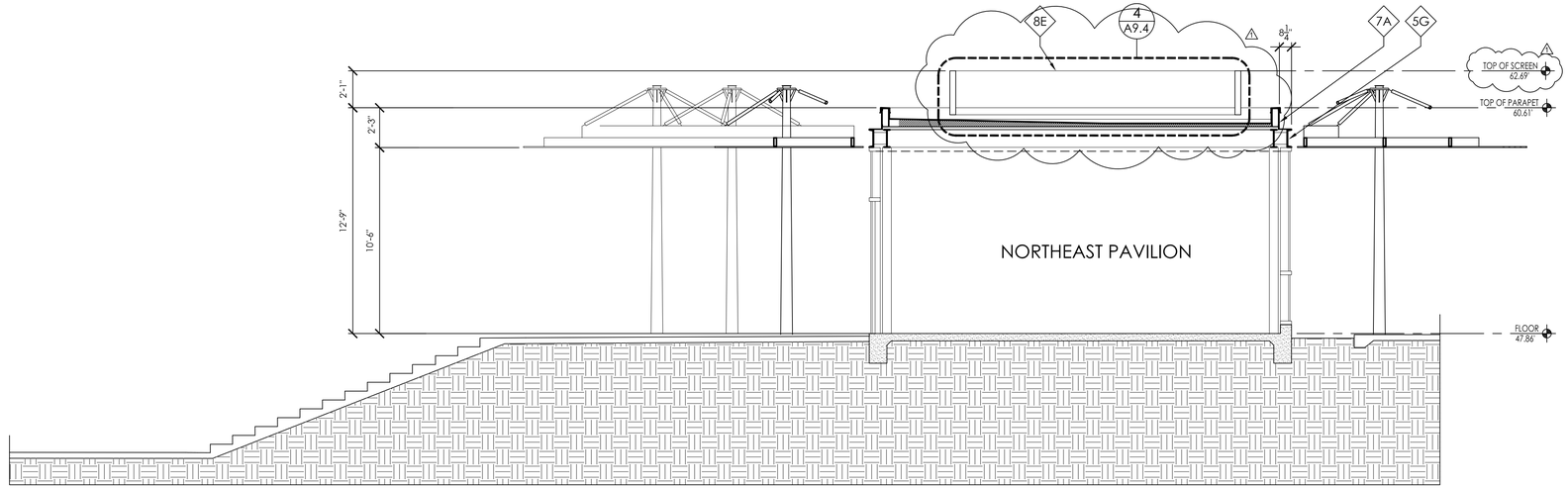
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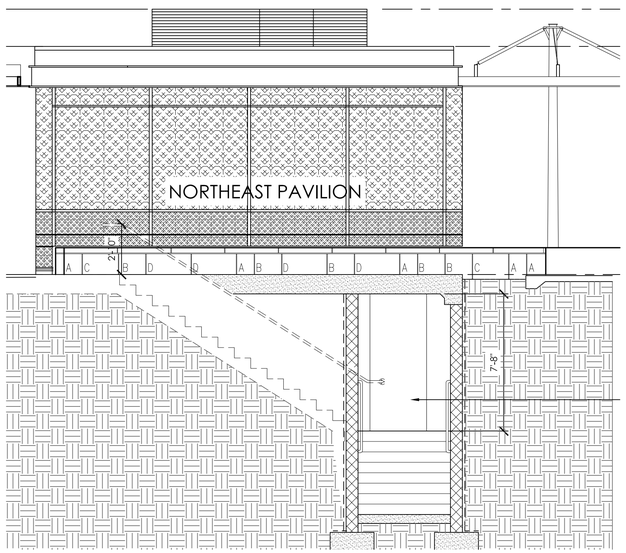
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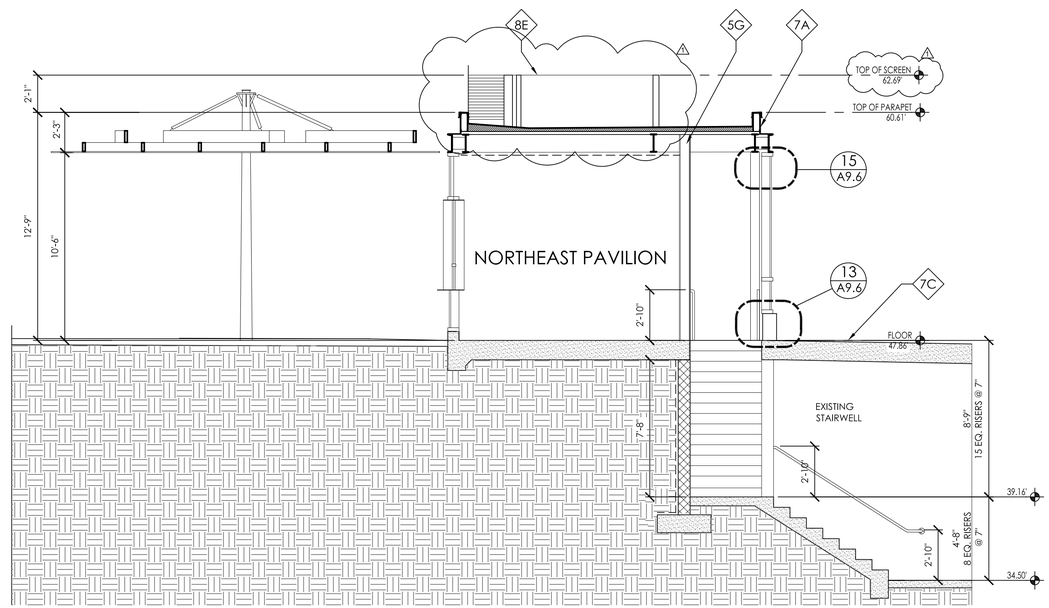


D NORTHEAST PAVILION SECTION
SCALE : 1/4" = 1'-0", TYP. U.O.N.

0 4 8



E STAIR SECTION
SCALE : 1/4" = 1'-0", TYP. U.O.N.



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10C	OVERFLOW ROOF DRAIN TO DAYLIHGT 6" A.F.F. SEE DETAIL 7/A9.10 AND PLUMBING PLANS.	-
10D	STAINLESS STEEL TRANSACTION COUNTER	055000
16A	LIGHT POLE	-

5F	BRUSHED STAINLESS STEEL TRELLIS FRAMING	051213
5G	PAINTED STEEL CHANNEL AESS - COLOR	051213
5H	PAINTED STEEL COLUMN AESS	051213
5J	STAINLESS STEEL PLATE SURROUND	051213
5K	PAINTED STEEL ROD AESS	051213
7A	METAL WALL PANEL	074213
7B	WATERPROOFING ASSEMBLY FOR BELOW GRADE VERTICAL WALLS	071413
7C	WATERPROOFING ASSEMBLY FOR HORIZONTAL EXTERIOR PEDESTRIAN DECKS WITH PAVING	071413
8A	PAINTED HOLLOW METAL DOOR/FRAME	081113
8B	GL-1 PRE-FINISHED ALUMINUM STOREFRONT DOOR - COLOR TO MATCH WINDOW SYSTEM	084113
8C	PRE-FINISHED ALUMINUM WINDOW SYSTEM	084113

ELEVATION / SECTION KEYNOTES

		SPEC SECTION
3A	ARCHITECTURAL C.I.P. CONCRETE W/ INTEGRAL COLOR	033300
4A	STONE VENEER- SPLIT FACED KINARO TAN LIMESTONE, GROUT COLOR- CUSTOM BUILDING PRODUCTS 333 ALABASTER SANDED. REFER TO 8/A9.9.	044300
4B	STONE VENEER- LYCHEE KINARO TAN LIMESTONE, GROUT COLOR- CUSTOM BUILDING PRODUCTS 333 ALABASTER SANDED. REFER TO 8/A9.9.	044300
4C	STONE VENEER-KINARO TAN LIMESTONE; LIGHT LYCHEE FINISH, GROUT COLOR- CUSTOM BUILDING PRODUCTS 333 ALABASTER NON SANDED. REFER TO 12/A9.9	044300
5A	GUARDRAIL PER LANDSCAPE AND STRUCTURAL	057300
5B	TAPERED STEEL COLUMN WITH SILVER HEXCEL TEXALUM CLADDING (9 1/2" DIA AT BASE AT THE SOUTH PAVILION, 8" DIA. AT BASE AT THE NORTH PAVILIONS)	051213
5C	PAINTED STEEL BRACING SUPPORTS	051213
5D	PAINTED STEEL MAIN MEMBERS	051213
5E	PAINTED STEEL INTERMEDIATE MEMBERS	051213

GLASS TYPE LEGEND

SYMBOL	DESCRIPTION	
	GL-1	1" CLEAR LOW IRON INSULATING PANEL
	GL-2A	1" INSULATING PANEL WITH 1/2" CLEAR TEXTURED LAMINATED GLASS AT OUTSIDE AND 1/4" PLATE MIRROR AT INSIDE. PATTERN: PULP STUDIOS #159 + #150 OR APPROVED EQUAL
	GL-2B	1" INSULATING PANEL WITH 1/2" CLEAR TEXTURED LAMINATED GLASS AT OUTSIDE AND 1/4" PLATE MIRROR AT INSIDE. PATTERN: PULP STUDIOS #159 + #501 OR APPROVED EQUAL
	GL-3	CLEAR TEMPERED GLASS FOR ALL-GLASS ENTRANCE DOORS
	GL-4	9/16" LAMINATED SKYLIGHT GLASS WITH TRANSLUCENT FINISH
	GL-5	POLYCARBONATE GLAZING FOR TRANSACTION WINDOWS

Civic San Diego
401 B STREET, SUITE 400
SAN DIEGO, CA 92101

City of San Diego
Park & Recreation Department

Park and Recreation Department Director: _____
Date: 12/12/13

Contractor: _____
Date Completed: _____
Date Started: _____
As-Builts By: _____
As-Builts Approved By: _____

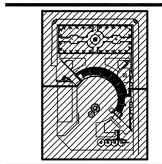
WALKER | MACY

carrierjohnson + CULTURE
1301 third avenue , san diego , ca . 92101
phone 619.239.2353 | fax 619.239.6227

HORTON PLAZA IMPROVEMENT PROJECT

SAN DIEGO, CALIFORNIA

LICENSED ARCHITECT
REN. 8/31/2015
FEB 28 2015
STATE OF CALIFORNIA

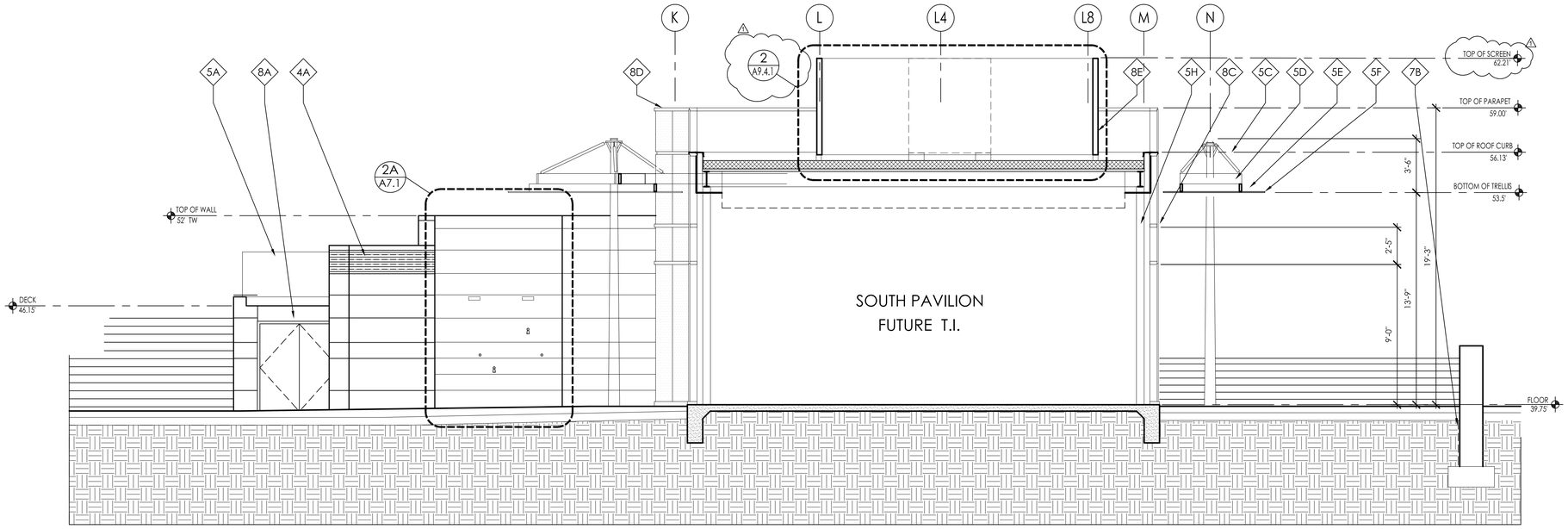


PROJECT NUMBER: WM-1103
DRAWN BY: _____ REVIEWED BY: _____
PHASE: 100% CONSTRUCTION DOCUMENTS PERMIT REVIEW SET
ISSUE DATE: 09/27/2013
REVISIONS:
1 ADDENDUM C, 4/28/14

PTS#288741 37342-D

SECTIONS

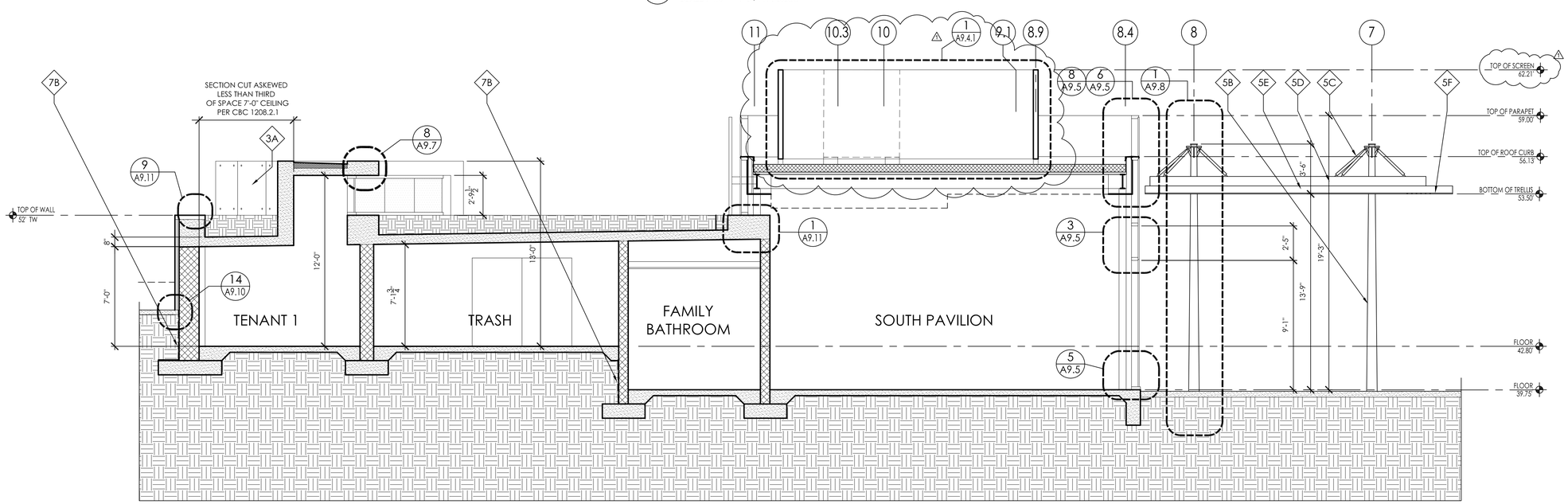
A4.1B



A SOUTH PAVILION- CROSS SECTION

SCALE : 1/4" = 1'-0", TYP, U.O.N.

0 4 8



B SOUTH PAVILION- LONGITUDINAL SECTION

SCALE : 1/4" = 1'-0", TYP, U.O.N.

0 4 8

ALTERNATE GLASS TYPE SPECIFICATION		
	GL-2A	1" INSULATING PANEL WITH 1/4" CLEAR TEXTURED GLASS AT OUTSIDE AND 1/4" PLATE MIRROR AT INSIDE. PATTERN: NATHAN ALLEN "BINARY"
	GL-2B	1" INSULATING PANEL WITH 1/4" CLEAR TEXTURED GLASS AT OUTSIDE AND 1/4" PLATE MIRROR AT INSIDE. PATTERN: NATHAN ALLEN "PARADIGM"

NOTE: PROVIDE TEMPERED SAFETY GLAZING AS FOLLOWS: (CBC SECTION 2406)
A. GLAZING IN DOORS
B. FIXED GLAZING WITHIN 24" OF DOORS
C. GLAZING ADJACENT TO A WALKING SURFACE WITH BOTTOM EDGE LESS THAN 18"AFF AND TOP EDGE GREATER THAN 36" AFF.

GENERAL NOTES

REFERENCE POINTS:
VERTICAL DIMENSIONS ARE TO THE TOP OF JOINTS AND REVEALS, U.O.N.

INSULATION:
PROVIDE THE FOLLOWING R-VALUES AT EXTERIOR WALLS AND ROOF CONSTRUCTION SURROUNDING CONDITIONED SPACES IN THE BUILDING ENVELOPE U.O.N.. ROOFS: R-30, WALLS: R-19, FLOOR OVERHANGS: R-19

WEATHER-TIGHTNESS:
ALL EXTERIOR JOINTS AND OPENINGS IN THE BUILDING ENVELOPE THAT ARE OBSERVABLE SOURCES OF AIR LEAKAGE SHALL BE CAULKED, GASKETED, WEATHER-STRIPPED, OR OTHERWISE SEALED.

PREMISES IDENTIFICATION:
ADDRESS NUMERALS SHALL BE PLACED IN SUCH A POSITION AS TO BE PLAINLY VISIBLE AND LEGIBLE FROM THE STREET OR ROAD FRONTING THE PROPERTY. NUMBERS SHALL CONTRAST WITH THEIR BACKGROUND. 12" HIGH NUMERALS WITH 1½" WIDE STROKE WIDTH U.O.N.

8D	PRE FINISHED ALUMINUM CAP - COLOR TO MATCH WINDOW SYSTEM	076200
8E	PRE FINISHED METAL EQUIPMENT SCREEN - PAINT	074213
8F	PRE-FINISHED OPERABLE WINDOW - COLOR TO MATCH WINDOW SYSTEM	084113
8G	GL-4 GLASS WITH STAINLESS STEEL STAND OFFS	088000
8H	GL-5 POLYCARBONATE TRANSACTION WINDOW WITH DIP TRAY	131500
8J	PRE-FINISHED ALUMINUM BREAK METAL - COLOR TO MATCH WINDOW SYSTEM	076200
8I	GL-3 ALL GLASS ENTRY DOOR	084113
10A	PREFINISHED ALUMINUM WALL LOUVERS - COLOR TO MATCH STONE, REFER TO MECH. DWGS. FOR SIZES	099600
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10C	OVERFLOW ROOF DRAIN TO DAYLIHGT 6" A.F.F. SEE DETAIL 7/A9.10 AND PLUMBING PLANS.	-
10D	STAINLESS STEEL TRANSACTION COUNTER	055000
16A	LIGHT POLE	-

5F	BRUSHED STAINLESS STEEL TRELLIS FRAMING	051213
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ELEVATION / SECTION KEYNOTES

		SPEC SECTION
3A	ARCHITECTURAL C.I.P. CONCRETE W/ INTEGRAL COLOR	033300
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4C	STONE VENEER-KINARO TAN LIMESTONE; LIGHT LYCHEE FINISH. GROUT COLOR- CUSTOM BUILDING PRODUCTS 333 ALABASTER NON SANDED. REFER TO 12/A9.9	044300
5A	GUARDRAIL PER LANDSCAPE AND STRUCTURAL	057300
5B	TAPERED STEEL COLUMN WITH SILVER HEXCEL TEXALIUM CLADDING (9 1/2" DIA AT BASE AT THE SOUTH PAVILION, 8" DIA. AT BASE AT THE NORTH PAVILIONS)	051213
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GLASS TYPE LEGEND

SYMBOL		DESCRIPTION
	GL-1	1" CLEAR LOW IRON INSULATING PANEL
	GL-2A	1" INSULATING PANEL WITH 1/2" CLEAR TEXTURED LAMINATED GLASS AT OUTSIDE AND 1/4" PLATE MIRROR AT INSIDE. PATTERN: PULP STUDIOS #159 + #150 OR APPROVED EQUAL
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Civic San Diego
401 B STREET, SUITE 400
SAN DIEGO, CA 92101

City of San Diego
Park & Recreation Department

Park and Recreation Department Director: _____
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Contractor: _____
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As-Builts By: _____
As-Builts Approved By: _____

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1301 third avenue , san diego , ca . 92101
phone 619.239.2353 | fax 619.239.6227

HORTON PLAZA IMPROVEMENT PROJECT

SAN DIEGO, CALIFORNIA

LICENSED ARCHITECT
No. C-29997
REN. FEB 28 2015
STATE OF CALIFORNIA

PROJECT NUMBER: WM-1103
DRAWN BY: _____ REVIEWED BY: _____
PHASE: 100% CONSTRUCTION DOCUMENTS
PERMIT REVIEW SET
ISSUE DATE: 09/27/2013
REVISIONS:
1 ADDENDUM C, 4/28/14

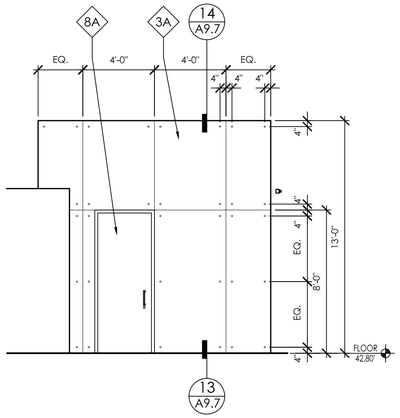
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SECTIONS

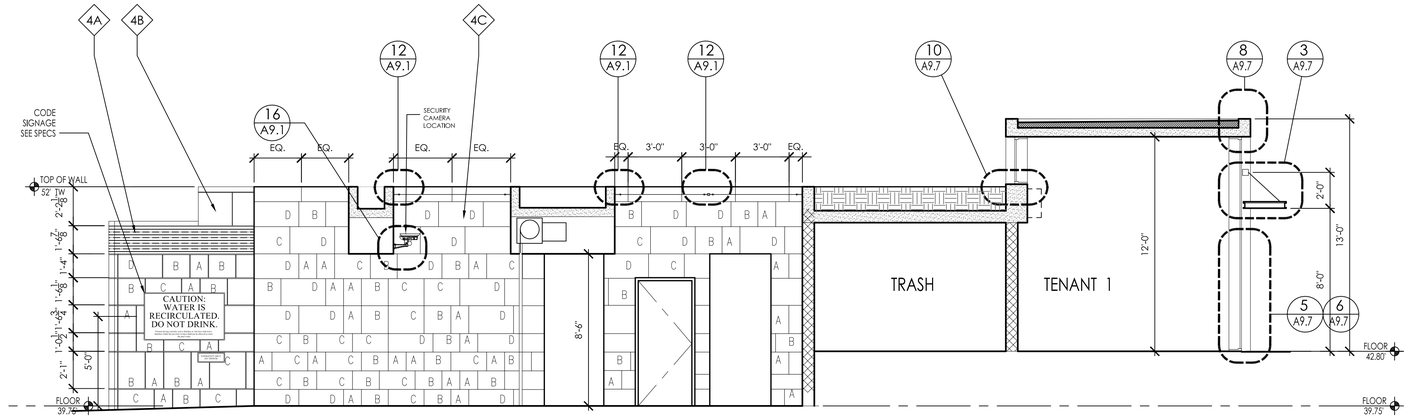
A4.2A

STONE VENEER SIZES–TABLE	
A	12" WIDTH
B	18" WIDTH
C	24" WIDTH
D	30" WIDTH

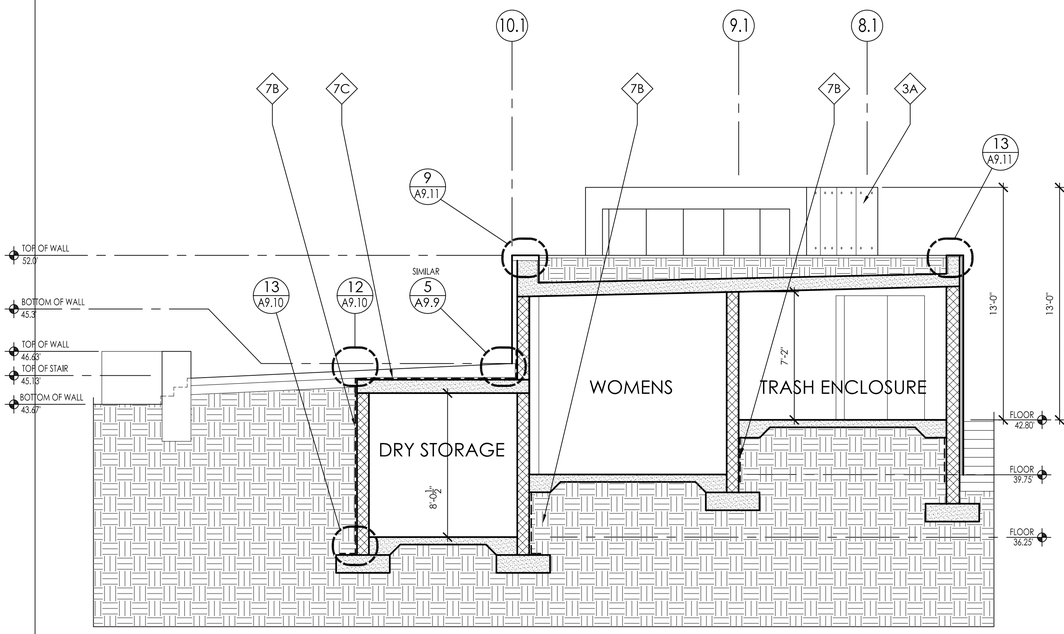
NOTE: WHERE NO MENTION OF STONE SIZE BASED ON TABLE ABOVE, A CUSTOM SIZE IS IN PLACE.



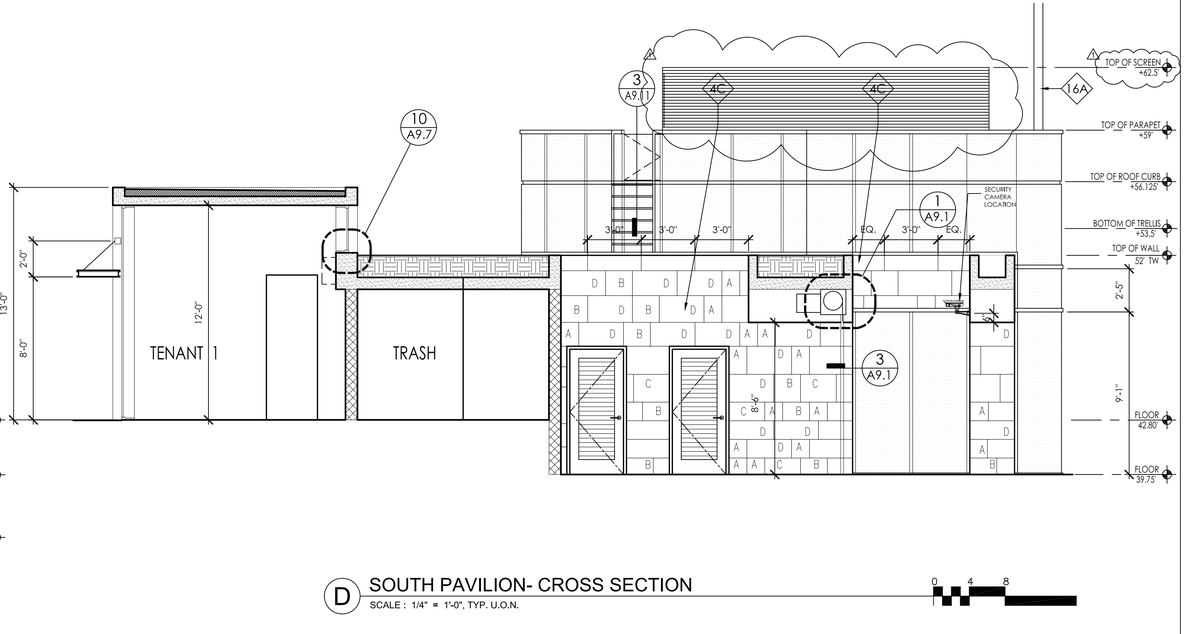
F WALL ELEVATION
SCALE : 1/4" = 1'-0", TYP. U.O.N.



E SOUTH PAVILION- CROSS SECTION
SCALE : 1/4" = 1'-0", TYP. U.O.N.



C SOUTH PAVILION- WOMENS RESTROOM
SCALE : 1/4" = 1'-0", TYP. U.O.N.



D SOUTH PAVILION- CROSS SECTION
SCALE : 1/4" = 1'-0", TYP. U.O.N.

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Civic San Diego
401 B STREET, SUITE 400
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City of San Diego
Park & Recreation Department

Park and Recreation Department Director: _____
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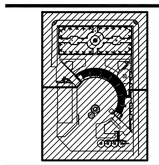
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HORTON PLAZA IMPROVEMENT PROJECT

SAN DIEGO, CALIFORNIA



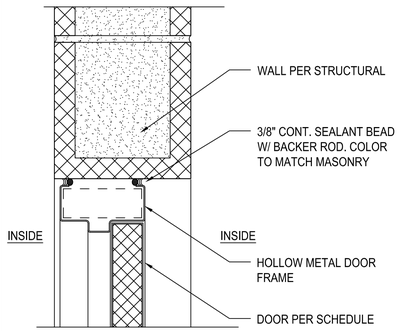
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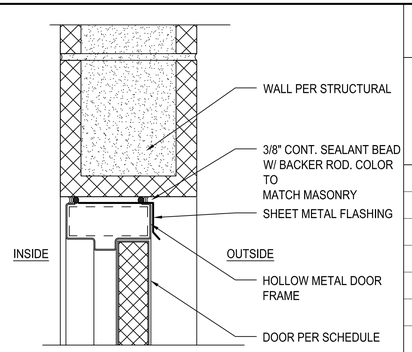
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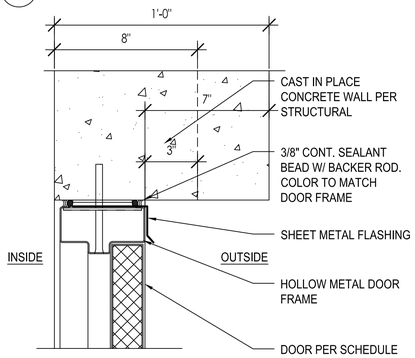
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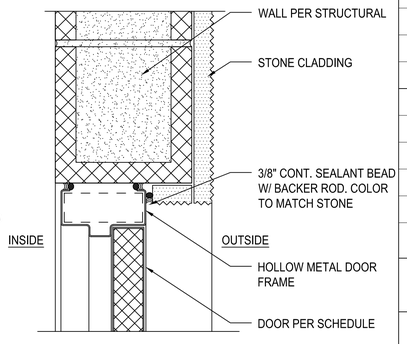
12 H.M. HEAD/JAMB @ CMU WALL
SCALE : 3" = 1'-0"



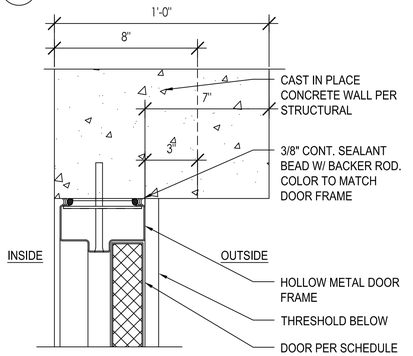
8 H.M. HEAD @ CMU WALL
SCALE : 3" = 1'-0"



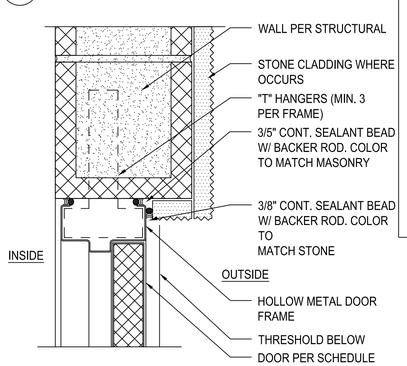
11 H.M. HEAD @ CONC. WALL
SCALE : 3" = 1'-0"



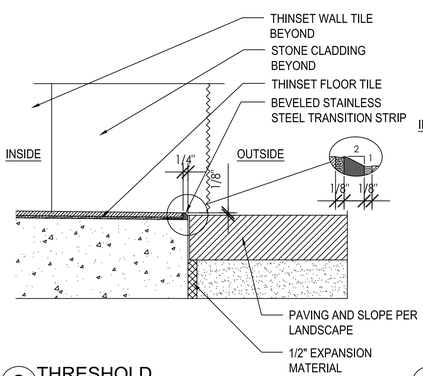
7 H.M. HEAD @ CMU WALL
SCALE : 3" = 1'-0"



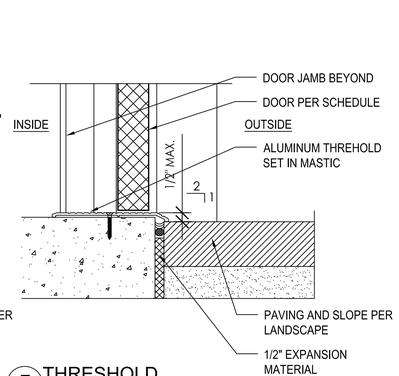
10 H.M. JAMB @ CONC. WALL
SCALE : 3" = 1'-0"



6 H.M. JAMB @ CMU WALL
SCALE : 3" = 1'-0"



9 THRESHOLD
SCALE : 3" = 1'-0"

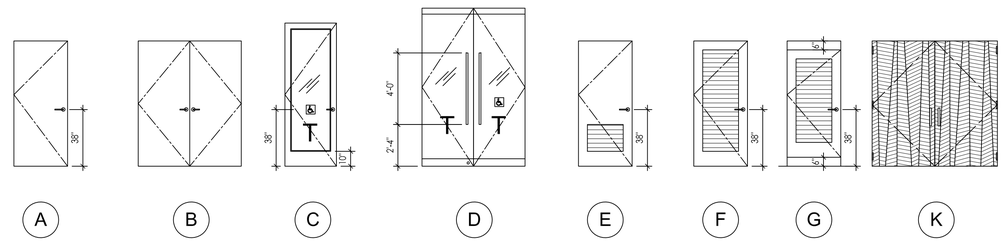


5 THRESHOLD
SCALE : 3" = 1'-0"

DOOR SCHEDULE

DOOR NO.	TYPE	DOOR SIZE			DOOR		FRAME		FIRE RATING	HARDWARE GROUP NO.	PANIC DEVICE	SELF-CLOSING	GASKETING	CARD READER	DETAILS			
		WIDTH	HEIGHT	THK.	MATERIAL	FINISH	MATERIAL	FINISH							HEAD	JAMB	SILL	NOTES
V100	K	6'-0"	6'-11"	1 3/4"	MTL	PT	HM	PT	NR	08		●	WEATHER		-	14/A9.3	-	2, SEE 7/A9.3
V102	A	3'-0"	7'-0"	1 3/4"	MTL	PT	HM	PT	NR	04		●			12/A9.0	12/A9.0	-	
V103	E	3'-0"	7'-0"	1 3/4"	MTL	PT	HM	PT	NR	04		●			12/A9.0	12/A9.0	-	
N101	C	3'-0"	8'-0"	1 3/4"	SF	AL/GL	SF	AL	NR	01.1		●	WEATHER		2/A9.5	13/A9.5	1/A9.5	1,5
N102	C	3'-0"	8'-0"	1 3/4"	SF	AL/GL	SF	AL	NR	01.1		●	WEATHER		2/A9.5	13/A9.5	1/A9.5	1,5
N103	C	3'-0"	8'-0"	1 3/4"	SF	AL/GL	SF	AL	NR	01.1A		●	WEATHER		2/A9.5	13/A9.5	1/A9.5	1,5
S103A	D	6'-0"	8'-10"	3/4"	SF	GL	SF	AL	NR	09		●			13/A9.12	15/A9.12	13/A9.12	3,5
S103B	D	6'-0"	8'-10"	3/4"	SF	GL	SF	AL	NR	09		●			13/A9.12	15/A9.12	13/A9.12	3,5
S103C	C	3'-0"	8'-10"	1 3/4"	SF	AL/GL	SF	AL	NR	01.1		●			13/A9.12	12/A9.5	13/A9.12	1
S103D	A	1'-8"	8'-0"	1 3/4"	SC	PT	HM	PT	NR	04.1					-	-	-	
S108	F	3'-0"	7'-0"	1 3/4"	MTL	PT	HM	PT	NR	05		●	WEATHER		7/A9.0	6/A9.0	5/A9.0	-
S109	G	3'-0"	7'-0"	1 3/4"	WD	PT	HM	PT	NR	10		●			-	6/A9.0	9/A9.0	4, 7
S110	K	7'-0"	6'-11"	1 3/4"	MTL	PT	HM	PT	NR	08.1		●	WEATHER		-	14/A9.3	-	6,2, SEE 15/A9.3
S111	A	3'-0"	7'-10"	1 3/4"	MTL	PT	HM	PT	NR	03		●	WEATHER		11/A9.0	10/A9.0	5/A9.0	
S113A	A	3'-0"	7'-0"	1 3/4"	MTL	PT	HM	PT	NR	06		●	-		12/A9.0	12/A9.0	5/A9.0	-
S113B	K	6'-0"	5'-7 1/2"	1 3/4"	MTL	PT	HM	PT	NR	08.2		●	WEATHER		-	14/A9.3	-	2, SEE 11/A9.3
S114	A	3'-0"	7'-0"	1 3/4"	MTL	PT	HM	PT	NR	06		●	-		12/A9.0	12/A9.0	5/A9.0	
S115	F	3'-0"	7'-0"	1 3/4"	MTL	PT	HM	PT	NR	03		●	WEATHER		7/A9.0	6/A9.0	5/A9.0	

DOOR TYPES



ABBREVIATIONS

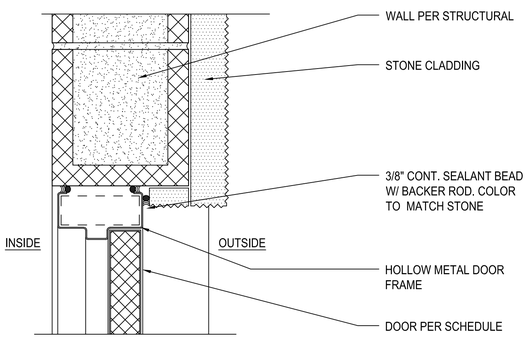
AL	= ALUMINUM	HM	= HOLLOW METAL
BR	= BRONZE	KD	= KNOCK-DOWN
(E)	= EXISTING	PT	= FIELD PAINTED, SEMI-GLOSS
FAC	= FACTORY FINISH	SC	= SOLID CORE WOOD
GALV	= GALVANIZED	SF	= STOREFRONT
GL	= GLASS	SM	= SILVER-METALLIC
HC	= HOLLOW CORE WOOD	SS	= STAINLESS STEEL

GENERAL NOTES

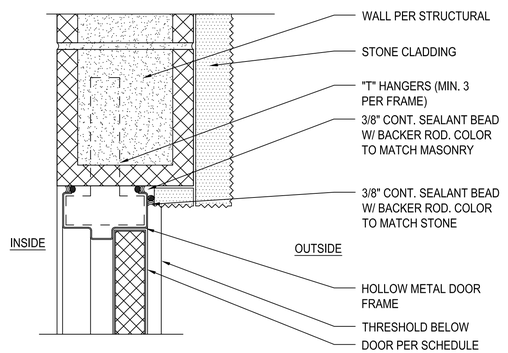
DOOR SIZES:
DOOR SIZES SHOWN ARE NOMINAL OPENING SIZES. VERIFY THROAT SIZES PER WALL TYPES INDICATED ON FLOOR PLANS. UNDERCUT DOORS WHERE REQUIRED TO CLEAR FLOORING MATERIALS BY 1/2".

DOOR SCHEDULE NOTES

1. MEDIUM STILE STOREFRONT DOOR
2. CUSTOM DECORATIVE STEEL DOORS. SEE SHEET A9.3 FOR ADDITIONAL INFORMATION.
3. OFFSET PIVOT HEAVY GLASS DOORS
4. RESTROOM SIGNAGE, SEE DETAIL 1/A9.3
5. INTERNATIONAL SYMBOL OF ACCESSIBILITY ENTRANCE SIGNAGE (6"X6" DECAL)
6. UNDERCUT DOOR BY 1"
7. FRAME HEIGHT 7'-0", DOOR HEIGHT 6'-0"



2 H.M. HEAD @ CMU WALL
SCALE : 3" = 1'-0"



1 H.M. JAMB @ CMU WALL
SCALE : 3" = 1'-0"

Civic San Diego
401 B STREET, SUITE 400
SAN DIEGO, CA 92101

City of San Diego
Park & Recreation Department
Park and Recreation Department Director: _____
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Date Completed: _____
Date Started: _____
As-Builts By: _____
As-Builts Approved By: _____

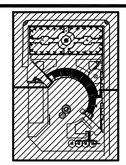
WALKER MACY

carrierjohnson + CULTURE
1301 third avenue . san diego . ca . 92101
phone 619.239.2353 | fax 619.239.6227

HORTON PLAZA IMPROVEMENT PROJECT

SAN DIEGO, CALIFORNIA

LICENSED ARCHITECT
CHRISTOPHER MACY
LICENSE NO. C-24337
FEB 28 2015
STATE OF CALIFORNIA

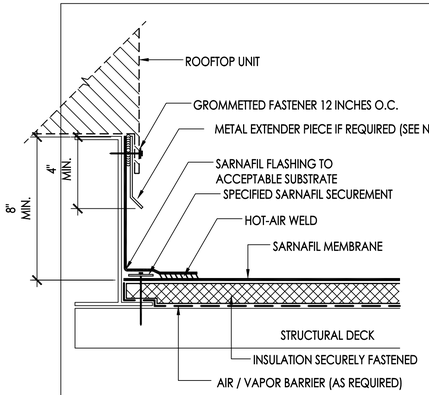


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DOOR SCHEDULE

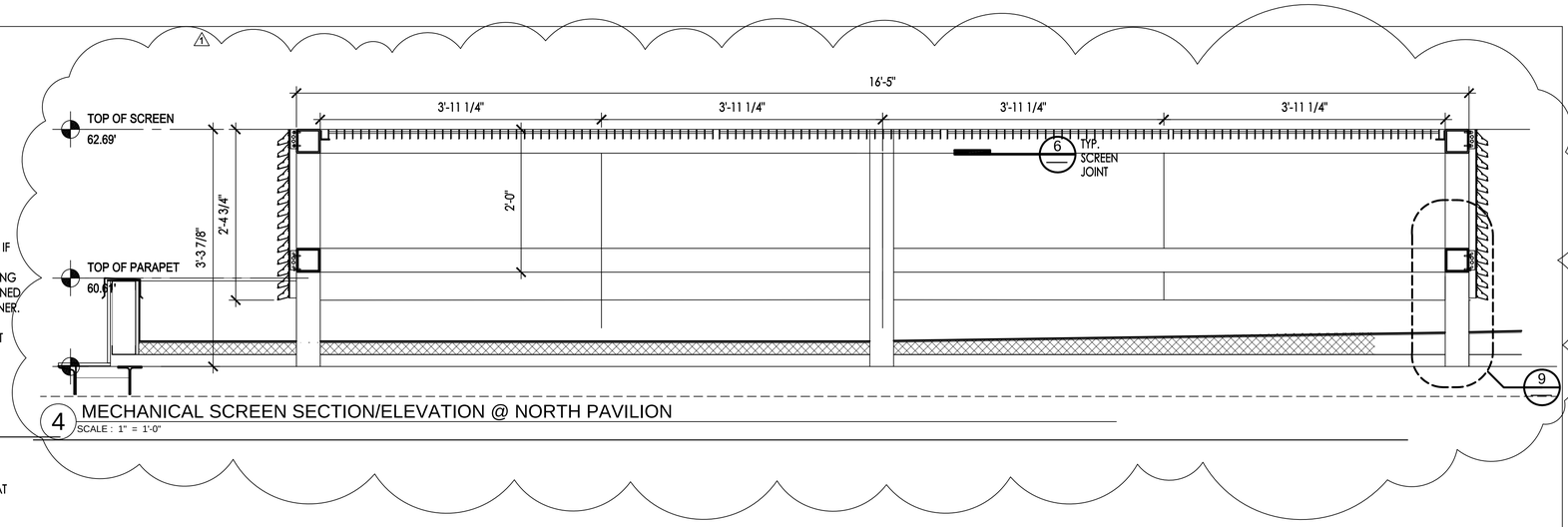
A9.0



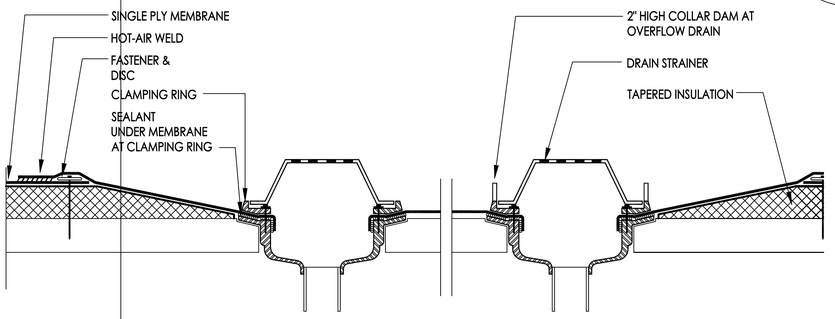
12 MECHANICAL EQUIPMENT CURB
SCALE : 3" = 1'-0"

NOTE:
1) METAL EXTENDER PIECE IS REQUIRED IF EXISTING COUNTERFLASHING IS CONTAMINATED AND OR COUNTERFLASHING FASCIA IS LESS THAN 4 INCHES WIDE. FASTENED 12 INCHES O.C. WITH GROMMETTED FASTENER.

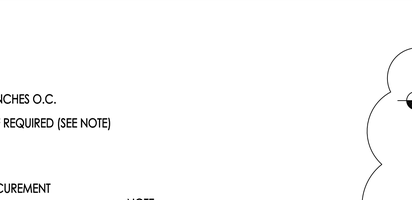
2) VAPOR BARRIER SHALL BE SEALED AT EDGES.



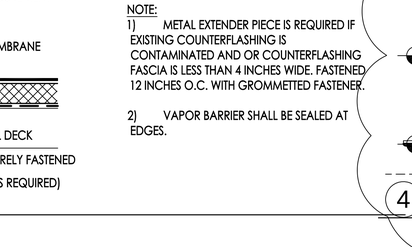
4 MECHANICAL SCREEN SECTION/ELEVATION @ NORTH PAVILION
SCALE : 1" = 1'-0"



11 ROOF DRAIN
SCALE : 3" = 1'-0"



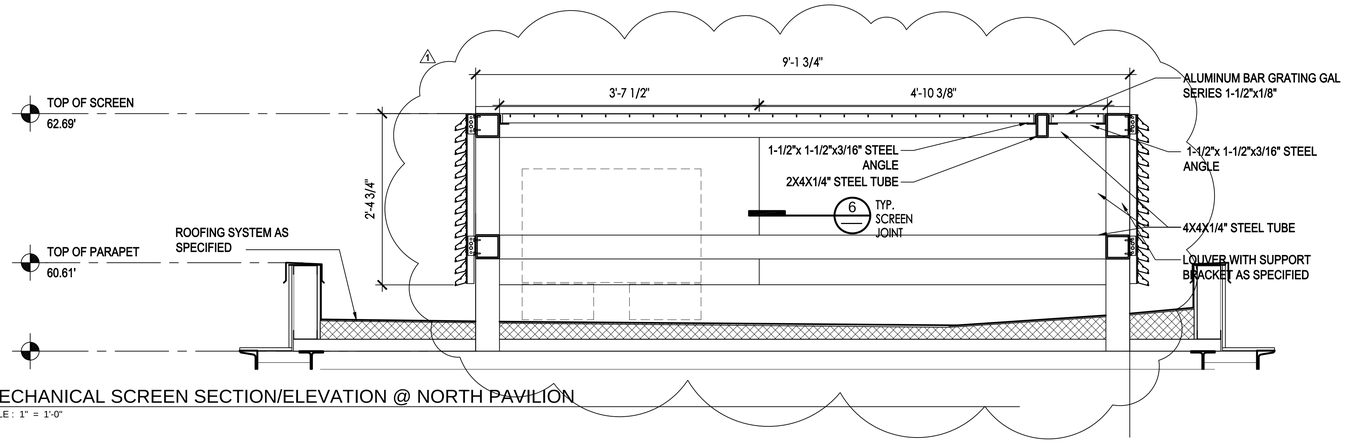
7 LOUVER DOOR
SCALE : 3" = 1'-0"



6 LOUVER MOUNTING DETAIL (PLAN)
SCALE : 3" = 1'-0"

9 ROOFING @ SUPPORT
SCALE : 3" = 1'-0"

5 LOUVER MOUNTING DETAIL (PLAN)
SCALE : 3" = 1'-0"



3 MECHANICAL SCREEN SECTION/ELEVATION @ NORTH PAVILION
SCALE : 1" = 1'-0"

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SAN DIEGO, CA 92101

City of San Diego
Park & Recreation Department

Park and Recreation Department Director: _____
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Date Completed: _____
Date Started: _____
As-Builts By: _____
As-Builts Approved By: _____

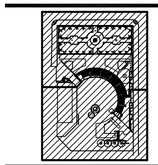
WALKER | MACY

carrierjohnson + CULTURE
1301 third avenue , san diego , ca . 92101
phone 619.239.2353 | fax 619.239.6227

HORTON PLAZA IMPROVEMENT PROJECT

SAN DIEGO, CALIFORNIA

LICENSED ARCHITECT REG. NO. C-24987 EXP. 08-31-2015 FEB. 28 2013 STATE OF CALIFORNIA



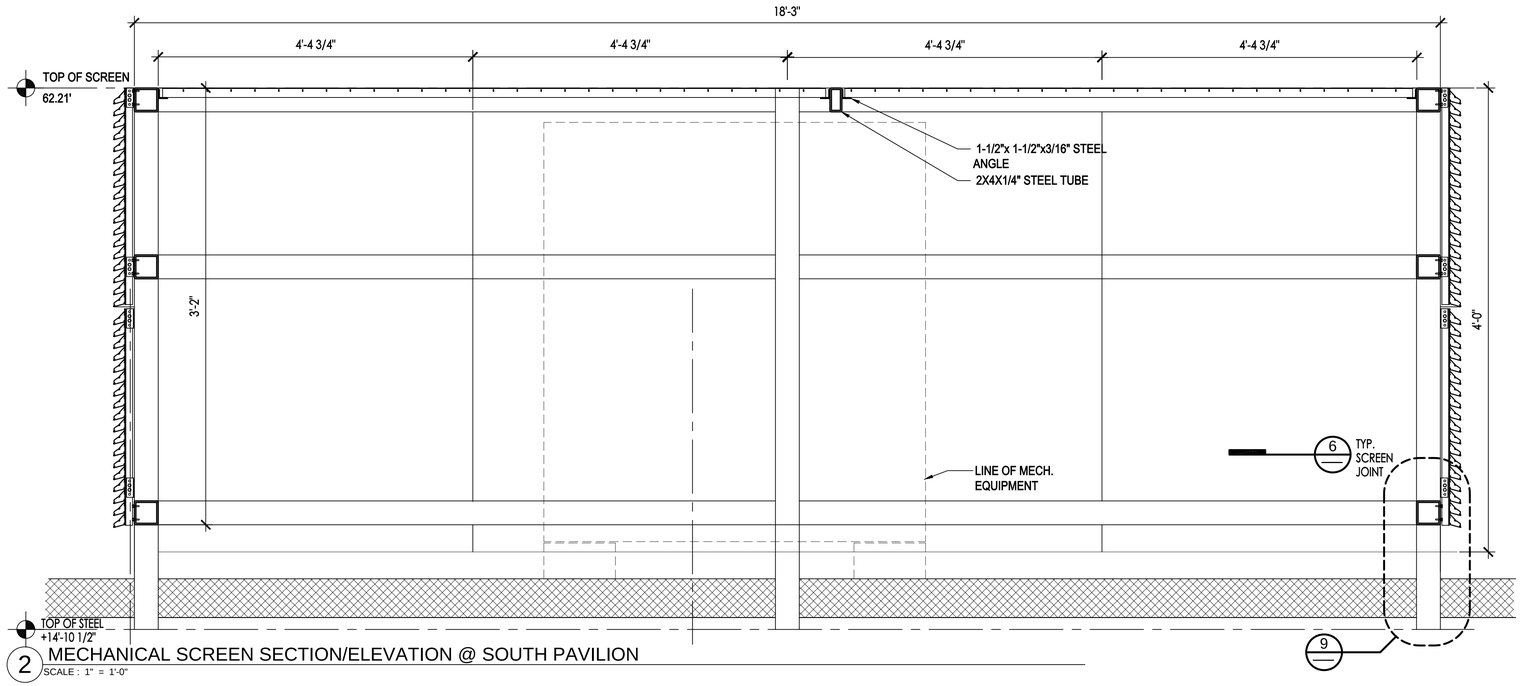
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1 ADDENDUM C, 4/28/14

PTS#288741 37342-D

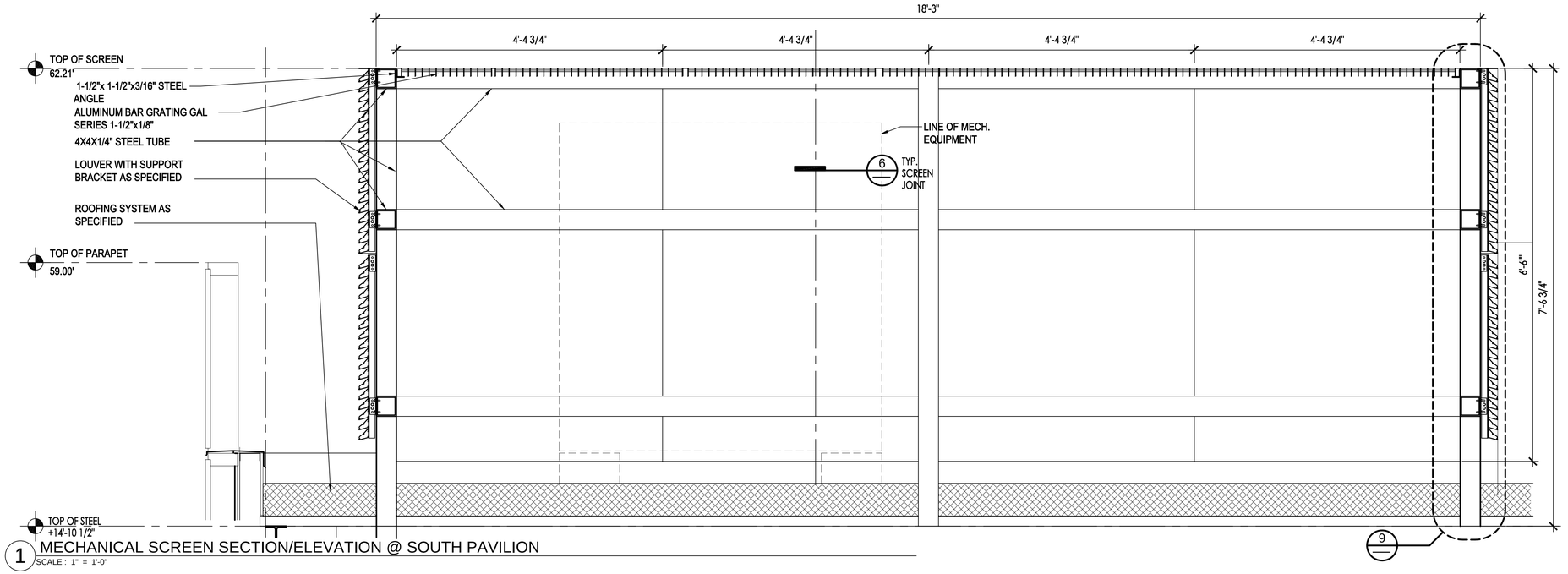
DETAILS

A9.4



2 MECHANICAL SCREEN SECTION/ELEVATION @ SOUTH PAVILION

SCALE : 1" = 1'-0"



1 MECHANICAL SCREEN SECTION/ELEVATION @ SOUTH PAVILION

SCALE : 1" = 1'-0"

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401 B STREET, SUITE 400
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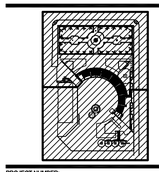
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HORTON PLAZA IMPROVEMENT PROJECT

SAN DIEGO, CALIFORNIA

LICENSED ARCHITECT
Lic. No. C-24987
FEB 28 2015
STATE OF CALIFORNIA



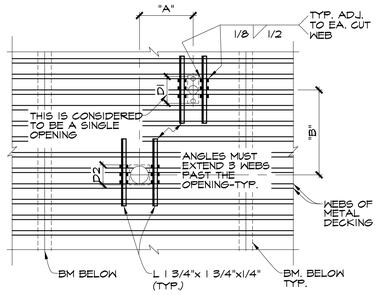
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PTS#288741 37342-D

DETAILS

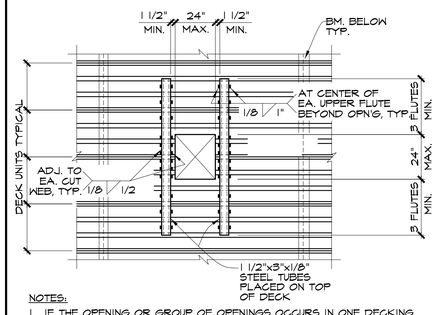
A9.4.1



NOTES:

1. TWO ADJACENT WEB OPENING IS DEFINED AS A 6" MAX. HOLE AT 1 1/2" DECK AND 12" MAX. HOLE AT 2" & 3" DECK. TYP.
2. ANGLES SHALL BE PLACED ON TOP OF DECK. IF ANGLES ARE LOCATED BELOW DECK, WELD ANGLE AS SHOWN ABOVE TO EACH BOTTOM FLUTE.
3. IF DIMENSION "A" IS GREATER THAN 4xD1, 4xD2, OR 32", WHICHEVER IS LARGER, THEN THERE IS NO RESTRICTION ON DIMENSION "B"
4. IF DIMENSION "B" IS GREATER THAN 4xD1, 4xD2, OR 32" WHICHEVER IS LARGER, THEN THERE IS NO RESTRICTION ON DIMENSION "A"
5. IF DIMENSION "A" AND "B" ARE LESS THAN 4xD1, 4xD2, OR 32", WHICHEVER IS LARGER, THE OPENING GROUP WILL BE CONSIDERED AS A SINGLE HOLE, AND MUST BE REINFORCED AS REQUIRED FOR THE LARGER COMBINED OPENING.

HOLES CUTTING NO MORE THAN TWO ADJACENT WEBS (A)



NOTES:

1. IF THE OPENING OR GROUP OF OPENINGS OCCURS IN ONE DECKING UNIT, THE OPENING OR OPENING GROUP MAY BE CUT PRIOR TO POURING OF CONCRETE.
2. IF, AS SHOWN ON DETAIL ABOVE, THE OPENING OR OPENING GROUP CUTS THROUGH TWO DECKING UNITS, THE DECKING SHALL NOT BE CUT UNTIL CONCRETE HAS BEEN PLACED AND CURED.
   A. AT THE TIME OF POURING, SUITABLE SLEEVES OR POUR-STOPS SHALL BE PLACED AROUND THE OPENING.
3. ADD REBAR AT CORNERS OF OPENING.
4. WHEN THE MAXIMUM DIMENSION OF AN OPENING OR OPENING GROUP EXCEEDS 24", PLACE HEADER BEAM AROUND OPENING PER 25

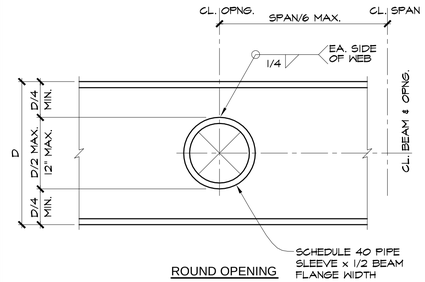
LARGER HOLES CUTTING MORE THAN TWO ADJACENT WEBS, RECTANGULAR OR SQUARE (B)

NOTE:

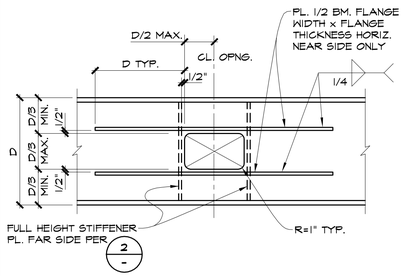
PRIOR TO CONCRETE POUR, SMALL OPENINGS SHOULD BE BLOCKED OUT AND METAL DECK LEFT INTACT. HOLES LESS THAN 6" IN DIAMETER AND CUTTING NO MORE THAN 1 WEB NEED NO REINFORCING. AFTER THE CONC. HAS CURED, THE BLOCKOUT CAN BE REMOVED AND THE METAL DECK IN THE AREA OF THE HOLE REMOVED.

TYP. OPENING IN ROOF METAL DECK 19

5300-17



ROUND OPENING



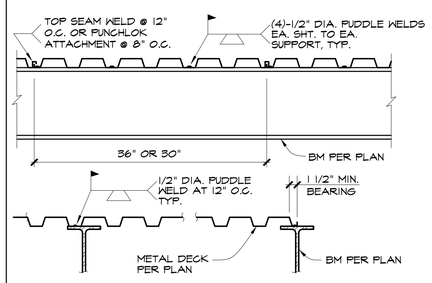
RECTANGULAR OPENING

NOTES:

1. WHERE OPENING DIA. IS D/3 OR LESS, AND NOT MORE THAN 4", REINFORCING SHOWN IS NOT REQUIRED.
2. ROUND HOLES GREATER THAN 12"? SHALL BE REINFORCED PER RECTANGULAR OPENINGS.
3. HOLES SHALL BE LOCATED AWAY FROM CROSS BEAM REACTIONS A DISTANCE EQUAL TO THE HORIZONTAL DIMENSION OF THE HOLE AND 1'-6" MIN.
4. HOLE LOCATIONS SHALL BE SUBMITTED FOR APPROVAL TO THE STRUCTURAL ENGINNER.

TYPICAL OPENING IN BEAM WEB 14

5000-09

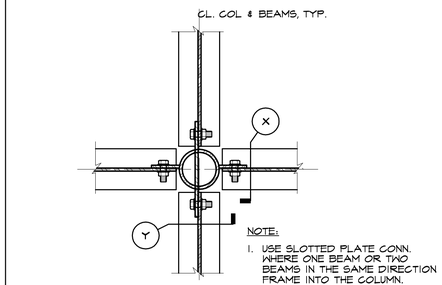


NOTES:

1. END BEARING SHALL BE 2" MIN.
2. DECK SHALL BE CONT. OVER 2 SPANS MIN. (U.O.N.)
3. PLUG WELD TO BE 1/2" DIA. EFFECTIVE FUSION DIAMETER.

TYP. 1 1/2" ROOF METAL DECK WELDING PATTERN 15

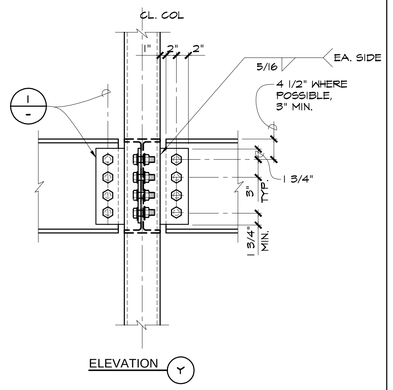
5300-02



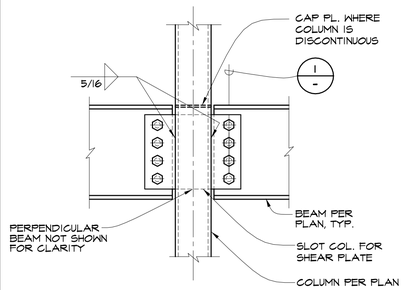
NOTE:

1. USE SLOTTED PLATE CONN. WHERE ONE BEAM OR TWO BEAMS IN THE SAME DIRECTION FRAME INTO THE COLUMN.
2. USE SHEAR PL CONNECTION AT SMALLER BEAM(S) WHERE MULTIPLE BEAMS FRAME INTO COL.

PLAN VIEW



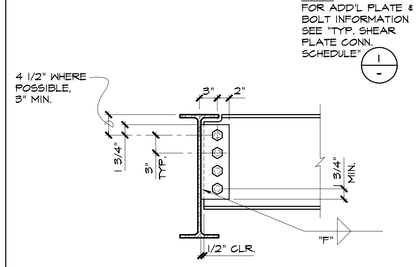
ELEVATION Y



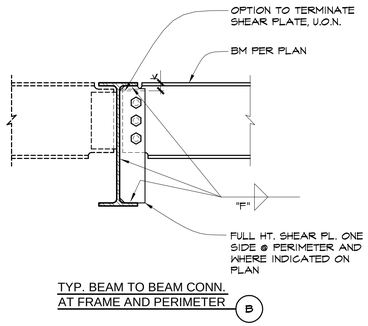
ELEVATION X

TYP. BEAM TO HSS COL. CONN. 11

5050-05



TYP. BEAM TO BEAM CONT. (A)

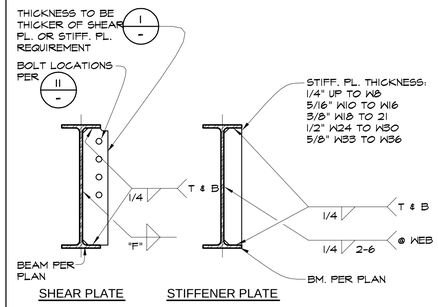


TYP. BEAM TO BEAM CONN. AT FRAME AND PERIMETER (B)

BEAM SIZE	SHEAR PLATE THICK.	SHEAR PLATE WELD 'F'	# OF 1"Ø A325N BOLTS	# OF ROWS
W8, W10	3/8	5/16	2	1
W12, W14	3/8	5/16	3	1
W16	3/8	5/16	4	1
W18, W21	3/8	5/16	5	1
W24	3/8	5/16	6	1
W27	3/8	5/16	7	1
W30	1/2	5/16	8	1
W33,W36	1/2	5/16	9	1

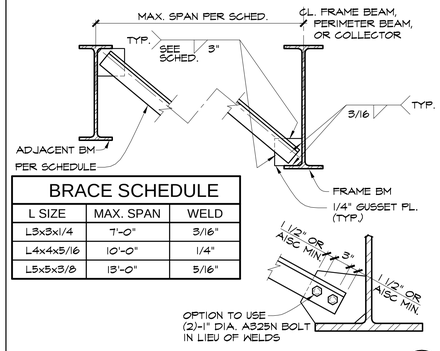
TYP. SHEAR PLATE CONN. SCHEDULE 1

5050-01



TYP. FULL HEIGHT SHEAR PLATE OR STIFFENER PLATE 2

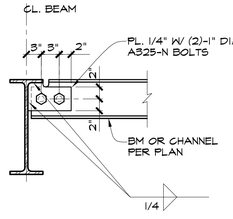
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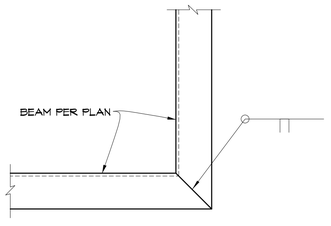
BRACE SCHEDULE		
L SIZE	MAX. SPAN	WELD
L3x3x1/4	7'-0"	3/16"
L4x4x5/16	10'-0"	1/4"
L5x5x3/8	13'-0"	5/16"

TYP. COMPRESSION FLANGE BRACE 3

5000-06

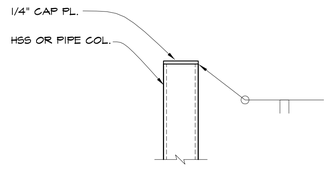


TYP. W6 OR C6 CONN. (C)



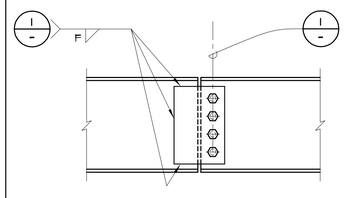
PLAN

TYP. MITER CONN. 15



TYP. HSS COL. CAP PLATE 12

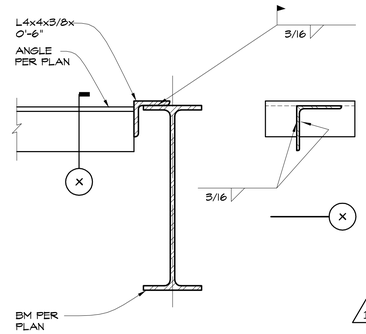
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TYPICAL BEAM SPLICE (D)

TYP. STEEL BEAM TO BEAM CONN. 8

5050-02



TYP. ANGLE TO BM. CONN. 4

5300-15

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HORTON PLAZA IMPROVEMENT PROJECT

SAN DIEGO, CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER JAMES A. AMUNDSON No. 3332 Exp. 12-31-13 STRUCTURAL STATE OF CALIFORNIA

PROJECT NUMBER: WM-1103

DRAWN BY: _____ REVIEWED BY: _____

PHASE: 100% CONSTRUCTION DOCUMENTS PERMIT REVIEW SET

ISSUE DATE: 09/27/2013

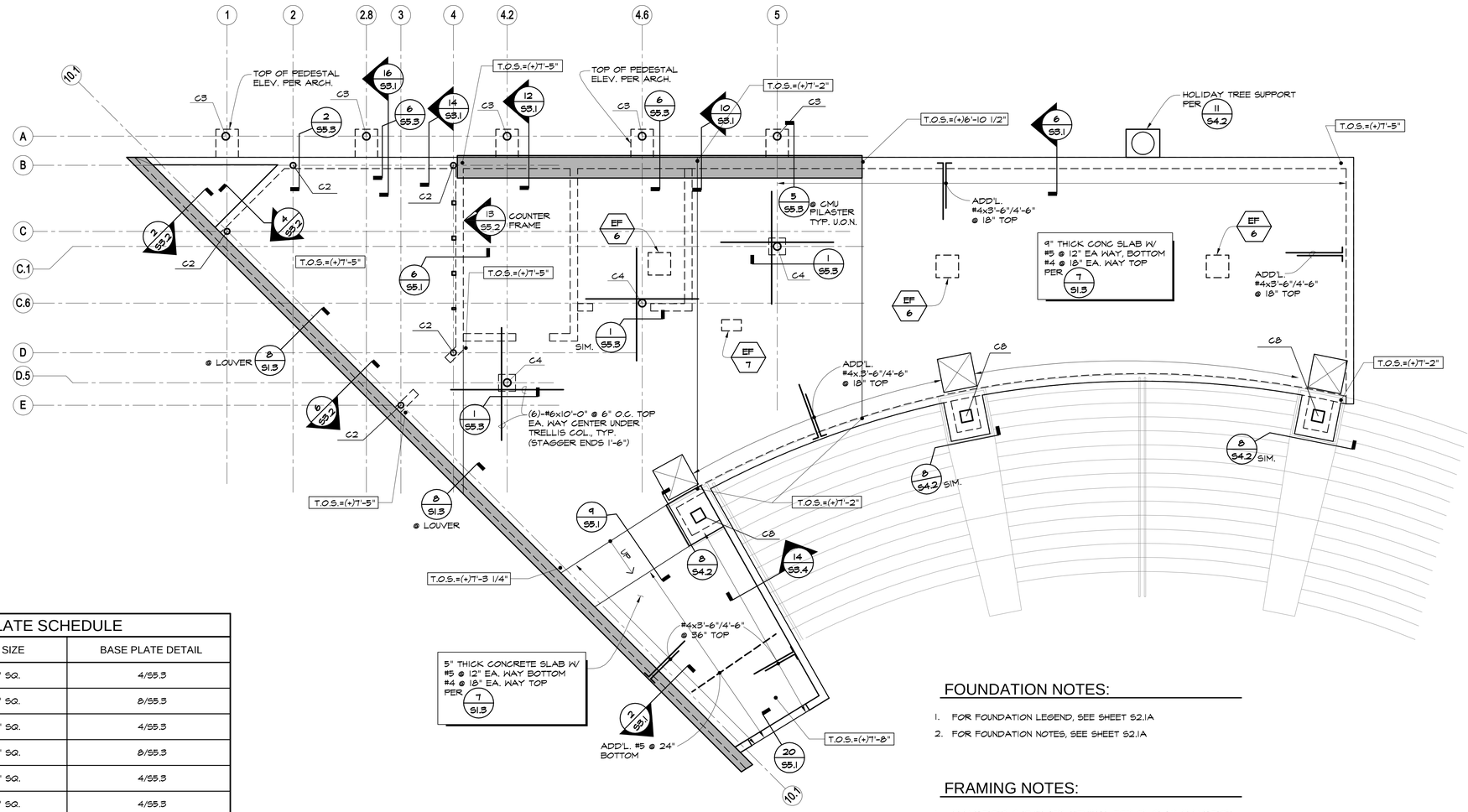
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1 ADDENDUM C, 4/28/14

PTS#288741 37342-D

TYPICAL DETAILS

S1.4



COLUMN AND BASE PLATE SCHEDULE

MARK	COLUMN	BASE PLATE SIZE	BASE PLATE DETAIL
C1	6"Ø XS PIPE	PL. 3/4"x1'-5" SQ.	4/S5.3
C2	6"Ø XS PIPE	PL. 3/4"x1'-5" SQ.	8/S5.3
C3	8"Øx3/8" THK. TAPERED	PL. 3/4"x1'-2" SQ.	4/S5.3
C4	8"Øx3/8" THK. TAPERED	PL. 3/4"x1'-2" SQ.	8/S5.3
C5	8 1/2"Øx3/8" THK. TAPERED	PL. 3/4"x1'-2" SQ.	4/S5.3
C6	10"Ø STD. PIPE	PL. 3/4"x1'-5" SQ.	4/S5.3
C7	10"Ø STD. PIPE	PER DETAIL	13/S5.3
C8	HSS 12x12x5/8	PER DETAIL	4/S5.4

FRAMING LEGEND:

- ELEVATION OR SECTION DRAWING (ILLUSTRATING MORE THAN 1 LEVEL)
- 3" MAX. — STEP IN SLAB SURFACE (VERIFY HEIGHT, LOCATION AND DIMENSIONS WITH ARCHITECTURAL DRAWINGS)
- -3" — AREA OF DEPRESSION IN SLAB SURFACE (VERIFY DEPTH, LOCATION AND DIMENSIONS WITH ARCHITECTURAL DRAWINGS) PER 4/S1.2
- ADDITIONAL TOP SLAB REINFORCEMENT — UPPER LAYER — LOWER LAYER
- ADDITIONAL BOTTOM SLAB REINFORCEMENT — UPPER LAYER — LOWER LAYER
- C1 — STEEL COLUMN & BASE PL PER PLAN SEE SCHEDULE ON THIS SHEET
- (TS=23'-0") — STEEL BEAM AND TOP OF STEEL RELATIVE TO DATUM
- X / X — MECHANICAL UNIT PER MECH. ANCHORAGE AS NOTED OR PER 16/S1.3 AT HANGING UNITS, AS NOTED ON PLANS FOR ROOF MOUNTED UNITS. MAX. WT=100# (1)
- 3100 LB — MAXIMUM OPERATING WEIGHT OF EQUIPMENT AT LOCATION INDICATED. ANCHORAGE PER MANUFACTURER, U.O.N.
- TOS=+0'-0" — NOMINAL TOP OF SLAB RELATIVE TO DATUM.
- TS — TOP OF STEEL ELEVATION RELATIVE TO DATUM.
- PL "X" — REFERENCE TO BASE PLATE DETAIL PER SCHEDULE
- SLAB PENETRATION. LOCATION PER LANDSCAPE, ADDITIONAL REINF. PER 3/S1.3 & 4/S1.3

NORTHWEST PAVILION FLOOR PLAN

SCALE: 3/16"=1'-0"

FOUNDATION NOTES:

1. FOR FOUNDATION LEGEND, SEE SHEET S2.1A
2. FOR FOUNDATION NOTES, SEE SHEET S2.1A

FRAMING NOTES:

1. ELEVATIONS SHOWN ARE NOMINAL TOP OF SLAB ELEVATION: (DATUM 0'-0" = 40.0 FT. MSL) SEE THE ARCHITECTURAL DRAWINGS FOR PRECISE TOP OF SLAB ELEVATIONS AND DRAINAGE REQUIREMENTS.
2. FOR SIZE AND LOCATION OF SLAB EDGES, CURBS, TOPPING SLABS, SLOPES,DEPRESSIONS OR PENETRATIONS IN STRUCTURAL SLAB SEE ARCHITECTURAL, LANDSCAPING OR MEP DRAWINGS.
3. PENETRATIONS IN THE STRUCTURAL SLAB NOT SHOWN ON THE STRUCTURAL DRAWINGS THAT EXCEED 12" IN ANY DIRECTION SHALL BE APPROVED IN WRITING BY THE STRUCTURAL ENGINEER.
4. SPECIAL REINFORCING (AT OPENINGS AND RE-ENTRANT CORNERS, AND AT SLAB CORNERS) SHALL BE INSTALLED IN ADDITION TO REINFORCING INDICATED ON THE PLANS. (SEE 2/S1.3, 3/S1.3, 5/S1.3 & 7/S5.2)
5. SEE DETAIL 1/S1.3 FOR ADDITIONAL BOTTOM REINF AT COLUMN.
6. WHERE FLOOR FINISHES HAVE MORE STRINGENT REQUIREMENTS FOR LEVELNESS, FLATNESS OR MOISTURE CONTENT THAN THE CONSTRUCTED FLOOR SLABS, A LEVELING AGENT AND/OR MOISTURE BARRIER MAY BE APPLIED. THE DESIGN OF THE SLAB ACCOUNTS FOR AN AVERAGE THICKNESS OF 3/4" AND A MAXIMUM THICKNESS OF 1 1/2" OF LEVELING AGENT.
7. DIAMETER OF TAPERED COLUMNS IS TAKEN AT TOP OF PLAZA PAVING, SEE 2/S5.5. COLUMNS TAPER TO BE PER ARCH. (0.14" PER FT. MAX.) COLUMN THICKNESS NOTED IS UNIFORM ALONG HEIGHT.
8. SEE LANDSCAPE DRAWINGS FOR HANDRAILS AND GUARDRAILS. FOR BASE ANCHORAGE , SEE 17/S5.3 & 18/S5.3
9. CMU WALL OPENINGS AT NON-RETAINING CONDITIONS PER 1/S1.3
10. (1) LOCATION OF MECHANICAL UNITS, EXHAUST FANS, SCRUBBERS, & ASSOCIATED PENETRATIONS SHALL BE LOCATED PER MECH. & COORDINATED IN THE FIELD.

0 5 10 20 40 N

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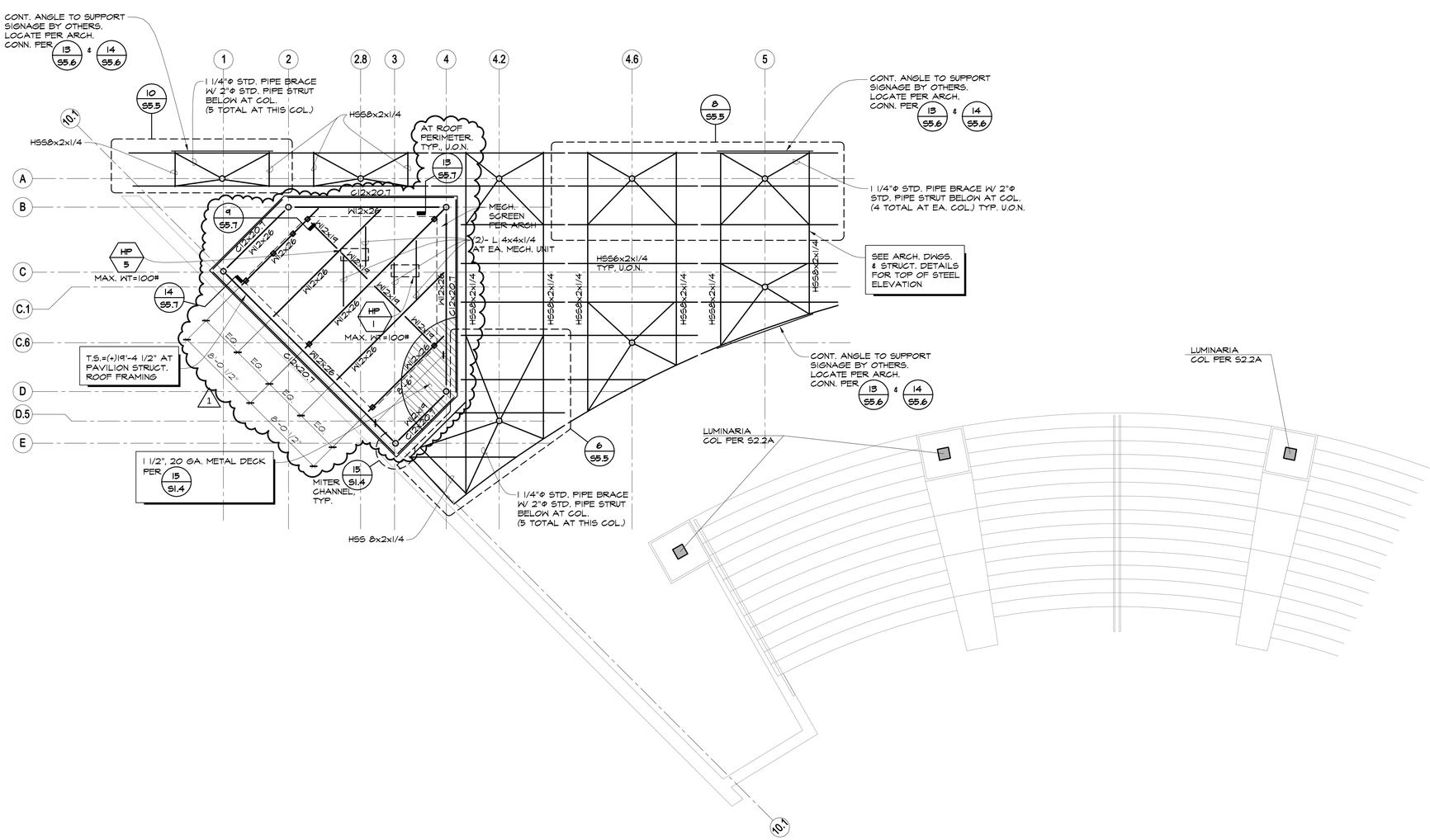
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NORTHWEST PAVILION FLOOR PLAN

S2.2A



FRAMING NOTES:

1. FOR FRAMING LEGEND, SEE SHEET S2.2A
2. FOR FRAMING NOTES, SEE SHEET S2.2A
3. MECH. SCREEN POSTS LOCATED PER ARCH. DWGS.
4. HP-1 & HP-5 MOUNTING DETAILS PER 12 55.7 1

NORTHWEST PAVILION ROOF PLAN

SCALE: 3/16"=1'-0"

0 5 10 20 40 N

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REGISTERED PROFESSIONAL ENGINEER
JAMES A. AMUNDSON
No. 3332
Exp. 12-31-13
STRUCTURAL
STATE OF CALIFORNIA

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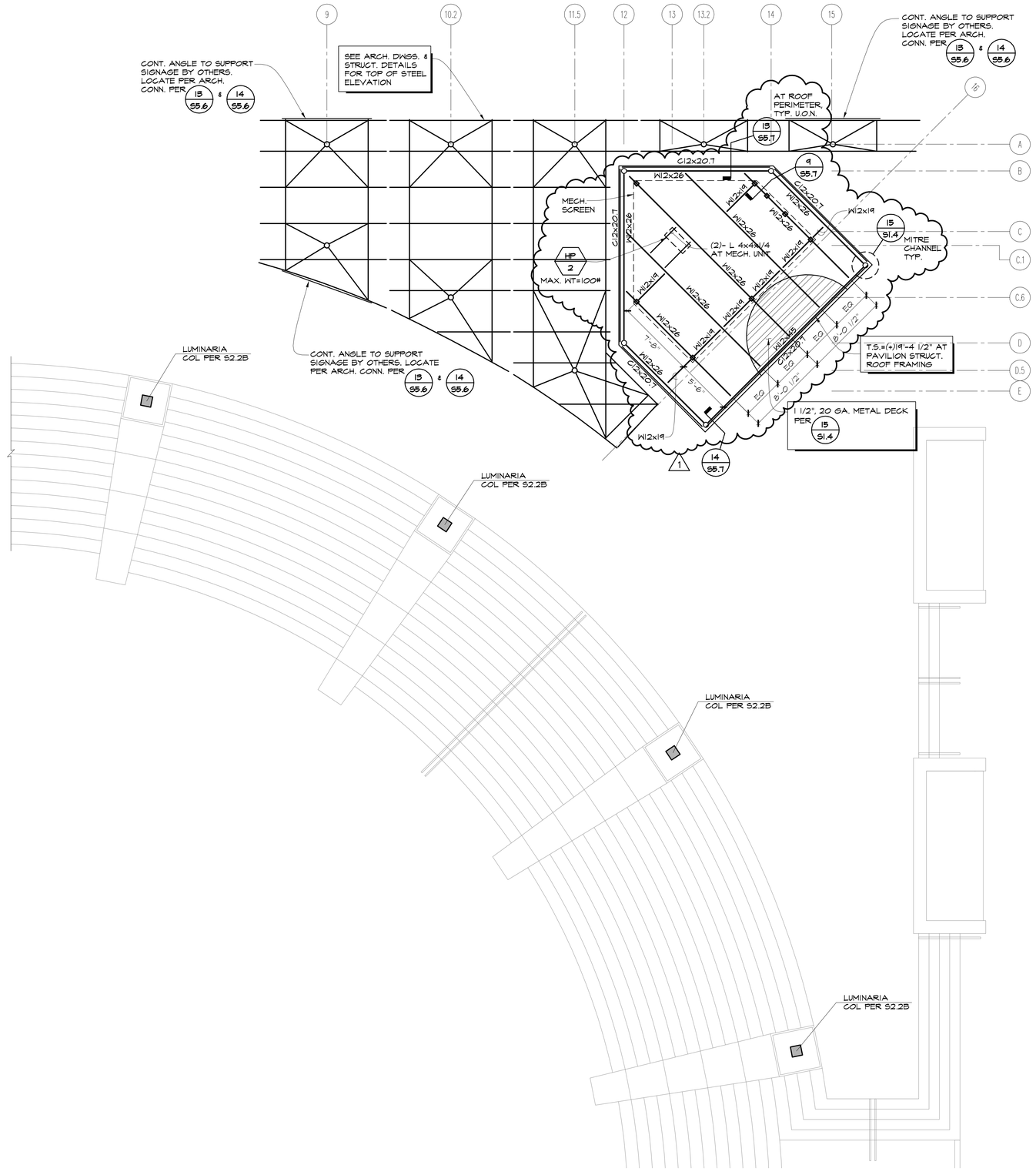
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NORTHWEST PAVILION ROOF PLAN

S2.3A



NORTHEAST PAVILION ROOF PLAN

SCALE: 3/16"=1'-0"

FRAMING NOTES:

1. FOR FRAMING LEGEND, SEE SHEET S2.2A.
2. FOR FRAMING NOTES, SEE SHHET S2.2A.
3. FOR TRELLIS MEMBER SIZES AND CALLOUTS SEE SHEET S2.3A (MIRRORED).
4. MECH. SCREEN POSTS LOCATED PER ARCH. DWGS.
5. HP-2 MOUNTING DETAILS PER 12 S5.7

0 5 10 20 40

N

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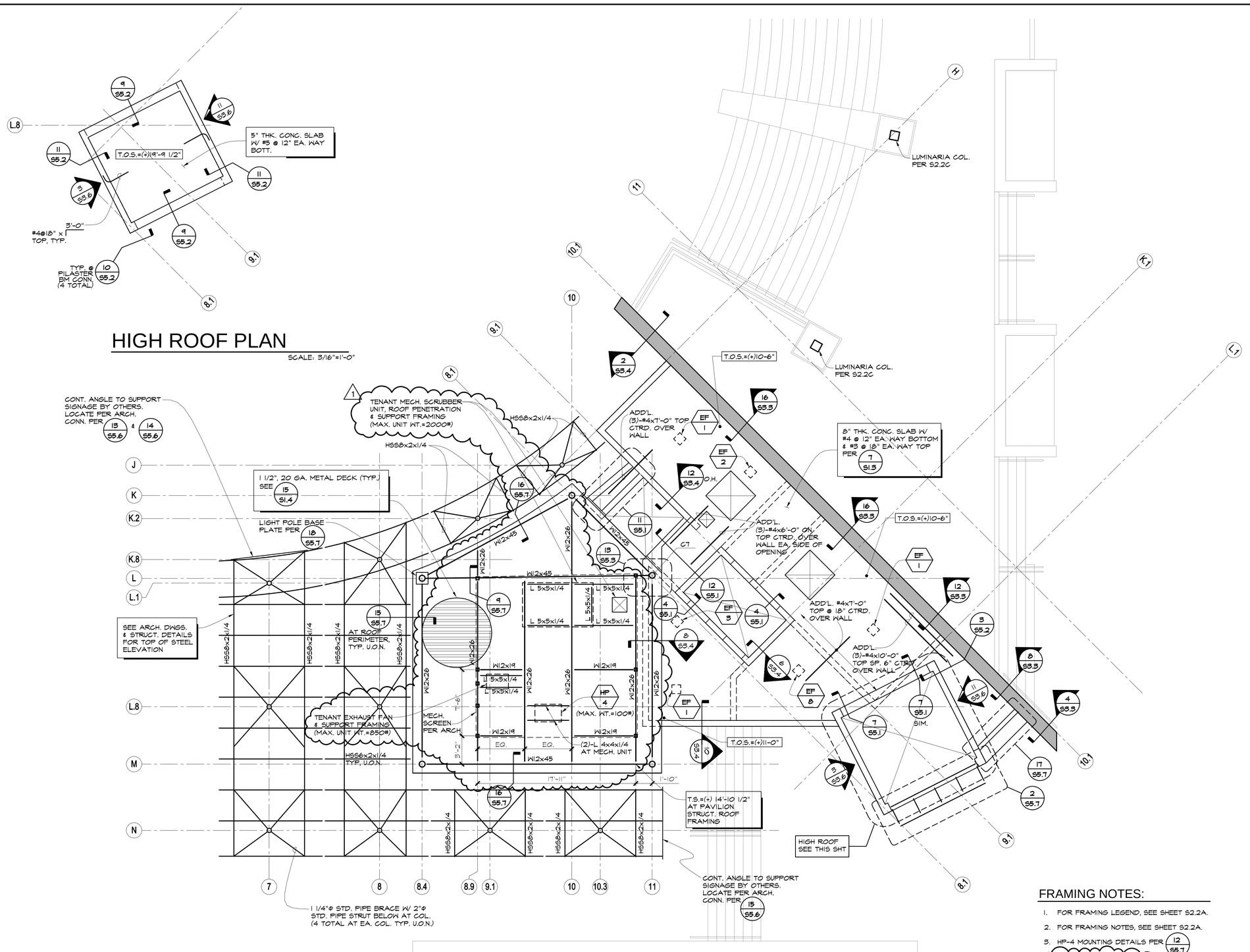
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NORTHEAST PAVILION ROOF PLAN

S2.3B



HIGH ROOF PLAN

SCALE: 3/16"=1'-0"

SOUTH PAVILION ROOF PLAN

SCALE: 3/16"=1'-0"

FRAMING NOTES:

1. FOR FRAMING LEGEND, SEE SHEET S2.2A.
2. FOR FRAMING NOTES, SEE SHEET S2.2A.
3. HP-4 MOUNTING DETAILS PER 12/55.7
4. FUTURE "SCRUBBER" AND FUTURE PAVILION EXHAUST FAN PER 7/55.7 & 8/55.7
5. FRAMING AND DETAILS ASSOCIATED WITH MECH. EQUIPMENT NOTES AS "FUTURE" TO BE COORDINATED BY THE CONTRACTOR.
6. MECH. SCREEN POSTS LOCATED PER ARCH. DWGS.

0 5 10 20 40

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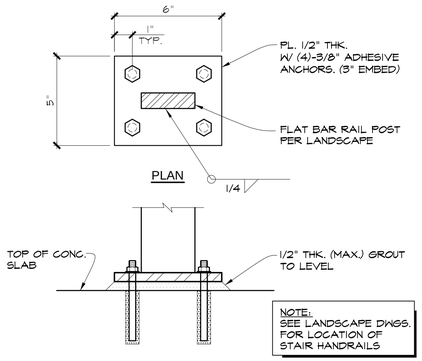
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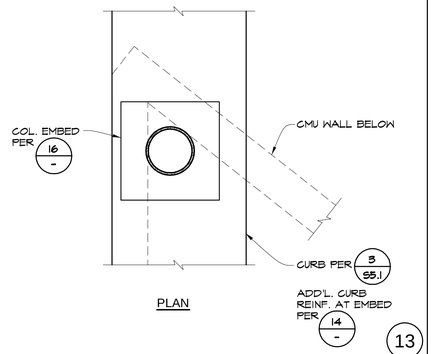
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SOUTH PAVILION ROOF PLAN

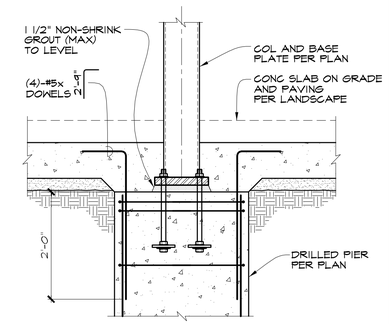
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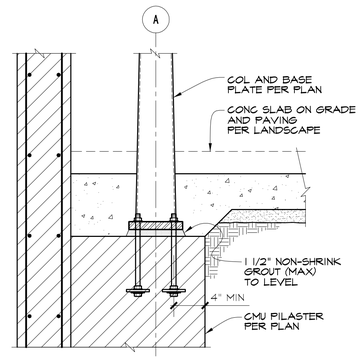
TYP. HANDRAIL AT STAIR BASE CONN. 17



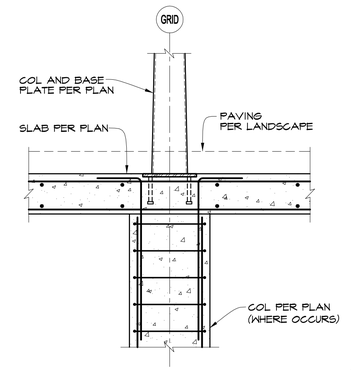
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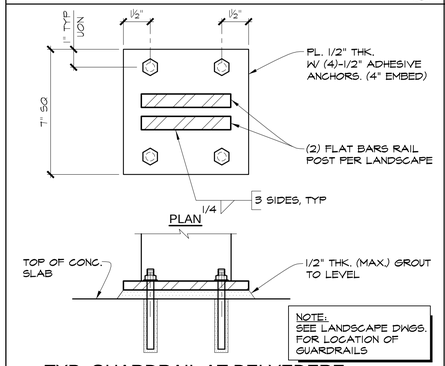
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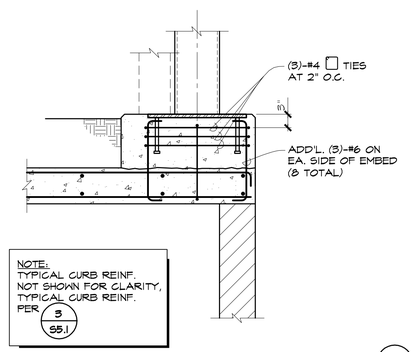
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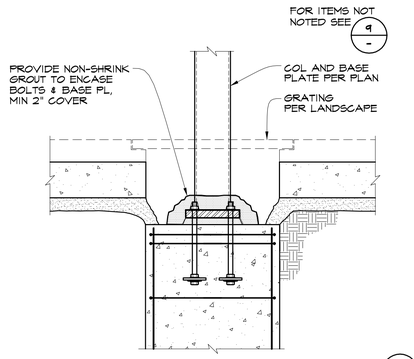
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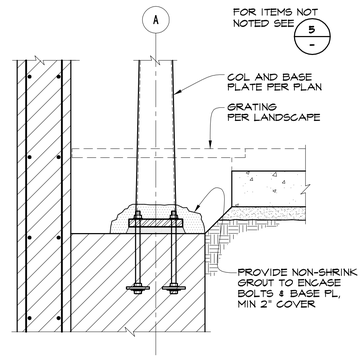
TYP. GUARDRAIL AT BELVEDERE BASE CONNECTION 18



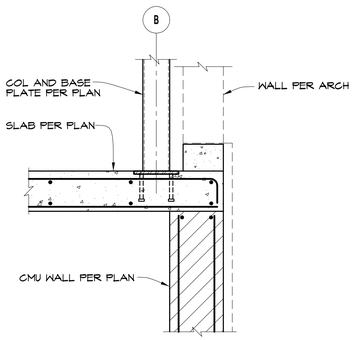
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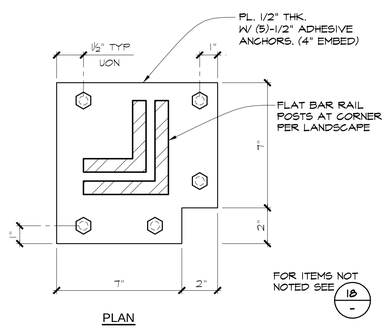
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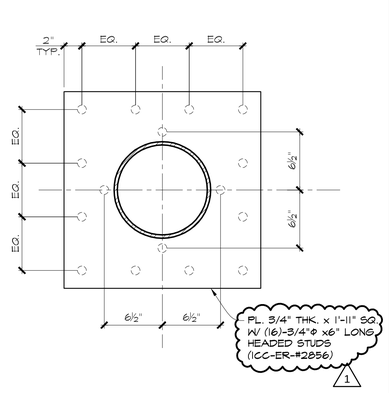
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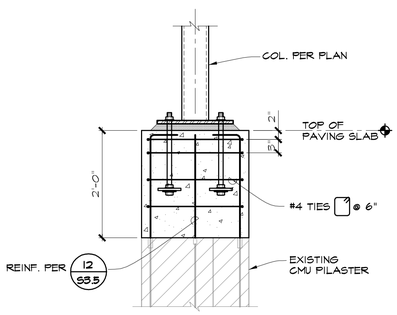
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GUARDRAIL AT BELVEDERE CORNER BASE CONNECTION 19

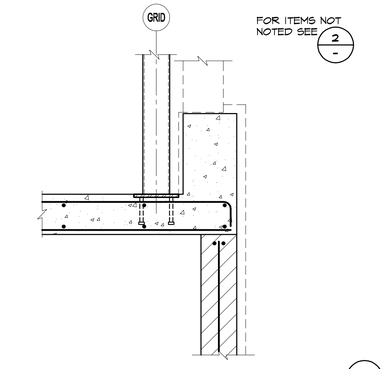


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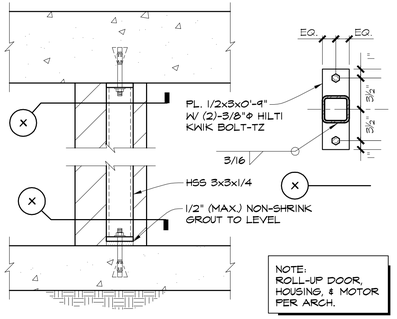


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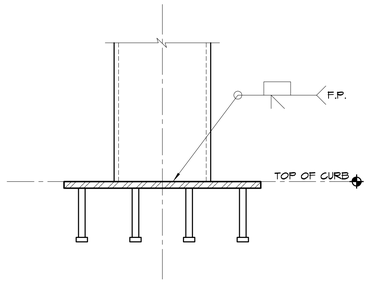
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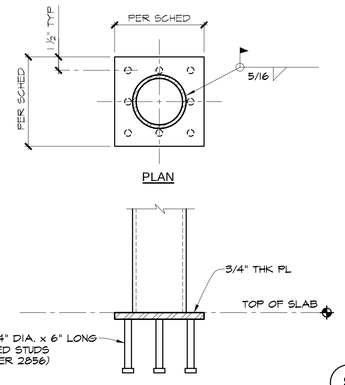


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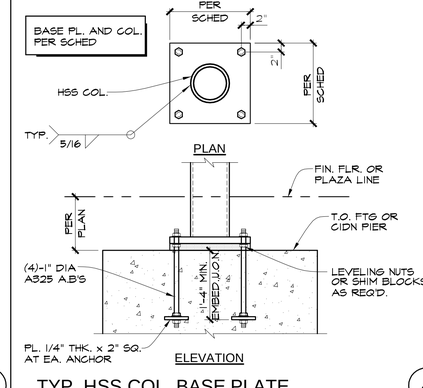
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NOT USED 12



8

TYP. HSS COL. BASE PLATE 5000-03 4



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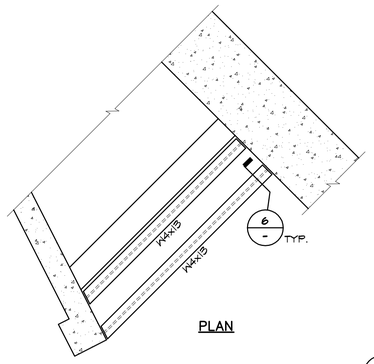
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DRAWN BY: _____ REVIEWED BY: _____
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1 ADDENDUM C, 4/28/14

PTS#288741 37342-D

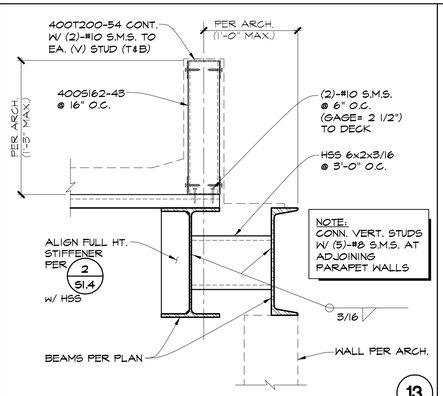
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S5.3

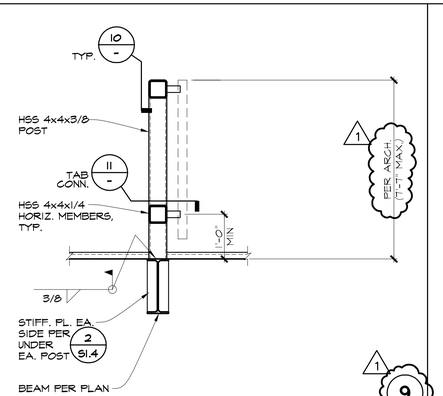


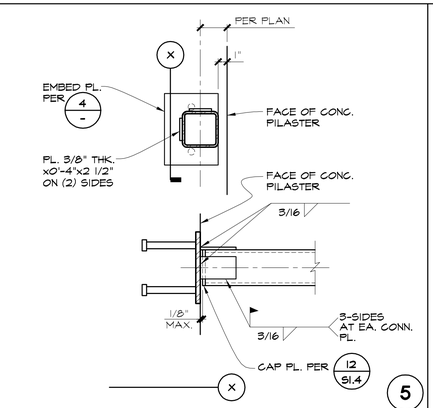
PLAN

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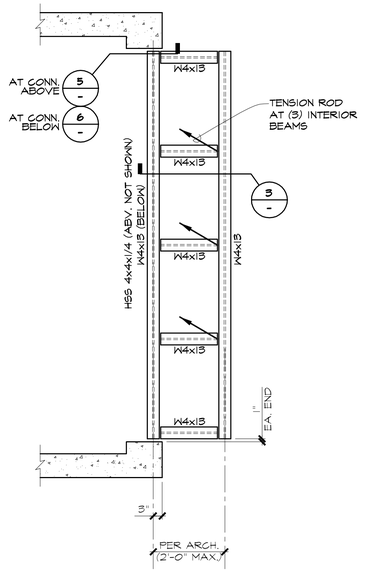


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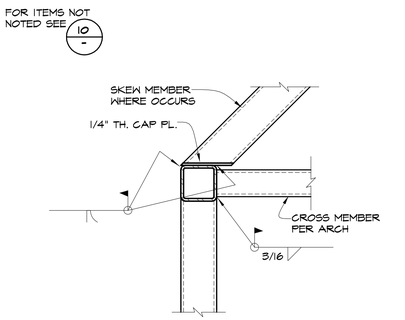


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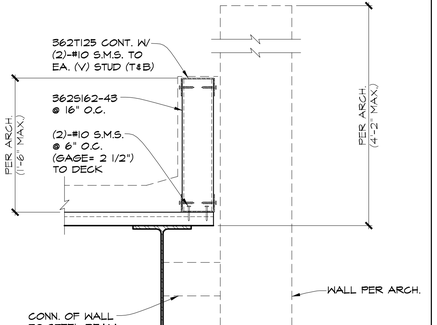
SOUTH PAVILION OVERHANG PLAN

2



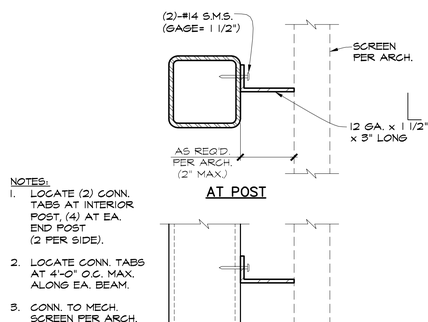
LIGHT POLE AT STEEL ROOF

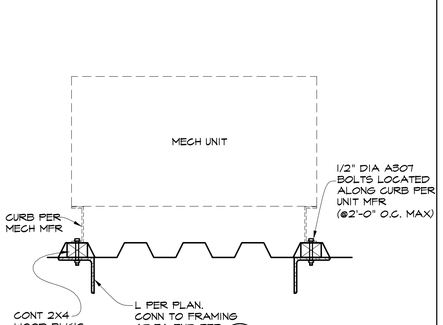
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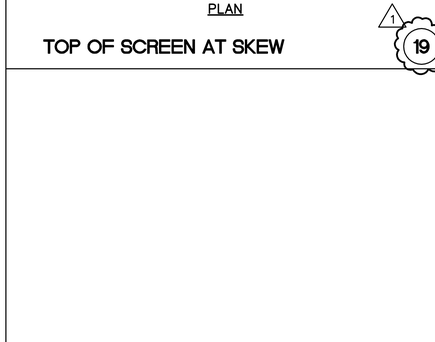
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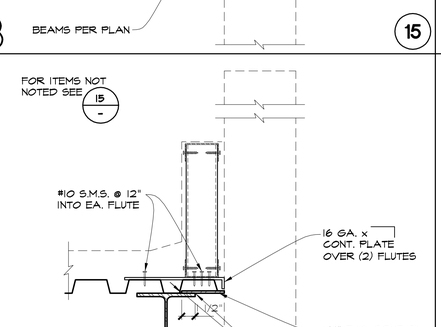
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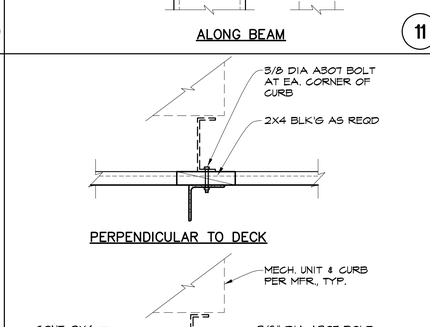
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TOP OF SCREEN AT SKEW

1
19



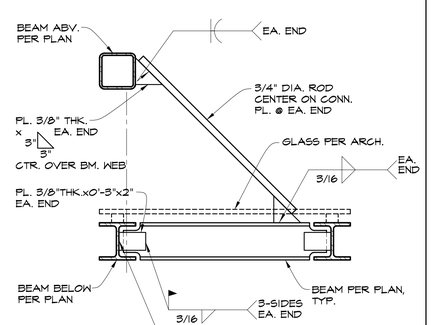
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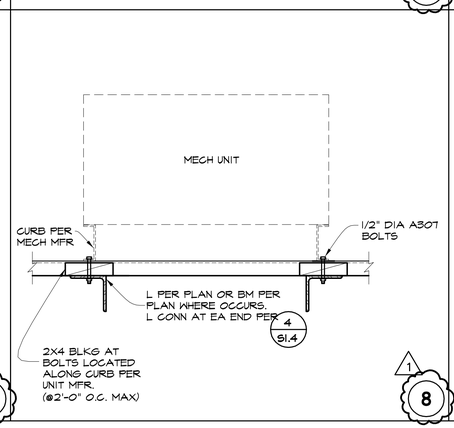
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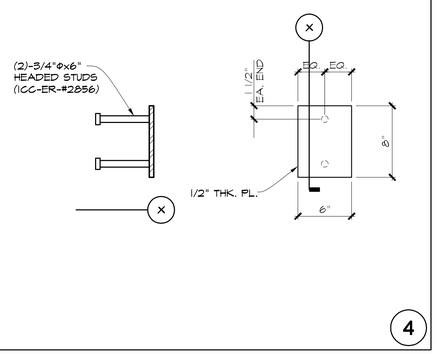
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3

16





4

Civic San Diego
401 B STREET, SUITE 400
SAN DIEGO, CA 92101

City of San Diego
Park & Recreation Department

Park and Recreation Department Director: _____
Date: 12/12/13
Contractor: _____
Date Completed: _____
Date Started: _____
As-Builts By: _____
As-Builts Approved By: _____

WALKER | MACY

HOPE

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1301 Third Avenue
Suite 300
San Diego, Ca 92101
TEL: (619) 232-4673
FAX: (619) 235-4675

HORTON PLAZA IMPROVEMENT PROJECT

SAN DIEGO, CALIFORNIA

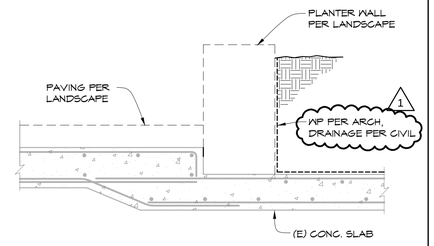
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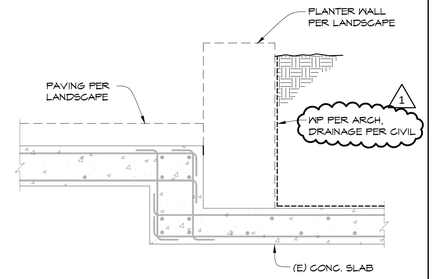
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STRUCTURAL DETAILS

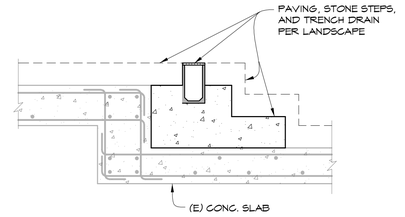
S5.7



(E) STEP HT LESS THAN 6" 1



(E) STEP HT 6" OR GREATER 2



3

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401 B STREET, SUITE 400
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City of San Diego
Park & Recreation Department

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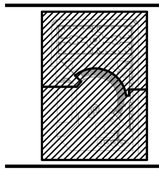
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HORTON PLAZA IMPROVEMENT PROJECT

SAN DIEGO, CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER
JAMES A. AMUNDSON
No. 3332
Exp. 12-31-13
STRUCTURAL
STATE OF CALIFORNIA

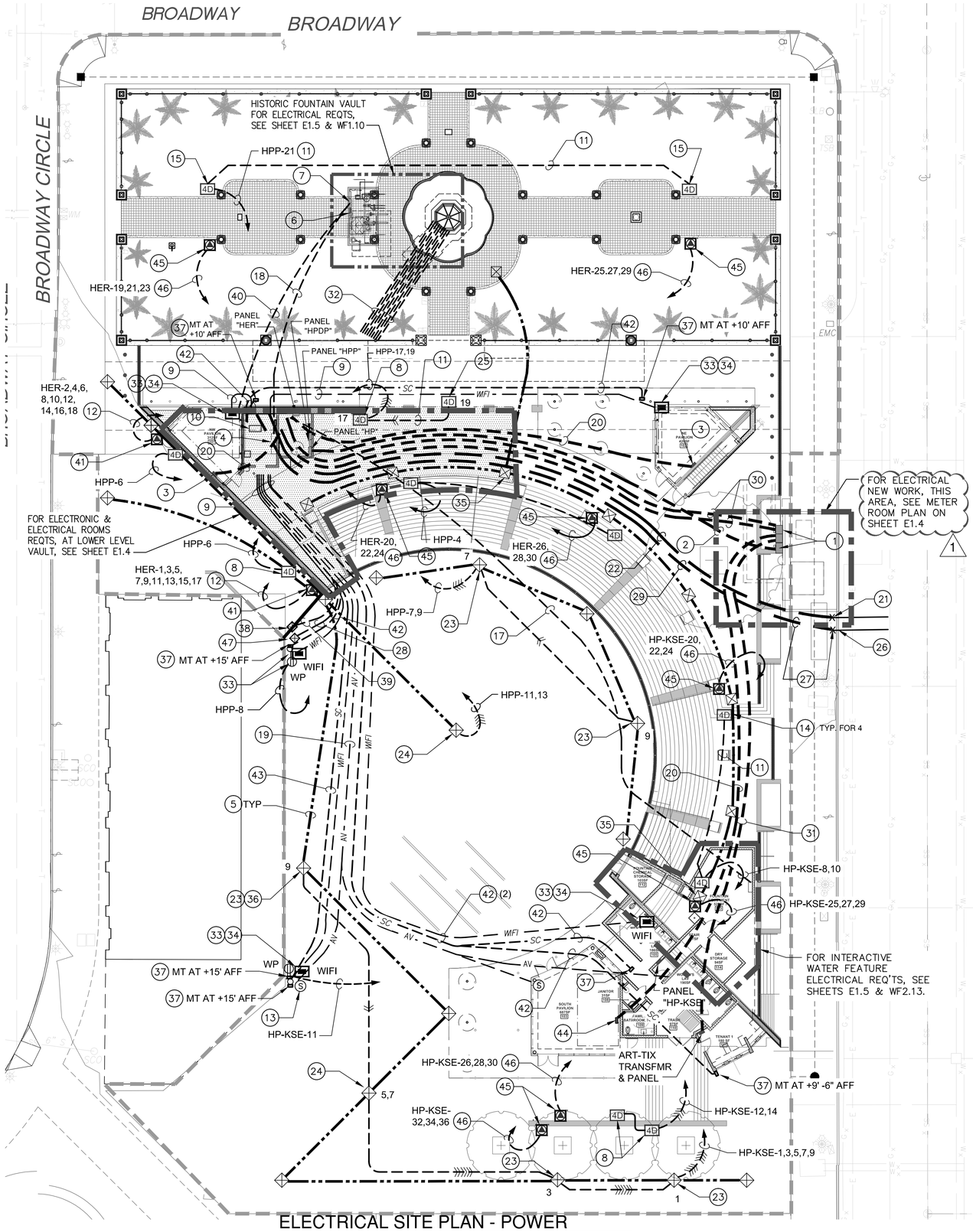


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STRUCTURAL DETAILS
ELEC. VAULT

S5.8



ELECTRICAL SITE PLAN - POWER

SCALE: 1" = 16'-0"

NOTES:

1. SUBTERRAINIAN ELECTRICAL METER ROOM VAULT "POINT-OF-CONNECTION" FOR S.D.G.&E. POWER SERVICE.
2. SERVICE FEEDER TO "HORTON PLAZA SITE" PANEL "HP" IN ELECTRIC ROOM, (2) 3"C. PVC SCHEDULE WITH (4) 350 MCM THWN, CU & (1) #1 GND.
3. PROPOSED LOCATION FOR PAVILION TENANT PANEL. 225 AMP. AT 120/208 VOLT, 3-PHASE, 4-WIRE.
4. FOR LOCATION OF POWER PANELS AND EQUIPMENT IN ELECTRICAL ROOM, SEE SHEET E1.5
5. UNDERGROUND DUCT SYSTEM FOR "EVENTS", TEMPORARY POWER OR SOUND/COMM, (2) 5" PVC WITH PULL ROPES
6. PANEL "WF", IN VAULT, FOR HISTORIC FOUNTAIN POWER.
7. PANEL "PLC", IN VAULT, FOR HISTORIC FOUNTAIN LIGHTS AND CONTROL POWER.
8. FOR DOUBLE DUPLEX CONVENIENCE OUTLET INSTALLATION REQUIREMENTS SEE DETAIL A E1.1 E2.3
9. A/V, WIFI AND SECURITY CAMERA CONDUIT SHALL BE EXTENDED TO COMMUNICATIONS BACKBOARD OR EQUIPMENT RACK IN ELECTRONICS ROOM, SEE SHEET E1.5.
10. A/V, SECURITY CAMERA AND WIFI COMMUNICATIONS RACKS IN ELECTRONIC EQUIPMENT ROOM, SEE SHEET E1.5.
11. 3/4" C. WITH (2) #10, THWN, CU AND (1) #10 GND.
12. 1¼"C. W/ (9) #8 THWN, CU & (1) #8 CU GROUND.
13. A/V & FUTURE WIFI COMMUNICATIONS EQUIPMENT SHALL BE MOUNTED ON LIGHTING POLE. SEE SHEET AV201 FOR DETAILS.
14. DOUBLE DUPLEX CONVENIENCE OUTLET, MOUNTED AT LUMINARIA BASE STRUCTURE, FOR INSTALLATION REQUIREMENTS SEE DETAIL 2 ON SHEET L8.19.
15. DOUBLE DUPLEX CONVENIENCE OUTLET MOUNTED IN PLANTER URN BASE FOR INSTALLATION REQUIREMENTS SEE DETAIL 4, SHEET HA6.2.
16. SPECIAL 30A. 4P. 120/208V 1ϕ, OUTLET, MOUNTED AT LUMINARIA BASE STRUCTURE, FOR INSTALLATION REQUIREMENTS SEE DETAIL 2 ON SHEET L8.19.
17. PROVIDE (1) 1" CONDUIT WITH (1) CAT5E CABLE FOR INTERACTIVE FOUNTAIN DMX CONTROL.
18. PROVIDE (1) 1" CONDUIT WITH (1) CAT5E CABLE FOR HISTORICAL FOUNTAIN DMX CONTROL.
19. CONDUIT FOR A/V SIGNAL SYSTEMS IS SHOWN FOR REFERENCE ONLY. FOR COMPLETE A/V CONDUIT RUNS, PULLBOXES AND EQUIPMENT LOCATIONS SEE A/V SHEETS AV201, AV301 AND AV302.
20. UNDERGROUND POWER SERVICE DUCT TO PAVILION TENANTS, (1) 2½" C. WITH (4) #4/0, THWN, CU AND (1) #6 THWN,CU GROUND.
21. INTERCEPT COX COMMUNICATIONS SERVICE DUCT AT/OR NEAR CURBLINE, COORDINATE EXACT LOCATION AND INTERFACE REQUIREMENTS WITH COX CABLE PLANNER; MR. STEVE WEATON (619) 266 5594.
22. COX SERVICE DUCT, (1) 2" C.O. PVC SCHEDULE 40, WITH PULL ROPE TO SERVICE BACKBOARD. SEE SHEET E1.5.
23. PROVIDE 30A. 120 VOLT RECEPTACLE CORD ASSEMBLY "WHIP" IN ACCESS BOX. FOR INSTALLATION REQUIREMENTS SEE DETAIL C E1.1 E2.3
24. PROVIDE (2) 30A. 120 VOLT RECEPTACLE CORD ASSEMBLY "WHIP" IN ACCESS BOX. FOR INSTALLATION REQUIREMENTS SEE DETAIL C E1.1 E2.3
25. DOUBLE DUPLEX CONVENIENCE OUTLET, FOR HOLIDAY TREE LIGHTS. FOR INSTALLATION REQ'TS SEE DETAIL B E1.1 E2.3

NOTES:

26. EXCAVATE AND EXPOSE EXISTING 4" CONDUIT AT LOCATION INDICATED ON THE WEST SIDE OF 4th AVENUE.
27. INTERCEPT EXISTING 4" CONDUIT AND EXTEND CONDUIT TO NEW TELEPHONE SERVICE BACKBOARD IN ELECTRONICS ROOM.
28. 1" C.O. RUN UNDERGROUND TO A/V EQUIP. RACK IN ELECTRONIC EQUIP. ROOM FOR FUTURE LARGE SCREEN VIDEO.
29. PROVIDE TELEPHONE SERVICE DUCT, (1) 4" PVC SCHEDULE 40, WITH PULL ROPE PER AT&T INSTALLATION REQUIREMENTS.
30. UNDERGROUND SERVICE DUCT TO PAVILION TENANT TRAMSFORMERS, (1) 2"C. WITH (3) #1, THWN, CU & (1) #6 THWN, CU GROUND.
31. UNDERGROUND SERVICE DUCT TO ART-TIX TENANT, (1) 2" C. WITH (3) #10, THWN, CU AND (1) #6 THWN, CU GROUND.
32. PROVIDE (15) 1¼" CONDUIT WITH (4) #8 & (2) CAT5E CABLE TO HISTORICAL FOUNTAIN LIGHTING CONTROL PANEL LCP, IN ELECTRONIC EQUIP RM V101a.
33. PROVIDE WEATHERPROOF BOX, 2"x4"x2"D. FOR FUTURE WIFI ANTENNA. ALSO PROVIDE GFI DUPLEX RECEPTACLE IN A WEATHERPROOF BOX WITH WEATHERPROOF COVERPLATE.
34. MOUNT OUTLETS ON A VERTICAL SURFACE NEAR THE ROOF AT BUILDINGS AND ADJACENT VERTICALLY ON LIGHT POLES. BOXES SHALL BE FINISHED TO MATCH ADJACENT SURFACES.
35. ELECTRICAL ACCESS BOX OVER STRUCTURE, 18"x30"X24" DEEP, NOMINAL. SEE LANDSCAPE PLAN L8.1 DETAIL 4 FOR REQUIREMENTS. TYPICAL OF 4.
36. ELECTRICAL ACCESS BOX IN STONE PAVING, 30"x30"X12" DEEP, NOMINAL. SEE LANDSCAPE PLAN L8.1 DETAIL 5 FOR REQUIREMENTS. TYPICAL OF 22.
37. PROVIDE WEATHERPROOF BOX, 2"x4"x2"D. FOR SECURITY CAMERA SYSTEM.
38. PROVIDE PULL BOX, 24"x24"x18" FOR FUTURE EXTENSION TO WESTFIELD SECURITY CAMERA SYSTEM. COORDINATE EXACT LOCATION AND ORIENTATION WITH PAVING PATTERN. SEE HARDSCAPE PLANS FOR REQ'TS.
39. CONDUIT BELOW GRADE FOR FUTURE SECURITY CAMERA SYSTEM FIBER OPTIC CABLE (1) 2" CONDUIT TO SECURITY CAMERA SYSTEM EQUIPMENT RACK IN THE ELECTRONICS ROOM.
40. 1" C. WITH (2) #14 THWN, CU & (1) #14 GROUND FROM WIND SENSOR ON PAVILION ROOF TO CONTROL PANEL IN HISTORICAL FOUNTAIN VAULT.
41. SPECIAL EVENTS OUTLET WITH (3) TWIST-LOCK 30A, 120V/208V 3ϕ, 5-WIRE RECEPTACLES, NEMA CONFIGURATION L21-30 WITH LOCKING WEATHERPROOF COVERPLATES.
42. ALL SECURITY CAMERA SYSTEM CONDUITS SHALL BE 3/4"C WITH CAT5E/CAT6 POWER AND DATA CABLE INSTALLED U.N.O.
43. SECURITY CAMERA SYSTEM CONDUIT, 3/4"C WITH (2) CAT5E/CAT6 POWER AND DATA CABLE INSTALLED.
44. PROPOSED LOCATION FOR PAVILION TENANT PANEL. 225 AMP. AT 277/480 VOLT, 3-PHASE, 4-WIRE.
45. SPECIAL EVENTS OUTLET WITH (1) TWIST-LOCK, 30A, 120V/208V, 3ϕ, 5-WIRE RECEPTACLE, NEMA CONFIGURATION L21-30, WITH LOCKING WEATHERPROOF COVERPLATE.
46. 1" C. WITH (4) #8, THWN, CU AND (1) #8 GND.
47. PROVIDE PULL BOX, 12"x12"x6", FOR FUTURE LARGE SCREEN VIDEO CABLE. COORDINATE EXACT LOCATION AND ORIENTATION WITH PAVING PATTERN. SEE HARDSCAPE PLANS FOR REQ'TS

GENERAL NOTES:

1. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO OBTAIN A COMPLETE SET OF DRAWINGS & SPECIFICATIONS. HE/SHE SHALL CHECK THE DRAWINGS OF THE OTHER TRADES AND SHALL CAREFULLY READ THE ENTIRE SPECIFICATION AND DETERMINE HIS/HER RESPONSIBILITIES. FAILURE TO DO SO SHALL NOT RELEASE THE CONTRACTOR FROM DOING THE WORK COMPLETE IN ACCORDANCE WITH THE DRAWINGS AND SPECIFICATIONS.
2. ALL ELECTRICAL SERVICE WORK SHALL BE IN COMPLIANCE WITH THESE DRAWINGS AND THE REQUIREMENTS THE UTILITY COMPANY. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO CONTACT THE UTILITY COMPANY AND RECEIVE COMPLETE INFORMATION ON THE REQUIREMENTS PRIOR TO THE SUBMISSION OF BID. THE ACT OF SUBMITTING THE BID SHALL CONSTITUTE ACCEPTANCE OF FULL RESPONSIBILITY BY THE CONTRACTOR TO INSTALL SERVICE IN COMPLIANCE WITH THE SERVING UTILITY.
3. ALL ITEMS SUCH AS SERVICE CONDUIT, CONDUCTORS, DUCTS, CONCRETE PADS, RISERS, PULL BOXES, PROTECTIVE COVERING AND THE LIKE FROM SERVICE LOCATION TO THE SERVICE TERMINATION EEQUIPMENT SHALL BE PROVIDED AND SHALL BE VERIFIED WITH THE SERVING UTILITY COMPANY. THE CONTRACTOR SHALL INSTALL THE SERVICE IN COMPLIANCE WITH THE SERVING UTILITY COMPANY AND SHALL PAY ALL CHARGES LEVIED BY THE SERVING UTILITY COMPANY FOR HIS SERVICE EXCEPT FIRST BILLING DEPOSIT.
4. THE CONTRACTOR SHALL SECURE AND PAY ALL PERMITS AND FEES NECESSARY FOR EXECUTION AND COMPLETION OF ELECTRICAL WORK, INCLUDING ALL CHARGES BY THE LOCAL AGENCIES.
5. THE CONTRACTOR SHALL COORDINATE HIS WORK WITH OTHER TRADES AT THE SITE. THE CONTRACTOR SHALL REVIEW THE MECHANICAL AND PLUMBING DRAWINGS FOR LOCATIONS OF DUCTS, LINES, EQUIPMENT, ETC. ANY COST TO ROUTE CONDUIT AS REQUIRED OTHER THAN AS SHOWN ON THE PLANS SHALL BE INCURRED BY THE CONTRACTOR.
6. ALL FINAL CONNECTIONS TO OWNER-FURNISHED EQUIPMENT SHALL BE MADE BY THE CONTRACTOR INCLUDING NECESSARY INTERFACES.
7. CONNECTIONS TO ALL EQUIPMENT FURNISHED BY OTHERS SHALL BE COORDINATED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING MANUFACTURER'S SHOP DRAWINGS PRIOR TO ROUGH-IN OF CONDUIT, DEVICES, EQUIPMENT.
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TRENCHING AND BACKFILLING AS REQUIRED TO PERFORM HIS WORK. THE CONTRACTOR SHALL USE EXTREME CAUTION WHEN TRENCHING SO AS NOT TO INTERFERE WITH EXISTING UNDERGROUND UTILITIES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROPER AND APPROVED REPAIR OF ANY AND ALL DAMAGES CAUSED.
9. THE POWER SERVICE POINT SHOWN HEREON IS APPROXIMATE ONLY. SERVICE POINT IS SUBJECT TO REVISION BY FINAL SAN DIEGO GAS & ELECTRIC COMPANY PLANS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING BUS DUCT FROM METERING EQUIPMENT TO APPROVED SERVICE POINT FURNISHED BY S.D.G.&E.
10. LIGHTING CONDUIT SHALL BE 1 INCH MINIMUM PVC (SCHEDULE 40). FINAL LOCATION AND SIZE OF LIGHTS, CONDUIT AND WIRE AND PULL BOXES SHALL BE APPROVED PRIOR TO BEGINNING OF CONSTRUCTION.

Civic San Diego
401 B STREET, SUITE 400
SAN DIEGO, CA 92101

City of San Diego
Park & Recreation Department

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As-Builts Approved By: _____

WALKER MACY

KANRAD Engineering, Inc.
CONSULTING ELECTRICAL ENGINEERS
9466 Black Mountain Road, Suite 250
San Diego, CA 92126 Email: kanrad@kanrad.net
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HORTON PLAZA IMPROVEMENT PROJECT

SAN DIEGO, CALIFORNIA

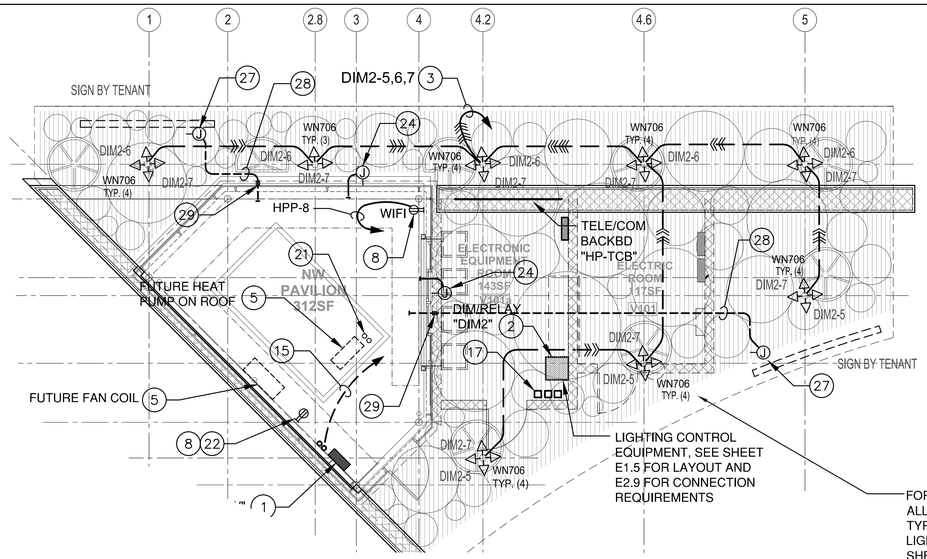
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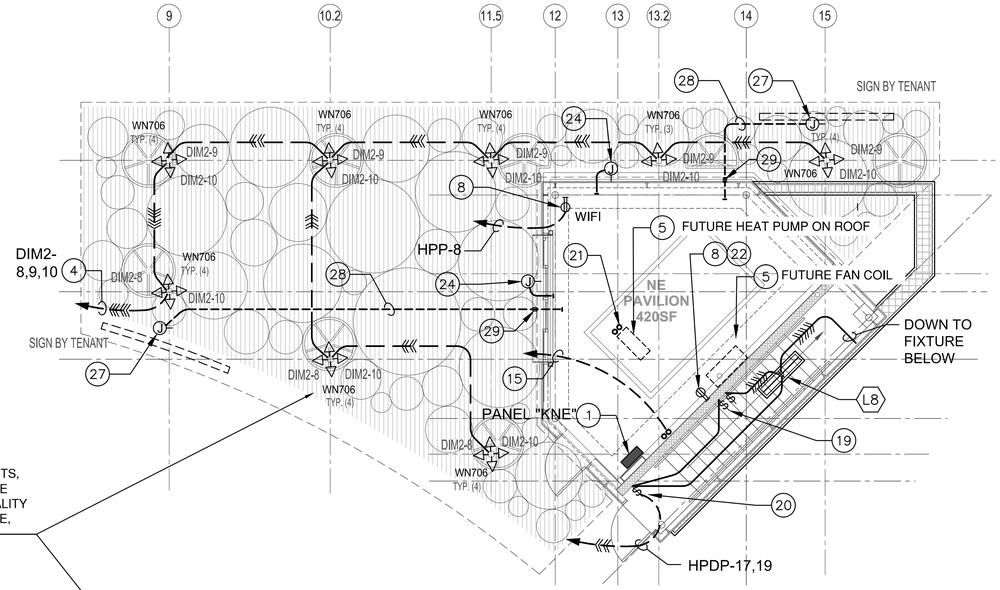
ELECTRICAL SITE POWER PLAN

E1.1



NORTH-WEST PAVILION ELECTRICAL PLAN

SCALE: 3/16" = 1'-0"

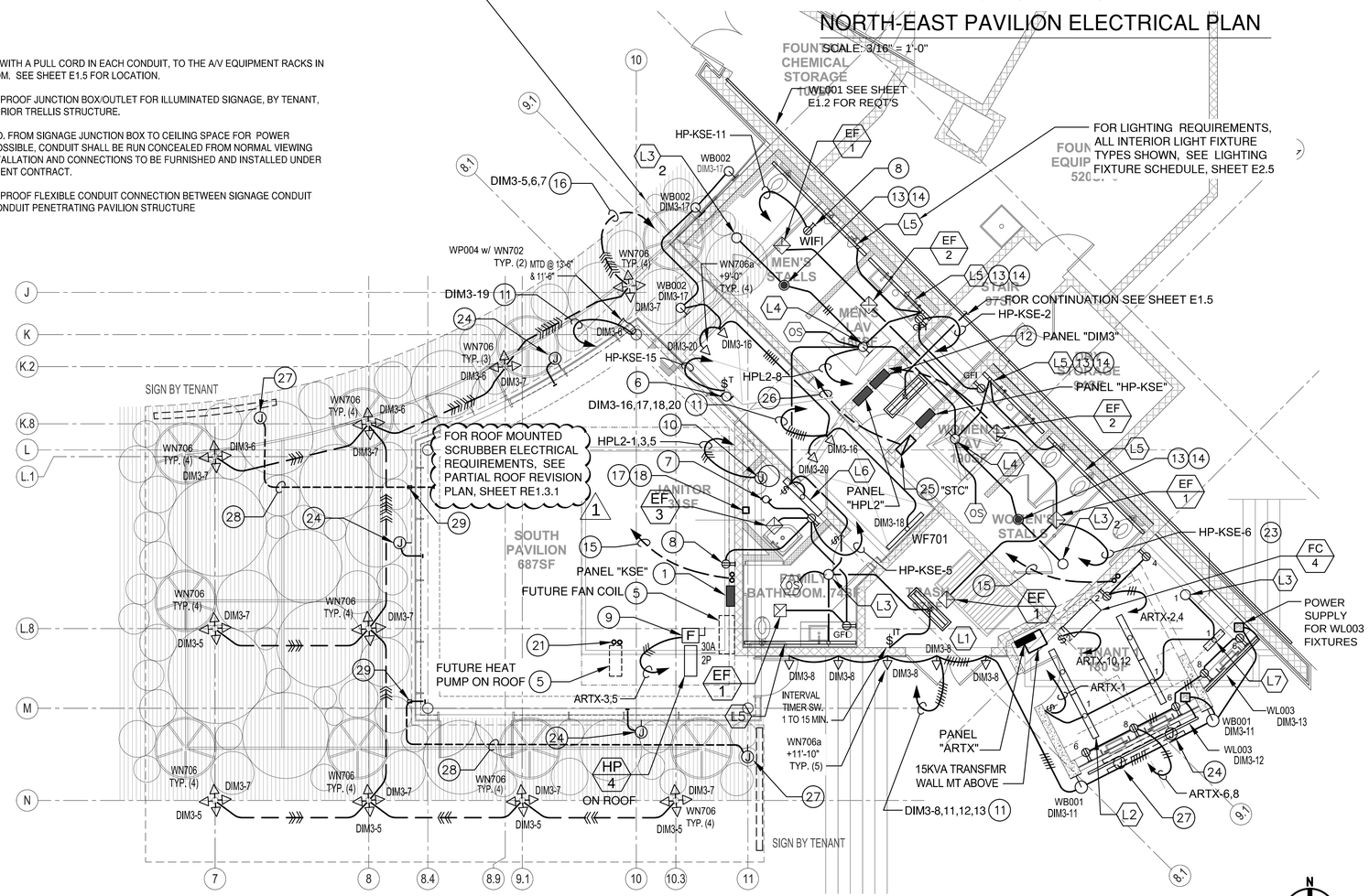


NORTH-EAST PAVILION ELECTRICAL PLAN

SCALE: 3/16" = 1'-0"

FOR LIGHTING REQUIREMENTS, ALL EXTERIOR LIGHT FIXTURE TYPES SHOWN, SEE SPECIALITY LIGHTING FIXTURE SCHEDULE, SHEETS E2.6, E2.7 & E2.8

FOR LIGHTING REQUIREMENTS, ALL INTERIOR LIGHT FIXTURE TYPES SHOWN, SEE LIGHTING FIXTURE SCHEDULE, SHEET E2.5



SOUTH PAVILION ELECTRICAL PLAN

SCALE: 3/16" = 1'-0"

NOTES:

1. PROPOSED LOCATION FOR TENNANT POWER PANEL.
2. HORTON PLAZA LIGHTING CONTROL DIMMER/RELAY RACK "DIM2" IN ELECTRONIC EQUIPMENT ROOM BELOW AT STORAGE VAULT LEVEL .
3. ROUTE HOMERUN, LOW VOLTAGE WIRE, TO TRANSFORMER/DRIVERS FOR NORTHWEST PAVILION, IN ELECTRONIC ROOM BELOW AT STORAGE VAULT LEVEL. SEE NOTE 17.
4. ROUTE HOMERUN, LOW VOLTAGE WIRE, TO TRANSFORMER/DRIVERS FOR NORTHEAST PAVILION, IN STORAGE VAULT LEVEL BELOW. SEE NORTH WEST STORAGE VAULT ELECTRICAL PLAN SHEET E1.4 NOTES 7,8,9 &10.
5. FUTURE HEAT PUMP AND FAN COIL UNIT SHALL BE FURNISHED AND INSTALLED UNDER TENANT IMPROVEMENT CONTRACT.
6. PROVIDE CONNECTION TO POWER OPERATED OVERHEAD GATE/DOOR, 1/8HP, 120V. 1ϕ.
7. PROVIDE CONNECTION TO CIRCULATION PUMP, 1/12HP, 120V. 1ϕ.
8. PROVIDE GROUND FAULT PROTECTED DUPLEX CONVENIENCE OUTLET IN WEATHERPROOF BOX AND COVER ON ROOF.
9. PROVIDE WEATHERPROOF OCPD/DISCONNECT SWITCH AND CONNECTION TO ROOF MOUNTED HVAC UNIT.
10. PROVIDE CONNECTION TO ELECTRIC HOT WATER HEATER, 6KW, 480V. 3ϕ.
11. ROUTE HOMERUN THROUGH LIGHTING CONTROL PANEL, SEE NOTE 12
12. SOUTHEAST PAVILION LIGHTING CONTROL PANEL, DIMMER RACK "DIM3"
13. LIGHT FIXTURES INDICATED SHALL HAVE AN INTEGRAL, SELF-CONTAINED EMERGENCY BATTERY/INVERTER FOR 90 MIN. RUN TIME.
14. EMERGENCY LIGHT SHALL BE CONNECTED ON CONSTANT "HOT" CIRCUIT.
15. PROVIDE (2) 1½"C.O. WITH A PULL CORD IN EACH CONDUIT, TO THE TELEPHONE BACKBOARD "HP-TCB" IN ELECTRONIS ROOM. SEE SHEET E1.5 FOR LOCATION.
16. ROUTE HOMERUN, LOW VOLTAGE WIRE, TO TRANSFORMER/DRIVERS IN SOUTH EAST PAVILION, SEE NOTE 17.
17. PROVIDE (3) 300VA, 277V, TO 12V TRANSFORMER/DRIVERS (LUMIERE #TC300) FOR LED LIGHTS TYPE "WN706" LOCATED ON PAVILION TRELLIS STRUCTURES..
18. CONTROL DESIGNATIONS, DIM3-5, DIM3-6 AND DIM3-7.
19. INTERCEPT EXISTING "PHASE V" INTERIM LIGHTING AND POWER CIRCUITS AT 2-POLE "MAIN" DISCONNECT SWITCH IN STAIRWELL AND EXTEND TO NEW LIGHT SWITCH AND HOMERUN.
20. NEW LOCATION OF SWITCHES REMOVED AND RELOCATED OR REPLACED.
21. PROVIDE (1) 1" C.O. (PWR) AND (1) 1/2" C.O. (CONTROL) STUBBED FROM ROOF TO CEILING SPACE BELOW FOR HVAC POWER AND CONTROL WIRING. WIRE INSTALLATION AND CONNECTIONS TO BE FURNISHED AND INSTALLED UNDER TENANT IMPROVEMENT CONTRACT. COORDINATE EXACT LOCATION WITH ARCHITECT, STRUCTURAL AND MECHANICAL ENGINEER.
22. PROVIDE (1) 1/2" C.O. STUBBED FROM ROOF TO CEILING SPACE BELOW FOR POWER WIRING TO ROOF RECEPTACLE. WIRE INSTALLATION AND CONNECTIONS TO BE FURNISHED AND INSTALLED UNDER TENANT IMPROVEMENT CONTRACT.
23. EXHAUST FAN CIRCUITS SHALL BE ROUTED THROUGH A TIME CLOCK FURNISHED UNDER THE MECHANICAL SECTION. SEE DIAGRAMS 1, 3, & 4 ON SHEET M6.1
24. PROVIDE WEATHERPROOF JUNCTION BOX/OUTLET FOR ILLUMINATED SIGNAGE, BY TENANT, MOUNTED ON EXTERIOR WALL. PROVIDE (1) 1/2" CONDUIT STUBBED INTO ACCESSIBLE CEILING FOR FUTURE EXTENSION TO TENANT PANEL(S).
25. PROVIDE SOUND-DATA-TELECOM SYSTEMS TERMINAL CABINET "STC", 24"x36"x6" D WITH PLYWOOD BACKBOARD FLUSH MOUNTED IN WALL AT +60" TO TOP OF CAB.
26. PROVIDE (2) 2"C.O. WITH A PULL CORD IN EACH CONDUIT, TO THE A/V EQUIPMENT RACKS IN ELECTRONICS ROOM. SEE SHEET E1.5 FOR LOCATION.
27. PROVIDE WEATHERPROOF JUNCTION BOX/OUTLET FOR ILLUMINATED SIGNAGE, BY TENANT, MOUNTED ON EXTERIOR TRELLIS STRUCTURE.
28. PROVIDE (1) 1/2" C.O. FROM SIGNAGE JUNCTION BOX TO CEILING SPACE FOR POWER WIRING. WHERE POSSIBLE, CONDUIT SHALL BE RUN CONCEALED FROM NORMAL VIEWING ANGLES. WIRE INSTALLATION AND CONNECTIONS TO BE FURNISHED AND INSTALLED UNDER TENANT IMPROVEMENT CONTRACT.
29. PROVIDE WEATHERPROOF FLEXIBLE CONDUIT CONNECTION BETWEEN SIGNAGE CONDUIT ON TRELLIS AND CONDUIT PENETRATING PAVILION STRUCTURE

Civic San Diego
401 B STREET, SUITE 400
SAN DIEGO, CA 92101

City of San Diego
Park & Recreation Department

Park and Recreation Department Director: _____
Date: _____
Contractor: _____
Date Completed: _____
Date Started: _____
As-Builts By: _____
As-Builts Approved By: _____

WALKER MACY

KANRAD Engineering, Inc.
CONSULTING ELECTRICAL ENGINEERS
9466 Black Mountain Road, Suite 250
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HORTON PLAZA IMPROVEMENT PROJECT

SAN DIEGO, CALIFORNIA

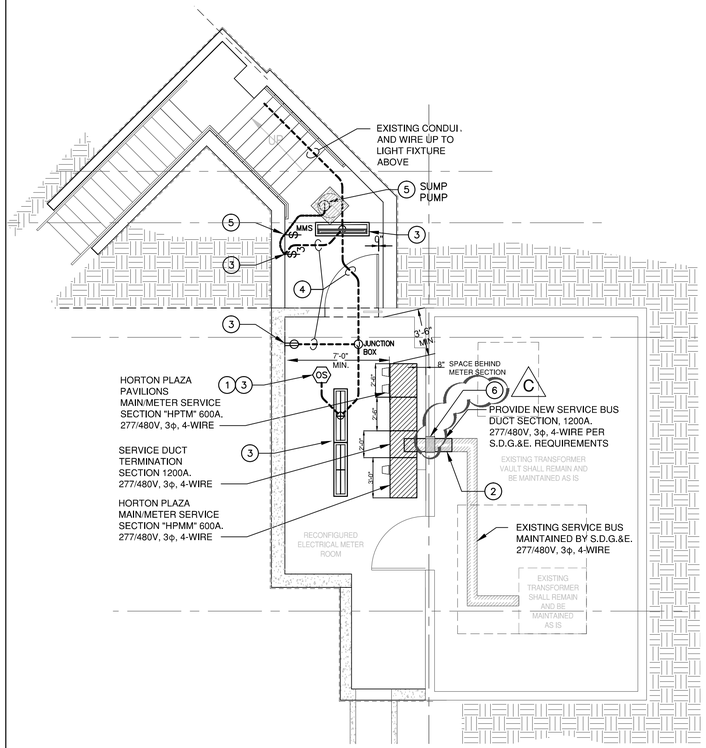
REGISTERED PROFESSIONAL ENGINEER — MARK WAY FAN — No. 18613 — ELECTRICAL — STATE OF CALIFORNIA

PROJECT NUMBER: WM-1103
DRAWN BY: TEL REVIEWED BY: KWK
PHASE: 100% CONSTRUCTION DOCUMENTS PERMIT REVIEW SET
ISSUE DATE: 09/27/2013
REVISIONS:
1 ADDENDUM C, 4/28/14

PTS#288741 37342-D

ELECTRICAL PAVILION PLANS

E1.3



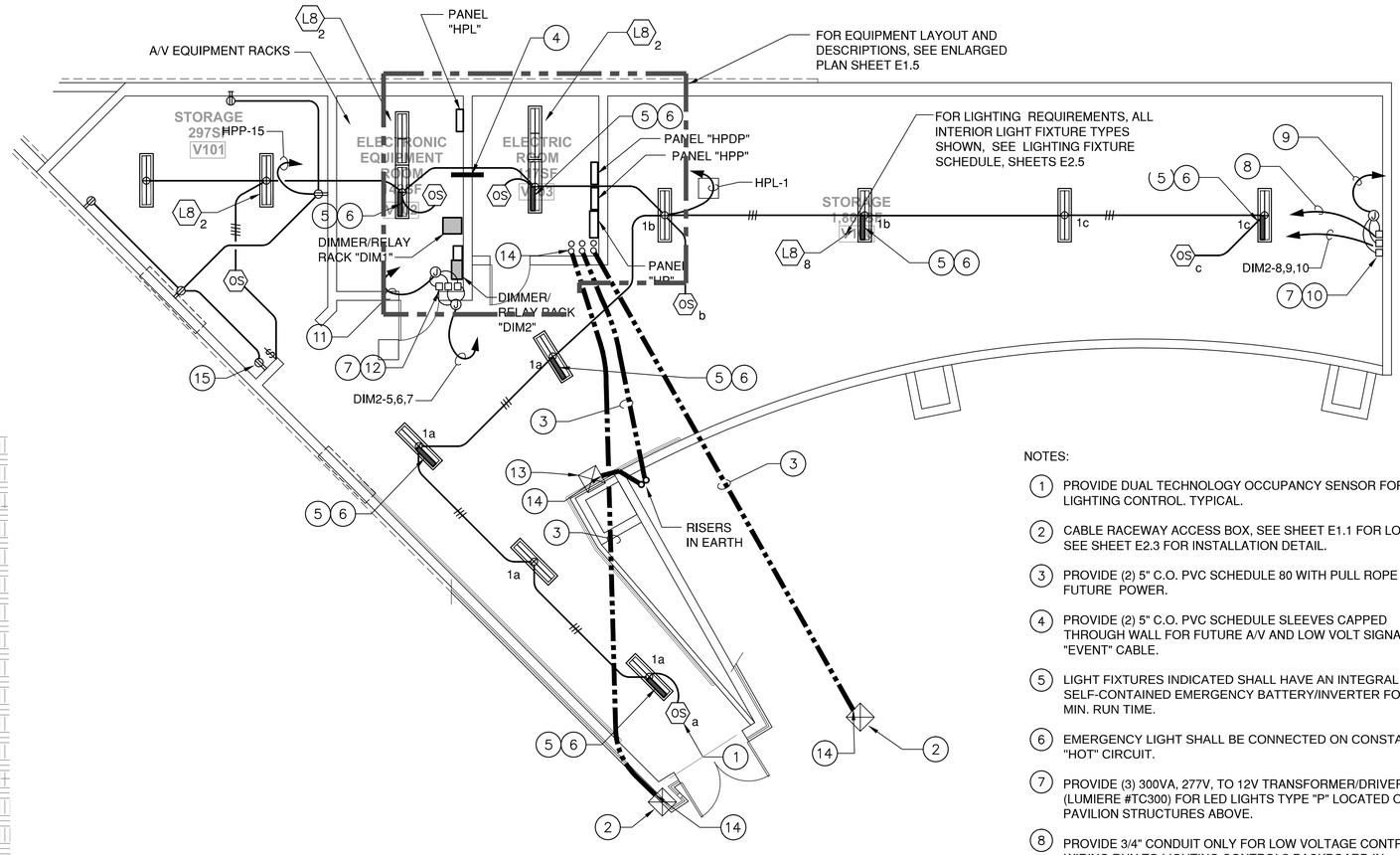
ELECTRICAL METER ROOM PLAN

SCALE: 1/4" = 1'-0"

NOTES:

1. PROVIDE DUAL TECHNOLOGY OCCUPANCY SENSOR FOR LOCAL LIGHTING CONTROL.
2. ELECTRICAL POWER SERVICE BUS DUCT, PROVIDE NEW 1200A. 277/480V, 3φ, 4-WIRE DUCT STUBBED INTO ELECTRICAL TRANSFORMER VAULT AND RECONNECTED BY S.D.G.&E. PROVIDE TERMINATION SECTION AND EXTEND AT 1200A. BUS TO NEW METER SECTIONS. SEE SINGLE LINE DIAGRAM SHEET E2.1
3. FIXTURES, DEVICES, AND EQUIPMENT INDICATED ARE FURNISHED UNDER PHASE V, INTERIM WORK, AND SHALL BE MAINTAINED DURING CONSTRUCTION PHASE OF CONTRACT.
4. ALL CONDUIT, WITH CONDUCTORS, INDICATED ARE FURNISHED UNDER PHASE V, INTERIM WORK, AND SHALL BE MAINTAINED DURING ALL CONSTRUCTION PHASES.
5. DEVICES AND EQUIPMENT INDICATED WERE FURNISHED UNDER PHASE V, INTERIM WORK, AND SHALL BE DISCONNECTED AND REMOVED UNDER CONTRACT WHEN AREA IS SECURED WATER TIGHT.
6. PROVIDE FIRE RATED PENETRATION THROUGH WALL FOR SERVICE BUS DUCT. USE ONLY UNDERWRITERS LABORATORIES CLASSIFIED FIRE RATED CAULK AND FIRE BARRIER MATERIAL FOR PENETRATION SEALANTS IN COMPLIANCE WITH N.E.C. 300-21.

1



NORTH-WEST VAULT ELECTRICAL PLAN

SCALE:3/16" = 1'-0"

PROJECT NORTH

NOTES:

1. PROVIDE DUAL TECHNOLOGY OCCUPANCY SENSOR FOR LOCAL LIGHTING CONTROL. TYPICAL.
2. CABLE RACEWAY ACCESS BOX, SEE SHEET E1.1 FOR LOCATION, SEE SHEET E2.3 FOR INSTALLATION DETAIL.
3. PROVIDE (2) 5" C.O. PVC SCHEDULE 80 WITH PULL ROPE FOR FUTURE POWER.
4. PROVIDE (2) 5" C.O. PVC SCHEDULE SLEEVES CAPPED THROUGH WALL FOR FUTURE A/V AND LOW VOLT SIGNAL "EVENT" CABLE.
5. LIGHT FIXTURES INDICATED SHALL HAVE AN INTEGRAL, SELF-CONTAINED EMERGENCY BATTERY/INVERTER FOR 90 MIN. RUN TIME.
6. EMERGENCY LIGHT SHALL BE CONNECTED ON CONSTANT "HOT" CIRCUIT.
7. PROVIDE (3) 300VA, 277V, TO 12V TRANSFORMER/DRIVERS (LUMIERE #TC300) FOR LED LIGHTS TYPE "P" LOCATED ON PAVILION STRUCTURES ABOVE.
8. PROVIDE 3/4" CONDUIT ONLY FOR LOW VOLTAGE CONTROL WIRING RUN TO LIGHTING CONTROLS BACKBOARD IN ELECTRONIC EQUIPMENT ROOM V-101a.
9. 1" C. WITH (6) #10 LOW VOLTAGE WIRE UP TO LIGHTS ON NORTHEAST PAVILION TRELLIS STRUCTURE. SEE SHEET E1.3 FOR CONTINUATION.
10. CONTROL DESIGNATIONS, DIM2-8 DIM2-9, DIM2-10.
11. 1" C. WITH (6) #10 LOW VOLTAGE WIRE UP TO LIGHTS ON NORTHWEST PAVILION TRELLIS STRUCTURE. SEE SHEET E1.3 FOR CONTINUATION.
12. CONTROL DESIGNATIONS, DIM2-5 DIM2-6, DIM2-7.
13. CABLE RACEWAY ACCESS BOX OVER STRUCTURE, 18"x30"x24" DEEP (NOMINAL) SEE SHEET E1.1 FOR LOCATION, SEE LANDSCAPE PLAN SHEET L8.1 DETAIL 4 FOR REQUIREMENTS AND INSTALLATION DETAIL..
14. PROVIDE REMOVABLE WATER-TIGHT CAPS ON 5" CONDUIT RUNS AT ELECTRICAL ROOM AND AT ACCESS BOXES.
15. CONVENIENCE OUTLET, 20 AMP, 120 VOLT, 1 φ, 3-WIRE, TYPICAL OF 5.

1

NOT REQUIRED, WORK COMPLETED UNDER PHASE V

ELECTRICAL SERVICE DEMOLITION PLAN

SCALE: 3/16" = 1'-0"

0 5 10 20 40

N

Civic San Diego
401 B STREET, SUITE 400
SAN DIEGO, CA 92101

City of San Diego
Park & Recreation Department

Park and Recreation Department Director: _____
Date: _____

Contractor: _____
Date Completed: _____
Date Started: _____
As-Builts By: _____
As-Builts Approved By: _____

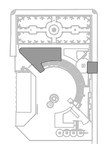
WALKER MACY

KANRAD Engineering, Inc.
CONSULTING ELECTRICAL ENGINEERS
9466 Black Mountain Road, Suite 250
San Diego, CA 92126 Email: kanrad@kanrad.net
Phone (858)547-1100 Website: www.kanrad.net
Fax (858)547-1104 FTP: ftp.kanrad.net

HORTON PLAZA IMPROVEMENT PROJECT

SAN DIEGO, CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER — No. 18424 — ELECTRICAL — STATE OF CALIFORNIA



PROJECT NUMBER: WM-1103
DRAWN BY: TEL REVIEWED BY: KWK
PHASE: 100% CONSTRUCTION DOCUMENTS PERMIT REVIEW SET
ISSUE DATE: 09/27/2013
REVISIONS:
1 ADDENDUM C, 4/28/14

PTS#288741 37342-D

ELECTRICAL ROOM PLANS AND ELEVATION

E1.4

CERTIFICATE OF COMPLIANCE (Page 1 of 4) LTG-1C

Project Name: Horton Plaza | Date: 11/01/12

Project Address: Broadway at 4th Street | Climate Zone: | Building CFA : | Unconditioned Floor Area : 4691

General Information

Building Type:	☒ Nonresidential	☐ High-Rise Residential	☐ Hotel/Motel
☐ Schools	☐ Relocatable Public Schools	☐ Conditioned Spaces	☒ Unconditioned Spaces
Phase of Construction:	☒ New Construction	☐ Addition	☐ Alteration
Method of Compliance:	☐ Complete Building	☒ Area Category	☐ Tailored

Documentation Author's Declaration Statement

- I certify that this Certificate of Compliance documentation is accurate and complete.

Name: KWOK WAI KAN | Signature: KW Kan

Company: KANRAD ENGINEERING, INC. | Date : 11/01/2012

Address: 9466 BLACK MOUNTAIN ROAD SUITE 250 | If applicable: CEA # CEPE #

City/State/Zip: SAN DIEGO, CA 92126 | Phone: (858) 547-1100

Principal Lighting Designer's Declaration Statement

- I am eligible under Division 3 of the California Business and Professions Code to accept responsibility for the lighting design.
- This Certificate of Compliance identifies the lighting features and performance specifications required for compliance with Title 24, Pages 1 and 6 of the California Code of Regulations.
- The design features represented on this Certificate of Compliance are consistent with the information provided to document this design on the other applicable compliance forms, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with this building permit application.

Name: Kwok Wai Kan | Signature: KW Kan

Company: KANRAD Engineering, Inc. | Phone: 855 547 1100

Address: 9466 Black Mountain Road, Suite 250 | License #: 9304

City/State/Zip: San Diego CA 92126 | Date: 11/01/2012

Lighting Mandatory Measures
Indicate location on building plans of Mandatory Measures Note Block: E2.5

LIGHTING COMPLIANCE FORMS & WORKSHEETS (check box if worksheet is included)

For detailed instructions on the use of this and all Energy Efficiency Standards compliance forms, please refer to the Nonresidential Manual published by the California Energy Commission.

☒	LTG-1C Pages 1 through 4	Certificate of Compliance. All Pages required on plans for all submittals.
☐	LTG-2C	Lighting Controls Credit Worksheet
☒	LTG-3C	Indoor Lighting Power Allowance
☐	LTG-4C Pages 1 through 4	Tailored Method Worksheet
☐	LTG-5C Pages 1 and 2	Line Voltage Track Lighting Worksheet

CERTIFICATE OF COMPLIANCE (Page 2 of 4) LTG-1C

INDOOR LIGHTING SCHEDULE and FIELD INSPECTION ENERGY CHECKLIST

Project Name: Horton Plaza | Date: 11/01/2012

Installation Certificate, LTG-1-INST (Retain a copy and verify form is completed and signed.) ☐ **Field Inspector**

Certificates of Acceptance, LTG-2A and LTG-3A (Retain a copy and verify form is completed and signed.) ☐ **Field Inspector**

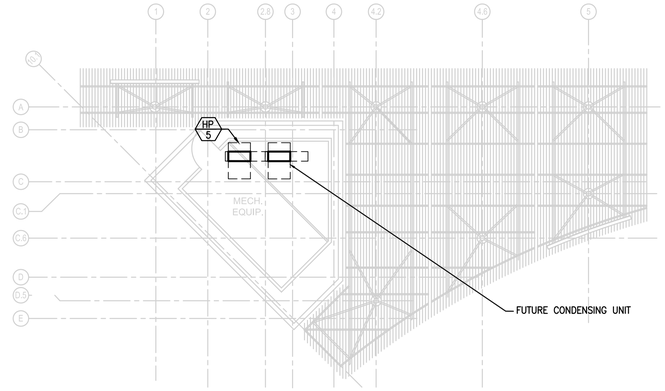
A separate Lighting Schedule Must Be Filled Out for Conditioned and Unconditioned Spaces Installed Lighting Power listed on this Lighting Schedule is only for: ☐ **CONDITIONED SPACE** ☒ **UNCONDITIONED SPACE**

☒ *The actual indoor lighting power listed below includes all installed permanent and portable lighting systems in accordance with §146(a)*

☐ *Only for offices: Up to the first 0.2 watts per square foot of portable lighting shall not be required to be included in the calculation of actual indoor lighting power density in accordance with the Exception to §146(a). All portable lighting in excess of 0.2 watts per square foot is totaled below.*

Luminaire Schedule (Type, Lamps, Ballasts)

A	B	C	D	E		F	G	H
Name or Item Tag	Complete Luminaire Description (i.e, 3 lamp fluorescent troffer, F32T8, one dimmable electronic ballast)		Watts per Luminaire [1]	How wattage was determined: CEC Default from NA8	How wattage was determined: According to §130 (d or e)	Number of Luminaires	Installed Watts (D x F)	Field Inspector [2]: Pass / Fail
L1	1' x 4' 2-Lamp, F32T8 fluorescent, electronic ballast wet locat[3]		63	☒	☐	8	504	☐ ☐
L2	8' 4-Lamp F32T fluorescent electronic ballast suspended		126	☒	☐	2	252	☐ ☐
L3	4" dia. downlight 1-18W compact fluorescent		23	☒	☐	6	138	☐ ☐
L4	1-9W compact fluorescent wall bracket light		12	☒	☐	2	24	☐ ☐
L5	4' long cove light with 1-F32T8 fluorescent, electronic ballast		32	☒	☐	11	352	☐ ☐
L6	4' long wall mnt w/ 1-F32T8 fluores, electronic ballast		32	☒	☐	1	32	☐ ☐
L7	2' 1-Lamp F31T U-lamp fluorescent electronic ballast suspended		34	☒	☐	1	34	☐ ☐
L8	1' x 4' 2-Lamp, F32T8 fluorescent, electronic ballast		63	☒	☐	17	1071	☐ ☐
				☐	☐			☐ ☐
				☐	☐			☐ ☐
				☐	☐	

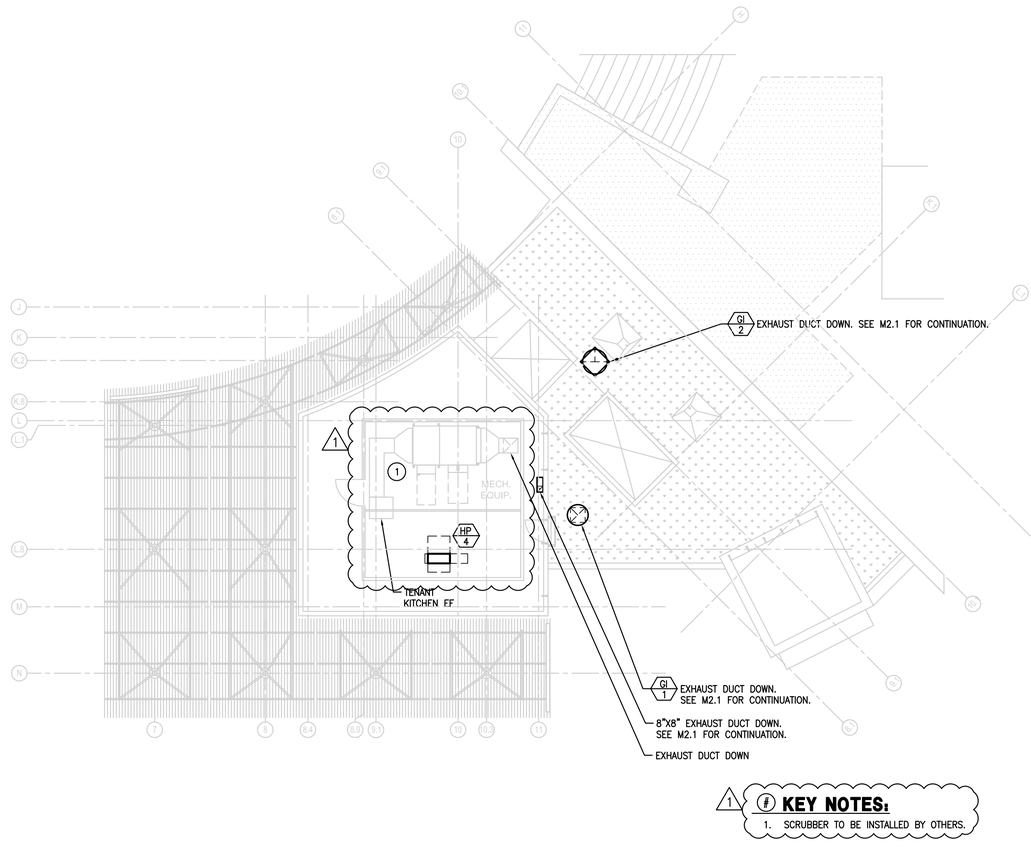


MECHANICAL - NORTHWEST PAVILION ROOF PLAN

SCALE : 1/8" = 1'-0"

0 2 4 8 16

1 / M2.2



MECHANICAL - SOUTH PAVILION ROOF PLAN

SCALE : 1/8" = 1'-0"

0 2 4 8 16

2 / M2.2

PROJECT NORTH

Civic San Diego
401 B STREET, SUITE 400
SAN DIEGO, CA 92101

City of San Diego
Park & Recreation Department

Deputy Director, Community Parks I Division: _____

Date: _____

Date Completed: _____

Date Started: _____

As-Builts By: _____

As-Builts Approved By: _____

WALKER | MACY

MA ENGINEERS

5160 Carroll Canyon Rd, Suite 200
San Diego, California 92121
Consulting Mechanical Engineers
T:858 200-0030
F:858 200-0037
www.ma-engr.com

HORTON PLAZA IMPROVEMENT PROJECT

SAN DIEGO, CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER
VINCENT IVERS
No. M 35029
EXP. 6-30-14
MECHANICAL
STATE OF CALIFORNIA

5483

PROJECT NUMBER: WM-1103

DRAWN BY: TF | REVIEWED BY: VV

PHASE:
100% CONSTRUCTION DOCUMENTS
PERMIT REVIEW SET

ISSUE DATE:
09/27/2013

REVISIONS:

1 ADDENDUM C, 4/28/14

PTS#288741 37342-D

MECHANICAL ROOF PLANS

M2.2

PLUMBING FIXTURE SCHEDULE

SYMBOL	FIXTURE	ROUGH-IN HW	CW	W	TRAP	V	REMARKS
WC 1	WATER CLOSET	--	1"	4"	INT.	2"	FLOOR MOUNT, 1.28 GPF
WC 2	WATER CLOSET	--	1"	4"	INT.	2"	FLOOR MOUNT, 1.28 GPF, ACCESSIBLE
UR 1	URINAL	--	3/4"	2"	INT.	1 1/2"	WALL MOUNT, 0.125 GPF, ACCESSIBLE
L 1	LAVATORY	--	1/2"	2"	2"	1 1/2"	COUNTERTOP, 0.5 GPM, ACCESSIBLE
SS 1	SERVICE SINK	1/2"	1/2"	3"	2"	2"	FLOOR MOUNTED, CORNER INSTALLATION, FAUCET WITH VACUUM BREAKER
FD 1	FLOOR DRAIN	--	--	2"	2"	1 1/2"	W/TRAP PRIMER
SH 1	SHOWER (ADDITIVE ALTERNATE) 1	1/2"	1/2"	--	--	--	PUSH BUTTON METERING SHOWER VALVE, 1.50 GPM SHOWER HEAD, FOR MOUNTING HEIGHT SEE ARCHITECTURAL DRAWINGS
HB 1	HOSE BIBB	--	3/4"	--	--	--	WITH VACUUM BREAKER
HB 2	HOSE BIBB	--	3/4"	--	--	--	WALL BOX WITH LOCKING COVER AND VACUUM BREAKER.
TP 1	TRAP PRIMER	--	1/2"	--	--	--	5 PSI PRESSURE DROP. PROVIDE WITH ACCESS PANEL
TD 1	TRENCH DRAIN (CONNECT TO STORM DRAIN SYSTEM)	--	--	4	--	--	MODULAR SECTIONS, PROVIDE RADIONS SECTIONS AS NECESSARY, MEDIUM DUCTY TRAFFIC RATING.
AD 1	AREA DRAIN (STORM DRAIN)	--	--	4	--	--	CAST IRON BODY, SEDIMENT BUCKET, LOCKING HEEL PROOF GRATE
DD 1	DECK DRAIN (STORM DRAIN)	--	--	3	--	--	CAST IRON BODY, SEDIMENT BUCKET, LOCKING HEEL PROOF GRATE

PLUMBING EQUIPMENT SCHEDULE

SYMBOL	TYPE	DESCRIPTION	LOCATION
CP 1	CIRCULATION PUMP (ADDITIVE ALTERNATE) 1	ALL BRUZE PUMP, 3 GPM @6 FT. HEAD, 0.12 HP, 120V	SOUTH KIOSK
EWH 1	DOMESTIC HOT WATER HEATER	ELECTRIC, DOMESTIC HOT WATER HEATER, 30 GALLON, TANK TYPE, 31 GPH RECOVERY @ 80° F RISE, 6kW, 480V, 3 PH., 400 LBS. OPERATING WEIGHT	SOUTH KIOSK
ET 1	EXPANSION TANK (ADDITIVE ALTERNATE) 1	POTABLE WATER RATED, REPLACEABLE BLADDER TYPE, 4 GALLON	SOUTH KIOSK
GI 1	GREASE INTERCEPTOR	52 GALLON, HYDROMECHANICAL TYPE, 50 GPM FLOW RATE. PROVIDE W/SAMPLE BOX	NW, NE KIOSK
GI 2	GREASE INTERCEPTOR	250 GALLON, HYDROMECHANICAL TYPE, 100 GPM FLOW RATE. PROVIDE WITH SAMPLE BOX	SOUTH KIOSK
SP 1	SUMP PUMP	20 GPM @ 30 FOOT HEAD, 3 FT DIAMETER BY 4 FT DEEP FIBERGLASS SUMP, 1 HP, 120V – SINGLE PHASE	NE KIOSK

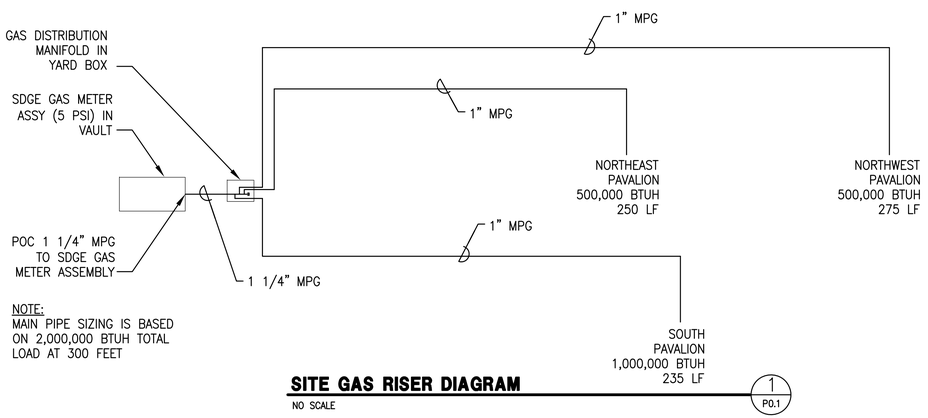
PLUMBING LEGEND AND ABBREVIATIONS

SYMBOL	ABBREV.	DESCRIPTION	SYMBOL	ABBREV.	DESCRIPTION
	POC	POINT OF CONNECTION		ABV	ABOVE
		WASTE OR SEWER BELOW SLAB		A/C	ABOVE CEILING
PW	PW	PUMPED SANITARY WASTE		A.F.F.	ABOVE FINISH FLOOR
		WASTE OR SEWER ABOVE SLAB		A.F.G.	ABOVE FINISH GRADE
V	V	SANITARY VENT		A/G	ABOVE GRADE
CW	CW	COLD WATER		A.P.	ACCESS PANEL
HW	HW	HOT WATER		B/F	BELOW FLOOR
HWR	HWR	HOT WATER RETURN		B/G	BELOW GRADE
G	G	LOW PRESSURE NATURAL GAS		CFH	CUBIC FEET PER HOUR
MPG	MPG	MEDIUM PRESSURE NATURAL GAS		DWGS.	DRAWINGS
FD	FD	FOUNDATION DRAIN		EA.	EACH
PD	PD	PUMPED FOUNDATION DRAIN		EXIST.	EXISTING
SD	SD	STORM DRAIN		(E)	EXISTING
	SOV	SHUT OFF VALVE		FT.	FEET OR FOOT
	PRV	PRESSURE REDUCING VALVE		FDC	FIRE DEPARTMENT CONNECTION
	FS	FLOOR SINK		F	FIRE RISER
	FD	FLOOR DRAIN		FLR.	FLOOR
	FCO	FLOOR CLEAN-OUT		G.P.F.	GALLONS PER FLUSH
	WCO	WALL CLEAN-OUT		G.P.H.	GALLONS PER HOUR
	GCO	GRADE CLEAN-OUT		G.P.M.	GALLONS PER MINUTE
	DN	DOWN OR DROP		GW	GREASE WASTE
	UP	RISE OR RISER		I.E.	INVERT ELEVATION
	HB	HOSE BIBB		KG	KILOGRAMS
		VALVE ON RISE OR DROP		kPq	KILOPASCALS
	U	UNION		L.P.F.	LITERS PER FLUSH
	RV	TEMPERATURE & PRESSURE RELIEF VALVE		L/S	LITERS PER SECOND
				MSA	MEDIUM PRESSURE GAS METER
F	F	FIRE SPRINKLER PIPING		mm	MILLIMETER
CD	CD	CONDENSATE DRAIN PIPING		NTS	NOT TO SCALE
	FDC	FIRE DEPARTMENT CONNECTION		ORD	OVERFLOW ROOF DRAIN
	CP	CIRCULATING PUMP		LB	POUNDS
	CV	CHECK VALVE		PSI	POUNDS PER SQUARE INCH
	TP	TRAP PRIMER		RD	ROOF DRAIN
	WHA	WATER HAMMER ARRESTOR		S	SEWER
	REG	GAS REGULATOR W/SHUT-OFF VALVE		SA	SET ASSEMBLY
				SF	SQUARE FEET
				T.D.H.	TOTAL DEVELOPED HEAD
				V.T.R.	VENT THROUGH ROOF
				W.C.	WATER COLUMN
				WHA	WATER HAMMER ARRESTOR

CGC TABLE 5.303.2.3 FIXTURE FLOW RATES

FIXTURE TYPE	FLOW RATE	MAXIMUM FLOW RATE AT @ 20 PERCENT REDUCTION
SHOWERHEADS	2.5 GPM @ 80 PSI	2 GPM @ 80 PSI
LAVATORY FAUCETS, NONRESIDENTIAL	0.5 GPM @ 60 PSI	0.4 GPM @ 60 PSI
SINK FAUCETS	2.2 GPM @ 60 PSI	1.8 GPM @ 60 PSI
FLUSHOMETER VALVE WATER CLOSETS	1.6 GALLONS/FLUSH	1.28 GALLONS/FLUSH
URINALS	1.0 GALLONS/FLUSH	0.5 GALLONS/FLUSH

NOTES:
1. INCLUDES SINGLE FLUSH WATER CLOSETS WITH AN EFFECTIVE FLUSH OF 1.28 GALLONS. THE EFFECTIVE FLUSH VOLUME IS THE AVERAGE FLUSH VOLUME WHEN TESTED IN ACCORDANCE WITH ASME A112.19.233.2. FLUSH VOLUMES WILL BE TESTED IN ACCORDANCE WITH ASME A112.19.2 AND ASME A112.19.14.
2. PLUMBING FIXTURES (WATER CLOSETS AND URINALS) AND FITTINGS (FAUCETS AND SHOWERHEADS) SHALL MEET THE STANDARDS REFERENCED IN TABLE 5.503.6 OF DIVISION 5.3.



SITE GAS RISER DIAGRAM
NO SCALE

1 / P0.1

GENERAL NOTES

1. NO PLUMBING SHALL BE INSTALLED UNTIL ALL REQUIRED PLUMBING PLAN CHECK PERMITS AND APPROVALS HAVE BEEN OBTAINED FROM ALL REQUIRED AGENCIES.
2. LAVATORY FAUCETS, SINK FAUCETS (NOT INCLUDING SERVICE SINK FAUCETS OR FAUCETS DESIGNATED AS INSTITUTIONAL) SHALL MEET THE FLOW REQUIREMENTS OUTLINED IN THE APPLIANCE EFFICIENCY STANDARDS.
3. COORDINATE WITH THE ARCHITECTURAL DRAWINGS FOR EXACT LOCATION OF PLUMBING FIXTURES AND DRAINS.
4. HOSE BIBBS SHALL BE PROTECTED BY AN APPROVED NON-REMOVABLE TYPE BACKFLOW PROTECTION DEVICE. HOSE BIBBS SHALL BE MOUNTED AT +18" ABOVE FLOOR UNLESS OTHERWISE NOTED.
5. PROVIDE ALL TAILPIECES, TRAPS, STOPS, SUPPLY PIPES TO LAVATORIES DESIGNED AS ACCESSIBLE, WITH PRE FORMED INSULATION JACKET.
6. COORDINATE AND VERIFY SIZES, LOCATIONS, DEPTHS AND PRESSURIZED PIPING PRESSURES OF ALL BUILDING UTILITIES WITH CIVIL.
7. COORDINATE AND SCHEDULE TIMING FOR UTILITY SERVICE CONNECTION.
8. ALL LINES BELOW SLAB ON GRADE TO BE LOCATED AWAY FROM ALL LOAD BEARING FOOTINGS.
9. ALL LINES RUNNING BELOW GRADE BEAMS OR PENETRATING, SEE STRUCTURAL DRAWINGS FOR CONSTRUCTION.
10. ALL VENTS THRU ROOF SHALL BE MINIMUM OF 18 INCHES VERTICAL AND TEN FEET HORIZONTAL AWAY FROM ALL AIR CONDITIONING FRESH AIR INTAKES AND PROVIDED WITH VANDAL PROOF HOODS.
11. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CUTTING AND PATCHING OF WALLS, ROOFS, FOOTINGS, FLOORS, INCLUDING ALL SAW CUTTING AND CORE DRILLING. COORDINATE ALL SAW CUTTING AND CORE DRILLING WITH STRUCTURAL DRAWINGS. ANY CUTTING AND DRILLING REQUIRED OF STRUCTURAL ELEMENTS THAT IS NOT SPECIFICALLY SHOWN ON THE PLANS SHALL BE BROUGHT TO THE ARCHITECTS ATTENTION PRIOR TO CUTTING AND DRILLING. CONTRACTOR SHALL SUBMIT PROPOSED LOCATION AND SIZES OF SUCH CUTTING AND DRILLING FOR THE ARCHITECTS AND STRUCTURAL ENGINEERS APPROVAL.
12. COORDINATE ALL EQUIPMENT LOCATIONS, PIPE PENETRATIONS AND EQUIPMENT PAD LOCATIONS WITH STRUCTURAL DRAWINGS PRIOR TO WORK.
13. COORDINATE INSTALLATION OF ALL EQUIPMENT AND PIPING WITH OTHER TRADES PRIOR TO INSTALLATION. ENSURE THAT ALL CONTROL DEVICES, SHUT-OFF VALVES, ETC. ARE ACCESSIBLE FOR MAINTENANCE. WHERE ACCESS PANELS IN FINISHED SPACES, OTHER THAN THAT SHOWN, CONTRACTOR SHALL PROVIDE AND COORDINATE EXACT LOCATION OF PANELS WITH ARCHITECT PRIOR TO INSTALLATION.
14. INSTALL VALVES WITH UNIONS OR FLANGES AT EACH PIECE OF EQUIPMENT ARRANGED TO ALLOW SERVICE, MAINTENANCE, AND EQUIPMENT REMOVAL WITHOUT SYSTEM SHUT-DOWN.
15. ANY STRUCTURAL FIREPROOFING DAMAGED DURING INSTALLATION OF PLUMBING EQUIPMENT, PIPING, ETC. SHALL BE REPAIRED AT NO COST TO THE OWNER. REPAIRS SHALL BE AS DIRECTED BY THE ARCHITECT.
16. LAVATORY FAUCETS IN RESTROOMS SHALL BE THE SELF-CLOSING TYPE.
17. PROVIDE VACUUM BREAKERS AT HOSE BIBBS.
18. FAUCETS TO BE 2. 2 G.P.M. MAXIMUM.
19. URINALS TO BE 1 G.P.M. MAXIMUM.
20. TOILETS TO BE ULTRA LOW FLUSH TYPE.
21. WATER HEATER IS TO BE USED ON CALIFORNIA ENERGY COMMISSION (CEC) LIST.
22. PROVIDE EXPANSION TANK OR OTHER APPROVED METHOD OF RELIEVING PRESSURE (SECTION 608.3 UPC)
23. CROSS CONNECTION PROTECTION SHALL BE PROVIDED AT ALL POTABLE WATER SUPPLIED APPLIANCES AND EQUIPMENT (OTHER THAN THOSE LISTED IN INFORMATION BULLETIN 103).
24. COORDINATE WITH ELECTRICAL AND CONTROL CONTRACTORS FOR ALL POWER REQUIREMENTS PRIOR TO BID.
25. COORDINATE WITH ELECTRICAL AND CONTROL CONTRACTORS FOR ALL POWER REQUIREMENTS PRIOR TO ORDERING ANY EQUIPMENT.
26. UPON INSTALLATION OF ALL EQUIPMENT, DEVICES, VIBRATION ISOLATION, ETC., PROVIDE WRITTEN CONFIRMATION BY EQUIPMENT MANUFACTURER'S REPRESENTATIVES TO ENSURE COMPLIANCE WITH MANUFACTURER'S REQUIREMENTS.
27. PROVIDE DETAILS AND SEISMIC CALCULATIONS FOR ALL EQUIPMENT ON VIBRATION ISOLATION. ALL DETAILS SHALL BE STAMPED BY A STRUCTURAL ENGINEER FROM VIBRATION ISOLATION MANUFACTURER.
28. UPON INSTALLATION OF ALL EQUIPMENT, DEVICES, VIBRATION ISOLATION, ETC., PROVIDE WRITTEN CONFIRMATION BY EQUIPMENT MANUFACTURER'S REPRESENTATIVES TO ENSURE COMPLIANCE WITH MANUFACTURER'S REQUIREMENTS.
29. FOR EACH SUBMITTAL, THE CONTRACTOR SHALL PROVIDE A LETTER (ON COMPANY LETTERHEAD) AND SIGNED BY THE PROJECT MANAGER INDICATING THE SUBMITTAL HAS BEEN FULLY IN HOUSE REVIEWED TO ENSURE FULL COMPLIANCE WITH THE CONTRACT DOCUMENTS AND COORDINATION WITH OTHER TRADES. ANY EXCEPTIONS TO THE CONTRACT DOCUMENTS SHALL BE CLEARLY INDICATED ON THIS LETTER. ANY DISCREPANCIES/EXCEPTIONS NOT IDENTIFIED IN WRITING SHALL BE CORRECTED AT THE SOLE EXPENSE OF THE CONTRACTOR AND AT NO EXPENSE TO THE OWNER AND ENGINEER.
30. THE CONTRACTOR SHALL SELECT ALL CIRCUIT SETTERS/BALANCING VALVES FOR ACTUAL FLOW THROUGH THE PIPE AND THE PROPER PRESSURE DROP TO ENSURE PROPER OPERATION AND NOT BASED ON PIPE SIZES.

PLAN CHECK NOTES

1. A WATER HEATER PRESSURE AND TEMPERATURE RELIEF DRAIN THAT TERMINATES OUTSIDE OF THE BUILDING SHALL COMPLY WITH SECTION 608.5 CPC..
2. PROVIDE EXPANSION TANK OR OTHER APPROVED METHOD OF RELIEVING PRESSURE PER SECTION 608.3 CPC.
3. PLUMBING FIXTURES (WATER CLOSETS AND URINALS) AND FITTINGS (FAUCETS AND SHOWER HEADS) SHALL MEET THE STANDARDS REFERENCED IN TABLE 5.503.6. OF DIVISION 5.3.

Civic San Diego
401 B STREET, SUITE 400
SAN DIEGO, CA 92101

City of San Diego
Park & Recreation Department
Deputy Director, Community Parks I Division: _____
Date: _____
Date Completed: _____
Date Started: _____
As-Builts By: _____
As-Builts Approved By: _____

WALKER | MACY

MA ENGINEERS
5160 Carroll Canyon Rd, Suite 200
San Diego, California 92121
Consulting Mechanical Engineers
T:858 200-0030
F:858 200-0037
www.ma-engr.com

HORTON PLAZA IMPROVEMENT PROJECT

SAN DIEGO, CALIFORNIA

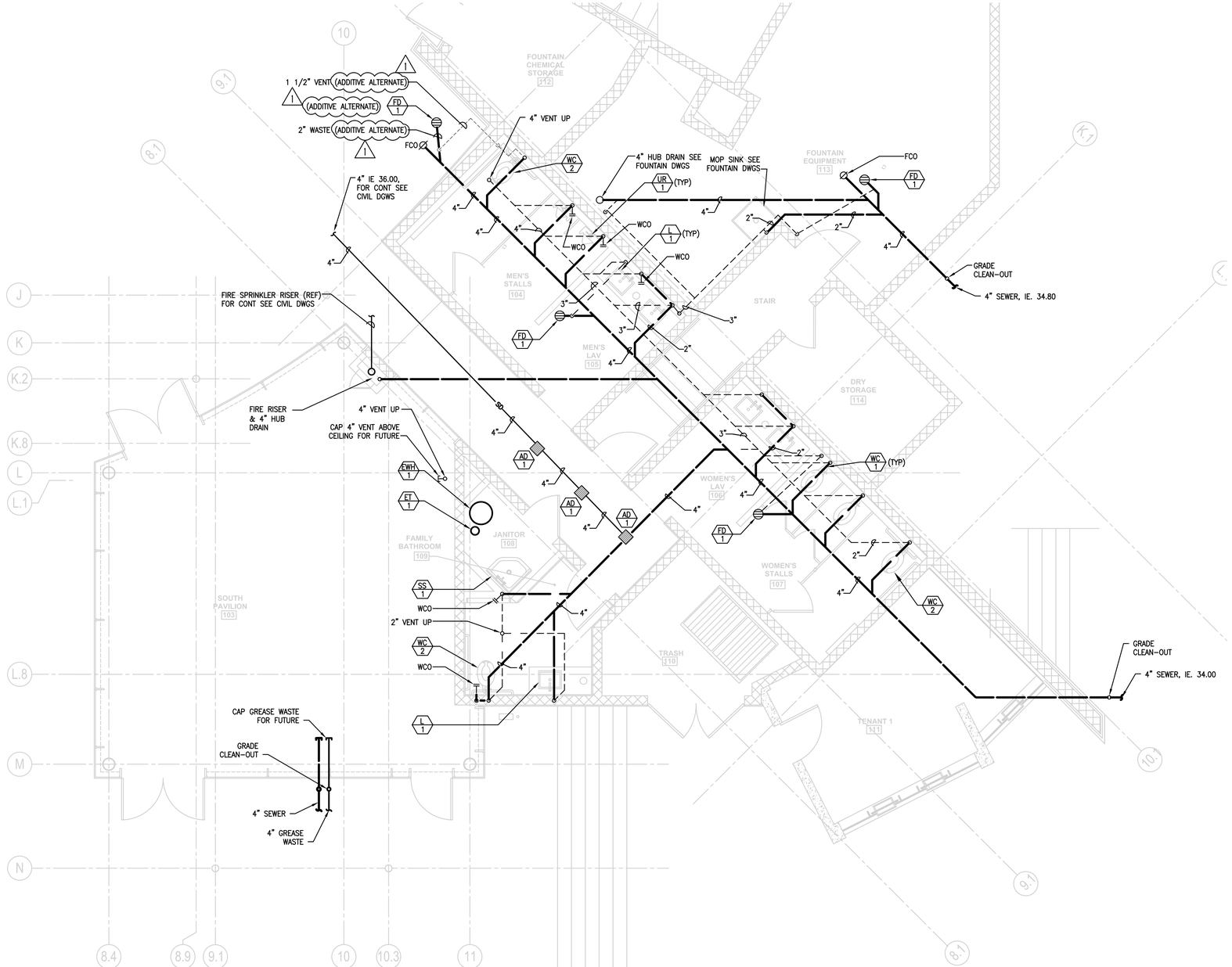
REGISTERED PROFESSIONAL ENGINEER
ROBERT HOLMES
No. M 35029
EXP. 6-30-14
MECHANICAL
STATE OF CALIFORNIA
5483

PROJECT NUMBER: WM-1103
DRAWN BY: TF | REVIEWED BY: RH
PHASE: 100% CONSTRUCTION DOCUMENTS PERMIT REVIEW SET
ISSUE DATE: 09/27/2013
REVISIONS:
1 ADDENDUM C, 4/28/14

PTS#288741 37342-D

PLUMBING LEGEND AND NOTES

P0.1



PLUMBING - SOUTH PAVILION FLOOR PLAN

SCALE : 1/4" = 1'-0"

0 2 4 8 16

1 / P2.2

PROJECT NORTH

Civic San Diego
401 B STREET, SUITE 400
SAN DIEGO, CA 92101

City of San Diego
Park & Recreation Department

Deputy Director, Community Parks I Division: _____

Date: _____

Date Completed: _____

Date Started: _____

As-Builts By: _____

As-Builts Approved By: _____

WALKER | MACY

MA ENGINEERS

5160 Carroll Canyon Rd, Suite 200
San Diego, California 92121
Consulting Mechanical Engineers
T:858 200-0030
F:858 200-0037
www.ma-engr.com

HORTON PLAZA IMPROVEMENT PROJECT

SAN DIEGO, CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER
RICHARD HOBBS
No. M 35029
EXP. 6-30-14
MECHANICAL
STATE OF CALIFORNIA

5483

PROJECT NUMBER: WM-1103

DRAWN BY: TF | REVIEWED BY: RH

PHASE: 100% CONSTRUCTION DOCUMENTS PERMIT REVIEW SET

ISSUE DATE: 09/27/2013

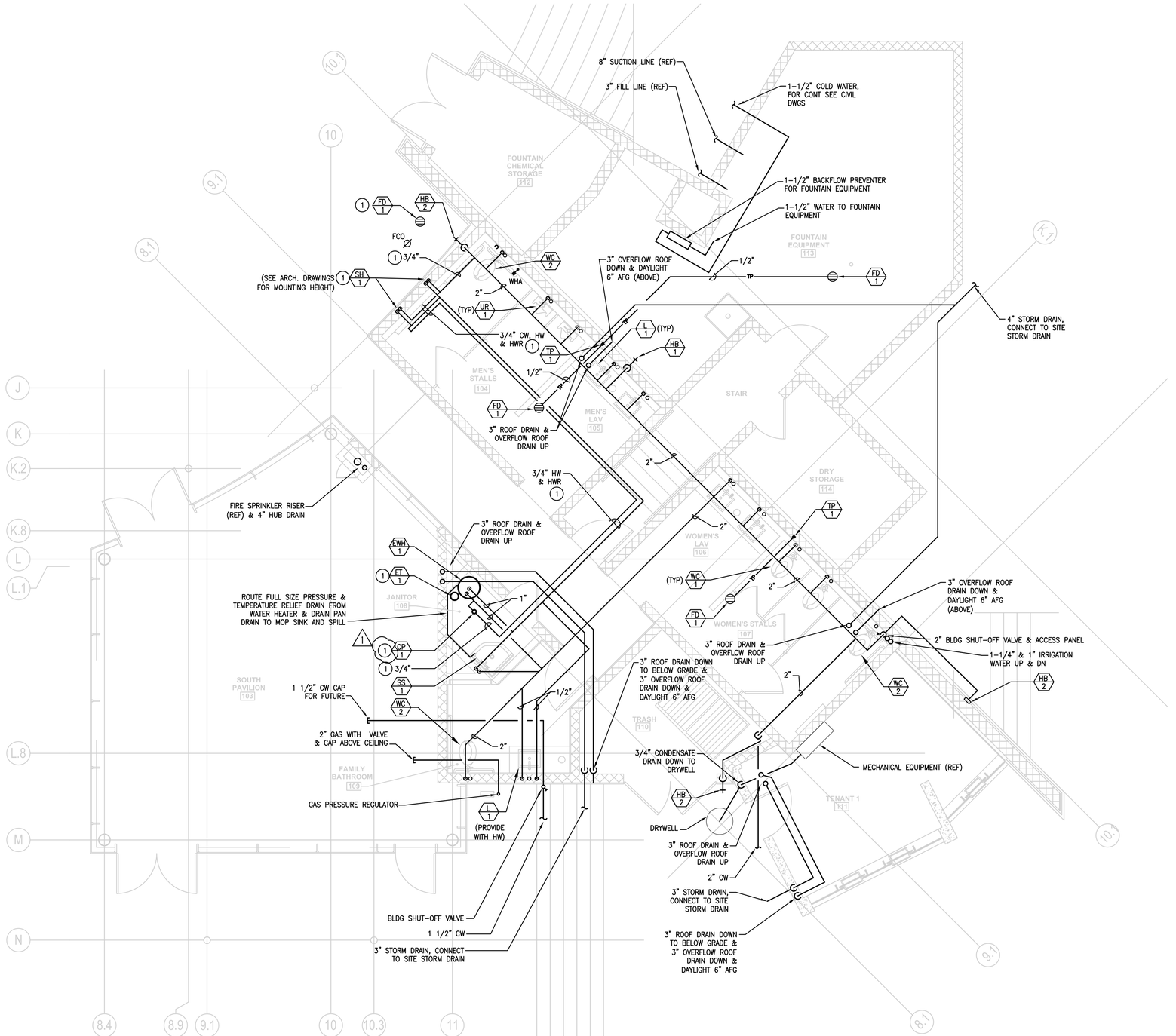
REVISIONS:

1 ADDENDUM C, 4/28/14

PTS#288741 37342-D

PLUMBING FLOOR PLANS

P2.2A



PLUMBING - SOUTH PAVILION FLOOR PLAN

SCALE : 1/4" = 1'-0"

0 2 4 8 16

KEY NOTES

1. ADDITIVE ALTERNATE.

PROJECT NORTH

Civic San Diego
401 B STREET, SUITE 400
SAN DIEGO, CA 92101

City of San Diego
Park & Recreation Department

Deputy Director, Community Parks I Division: _____
Date: _____
Date Completed: _____
Date Started: _____
As-Builts By: _____
As-Builts Approved By: _____

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HORTON PLAZA IMPROVEMENT PROJECT

SAN DIEGO, CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER
ROBERT HANS
No. M 35029
EXP. 6-30-14
MECHANICAL
STATE OF CALIFORNIA
5483

PROJECT NUMBER: WM-1103
DRAWN BY: TF
REVIEWED BY: RH
PHASE: 100% CONSTRUCTION DOCUMENTS PERMIT REVIEW SET
ISSUE DATE: 09/27/2013
REVISIONS:
1 ADDENDUM C, 4/28/14

PTS#288741 37342-D

PLUMBING FLOOR PLANS

P2.2B

City of San Diego, solely in its capacity as the designated Successor Agency to the Redevelopment Agency of the City of San Diego, a former public body, corporate and politic, herein referred to as

Successor Agency

CITY CONTACT: Damian Singleton, Contract Specialist, Email: Dsingleton@sandiego.gov
Phone No. (619) 533-3482, Fax No. (619) 533-3633

ADDENDUM "D"

FOR

HORTON PLAZA IMPROVEMENT PROJECT

BID NO.: K-14-6120-DBB-3
SAP NO. (WBS/IO/CC): 24002919
CLIENT DEPARTMENT: 1714
COUNCIL DISTRICT: 3
PROJECT TYPE: BE/GA

BID DUE DATE:

2:00 PM
MAY 14, 2014
CITY OF SAN DIEGO
PUBLIC WORKS CONTRACTING GROUP
1010 SECOND AVENUE, 14th FLOOR, MS 614C
SAN DIEGO, CA 92101

ENGINEER OF WORK

The technical content of the engineering Specifications and Special Provisions contained herein has been prepared by or under the direction of the following Professional Engineer and Architect:

1) Registered Architect, Douglas Macy — 5.5.14 Date — Seal:



The contractual content of the engineering Specifications and Special Provisions contained herein has been reviewed by the following Professional Engineer:

2) Registered Project Engineer, Daniel Kay — 5/5/14 Date — Seal:



A. CHANGES TO CONTRACT DOCUMENTS

The following changes to the Contract Documents are hereby made effective as though originally issued with the bid package. Bidders are reminded that all previous requirements to this solicitation remain in full force and effect.

B. ADDENDUM

1. To Addendum C, D. Volume 1, page 11, Item 8, "Section 32 1440 – Stone Paving", pages 31 through 42, **DELETE** in their entirety and **SUBSTITUTE** with pages 4 through 16 of this Addendum.

James Nagelvoort, Director
Public Works Department

Dated: *May 5, 2014*
San Diego, California

JN/BD/egz

SECTION 32 1440 – STONE PAVING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Stone pavers set in mortar setting bed.
2. Stone at seating terraces set in mortar setting bed.
3. Stone at stairs set in mortar bed.

B. Related Sections include the following:
1. Drawings and general provisions of the Contract, including Part 1- “General Provisions” of the Greenbook and Whitebook apply to this Section.
2. Division 32 Section “Concrete Paving” for joint types, expansion joint filler, backer rod and joint sealant.
3. Division 03 Section "Cast in Place Concrete" for concrete slabs under stone pavers.
4. Division 04 Section “Adhered Stone Veneer” for mortared stone wall cladding.
5. Division 04 Section “Exterior Stone Cladding” for stone panels mechanically anchored to concrete substrate.
6. Division 07 Section “Joint Sealants” for sealants, compatibility and adhesion testing and procedures for their use with stone paving.

1.2 SUBMITTALS

A. Product Data: For the following:

1. Stone pavers.
2. Stone at seating terraces.
3. Stone at stairs.
4. Mortar materials.
5. Grout materials.
6. Expansion Joint Material including backer rod and sealant.
7. Sealer.
8. Epoxy Adhesive

B. Samples for Verification: The following stone shall be submitted to show the color, texture, and pattern specified, showing the full range of variations expected in the completed work for pavers, risers, treads and seat terraces.
1. A minimum of three (3) for each stone type specified.
   a. Paver samples shall be 12 inches x 12 inches in size. Submit one sample showing each finish type. Apply the specified sealer to one half of each sample.
   b. Riser samples shall be a minimum of 5 inches in length and full scale height and depth and shall include warning grooves with a range of light gray to black lithichrome paint.
   c. Tread samples shall be 12 inches x 12 inches in size.

C. Coefficient of Friction Test Reports: Provide test reports for each specified stone type and finish to be used for paving in pedestrian and vehicular areas of the site, for stair treads and risers and for seat terrace seating surfaces and risers. All finishes must meet a minimum .8 Coefficient of Friction in areas which may be wet at any time.

D. Shop Drawings: **Provide all shop drawings in English and with all dimensioning in Standard (not metric) units of measurement.** Indicate fabrication and installation details for stone including layout, dimensions, thicknesses, jointing, anchors, and connections with other work.

E. Grout Samples for Initial Selection: Submit manufacturer's color charts showing the full range of colors for selection by the Architect.

F. Grout Samples for Verification: Submit three (3) four inch long product samples of the colored grout selected by Architect installed between stone pavers or as required to show the full range of colors to be expected in the finish work.

G. Compatibility and Adhesion Test Reports: From latex-additive manufacturer indicating the following:

1. Mortar and grout containing latex additives have been tested with pavers and slabs for compatibility and adhesion.
2. Interpretation of test results relative to mortar and grout performance and written recommendations for installation practices needed for adhesion.

H. Certification: Submit a letter of certification from the stone fabricator, stating the material being furnished is the specified material and there are sufficient reserves available to supply the project and furnish replacements as needed.

1. Provide track record for stone including quarry name and location.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer with a minimum of 12 years successful in-service performance. The installer shall have completed a minimum of 10 stone paving installations similar in material, design, and extent to that indicated for this Project and whose work has resulted in a construction record of successful in-service performance. Past work must include a minimum of three (3) projects with stone in a water feature setting.

B. Source Limitations: Obtain each type of stone paver, joint material, and setting material from one source with resources to provide materials and products of consistent quality in appearance and physical properties.

C. Preconstruction Compatibility and Adhesion Testing: Submit to latex-additive manufacturer, for testing indicated below, samples of paving materials that will contact or affect mortar and grout that contain latex additives.

1. Use manufacturer's standard test methods to determine whether mortar and grout materials are required to obtain optimum adhesion with, and will be nonstaining to installed pavers and other materials constituting paver installation.

2. Submit a sufficient number of pavers and other materials involved in installation to allow comprehensive testing.
3. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
4. For materials failing tests, obtain mortar and grout manufacturer's written instructions for corrective measures, including the use of alternative materials to obtain optimum bond and prevent staining.

D. Mockups: Before installing stone, build mockups of the size indicated below, on the project site, for each form and pattern of stone pavers, stone stairs, and seating terrace to verify selections made under sample submittals and to demonstrate aesthetic effects and qualities of materials and execution. Build mockups to comply with the following requirements, using materials indicated for the completed Work, including same base construction, special features for expansion joints, grouted joints with colored grout, sealer application and contiguous work as indicated.

1. Provide mockups in a location as directed by Owner’s Representative for each of the following:
   a. Construct a 12 foot x 12 foot mockup of the Fine Grain paving pattern.
   b. Construct a 24 foot x 24 foot mockup of the Course Grain paving pattern.
   c. Construct a six (6) foot length of the stone seating terrace including a minimum of two (2) risers and two (2) seating surfaces. Include warning groove detail.
   d. Construct a six (6) foot length of a stone stair including a minimum of two (2) risers and two (2) treads. Include warning groove detail.
2. Notify Owner’s Representative seven days in advance of dates and times when mockups will be constructed.
3. Demonstrate the proposed range of aesthetic effects and workmanship.
4. Obtain Owner’s Representative approval of mockups before starting stone paving installation.
5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
6. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Protect all stone and aggregate during storage and construction against soiling or contamination from earth and other materials.

1. Cover stone with plastic or use other packaging materials that will prevent rust marks from steel strapping.

B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

1.5 PROJECT CONDITIONS

A. Cold-Weather Protection: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen subgrade or setting beds. Remove and replace stone paver work damaged by frost or freezing.

B. Hot Weather Protection: In hot weather, masonry shall be protected to prevent excessive evaporation of setting beds and grout. Artificial shade, wind breaks and cooled materials shall be used as required.

C. Weather Limitations for Mortar and Grout: Comply with the following requirements:

1. Maintain ambient temperatures between 50-100 degrees Fahrenheit during installation and for minimum 7 days after completion. Verify substrate, ambient and material at least 37 degrees Fahrenheit for installation of Latex-modified mortars. Maintain surface between 60 to 90 degrees Fahrenheit during installation of epoxy grouts. Protect mortars and grouts until cured to prevent premature evaporation of moisture.

PART 2 - PRODUCTS

2.1 STONE GENERAL

A. Stone fabrication shall include the following:
1. An additional 5% of total stone paver quantity for each specified paver type.
2. An additional 4 pavers each for the specified Fountain Jet and Nozzle paver sizes.

2.2 STONE FOR PAVING

A. Stone thickness for use in Vehicular areas identified on the drawings shall be three (3) inch thickness, in Pedestrian Areas stone thickness shall be two (2) inches. Stone for attachment to utility access covers shall be ¾” thickness and be contiguous with the surrounding pattern unless indicated otherwise, verify location and number of stone filled utility hatches identified on drawings. Provide the Owner with ten (10) additonal pavers of each specified size, finish and thickness for future use.

B. Stone Supplier: Provide stone from one of the following or approved equal:
1. Nelson Architectural Inc., Happy Valley, OR, Tele: 971 255 0962.
2. Arris Stoneworks, Seattle, WA, Tele: 206 370 0000.
3. Yellow Mountain Stoneworks, Seattle, WA, Tele: 206 267 5696.

C. Stone Strength shall meet the following criteria:

1. Tiger Yellow Granite, or approved equal.
   a. Density: 177 lbs/cf, +/- 10%
   b. Absorption: Less than 0.58%
   c. Compressive Strength: 13,202 psi min.
   d. Flexural Strength: 2,429 psi min.
   e. Hardness: HS89
   f. Color: Combination of Whites, creams, and golds with minimal black.

D. Stone shall not include any large veining, pockets or deposits of iron or other materials that may cause deterioration of stone when exposed to moisture.

E. Stone color range 'Tiger Yellow' shall be medium-grained granite with yellow-cream, gray-cream colored background and golden coloration with black, gray, and slight salmon patterns and flecks. Stone will have natural variations in color and pattern range.

F. Face dimensions of paving stone shall be no smaller than 1 1/2 inches in any single dimension.

G. Stone Types:

1. Stone Type 1A:
   a. Style: Pattern Cut with indicated finish on top and saw-cut edges, to match Architect's sample.
   b. Finish: Lychee
   c. Size: 8-5/8" x 11-5/8".
   d. Thickness: 3 inch.
   e. Color: Tiger Yellow Granite
   f. Location: Course Grain paving areas.

2. Stone Type 1B:
   a. Style: Pattern Cut with indicated finish on top and saw-cut edges, to match Architect's sample.
   b. Finish: Adze (Direction of finish shall be perpendicular to long dimension)
   c. Size: 4-1/8" x 11-5/8"
   d. Thickness: 3 inch
   e. Color: Tiger Yellow Granite
   f. Location: Course Grain paving areas.

3. Stone Type 1C:
   a. Style: Pattern Cut with indicated finish on top and saw-cut edges, to match Architect's sample.
   b. Finish: Lychee
   c. Sizes: 4-1/8" x 11-5/8"
   d. Thickness: 3 inch
   e. Color: Tiger Yellow Granite
   f. Location: Course Grain paving areas

4. Stone Type 1D & 1D-T:
   a. Style: Pattern Cut with indicated finish on top and saw-cut edges, to match Architect's sample.
   b. Finish: Lychee
   c. Sizes: 8-5/8" x 17-5/8"
   d. Thickness: Type 1D: 3 inches, Type 1D-T: 2 inches.
   e. Color: Tiger Yellow Granite
   f. Location: Fine Grain paving areas

5. Stone Type 2A:

a. Style: Pattern Cut with indicated finish on top and saw-cut edges, to match Architect's sample.
b. Finish: Bladestalk (Direction of finish shall be perpendicular to long dimension)
c. Sizes: 4-1/8" x 11-5/8"
d. Thickness: 3 inches
e. Color: Tiger Yellow Granite
f. Location: Course Grain paving areas

6. Stone Type 2B & 2B-T:
a. Style: Pattern Cut with indicated finish on top and saw-cut edges, to match Architect's sample.
b. Finish: Bladestalk (Direction of finish shall be perpendicular to long dimension)
c. Sizes: 5-5/8" x 17-5/8"
d. Thickness: Type 2B: 3 inches, Type 2B-T: 2 inches.
e. Color: Tiger Yellow Granite
f. Location: Fine Grain paving areas

2.3 STONE FOR STEPS AND SEAT TERRACES

A. Stone Strength shall meet the following criteria:
1. Density: 177 lbs/cf, +/- 10%
2. Absorption: Less than 0.58%
3. Compressive Strength: 13,202 psi min.
4. Flexural Strength: 2,429 psi min.
5. Hardness: HS89

B. Stone shall not include any large veining, pockets or deposits of iron or other materials that may cause deterioration of stone when exposed to moisture.

C. Stone color range 'Tiger Yellow' shall be medium-grained granite with yellow-cream, gray-cream colored background and golden coloration with black, gray, and slight salmon patterns and flecks. Stone will have natural variations in color and pattern range.

D. Stone Supplier: Provide stone from one of the following or approved equal:

1. Nelson Architectural Inc., Happy Valley, OR, Tele: 503 810 9898.
2. Arris Stoneworks, Seattle, WA, Tele: 206 370 0000.
3. Yellow Mountain Stoneworks, Seattle, WA, Tele: 206 267 5696.

E. Stone Types:

1. Stone Stair Treads and Seat Terrace seating surface:
a. Style: Pattern Cut with indicated finish on top with saw-cut edges to match Architect's sample.
b. Finish: Lychee
c. Size: As shown
d. Thickness: 2 inches
e. Color: Tiger Yellow Granite
f. Pattern: As Shown

2. Risers for Stone Stairs and Seat Terrace:
   a. Style: Pattern Cut with indicated finish on exposed surfaces and saw-cut back and bottom, to match Architect's sample.
   b. Finish: Lychee
   c. Size: As shown
   d. Thickness: 3-5/8 inches
   e. Color: Tiger Yellow Granite
   f. Pattern: As Shown
   g. Apply lithichrome paint of approved color to the bottom and vertical sides of all warning grooves.

2.4 STONE FOR FOUNTAIN JETS AND NOZZLES

A. Stone Strength shall meet the following criteria:

1. Density: 177 lbs/cf +/- 10%
2. Absorption: 0.58%
3. Compressive Strength: 13,202 psi
4. Flexural Strength: 2,429 psi
5. Hardness: HS89

B. Stone Supplier: Provide stone from one of the following or approved equal:

1. Nelson Architectural Inc., Happy Valley, OR, Tele: 503 810 9898.
2. Arris Stoneworks, Seattle, WA, Tele: 206 370 0000.
3. Yellow Mountain Stoneworks, Seattle, WA, Tele: 206 267 5696.

C. Stone Types:

1. Stone at fountain jets and nozzles:
   a. Style: Pattern Cut with indicated finish on top with saw-cut edges to match Architect's sample.
   b. Finish: Lychee
   c. Sizes:
      1) Aerated jets, pop jets and fog nozzles: 17-5/8" x 17-5/8"
      2) Leaper jets: 26-5/8" x 29-5/8"
   d. Thickness: 3 inches
   e. Color: Tiger Yellow Granite
   f. Pattern: As Shown

2.5 SETTING and GROUT MATERIALS

A. Cementitious Material:

1. Portland cement shall be ASTM-C 150, Type I of natural color or white, as required to produce the required color of mortar or grout.

B. Latex Additive Manufacturer, provide mortar and grout products by one of the following or approved equal:

1. Laticrete International, Inc.
2. Custom Building Products.

3. TEC Specialty Construction Brands, Inc.

C. Slurry Bond Coat: One-step, high strength, polymer fortified thin set mortar for exterior installation, meeting ANSI A118.4 and ANSI A118.11.

D. Thick-set Mortar Leveling Bed: One step, high strength, polymer fortified mortar bed for exterior installation, meeting ASTM C270.

E. Thin-set (Paver Bond Coat) Mortar Bed: One-step, high strength, polymer fortified thin set mortar for exterior installation, meeting ANSI A118.4 and ANSI A118.11.

F. Substitutions: For approval of other Manufacturers and Products, a substitution request shall be submitted prior to the Bid date.

1. Mortar and Grout materials and additives shall be compatible and from one manufacturer.

G. Aggregate for Mortar and Grout: ASTM C 144, graded to comply with latex-additive manufacturer's requirements.

H. Grout Materials:

1. Latex-Modified Portland Cement Grout: One-step, latex modified, high performance grout for exterior installation. Stain resistant and color consistent. Meeting ANSI A118.6. Color to be selected by Architect.

I. The mortar and grout shall meet ANSI 118.7 and be weather, frost, shock and chemical resistant and meet the following requirements:

1. Thick-set mortar bed:
   a. Compressive strength, 4000-5000 psi.
   b. Flexural strength, 1100-1200 psi.
2. Thin-set paver bed bond strength, 500 psi.

J. All materials shall be delivered to the job site in the original containers with the manufacturer’s identification on each package.

K. Mortar and Grout Mixes General: Comply with referenced standards and with manufacturers' written instructions for mix proportions, mixing equipment, mixer speeds, mixing containers, mixing times, and other procedures needed to produce setting-bed and joint materials of uniform quality and with optimum performance characteristics. Discard mortars and grout when they have reached their initial set. Mortar and Grouts used for Water Feature applications shall be formulated to be high strength, minimum shrinkage, chemically resistant and have very low water absorption.

L. Slurry Bond Coat: Mix bond coat to a consistency similar to that of thick cream, consisting of material indicated as “Slurry Bond Coat” in paragraph 2.5 “Setting and Grout Materials” of this specification.

M. Thin-set (Paver Bond Coat) Mortar Bed: Proportion and mix for setting bed to comply with directions of latex-additive manufacturer and as necessary to produce stiff mixture with a moist surface when bed is ready to receive pavers.

N. Latex-Modified Portland Cement Grout: Mix in proportion and concentration recommended by latex-additive manufacturer. For vertical installation include and mix in non-sag additive per manufacturer's instructions.

2.6 GROUT COLORS AND TEXTURES

A. Colors and Textures: As selected by Architect from manufacturer's full range.

2.7 ACCESSORIES

A. Bond Breaker (Concrete Slab): 15 pound asphalt impregnated felt.

1. Comply with ASTM 15
2. Cut into 18 inch wide strips.
3. Install centered over contraction joints in concrete slab.

B. Spacers: Resilient plastic, non-staining to stone, sized to suit joint thicknesses.

C. Sealants for use with Stone Paving: Refer to Division 07 – Section "Joint Sealants".

D. Stone and Grout Sealer: Colorless, non-film forming, non-peeling, slip and stain-resistant, VOC compliant, breathable sealer that does not affect color or physical properties of stone surfaces. Suitable for exterior application and as recommended by stone producer for application indicated. Product must meet performance requirements without failure due to defective manufacture, fabrication or installation and maintain performance for a minimum of 8 to 10 cleaning cycles without reapplication.
1. Product Warranty: manufacturer's warranty in which manufacturer agrees to repair or replace materials that fail to maintain coating effectiveness and the qualities identified herein for the specified warranty period.
2. Warranty Period: Five years from date of Substantial Completion.

E. Reinforcing Wire Fabric: Galvanized, welded wire fabric, 2 by 2 inches by 0.108-inch (12 gauge) diameter; comply with ASTM A 185 and ASTM A 82 except for minimum wire size.

F. Epoxy Adhesive for attachment of stone to Utility Access Hatches: ASTM C 881, two-component material suitable for use on dry or damp surfaces. Provide material "Type," "Grade," and "Class" to suit project requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas indicated to receive paving, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

B. Verify that concrete base is sloped for drainage and is free of standing water, dust, oil, grease, paint, wax, curing compounds, primer, sealers, form release agents, or any deleterious substances and debris which may prevent or reduce bonding. Conduct moisture tests to verify that concrete surfaces are completely cured, free from hydrostatic pressure and having a moisture content of less than 5%.

3.2 PREPARATION

A. Vacuum clean concrete substrates to remove dirt, dust, debris, and loose particles.

A. Remove substances, from concrete substrates, that could impair mortar bond, including curing and sealing compounds, form oil, and laitance. This may require mechanical grinding and scarifying of the surface. Neutralize any trace of strong acid or alkali from the substrate prior to mortar application.

3.3 INSTALLATION, GENERAL

A. Do not use stone with chips, cracks, voids, discolorations, and other defects that might be visible or cause staining in finished work.

B. **NOTE:** The stone paving has been designed to be a seamless and contiguous pattern covering the Horton Plaza, the Westfield Site Improvements and Public Improvements which surround the Historic Park. All three sites share a common point of origin at the center of the Horton Plaza site for stone paving layout. Whole paver units should be used to span the junctures between individual projects to maintain pattern continuity.

C. Joint Pattern: As shown in Drawings. Install stone in 24 foot square or 12 foot square segments with special attention to changes in the pattern as indicated on drawings.

D. Mix stone pavers from several pallets or cubes, as they are placed, to produce uniform blend of colors and textures.

E. Cut stone pavers with motor-driven masonry saw equipment to provide clean, sharp, unchipped edges. Cut to provide pattern indicated and to fit adjoining work neatly. Use full units without cutting where possible. Hammer cutting is not acceptable.

1. Thickness of Stone Paving, stone risers and stone treads: As indicated in this section.
2. Ease cut stone edges.
3. Cut stone to produce uniform joints to widths and in locations as indicated.
4. Clean sawed backs of stones to remove rust stains and iron particles.

F. Tolerances: do not exceed 1/16-inch paver to paver offset from flush (lippage) or 1/8 inch in 24 inches and 1/4 inch in 10 feet from level, or indicated slope, for finished surface of paving. All surfaces shall be free of standing water, i.e. no“bird baths”.

G. Isolation and Control Joints: Provide for sealant-filled joints at locations and of widths indicated. Provide joint filler and backer rod for sealant-filled joints where indicated. Install joint filler before setting pavers.

1. Install isolation joints at all vertical surfaces including building walls and foundations, site walls, curbs and where new paving abuts existing unless indicated otherwise.

H. Provide seating terraces and stairs made of stone as indicated. Install stone seating terraces before installing adjacent pavers.

3.4 MORTAR SETTING-BED APPLICATIONS

A. Saturate concrete subbase with clean water several hours before placing setting bed. Remove surface water about one hour before placing setting bed.

B. Apply cement-paste bond coat over surface of concrete subbase about 15 minutes before placing setting bed. Limit area of bond coat to avoid its drying out before placing setting bed. Do not exceed 1/16-inch thickness for bond coat.

1. Place reinforcing wire fabric over concrete, lapped at joints by at least one full mesh and supported so mesh becomes embedded in middle of setting bed. Hold edges back from vertical surfaces approximately 1/2 inch.

C. Apply mortar bed over bond coat immediately after applying bond coat. Spread and screed setting bed to uniform thickness at subgrade elevations required for accurate setting of pavers to finished grades indicated.

D. Mix and place only that amount of mortar bed that can be covered with pavers before initial set. Cut back, bevel edge, remove, and discard setting-bed material that have reached initial set before placing pavers.

E. Place pavers before initial set of cement occurs. Immediately before placing pavers on setting bed, apply uniform 1/16-inch- thick, slurry bond coat to bed or to back of each paver with a flat trowel.

F. Tamp or beat pavers with a wooden block or rubber mallet to obtain full contact with setting bed and to bring finished surfaces within indicated tolerances. Set each paver in a single operation before initial set of mortar; do not return to areas already set and disturb pavers for purposes of realigning finished surfaces or adjusting joints.

G. Rake out joints to depth required to receive grout as units are set.

H. Spaced Joint Widths: Provide 3/8 inch nominal joint width unless indicated otherwise, with variations not exceeding plus or minus 1/16 inch

3.5 STONE TERRACE SEATING INSTALLATION

A. Install stone terrace seating to comply with paragraph 3.4 "Mortar Setting Bed Applications" of this specification.

3.6 STONE INSTALLATION AT WATER FEATURE JETS

A. Install stone as indicated on water feature jet details. Jets shall be in place prior to paving installation.

B. Core drill stone pavers at water jet locations. Maintain tolerances indicated on stone shop drawings.

C. Apply joint sealant specified for Use I per the manufacturer's recommendations after stone installation. Refer to Division 07 – Section "Joint Sealants".

3.7 GROUTING OF STONE PAVING

A. Grout stone joints to comply with ANSI A108.10 and manufacturer's written instructions.

B. Grout joints as soon as possible after initial set of setting bed. Force grout into joints, taking care not to smear grout on adjoining stone and other surfaces. After initial set of grout, finish joints by tooling to produce a slightly concave polished joint, free of drying cracks.

C. Cure grout by maintaining in a damp condition for seven days except as otherwise recommended by latex-additive manufacturer.

3.8 JOINT SEALANT APPLICATION

A. Prepare joints and apply sealants of the type and at locations indicated to comply with applicable requirements in Division 07 – Section "Joint Sealants".

3.9 ADJUSTING AND CLEANING

A. Remove and replace stone paving and flooring of the following description:

1. Broken, chipped, stained, or otherwise damaged stone. Stone may be repaired if methods and results are approved by Owner's Representative.
2. Defective joints.
3. Stone paving and joints not matching approved samples and mockups.
4. Stone paving not complying with other requirements indicated.

B. Replace in a manner that results in stone paving matching approved samples and mockups, complying with other requirements, and showing no evidence of replacement.

C. In-Progress Cleaning: Clean stone paving, steps and terraces as work progresses. Remove mortar fins and smears before tooling joints.

D. Clean stone paving, steps and terraces after setting and grouting are complete. Use procedures recommended by stone fabricator for types of application.

3.10 PROTECTION

A. Prohibit traffic from installed stone for a minimum of 72 hours.

B. Protect stone paving, stairs and terraces during construction with non staining kraft paper. Where adjoining areas require construction work access, cover stone surfaces with a minimum of 3/4-inch untreated plywood over non staining kraft paper.

3.11 REPAIR, POINTING, CLEANING, AND PROTECTION

A. Remove and replace stone pavers, stairs or terraces that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units as intended. Provide new full sized units to match adjoining units and install in same manner as original units, with same joint treatment and with no evidence of replacement.

B. Pointing: During tooling of joints, enlarge voids or holes and completely fill with mortar or grout. Point up joints at sealant joints to provide a neat, uniform appearance, properly prepared for sealant application.

C. Cleaning: Remove excess grout from exposed surfaces of stone; wash and scrub clean.

3.12 PAVER AND GROUT SEALER

A. After pavers are thoroughly cleaned and joint sealant has been installed apply sealer to the tops of pavers, stone stair treads and risers, seat terrace risers, seat surfaces and grout joints. Apply sealer only after grout and mortar beds have fully set, do not apply to wet conditions.

1. Verify surfaces are clean, dry and free of efflorescence or other residues which could be trapped beneath coating application. Follow sealer manufacturer’s recommendations for cleaning and preparation of the masonry surfaces prior to sealer application.
2. Apply sealer according to manufacturer’s written instructions.
3. After sealer is applied, protect area from traffic for a minimum of 24 hours.

END OF SECTION 32 1440

tabs complete

City of San Diego, solely in its capacity as the designated successor agency to the Redevelopment Agency of the City of San Diego, a former public body, corporate and politic, herein referred to as

Successor Agency

CONTRACTOR'S NAME: Echo Pacific
ADDRESS:
TELEPHONE NO.: **FAX NO.:**
CONTACT: Damian Singleton, Contract Specialist, Email: Dsingleton@sandiego.gov
Phone No. (619) 533-3481, Fax No. (619) 533-3633

CONTRACT DOCUMENTS

FOR

HORTON PLAZA IMPROVEMENT PROJECT

VOLUME 2 OF 2

BID NO.: K-14-6120-DBB-3
SAP NO. (WBS/IO/CC): 24002919
CLIENT DEPARTMENT: 1714
COUNCIL DISTRICT: 3
PROJECT TYPE: BE/GA

THIS CONTRACT IS SUBJECT TO THE FOLLOWING:

- THE CITY'S SUBCONTRACTING PARTICIPATION REQUIREMENTS FOR SLBE PROGRAM.
- PREVAILING WAGE RATES: STATE ☒ FEDERAL ☐

THIS BIDDING DOCUMENT TO BE SUBMITTED IN ITS ENTIRETY
REFER TO VOLUME 1 COVER PAGE FOR TIME, DATE, AND LOCATION

TABLE OF CONTENTS

DESCRIPTION **PAGE NUMBER**

Volume 2 - Bidding Documents

The following forms must be completed in their entirety and submitted with the Bid. Include the form(s) even if the information does not apply. Where the information does not apply write in N/A. Failure to include any of the forms may cause the Bid to be deemed **non-responsive.** If you are uncertain or have any questions about any required information, contact the City no later than 14 days prior to Bid due date.

1. Bid/Proposal 3
2. Bid Bond 6
3. Non-Collusion Affidavit to be executed by Bidder and Submitted with Bid under 23 USC 112 and PCC 7106 7
4. Contractors Certification of Pending Actions 8
5. Equal Benefits Ordinance Certification of Compliance 9
6. Proposal (Bid) 10
7. Form AA35 - List of Subcontractors 14
8. Form AA40 - Named Equipment/Material Supplier List 15
9. Form AA45 - Subcontractors Additive/Deductive Alternate 16

The Successor Agency is defined in SECTION 1 – TERMS, DEFINITIONS, ABBREVIATIONS, UNITS OF MEASURE, AND SYMBOLS of Volume 1 of this solicitation. **All references herein to City shall be deemed to refer to the Successor Agency where necessary to identify the agency in privity of contract for the performance of this project.**

PROPOSAL

Bidder's General Information

To the City of San Diego:

Pursuant to "Notice Inviting Bids", specifications, and requirements on file with the City Clerk, and subject to all provisions of the Charter and Ordinances of the City of San Diego and applicable laws and regulations of the United States and the State of California, the undersigned hereby proposes to furnish to the City of San Diego, complete at the prices stated herein, the items or services hereinafter mentioned. The undersigned further warrants that this bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation; that the bid is genuine and not collusive or sham; that the bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid, and has not directly or indirectly colluded, conspired, connived, or agreed with any bidder or anyone else to put in a sham bid, or that anyone shall refrain from bidding; that the bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the bid price of the bidder or any other bidder, or to fix any overhead, profit, or cost element of the bid price, or of that of any other bidder, or to secure any advantage against the public body awarding the contract of anyone interested in the proposed contract; that all statements contained in the bid are true; and, further, that the bidder has not, directly or indirectly, submitted his or her bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, or paid, and will not pay, any fee to any corporation, partnership, company, association, organization, bid depository, or to any member or agent thereof to effectuate a collusive or sham bid.

The undersigned bidder(s) further warrants that bidder(s) has thoroughly examined and understands the entire Contract Documents (plans and specifications) and the Bidding Documents therefore, and that by submitting said Bidding Documents as its bid proposal, bidder(s) acknowledges and is bound by the entire Contract Documents, including any addenda issued thereto, as such Contract Documents incorporated by reference in the Bidding Documents.

IF A SOLE OWNER OR SOLE CONTRACTOR SIGN HERE: NOT APPLICABLE

(1) Name under which business is conducted_____

(2) Signature (Given and surname) of proprietor _____

(3) Place of Business (Street & Number) _____

(4) City and State _____ Zip Code _____

(5) Telephone No. _____ Facsimile No._____

(6) Email Address _____

IF A PARTNERSHIP, SIGN HERE: NOT APPLICABLE

(1) Name under which business is conducted _____

(2) Name of each member of partnership, indicate character of each partner, general or special (limited):

_____

_____

(3) Signature (Note: Signature must be made by a general partner)

_____

Full Name and Character of partner

_____

_____

(4) Place of Business (Street & Number) _____

(5) City and State _____ Zip Code _____

(6) Telephone No. _____ Facsimile No. _____

(7) Email Address _____

IF A CORPORATION, SIGN HERE:

(1) Name under which business is conducted Echo Pacific Construction, Inc.

(2) Signature, with official title of officer authorized to sign for the corporation:

_____
(Signature)

Christopher A. Rowe
(Printed Name)

President
(Title of Officer)

(Impress Corporate Seal Here)

(3) Incorporated under the laws of the State of California

(4) Place of Business (Street & Number) 1230 Simpson Way

(5) City and State Escondido, CA Zip Code 92029

(6) Telephone No. 760-737-3003 Facsimile No. 760-737-9487

(7) Email Address rachael@echopacific.com

THE FOLLOWING SECTIONS MUST BE FILLED IN BY ALL PROPOSERS:

In accordance with the "**NOTICE INVITING BIDS**", the bidder holds a California State Contractor's license for the following classification(s) to perform the work described in these specifications:

LICENSE CLASSIFICATION A, B, C-8

LICENSE NO. 669251 EXPIRES 4/30/15

This license classification must also be shown on the front of the bid envelope. Failure to show license classification on the bid envelope may cause return of the bid unopened.

TAX IDENTIFICATION NUMBER (TIN): [redacted]

Email Address: rachael@echopacific.com

THIS PROPOSAL MUST BE NOTARIZED BELOW:

I certify, under penalty of perjury, that the representations made herein regarding my State Contractor's license number, classification and expiration date are true and correct.

Signature C A Rowe Title President

Christopher A. Rowe

SUBSCRIBED AND SWORN TO BEFORE ME, THIS 14th DAY OF May, 2014.

Notary Public in and for the County of San Diego, State of California

Rachael L. Gonzalez

Rachael L. Gonzalez, "Notary Public"

(NOTARIAL SEAL)

RACHAEL L. GONZALEZ
Commission # 2010877
Notary Public - California
San Diego County
My Comm. Expires Mar 9, 2017

BID BOND

KNOW ALL MEN BY THESE PRESENTS,

That Echo Pacific Construction, Inc. as Principal, and

Hartford Fire Insurance Company as Surety, are held and firmly bound unto The Successory Agency hereinafter called "OWNER," in the sum of **10% OF THE TOTAL BID AMOUNT** for the payment of which sum, well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

WHEREAS, said Principal has submitted a Bid to said OWNER to perform the WORK required under the bidding schedule(s) of the OWNER's Contract Documents entitled

Horton Plaza Improvement Project

NOW THEREFORE, if said Principal is awarded a contract by said OWNER and, within the time and in the manner required in the "Notice Inviting Bids" enters into a written Agreement on the form of agreement bound with said Contract Documents, furnishes the required certificates of insurance, and furnishes the required Performance Bond and Payment Bond, then this obligation shall be null and void, otherwise it shall remain in full force and effect. In the event suit is brought upon this bond by said OWNER and OWNER prevails, said Surety shall pay all costs incurred by said OWNER in such suit, including a reasonable attorney's fee to be fixed by the court.

SIGNED AND SEALED, this 12th day of May, 2014

Echo Pacific Construction, Inc. (SEAL)
(Principal)

By: CA Rowe
(Signature)
Christopher A. Rowe, President

Hartford Fire Insurance Company (SEAL)
(Surety)

By:
(Signature)
Sarah Myers, Attorney-in-Fact

(SEAL AND NOTARIAL ACKNOWLEDGEMENT OF SURETY)

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

CIVIL CODE § 1189

State of California

County of San Diego

On May 13, 2014 (Date) before me, Rachael L. Gonzalez, "Notary Public" (Here Insert Name and Title of the Officer),

personally appeared Christopher A. Rowe (Name(s) of Signer(s)),

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature: Rachael L. Gonzalez (Signature of Notary Public)

RACHAEL L. GONZALEZ
Commission # 2010877
Notary Public - California
San Diego County
My Comm. Expires Mar 9, 2017

Place Notary Seal Above

OPTIONAL

Though the information below is not required by law, it may prove valuable to persons relying on the document and could prevent fraudulent removal and reattachment of this form to another document.

Description of Attached Document

Title or Type of Document: Bid Bond - Horton Plaza Improvement Project

Document Date: May 12, 2014 Number of Pages: 1

Signer(s) Other Than Named Above: None

Capacity(ies) Claimed by Signer(s)

Signer's Name: Christopher A. Rowe	Signer's Name:
XX Corporate Officer — Title(s): President	☐ Corporate Officer — Title(s):
☐ Individual	☐ Individual
☐ Partner — ☐ Limited ☐ General	☐ Partner — ☐ Limited ☐ General
☐ Attorney in Fact	☐ Attorney in Fact
☐ Trustee	☐ Trustee
☐ Guardian or Conservator	☐ Guardian or Conservator
☐ Other:	☐ Other:
Signer Is Representing: Echo Pacific Construction, Inc.	Signer Is Representing:
RIGHT THUMBPRINT OF SIGNER — Top of thumb here	RIGHT THUMBPRINT OF SIGNER — Top of thumb here

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CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

STATE OF CALIFORNIA

County of San Diego }

On MAY 12 2014 (Date) before me, John Richard Flores JR. (Insert Name of Notary exactly as it appears on the official seal), Notary Public,

personally appeared Sarah Myers (Name(s) of Signer(s)),

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

Witness my hand and official seal.

Signature _____ (Signature of Notary Public) John Richard Flores JR.

JOHN RICHARD FLORES JR.
COMM. #2036097
Notary Public - California
San Diego County
My Comm. Expires Aug. 8, 2017
NRO1 NRO1

Place Notary Seal Above

OPTIONAL

Though the information below is not required by law, it may prove valuable to persons relying on the document and could prevent fraudulent removal and reattachment of the form to another document.

Description of Attached Document

Title or Type of Document: _____

Document Date: _____ Number of Pages: _____

Signer(s) Other Than Named Above: _____

Capacity(ies) Claimed by Signer(s)

Signer's Name: _____
- ☐ Individual
- ☐ Corporate Officer — Title(s): _____
- ☐ Partner ☐ Limited ☐ General
- ☑ Attorney in Fact
- ☐ Trustee
- ☐ Guardian or Conservator
- ☐ Other: _____

Signer is Representing: Surety Company

RIGHT THUMBPRINT OF SIGNER
Top of thumb here

Signer's Name: _____
- ☐ Individual
- ☐ Corporate Officer — Title(s): _____
- ☐ Partner ☐ Limited ☐ General
- ☐ Attorney in Fact
- ☐ Trustee
- ☐ Guardian or Conservator
- ☐ Other: _____

Signer is Representing: _____

RIGHT THUMBPRINT OF SIGNER
Top of thumb here

POWER OF ATTORNEY

Direct Inquiries/Claims to:
THE HARTFORD
BOND, T-4
One Hartford Plaza
Hartford, Connecticut 06155
call: **888-266-3488** *or fax:* **860-757-5835**

KNOW ALL PERSONS BY THESE PRESENTS THAT: **Agency Code: 72-160200**

- [X] **Hartford Fire Insurance Company**, a corporation duly organized under the laws of the State of Connecticut
- [X] **Hartford Casualty Insurance Company**, a corporation duly organized under the laws of the State of Indiana
- [ ] **Hartford Accident and Indemnity Company**, a corporation duly organized under the laws of the State of Connecticut
- [ ] **Hartford Underwriters Insurance Company**, a corporation duly organized under the laws of the State of Connecticut
- [ ] **Twin City Fire Insurance Company**, a corporation duly organized under the laws of the State of Indiana
- [ ] **Hartford Insurance Company of Illinois**, a corporation duly organized under the laws of the State of Illinois
- [ ] **Hartford Insurance Company of the Midwest**, a corporation duly organized under the laws of the State of Indiana
- [ ] **Hartford Insurance Company of the Southeast**, a corporation duly organized under the laws of the State of Florida

having their home office in Hartford, Connecticut, (hereinafter collectively referred to as the "Companies") do hereby make, constitute and appoint, ***up to the amount of unlimited:***

Lawrence F. McMahon, James Baldassare Jr., Sarah Myers, Maria Guise, Lilia Robinson, Charlotte Aquino, Jennifer L. Clampert, Janice Martin
of
San Diego, CA

their true and lawful Attorney(s)-in-Fact, each in their separate capacity if more than one is named above, to sign its name as surety(ies) only as delineated above by ☒, and to execute, seal and acknowledge any and all bonds, undertakings, contracts and other written instruments in the nature thereof, on behalf of the Companies in their business of guaranteeing the fidelity of persons, guaranteeing the performance of contracts and executing or guaranteeing bonds and undertakings required or permitted in any actions or proceedings allowed by law.

In Witness Whereof, and as authorized by a Resolution of the Board of Directors of the Companies on August 1, 2009 the Companies have caused these presents to be signed by its Vice President and its corporate seals to be hereto affixed, duly attested by its Assistant Secretary. Further, pursuant to Resolution of the Board of Directors of the Companies, the Companies hereby unambiguously affirm that they are and will be bound by any mechanically applied signatures applied to this Power of Attorney.

Wesley W. Cowling, Assistant Secretary

M. Ross Fisher, Vice President

STATE OF CONNECTICUT }
COUNTY OF HARTFORD } ss. Hartford

On this 12th day of July, 2012, before me personally came M. Ross Fisher, to me known, who being by me duly sworn, did depose and say: that he resides in the County of Hartford, State of Connecticut; that he is the Vice President of the Companies, the corporations described in and which executed the above instrument; that he knows the seals of the said corporations; that the seals affixed to the said instrument are such corporate seals; that they were so affixed by authority of the Boards of Directors of said corporations and that he signed his name thereto by like authority.

Kathleen T. Maynard
Notary Public
My Commission Expires July 31, 2016

CERTIFICATE

I, the undersigned, Vice President of the Companies, DO HEREBY CERTIFY that the above and foregoing is a true and correct copy of the Power of Attorney executed by said Companies, which is still in full force effective as of MAY 12 2014

Signed and sealed at the City of Hartford.

Gary W. Stumper, Vice President

NON-COLLUSION AFFIDAVIT TO BE EXECUTED BY BIDDER AND SUBMITTED WITH BID UNDER 23 UNITED STATES CODE 112 AND PUBLIC CONTRACT CODE 7106

State of California)

) ss.

County of San Diego)

Christopher A. Rowe, being first duly sworn, deposes and says that he or she is President of the party making the foregoing bid that the bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation; that the bid is genuine and not collusive or sham; that the bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid, and has not directly or indirectly colluded, conspired, connived, or agreed with any bidder or anyone else to put in a sham bid, or that anyone shall refrain from bidding; that the bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the bid price of the bidder or any other bidder, or to fix any overhead, profit, or cost element of the bid price, or of that of any other bidder, or to secure any advantage against the public body awarding the contract of anyone interested in the proposed contract; that all statements contained in the bid are true; and further, that the bidder has not, directly or indirectly, submitted his or her bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, or paid, and will not pay, any fee to any corporation, partnership, company association, organization, bid depository, or to any member or agent thereof to effectuate a collusive or sham bid.

Signed: C A Rowe
Christopher A. Rowe

Title: President

Subscribed and sworn to before me this 14th day of May, 20 14

Rachael L. Gonzalez
Rachael L. Gonzalez, "Notary Public"

(SEAL)

RACHAEL L. GONZALEZ
Commission # 2010877
Notary Public - California
San Diego County
My Comm. Expires Mar 9, 2017

CONTRACTORS CERTIFICATION OF PENDING ACTIONS

As part of its bid or proposal (Non-Price Proposal in the case of Design-Build contracts), the Bidder shall provide to the City a list of all instances within the past 10 years where a complaint was filed or pending against the Bidder in a legal or administrative proceeding alleging that Bidder discriminated against its employees, subcontractors, vendors or suppliers, and a description of the status or resolution of that complaint, including any remedial action taken.

CHECK ONE BOX ONLY.

☒ The undersigned certifies that within the past 10 years the Bidder has NOT been the subject of a complaint or pending action in a legal administrative proceeding alleging that Bidder discriminated against its employees, subcontractors, vendors or suppliers.

☐ The undersigned certifies that within the past 10 years the Bidder has been the subject of a complaint or pending action in a legal administrative proceeding alleging that Bidder discriminated against its employees, subcontractors, vendors or suppliers. A description of the status or resolution of that complaint, including any remedial action taken and the applicable dates is as follows:

DATE OF CLAIM	LOCATION	DESCRIPTION OF CLAIM	LITIGATION (Y/N)	STATUS	RESOLUTION/REMEDIAL ACTION TAKEN

Contractor Name: Echo Pacific Construction, Inc.

Certified By Christopher A. Rowe Title President

Name

Date May 14, 2014

Signature

USE ADDITIONAL FORMS AS NECESSARY

EQUAL BENEFITS ORDINANCE CERTIFICATION OF COMPLIANCE

For additional information, contact:
CITY OF SAN DIEGO
EQUAL BENEFITS PROGRAM
202 C Street, MS 9A, San Diego, CA 92101
Phone (619) 533-3948 Fax (619) 533-3220

COMPANY INFORMATION

Company Name: Echo Pacific Construction, Inc.	Contact Name: Rachael Gonzalez
Company Address: 1230 Simpson Way, Escondido, CA 92029	Contact Phone: 760-737-3003
	Contact Email: rachael@echopacific.com

CONTRACT INFORMATION

Contract Title: Horton Plaza Improvement Project	Start Date: July 2014
Contract Number (if no number, state location): K-14-6120-DBB-3	End Date: May 2015

SUMMARY OF EQUAL BENEFITS ORDINANCE REQUIREMENTS

The Equal Benefits Ordinance [EBO] requires the City to enter into contracts only with contractors who certify they will provide and maintain equal benefits as defined in SDMC §22.4302 for the duration of the contract. To comply:

- Contractor shall offer equal benefits to employees with spouses and employees with domestic partners.
  - Benefits include health, dental, vision insurance; pension/401(k) plans; bereavement, family, parental leave; discounts, child care; travel/relocation expenses; employee assistance programs; credit union membership; or any other benefit.
  - Any benefit not offer an employee with a spouse, is not required to be offered to an employee with a domestic partner.
- Contractor shall post notice of firm's equal benefits policy in the workplace and notify employees at time of hire and during open enrollment periods.
- Contractor shall allow City access to records, when requested, to confirm compliance with EBO requirements.
- Contractor shall submit *EBO Certification of Compliance*, signed under penalty of perjury, prior to award of contract.

NOTE: This summary is provided for convenience. Full text of the EBO and Rules Implementing the EBO are available at *www.sandiego.gov/administration.*

CONTRACTOR EQUAL BENEFITS ORDINANCE CERTIFICATION

Please indicate your firm's compliance status with the EBO. The City may request supporting documentation.

☒ I affirm **compliance** with the EBO because my firm *(contractor must select one reason):*

- ☒ Provides equal benefits to spouses and domestic partners.
- ☐ Provides no benefits to spouses or domestic partners.
- ☐ Has no employees.
- ☐ Has collective bargaining agreement(s) in place prior to January 1, 2011, that has not been renewed or expired.

☐ I request the City's approval to pay affected employees a cash equivalent in lieu of equal benefits and verify my firm made a reasonable effort but is not able to provide equal benefits upon contract award. I agree to notify employees of the availability of a cash equivalent for benefits available to spouses but not domestic partners and to continue to make every reasonable effort to extend all available benefits to domestic partners.

It is unlawful for any contractor to knowingly submit any false information to the City regarding equal benefits or cash equivalent associated with the execution, award, amendment, or administration of any contract. [San Diego Municipal Code §22.4307(a)]

Under penalty of perjury under laws of the State of California, I certify the above information is true and correct. I further certify that my firm understands the requirements of the Equal Benefits Ordinance and will provide and maintain equal benefits for the duration of the contract or pay a cash equivalent if authorized by the City.

Christopher A. Rowe, President	CA Rowe	5/14/14
Name/Title of Signatory	Signature	Date

FOR OFFICIAL CITY USE ONLY

Receipt Date: EBO Analyst: ☐ Approved ☐ Not Approved – Reason:

(Rev 02/15/2011)

PROPOSAL (BID) PM – The proposal shown here is not how the City handles projects. Please consult with PWCG for the requirements.

Where are the following

The Bidder agrees to the construction of **Horton Plaza Improvement Project,** for the Successor Agency, in accordance with these contract documents for the prices listed below. The Bidder guarantees the Contract Price for a period of 120 days (90 days for federally funded contracts and contracts valued at $500,000 or less) from the date of Bid opening to Award of the Contract. The duration of the Contract Price guarantee shall be extended by the number of days required for the City to obtain all items necessary to fulfill all conditions precedent e.g., bond and insurance.

Item	Quantity	Unit	NAICS	Payment Reference	Description	Unit Price	Extension
BASE BID							
1.	1	LS	237110	9-3.4.1	Mobilization		$693,123
2.	1	LS	524126	2-4.1	Bonds (Payment & Performance)		$135,000
3.	1	LS	237990	701-13.8.4	Water Pollution Control Implementation per the Attached SWPPP, Water Quality Technical Report and Construction Contract Documents		$37,938
4.	1	LS	238910	9-3.1	Demolition/Existing Conditions		$90,237
5.	1	LS	238110	303-1.11	Concrete Structures		$576,734
6.	1	LS	238110	303-5.9	Concrete Curbs, Walks, Ramps, Gutters, Planters, Seat Walls		$1,028,163
7.	1	LS	238140	303-4.1.5	Masonry		$192,100
8.	1	LS	238120	9-3.1	Structural Steel - General		$432,163
9.	1	LS	237990	9-3.1	Structural Steel - Pavilion Trellis		$685,000
10.	1	LS	238350	9-3.1	Woods & Plastics		$20,000
11.	1	LS	238390	9-3.1	Thermal & Moisture		$357,433
12.	1	LS	238350	9-3.1	Doors, Windows, & Curtain Walls		$529,492
13.	1	LS	238340	9-3.1	Finishes		$120,724
14.	1	LS	238220	9-3.1	Fire Suppression		$17,650
15.	1	LS	238220	9-3.1	Plumbing		$146,618
16.	1	LS	238220	9-3.1	HVAC		$38,000

Item	Quantity	Unit	NAICS	Payment Reference	Description	Unit Price	Extension
17.	1	LS	238210	9-3.1	Electrical		$1,282,672
18.	1	LS	238210	9-3.1	Communications		$64,758
19.	1	LS	238210	9-3.1	Security Systems		$64,670
20.	1	LS	238910	9-3.1	Earthwork/Grading		$ 90,237
21.	8	EA	238120	9-3.1	Architectural Luminaria	$	$ 1,193,883
22.	1	LS	237110	308-7	Landscaping & Irrigation		$ 286,053
23.	1	LS	238140	9-3.1	Stone Cladding/Veneer		$687,481
24.	1	LS	238140	9-3.1	Stone Paving – Pedestrian		$1,187,402
25.	1	LS	238140	9-3.1	Stone Paving – Vehicular		$1,657,472
26.	1	LS	237310	9-3.1	Asphalt Paving		$28,458
27.	1	LS	238160	310-5.1.4	Painting		$78,000
28.	1	LS	238120	9-3.1	Handrails & Guardrails		$210,000
29.	1	LS	238120	9-3.1	Bollards (Fixed & Removable)		$ 19,000
30.	1	LS	238990	9-3.1	Trash & Recycling Receptacles		$ 12,984
31.	1	LS	238990	9-3.1	Bike Racks		$ 67,000
32.	1	LS	238990	9-3.1	Signage		$ 7,500
33.	1	LS	237110	306.1.6	Utilities		$ 521,272
34.	1	LS	238990	9-3.1	Historic Park & Historic Fountain Demolition		$168,515
35.	1	LS	238990	9-3.1	Historic Park & Historic Fountain Improvements		$ 784,217
36.	1	AL		9-3.5	Field Orders – Type II		$80,000.00 (K)
						ESTIMATED TOTAL BASE BID:	$~~12,823,130~~ 13,516,255
					ADDITIVE ALTERNATE A		
1.	1	LS	238990	9-3.1	Interactive Fountain		$ 940,300
						ESTIMATED TOTAL ADDITIVE ALTERNATE A:	$ 940,300
						ESTIMATED TOTAL BASE BID PLUS ADDITIVE ALTERNATE A:	$ 14,456,555

Item	Quantity	Unit	NAICS	Payment Reference	Description	Unit Price	Extension
DEDUCTIVE ALTERNATE B							
1.	-1	LS	237990	9-3.1	Pavilion Trellis Structures (Base Bid Item No. 9)		$ 285,000
2.	1	LS	237990	9-3.1	Pavilion Trellis Structures with Uniform Diameter Support Columns		$ 617,659
						ESTIMATED TOTAL DEDUCTIVE ALTERNATE B:	-$ ~~617,341~~ 332,659

TOTAL BID PRICE FOR BID (Items 1 through 36 Plus Additive Alternate A, Item 1, inclusive) amount written in words:

Fourteen million four hundred fifty-six thousand four hundred fifty-five and 00/100

The Bid shall contain an acknowledgment of receipt of all addenda, the numbers of which shall be filled in on the Bid form. If an addendum or addenda has been issued by the City and not noted as being received by the Bidder, this proposal shall be rejected as being **non-responsive**. The following addenda have been received and are acknowledged in this bid: A, B, C, D

The names of all persons interested in the foregoing proposal as principals are as follows:

Christopher A. Rowe, President

IMPORTANT NOTICE: If Bidder or other interested person is a corporation, state secretary, treasurer, and manager thereof; if a co-partnership, state true name of firm, also names of all individual co-partners composing firm; if Bidder or other interested person is an individual, state first and last names in full.

Bidder: Echo Pacific Construction, Inc.

Title: Christopher A. Rowe, President

Business Address: 1230 Simpson Way, Escondido, CA 92029

Place of Business: 1230 Simpson Way, Escondido, CA 92029

Place of Residence: Poway, CA

Signature: CA Rowe

Christopher A. Rowe, President

NOTES:

A. The City shall determine the low Bid based on the Base Bid plus the following Alternate(s): **Additive Alternate A.**

B. After the low Bid has been determined, the Successor Agency may award the Contract for the Base Bid alone or if applicable, for the Base Bid plus any combination of alternates selected in the Successor Agency's sole discretion.

C. Prices and notations shall be in ink or typewritten. All corrections (which have been initiated by the Bidder using erasures, strike out, line out, or "white-out") shall be typed or written in with ink adjacent thereto, and shall be initialed in ink by the person signing the bid proposal.

D. Failure to initial all corrections made in the bidding documents may cause the Bid to be rejected as **non-responsive** and ineligible for further consideration.

E. Blank spaces must be filled in, using figures. Bidder's failure to submit a price for any Bid item that requires the Bidder to submit a price shall render the Bid **non-responsive** and shall be cause for its rejection.

F. Unit prices shall be entered for all unit price items. Unit prices shall not exceed two (2) decimal places. If the Unit prices entered exceed two (2) decimal places, the City will only use the first two digits after the decimal points without rounding up or down.

G. All extensions of the unit prices bid will be subject to verification by the City. In the case of inconsistency or conflict between the product of the Quantity x Unit Price and the Extension, the product shall govern.

H. In the case of inconsistency or conflict, between the sums of the Extensions with the estimated total Bid, the sum of the Extensions shall govern.

I. Bids shall not contain any recapitulation of the Work. Conditional Bids will be rejected as being **non-responsive**. Alternative proposals will not be considered unless called for.

LIST OF SUBCONTRACTORS

In accordance with the requirements provided in the "Subletting and Subcontracting Fair Practices Act", Division 2, Part 1, Chapter 4 of the Public Contract Code, the Bidder shall list below the name and address of each Subcontractor who will perform work, labor, render services or specially fabricates and installs a portion [type] of the work or improvement, in an amount in excess of 0.5% of the Contractor's total Bid. The Bidder shall also list below the portion of the work which will be done by each subcontractor under this Contract. The Contractor shall list only one Subcontractor for each portion of the Work. The **DOLLAR VALUE** of the total Bid to be performed shall be stated for all subcontractors listed. Failure to comply with this requirement shall result in the Bid being rejected as **non-responsive** and ineligible for award. The Bidder's attention is directed to the Special Provisions - General; Paragraph 2-3 Subcontracts, which stipulates the percent of the Work to be performed with the Bidders' own forces. The Bidder shall list all SLBE, ELBE, DBE, DVBE, MBE, WBE, OBE, SDB, WoSB, HUBZone, and SDVOSB Subcontractors that Bidders are seeking recognition towards achieving any mandatory, voluntary, or both subcontracting participation percentages.

	NAME, ADDRESS AND TELEPHONE NUMBER OF SUBCONTRACTOR	CONSTRUCTOR OR DESIGNER	TYPE OF WORK	DOLLAR VALUE OF SUBCONTRACT	MBE, WBE, DBE, DVBE, OBE, ELBE, SLBE, SDB, WoSB, HUBZone, OR SDVOSB①	WHERE CERTIFIED②	CHECK IF JOINT VENTURE PARTNERSHIP
1. ✓	Name: Spectra Company Address: 2510 Supply St City: Pomona State: CA Zip: 91767 Phone: 909-445-8242	Constructor	Historic Renovation	$423,932	N/A	N/A	N/A
	Name: Address: City: State: Zip: Phone:						
2. ✓	Name: Western Address: 5165 N. Irwindale St. City: Escondido State: CA Zip: 92025 Phone: 760-233-2570	Constructor	Demo & Earthwork	$180,474	N/A	N/A	N/A

① As appropriate, Bidder shall identify Subcontractor as one of the following and shall include a valid proof of certification (except for OBE, SLBE and ELBE):

Certified Minority Business Enterprise	MBE	Certified Woman Business Enterprise	WBE
Certified Disadvantaged Business Enterprise	DBE	Certified Disabled Veteran Business Enterprise	DVBE
Other Business Enterprise	OBE	Certified Emerging Local Business Enterprise	ELBE
Certified Small Local Business Enterprise	SLBE	Small Disadvantaged Business	SDB
Woman-Owned Small Business	WoSB	HUBZone Business	HUBZone
Service-Disabled Veteran Owned Small Business	SDVOSB		

② As appropriate, Bidder shall indicate if Subcontractor is certified by:

City of San Diego	CITY	State of California Department of Transportation	CALTRANS
California Public Utilities Commission	CPUC	San Diego Regional Minority Supplier Diversity Council	SRMSDC
State of California's Department of General Services	CADoGS	City of Los Angeles	LA
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Name: Address: City: State: Zip: Phone:						
3. ✓ Name: Concrete Building Supply Address: PO Box 752 #1 City: Bonsall State: CA Zip: 92003 Phone: 760-731-3224	Constructor	CIP Concrete	$472,602	ELBE	City of San Diego	N/A
Name: Address: City: State: Zip: Phone:						

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4. ✓	Name: Quality Rebar Address: PO Box 501877 City: San Diego State: CA Zip: 92150 Phone: 858-679-3934	Constructor	Concrete Reinforcing	$225,963	WOSB	City of San Diego	N/A
	Name: Address: City: State: Zip: Phone:						
5. ✓	Name: Clevenger Masonry Address: PO Box 2337 City: Alpine State: CA Zip: 91903 Phone: 619-390-7997	Constructor	Masonry	$192,100	N/A	N/A	N/A

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Name: Address: City: State: Zip: Phone:						
Name: Kiasor Tile Co. Address: 1595 Jamken Way City: Chula Vista State: CA Zip: 91911 Phone: (619-628-8282	Constructor	Stone Veneer	$3,359,280	WOSB	WBENC	N/A
Name: Address: City: State: Zip: Phone:						

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7. Name: Richardson Steel Address: 9102 Harness St. City: Spring Valley State: CA Zip: 91977 Phone: 619-697-5992	Constructor	Structural Steel	$1,327,160	N/A	N/A	N/A
Name: Address: City: State: Zip: Phone:						
8. Name: Address: City: State: Zip: Phone:	Constructor	Railings				N/A

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Name: Address: City: State: Zip: Phone:						
Name: California Sheet Metal Address: 1020 N. Marshall Ave. City: El Cajon State: CA Zip: 92020 Phone: 619-562-7010	Constructor	Luminarie	$1,183,883	N/A	N/A	N/A
Name: Address: City: State: Zip: Phone:						

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	NAME, ADDRESS AND TELEPHONE NUMBER OF SUBCONTRACTOR	CONSTRUCTOR OR DESIGNER	TYPE OF WORK	DOLLAR VALUE OF SUBCONTRACT	MBE, WBE, DBE, DVBE, OBE, ELBE, SLBE, SDB, WoSB, HUBZone, OR SDVOSB①	WHERE CERTIFIED②	CHECK IF JOINT VENTURE PARTNERSHIP
10.	Name: Alcala Address: 10788 Roselle St. City: San Diego State: CA Zip: 92121 Phone: 858-550-2011	Constructor	Waterproofing	$168,620	SLBE	City of San Diego	N/A
	Name: Address: City: State: Zip: Phone:						
11.	Name: Alcala Address: 10788 Roselle St. City: San Diego State: CA Zip: 92121 Phone: 858-550-2011	Constructor	Roofing	$24,500	SLBE	City of San Diego	N/A

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Certified Disadvantaged Business Enterprise	DBE	Certified Disabled Veteran Business Enterprise	DVBE
Other Business Enterprise	OBE	Certified Emerging Local Business Enterprise	ELBE
Certified Small Local Business Enterprise	SLBE	Small Disadvantaged Business	SDB
Woman-Owned Small Business	WoSB	HUBZone Business	HUBZone
Service-Disabled Veteran Owned Small Business	SDVOSB		

② As appropriate, Bidder shall indicate if Subcontractor is certified by:

City of San Diego	CITY	State of California Department of Transportation	CALTRANS
California Public Utilities Commission	CPUC	San Diego Regional Minority Supplier Diversity Council	SRMSDC
State of California's Department of General Services	CADoGS	City of Los Angeles	LA
State of California	CA	U.S. Small Business Administration	SBA

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Name: Address: City: State: Zip: Phone:						
Name: Address: City: State: Zip: Phone:	Constructor	Green Roof				
Name: Address: City: State: Zip: Phone:						

12.

① As appropriate, Bidder shall identify Subcontractor as one of the following and shall include a valid proof of certification (except for OBE, SLBE and ELBE):

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Certified Disadvantaged Business Enterprise	DBE	Certified Disabled Veteran Business Enterprise	DVBE
Other Business Enterprise	OBE	Certified Emerging Local Business Enterprise	ELBE
Certified Small Local Business Enterprise	SLBE	Small Disadvantaged Business	SDB
Woman-Owned Small Business	WoSB	HUBZone Business	HUBZone
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13. ✓	Name: Challenger Sheet Metal Address: 9353 Abraham Way City: Santee State: CA Zip: 92071 Phone: 858-547-8040	Constructor	Sheet Metal	$130,000	N/A	N/A	N/A
	Name: Address: City: State: Zip: Phone:						
14. ✓	Name: VBT Address: 14035 Kirkham Way City: Poway State: CA Zip: 92064 Phone: 858-603-7884	Constructor	Doors, Frames, Hdwr	$42,735	N/A	N/A	N/A

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Certified Disadvantaged Business Enterprise	DBE	Certified Disabled Veteran Business Enterprise	DVBE
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Name: Address: City: State: Zip: Phone:						
15 Name: Perfection Glass Address: 554 3rd St. City: Lake Elsinore State: CA Zip: 92530 Phone: 951-674-0240	Constructor	Aluminum & Glass	$11,757	N/A	N/A	N/A
Name: Sun Pacific Glazing Address: 747 Grand Ave. City: Sonoma Valley State: CA Zip: 91979 Phone: 619-303-7182	C1	C1	$479,000	N/A	N/A	N/A

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16.	Name: Address: City: State: Zip: Phone:	Constructor	Gypsum Board				
	Name: Address: City: State: Zip: Phone:						
17.	Name: TMT Address: 11211 Sorrento Valley Rd City: San Diego State: CA Zip: 92121 Phone: 858-452-8082	Constructor	Tile	$44,974	N/A	N/A	N/A

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Name: Address: City: State: Zip: Phone:						
18. Name: Recarono Inc. Address: 501 W. Broadway City: San Diego State: CA Zip: 92101 Phone: 619-230-1730	Constructor	Painting	$78,000	N/A	N/A	N/A
Name: Address: City: State: Zip: Phone:						

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19.	Name: Southwest Specialties Address: 11653 Riverside Dr. City: Lakeside State: CA Zip: 92040 Phone: 619-258-9944	Constructor	Specialties	$40,681	SLBE, ELBE	City of SD	N/A
	Name: Address: City: State: Zip: Phone:						
20.	Name: Scott McCharel Inc. Address: PO Box 127 City: San Marcos State: CA Zip: 92079 Phone: 760-744-2807	Constructor	Plumbing	$146,618	N/A	N/A	N/A

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Name: Address: City: State: Zip: Phone:						
21. Name: Innovative Mechanical Address: 1831.5 Wheatlands Ave. City: Santee State: CA Zip: 92071 Phone: 619-449-4444	Constructor	HVAC	$38,000	N/A	N/A	N/A
Name: Address: City: State: Zip: Phone:						

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22.	Name: Titan Electric Group Address: 10746 Kenny St City: Santee State: CA Zip: 92071 Phone: 619-938-2930	Constructor	Electrical	$1,289,672	ELBE, SLBE	City of SD	N/A
	Name: Address: City: State: Zip: Phone:						
23.	Name: Kiser Tile Co Address: 1595 Hayden Way City: State: CA Zip: Phone:	~~Constructor~~	~~Stone Paving~~				

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Name: Address: City: State: Zip: Phone:						
24. ✓ Name: Western Gardens Address: 4616 E. Pannonia Rd. City: Carlsbad State: CA Zip: 92008 Phone: 760-720-1459	Constructor	Landscaping	$280,653	SLBE	City of SD	N/A
Name: Address: City: State: Zip: Phone:						

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State of California's Department of General Services	CADoGS	City of Los Angeles	LA
State of California	CA	U.S. Small Business Administration	SBA

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LIST OF SUBCONTRACTORS

In accordance with the requirements provided in the "Subletting and Subcontracting Fair Practices Act", Division 2, Part 1, Chapter 4 of the Public Contract Code, the Bidder shall list below the name and address of each Subcontractor who will perform work, labor, render services or specially fabricates and installs a portion [type] of the work or improvement, in an amount in excess of 0.5% of the Contractor's total Bid. The Bidder shall also list below the portion of the work which will be done by each subcontractor under this Contract. The Contractor shall list only one Subcontractor for each portion of the Work. The **DOLLAR VALUE** of the total Bid to be performed shall be stated for all subcontractors listed. Failure to comply with this requirement shall result in the Bid being rejected as **non-responsive** and ineligible for award. The Bidder's attention is directed to the Special Provisions - General; Paragraph 2-3 Subcontracts, which stipulates the percent of the Work to be performed with the Bidders' own forces. The Bidder shall list all SLBE, ELBE, DBE, DVBE, MBE, WBE, OBE, SDB, WoSB, HUBZone, and SDVOSB Subcontractors that Bidders are seeking recognition towards achieving any mandatory, voluntary, or both subcontracting participation percentages.

NAME, ADDRESS AND TELEPHONE NUMBER OF SUBCONTRACTOR	CONSTRUCTOR OR DESIGNER	TYPE OF WORK	DOLLAR VALUE OF SUBCONTRACT	MBE, WBE, DBE, DVBE, OBE, ELBE, SLBE, SDB, WoSB, HUBZone, OR SDVOSB①	WHERE CERTIFIED②	CHECK IF JOINT VENTURE PARTNERSHIP
25. Name: Ahrens Mechanical Address: 5915 Mission Gorge Rd. City: San Diego State: CA Zip: 92120 Phone: (619) 287-9030	Constructor	Site Utilities	$5[illegible],000	N/A	N/A	N/A
J Name: HPF Mechanical Address: 2107 E. Bell Terrace City: Bakersfield State: CA Zip: _____ Phone: (661-397-2601	"	"	$521,272	N/A	N/A	N/A
26. J Name: Applied Restoration, Inc Address: 3625 Grove St. City: Lemon Grove State: CA Zip: 91945 Phone: (619-433-4701	Constructor	Caulking	$34,253	SLBE	City of SD	N/A

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Certified Disadvantaged Business Enterprise	DBE	Certified Disabled Veteran Business Enterprise	DVBE
Other Business Enterprise	OBE	Certified Emerging Local Business Enterprise	ELBE
Certified Small Local Business Enterprise	SLBE	Small Disadvantaged Business	SDB
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Name: Address: City: State: Zip: Phone:						
27. Name: AVER Group Address: 9465 Business Park Ave. City: San Diego State: CA Zip: 92131 Phone: 858-549-1094	Constructor	Communications	$64,758	N/A	N/A	N/A
Name: Address: City: State: Zip: Phone:						

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28. Name: Silverstrand Technologies Address: 9625 Mission Gorge Rd. City: Santee State: CA Zip: 92071 Phone: 619-328-0330	Constructor	Security Cameras	$64,670	N/A	N/A	N/A
Name: Address: City: State: Zip: Phone:						
29. Name: Excel Concrete Address: 26441 Rancho Calif. Rd. City: Temecula State: CA Zip: 92590 Phone: 951-695-0170	Constructor	Site paving	$715,500	N/A	N/A	N/A

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Other Business Enterprise	OBE	Certified Emerging Local Business Enterprise	ELBE
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NAMED EQUIPMENT/MATERIAL SUPPLIER LIST

The Bidder seeking the recognition of equipment, materials, or supplies obtained from Suppliers towards achieving any mandatory, voluntary, or both subcontracting participation percentages shall list the Supplier(s) on the Named Equipment/Material Supplier List. The Named Equipment/Material Supplier List, at a minimum, shall have the name, locations (City) and the **DOLLAR VALUE** of the Suppliers. The Bidder will be credited up to 60% of the amount to be paid to the Suppliers for such materials and supplies unless vendor manufactures or substantially alters materials and supplies in which case 100% will be credited. The Bidder is to indicate (Yes/No) whether listed firm is a supplier or manufacturer. In calculating the subcontractor participation percentages, vendors/suppliers will receive 60% credit of the listed **DOLLAR VALUE**, whereas manufacturers will receive 100% credit. If no indication provided, listed firm will be credited at 60% of the listed dollar value for purposes of calculating the Subcontractor Participation Percentage, Suppliers will receive 60% credit of the listed **DOLLAR VALUE**, whereas manufacturers will receive 100% credit. If no indication provided, listed firm will be credited at 60% of the listed **DOLLAR VALUE** for purposes of calculating the subcontractor participation percentages.

	NAME, ADDRESS AND TELEPHONE NUMBER OF VENDOR/SUPPLIER	MATERIALS OR SUPPLIES	DOLLAR VALUE OF MATERIAL OR SUPPLIES	SUPPLIER (Yes/No)	MANUFACTURER (Yes/No)	MBE, WBE, DBE, DVBE, OBE, ELBE, SLBE, SDB, WoSB, HUBZone, OR SDVOSB①	WHERE CERTIFIED②
1.	Name: Relagio Precast Address: 3210 Island Ave. City: San Diego State: CA Zip: 92102 Phone: 858-301-1357	Precast Concrete	$86,700	Yes	NO	N/A	N/A
	Name: Address: City: State: Zip: Phone:						
	Name: Address: City: State: Zip: Phone:						

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SUBCONTRACTORS ADDITIVE/DEDUCTIVE ALTERNATE (USE ONLY WHEN ADDITIVE ALTERNATES ARE REQUIRED)

Bidder shall list all Subcontractors described in the Bidder's *Base Bid* whose percentage of work will increase or decrease if alternates are selected for award. Bidder shall also list additional Subcontractors not described in the Bidder's *Base Bid* who, as a result of the alternates, will perform work or labor, or render services, or specially fabricate and install a portion [type] of work or improvements in an amount in excess of 0.5%.. The Bidder shall list all SLBE, ELBE, DBE, DVBE, MBE, WBE, OBE, SDB, WoSB, HUBZone, and SDVOSB Subcontractors that Bidders are seeking recognition towards achieving any mandatory, voluntary, or both subcontracting participation percentages.

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1.	Deduct	Name: Richardson Steel Address: 9102 Harness St. City: Spring Valley State: CA Zip: 91977 Phone: 619-697-5992	Constructor	Structural Steel	$67,341	N/A	N/A	N/A
		Name: Address: City: State: Zip: Phone:						
2.	Add	Name: Pacific Aqua Scape Address: 17520 Newhope St. City: Fountain Valley State: CA Zip: 92708 Phone:	Constructor	Interactive Fountain	$940,300	N/A	N/A	N/A

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