

City of San Diego

CONTRACTOR'S NAME: West Coast General Corporation
ADDRESS: 13700 Stowe Dr. Ste 100, Poway, CA 92064
TELEPHONE NO.: 619-561-4200 FAX NO.: 619-561-4205
CITY CONTACT: Angelica Gil, Contract Specialist, Email: AngelicaG@sandiego.gov
Phone No. (619) 533-3622
J. Acevedo / A. Jaro / egz

BIDDING DOCUMENTS



FOR

101 ASH ST TENANT IMPROVEMENTS

BID NO.: K-18-1586-DBB-3-A
SAP NO. (WBS/IO/CC): S-17009
CLIENT DEPARTMENT: 1613
COUNCIL DISTRICT: 3
PROJECT TYPE: BS

THIS CONTRACT WILL BE SUBJECT TO THE FOLLOWING:

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

R-2019-61

BID DUE DATE:

2:00 PM

JULY 12, 2018

CITY OF SAN DIEGO

PUBLIC WORKS CONTRACTS

525 B STREET, SUITE 750, MS 908A

SAN DIEGO, CA 92101

ENGINEER OF WORK

The engineering Specifications and Special Provisions contained herein have been prepared by or under the direction of the following Registered Architect:

Thomas P. Hefferman

5/29/2018

Seal:



1) Registered Architect

Date

Jason D. Grant

5/29/18

Seal



2) For City Engineer

Date

Nikki Damian Lewis

5/29/18

Seal



3) For City Engineer
(for Right-of Way improvements only)

Date

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NOTICE INVITING BIDS

1. **SUMMARY OF WORK:** This is the City of San Diego's (City) solicitation process to acquire Construction services for **101 Ash St Tenant Improvements**. For additional information refer to Attachment A.
2. **FULL AND OPEN COMPETITION:** This contract is open to full competition and may be bid on by Contractors who are on the City's current Prequalified Contractors' List. For information regarding the Contractors Prequalified list visit the City's web site: <http://www.sandiego.gov>.
3. **ESTIMATED CONSTRUCTION COST:** The City's estimated construction cost for this project is **\$17,357,000**.
4. **BID DUE DATE AND TIME ARE: JULY 12, 2018, AT 2:00 PM.**
5. **PREVAILING WAGE RATES APPLY TO THIS CONTRACT:** Refer to Attachment D.
6. **LICENSE REQUIREMENT:** The City has determined that the following licensing classification is required for this contract: **B**
7. **SUBCONTRACTING PARTICIPATION PERCENTAGES:** Subcontracting participation percentages apply to this contract.
 - 7.1. 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	3.3%
2.	ELBE participation	4.8%
3.	Total mandatory participation	8.1%
 - 7.2. The Bid may be declared non-responsive if the Bidder fails to meet the following requirements:
 - 7.2.1. Include SLBE-ELBE certified subcontractors at the overall mandatory participation percentage identified in this document; **OR**
 - 7.2.2. Submit Good Faith Effort documentation, saved in searchable Portable Document Format (PDF) and stored on Compact Disc (CD) or Digital Video Disc (DVD), 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.

8. PRE-BID MEETING:

8.1. Prospective Bidders are **encouraged** to attend the Pre-Bid Meeting. The purpose of the meeting is to discuss the scope of the Project, submittal requirements, the pre-qualification process and any Equal Opportunity Contracting Program requirements and reporting procedures. To request a sign language or oral interpreter for this visit, call the Public Works Contracts at (619) 533-3450 at least 5 Working Days prior to the meeting to ensure availability. The Pre-Bid meeting is scheduled as follows:

Date: JUNE 20, 2018
Time: 10:30 AM
Location: 7TH FLOOR, WADA CONFERENCE ROOM
525 B STREET, SUITE 750, MS 908A
San Diego, CA 92101

Attendance at the Pre-Bid Meeting will be evidenced by the representative's signature on the attendance roster. It is the responsibility of the Bidder's representative to complete and sign the attendance roster.

9. PRE-BID SITE VISIT: All those wishing to submit a bid **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 Contracts at (619) 533-3450 at least 5 Working Days prior to the meeting to ensure availability. The Pre-Bid Site Visit is scheduled as follows:

Time: JUNE 20, 2018
Date: 11:30 AM
Location: 101 Ash Street
San Diego, CA 92101

10. AWARD PROCESS:

10.1. The Award of this contract is contingent upon the Contractor's compliance with all conditions of Award as stated within these documents and within the Notice of Intent to Award.

10.2. Upon acceptance of bids and determination of the apparent low bidder, the City will prepare the contract documents for execution within approximately 21 days of the date of the bid opening. The City will then award the contract upon receipt of properly signed Contract, bonds, and insurance documents.

10.3. This contract will be deemed executed and effective only upon the signing of the Contract by the Mayor or his designee and approval as to form by the City Attorney's Office.

10.4. The low Bid will be determined by the Base Bid plus all the Alternates.

10.5. Once the low bid has been determined, the City may, at its sole discretion, award the contract for the Base bid alone; or for the Base bid plus one or more alternates.

11. SUBMISSION OF QUESTIONS:

11.1. The Director (or Designee) of 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. Any questions related to this solicitation shall be submitted to:

Public Works Contracts
525 B Street, Suite 750, MS 908A
San Diego, California, 92101
Attention: Angelica Gil

OR:

AngelicaG@sandiego.gov

- 11.2.** Questions received less than 14 days prior to the date for opening of Bids may not be considered.
- 11.3.** Questions or clarifications deemed by the City to be material shall be answered via issuance of an addendum and posted to the City's online bidding service.
- 11.4.** Only questions answered by formal written addenda shall be binding. Oral and other interpretations or clarifications shall be without legal effect. It is the Bidder's responsibility to be informed of any addenda that have been issued and to include all such information in its Bid.

12. ADDITIVE ALTERNATES:

12.1. The additive alternates have been established to allow the City to compare the cost of specific portions of the Work with the Project's budget and enable the City to make a decision whether to incorporate these portions 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 for the Base Bid plus one or more Alternates.

INSTRUCTIONS TO BIDDERS

1. PREQUALIFICATION OF CONTRACTORS:

1.1. Contractors submitting a Bid must be pre-qualified for the total amount proposed, including 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 may be deemed **non-responsive** and ineligible for award. Complete information and links to the on-line prequalification application are available at:

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

1.2. The completed application must be submitted online no later than 2 weeks prior to the bid opening.

1.3. Due to the City's fiduciary requirement to safeguard vendor data, City staff will not be able to provide information regarding contractors' prequalification status over the telephone. Contractors may access real-time information about their prequalification status via their vendor profile on [PlanetBids™](#).

2. **ELECTRONIC FORMAT RECEIPT AND OPENING OF BIDS:** Bids will be received in electronic format (eBids) EXCLUSIVELY at the City of San Diego's electronic bidding (eBidding) site, at: <http://www.sandiego.gov/cip/bidopps/index.shtml> and are due by the date, and time shown on the cover of this solicitation.

2.1. **BIDDERS MUST BE PRE-REGISTERED** with the City's bidding system and possess a system-assigned Digital ID in order to submit an electronic bid.

2.2. The City's bidding system will automatically track information submitted to the site including IP addresses, browsers being used and the URLs from which information was submitted. In addition, the City's bidding system will keep a history of every login instance including the time of login, and other information about the user's computer configuration such as the operating system, browser type, version, and more. Because of these security features, Contractors who disable their browsers' cookies will not be able to log in and use the City's bidding system.

2.3. The City's electronic bidding system is responsible for bid tabulations. Upon the bidder's or proposer's entry of their bid, the system will ensure that all required fields are entered. **The system will not accept a bid for which any required information is missing.** This includes all necessary pricing, subcontractor listing(s) and any other essential documentation and supporting materials and forms requested or contained in these solicitation documents.

- 2.4. BIDS REMAIN SEALED UNTIL BID DEADLINE.** eBids are transmitted into the City's bidding system via hypertext transfer protocol secure (https) mechanism using SSL 128-256 bit security certificates issued from Verisign/Thawte which encrypts data being transferred from client to server. Bids submitted prior to the "Bid Due Date and Time" are not available for review by anyone other than the submitter who has until the "Bid Due Date and Time" to change, rescind or retrieve its proposal should it desire to do so.
- 2.5. BIDS MUST BE SUBMITTED BY BID DUE DATE AND TIME.** Once the bid deadline is reached, no further submissions are accepted into the system. Once the Bid Due Date and Time has lapsed, bidders, proposers, the general public, and City staff are able to immediately see the results on line. City staff may then begin reviewing the submissions for responsiveness, EOCP compliance and other issues. The City may require any Bidder to furnish statement of experience, financial responsibility, technical ability, equipment, and references.
- 2.6. RECAPITULATION OF THE WORK.** Bids shall not contain any recapitulation of the Work. Conditional Bids may be rejected as being non-responsive. Alternative proposals will not be considered unless called for.
- 2.7. BIDS MAY BE WITHDRAWN** by the Bidder only up to the bid due date and time.
- 2.7.1. Important Note:** Submission of the electronic bid into the system may not be instantaneous. Due to the speed and capabilities of the user's internet service provider (ISP), bandwidth, computer hardware and other variables, it may take time for the bidder's submission to upload and be received by the City's eBidding system. It is the bidder's sole responsibility to ensure their bids are received on time by the City's eBidding system. The City of San Diego is not responsible for bids that do not arrive by the required date and time.
- 2.8. ACCESSIBILITY AND AMERICANS WITH DISABILITIES ACT (ADA) COMPLIANCE:** To request a copy of this solicitation in an alternative format, contact the Public Works Contract Specialist listed on the cover of this solicitation at least five (5) working days prior to the Bid/Proposal due date to ensure availability.

3. ELECTRONIC BID SUBMISSIONS CARRY FULL FORCE AND EFFECT

- 3.1.** The bidder, by submitting its electronic bid, acknowledges that doing so carries the same force and full legal effect as a paper submission with a longhand (wet) signature.
- 3.2.** By submitting an electronic bid, the bidder certifies that the bidder has thoroughly examined and understands the entire Contract Documents (which consist of the plans and specifications, drawings, forms, affidavits and the solicitation documents), and that by submitting the eBid as its bid proposal, the bidder acknowledges, agrees to and is bound by the entire Contract Documents, including any addenda issued thereto, and incorporated by reference in the Contract Documents.

- 3.3.** The Bidder, by submitting its electronic bid, agrees to and certifies under penalty of perjury under the laws of the State of California, that the certification, forms and affidavits submitted as part of this bid are true and correct.
- 3.4.** The Bidder agrees to the construction of the project as described in Attachment “A–Scope of Work” for the City of San Diego, in accordance with the requirements set forth herein for the electronically submitted prices. The Bidder guarantees the Contract Price for a period of 120 days from the date of Bid opening. 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.
- 4. 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.
- 5. CONTRACTOR REGISTRATION AND ELECTRONIC REPORTING SYSTEM:**
- 5.1.** **Prior** to the Award of the Contract or Task Order, you and your Subcontractors and Suppliers must register with the City’s web-based vendor registration and bid management system. For additional information go to:

<http://www.sandiego.gov/purchasing/bids-contracts/vendorreg.shtml>.
- 5.2.** The City 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 City 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.
- 6. 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 7-6, “The Contractors Representative” in The GREENBOOK and 7-6.1 in The WHITEBOOK.
- 7. PREVAILING WAGE RATES WILL APPLY:** Refer to Attachment D.
- 8. SUBCONTRACTING PARTICIPATION PERCENTAGES:** Subcontracting participation percentages apply to this contract. Refer to Attachment E.

9. INSURANCE REQUIREMENTS:

- 9.1. All certificates of insurance and endorsements required by the contract are to be provided upon issuance of the City's Notice of Intent to Award letter.
- 9.2. 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.

10. 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") http://www.greenbookspecs.org/	2015	PWPI070116-01
City of San Diego Standard Specifications for Public Works Construction ("The WHITEBOOK")* https://www.sandiego.gov/publicworks/edocref/greenbook	2015	PWPI070116-02
City of San Diego Standard Drawings* https://www.sandiego.gov/publicworks/edocref/standarddraw	2016	PWPI070116-03
Citywide Computer Aided Design and Drafting (CADD) Standards https://www.sandiego.gov/publicworks/edocref/drawings	2016	PWPI092816-04
California Department of Transportation (CALTRANS) Standard Specifications – http://www.dot.ca.gov/des/oe/construction-contract-standards.html	2015	PWPI092816-05
CALTRANS Standard Plans http://www.dot.ca.gov/des/oe/construction-contract-standards.html	2015	PWPI092816-06
California Manual on Uniform Traffic Control Devices Revision 1 (CA MUTCD Rev 1) - http://www.dot.ca.gov/trafficops/camutcd/	2014	PWPI092816-07
NOTE: *Available online under Engineering Documents and References at: http://www.sandiego.gov/publicworks/edocref/index.shtml		

11. CITY'S RESPONSES AND ADDENDA: The City, at its discretion, may respond to any or all questions submitted in writing via the City's eBidding web site in the **form of an addendum**. No other responses to questions, oral or written shall be of any force or effect with respect to this solicitation. The changes to the Contract Documents through addenda are made effective as though originally issued with the Bid. The Bidders shall acknowledge the receipt of Addenda at the time of bid submission.

- 12. 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.
- 13. CONTRACT PRICING:** This solicitation is for a Lump Sum contract with Unit Price provisions as set forth herein. The Bidder agrees to perform construction services for the City of San Diego in accordance with these contract documents for the prices listed below. The Bidder further agrees to guarantee the Contract Price for a period of 120 days from the date of Bid opening. The duration of the Contract Price guarantee may be extended, by mutual consent of the parties, by the number of days required for the City to obtain all items necessary to fulfill all contractual conditions.
- 14. SUBCONTRACTOR INFORMATION:**
- 14.1. LISTING OF SUBCONTRACTORS.** In accordance with the requirements provided in the "Subletting and Subcontracting Fair Practices Act" of the California Public Contract Code, the Bidder shall provide the **NAME** and **ADDRESS** of each Subcontractor who will perform work, labor, render services or who 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 state within the description, whether the subcontractor is a **CONSTRUCTOR, CONSULTANT** or **SUPPLIER**. The Bidder shall state the **DIR REGISTRATION NUMBER** for all subcontractors and shall further state within the description, the **PORTION** of the work which will be performed 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 may 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 for which Bidders are seeking recognition towards achieving any mandatory, voluntary (or both) subcontracting participation goals.
- 14.2. LISTING OF SUPPLIERS.** Any Bidder seeking the recognition of Suppliers of equipment, materials, or supplies obtained from third party Suppliers towards achieving any mandatory or voluntary (or both) subcontracting participation goals shall provide, at a minimum, the **NAME, LOCATION (CITY), DIR REGISTRATION NUMBER** and the **DOLLAR VALUE** of each supplier. The Bidder will be credited up to 60% of the amount to be paid to the Suppliers for materials and supplies unless vendor manufactures or substantially alters materials and supplies, in which case, 100% will be credited. The Bidder is to indicate within the description whether the listed firm is a supplier or manufacturer. If no indication is provided, the listed firm will be credited at 60% of the listed dollar value for purposes of calculating the Subcontractor Participation Percentage.

- 14.3. LISTING OF SUBCONTRACTORS OR SUPPLIERS FOR ALTERNATES.** For subcontractors or suppliers to be used on additive or deductive alternate items, in addition to the above requirements, bidder shall further note "ALTERNATE" and alternate item number within the description.
- 15. SUBMITTAL OF "OR EQUAL" ITEMS:** See Section 4-1.6, "Trade Names or Equals" in The WHITEBOOK and as amended in the SSP.
- 16. AWARD:**
- 16.1.** The Award of this contract is contingent upon the Contractor's compliance with all conditions precedent to Award.
- 16.2.** Upon acceptance of a Bid, the City 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.
- 16.3.** This contract will be deemed executed and effective only upon the signing of the Contract by the Mayor or his designee and approval as to form the City Attorney's Office.
- 17. 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 not less than the specified amount. Failure to comply with this requirement shall render the bid **non-responsive** and ineligible for award.
- 18. 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 Contracts.
- 19. ONLY ONE BID PER CONTRACTOR SHALL BE ACCEPTED:** 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.
- 20. 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 within these documents.

21. BIDDER'S GUARANTEE OF GOOD FAITH (BID SECURITY) FOR DESIGN-BID-BUILD CONTRACTS:

- 21.1.** For bids \$250,000 and above, bidders shall submit Bid Security at bid time. Bid Security shall be in one of the following forms: a cashier's check, or a properly certified check upon some responsible bank; or an approved corporate surety bond payable to the City of San Diego for an amount of not less than 10% of the total bid amount.
- 21.2.** This check or bond, and the monies represented thereby, will be held by the City as a guarantee that the Bidder, if awarded the contract, will in good faith enter into the contract and furnish the required final performance and payment bonds.
- 21.3.** The Bidder agrees that in the event of the Bidder's failure to execute this contract and provide the required final bonds, the money represented by the cashier's or certified check will remain the property of the City; and the Surety agrees that it will pay to the City the damages, not exceeding the sum of 10% of the amount of the Bid, that the City may suffer as a result of such failure.
- 21.4.** At the time of bid submission, bidders must upload and submit an electronic PDF copy of the aforementioned bid security. Whether in the form of a cashier's check, a properly certified check or an approved corporate surety bond payable to the City of San Diego, the bid security must be uploaded to the City's eBidding system. Within twenty-four (24) hours after the bid due date and time, the first five (5) apparent low bidders must provide the City with the original bid security.
- 21.5.** Failure to submit the electronic version of the bid security at the time of bid submission AND failure to provide the original within twenty-four (24) hours may cause the bid to be rejected and deemed **non-responsive**.

22. AWARD OF CONTRACT OR REJECTION OF BIDS:

- 22.1.** This contract may be awarded to the lowest responsible and reliable Bidder.
- 22.2.** Bidders shall complete ALL eBid forms as required by this solicitation. Incomplete eBids will not be accepted.
- 22.3.** The City reserves the right to reject any or all Bids, to waive any informality or technicality in Bids received, and to waive any requirements of these specifications as to bidding procedure.
- 22.4.** Bidders will not be released on account of their errors of judgment. Bidders may be released only upon receipt by the City within 3 Working Days of the bid opening, written notice from the Bidder which shows proof of honest, credible, clerical error of a material nature, free from fraud or fraudulent intent; and of evidence that reasonable care was observed in the preparation of the Bid.

- 22.5.** A bidder who is not selected for contract award may protest the award of a contract to another bidder by submitting a written protest in accordance with the San Diego Municipal Code.
- 22.6.** The City of San Diego will not discriminate in the award of contracts with regard to race, religion creed, color, national origin, ancestry, physical handicap, marital status, sex or age.
- 22.7.** Each Bid package properly signed as required by these specifications shall constitute a firm offer which may be accepted by the City within the time specified herein.
- 22.8.** The City reserves the right to evaluate all Bids and determine the lowest Bidder on the basis of the base bid and any proposed alternates or options as detailed herein.

23. BID RESULTS:

- 23.1.** The availability of the bids on the City's eBidding system 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 notation of such will be made on the eBidding system. The new ranking and apparent low bidder will be adjusted accordingly.
- 23.2.** To obtain the bid results, view the results on the City's web site, or request the results by U.S. mail and provide a self-addressed, stamped envelope. If requesting by mail, be sure to reference the bid name and number. The bid tabulations will be mailed to you upon their completion. The results will not be given over the telephone.

24. THE CONTRACT:

- 24.1.** The Bidder to whom award is made shall execute a written contract with the City of San Diego 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.
- 24.2.** 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 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.
- 24.3.** 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.

- 24.4.** Pursuant to the San Diego City Charter section 94, the City 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.
- 24.5.** 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 Mayor or designee and approval as to form the City Attorney's Office. If the Apparent Low Bidder does not execute the Contract or submit required documents and information, the City 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.
- 25. 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.
- 26. CITY STANDARD PROVISIONS:** This contract is subject to the following standard provisions. See The WHITEBOOK for details.
- 26.1.** The City of San Diego Resolution No. R-277952 adopted on May 20, 1991 for a Drug-Free Workplace.
- 26.2.** The City of San Diego Resolution No. R-282153 adopted on June 14, 1993 related to the Americans with Disabilities Act.
- 26.3.** The City of San Diego Municipal Code §22.3004 for Contractor Standards.
- 26.4.** The City of San Diego's Labor Compliance Program and the State of California Labor Code §§1771.5(b) and 1776.
- 26.5.** 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.

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

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

27. PRE-AWARD ACTIVITIES:

27.1. The contractor selected by the City to execute a contract for this Work shall submit the required documentation as specified in the herein and in the Notice of Award. Failure to provide the information as specified may result in the Bid being rejected as **non-responsive**.

27.2. The decision that bid is non-responsive for failure to provide the information required within the time specified shall be at the sole discretion of the City.

PERFORMANCE BOND, LABOR AND MATERIALMEN'S BOND

FAITHFUL PERFORMANCE BOND AND LABOR AND MATERIALMEN'S BOND:

West Coast General Corporation, a corporation, as principal, and
Fidelity and Deposit Company of Maryland and
Zurich American 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 a municipal corporation in the sum of
Seventeen Million Eighty Thousand Two Hundred Sixty One Dollars and Zero Cents
(\$17,080,261.00) for the faithful performance of the annexed contract, and in the sum of **Seventeen**
Million Eighty Thousand Two Hundred Sixty One Dollars and Zero Cents (\$17,080,261.00) for the
benefit of laborers and materialmen designated below.

Conditions:

If the Principal shall faithfully perform the annexed contract with the City of 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 Article 2. Claimants, (iii) public works of improvement commencing with Civil Code Section 9100 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.

PERFORMANCE BOND, LABOR AND MATERIALMEN'S BOND (continued)

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

Dated July 25th, 2018

Approved as to Form

West Coast General Corporation

Principal

By 

David E. Davey, President

Printed Name of Person Signing for Principal

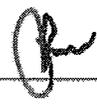
Mara W. Elliott, City Attorney

By Christina Rae
Deputy City Attorney 8/21/18

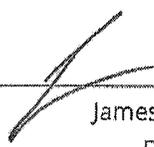
Fidelity and Deposit Company of Maryland and
Zurich American Insurance Company

Surety

By 
Attorney-in-fact, Richard Hallett

By 
Attorney-in-fact, Richard Hallett

Approved:

By 
James Nagelvoort
Director
Public Works Department

777 S. Figueroa Street, Suite 3900
Local Address of Surety

Los Angeles, CA 90017
Local Address (City, State) of Surety

213-270-0717
Local Telephone No. of Surety

Premium \$ 97,655.00
Premium is for contract term and subject to adjustment based on final contract price.

Bond No. 9217787

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT Civil Code § 1189

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document, to which this certificate is attached, and not the truthfulness, accuracy or validity of that document.

STATE OF CALIFORNIA

County of San Diego

On JUL 25 2018 before me, Jose Lemus, Notary Public,
Date Insert Name of Notary exactly as it appears on the official seal

personally appeared Richard Hallett
Name(s) of Signer(s)



Place Notary Seal Above

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 [Handwritten Signature]
Signature of Notary Public: Jose Lemus

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: _____

RIGHT THUMBPRINT OF SIGNER

Top of thumb here

Signer is Representing:
Fidelity and Deposit Company of Maryland and Zurich American Insurance Company

Signer's Name: _____

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

RIGHT THUMBPRINT OF SIGNER

Top of thumb here

Signer is Representing:

**ZURICH AMERICAN INSURANCE COMPANY
COLONIAL AMERICAN CASUALTY AND SURETY COMPANY
FIDELITY AND DEPOSIT COMPANY OF MARYLAND
POWER OF ATTORNEY**

KNOW ALL MEN BY THESE PRESENTS: That the ZURICH AMERICAN INSURANCE COMPANY, a corporation of the State of New York, the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY, a corporation of the State of Maryland, and the FIDELITY AND DEPOSIT COMPANY OF MARYLAND a corporation of the State of Maryland (herein collectively called the "Companies"), by **DAVID MCVICKER, Vice President**, in pursuance of authority granted by Article V, Section 8, of the By-Laws of said Companies, which are set forth on the reverse side hereof and are hereby certified to be in full force and effect on the date hereof, do hereby nominate, constitute, and appoint **Richard HALLETT, Aidan SMOCK, Tim MCCLELLAN, Marta COLLETT and Jose LEMUS, all of San Diego, California, EACH** its true and lawful agent and Attorney-in-Fact, to make, execute, seal and deliver, for, and on its behalf as surety, and as its act and deed: **any and all bonds and undertakings**, and the execution of such bonds or undertakings in pursuance of these presents, shall be as binding upon said Companies, as fully and amply, to all intents and purposes, as if they had been duly executed and acknowledged by the regularly elected officers of the ZURICH AMERICAN INSURANCE COMPANY at its office in New York, New York., the regularly elected officers of the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY at its office in Owings Mills, Maryland., and the regularly elected officers of the FIDELITY AND DEPOSIT COMPANY OF MARYLAND at its office in Owings Mills, Maryland., in their own proper persons.

The said Vice President does hereby certify that the extract set forth on the reverse side hereof is a true copy of Article V, Section 8, of the By-Laws of said Companies, and is now in force.

IN WITNESS WHEREOF, the said Vice-President has hereunto subscribed his/her names and affixed the Corporate Seals of the said **ZURICH AMERICAN INSURANCE COMPANY, COLONIAL AMERICAN CASUALTY AND SURETY COMPANY, and FIDELITY AND DEPOSIT COMPANY OF MARYLAND**, this 3rd day of August, A.D. 2017.

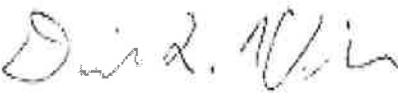
ATTEST:

**ZURICH AMERICAN INSURANCE COMPANY
COLONIAL AMERICAN CASUALTY AND SURETY COMPANY
FIDELITY AND DEPOSIT COMPANY OF MARYLAND**



By: 

*Assistant Secretary
Joshua Lecker*



*Vice President
David McVicker*

State of Maryland
County of Baltimore

On this 3rd day of August, A.D. 2017, before the subscriber, a Notary Public of the State of Maryland, duly commissioned and qualified, **DAVID MCVICKER, Vice President, and JOSHUA LECKER, Assistant Secretary**, of the Companies, to me personally known to be the individuals and officers described in and who executed the preceding instrument, and acknowledged the execution of same, and being by me duly sworn, depose and saith, that he/she is the said officer of the Company aforesaid, and that the seals affixed to the preceding instrument are the Corporate Seals of said Companies, and that the said Corporate Seals and the signature as such officer were duly affixed and subscribed to the said instrument by the authority and direction of the said Corporations.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed my Official Seal the day and year first above written.





Constance A. Dunn, Notary Public
My Commission Expires: July 9, 2019

EXTRACT FROM BY-LAWS OF THE COMPANIES

"Article V, Section 8, Attorneys-in-Fact. The Chief Executive Officer, the President, or any Executive Vice President or Vice President may, by written instrument under the attested corporate seal, appoint attorneys-in-fact with authority to execute bonds, policies, recognizances, stipulations, undertakings, or other like instruments on behalf of the Company, and may authorize any officer or any such attorney-in-fact to affix the corporate seal thereto; and may with or without cause modify or revoke any such appointment or authority at any time."

CERTIFICATE

I, the undersigned, Vice President of the ZURICH AMERICAN INSURANCE COMPANY, the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY, and the FIDELITY AND DEPOSIT COMPANY OF MARYLAND, do hereby certify that the foregoing Power of Attorney is still in full force and effect on the date of this certificate; and I do further certify that Article V, Section 8, of the By-Laws of the Companies is still in force.

This Power of Attorney and Certificate may be signed by facsimile under and by authority of the following resolution of the Board of Directors of the ZURICH AMERICAN INSURANCE COMPANY at a meeting duly called and held on the 15th day of December 1998.

RESOLVED: "That the signature of the President or a Vice President and the attesting signature of a Secretary or an Assistant Secretary and the Seal of the Company may be affixed by facsimile on any Power of Attorney...Any such Power or any certificate thereof bearing such facsimile signature and seal shall be valid and binding on the Company."

This Power of Attorney and Certificate may be signed by facsimile under and by authority of the following resolution of the Board of Directors of the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY at a meeting duly called and held on the 5th day of May, 1994, and the following resolution of the Board of Directors of the FIDELITY AND DEPOSIT COMPANY OF MARYLAND at a meeting duly called and held on the 10th day of May, 1990.

RESOLVED: "That the facsimile or mechanically reproduced seal of the company and facsimile or mechanically reproduced signature of any Vice-President, Secretary, or Assistant Secretary of the Company, whether made heretofore or hereafter, wherever appearing upon a certified copy of any power of attorney issued by the Company, shall be valid and binding upon the Company with the same force and effect as though manually affixed.

IN TESTIMONY WHEREOF, I have hereunto subscribed my name and affixed the corporate seals of the said Companies, this ____ day of **JUL 25 2018**, 20____.



Michael Bond, Vice President

TO REPORT A CLAIM WITH REGARD TO A SURETY BOND, PLEASE SUBMIT ALL REQUIRED INFORMATION TO:

Zurich American Insurance Co.
Attn: Surety Claims
1299 Zurich Way
Schaumburg, IL 60196-1056

ATTACHMENTS

ATTACHMENT A
SCOPE OF WORK

SCOPE OF WORK

- 1. Scope of Work:** The Base Bid consists of Tenant Improvements that involve the demolition of selected existing building elements and the construction of new partition walls, replacement and reconfiguration of acoustical ceiling, replacement of selected flooring, upgrades to the existing Mechanical, Electrical, Plumbing, Information Technology and Audio/Video systems to floors 1, 2, 17, 18, and 19, construction of fenced enclosures for storage and accessibility upgrades at the basement levels, as well as Right Of Way upgrades.

The Additive Alternate consists of Tenant Improvements that involve the demolition of selected existing building elements and the construction of new partition walls, replacement and reconfiguration of acoustical ceiling, replacement of selected flooring, upgrades to the existing Mechanical, Electrical, Plumbing, Information Technology and Audio/Video systems to floors 3 through 16.

- 1.1.** The Work shall be performed in accordance with:

- 1.1.1.** The Notice Inviting Bids and Plans numbered **40154-01-D** through **40154-402-D**, inclusive.

- 2. LOCATION OF WORK: The location of the Work is as follows:**

101 Ash Street, San Diego, California 92101. See **Appendix E**.

- 3. CONTRACT TIME:** The Contract Time for completion of the Work in the Base Bid shall be **125 Working Days**. If the Base Bid and Additive Alternates are both awarded, the completion of the work shall be **230 Working Days**.

ATTACHMENT B

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ATTACHMENT C

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ATTACHMENT D
PREVAILING WAGES

PREVAILING WAGES

1. **PREVAILING WAGE RATES:** Pursuant to San Diego Municipal Code section 22.3019, construction, alteration, demolition, repair and maintenance work performed under this Contract is subject to State prevailing wage laws. For construction work performed under this Contract cumulatively exceeding \$25,000 and for alteration, demolition, repair and maintenance work performed under this Contract cumulatively exceeding \$15,000, the Contractor and its subcontractors shall comply with State prevailing wage laws including, but not limited to, the requirements listed below.

- 1.1. **Compliance with Prevailing Wage Requirements.** Pursuant to sections 1720 through 1861 of the California Labor Code, the Contractor and its subcontractors shall ensure that all workers who perform work under this Contract are paid not less than the prevailing rate of per diem wages as determined by the Director of the California Department of Industrial Relations (DIR). This includes work performed during the design and preconstruction phases of construction including, but not limited to, inspection and land surveying work.

- 1.1.1. Copies of such prevailing rate of per diem wages are on file at the City and are available for inspection to any interested party on request. Copies of the prevailing rate of per diem wages also may be found at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Contractor and its subcontractors shall post a copy of the prevailing rate of per diem wages determination at each job site and shall make them available to any interested party upon request.

- 1.1.2. The wage rates determined by the DIR refer to expiration dates. If the published wage rate does not refer to a predetermined wage rate to be paid after the expiration date, then the 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 DIR, 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.

- 1.2. **Penalties for Violations.** Contractor and its subcontractors shall comply with California Labor Code section 1775 in the event a worker is paid less than the prevailing wage rate for the work or craft in which the worker is employed. This shall be in addition to any other applicable penalties allowed under Labor Code sections 1720 – 1861.

- 1.3. Payroll Records.** Contractor and its subcontractors shall comply with California Labor Code section 1776, which generally requires keeping accurate payroll records, verifying and certifying payroll records, and making them available for inspection. Contractor shall require its subcontractors to also comply with section 1776. Contractor and its subcontractors shall submit weekly certified payroll records online via the City's web-based Labor Compliance Program. Contractor is responsible for ensuring its subcontractors submit certified payroll records to the City.
- 1.3.1.** Contractor and their subcontractors shall also furnish records specified in Labor Code section 1776 directly to the Labor Commissioner in the manner required by Labor Code section 1771.4.
- 1.4. Apprentices.** Contractor and its subcontractors shall comply with California Labor Code sections 1777.5, 1777.6 and 1777.7 concerning the employment and wages of apprentices. Contractor is held responsible for the compliance of their subcontractors with sections 1777.5, 1777.6 and 1777.7.
- 1.5. Working Hours.** Contractor and their subcontractors shall comply with California Labor Code sections 1810 through 1815, including but not limited to: (i) restrict working hours on public works contracts to eight hours a day and forty hours a week, unless all hours worked in excess of 8 hours per day are compensated at not less than 1½ times the basic rate of pay; and (ii) specify penalties to be imposed on contractors and subcontractors of \$25 per worker per day for each day the worker works more than 8 hours per day and 40 hours per week in violation of California Labor Code sections 1810 through 1815.
- 1.6. Required Provisions for Subcontracts.** Contractor shall include at a minimum a copy of the following provisions in any contract they enter into with a subcontractor: California Labor Code sections 1771, 1771.1, 1775, 1776, 1777.5, 1810, 1813, 1815, 1860 and 1861.
- 1.7. Labor Code Section 1861 Certification.** Contractor in accordance with California Labor Code section 3700 is required to secure the payment of compensation of its employees and by signing this Contract, Contractor certifies that "I am aware of the provisions of Section 3700 of the California Labor Code which require every employer to be insured against liability for workers' compensation or to undertake self-insurance in accordance with the provisions of that code, and I will comply with such provisions before commencing the performance of the work of this Contract."
- 1.8. Labor Compliance Program.** The City has its own Labor Compliance Program authorized in August 2011 by the DIR. The City will withhold contract payments when payroll records are delinquent or deemed inadequate by the City or other governmental entity, or it has been established after an investigation by the City or other governmental entity that underpayment(s) have occurred. For questions or assistance, please contact the City of San Diego's Equal Opportunity Contracting Department at 619-236-6000.

- 1.9. Contractor and Subcontractor Registration Requirements.** This project is subject to compliance monitoring and enforcement by the DIR. A contractor or subcontractor shall not be qualified to bid on, be listed in a bid or proposal, subject to the requirements of section 4104 of the Public Contract Code, or engage in the performance of any contract for public work, unless currently registered and qualified to perform public work pursuant to Labor Code section 1725.5. It is not a violation of this section for an unregistered contractor to submit a bid that is authorized by Section 7029.1 of the Business and Professions code or by Section 10164 or 20103.5 of the Public Contract Code, provided the contractor is registered to perform public work pursuant to Section 1725.5 at the time the contract is awarded.
- 1.9.1.** A Contractor's inadvertent error in listing a subcontractor who is not registered pursuant to Labor Code section 1725.5 in response to a solicitation shall not be grounds for filing a bid protest or grounds for considering the bid non-responsive provided that any of the following apply: (1) the subcontractor is registered prior to bid opening; (2) within twenty-four hours after the bid opening, the subcontractor is registered and has paid the penalty registration fee specified in Labor Code section 1725.5; or (3) the subcontractor is replaced by another registered subcontractor pursuant to Public Contract Code section 4107.
- 1.9.2.** By submitting a bid or proposal to the City, Contractor is certifying that he or she has verified that all subcontractors used on this public work project are registered with the DIR in compliance with Labor Code sections 1771.1 and 1725.5, and Contractor shall provide proof of registration for themselves and all listed subcontractors to the City at the time of bid or proposal due date or upon request.
- 1.10. Stop Order.** For Contractor or its subcontractors engaging in the performance of any public work contract without having been registered in violation of Labor Code sections 1725.5 or 1771.1, the Labor Commissioner shall issue and serve a stop order prohibiting the use of the unregistered contractors or unregistered subcontractor(s) on ALL public works until the unregistered contractor or unregistered subcontractor(s) is registered. Failure to observe a stop order is a misdemeanor.
- 1.11. List of all Subcontractors.** The City may ask Contractor for the most current list of subcontractors (regardless of tier), along with their DIR registration numbers, utilized on this Agreement at any time during performance of this contract, and Contractor shall provide the list within ten (10) working days of the City's request. Additionally, Contractor shall provide the City with a complete list of all subcontractors utilized on this contract (regardless of tier), within ten working days of the completion of the contract, along with their DIR registration numbers. The City shall withhold final payment to Contractor until at least 30 days after this information is provided to the City.
- 1.12. Exemptions for Small Projects.** There are limited exemptions for installation, alteration, demolition, or repair work done on projects of \$25,000 or less. The Contractor shall still comply with Labor Code sections 1720 et. seq. The only recognized exemptions are listed below:

- 1.12.1.** Registration. The Contractor will not be required to register with the DIR for small projects. (Labor Code section 1771.1)
- 1.12.2.** Certified Payroll Records. The records required in Labor Code section 1776 shall be required to be kept and submitted to the City of San Diego, but will not be required to be submitted online with the DIR directly. The Contractor will need to keep those records for at least three years following the completion of the Contract. (Labor Code section 1771.4).
- 1.12.3.** List of all Subcontractors. The Contractor shall not be required to hire only registered subcontractors and is exempt from submitting the list of all subcontractors that is required in section 4.20.11 above. (Labor code section 1773.3).

ATTACHMENT E
SUPPLEMENTARY SPECIAL PROVISIONS

SUPPLEMENTARY SPECIAL PROVISIONS

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

1. The **2015 Edition** of the Standard Specifications for Public Works Construction (The "GREENBOOK").
 2. The **2015 Edition** of the City of San Diego Standard Specifications for Public Works Construction (The "WHITEBOOK"), including the following:
 - a) General Provisions (A) for all Contracts.
-

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

- 1-2 TERMS AND DEFINITIONS.** To the "WHITEBOOK", item 54, "Normal Working Hours", ADD the following:

The **Normal Working Hours** are 7:00 AM to 4:00 PM.

SECTION 2 - SCOPE AND CONTROL OF WORK

- 2-3.2 Self Performance.** To the "GREENBOOK", DELETE in its entirety and SUBSTITUTE with the following:

1. RESERVED

- 2-5.4.2 Asset Specific Red-lines.** To the "WHITEBOOK", ADD the following:

1. **Fiber Optic and WIFI Device Red-lines.** Fiber Optic and WIFI Device Red-lines shall clearly record by dimension from 2 known fixed points and by depth of underground facilities all deviations, modifications, and changes in the Work. Records, deviations, modifications, and changes on the day the Work is performed shall reflect the actual Work location and shall be marked in red at the scale of the Plan sheet on which they are recorded. Red-lines shall show the equipment locations and associated information for the following:
 - a) Locations and depths of underground utilities.
 - b) Revisions to the routing of piping and conduits.
 - c) Actual equipment locations.
 - d) Pull Boxes.
 - e) Electrical Meter, including meter address.
 - f) Items abandoned in place.

ADD:

2-10 **AUTHORITY OF THE BOARD AND THE ENGINEER.** To the "GREENBOOK", Paragraph (2), DELETE in its entirety and SUBSTITUTE with the following:

The decision of the Engineer is final and binding on all questions relating to: quantities; acceptability of material, equipment, or work; execution, progress or sequence of work; requests for information (RFI), and interpretation of the Plans, Specifications, or other Contract Documents. This shall be precedent to any payment under the Contract. The Engineer shall be the single point of contact and shall be included in all communications.

2-14.2 **Integration of the Work with Separate Contractors.** To the "WHITEBOOK", ADD the following:

2. The list of Separate Contractors includes:
 - a) Asbestos Monitor
 - b) Access Control
 - c) Building Management (CBRE)
 - d) City of San Diego's Department of IT.
 - e) Furniture Vendor as a separate contract.

2-16 **CONTRACTOR REGISTRATION AND ELECTRONIC REPORTING SYSTEM.** To the "WHITEBOOK", item 1, DELETE in its entirety.

SECTION 3 – CHANGES IN WORK

3-3.2.3 **Markup.** To the "WHITEBOOK", DELETE in its entirety and SUBSTITUTE with the following:

1. Work paid under Allowance Bid items for permits, governmental fees, or direct payments specified in the Contract Documents shall not be subject to any markups.
2. The allowance for overhead and profit shall not exceed the values listed in the table below:

Component	Overhead	Profit
Labor	10%	10%
Material	10%	5%
Equipment	10%	5%

3. Markups for materials shall be applied to the actual cost of the material before applying the sales tax.

4. When a Subcontractor is performing Extra Work, the allowance for overhead and profit shall be applied to the labor, materials, and equipment costs of the Subcontractor as follows:
 - a) Regardless of the number of Subcontractor tasks for Extra Work, you may only apply 10% for the first \$50,000 of the Subcontractor's portion of accumulated total cost.
 - b) If the accumulated costs of single or subsequent tasks exceed the \$50,000 threshold, you shall instead only apply 5% to any amounts in excess of the \$50,000.
 - c) You shall not apply 10% to any costs after the first \$50,000 of accumulated total costs from performing Extra Work.

3-5.1 Claims. To the "WHITEBOOK", DELETE in its entirety and SUBSTITUTE with the following:

ADD:

3-5.1 Claims.

1. A Claim is a written demand by you that seeks an adjustment in the Contract Price, Contract Time, or other relief associated with a dispute arising under or relating to the Contract, including a breach of any provision thereof. A voucher, invoice, or other routine request for payment is not a Claim.
2. A Claim shall conform to these specifications and may be considered after the City has previously denied a request by you for a Change Order seeking the demanded relief.
3. You shall submit a Claim to the Engineer if a dispute occurs that arises from or relates to the Contract. The Claim shall seek all relief to which you assert you are entitled as a result of the event(s) giving rise to the dispute. Your failure to process a Claim in accordance with these specifications shall constitute a waiver of all relief associated with the dispute. Claims are subject to 6-11, "Right to Audit".
4. You shall continue to perform the Services and Work and shall maintain the Schedule during any dispute proceedings. The Engineer will continue to make payments for undisputed Services and Work.
5. The City's Claims process specified herein shall not relieve you of your statutory obligations to present claims prior to any action under the California Government Code.

3-5.1.1 Initiation of Claim.

1. You shall promptly, but no later than 30 Days after the event(s) giving rise to the Claim, deliver the Claim to the Engineer.
2. You shall not process a Claim unless the Engineer has previously denied a request by you for a Change Order that sought the relief to be pursued in the claim.

3-5.1.1.1 Claim Certification Submittal.

1. If your Claim seeks an increase in the Contract Price, the Contract Time, or both, submit with the Claim an affidavit certifying the following:
 - a) The Claim is made in good faith and covers all costs and delays to which you are entitled as a result of the event(s) giving rise to the Claim.
 - b) The amount claimed accurately reflects the adjustments in the Contract Price, the Contract Time, or both to which you believe you are entitled.
 - c) All supporting costs and pricing data are current, accurate, and complete to the best of your knowledge. The cost breakdown per item of Work shall be supplied.
 - d) You shall ensure that the affidavit is executed by an official who has the authority to legally bind you.

3-5.1.2 Initial Determination.

1. The Engineer will respond in writing to your Claim within 30 Days of receipt of the Claim.

3-5.1.3 Settlement Meeting.

1. If you disagree with the Initial Determination, you shall request a Settlement Meeting within 30 Days. Upon receipt of this request, the Engineer will schedule the Settlement Meeting within 15 Working Days.

3-5.1.4 City's Final Determination.

1. If a settle agreement is not reached, the City shall make a written Final Determination within 10 Working Days after the Settlement Meeting.
2. If you disagree with the City's Final Determination, notify the Engineer in writing of your objection within 15 Working Days after receipt of the written determination and file a "Request for Mediation" in accordance with 3-5.2, "Dispute Resolution Process".
3. Failure to give notice of objection within the 15 Working Days period shall waive your right to pursue the Claim.

3-5.1.5 Mandatory Assistance.

1. If a third party dispute, litigation, or both arises out of or relates in any way to the Services provided under the Contract, upon the City's request, you shall agree to assist in resolving the dispute or litigation. Your assistance includes, but is not limited to the following:

- a) Providing professional consultations.
- b) Attending mediations, arbitrations, depositions, trials, or any event related to the dispute resolution and litigation.

3-5.1.5.1 Compensation for Mandatory Assistance.

1. The City will reimburse you for reasonable fees and expenses incurred by you for any required assistance rendered in accordance with 3-5.1.5, "Mandatory Assistance" as Extra Work.
2. The Engineer will determine whether these fees and expenses were necessary due to your conduct or failure to act.
3. If the Engineer determines that the basis of the dispute or litigation in which these fees and expenses were incurred were the result of your conduct or your failure to act in part or in whole, you shall reimburse the City for any payments made for these fees and expenses.
4. Reimbursement may be through any legal means necessary, including the City's withholding of your payment.

3-5.2.3 Selection of Mediator. To the "WHITEBOOK", DELETE in its entirety and SUBSTITUTE with the following:

1. A single mediator, knowledgeable in construction aspects and acceptable to both parties, shall be used to mediate the dispute.
2. To initiate mediation, the initiating party shall serve a Request for Mediation at the American Arbitration Association (AAA) on the opposing party.
3. If AAA is used, the initiating party shall concurrently file with AAA a "Request for Mediation" along with the appropriate fees, a copy of requested mediators marked in preference order, and a preference for available dates.
4. If AAA is selected to coordinate the mediation (Administrator), within 10 Working Days from the receipt of the initiating party's Request for Mediation, the opposing party shall file the following:
 - a) A copy of the list of the preferred mediators listed in preference order after striking any mediators to which they have any objection.
 - b) A preference for available dates.
 - c) Appropriate fees.
5. If the parties cannot agree on a mediator, then each party shall select a mediator and those mediators shall select the neutral third party to mediate the matter.

3-5.3 Forum of Litigation. To the "WHITEBOOK", DELETE in its entirety and SUBSTITUTE with the following:

1. It is the express intention that all legal actions and proceedings related to the Contract or Agreement with the City or to any rights or any relationship between the parties arising therefrom shall be solely and exclusively initiated and maintained in courts of the State of California for the County of San Diego.

ADD:

3-5.4 Pre-judgment Interest.

1. The parties stipulate that if a judgment is entered against a party for breaching this Contract, the pre-judgment interest shall be two percent (2%) per annum.

SECTION 4 - CONTROL OF MATERIALS

4-1.3.2 Inspection by the Agency. To the "GREENBOOK", DELETE in its entirety and SUBSTITUTE with the following:

The City will provide inspection and testing laboratory services within the continental United States within a 200-mile radius of the geographical limits of the City.

4-1.3.3 Inspection of Items Not Locally Produced. To the "WHITEBOOK", DELETE in its entirety.

ADD:

4-1.3.3 Inspection of Items Not Locally Produced. To the "GREENBOOK", DELETE in its entirety and SUBSTITUTE with the following:

1. When you intend to purchase materials, fabricated products, or equipment from sources located more than 200 miles (321.9 km) outside the geographical limits of the City, City Lab staff or a qualified inspection agency approved by the Engineer, shall be engaged at your expense to inspect the materials, equipment, or process.
2. This approval shall be obtained before producing any material or equipment. City Lab staff or inspector shall evaluate the materials for conformance with the requirements of the Plans and Specifications. You shall forward reports required by the Engineer. No materials or equipment shall be shipped nor shall any processing, fabrication or treatment of such materials be done without proper inspection by City Lab staff or the approved agent. Approval by said agent shall not relieve you of responsibility for complying with the requirements of the Contract Documents.
3. The Engineer may elect City Lab staff to perform inspection of an out-of-town manufacturer. You shall incur additional inspection costs of the Engineer including lodging, meals, and incidental expenses based on Federal Per Diem Rates, along with travel and car rental expenses. If the manufacturing plant operates a double shift, a double shift shall be figured in the inspection costs.

- a) At the option of the Engineer, full time inspection shall continue for the length of the manufacturing period. If the manufacturing period will exceed 3 consecutive weeks, you shall incur additional inspection expenses of the Engineer's supervisor for a trip of 2 Days to the site per month.
- b) When the Engineer elects City Lab staff to perform out-of-town inspections, the wages of staff employed by the City shall not be part of the additional inspection expenses paid by you.
- c) Federal Per Diem Rates can be determined at the location below:
<https://www.gsa.gov/portal/content/104877>

4-1.3.4 Inspection Paid For By the Contractor. To the "WHITEBOOK", ADD the following:

- 1. The special inspections required are listed as follows:
 - a) As indicated in Construction Drawings.

4-1.3.5 Special Inspection. To the "WHITEBOOK", ADD the following:

- 5. The payment for special inspection Work specified under this section shall be paid in accordance with 4-1.3.4.1, "Payment".

4-1.3.6 Preapproved Materials. To the "WHITEBOOK", 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. To the "WHITEBOOK", ADD the following:

- 11. You shall submit your list of proposed substitutions for an "equal" item **no less than 15 Working Days prior to the Bid due date** and on the City's Product Submittal Form available at:
<http://www.sandiego.gov/publicworks/edocref/index.shtml>

SECTION 5 – UTILITIES

5-1.1 General. To the "WHITEBOOK", ADD the following:

- 9. **90 Calendar Days** prior to any paving work, you shall notify the utility owner to provide them adequate time to adjust their utility box frame and cover to finish grade.

5-2 PROTECTION. To the "WHITEBOOK", item 2, ADD the following:

- g) Refer to **Appendix H** for more information on the protection of AMI devices.

SECTION 6 - PROSECUTION, PROGRESS AND ACCEPTANCE OF WORK

6-1.1

Construction Schedule. To the "WHITEBOOK", items 5, 9, and 22, DELETE in their entirety and SUBSTITUTE with the following:

5. Monthly progress payments are contingent upon the submittal of an updated Schedule and cash flow forecast as discussed in item 22 of 6-1.1, "Construction Schedule" to the Engineer. The Engineer may refuse to recommend the whole or part of any monthly payment if, in the Engineer's opinion, your failure or refusal to provide the required Schedule and cash flow forecast information precludes a proper evaluation of your ability to complete the Project within the Contract Time and amount.
9. Inclusive to the Contract Time, include 15 Working Days to the Schedule for the generation of the Punchlist. You shall Work diligently to complete all Punchlist items within 30 Working Days after the Engineer provides the Punchlist.
22. With every pay request, submit the following:
 - a) An updated cash flow forecast showing periodic and cumulative construction billing amounts for the duration of the Contract Time. If there has been any Extra Work since the last update, include only the approved amounts.
 - b) A curve value percentage comparison between the Contract Price and the updated cash flow forecast for each Project ID included in the Contract Documents. Curve values shall be set on a scale from 0% to 100% in intervals of 5% of the Contract Time. Refer to the Sample City Invoice materials in **Appendix D – Sample City Invoice with Spend Curve** and use the format shown. Your invoice amounts shall be supported by this curve value percentage. For previous periods, use the actual values and percentages and update the curve value percentages accordingly. See "Cash Flow Curve Fitting Example" at the location below:

<https://www.sandiego.gov/publicworks/edocref>

ADD:

6-3.2.1.1

Environmental Document.

1. The City of San Diego has prepared a **Notice of Exemption (NOE)** for **101 Ash St. Tenant Improvement(s)** as referenced in the Contract Appendix. You shall comply with all requirements of the **NOE** as set forth in **Appendix A**.
2. Compliance with the City's environmental document shall be included in the Contract Price.

6-8.3.1

Defective Work. To the "WHITEBOOK", item 6, DELETE in its entirety and SUBSTITUTE with the following:

6. For Building Projects which require a certificate of occupancy, not including sewer and water facilities, if you fail to correct the defective Work listed on the City's Punch-list within 10 Calendar Days after the Contract Time, you shall

reimburse the City for all costs to provide inspection services required to monitor Work beyond the 10 Calendar Days. The City shall bill you for the additional inspection at the City's established rates.

6-9 Liquidated Damages. To the "WHITEBOOK", item 2, DELETE in its entirety and SUBSTITUTE with the following:

2. The execution of the Contract shall constitute agreement between you the City that the liquidated damage amount described in the table below is the minimum value of the costs and actual damage caused by your failure to complete the Work within the allotted time. Such sum shall not be construed as a penalty and may be deducted from your payments if such delay occurs.

Contract Value	Liquidated Damage Daily Amount
Less than \$100,000	\$250
\$100,000 and more	\$6703.60

SECTION 7 - RESPONSIBILITIES OF THE CONTRACTOR

7-3 INSURANCE. To the "GREENBOOK", DELETE in its entirety and SUBSTITUTE with the following:

7-3 INSURANCE.

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

7-3.1 Policies and Procedures.

1. You shall 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 shall 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. The payment for insurance shall be included in the Contract Price as bid by you. Except as specifically agreed to by the City in writing, you are not entitled

to any additional payment. Do not begin any Work under this Contract until you have provided and the City has approved all required insurance.

5. Policies of insurance shall provide that the City 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 City 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 shall 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 shall 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 shall be no endorsement or modification limiting the scope of coverage for either "insured vs. insured" claims or contractual liability. You shall maintain the same or equivalent insurance for at least 10 years following completion of the Work.
4. All costs of defense shall be outside the policy limits. Policy coverage shall be in liability limits of not less than the following:

<u>General Annual Aggregate Limit</u>	<u>Limits of Liability</u>
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 shall 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 shall be outside the limits of the policy.

7-3.2.4

Contractors Hazardous Transporters Pollution Liability Insurance.

1. You shall provide at your expense or require your Subcontractor to provide, as described below, Contractors Hazardous Transporters Pollution Liability Insurance including contractual liability coverage to cover liability arising out of transportation of hazardous or toxic, materials, substances, or any other pollutants by you or any Subcontractor in an amount not less than \$2,000,000 limit per occurrence/aggregate for bodily injury and property damage.
2. All costs of defense shall be outside the limits of the policy. The deductible shall not exceed \$25,000 per claim. Any such insurance provided by a subcontractor instead of you shall be approved separately in writing by the City.
3. For approval of the substitution of Subcontractor's insurance the Contractor shall certify that all activities for which Contractors Hazardous Transporters Pollution Liability Insurance will provide coverage will be performed exclusively by the Subcontractor providing the insurance.
4. Contractual liability shall include coverage of tort liability of another party to pay for bodily injury or property damage to a third person or organization. There shall be no endorsement or modification of the coverage limiting the scope of coverage for either "insured vs. insured" claims or contractual liability. Occurrence based policies shall be procured before the Work commences and shall be maintained for the duration of this Contract. Claims Made policies shall be procured before the Work commences, shall be maintained for the duration of this contract, and shall include a 12 month extended Claims Discovery Period applicable to this contract or the existing policy or policies that shall continue to be maintained for 12 months after the completion of the Work under this Contract without advancing the retroactive date.
5. Except as provided for under California law, the policy or policies shall provide that the City 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.

7-3.2.5

Contractors Builders Risk Property Insurance.

1. You shall provide at your expense, and maintain until Final Acceptance of the Work, a Special Form Builders Risk Policy or Policies. This insurance shall 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 shall be 100% of this Contract value of the Work plus 15% to cover administrative costs, design costs, and the costs of inspections and construction management.
2. Insured property shall include material or portions of the Work located away from the Site but intended for use at the Site and shall cover material or portions of the Work in transit. The policy or policies shall include as insured property scaffolding, falsework, and temporary buildings located at the Site. The policy or policies shall cover the cost of removing debris, including demolition.

3. The policy or policies shall provide that all proceeds thereunder shall be payable to the City as Trustee for the insured, and shall name the City, the Contractor, Subcontractors, and Suppliers of all tiers as named insured. The City, 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 shall 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 shall be apportioned among the parties except for the City as follows: if there is more than one claimant for a single occurrence, then each claimant shall 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 City shall be entitled to 100% of its loss. You shall pay the City any portion of that loss not covered because of a deductible at the same time the proceeds of the insurance are paid to the City as trustee.
5. Any insured, other than the City, making claim to which a deductible applies shall be responsible for 100% of the loss not insured because of the deductible. Except as provided for under California law, the policy or policies shall provide that the City 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.

7-3.3 Rating Requirements. Except for the State Compensation Insurance Fund, all insurance required by this Contract as described herein shall 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 City 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 shall 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 City 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 shall 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.

7-3.5 Policy Endorsements.

7-3.5.1 Commercial General Liability Insurance.

7-3.5.1.1 Additional Insured.

1. You shall 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.
2. To the fullest extent allowed by law e.g., California Insurance Code §11580.04, the policy shall be endorsed to include the City and its respective elected officials, officers, employees, agents, and representatives as additional insured.
3. The additional insured coverage for projects for which the Engineer's Estimate is \$1,000,000 or more shall 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.
4. The additional insured coverage for projects for which the Engineer's Estimate is less than \$1,000,000 shall 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 shall 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 and its elected officials, officers, employees, agents and representatives. Further, it shall provide that any insurance maintained by the City and its elected officials, officers, employees, agents and representatives shall be in excess of your insurance and shall not contribute to it.

7-3.5.1.3 Project General Aggregate Limit. The policy or policies shall 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 shall reduce the Designated Construction Project General Aggregate Limit. The Designated Construction Project General Aggregate Limit shall 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 shall be endorsed to include the City 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.

7-3.5.4 Contractors Hazardous Transporters Pollution Liability Insurance Endorsements.

7-3.5.4.1 Additional Insured.

1. The policy or policies shall be endorsed to include as an Insured the City and its respective elected officials, officers, employees, agents, and representatives, with respect to 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.

Except that in connection with, collateral to, or affecting any construction contract to which the provisions of subdivision (b) of §2782 of the California Civil Code apply, this endorsement shall not provide any duty of indemnity coverage for the active negligence of the City and its respective elected officials, officers, employees, agents, and representatives in any case where an agreement to indemnify the City and its respective elected officials, officers, employees, agents, and representatives would be invalid under subdivision (b) of §2782 of the California Civil Code.

2. In any case where a claim or loss encompasses the negligence of the Insured and the active negligence of the City and its respective elected officials, officers, employees, agents, and representatives that are not covered because of California Insurance Code §11580.04, the insurer's obligation to the City and its respective elected officials, officers, employees, agents, and representatives shall be limited to obligations permitted by California Insurance Code §11580.04.

7-3.5.4.2 Primary and Non-Contributory Coverage. The policy or policies shall be endorsed to provide that the insurance afforded by the Contractors Pollution Liability Insurance policy or policies is primary to any insurance or self-insurance of the City and its elected officials, officers, employees, agents and representatives with respect to operations including the completed operations of the Named Insured. Any insurance maintained by the City and its elected officials, officers, employees, agents and representatives shall be in excess of your insurance and shall not contribute to it.

7-3.5.4.3 Severability of Interest. For Contractors Hazardous Transporters Pollution Liability Insurance, the policy or policies shall provide that your insurance shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the limits of the insurer's liability and shall provide cross-liability coverage.

7-3.5.5 Builders Risk Endorsements.

7-3.5.5.1 Waiver of Subrogation. The policy or policies shall be endorsed to provide that the insurer will waive all rights of subrogation against the City, 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 City.

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

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

7-3.7 Reservation of Rights. The City 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 City. The City 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 shall notify the City 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 shall follow the form of the primary policy or policies e.g., all endorsements.

7-4 NOT USED. To the "GREENBOOK", DELETE in its entirety and SUBSTITUTE with the following:

7-4 WORKERS' COMPENSATION INSURANCE AND EMPLOYERS LIABILITY INSURANCE.

1. In accordance with the provisions of §3700 of the California Labor Code, you shall 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, 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 shall be not less than the following:

<u>Workers' Compensation</u>	<u>Statutory Employers Liability</u>
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 requires 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 shall comply with such provisions before commencing the Work as required by §1861 of the California Labor Code.

7-4.1. Waiver of Subrogation. The policy or policies shall be endorsed to provide that the insurer will waive all rights of subrogation against the City 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 City.

ADD:

7-6 THE CONTRACTORS REPRESENTATIVE. To the "GREENBOOK", ADD the following:

1. Both the representative and alternative representative shall be employees of the Contractor and shall not be assigned to a Subcontractor unless otherwise approved by the City in writing.

7-8.6 Water Pollution Control. To the "WHITEBOOK", ADD the following:

6. Based on a preliminary assessment by the City, this Contract is subject to WPCP.

ADD:

7-10.4.1.4 Emergency Drills.

1. You shall participate in the City's initiated emergency drills. Make yourself familiar with the emergency evacuation routes and procedures in the event of an emergency. Drills are conducted annually and are scheduled a year in advance. Further information prior to bidding is available upon request from our Safety and Security Officer or the Facility Managers for the facility included in the Project. The information includes a listing of dates for upcoming Emergency Evacuation Drills.
2. Reflect the drill activities in the Schedule. Approved delay times caused by unscheduled drills may be added to the Schedule and shall be treated as Extra Work.
3. The payment for complying with this provision shall be included in the Bid item for "Emergency Drills".

7-13.4 Contractor Standards and Pledge of Compliance. To the "WHITEBOOK", DELETE in its entirety and SUBSTITUTE with the following:

1. The Contract is subject to City's Municipal Code §22.3004 as amended 10/29/13 by ordinance O-20316.
2. You shall complete a Pledge of Compliance attesting under penalty of perjury that you complied with the requirements of this section.

3. You shall ensure that all Subcontractors complete a Pledge of Compliance attesting under penalty of perjury that they complied with the requirements of this section.
4. You shall require in each subcontract that the Subcontractor shall abide by the provisions of the City's Municipal Code §22.3004. A sample provision is as follows:

“Compliance with San Diego Municipal Code §22.3004. The Subcontractor acknowledges that it is familiar with the requirements of San Diego Municipal Code §22.3004 (“Contractor Standards”), and agrees to comply with requirements of that section. The Subcontractor further agrees to complete the Pledge of Compliance, incorporated herein by reference.”

ADD:

7-13.8 Equal Pay Ordinance.

1. You shall comply with the Equal Pay Ordinance (EPO) codified in the San Diego Municipal Code (SDMC) in section 22.4801 through 22.4809, unless compliance is not required based on an exception listed in SDMC section 22.4804.
2. You shall require all of your Subcontractors to certify compliance with the EPO in their written subcontracts.
3. You shall post a notice informing your employees of their rights under the EPO in the workplace or job site.
4. By signing this Contract with the City of San Diego, you acknowledge the EPO requirements and pledge ongoing compliance with the requirements of SDMC Division 48, section 22.4801 et seq., throughout the duration of this Contract.

7-20 ELECTRONIC COMMUNICATION. To the “WHITEBOOK”, ADD the following:

2. Virtual Project Manager shall be used on this Contract.

7-21.1 General. To the “WHITEBOOK”, item 3, DELETE in its entirety and SUBSTITUTE with the following:

3. During the construction phase of projects, the minimum waste management reduction goal is 90% of the inert material (a material not subject to decomposition such as concrete, asphalt, brick, rock, block, dirt, metal, glass, and etc.) and 65% of the remaining project waste. You shall provide appropriate documentation, including a Waste Management Form attached as an appendix, and evidence of recycling and reuse of materials to meet the waste reduction goals specified.

7-22.20

Payment. To the "WHITEBOOK", item 1, ADD the following:

- o) Payment for removal and disposal of asbestos and all associated work described in **Appendix F, Asbestos Abatement Specifications** shall be paid as lump sum and shall be included in the Bid Item "Asbestos Abatement".
- p) The payment for Additive Alternate Bid Item "Asbestos Abatement" shall include payment for removal and disposal of asbestos for and all associated work described in **Appendix F, Asbestos Abatement Specifications** for Floors 3-16 and shall be paid as lump sum.

SECTION 9 - MEASUREMENT AND PAYMENT

9-3.1

Payment. To the "GREENBOOK", ADD the following:

The payment for Bid Items **"Construction of the Tenant Improvements Floors 1,2, 17-19 and Basement of 101 Ash Street, San Diego, California, 92101"** shall include full compensation for furnishing all labor, materials, tools, equipment, apparatus and all incidentals required to complete the work as shown in the contract documents.

The payment for Additive Alternate Bid Items **"Construction of the Tenant Improvements Floors 3-16 of 101 Ash Street, San Diego, California, 92101"** shall include full compensation for furnishing all labor, materials, tools, equipment, apparatus and all incidentals required to complete the work as shown in the contract documents.

The payment for Additive Alternate Bid Item **"As-needed replacement of 100' of #12 THHN-2/THWN-2 wire, due to building inspector's request to replace wire splicing in wire ducts"** shall include full compensation for furnishing all labor, materials, tools, equipment, apparatus and all incidentals required to complete the work as shown in the contract documents.

SECTION 217 - BEDDING AND BACKFILL MATERIALS

217-2.2

Stones, Boulders, and Broken Concrete. To the "GREENBOOK", Table 217-2.2, DELETE in its entirety and SUBSTITUTE with the following:

TABLE 217-2.2

Zone	Zone Limits	Maximum Size (greatest dimension)	Backfill Requirements in Addition to 217-2.1
Street or Surface Zone	From ground surface to 12" (300 mm) below	2.5" (63 mm)	As required by the Plans or Special Provisions.

Zone	Zone Limits	Maximum Size (greatest dimension)	Backfill Requirements in Addition to 217-2.1
Street or Surface Zone Backfill of Tunnels beneath Concrete Flatwork	pavement subgrade or ground surface	Sand	Sand equivalent of not less than 30.
Trench Zone	From 12" (300 mm) below pavement subgrade or ground surface to 12" (300 mm) above top of pipe or box	6" (150 mm)	
Deep Trench Zone (Trenches 3' (0.9 m) wide or wider)	From 60" (1.5 m) below finished surface to 12" (300 mm) above top of pipe or box	Rocks up to 12" (300 mm) excavated from trench may be placed as backfill	
Pipe Zone	From 12" (300 mm) above top of pipe or box to 6" (150 mm) below bottom of pipe or box exterior	2.5" (63 mm)	Sand equivalent of not less than 30 or a coefficient of permeability greater than 1-½ inches/hour (35 mm per hour).
Overexcavation	Backfill more than 6" (150 mm) below bottom of pipe or box exterior	6" (150 mm)	Sand equivalent of not less than 30 or a coefficient of permeability greater than 1-½ inches/hour (35 mm per hour). Trench backfill slurry (100-E-100) per 201-1 may also be used.

SECTION 302 - ROADWAY SURFACING

302-5.9 Measurement and Payment. To the "WHITEBOOK", item 2, DELETE in its entirety

302-7.4 Payment. To the "WHITEBOOK", item 1, last sentence, DELETE in its entirety and SUBSTITUTE with the following:

Payment shall not be made for additional fabric for overlapped areas.

SECTION 304 – METAL FABRICATION AND CONSTRUCTION

304-5 **PAYMENT.** To the “WHITEBOOK”, REVISE section “**304-5**” to “**304-6**”.

SECTION 600 - ACCESS

ADD:

600-1 **GENERAL.** To the “WHITEBOOK”, item 5, DELETE in its entirety and SUBSTITUTE with the following:

5. If the City’s crews are unable to provide the citizens with the mandated services due to your failure to comply with these specifications, you shall collect trash, recyclables, and yard waste on the City’s schedule and deliver to the City’s designated locations. If you fail to perform this Work, you shall incur additional costs for the City to reschedule pick up of an area.

SECTION 601 - TEMPORARY TRAFFIC CONTROL FOR CONSTRUCTION AND MAINTENANCE WORK ZONES

601-2.1.2 **Engineered Traffic Control Plans (TCP).** To the “GREENBOOK”, ADD the following:

6. Engineered TCP (24x 36sheets)

EQUAL OPPORTUNITY CONTRACTING PROGRAM (EOCP) SECTION A – GENERAL REQUIREMENTS

4.1 **Nondiscrimination in Contracting Ordinance.** To the “WHITEBOOK”, subsection 4.1.1, paragraph (2), sentence (1), DELETE in its entirety and SUBSTITUTE with the following:

You shall not discriminate on the basis of race, gender, gender expression, gender identity, religion, national origin, ethnicity, sexual orientation, age, or disability in the solicitation, selection, hiring, or treatment of subcontractors, vendors, or suppliers.

END OF SUPPLEMENTARY SPECIAL PROVISIONS (SSP)

TECHNICALS

SECTION 00 01 03 - CONSULTANTS DIRECTORY

PART 1 - GENERAL

1.1 PROJECT LISTING

MEP Engineer: BSE Engineering, 10680 Treena
Street, 100, San Diego, CA 92131

Structural Engineer: KPFF, 3131 Camino Del Rio
North, 1080, San Diego, CA 92108

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 00 01 03

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<i>Document Issue Description</i>	<i>Issue Date</i>
In progress	In Progress
100% Construction Documents for bid / permit	09/07/17

PROCUREMENT AND CONTRACTING REQUIREMENTS GROUP

DIVISION 00 - PROCUREMENT AND CONTRACTING REQUIREMENTS

INTRODUCTORY INFORMATION

<i>Date</i>	<i>Document No.</i>	<i>Title</i>
	00 01 03	Consultants Directory
	00 01 10	Table of Contents

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GENERAL REQUIREMENTS SUBGROUP

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	01 14 00	Work Restrictions
	01 23 00	Alternates
	01 26 13	Requests for Information (RFI)
	01 31 00	Project Management and Coordination
	01 32 00	Construction Progress Documentation
	01 32 33	Photographic Documentation
	01 33 00	Submittal Procedures
	01 40 00	Quality Requirements
	01 42 00	References
	01 46 00	Seismic Design Requirements for Nonstructural Systems
	01 50 00	Temporary Facilities and Controls
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FACILITY CONSTRUCTION SUBGROUP

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DIVISION 05 – METALS

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	09 51 13	Acoustical Panel Ceilings
	09 61 43	Vapor-Control Flooring Treatment
	09 65 13	Resilient Base and Accessories
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	09 68 13	Tile Carpeting
	09 72 00	Wall Coverings
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	26 28 16	Enclosed Switches and Circuit Breakers
	26 51 19	LED Interior Lighting
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SECTION 01 10 00 - SUMMARY

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Work covered by Contract Documents.
 2. Work under separate contracts.
 3. Miscellaneous provisions.
 4. Owner's '**WHITEBOOK**' is incorporated by reference to the project manual.
- B. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to all Sections. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all. See **WHITEBOOK 2-5.2, pages 15-16.**

1.2 WORK COVERED BY CONTRACT DOCUMENTS

- A. The Work of Project is defined by the Contract Documents and consists of the following:
1. Selective demolition of existing construction as indicated on Drawings.
 2. Construction of interior tenant facilities within an existing building.
- B. Type of Contract: Project will be constructed under a single prime contract with the addition of separate specialty contracts described below.

1.3 WORK UNDER SEPARATE CONTRACTS See WHITEBOOK 2-14

- A. General: Owner will award separate contracts for performance of certain construction activities at the Project site. The activities may occur prior to commencement of Work under this Contract, concurrent with the Work under this Contract, or as future work.
1. Cooperate fully with separate contractors so work on those contracts may be carried out smoothly, without interfering with or delaying work under this Contract or other contracts.
 2. Coordinate the Work of this Contract with work performed under separate contracts, including furniture vendor GMBI
 3. Advise Owner of installation schedules and critical dates when Contractor's work is dependent on the installation of Work by others.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 10 00

SECTION 01 14 00 - WORK RESTRICTIONS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Existing utility interruptions.
 2. Use of premises.
 3. Occupancy requirements during construction.
 4. Occupancy requirements prior to Substantial Completion.
 5. Miscellaneous restrictions.

1.2 EXISTING UTILITY INTERRUPTIONS

- A. Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:
1. Notify Resident Engineer (RE) not less than two days in advance of proposed utility interruptions.
 2. Obtain Resident Engineer (RE) written permission before proceeding with utility interruptions.

1.3 USE OF PREMISES

- A. Access: At all times, provide the Architect and the Owner's representatives, easy and safe access to the Work wherever it is in preparation and progress. Provide such access so Architect may perform its functions. Provide access to any testing agencies to perform required testing.
1. Coordination with Owner's Separate Contractors: Provide access for Owner's separate contractors listed in Attachment E, SSP, Section 2-14.2 and coordinate schedule for the installation of their work.
- B. Use of Site: Confine operations at the site to areas permitted by law, ordinances, permits, and the Contract Documents. Do not unreasonably encumber the Site with any materials or equipment. Coordinate loading on floor or roof with Architect and/or Structural Engineer to assure that no surfaces exceed carrying capacity.
1. Coordinate with Building Manager for secured storage within the building, if applicable.
 2. Protect and maintain common areas of the building that are in the path of travel for construction personnel and used for transporting materials and equipment to and from the construction site.

- C. On-Site Work Hours: Limit work in the existing building to normal business working hours, Monday through Friday, unless otherwise indicated.
1. Hours for Noise-Generating, Odor-Generating, and Dust-Generating Activities and Demolition: After business hours, or at such times as approved by the Resident Engineer .
 - a. Noise- and Odor-Generating activities include, but are not limited to, sprinkler work, hammering, nailing, and similar work, which may cause noise, dust, or odors, thereby disturbing occupants.
- D. Landlord's or Property Manager's Rules: Conform at all times to the Landlord's and Property Manager's requirements for protection of plant, materials, equipment, and noise levels. **[A copy of the Landlord's or Property Manager's rules (tenant work letter or lease requirements) will be furnished from the Owner upon written request.]**
- E. Driveways and Entrances: Keep driveways and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.
1. Schedule deliveries to minimize use of driveways and entrances.
 2. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
 3. Do not block entrances, fire exits or lanes, or delivery routes.
 4. Limit use of driveways and entrances to the following times:
 - a. Monday through Friday: 7 AM to 4 PM
 - b. After Hours (When Approved by Resident Engineer: 7 PM to 10 PM, and anytime on Saturday.
- F. Existing Elevator Use: Use of Owner's existing elevators will be permitted, provided elevators are cleaned and maintained in a condition acceptable to Owner. Hours and/or elevator(s) may be restricted for material deliveries.
1. Do not load elevators beyond their rated weight capacity.
 2. Provide protective coverings, barriers, devices, signs, or other procedures to protect elevator car and entrance doors and frame. If, despite such protection, elevators become damaged, engage elevator Installer to restore damaged work so no evidence remains of correction work. Return items that cannot be refinished in field to the shop, make required repairs and refinish entire unit, or provide new units as required.
- G. Existing Stair Usage: Use of Owner's existing stairs will be permitted, provided stairs are cleaned and maintained in a condition acceptable to Owner.
1. Provide protective coverings, barriers, devices, signs, or other procedures to protect stairs and to maintain means of egress. If stairs become damaged, restore damaged areas so no evidence remains of correction work.

- H. Loading Dock Usage: Use loading dock for delivery of material to work areas and for the disposal of rubbish and waste materials. Maintain loading dock in a clean condition acceptable to Owner.
1. Schedule use of loading dock with Owner and Tenants to avoid disruption of building occupants' operations.
 2. Do not store materials on loading dock.

1.4 OCCUPANCY REQUIREMENTS DURING CONSTRUCTION

- A. Full Owner Occupancy: Owner will occupy the site during entire construction period. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's operations.
1. Schedule use of premises for Work and coordinate construction operations with the Resident Engineer to allow for Tenant occupancy.
 2. Schedule use of premises for Work and coordinate construction operations with the Resident Engineer to allow for use of site and premises by the public.
 3. Keep premises orderly, clean and with a minimum of obstruction and inconvenience to the tenants and the public.
 4. Relocate any stored products that interfere with public access, operations of the Tenant or separate contractor. If necessary, obtain and pay for additional storage or work areas needed for operations.
 5. Limit use of premises to areas designated unless otherwise allowed in writing by the Resident Engineer .
 6. Maintain all required exits at all times. Do not locate any materials in exit pathways.

1.5 OCCUPANCY REQUIREMENTS PRIOR TO SUBSTANTIAL COMPLETION

- A. Owner Limited Occupancy of Completed Areas of Construction: Owner reserves the right to occupy and to place and install equipment in completed areas of the site, before Substantial Completion, provided such occupancy does not interfere with completion of the Work. Such placement of equipment and partial occupancy shall not constitute acceptance of incomplete portions of the Work, nor shall it relieve the Contractor of its responsibility for completion of the Work in accordance with the Contract Documents.
1. Resident Engineer will prepare a Certificate of Substantial Completion for each specific portion of the Work to be occupied prior to Owner acceptance of the completed Work.
 2. Obtain a Certificate of Occupancy from authorities having jurisdiction before Owner occupancy.
 3. Before limited Owner occupancy, mechanical and electrical systems shall be fully operational, and required tests and inspections shall be successfully completed. On occupancy, Owner will provide, operate, and maintain mechanical and electrical systems serving occupied portions of the Work.
 4. On occupancy, Owner will assume responsibility for maintenance and custodial service for occupied portions of the Work.

1.6 MISCELLANEOUS RESTRICTIONS

- A. Noise, Dust, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to occupancy.
 - 1. Notify Resident Engineer not less than two days in advance of proposed disruptive operations.
 - 2. Obtain Resident Engineer written permission before proceeding with disruptive operations.
 - 3. Radios and music are not permitted.
 - 4. On-site paging systems are not permitted.
- B. Controlled Substances: Use of tobacco products and other controlled substances on Project site is not permitted.
- C. Nonsmoking Building: Smoking is not permitted within the building or within 25 feet of entrances, operable windows, or outdoor-air intakes.
- D. Employee Identification: Provide identification tags for Contractor personnel working on Project site. Require personnel to use identification tags at all times.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 14 00

SECTION 01 23 00 - ALTERNATES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for alternates.

1.2 DEFINITIONS

- A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the bidding requirements that may be added to or deducted from the base bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.
 - 1. Alternates described in this Section are part of the Work only if enumerated in the Agreement.
 - 2. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

1.3 PROCEDURES

- A. Coordination: Revise or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.
 - 1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.
- B. Notification: per City's Resident Engineer .
- C. Execute accepted alternates under the same conditions as other work of the Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

END OF SECTION 01 23 00

SECTION 01 26 13 - REQUESTS FOR INFORMATION (RFI)

PART 1 - GENERAL

1.1 Per WHITEBOOK 2-1.1.3 - Any questions related to how the Work is to be completed shall be submitted, in writing, to the City.

1.2 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.3 SUMMARY

A. Section includes administrative and procedural requirements for handling and processing Requests for Information.

1.4 DEFINITIONS

A. Requests for Information (RFI): Contractor initiated written instrument related to the execution of the Work that is addressed to the City's Resident Engineer (RE). The RFI shall be used by the Contractor as the means to ask questions related to the Work; subject to the conditions contained within this Section.

1.5 ACTION SUBMITTALS

A. Requests for Information: Include a detailed, legible description of an item needing information or information and the following:

1. Project name.
2. Project number.
3. Date.
4. Name of Contractor.
5. Name of City's Resident Engineer.
6. RFI number, numbered sequentially.
7. RFI subject.
8. Reference to appropriate documents:
 - a. Specification Section number and title and related paragraphs.
 - b. Drawing number and detail references.
 - c. Schedule.
 - d. Bulletin number.
 - e. Other Contract Documents, if any.

9. Field dimensions and conditions, as appropriate.
10. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
11. Contractor's signature.
12. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing information.
 - a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.

B. RFI Forms: Use "Request for Information"

1. Attachments shall be electronic files in PDF format.

1.6 INFORMATIONAL SUBMITTALS

A. RFI Log: Prepare, maintain, and submit a tabular log of RFI organized by the RFI number. Submit log weekly. Use software log that is part of Project Web site per Whitebook section 7-20. Include the following:

1. Project name.
2. Name and address of Contractor.
3. Name and address of City's Resident Engineer.
4. RFI number including RFIs that were returned without action or withdrawn.
5. RFI description.
6. Date the RFI was submitted.
7. Date Architect's response was received from City's Resident Engineer.

1.7 QUALITY ASSURANCE

A. Authorship: Prior to the commencement of the RFI process, designate a full time "RFI Manager" whose duties shall include the responsibility for enforcing the Request for Information provisions of this Section, to maintain an up-to-date log of all RFI, advise the City's Resident Engineer, in writing, of the status and disposition of all RFI at the progress meetings, and be a member of the Contractor's staff. The RFI Manager shall be experienced in administration and supervision of the type of Work indicated on the Contract Documents.

1. RFI Manager may be the Contractor's Job Superintendent.
2. Each RFI shall originate solely from the RFI Manager. An RFI submitted to the City's Resident Engineer by an entity, or individual, other than the RFI Manager shall be returned to the Contractor.

1.8 ADMINISTRATIVE REQUIREMENTS

- A. Processing Time: Allow five working days for Architect's response for each RFI. RFI received by City's Resident Engineer after 3:00 p.m. will be considered as received the following business day.
1. Allow additional time if coordination with other work is required. City's resident Engineer will advise Contractor when a RFI being processed must be delayed for coordination.
 2. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt of additional information.
- B. City's Resident Engineer action on RFI that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Proposal Change Order Request, reference Whitebook, section 3.
1. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify City Resident Engineer in writing within 10 days of receipt of the RFI response.
- C. Frivolous RFI:
1. RFI shall not be used for the following:
 - a. Request for approval of submittals.
 - b. Request approval of substitutions.
 - c. Requests for approval of Contractor's means and methods.
 - d. Request for adjustment in the Contract Time or the Contract Sum.
 - e. Requests for information of Architect's actions on submittals.
 - f. Requests for coordination information already indicated in the Contract Documents, or to transfer coordination responsibility from the Contractor to the , Architect, or City Resident Engineer.
 - g. Incomplete RFI or inaccurately prepared RFI.
 2. The Owner reserves the right to assess the Contractor for the cost (based on time and materials) of a RFI response performed by the City's Resident Engineer, and any of its consultants, which is deemed by the City and the City's Resident Engineer as being frivolous or unnecessary.
 3. Frivolous RFI shall be removed from the RFI log.

1.9 COORDINATION

- A. Coordination: Coordinate preparation and processing of RFI with performance of construction activities.
1. Submit RFI with such promptness as to cause no delays in the Work. No adjustments of Contract Time or Contract Sum will be granted because of failure to have an RFI submitted with sufficient time to allow for the orderly processing of a response by the City Resident Engineer.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 CONTRACTOR'S ACTION

- A. General: Immediately on discovery of the need for additional information or information of the Contract Documents, prepare and submit an RFI in the form specified.
- B. Prior to submission of the RFI, coordinate the nature of the inquiry with the requirements of other Sections or trades as related thereto and responses to previous RFI.
- C. Complete each blank on the RFI form.
- D. In preparing each RFI, verify the applicable dimension(s), field conditions, Drawing requirements (small through large scale details), and/or Specification Section requirements pertaining thereto.
- E. Each RFI shall be reviewed, and signed by the RFI Manager prior to transmitting to the City's Resident Engineer.
- F. On receipt of the City's Resident Engineer action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify City's Resident Engineer within seven days if Contractor disagrees with response.

3.2 ARCHITECT'S AND RESIDENT ENGINEERS ACTION

- A. City's Resident Engineer Action: Resident Engineer will review each RFI, determine action required, and respond.
 - 1. Frivolous RFI will be returned without action.
- B. RFI which fail to conform to requirements, (for example, is incomplete or contain numerous errors) shall be returned to the Contractor without a response. No adjustments for Contract Time or Contract Sum shall be granted for an RFI failing to conform to requirements.

END OF SECTION 01 26 13

SECTION 01 31 00 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
 - 1. General project coordination procedures.
 - 2. Coordination drawings.
 - 3. Project meetings.

1.2 INFORMATIONAL SUBMITTALS

- A. Coordination drawings.
- B. Meeting minutes.

1.3 GENERAL COORDINATION PROCEDURES

- A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections, that depend on each other for proper installation, connection, and operation.
 - 1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
 - 2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
 - 3. Make adequate provisions to accommodate items scheduled for later installation.
 - 4. Arrange pipes, ducts, conduits, and other overhead systems in an orderly manner when indicated to remain exposed.
- B. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and to ensure orderly progress of the Work.

1.4 COORDINATION DRAWINGS - REFERENCE WHITEBOOK 2-5.7.4

- A. Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, and additionally where installation is not completely shown on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.
1. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:
 - a. Use applicable Contract Drawings as a basis for preparation of coordination drawings. Prepare sections, elevations, and details as needed to describe relationship of various systems and components.
 - b. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
 - c. Indicate space requirements for routine maintenance and for anticipated replacement of components during the life of the installation.
 - d. Show location and size of access doors required for access to concealed dampers, valves, and other controls.
 - e. Indicate required installation sequences.
 - f. Indicate dimensions shown on the Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Architect indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.
- B. Coordination Drawing Organization: Organize coordination drawings as follows:
1. Floor Plans and Reflected Ceiling Plans: Show architectural and structural elements, and mechanical, plumbing, fire-protection, fire-alarm, and electrical Work. Show locations of visible ceiling-mounted devices relative to acoustical ceiling grid. Supplement plan drawings with section drawings where required to adequately represent the Work.
 2. Plenum Space: Indicate subframing for support of ceiling and wall systems, mechanical and electrical equipment, and related Work. Locate components within ceiling plenum to accommodate layout of light fixtures indicated on Drawings. Indicate areas of conflict between light fixtures and other components.
 3. Mechanical Rooms: Provide coordination drawings for mechanical rooms showing plans and elevations of mechanical, plumbing, fire-protection, fire-alarm, and electrical equipment.
 4. Structural Penetrations: Indicate penetrations and openings required for all disciplines.
 5. Slab Edge and Embedded Items: Indicate slab edge locations and sizes and locations of embedded items for metal fabrications, sleeves, anchor bolts, bearing plates, angles, door floor closers, slab depressions for floor finishes, curbs and housekeeping pads, and similar items.
 6. Mechanical and Plumbing Work: Show the following:

- a. Sizes and bottom elevations of ductwork, piping, and conduit runs, including insulation, bracing, flanges, and support systems.
 - b. Dimensions of major components, such as dampers, valves, diffusers, access doors, cleanouts and electrical distribution equipment.
 - c. Fire-rated enclosures around ductwork.
7. Electrical Work: Show the following:
- a. Runs of vertical and horizontal conduit 1-1/4 inches in diameter and larger.
 - b. Light fixture, exit light, emergency battery pack, smoke detector, and other fire-alarm locations.
 - c. Panel board, switch board, switchgear, transformer, busway, generator, and motor control center locations.
 - d. Location of pull boxes and junction boxes, dimensioned from column center lines.
8. Fire-Protection System: Show the following:
- a. Locations of standpipes, mains piping, branch lines, pipe drops, and sprinkler heads.
9. Review: Architect will review coordination drawings to confirm that the Work is being coordinated, but not for the details of the coordination, which are Contractor's responsibility. If Architect determines that coordination drawings are not being prepared in sufficient scope or detail, or are otherwise deficient, Architect will so inform Contractor, who shall make changes as directed and resubmit.

1.5 PROJECT MEETINGS

- A. General: Reference Whitebook section 7-6.1. Resident Engineer will schedule and conduct meetings and conferences at Project site unless otherwise indicated.
1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times.
 2. Agenda: Entity responsible for conducting meeting will prepare the meeting agenda. Distribute the agenda to all invited attendees.
 3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner, participants and others involved whose presence was required at the time of the meeting and Architect, within three days of the meeting.
- B. Pre-Construction Conference: Reference Whitebook Section 6-1.7. Resident Engineer will schedule and conduct a pre-construction conference before starting construction, at a time convenient to Owner and Architect.
- C. Pre-Installation Conferences: Resident Engineer will Conduct a pre-installation conference at Project site before each construction activity that requires coordination with other construction.

1. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.

- D. Progress Meetings: Reference Whitebook Section 7-6.1. Resident Engineer will conduct progress meetings at regular intervals that reflects the stage of the work
 1. Coordinate dates of meetings with preparation of payment requests.
 2. Schedule Updating: Comply with requirements in Section 01 32 00 "Construction Progress Documentation."

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 31 00

SECTION 01 32 00 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
 - 1. Contractor's construction schedule.
 - 2. Daily construction reports.

1.2 DEFINITIONS - REFERENCE WHITEBOOK 6-1.1

1.3 INFORMATIONAL SUBMITTALS

- A. Format for Submittals: Submit required submittals in the following format:
 - 1. Working electronic copy of schedule file.
 - 2. PDF electronic file.
- B. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.
- C. Construction Schedule Updating Reports: Submit updated schedule with each Application for Payment.

1.4 COORDINATION

- A. Coordinate Contractor's construction schedule with the schedule of values, list of subcontracts, submittal schedule, progress reports, payment requests, and other required schedules and reports.
 - 1. Secure time commitments for performing critical elements of the Work from entities involved.
 - 2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 2 - PRODUCTS

**2.1 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL - REFERENCE
WHITEBOOK 6-1.1**

1. Distribution: Distribute copies of approved schedule to Architect, Resident Engineer
Post copies in Project meeting rooms and temporary field offices.
2. Delete parties from distribution when they have completed their
activities.

END OF SECTION 01 32 00

SECTION 01 33 00 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes requirements for the administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.

1.2 DEFINITIONS

- A. Action Submittals: Written and graphic information and physical samples that require Architect's and Resident Engineer's responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals."
- B. Informational Submittals: Written and graphic information and physical samples that do not require Architect's and Resident Engineer's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals."
- C. FTP: File Transfer Protocol
 - 1. FTP Internet Address: City FileCloud site to be provided. .
- D. PDF: Portable Document Format licensed by Adobe Systems.

1.3 ACTION SUBMITTALS

- A. Submittal Schedule: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Architect and Resident Engineer and additional time for handling and reviewing submittals required by those corrections.
 - 1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
 - 2. Submit concurrently with the first complete submittal of Contractor's construction schedule.
 - a. Submit revised submittal schedule to reflect changes in current status and timing for submittals.
 - 3. Format: Arrange the following information in a tabular format:
 - a. Scheduled date for first submittal.
 - b. Specification Section number and title.

- c. Submittal category (Action, informational, closeout).
 - d. Name of subcontractor.
 - e. Description of the Work covered.
 - f. Scheduled date for Resident Engineer's final release or approval.
 - g. Scheduled date of fabrication.
4. SUBMITTAL ADMINISTRATIVE REQUIREMENTS - REFERENCE SECTION 2-5.3.2 OF GREENBOOK AND WHITEBOOK
- B. Architect's Digital Data Files: Electronic copies of digital data Drawings of the Contract Drawings will be furnished by Architect for Contractor's use in preparing Shop Drawings and Project record drawings.
1. Architect makes no representations as to the accuracy or completeness of digital data drawing files as they relate to the Contract Drawings.
 2. Execute and submit the Data Transfer Agreement C Do not distribute digital data drawing files prior to transmitting to Architect copies of Data Transfer Agreement signed by each entity requesting the files.
- C. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 2. Submit all submittal items required for each Specification Section concurrently.
 3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
 4. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
 - a. Architect and Resident Engineer reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- D. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. Architect will document on submittal the date of receipt. Submittals received by Architect after 1:00 p.m. will be considered as received the following working day. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
1. Initial Review: Allow 10 working days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect or Resident Engineer will advise Contractor when a submittal being processed must be delayed for coordination. Delaying submittals to facilitate coordination between submittals shall not constitute a delay of the Work nor shall it be the basis for an extension of time.
 2. Resubmittal Review: Allow 10 days for review of each resubmittal.

3. Sequential Review: Sequential review is a submittal that requires review by more than one design discipline. Where sequential review of submittals by Architect's consultants, Owner, or other parties is indicated, allow 15 days for initial review of each submittal.
- E. Electronic Submittals: Identify and incorporate information in each electronic submittal file as follows:
1. Assemble complete submittal package into a single indexed file with links enabling navigation to each item.
 - a. Unique identifier, including revision number. Submittals shall be numbered with the Section number, followed by a dash, followed by a three-digit number, followed by a dash, and ending with a sequential submission number as indicated below. The numbering system shall be retained throughout all revisions.
 - 1) Section Number: Section number where submittal is specified.
 - 2) Three-Digit Number: Sequential number, beginning with "001," for each submittal transmitted to Architect for each Section.
 - 3) Submission Number: Use "0" for initial submittal, "1" for first resubmittal, "2" for second resubmittal, and so forth.
 - 4) Example: 061000-001-0 (Section 06 10 00, first submission of the Section, initial submittal).
 2. Provide means for insertion to permanently record Contractor's review and approval markings and action taken by Architect.
 3. Scanned Copies: Legible scanned PDF files of paper originals are acceptable. Scanned submittals that are not legible will be rejected.
 4. Sheet Orientation: Orient PDF sheets to a "Ready-to-Read" orientation with majority of text horizontal to the sheet with no additional adjustments or formatting required by the viewer.
 5. File Security: Do not set any permissions on the file. Protected documents will not be accepted.
 6. Transmittal Form for Electronic Submittals: Use PDF of completed Submittal Transmittal form
 7. Metadata: Include the following information in the electronic submittal file metadata:
 - a. Title: Project title
 - b. Author: Contractor's name.
 - c. Subject: Submittal type (product data, shop drawing, report, etc.)
 - d. Keywords: Number and title of appropriate Specification Section; manufacturer name; product name/model number.
 8. File Size: Limit file size of each submittal as follows. Break larger PDF files into multiple packages where necessary to meet delivery restrictions. Identify split packages as "1 of #" and "2 of #" in the subject line.
 - a. Email Delivery: 2 Megabytes.
 - b. FTP Delivery: 100 Megabytes.
- F. Options: Identify options requiring selection by Architect.

- G. Deviations and Additional Information: On an attached separate document, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Architect on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same identification information as related submittal.
- H. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
1. Note date and content of previous submittal.
 2. Note date and content of revision in label or title block and clearly indicate extent of revision.
 3. Resubmit submittals until they are stamped with Architect's action stamp marked "NO EXCEPTIONS TAKEN" or "MAKE CORRECTIONS NOTED[.]" [, **and Construction Manager's approval notation.**]
 4. Costs of compensation for Architect's additional services and expenses made necessary for review of submittals exceeding the limits set forth below shall be at the Contractor's expense.
 - a. Reviews of Each Submittal: Two, including initial review.
- I. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
- J. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals with Architect's action stamp marked "NO EXCEPTIONS TAKEN" or "MAKE CORRECTIONS AS NOTED."
- K. The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples or similar submittals until the respective submittal has been reviewed by Architect and returned to Contractor with Architect's action stamp marked "NO EXCEPTIONS TAKEN" or "MAKE CORRECTIONS AS NOTED."

PART 2 - PRODUCTS

2.1 SUBMITTAL PROCEDURES

- A. General Submittal Procedure Requirements: Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.
1. Submit electronic submittals via email as PDF electronic files. Do not submit zipped files.
 - a. Architect, through City's Resident Engineer, will return annotated file. Annotate and retain one copy of file as an electronic Project record document file.

2. Certificates and Certifications Submittals: Provide a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
 - a. Provide a digital signature with digital certificate on electronically submitted certificates and certifications where indicated.
 3. Systems Submittals: Identify submittals for systems such as fire alarms and fire protection systems, on the transmittal and act upon the system singularly as a combined submittal. If resubmission is required, resubmit entire system submittal.
- B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
1. If information must be specially prepared for submittal because standard published data are not suitable for use, submit as Shop Drawings, not as Product Data.
 2. Mark each copy of each submittal to show which products and options are applicable.
 3. Include the following information, as applicable:
 - a. Manufacturer's catalog cuts.
 - b. Manufacturer's written recommendations.
 - c. Manufacturer's product specifications.
 - d. Manufacturer's installation instructions.
 - e. Standard color charts.
 - f. Standard product operating and maintenance manuals.
 - g. Compliance with recognized trade association standards.
 - h. Compliance with recognized testing agency standards.
 - i. Application of testing agency labels and seals.
 - j. Notation of coordination requirements.
 - k. Availability and delivery time information.
 4. For equipment, include the following in addition to the above, as applicable:
 - a. Wiring diagrams showing factory-installed wiring.
 - b. Printed performance curves.
 - c. Operational range diagrams.
 - d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.
 5. Submit Product Data before or concurrent with Samples.
- C. Shop Drawings: Prepare and submit Project-specific information, drawn accurately to scale. Do not reproduce, digitally or otherwise, the Contract Documents and submit as Shop Drawings. Do not use, copy or reproduce title blocks, dimensions, notes, keynotes, symbols schedules or details from Contract Drawings, digital or otherwise. Use of the Contract Drawings shall be limited to reproduction, digitally or otherwise, of the exterior wall layout, interior partition layout, grid lines, doors, and windows. Do not base Shop Drawings on standard printed data.

1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
 - a. Identification of products.
 - b. Fabrication and installation drawings.
 - c. Roughing-in and setting diagrams.
 - d. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring. Differentiate between manufacturer-installed and field-installed wiring.
 - e. Shopwork manufacturing instructions.
 - f. Templates and patterns.
 - g. Schedules.
 - h. Design calculations.
 - i. Compliance with specified standards.
 - j. Notation of coordination requirements.
 - k. Notation of dimensions established by field measurement.
 - l. Relationship and attachment to adjoining construction clearly indicated.
 - m. Seal and signature of professional engineer if specified.
 2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches, but no larger than size of Contract Drawings.
- D. Samples: Submit physical units of materials or products for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.
1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
 2. Refer to individual Specification Sections for requirements for Samples that illustrate workmanship, fabrication techniques, details of assembly, connections, operation, and similar construction characteristics.
 3. Identification: Attach label on unexposed side of Samples that includes the following:
 - a. Generic description of Sample.
 - b. Product name and name of manufacturer.
 - c. Sample source.
 - d. Number and title of applicable Specification Section.
 - e. Specification paragraph number and generic name of each item.
 4. Submit corresponding electronic submittal of Sample transmittal, digital image file illustrating Sample characteristics, and identification information for record.
 5. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
 - a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.

- b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
 - 6. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
 - a. Number of Samples: Submit one full set of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line.
 - b. Architect through Resident Engineer will return submittal with options selected.
 - 7. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
 - a. Number of Samples:
 - 1) Submit three sets of Samples.
 - 2) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
 - 3) Submit at least three sets of paired units that show approximate limits of variations if variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample.
 - b. Architect will retain one Sample set; remainder will be returned. Mark up and retain one returned Sample set as a Project record sample.
 - 8. Preparation: Mount, display, or package Samples in manner specified to facilitate review of qualities indicated. Prepare Samples to match Architect's sample where so indicated. Attach label on unexposed side that includes the following:
 - a. Generic description of Sample.
 - b. Product name or name of manufacturer.
 - c. Sample source.
- E. Additional Submittals: Comply with requirements in other Division 01 Sections.
- F. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on AWS forms. Include names of firms and personnel certified.
- G. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.

- H. **Material Certificates:** Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
- I. **Research Reports:** Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
 - 1. Name of evaluation organization.
 - 2. Date of evaluation.
 - 3. Time period when report is in effect.
 - 4. Product and manufacturers' names.
 - 5. Description of product.
 - 6. Test procedures and results.
 - 7. Limitations of use.
- J. **Compatibility Test Reports:** Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
- K. **Field Test Reports:** Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
- L. **Design Data:** Prepare and submit written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

2.2 DELEGATED-DESIGN SERVICES

- A. **Performance and Design Criteria:** Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
 - 1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.
- B. **Delegated-Design Services Certification:** In addition to Shop Drawings, Product Data, and other required submittals, submit digitally signed PDF electronic file of certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.
 - 1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

- A. Action and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect and Resident Engineer.
- B. Project Closeout and Maintenance/Material Submittals: Refer to requirements in Section 01 77 00 "Closeout Procedures."
- C. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, coordinated, checked, and approved for compliance with the Contract Documents.

3.2 ARCHITECT'S [AND CONSTRUCTION MANAGER'S] ACTION

- A. General: Architect and Resident Engineer will not review submittals that have not been properly transmitted, reviewed by Contractor, or do not bear Contractor's approval stamp and will return them without action.
- B. Action Submittals: Resident Engineer will review, approve, and transmit to Architect or return to Contractor for correction. Architect will review submittal approved by Resident Engineer, make marks to indicate corrections or revisions required, and return it to Contractor Resident Engineer. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action, as follows:
 - 1. "NO EXCEPTIONS TAKEN": No further review of Submittal required.
 - 2. "MAKE CORRECTIONS AS NOTED. Resubmittal not required unless Contractor cannot comply with corrections noted.": Incorporate corrections in Work. If Contractor cannot comply with corrections as noted, revise to respond to exceptions and resubmit.
 - 3. "REVISE AS NOTED AND RESUBMIT": Revise as noted and resubmit for further review.
 - 4. "RESUBMIT PROPERLY Submittal not reviewed for reasons noted."
 - 5. "NOT REVIEWED Submittal not required by Contract Documents.": Remove from submittal log.
 - 6. "RECEIVED FOR CLIENT'S RECORD ONLY. Submittal not reviewed."
- C. Informational Submittals: Resident Engineer will review, approve, and transmit to Architect, or return to Contractor for correction. Architect will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect and Resident Engineer will forward each submittal to appropriate party.
- D. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.

- E. Submittals not required by the Contract Documents will not be reviewed and may be discarded or returned to the Contractor without action.
- F. Substitution items received as product data, shop drawing, or sample submittals required by individual Sections will be returned to Contractor without review. Comply with requirements in Section 01 25 00 "Substitution Procedures" for submission of substitution request.

END OF SECTION 01 33 00

SECTION 01 40 00 - QUALITY REQUIREMENTS

PART 1 - GENERAL - REFERENCE WHITEBOOK Section 4

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements. **REFERENCE WHITEBOOK 2-11**
 - 1. Specific quality-control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
 - 2. Specified tests, inspections, and related actions do not limit Contractor's quality-control procedures that facilitate compliance with the Contract Document requirements.
 - 3. Requirements for Contractor to provide quality-control services required by Architect, Owner, Resident Engineer or authorities having jurisdiction are not limited by provisions of this Section.
 - 4. Specific test and inspection requirements are not specified in this Section.

1.2 DEFINITIONS

- A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and ensure that proposed construction complies with requirements.
- B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that completed construction complies with requirements. Services do not include contract enforcement activities performed by Construction Management & Field Services..
- C. Mockups: Full-size physical assemblies that are constructed on-site, unless indicated otherwise. Mockups are constructed to verify selections made under Sample submittals; to demonstrate aesthetic effects and, where indicated, qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mockups are not Samples. Unless otherwise indicated, approved mockups establish the standard by which the Work will be judged.
 - 1. Room Mockups: Mockups of typical interior spaces complete with wall, floor, and ceiling finishes, doors, windows, millwork, casework, specialties, furnishings and equipment, and lighting.

- D. **Product Testing:** Tests and inspections that are performed by an NRTL (Nationally Recognized Testing Lab), an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.
- E. **Field Quality-Control Testing:** Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- F. **Testing Agency:** An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.
- G. **Installer/Applicator/Erector:** Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
 - 1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).
- H. **Experienced:** When used with an entity or individual, "experienced" means having successfully completed a minimum of one previous project similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.
- I. **Professional Engineer:** Engineer currently licensed to practice in the State of CA.

1.3 Reference Whitebook Section 2-5.3.2 INFORMATIONAL SUBMITTALS

- A. **Contractor's Statement of Responsibility:** When required by authorities having jurisdiction, submit copy of written statement of responsibility sent to authorities having jurisdiction before starting work on the following systems:
 - 1. Seismic-force-resisting system, designated seismic system, or component listed in the designated seismic system quality-assurance plan prepared by Architect.
- B. **Testing Agency Qualifications:** For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.
- C. **Schedule of Tests and Inspections:** Prepare in tabular form and include the following:
 - 1. Specification Section number and title.
 - 2. Description of test and inspection.
 - 3. Identification of applicable standards.
 - 4. Identification of test and inspection methods.
 - 5. Number of tests and inspections required.
 - 6. Time schedule or time span for tests and inspections.
 - 7. Entity responsible for performing tests and inspections.
 - 8. Requirements for obtaining samples.

9. Unique characteristics of each quality-control service.
- D. Testing Agency and Inspection Reports: Prepare and submit certified written reports that include the following:
1. Date of issue.
 2. Project title and number.
 3. Name, address, and telephone number of testing agency.
 4. Dates and locations of samples and tests or inspections.
 5. Names of individuals making tests and inspections.
 6. Description of the Work and test and inspection method.
 7. Identification of product and Specification Section.
 8. Complete test or inspection data.
 9. Test and inspection results and an interpretation of test results.
 10. Ambient conditions at time of sample taking and testing and inspecting.
 11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
 12. Name and signature of laboratory inspector.
 13. Recommendations on retesting and reinspecting.
- E. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:
1. Name, address, and telephone number of technical representative making report.
 2. Statement on condition of substrates and their acceptability for installation of product.
 3. Statement that products at Project site comply with requirements.
 4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
 5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 6. Statement whether conditions, products, and installation will affect warranty.
 7. Other required items indicated in individual Specification Sections.
- F. Factory-Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:
1. Name, address, and telephone number of factory-authorized service representative making report.
 2. Statement that equipment complies with requirements.
 3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 4. Statement whether conditions, products, and installation will affect warranty.
 5. Other required items indicated in individual Specification Sections.
- G. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.4 QUALITY ASSURANCE

- A. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish specified in individual Sections, to comply with the following requirements, using materials indicated for the completed Work:
1. Build mockups in location and of size indicated or, if not indicated, as directed by Architect or Resident Engineer.
 2. Notify Architect and Resident Engineer seven days in advance of dates and times when mockups will be constructed.
 3. Employ supervisory personnel who will oversee mockup construction. Employ workers that will be employed during the construction at Project.
 4. Demonstrate the proposed range of aesthetic effects and workmanship.
 5. Obtain Architect's and Resident Engineer's approval of mockups before starting work, fabrication, or construction.
 - a. Allow seven days for initial review and each re-review of each mockup.
 6. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 7. Demolish and remove mockups when directed, unless otherwise indicated.

1.5 QUALITY CONTROL

- A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.
1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of the types of testing and inspecting they are engaged to perform.
 2. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.
- B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities required to verify that the Work complies with requirements, whether specified or not.
1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
 2. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
 - a. Contractor shall not employ the same entity engaged by Owner, unless agreed to in writing by Owner.
 3. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.

4. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
 5. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
 6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
 7. Provide quality assurance and control services required due to changes in the Work proposed by or made by the Contractor.
 8. Provide quality control services for Work done contrary to the Contract Documents, without prior notice, when so specified, or without proper supervision.
 9. Overtime expenses and schedule delays accruing as a result of executing quality control services shall be the Contractor's responsibility and shall not be charged to the Owner.
- C. **Manufacturer's Field Services:** Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Section 01 33 00 "Submittal Procedures."
- D. **Manufacturer's Technical Services:** Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.
- E. **Retesting/Reinspecting:** Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that revised or replaced Work that failed to comply with requirements established by the Contract Documents. Architect retains the right to require the use of a different testing agency for retesting and reinspecting.
- F. **Testing Agency Responsibilities:** Cooperate with Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
1. Notify Architect Resident Engineer and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
 2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
 3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
 4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
 5. Do not release, revoke, alter, or increase requirements of the Contract Documents or approve or accept any portion of the Work.
 6. Do not perform any duties of Contractor.
 7. Attend Project progress meetings as requested by Architect, Resident Engineer and Contractor.

- G. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
1. Access to the Work.
 2. Incidental labor and facilities necessary to facilitate tests and inspections.
 3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
 4. Facilities for storage and field-curing of test samples.
 5. Delivery of samples to testing agencies or arranging for pick-up of test samples after normal business hours.
 6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
 7. Security and protection for samples and for testing and inspecting equipment at Project site.
- H. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and quality control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
1. Schedule times for tests, inspections, obtaining samples, and similar activities.
- I. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents. Coordinate and submit schedule concurrently with Contractor's Construction Schedule as specified in Section 01 32 00 "Construction Progress Documentation."
1. Distribution: Distribute schedule to Owner, Architect, Resident Engineer testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

1.6 SPECIAL TESTS AND INSPECTIONS - SEE WHITEBOOK SECTION 4-1.3.5

- A. Special Tests and Inspections: Contractor will engage a qualified special inspector to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Contractor, and as follows:
1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviews the completeness and adequacy of those procedures to perform the Work.
 2. Notifying Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
 3. Submitting a certified written report of each test, inspection, and similar quality-control service to with copy to Contractor and to authorities having jurisdiction.
 4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
 5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
 6. Retesting and reinspecting corrected work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

- A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:
 - 1. Date test or inspection was conducted.
 - 2. Description of the Work tested or inspected.
 - 3. Date test or inspection results were transmitted to Architect.
 - 4. Identification of testing agency or special inspector conducting test or inspection.
- B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Resident Engineer's reference during normal working hours.

3.2 REPAIR AND PROTECTION

- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
 - 1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for Section 01 73 00 "Execution."
- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 01 40 00

SECTION 01 42 00 - REFERENCES - REFERENCE WHITEBOOK Section 1

PART 1 - GENERAL

1.1 STANDARDS, REGULATIONS AND CODES

- A. **Applicability of Standards:** Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
- B. **Publication Dates:** Comply with standards in effect as of date of the Contract Documents, unless otherwise indicated.
- C. **Copies of Standards:** Each entity engaged in construction on Project must be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source and make them available on request.
- D. **Industry Organizations:** Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names and Web site addresses are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.
1. AA; Aluminum Association (The); www.aluminum.org.
 2. AAADM; American Association of Automatic Door Manufacturers; www.aaadm.com.
 3. AABC; Associated Air Balance Council; www.aabc.com.
 4. AAMA; American Architectural Manufacturers Association; www.aamanet.org.
 5. AASHTO; American Association of State Highway and Transportation Officials; www.transportation.org.
 6. AATCC; American Association of Textile Chemists and Colorists; www.aatcc.org.
 7. ABMA; American Bearing Manufacturers Association; www.americanbearings.org.
 8. ACI; American Concrete Institute; (Formerly: ACI International); www.concrete.org.
 9. ADC; Air Diffusion Council; www.flexibleduct.org.
 10. AEIC; Association of Edison Illuminating Companies, Inc. (The); www.aeic.org.
 11. AF&PA; American Forest & Paper Association; www.afandpa.org.
 12. AGA; American Gas Association; www.aga.org.
 13. AGC; Associated General Contractors of America (The); www.agc.org.
 14. AHA; American Hardboard Association; <http://domensino.com/AHA>.
 15. AHAM; Association of Home Appliance Manufacturers; www.aham.org.
 16. AHRI; Air-Conditioning, Heating, and Refrigeration Institute (The); www.ahrinet.org.
 17. AIA; American Institute of Architects (The); www.aia.org.
 18. AISC; American Institute of Steel Construction; www.aisc.org.
 19. AISI; American Iron and Steel Institute; www.steel.org.
 20. AITC; American Institute of Timber Construction; www.aitc-glulam.org.

21. ALSC; American Lumber Standard Committee, Incorporated; www.alsc.org.
22. AMCA; Air Movement and Control Association International, Inc.; www.amca.org.
23. ANSI; American National Standards Institute; www.ansi.org.
24. APA; The Engineered Wood Association; www.apawood.org.
25. APA; Architectural Precast Association; www.archprecast.org.
26. APWA; American Public Works Association; www.apwa.net.
27. ARI; Air-Conditioning & Refrigeration Institute; (See AHRI).
28. ARI; American Refrigeration Institute; (See AHRI).
29. ASA; Acoustical Society of America; www.acousticalsociety.org.
30. ASC; Adhesive and Sealant Council (The); www.ascouncil.org.
31. ASCA; Architectural Spray Coaters Association.
32. ASHRAE; American Society of Heating, Refrigerating and Air-Conditioning Engineers; www.ashrae.org.
33. ASME; ASME International; (American Society of Mechanical Engineers); www.asme.org.
34. ASPE; American Society of Plumbing Engineers; www.aspe.org.
35. ASSE; American Society of Safety Engineers (The); www.asse.org.
36. ASSE; American Society of Sanitary Engineering; www.asse-plumbing.org.
37. ASTM; ASTM International; (American Society for Testing and Materials International); www.astm.org.
38. ATIS; Alliance for Telecommunications Industry Solutions; www.atis.org.
39. ASCI; Association of the Wall and Ceiling Industry; www.awci.org.
40. AWI; Architectural Woodwork Institute; www.awinet.org.
41. AWMAC; Architectural Woodwork Manufacturers Association of Canada; www.awmac.com.
42. AWWA; American Wood Protection Association; (Formerly: American Wood-Preservers' Association); www.awpa.com.
43. AWS; American Welding Society; www.aws.org.
44. AWWA; American Water Works Association; www.awwa.org.
45. BHMA; Builders Hardware Manufacturers Association; www.buildershardware.com.
46. BIA; Brick Industry Association (The); www.gobrick.com.
47. BICSI; BICSI, Inc.; www.bicsi.org.
48. BIFMA; BIFMA International; (Business and Institutional Furniture Manufacturer's Association); www.bifma.com.
49. BISSC; Baking Industry Sanitation Standards Committee; www.bissc.org.
50. CCC; Carpet Cushion Council; www.carpetcushion.org.
51. CCFSS; Center for Cold-formed Steel Structures; www.ccfsonline.org.
52. CDA; Copper Development Association; www.copper.org.
53. CEA; Canadian Electricity Association; www.electricity.ca.
54. CEA; Consumer Electronics Association; www.ce.org.
55. CFFA; Chemical Fabrics & Film Association, Inc.; www.chemicalfabricsandfilm.com.
56. CFI; International Certified Floorcovering Installers Association; www.cfi-installers.org.
57. CFSEI; Cold-Formed Steel Engineers Institute; www.cfsei.org.
58. CIMA; Cellulose Insulation Manufacturers Association; www.cellulose.org.
59. CISCA; Ceilings & Interior Systems Construction Association; www.cisca.org.
60. CISPI; Cast Iron Soil Pipe Institute; www.cispi.org.
61. CPA; Composite Panel Association; www.pbmdf.com.
62. CRI; Carpet and Rug Institute (The); www.carpet-rug.org.
63. CRSI; Concrete Reinforcing Steel Institute; www.crsi.org.
64. CSA; Canadian Standards Association; www.csa.ca.

65. CSA; CSA International; (Formerly: IAS; International Approval Services); www.csa-international.org.
66. CSI; Construction Specifications Institute (The); www.csinet.org.
67. CTI; Cooling Technology Institute; (Formerly: Cooling Tower Institute); www.cti.org.
68. CWC; Composite Wood Council; (See CPA).
69. DASMA; Door and Access Systems Manufacturers Association; www.dasma.com.
70. DHI; Door and Hardware Institute; www.dhi.org.
71. ECA; Electronic Components Association; (See ECIA).
72. ECAMA; Electronic Components Assemblies & Materials Association; (See ECIA).
73. ECIA; Electronic Components Industry Association; www.eciaonline.org
74. EIA; Electronic Industries Alliance; (See TIA).
75. EIMA; EIFS Industry Members Association; www.eima.com.
76. EJMA; Expansion Joint Manufacturers Association, Inc.; www.ejma.org.
77. ESD; ESD Association; (Electrostatic Discharge Association); www.esda.org.
78. ESTA; Entertainment Services and Technology Association; (See PLASA).
79. EVO; Efficiency Valuation Organization; www.evo-world.org.
80. FM Approvals; FM Approvals LLC; www.fmglobal.com.
81. FM Global; FM Global; (Formerly: FMG; FM Global); www.fmglobal.com.
82. FRSA; Florida Roofing, Sheet Metal & Air Conditioning Contractors Association, Inc.; www.floridarroof.com.
83. FSA; Fluid Sealing Association; www.fluidsealing.com.
84. FSC; Forest Stewardship Council U.S.; www.fscus.org.
85. GA; Gypsum Association; www.gypsum.org.
86. GANA; Glass Association of North America; www.glasswebsite.com.
87. GBCI; Green Building Certification Institute; www.gbci.org.
88. GS; Green Seal; www.greenseal.org.
89. GTA; Glass Tempering Division of Glass Association of North America; (see GANA).
90. HI; Hydraulic Institute; www.pumps.org.
91. HI/GAMA; Hydronics Institute/Gas Appliance Manufacturers Association; (See AHRI).
92. HMMA; Hollow Metal Manufacturers Association; (See NAAMM).
93. HPVA; Hardwood Plywood & Veneer Association; www.hpva.org.
94. HPW; H. P. White Laboratory, Inc.; www.hpwhite.com.
95. IAPSC; International Association of Professional Security Consultants; www.iapsc.org.
96. IAS; International Accreditation Service; www.iasonline.org.
97. IAS; International Approval Services; (See CSA).
98. ICBO; International Conference of Building Officials; (See ICC).
99. ICC; International Code Council; www.iccsafe.org.
100. ICEA; Insulated Cable Engineers Association, Inc.; www.icea.net.
101. ICPA; International Cast Polymer Alliance; www.icpa-hq.org.
102. ICRI; International Concrete Repair Institute, Inc.; www.icri.org.
103. IEC; International Electrotechnical Commission; www.iec.ch.
104. IEEE; Institute of Electrical and Electronics Engineers, Inc. (The); www.ieee.org.
105. IES; Illuminating Engineering Society; (Formerly: Illuminating Engineering Society of North America); www.ies.org.
106. IESNA; Illuminating Engineering Society of North America; (See IES).
107. IEST; Institute of Environmental Sciences and Technology; www.iest.org.
108. IGCC; Insulating Glass Certification Council; www.igcc.org.
109. IGMA; Insulating Glass Manufacturers Alliance; www.igmaonline.org.
110. ILI; Indiana Limestone Institute of America, Inc.; www.iliai.com.

111. Intertek; Intertek Group; (Formerly: ETL SEMCO; Intertek Testing Service NA); www.intertek.com.
112. ISA; International Society of Automation (The); (Formerly: Instrumentation, Systems, and Automation Society); www.isa.org.
113. ISAS; Instrumentation, Systems, and Automation Society (The); (See ISA).
114. ISFA; International Surface Fabricators Association; (Formerly: International Solid Surface Fabricators Association); www.isfanow.org.
115. ISO; International Organization for Standardization; www.iso.org.
116. ISSFA; International Solid Surface Fabricators Association; (See ISFA).
117. ITU; International Telecommunication Union; www.itu.int/home.
118. KCMA; Kitchen Cabinet Manufacturers Association; www.kcma.org.
119. LMA; Laminating Materials Association; (See CPA).
120. MCA; Metal Construction Association; www.metalconstruction.org.
121. MFMA; Maple Flooring Manufacturers Association, Inc.; www.maplefloor.org.
122. MFMA; Metal Framing Manufacturers Association, Inc.; www.metalframingmfg.org.
123. MHIA; Material Handling Industry of America; www.mhia.org.
124. MIA; Marble Institute of America; www.marble-institute.com.
125. MIA; Masonry Institute of America; www.masonryinstitute.org.
126. MMPA; Moulding & Millwork Producers Association; (Formerly: Wood Moulding & Millwork Producers Association); www.wmmpa.com.
127. MPI; Master Painters Institute; www.paintinfo.com.
128. MSS; Manufacturers Standardization Society of The Valve and Fittings Industry Inc.; www.mss-hq.org.
129. NAAMM; National Association of Architectural Metal Manufacturers; www.naamm.org.
130. NACE; NACE International; (National Association of Corrosion Engineers International); www.nace.org.
131. NADCA; National Air Duct Cleaners Association; www.nadca.com.
132. NAIMA; North American Insulation Manufacturers Association; www.naima.org.
133. NBGQA; National Building Granite Quarries Association, Inc.; www.nbgqa.com.
134. NCMA; National Concrete Masonry Association; www.ncma.org.
135. NCTA; National Cable & Telecommunications Association; www.ncta.com.
136. NEBB; National Environmental Balancing Bureau; www.nebb.org.
137. NECA; National Electrical Contractors Association; www.necanet.org.
138. NeLMA; Northeastern Lumber Manufacturers Association; www.nelma.org.
139. NEMA; National Electrical Manufacturers Association; www.nema.org.
140. NETA; InterNational Electrical Testing Association; www.netaworld.org.
141. NFPA; NFPA; (National Fire Protection Association); www.nfpa.org.
142. NFPA; NFPA International; (See NFPA).
143. NFRC; National Fenestration Rating Council; www.nfrc.org.
144. NGA; National Glass Association; www.glass.org.
145. NHLA; National Hardwood Lumber Association; www.nhla.com.
146. NLGA; National Lumber Grades Authority; www.nlga.org.
147. NOFMA; National Oak Flooring Manufacturers Association; (See NWFA).
148. NOMMA; National Ornamental & Miscellaneous Metals Association; www.nomma.org.
149. NRMCA; National Ready Mixed Concrete Association; www.nrmca.org.
150. NSF; NSF International; (National Sanitation Foundation International); www.nsf.org.
151. NSPE; National Society of Professional Engineers; www.nspe.org.
152. NSSGA; National Stone, Sand & Gravel Association; www.nssga.org.
153. NTMA; National Terrazzo & Mosaic Association, Inc. (The); www.ntma.com.
154. NWFA; National Wood Flooring Association; www.nwfa.org.

155. PCA; Portland Cement Association; www.cement.org.
156. PDCA; Painting and Decorating Contractors of America; www.pdca.com.
157. PDI; Plumbing & Drainage Institute; www.pdionline.org.
158. PLASA; PLASA; (Formerly: ESTA; Entertainment Services and Technology Association); www.plasa.org.
159. RCSC; Research Council on Structural Connections; www.boltcouncil.org.
160. RFCI; Resilient Floor Covering Institute; www.rfci.com.
161. RIS; Redwood Inspection Service; www.redwoodinspection.com.
162. RMA; Rubber Manufacturers Association; www.rma.org.
163. SCTE; Society of Cable Telecommunications Engineers; www.scte.org.
164. SDI; Steel Deck Institute; www.sdi.org.
165. SDI; Steel Door Institute; www.steeldoor.org.
166. SEFA; Scientific Equipment and Furniture Association; www.sefalabs.com.
167. SEI/ASCE; Structural Engineering Institute/American Society of Civil Engineers; (See ASCE).
168. SGCC; Safety Glazing Certification Council; www.sgcc.org.
169. SIA; Security Industry Association; www.siaonline.org.
170. SJI; Steel Joist Institute; www.steeljoist.org.
171. SMA; Screen Manufacturers Association; www.smainfo.org.
172. SMACNA; Sheet Metal and Air Conditioning Contractors' National Association; www.smacna.org.
173. SMPTE; Society of Motion Picture and Television Engineers; www.smpte.org.
174. SPFA; Spray Polyurethane Foam Alliance; www.sprayfoam.org.
175. SPIB; Southern Pine Inspection Bureau; www.spib.org.
176. SSINA; Specialty Steel Industry of North America; www.ssina.com.
177. SSMA; Steel Stud Manufacturers Association; www.ssma.com.
178. SSPC; SSPC: The Society for Protective Coatings; www.sspc.org.
179. SWI; Steel Window Institute; www.steelwindows.com.
180. SWPA; Submersible Wastewater Pump Association; www.swpa.org.
181. SWRI; Sealant, Waterproofing, and Restoration Institute; www.swrionline.org.
182. TCNA; Tile Council of North America, Inc.; (Formerly: Tile Council of America); www.tileusa.com.
183. TEMA; Tubular Exchanger Manufacturers Association, Inc.; www.tema.org.
184. TIA; Telecommunications Industry Association; (Formerly: TIA/EIA; Telecommunications Industry Association/Electronic Industries Alliance); www.tiaonline.org.
185. TIA/EIA; Telecommunications Industry Association/Electronic Industries Alliance; (See TIA).
186. TMS; The Masonry Society; www.masonrysociety.org.
187. TPI; Truss Plate Institute; www.tpinst.org.
188. UFAC; Upholstered Furniture Action Council; www.ufac.org.
189. UL; Underwriters Laboratories Inc.; www.ul.com.
190. UNI; Uni-Bell PVC Pipe Association; www.uni-bell.org.
191. USGBC; U.S. Green Building Council; www.usgbc.org.
192. USITT; United States Institute for Theatre Technology, Inc.; www.usitt.org.
193. WASTEC; Waste Equipment Technology Association; www.wastec.org.
194. WCLIB; West Coast Lumber Inspection Bureau; www.wclib.org.
195. WCMA; Window Covering Manufacturers Association; www.wcmanet.org.
196. WDMA; Window & Door Manufacturers Association; www.wdma.com.

197. WI; Woodwork Institute; (Formerly: WIC; Woodwork Institute of California);
www.wicnet.org.
198. WMPMA; Wood Moulding & Millwork Producers Association; (See MMPA).
199. WPA; Western Wood Products Association; www.wwpa.org.

E. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web site addresses are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

1. DIN; Deutsches Institut für Normung e.V.; www.din.de.
2. IAPMO; International Association of Plumbing and Mechanical Officials;
www.iapmo.org.
3. ICC; International Code Council; www.iccsafe.org.
4. ICC-ES; ICC Evaluation Service, LLC; www.icc-es.org.

F. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names and Web site addresses are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

1. CPSC; Consumer Product Safety Commission; www.cpsc.gov.
2. DOC; Department of Commerce; National Institute of Standards and Technology;
www.nist.gov.
3. DOE; Department of Energy; www.energy.gov.
4. EPA; Environmental Protection Agency; www.epa.gov.
5. OSHA; Occupational Safety & Health Administration; www.osha.gov.
6. USDA; Department of Agriculture; Agriculture Research Service; U.S. Salinity
Laboratory; www.ars.usda.gov.
7. USDA; Department of Agriculture; Rural Utilities Service; www.usda.gov.
8. USDJ; Department of Justice; Office of Justice Programs; National Institute of Justice;
www.ojp.usdoj.gov.
9. USPS; United States Postal Service; www.usps.com.

G. Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list. Names and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

1. ADAAG; Americans with Disabilities Act Accessibility Guidelines for Buildings
and Facilities; www.access-board.gov.
2. CFR; Code of Federal Regulations; Available from Government Printing Office;
www.gpo.gov/fdsys.
3. FS; Federal Specification; Available from Department of Defense Single Stock Point;
<http://dodssp.daps.dla.mil>.
 - a. Available from Defense Standardization Program; www.dsp.dla.mil.
 - b. Available from General Services Administration; www.gsa.gov.
 - c. Available from National Institute of Building Sciences/Whole Building Design
Guide; www.wbdg.org/ccb.

4. USATBCB; U.S. Architectural & Transportation Barriers Compliance Board; (See USAB).
- H. State Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names and Web site addresses are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.
1. BSC; California Building Standards Commission; www.bsc.ca.gov.
 2. Cal/EPA; California Environmental Protection Agency; www.calepa.ca.gov.
 3. Cal/OSHA; California Division of Occupational Safety and Health; www.dir.ca.gov/DOSH/dosh1.htm.
 4. Cal/Tran; California Department of Transportation; www.dot.ca.gov.
 5. CBHF; State of California; Department of Consumer Affairs; Bureau of Electronic Appliance and Repair, Home Furnishings and Thermal Insulation; www.bearhfti.ca.gov.
 6. CCR; California Code of Regulations; Office of Administrative Law; California Title 24 Energy Code; www.calregs.com.
 7. CDHS; California Department of Health Services; (See CDPH).
 8. CDPH; California Department of Public Health; Indoor Air Quality Program; www.cal-iaq.org.
 9. CEC; California Energy Commission; www.energy.ca.gov.
 10. CPUC; California Public Utilities Commission; www.cpuc.ca.gov.
 11. DGS; California Department of General Services; www.dgs.ca.gov.
 12. DSA; California Division of State Architect; www.dsa.dgs.ca.gov.
 13. OSF; California Office of the State Fire Marshal; www.osfm.fire.ca.gov.
 14. OSHPD; California Office of Statewide Health Planning and Development; www.oshpd.ca.gov.
 15. SCAQMD; South Coast Air Quality Management District; www.aqmd.gov.
 16. TFS; Texas Forest Service; Forest Resource Development and Sustainable Forestry; <http://txforests-service.tamu.edu>.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 42 00

SECTION 01 46 00 - SEISMIC DESIGN REQUIREMENTS FOR NONSTRUCTURAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

1. Section includes requirements for the seismic bracing of components of the building that are "nonstructural," meaning that these components are not part of the structural support of the building itself.
2. The requirements of this Section shall apply to architectural, mechanical, electrical, plumbing, fire protection, and elevator systems as specified in Table 1 of this Section. This Section includes seismic design requirements for nonstructural components including, but not limited to, the following:
 - a. Components subject to compliance with this section include, but are not limited to, the following:
 - 1) Mechanical equipment and conveyances.
 - 2) Electrical equipment and conveyances.
 - 3) Alarms and fire suppression systems.
 - 4) Communication systems.
 - 5) Partitions.
 - 6) Suspended ceilings.
 - 7) Interior fall arrest system.
 - b. Components Exempt from the Requirements of this Section:
 - 1) Suspended components or systems weighing 20 pounds or less.
 - 2) Wall mounted components weighing 200 pounds or less.
 - 3) Wall, floor or roof mounted equipment located 4 feet or less above the floor or roof level and weighing 400 pounds or less.
3. Related Sections:
 - a. Divisions 03, 05 through 10.
 - b. Divisions 22, 23 – Mechanical.
 - c. Divisions 26 – Electrical.

1.2 INFORMATIONAL SUBMITTALS

1. General: In addition to submittals required by individual specification Sections, provide stamped and signed Drawings and calculations with the requirements of this Section for any affected system.
 - a. FM Submittals:

- 1) Structural calculations.
- 2) Additional copies of shop drawings if the individual Specification Sections require them.

1.3 DEFINITIONS

1. **Component:** A part or element of an architectural, electrical, or mechanical nonstructural system.
2. **Support:** Those structural members, assemblies of members, or manufactured elements, including braces, frames, legs, lugs, snubbers, hangers, saddles, or struts, which transmit loads between the nonstructural components and the structure.
3. **Attachment:** Means by which components and their supports are secured or connected to the seismic force resisting system of the structure. Such attachments include anchor bolts, welded connections, and mechanical fasteners.
4. **Performance Class:** Classification used to identify nonstructural systems and components that are required to function for life safety purposes after an earthquake, contain hazardous materials, are needed for continued operation of the facility, or require substantial time to repair following an earthquake.
 - a. **Note:** The term Performance Class is not defined by the IBC or ASCE 7. The term is presented here as a tool to communicate nonstructural seismic design requirements.
5. **Ductile Piping:** Piping systems constructed with steel, aluminum, or copper.
6. **Nonductile Piping:** Piping and tubing systems constructed with plastic, cast iron, glass, or ceramics.

1.4 SEISMIC DESIGN CRITERIA FOR NONSTRUCTURAL SYSTEMS

1. **Performance Class for Nonstructural Systems:**
 - a. **Critical (C)** for systems and components required to function for life safety purposes after an earthquake, systems and components containing hazardous materials, systems and components that are needed for continued operation of the facility, and other systems and components that the Owner has designated to be critical. Specific critical systems and components shall be as follows:
 - 1) **Required to Function for Life Safety Purposes:**
 - a) Fire protection systems.
 - b) Fire alarm system.
 - c) Emergency lighting fixtures and low voltage devices mounted in suspended ceilings.
 - 2) **Hazardous Materials:**
 - a) Generator fuel.
 - b) Natural gas.

- 3) Needed for Continued Operation of the Facility:
- a) Walls and partitions that support other critical components.
 - b) Ceilings.
 - c) Access flooring.
 - d) Casework with sinks.
 - e) Elevators (specially designated elevators).
 - f) Air handling units.
 - g) Exhaust fans.
 - h) Pressurization fans.
 - i) Booster, sump, and heating water pumps.
 - j) Elevator machine room cooling equipment.
 - k) Constant volume terminal units.
 - l) Cold water piping.
 - m) Hot water piping.
 - n) Hot water circulation piping.
 - o) Deionized water piping.
 - p) Sanitary waste and vent piping.
 - q) Rain leader piping.
 - r) Heating water piping.
 - s) Process chilled water piping.
 - t) Steam piping.
 - u) Condensate piping.
 - v) Rupture relief vent.
 - w) Uninterruptable Power Supply units (UPS).
 - x) Emergency power unit substations (15 KV and 5KV systems).
 - y) Emergency 15 KV and 5KV equipment and cabling/wiring.
 - z) Complete emergency distribution system to branch circuit level (lighting, power and LV systems).
 - aa) Lighting for and related to the helistop.
 - bb) Equipment racks in MDF and IDF rooms.
 - cc) Overhead paging system.
 - dd) Two-way radio communication system.
 - ee) Conduit runs for critical components.
 - ff) Cable tray.
- 4) Owner Designated:
- a) Normal power unit substations (15 KV systems).
 - b) Normal 15 KV equipment and cabling/wiring.
 - c) Normal distribution system from source to distribution panelboard level for portions serving patient care areas.
 - d) Normal lighting fixtures and low voltage devices mounted in suspended ceilings.
 - e) Normal distribution system from source to 480 volt unit substation level.
 - f) Connections to select cooking and refrigeration equipment.
- b. Not Critical (NC) for all other nonstructural systems and components.

2. Component Importance Factor (I_p) for nonstructural systems and components shall be per Table 1 of this Section.
3. Design earthquake spectral response coefficients: $S_{DS} = 0.771$, $S_{DI} = 0.376$.

1.5 SEISMIC DESIGN REQUIREMENTS FOR NONSTRUCTURAL SYSTEMS

1. The seismic design requirements for each nonstructural system shall be as specified in Table 1 below.
2. Seismic forces (F_p) and displacements (D_p) shall be calculated in accordance with ASCE 7 Section 13.3. Equations 13.3-1 through 13.3-3 shall not be used; instead, Equation 13.3-4 shall be used at all levels with $a_x A_x$ taken equal to 0.5. Components attached to two adjacent floors within the same structure shall accommodate the following relative lateral displacements: 3 inches at or below Level 5; 2.5 inches above Level 5. Components attached to two adjacent structures shall accommodate relative lateral displacement in any direction equal to the size of the seismic joint provided.

TABLE 1				
Nonstructural System	Performance Class (Component Importance Factor, I_p)	Seismic Design Required?		Comments
		Component	Support and Attachment	
Architectural Systems:				
Nonstructural Walls and Partitions	NC (1.0)	Yes	Yes	
	C (1.5)	Yes	Yes	
2 Ceilings	NC (1.0)	No	Yes	
	C (1.5)	No	Yes	
Access flooring	NC (1.0)	Yes	Yes	
	C (1.5)	Yes	Yes	
Casework	NC (1.0)	No	Yes	
	C (1.5)	No	Yes	
Medical Equipment	NC (1.0)	No	Yes	
	C (1.5)	No	Yes	
Audio-Visual Equipment	NC (1.0)	No	Yes	
Mechanical and Electrical Systems:				
General Mechanical Equipment (Components)	NC (1.0)	No	Yes	Seismic design of support and attachment is not required for components that: PART 2 - have flexible connections to associated ductwork, piping, and conduit, PART 3 - are mounted no more than 4 feet above floor, and PART 4 - weigh no more than 400 pounds or PART 5 - have flexible connections to associated ductwork, piping, and conduit, and PART 6 - weigh no more than 20 pounds (for distribution systems, no more than 5 lb/ft)
	C (1.5)	Yes (note 1)	Yes	

TABLE 1				
Nonstructural System	Performance Class (Component Importance Factor, I _p)	Seismic Design Required?		Comments
		Component	Support and Attachment	
General Electrical Equipment (Components)	NC (1.0)	No	Yes	Seismic design of support and attachment is not required for components that: PART 7 - have flexible connections to associated ductwork, piping, and conduit, PART 8 - are mounted no more than 4 feet above floor, and PART 9 - weigh no more than 400 pounds or PART 10 - have flexible connections to associated ductwork, piping, and conduit, and PART 11 - weigh no more than 20 pounds (for distribution systems, no more than 5 lb/ft)
	C (1.5)	Yes (note 1)	Yes	
Piping Systems	NC (1.0)	No	Yes	Seismic design of support and attachment is not required for: PART 12 - Piping supported by rod hangers, where hangers in the pipe run are no more than 12 inches long from top of pipe to supporting structure, hangers are detailed to avoid bending of the hangers and their attachments, and provisions are made for piping to accommodate the expected deflections. or PART 13 - Ductile piping systems having a nominal pipe size of no more than 3 inches.
	C (1.5)	Yes	Yes	Component design shall consider the allowable stress for pipe materials defined by ASCE 7-05 Section 13.6.11. Seismic design of support and attachment is not required for: PART 14 - Piping supported by rod hangers, where hangers in the pipe run are no more than 12 inches long from top of pipe to supporting structure, hangers are detailed to avoid bending of the hangers and their attachments, and provisions are made for piping to accommodate the expected deflections. or

TABLE 1				
Nonstructural System	Performance Class (Component Importance Factor, I _p)	Seismic Design Required?		Comments
		Component	Support and Attachment	
				PART 15 - Ductile piping systems having a nominal pipe size of no more than 1 inch.
Fire Protection Alarm and Sprinkler System	C (1.5)	No	Yes	Design shall be in accordance with NFPA 13-07.
HVAC and Duct Systems	NC (1.0)	No	Yes	Seismic design of support and attachment is not required for: PART 16 - HVAC ducts suspended from hangers no more than 12 inches long, detailed to avoid significant bending of the hangers and their attachments or PART 17 - Duct systems having a cross sectional area of no more than 6 square feet.
	C (1.5)	Yes	Yes	Component design shall consider the duct material strength and method of connection between sections. Seismic design of support and attachment is not required for: PART 18 - HVAC ducts suspended from hangers no more than 12 inches long, detailed to avoid significant bending of the hangers and their attachments or PART 19 - Duct systems having a cross sectional area of no more than 6 square feet.
Conduit and Cable Tray	NC (1.0)	No	Yes	Seismic design of support and attachment is not required for conduit systems that weigh no more than 5 lb/ft.
	C (1.5)	No	Yes	
Elevators	NC (1.0)	No	Yes	
	C (1.5)	No	Yes	
Notes:				

PART 20 - PRODUCTS (Not Used)

PART 21 - EXECUTION (Not Used)

END OF SECTION 01 46 00

SECTION 01 50 00 - TEMPORARY FACILITIES AND CONTROLS - SMALL RENOVATIONS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.

1.2 USE CHARGES

- A. Sewer, Water, and Electric Power Service: Provide connections and extensions of services as required for construction purposes.

1.3 QUALITY ASSURANCE

- A. Accessible Temporary Egress: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and local building code.

PART 2 - PRODUCTS

2.1 EQUIPMENT

- A. Air-Filtration Units: Primary and secondary HEPA-filter-equipped portable units with four-stage filtration. Provide single switch for emergency shutoff. Configure to run continuously.

PART 3 - EXECUTION

3.1 TEMPORARY UTILITY INSTALLATION AND USE

- A. Contractor to supply Portable toilets for use during duration of construction.
- B. Contractor to supply water from the building.
- C. Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment from that specified that will not have a harmful effect on completed installations or elements being installed.

1. Maintain a minimum temperature of 50 deg F in permanently enclosed portions of building for normal construction activities, and 65 deg F for finishing activities and areas where finished Work has been installed.
- D. Isolation of Work Areas in Occupied Facilities: Prevent dust, fumes, and odors from entering occupied areas.
1. Prior to commencing Work, isolate the HVAC system in area where Work is to be performed according to coordination drawings.
 - a. Disconnect supply and return ductwork in Work area from HVAC systems servicing occupied areas.
 - b. Maintain negative air pressure within Work area using HEPA-equipped air-filtration units, starting with commencement of temporary partition construction, and continuing until removal of temporary partitions is complete.
 2. Maintain dust partitions during the Work. Use vacuum collection attachments on dust-producing equipment. Isolate limited Work within occupied areas using portable dust-containment devices.
 3. Perform daily construction cleanup and final cleanup using approved, HEPA-filter-equipped vacuum equipment.
 4. Provide for one entrance to be used for construction personnel and materials.
- E. Ventilation and Humidity Control: Provide adequate ventilation in enclosed areas throughout construction period required to: facilitate progress of Work; to protect Work and products against dampness and heat and cold; to prevent moisture condensation on surfaces; to provide suitable ambient temperatures for installation and curing of finish materials; to provide adequate ventilating; to meet health regulations for safe working environment; and, to prevent hazardous accumulations of dusts, fumes, mists, vapors or gases in areas occupied during construction. Provide local exhaust ventilating to prevent harmful dispersal of hazardous substances into atmosphere of occupied areas. Dispose of exhaust materials in manner that will not result in harmful exposure to persons or property. Provide ventilating operations at all times personnel occupy an area, when subject to hazardous accumulations of harmful elements. Continue operation of ventilating system for as long as required after cessation of Work to ensure removal of harmful elements.
1. In the event that the Owner accepts the Contractor's use of the permanent ventilation and air conditioning systems for the balance of the Work, provide and maintain temporary filters to adequately filter air being distributed through the ductwork and air handling units to the supply outlets; disposable filter shall be placed in front of all exhaust registers to keep construction dirt out of exhaust ductwork.
- F. Electric Power Service: Connect to Owner's existing electric power service. Maintain equipment in a condition acceptable to Owner.
1. Do not overload existing electric power service.
- G. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions if existing lighting is not sufficient.

1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.
 2. All temporary equipment and wiring for temporary lighting shall be in accordance with the applicable provisions of the governing codes and regulations, the NEC, NEMA, UL, and OSHA standards. Install temporary service to comply with NFPA 70.
 3. Maintain temporary lighting to give safe working conditions, continuous service, and so as not to pose a threat to the Owner's property.
- H. Internet Service: Provide computer with high-speed, broadband connection (examples: Business Class DSL, Multiple T1, Metro Ethernet), including router, equipped with hardware firewall; providing minimum 1Mbps upload and 1 Mbps download speeds for superintendent's use in sending and receiving e-mail.

3.2 SUPPORT FACILITIES INSTALLATION

- A. Project Signs: No Project identification signs or advertisements will be permitted on the Project site. Provide warning signs as required to inform tenants, public, and construction personnel of possible dangers.
- B. Construction Aids: Provide all items, such as lifting devices, scaffolding, staging, platforms, runways, ladders; and temporary flooring, as required by the various trades for the proper execution and protection of the Work. Provide such construction aids with proper guys, bracing, guards, railings and other safety devices as required by the governing authorities and OSHA.

3.3 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, finishes and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.
- B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects. Comply with MND.
- C. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.
- D. Temporary Partitions: Provide floor-to-ceiling dustproof partitions to limit dust and dirt migration and to separate areas occupied by Owner and tenants from fumes and noise. Where fire-resistance-rated temporary partitions are indicated or are required by authorities having jurisdiction, construct partitions according to the rated assemblies.
- E. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241 and all applicable Federal, state and local codes and regulations; manage fire-prevention program.

- F. Security: Provide and maintain provisions for closing and locking the site to prevent unauthorized entrance, vandalism, theft, and similar violations of security.
- G. Moisture-Protection: Avoid trapping water in finished Work. Document visible signs of mold that may appear during construction. Prior to the full operation of permanent HVAC systems, maintain as follows:
 - 1. Control moisture and humidity inside building by maintaining effective dry-in conditions.
 - 2. Comply with manufacturers' written instructions for temperature, relative humidity, and exposure to water limits.

3.4 TERMINATION AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- B. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
 - 1. Materials and facilities that constitute temporary facilities are property of Contractor.
 - 2. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 01 77 00 "Closeout Procedures."

END OF SECTION 01 50 00

SECTION 01 60 00 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.

1.2 DEFINITIONS

- A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
 - 1. Comparable Product: Product that is demonstrated and approved through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- B. Basis-of-Design Product Specification: A specification in which a specific manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of additional manufacturers named in the specification.
- C. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
- D. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.

1.3 QUALITY ASSURANCE

- A. General: All bids shall be based on the products required in the Contract Documents.

1.4 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.
- B. Delivery and Handling:

1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.

C. Storage: **See WHITEBOOK 7-8.4.1 & 7-8.4.3**

1. Store products to allow for inspection and measurement of quantity or counting of units.
2. Store materials in a manner that will not endanger Project structure.
3. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
4. Protect stored products from damage and liquids from freezing.

1.5 PRODUCT WARRANTIES - See WHITEBOOK 6-8.3

- A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.
 1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
 2. Specified Form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
 3. See other Sections for specific content requirements and particular requirements for submitting special warranties.

PART 2 - PRODUCTS - See WHITEBOOK 2-5.3.1

2.1 PRODUCTS, GENERAL

- A. Components, materials, or parts required to be supplied in quantity within a Section shall be of the same manufacture, shall be interchangeable, and shall be the same with regard to function, texture, pattern, and color.
- B. Except for building equipment in service areas, no manufacturers' labels or name plates shall be visible on any component, unless required by local authorities having jurisdiction.

2.2 PRODUCT SELECTION PROCEDURES

- A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.
1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
 2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
 3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
 4. Where products are accompanied by the term "as selected," Architect (through Resident Engineer) will make selection.
 5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
- B. Product Selection Procedures:
1. Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements.
 2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements.
 3. Products: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements.
 4. Manufacturers: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements.
 5. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named.
- C. Visual Matching Specification: Where Specifications require matching an established Sample, provide a product that complies with requirements and matches sample specified. Architect's decision (through Resident Engineer) will be final on whether a proposed product matches.
1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Section 01 25 00 "Substitution Procedures" for proposal of product.
- D. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or similar phrase, select a product that complies with requirements. Architect (through Resident Engineer) will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.3 COMPARABLE PRODUCTS

- A. Conditions for Consideration: City's Resident Engineer will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, City's Resident Engineer may return requests without action, except to record noncompliance with these requirements:
1. Evidence that the proposed product does not require revisions to the Contract Documents, that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
 2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
 3. Evidence that proposed product provides specified warranty.
 4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
 5. Samples, if requested.

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 60 00

SECTION 01 73 00 - EXECUTION - See WHITEBOOK 2-1

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes general administrative and procedural requirements governing execution of the Work, including the following:
 - 1. Construction layout.
 - 2. Installation of the Work.
 - 3. Cutting and patching.
 - 4. Coordination of Owner-installed products.
 - 5. Progress cleaning.
 - 6. Starting and adjusting.
 - 7. Protection of installed construction.

1.2 DEFINITIONS

- A. Cutting: Removal of in-place construction necessary to permit installation or performance of other work. Cutting in this sense does not include demolition.
- B. Patching: Fitting and repair work required to restore construction to original conditions after installation of other work.

1.3 QUALITY ASSURANCE

- A. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.
 - 1. Structural Elements: When cutting and patching structural elements, notify Architect of locations and details of cutting and await directions from Architect before proceeding. Shore, brace, and support structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection
 - 2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety.
 - 3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety.

4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
- B. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Comply with requirements specified in other Sections.
- B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Architect for the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Existing Conditions: The existence and location of utilities and construction indicated as existing are not guaranteed. Before beginning Work, investigate and verify the existence and location of mechanical and electrical systems, and other construction affecting the Work.
- B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance.
1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
 2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
 3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
- C. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. **Field Measurements:** Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- B. **Space Requirements:** Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- C. **Review of Contract Documents and Field Conditions:** Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to City's Resident Engineer according to requirements in Section 01 26 13 "Requests for Information (RFI)."

3.3 CONSTRUCTION LAYOUT

- A. **Verification:** Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to existing conditions. If discrepancies are discovered, notify Architect and Resident Engineer promptly.
- B. **General:** The Work to be performed under the Contract Documents shall be laid out solely by the Contractor. Provide and pay for all construction layout work required for the Project. Under no circumstances will the Architect assume any responsibilities for laying out the Work.
 - 1. Establish benchmarks and control points to set lines and levels as needed to locate each element of Project.
 - 2. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
 - 3. Inform installers of lines and levels to which they must comply.
 - 4. Check the location, level and plumb, of every major element as the Work progresses.
 - 5. Notify Architect and Resident Engineer when deviations from required lines and levels exceed allowable tolerances.

3.4 INSTALLATION

- A. **General:** Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
 - 1. Make vertical work plumb and make horizontal work level.
 - 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
 - 3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated. Where indicated to remain exposed, arrange overhead systems in an orderly manner.
 - 4. Maintain minimum headroom clearance of 96 inches in occupied spaces and 90 inches in unoccupied spaces.

- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.
- F. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.
- G. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.
 - 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
 - 2. Coordinate installation of anchorages. 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.
- I. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
- J. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.5 CUTTING AND PATCHING

- A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
 - 1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

- B. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.
- C. Temporary Support: Provide temporary support of work to be cut.
- D. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- E. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to minimize interruption to occupied areas.
- F. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
 - 1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 - 2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
 - 3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill. Avoid cutting steel reinforcement.
 - a. Locate steel reinforcement using Ground Penetrating Radar or Ferroskan prior to cutting or drilling reinforced concrete and masonry. If existing steel reinforcement is in proposed cut or hole location, contact Architect before proceeding with the Work.
 - 4. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
 - 5. Proceed with patching after construction operations requiring cutting are complete.
- G. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.
 - 1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
 - 2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.

- a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
 - b. Restore damaged pipe covering to its original condition.
3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
- a. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
- H. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.6 OWNER-INSTALLED PRODUCTS

- A. Site Access: Provide access to Project site for Owner's construction personnel.
- B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction personnel.
1. Construction Schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.
 2. Preinstallation Conferences: Include Owner's construction personnel at pre-installation conferences covering portions of the Work that are to receive Owner's work. Attend pre-installation conferences conducted by Owner's construction personnel if portions of the Work depend on Owner's construction.

3.7 PROGRESS CLEANING - REFERENCE WHITEBOOK 7-8.6.2.3

- A. General: Clean Project site and work areas daily, including common areas. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Enforce requirements strictly. Dispose of materials lawfully.
1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
 2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F.

3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
 - a. Use containers intended for holding waste materials of type to be stored.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
 1. Remove liquid spills promptly.
 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- H. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- I. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.8 STARTING AND ADJUSTING

- A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- B. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.
- C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

3.9 PROTECTION OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
- B. Comply with manufacturer's written instructions for temperature and relative humidity.

END OF SECTION 01 73 00

SECTION 01 73 40 - RENOVATION DESIGN GUIDELINES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes general procedural and design requirements applying to all of the alterations and renovation work of the Project. Because of the size and scope of the Project, not every instance of a deviation from shown details can be described; this Section governs overall design intent for renovation work and alterations work.
- B. Datum lines are shown on the Drawings; locations of new items are based on datum information shown.

1.2 DESIGN GUIDELINES, GENERAL

- A. Where new materials are intended to match existing materials either to complete an existing installation, or extend an existing installation. The degree of acceptable color match between materials will be solely the decision of the Architect.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Comply with requirements specified in other Sections.
- B. In locations of patching and extending existing materials, provide the same material as exists on the building in the immediately adjacent area.
- C. Procedure for Patching Existing Roofing and Waterproofing Assemblies:
 - 1. Use Owner's attic stock if available.
 - 2. If no attic stock is available for use, verify existing material type and manufacturer. Procure compatible new material from the same manufacturer for patching work.
 - 3. If warranty is in place, perform patching to meet all manufacturer requirements for warranty repair and maintenance. Provide manufacturer observation if required for warranty maintenance by material manufacturer.
 - 4. Cut back existing material to area of sound bond and make seams between new and old material at an unstressed location, or in location recommended by membrane/coating manufacturer.
- D. Shop Assembly: Preassemble items in the shop to greatest extent possible. Use connections that maintain structural value of joined pieces.
- E. Primers and Coatings: Comply with requirements in Section 09 91 23 "Interior Painting."

2.2 ROUGH CARPENTRY

- A. Equipment Backing Panels: DOC PS 1, Exterior, AC, fire-retardant treated, in thickness indicated or, if not indicated, not less than 1/2-inch nominal thickness.
- B. Screws for Fastening to Metal Framing: ASTM C 1002, length as recommended by screw manufacturer for material being fastened.

2.3 MISCELLANEOUS METAL ITEMS

- 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. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- C. Stainless-Steel Bars and Shapes: ASTM A 276, Type 304.
- 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. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.
- F. 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.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Where deviations between existing conditions and conditions shown on the Drawings materially affect the Work, provide a written report of the existing conditions. Include the following
 - 1. Description of the Work.
 - 2. List of detrimental conditions, including substrates.
 - 3. List of unacceptable installation tolerances.
 - 4. Recommended corrections.
- B. Protect persons, motor vehicles, surrounding surfaces of building being restored, building site, plants, and surrounding buildings from harm resulting from repair and maintenance work.

- C. Existing Drains: Prior to the start of Work in an area with a floor drain, test drainage system to ensure that it is functioning properly. Notify Architect immediately of inadequate drainage or blockage. Do not begin Work in an area until the drainage system is in working order.
- D. Locate areas of deteriorated or delaminated concrete using hammer or chain-drag sounding and mark boundaries. Mark areas for removal by simplifying and squaring off boundaries. At columns and walls make boundaries level and plumb unless otherwise indicated.

3.2 GENERAL REQUIREMENTS

- A. 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.
- B. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction.

3.3 NEW WALL CONSTRUCTION

- A. Existing Conditions: The degree of plumb; out of line or other wall deviations may not be shown or indicated on the Drawings or in all locations. New walls are shown as level in two planes. New studs will not necessarily be attached directly to the existing concrete walls. Adjust location of runners and studs to provide straight walls in locations shown on the Drawings.
 - 1. Deviations less than 1/2 inch from required location may be shimmed.
 - 2. Deviations of 1/2 to 1 inch from required location; shim using metal channels.
 - 3. Deviations greater than 1 inch from required location: clarify intent with Architect.

3.4 CONFLICTS BETWEEN MATERIAL LOCATIONS

- A. If multiple systems must occupy the same space and the Drawings do not resolve the conflict, use the following guidelines for locating utilities in plenum or wall spaces. The items are listed in order of priority:
 - 1. Ceiling framing.
 - 2. Fire sprinkler runs and slopes.
 - 3. Gravity piping, roof drains, and plumbing wastelines.
 - 4. Mechanical ductwork (including flanges, supports and insulation).
 - 5. Pressure piping.
 - 6. Electrical conduits and cable trays.
 - 7. Light fixtures and clear space around lights.
 - 8. Flex duct for registers and grilles.

9. Electrical J-boxes for exit signs and smoke detectors.

3.5 FLOOR LEVELING

- A. Grind down high spots and fill low spots to provide typical 1/4 inch in 10 feet floor levelness. In selected areas, hydraulic cement will be used to achieve levelness of 1/8 inch in 10 feet or greater when required for equipment or installation of finish materials.

3.6 WATERPROOFING MEMBRANES AND OTHER WEATHER BARRIERS

- A. Where waterproofing membranes are not being entirely removed and replaced by the new construction, observe the following precautions:
 1. Verify compatibility of the new material with the existing material. If existing material is still under warranty, provide for full time observation by the appropriate product representative and whatever procedures are necessary for warranty maintenance.
 2. Cut back surface material sufficiently to provide a minimum 3 inch overlap between new waterproofing and existing waterproofing.
 3. If new proposed material is not compatible with existing material, inform Architect, who will select an alternative material for application in that location.

END OF SECTION 01 73 40

SECTION 01 74 19 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL - REFERENCE WHITEBOOK SECTION 7-21. See San Diego Municipal Code, Chapter 6, Article 6, Division 6, Page 1. Please see DSD - Waste Management form - Part I, Construction and Demolition (C&D) Debris Deposit Program Required for projects described in Municipal Code 66.0601-66.0610.

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for waste reduction, including salvaging, recycling, and disposing of nonhazardous waste.

1.2 DEFINITIONS

- A. Construction Waste: Building improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
- B. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.
- C. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.
- D. Hazardous Materials: Construction and demolition debris that are regulated for disposal by local, city, county, state, or Federal authorities.
- E. Reclamation Materials: Construction and demolition debris that meets the requirements of a product manufacturer's reclamation program where the debris is removed and prepared for shipping to a manufacturer's facility for reuse in producing new products.
- F. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.
- G. Recyclable Materials: Construction and demolition debris that can be recovered and processed into new products or materials. Recyclable materials include, but are not limited to, the following:
 - 1. Metals: Ferrous (iron, steel, stainless steel, galvanized steel) and non-ferrous (copper, brass, bronze, aluminum) types and containers made from metals such as pails, buckets and beverage cans. Paint cans shall be cleaned to qualify.
 - 2. Concrete.
 - 3. Brick.
 - 4. Gypsum wallboard.

5. Paper products such as generated from field office activities and clean corrugated packaging cardboard.
6. Wood products, including untreated dimensional lumber, plywood, oriented strand board, hardboard, particleboard and crates and pallets made from wood products.
7. Carpet and padding.
8. Plastics and containers made from plastics such as pails, buckets, and beverage bottles.
9. Glass: Glass beverage containers, window and mirror glass.

1.3 PERFORMANCE REQUIREMENTS

- A. Practice efficient waste management in the use of materials in the course of the Work. Reduce waste by minimizing factors that contribute to waste and achieve the most efficient use of resources and materials; uses water efficiently; avoids practices such as over-packaging, improper storage, ordering errors, poor planning, breakage, mishandling and contamination

1.4 ACTION SUBMITTALS

- A. Waste Management Plan: Submit plan within 7 days of date established for the Notice to Proceed.

B. INFORMATIONAL SUBMITTALS

- C. Waste Management Reports: Concurrent with each Application for Payment, submit report.

- D. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

- E. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.

1.5 QUALITY ASSURANCE

- A. Refrigerant Recovery Technician Qualifications: Certified by EPA-approved certification program.

- B. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.

- C. Waste Management Conference: Conduct preconstruction conference at Project site to comply with requirements in Section 01 31 00 "Project Management and Coordination." Review methods and procedures related to waste management including, but not limited to, the following:

1. Review and discuss waste management plan including responsibilities of waste management coordinator.
2. Review requirements for documenting quantities of each type of waste and its disposition.
3. Review and finalize procedures for materials separation and verify availability of containers and bins needed to avoid delays.
4. Review procedures for periodic waste collection and transportation to recycling and disposal facilities.
5. Review waste management requirements for each trade.

1.6 WASTE MANAGEMENT PLAN

- A. **General:** Develop a waste management plan according to ASTM E 1609 and requirements in this Section. Plan shall consist of waste identification, waste reduction work plan, and cost/revenue analysis. Distinguish between demolition and construction waste. Indicate quantities by weight or volume, but use same units of measure throughout waste management plan.
- B. **Waste Identification:** Indicate anticipated types and quantities of demolition and construction waste generated by the Work.
- C. **Waste Management Plan:** List each type of waste and whether it will be salvaged, recycled, or disposed of in landfill or incinerator. Include points of waste generation, total quantity of each type of waste, quantity for each means of recovery, and handling and transportation procedures.
 1. **Salvaged Materials for Reuse:** For materials that will be salvaged and reused in this Project, describe methods for preparing salvaged materials before incorporation into the Work.
 2. **Salvaged Materials for Sale:** For materials that will be sold to individuals and organizations, include list of their names, addresses, and telephone numbers.
 3. **Salvaged Materials for Donation:** For materials that will be donated to individuals and organizations, include list of their names, addresses, and telephone numbers.
 4. **Recycled Materials:** Include list of local receivers and processors and type of recycled materials each will accept. Include names, addresses, and telephone numbers.
 5. **Disposed Materials:** Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and incinerator facility.
 6. **Handling and Transportation Procedures:** Include method that will be used for separating recyclable waste including sizes of containers, container labeling, and designated location where materials separation will be performed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Reclamation Programs: Research and prepare a plan to work with manufacturers who have programs to receive used materials. Known reclamation programs are available from, but not limited to, the following manufacturers:
1. Carpet:
 - a. ReEntryProgram by Interface.
 - b. Antron, Invista.
 - c. CON-tinum by Constantine & Covanta.
 - d. Local carpet and carpet cushion reclamation centers may be found on <http://www.carpetrecovery.org/>.
 - e. or approved equal
 2. Ceiling Panels: Armstrong World Industries, Inc.
 3. Resilient Flooring: ReUse Program by Tarkett or approved equal.

PART 3 - EXECUTION

3.1 PLAN IMPLEMENTATION

- A. General: Implement approved waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.
- B. Waste Management Coordinator: Engage a waste management coordinator to be responsible for implementing, monitoring, and reporting status of waste management work plan. Waste management coordinator may have other duties on site.
- C. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work.
1. Distribute waste management plan to everyone concerned within three days of submittal return.
 2. Distribute waste management plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.
- D. Waste Management in Historic Zones or Areas: Hauling equipment and other materials shall be of sizes that clear surfaces within historic spaces, areas, rooms, and openings, by 12 inches or more.

3.2 RECYCLING WASTE AND RECLAMATION

- A. General: Recycle paper and beverage containers used by on-site workers.

- B. Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall accrue to Contractor.
- C. Preparation of Waste: Prepare and maintain recyclable waste materials according to recycling or reuse facility requirements. Maintain materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to the recycling process.
- D. Procedures: Separate recyclable waste from nonrecyclable waste materials, trash, and debris.
 - 1. Designate separate on-site areas for recyclable waste and nonrecyclable materials, trash and debris. Locate each area in order that non-recyclable debris will not contaminate materials to be reused or recycled. Provide appropriately marked containers or bins for controlling waste until removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.
 - a. Inspect containers and bins for contamination and remove contaminated materials if found.
 - 2. Maintain the facilities in an orderly condition.
 - 3. Cut all items to lengths and sizes to fit within the containers or bins provided.
 - 4. Where there is sufficient quantity of a specific recyclable debris item (for example; salvaged metal doors and frames or duct work), make arrangements for items to be bundled, banded or tied, and stack in a designated location for a special pick-up.
 - 5. Separate construction and demolition debris at the project site by the following method:
 - a. Co-Mingled Method: Place all recyclable construction and demolition debris into containers or bins and transport to a recycling facility where recyclable and salvageable materials are removed, sorted, and processed. .
- E. Reclamation: Provide on-site operations to remove reclamation materials and package or palletize in accordance with manufacturer's reclamation program requirements.

3.3 DISPOSAL OF WASTE

- A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.
 - 1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
 - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- B. Burning: Do not burn waste materials.
- C. Do not dispose waste materials in building trash dumpster.

END OF SECTION 01 74 19

SECTION 01 81 23 - CAL GREEN REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes general requirements and procedures for compliance with certain provisions of the California Green Building Standards Code, also known and hereinafter referred to as the "Code."
 - 1. Other prerequisites and credits needed to obtain Code compliance depend on material selections and may not be specifically identified as requirements for Code compliance. Compliance with requirements needed to obtain Code compliance may be used as one criterion to evaluate substitution requests and comparable product requests.
 - 2. Additional requirements needed to obtain Code compliance depend on Architect's design and other aspects of Project that are not part of the Work of the Contract.
 - 3. Sample compliance forms and worksheets are provided at the end of this Section, for information only. Provide required data in form acceptable to Architect and authorities having jurisdiction.

- B. Related Sections:
 - 1. Divisions 01 through 33 Sections for requirements for Code compliance specific to the work of each of these Sections.
 - 2. Section 01 50 00 "Temporary Facilities and Controls" for storm water pollution prevention plan.
 - 3. Section 01 74 19 "Construction Waste Management and Disposal" for construction waste management plan.
 - 4. Section 01 91 13 "General Commissioning Requirements" for building commissioning.

1.2 REFERENCE

- A. ARB: California Air Resources Board.
- B. CCR: California Code of Regulations.
- C. SCAQMD: South Coast Air Quality Management District.

1.3 DEFINITIONS

- A. Building Commissioning: A systematic quality assurance process that spans the entire design and construction process, including verifying and documenting that building systems and components are planned, designed, installed, tested, operated and maintained to meet the owner's project requirements.

- B. Composite Wood Products: Composite wood products include hardwood plywood, particleboard and medium density fiberboard. "Composite wood products" does not include hardboard, structural plywood, structural panels, structural composite lumber, oriented strand board, glued laminated timber, prefabricated wood I-joists or finger-jointed lumber, all as specified in California Code of Regulations (CCR), Title 17, Section 93120.1(a).
- C. Recycled Content: The percentage by weight of constituents that have been recovered or otherwise diverted from the solid waste stream, either during the manufacturing process (pre-consumer), or after consumer use (post-consumer).
1. Spills and scraps from the original manufacturing process that are combined with other constituents after a minimal amount of reprocessing for use in further production of the same product are not recycled materials.
 2. Discarded materials from one manufacturing process that are used as constituents in another manufacturing process are pre-consumer recycled materials.
- D. Recycled Content Value: Material cost multiplied by postconsumer content plus $\frac{1}{2}$ the preconsumer content, or $RCV = \$ X (\text{postconsumer content} + \frac{1}{2} \text{preconsumer content})$:
1. "Post-consumer waste" is defined as waste material generated by consumers after it is used and which would otherwise be discarded.
 2. "Pre-consumer waste" is defined as material diverted from the waste stream during the manufacturing process, including scraps, damaged goods, and excess production that is used in another manufacturing process.
- E. Maximum Incremental Reactivity (MIR): The maximum change in weight of ozone formed by adding a compound to the "Base Reactive Organic Gas (ROG) Mixture" per weight of compound added, expressed to hundredths of a gram.
1. MIR values for individual compounds and hydrocarbons solvents are specified in CCR, Title 17, Section 94700 and Section 94701.
- F. Reactive Organic Compound (ROC): Any compound that has the potential, once emitted, to contribute to ozone formation in the troposphere.
- G. Product-Weight MIR (PWMIR): The sum of all weighted-MIR for all ingredients in a product subject to this article. The PWMIR is the total product reactivity expressed to hundredths of a gram of ozone formed per gram of product (excluding container and packaging).
1. PWMIR is calculated according to equations found in CCR, Title 17, Section 94521(a).
- H. VOC: A volatile organic compound (VOC) is broadly defined as a chemical compound based on carbon chains or rings with vapor pressures greater than 0.1 millimeters of mercury at room temperature. These compounds typically contain hydrogen and may contain oxygen, nitrogen and other elements. See CCR Title 17, Section 94508(a).
1. Note: Where specific regulations are cited from different agencies such as South Coast Air Quality Management District (SCAQMD), California Air Resources Board (ARB), etc., the VOC definition included in that specific regulation is the one that prevails for the specific measure in question.

1.4 SUBMITTALS

- A. Project Materials Cost Data: Provide statement indicating total cost for materials used for Project. Costs exclude labor, overhead, and profit. Include breakout of costs for the following categories of items:
1. Plumbing.
 2. Mechanical.
 3. Electrical.
 4. Wood-based construction materials.
- B. Action Plans: Provide preliminary submittals within 14 days of date established for commencement of the Work indicating how the following requirements will be met:
1. Storm Water Pollution Prevention Plan: Comply with Section 01 50 00 "Temporary Facilities and Controls."
 2. Construction Waste Management Plan: Comply with Section 01 74 19 "Construction Waste Management and Disposal."
 3. List of proposed salvaged and refurbished materials. Identify each material that will be salvaged or refurbished, including its source, cost, and replacement cost if the item was to be purchased new.
 4. List of materials and procedures for covering of duct openings and protection of mechanical equipment.
- C. Progress Reports: Concurrent with each Application for Payment, submit reports comparing actual construction and purchasing activities with Action Plans for the following:
1. Waste reduction progress reports complying with Section 01 74 19 "Construction Waste Management and Disposal."
 2. Salvaged and refurbished materials.
 3. Recycled content.
- D. Documentation Submittals:
1. Receipts for salvaged and refurbished materials used for Project, indicating sources and costs for salvaged and refurbished materials.
 2. Product data and certification letter indicating percentages by weight of post-consumer and pre-consumer recycled content for products having recycled content. Include statement indicating costs for each product having recycled content.
 3. Construction Documentation: Six photographs at three different times during the construction period, along with a brief description of the approach employed, documenting protection of ducts and HVAC equipment.
 4. Product data for adhesives, sealants and caulks, indicating VOC content of each product used. Indicate VOC content in g/L calculated according to SCAQMD Rule 1168 VOC limits and CCR Title 17 for aerosols.
 5. Product data for paints and coatings, indicating VOC content of each product used. Indicate VOC content in g/L calculated according to the Air Resource Board Architectural Coatings Suggested Control Measure and CCAR Title 17 for aerosols.

6. Product data for carpet used inside the weatherproofing system indicating compliance with the Carpet and Rug Institute "Green Label Plus Program"; compliance with the VOC-emission limits and testing requirements specified in the California Department of Public Health Standard Practice Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers, Version 1.1, February.; compliance with NSF/ANSI 140 at the Gold Level or higher; compliance with (CA-CHPS) Criteria Interpretation for EQ 7.0 and EQ 7.1 dated July 2012 and listed in the CHPS High Performance Product database, or other standard accepted by authorities having jurisdiction.
7. Product data for carpet cushion used inside the weatherproofing system indicating compliance with the Carpet and Rug Institute "Green Label Program'.
8. Product data for resilient flooring indicating compliance with the VOC-emissions limits and testing requirements specified in the California Department of Public Health's 2010 Standard Method for the Testing and Evaluation Chambers, Version 1.1, February 2010; compliance with the Collaborative for CA-CHPS Criteria Interpretation for EQ 7.0 and EQ 7.1 dated July 2012 and listed in the CHPS High Performance Product Database; certification under UL GREENGUARD or certification under the Resilient Floor Covering Institute (RFCI) Floor Score program.
9. Product data, manufacturer's certifications, chain of custody certifications, or other documentation acceptable to authorities having jurisdiction; for products containing composite wood or agrifiber products or wood glues. Indicate compliance with ARB Air Toxics Control Measure for Composite Wood.
10. Product Data for residential appliances, indicating that products are ENERGY STAR rated.
11. Product data for carbon dioxide (CO₂) sensors and controls.
12. Product data for HVAC, refrigeration, and fire suppression equipment and systems, indicating no use of Chlorofluorocarbons (CFCs) and Halons.
13. Product data for wood- burning appliances indicating compliance with requirements for direct venting as defined and required by the California Energy Code, Title 24, Part 6, Subchapter 7, Section 150, and for compliance with United State Environmental Protection Agency (USEPA) Phase II emission limits where applicable..
14. Product data for irrigation systems components including but not necessarily limited to the following:
 - a. Sprinkler heads: Indicate degree of head rotation and spray characteristics/ pattern.
 - b. Controllers and sensors.
15. Product data and schedules for plumbing fixtures and fittings. Include rated capacities and operating characteristics.
16. Product data, including photometrics, for interior and exterior lighting fixtures. Include Testing Agency and Manufacturer's certified data.
17. Qualifications data for HVAC system installers' certification. Include employee names, positions, dates of service, types of certification, certification program names, descriptions, dates of completion, and dates of expiration.

PART 2 - PRODUCTS

2.1 ADHESIVES, SEALANTS AND CAULKS

- A. For field applications, use adhesives, sealants and caulks that comply with the indicated limits for VOC content when calculated according to SCAQMD Rule 1168 VOC limits and CCR Title 17 for aerosols.
- B. Adhesive VOC Limits:
1. Architectural Applications:
 - a. Indoor carpet adhesives: 50 g/L.
 - b. Carpet pad adhesives: 50 g/L.
 - c. Outdoor carpet adhesives: 150 g/L.
 - d. Wood flooring adhesive: 100 g/L.
 - e. Rubber floor adhesives: 60 g/L.
 - f. Subfloor adhesives: 50 g/L.
 - g. Ceramic tile adhesives: 65 g/L.
 - h. VCT and asphalt tile adhesives: 50g/L.
 - i. Drywall and panel adhesives: 50g/L.
 - j. Cove base adhesives: 50 g/L.
 - k. Multipurpose construction adhesives: 70g/L.
 - l. Structural glazing adhesives: 100g/L.
 - m. Single-ply roof membrane adhesives: 250g/L.
 - n. Other adhesive not specifically listed: 50g/L.
 2. Specialty Applications:
 - a. PVC welding: 510 g/L.
 - b. CPVC welding: 490g/L.
 - c. ABS welding: 325g/L.
 - d. Plastic cement welding: 250 g/L.
 - e. Adhesive primer for plastic: 550g/L.
 - f. Contact adhesive: 80 g/L.
 - g. Special purpose contact adhesive: 250g/L.
 - h. Structural wood member adhesive: 140 g/L.
 - i. Top and trim adhesive: 250 g/L.
 3. Substrate- specific Applications:
 - a. Metal to metal: 30 g/L.
 - b. Plastic foams: 50g/L.
 - c. Porous material: (except wood) 50g/L.
 - d. Wood: 30 g/L.
 - e. Fiberglass: 80 g/L.
- C. Sealant and Sealant Primer VOC Limits:

1. Sealants:
 - a. Architectural: 250 g/L.
 - b. Marine deck: 760 g/L.
 - c. Nonmembrane roof: 300 g/L.
 - d. Roadway: 250 g/L.
 - e. Single-ply roof membrane: 450 g/L.
 - f. Other: 420 g/L.

2. Sealant Primers:
 - a. Architectural nonporous: 250 g/L.
 - b. Architectural porous: 775 g/L.
 - c. Modified bituminous: 500 g/L.
 - d. Marine deck: 760 g/L.
 - e. Other: 750 g/L.

2.2 PAINTS AND COATINGS

- A. For field applications, use paints and coatings that comply with the indicated limits for VOC content when calculated according to CEPA Air Resources Board Architectural Coatings Suggested Control Measure and CCR Title 17 for aerosols. Additionally, comply with more stringent local limits where they occur.

1. Specialty Coatings:
 - a. Aluminum roof coatings: [400(CALgreen)] [100(SCAQMD)] g/L.
 - b. Bituminous roof coatings: 50 g/L.
 - c. Bituminous roof primers: 350 g/L.
 - d. Bond breakers: 350 g/L.
 - e. Concrete curing compounds: [350][100] g/L.
 - f. Concrete/masonry sealers: 100 g/L.
 - g. Fire resistive coatings: 150 g/L.
 - h. Floor coatings: 50 g/L.
 - i. Form-release compounds: 100 g/L.
 - j. Graphic arts coatings (sign paints): 150 g/L.
 - k. High-temperature coatings: 420 g/L.
 - l. Industrial maintenance coatings 100 g/L.
 - m. Low solids coatings: 120 g/L.
 - n. Magnesite cement coatings: 450 g/L.
 - o. Mastic texture coatings: 100g/L.
 - p. Multicolor coatings: 250 g/L.
 - q. Pretreatment wash primers: 420 g/L.
 - r. Primers, sealers and undercoaters: 100 g/L.
 - s. Reactive penetrating sealers: 350 g/L.
 - t. Recycled coatings: 250 g/L.
 - u. Roof coatings: 50 g/L.
 - v. Rust preventative coatings: 100 g/l.
 - w. Clear shellacs: 730 g/L.

- x. Opaque shellacs: 550 g/L.
- y. Specialty primers, sealers and undercoaters: 100.g/l.
- z. Stains:
 - 1) General: 100 g/L.
 - 2) Interior Stains: 250 g/l.
- aa. Stone consolidants: 450 g/L.
- bb. Traffic marking coatings: 100 g/L.
- cc. Waterproofing membranes: 100 g/L.
- dd. Wood coatings: 275 g/L.
- ee. Wood preservatives: 350g/L.
- ff. Zinc-rich primers: 100 g/L.

B. Coatings that do not meet the definitions for the specialty coatings categories indicated above shall be determined by classifying the coating as a Flat, Nonflat or Nonflat-High Gloss coating, based on its gloss, as defined in Subsections 4.21, 4.36 and 4.37 of the 2007 California Air Resources Board Suggested Control Measure.

- 1. Flat coatings: 50 g/L.
- 2. Nonflat coatings: 50 g/L.
- 3. Nonflat high gloss coatings: 50 g/L.

2.3 COMPOSITE WOOD

A. Composite wood must comply with indicated limits for formaldehyde as derived from those specified by the ARB's, Air Toxics Control Measure (ATCN)for Composite Wood in accordance with ASTM E 1333-96, and as specified in CCR, Title 17, Sections 93120 through 93120.12.

- 1. Formaldehyde Limits: Maximum formaldehyde emissions:
 - a. Hardwood Plywood Veneer Core: 0.05 ppm.
 - b. Hardwood Plywood Composite Core: 0.05 ppm.
 - c. Particle Board: 0.09 ppm.
 - d. Medium Density Fiberboard: 0.11 ppm.
 - e. Thin Medium Density Fiberboard: 0.13 ppm.
 - 1) Note: Thin medium density fiberboard has a maximum thickness of 0.3125 inch.

2.4 CARPET

A. Carpet must comply with one or more of the following:

- 1. Carpet and Rug Institute Green Label Plus Program;

2. Compliant with the VOC-emission limits and testing requirements specified in the California Department of Public Health Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers, Version 1.1, February.;
 3. NSF/ANSI 140 at the Gold Level or higher;
 4. Scientific Certification Systems Sustainable Choice;
 5. Compliant with the Collaborative for High Performance Schools California (CA-CHPS) Criteria Interpretation for EQ 7.0 and EQ 7.1 dated July 2012 and listed in the CHPS High Performance Product database.
- B. Carpet cushion must comply with the requirements of the Carpet and Rug Institute Green Label Program.

2.5 RESILIENT FLOORING SYSTEMS

- A. For 80% of the floor area receiving resilient flooring, installed resilient flooring shall meet at least one of the following:
1. Compliant with the VOC-emissions limits and testing requirements specified in the California Department of Public Health's 2010 Standard Method for the Testing and Evaluation Chambers, Version 1.1, February 2010;
 2. Certified under the Resilient Floor Covering Institute (RFCI) FloorScore program;
 3. Compliant with the Collaborative for High Performance Schools California (CA-CHPS) Criteria Interpretation for EQ 7.0 and EQ 7.1 dated July 2012 and listed in the CHPS High Performance Product Database;
 4. Products certified under UL GREENGUARD.

2.6 ENERGY STAR

- A. In accordance with CALgreen A5.303.3, new appliances provided and installed shall be ENERGY STAR labeled if ENERGY STAR is applicable to that equipment or appliance.

2.7 PLUMBING

- A. New plumbing fixtures and fittings shall comply with CALgreen Section 5.303.3.

PART 3 - EXECUTION

3.1 CONSTRUCTION WASTE MANAGEMENT

- A. Comply with Section 01 74 19 "Construction Waste Management and Disposal."

3.2 BUILDING COMMISSIONING

- A. Comply with Section 01 91 13 "General Commissioning Requirements."

END OF SECTION 01 81 23

SECTION 01 91 13 - GENERAL COMMISSIONING REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Owner's Project Requirements (OPR) and Basis of Design (BoD) documentation are included by reference for information only.

1.2 SUMMARY

- A. Section includes general requirements that apply to implementation of commissioning without regard to specific systems, assemblies, or components.

1.3 DEFINITIONS

- A. **BoD: Basis of Design.** A document that records concepts, calculations, decisions, and product selections used to meet the OPR and to satisfy applicable regulatory requirements, standards, and guidelines. The document includes both narrative descriptions and lists of individual items that support the design process.
- B. **Commissioning Plan:** A document that outlines the organization, schedule, allocation of resources, and documentation requirements of the commissioning process.
- C. **CxA: Commissioning Authority.**
- D. **OPR: Owner's Project Requirements.** A document that details the functional requirements of a Project and the expectations of how it will be used and operated. These include Project goals, measurable performance criteria, cost considerations, benchmarks, success criteria, and supporting information.
- E. **Systems, Subsystems, Equipment, and Components:** Where these terms are used together or separately, they shall mean "as-built" systems, subsystems, equipment, and components.

1.4 COMMISSIONING TEAM

- A. **Members Appointed by Contractor(s):** Individuals, each having the authority to act on behalf of the entity he or she represents, explicitly organized to implement the commissioning process through coordinated action. The commissioning team shall consist of, but not be limited to, representatives of [each] Contractor whose work is to be commissioned, including Project superintendent and subcontractors, installers, suppliers, and specialists deemed appropriate by the CxA.
- B. **Members Appointed by Owner:**

1. CxA: The designated person, company, or entity that plans, schedules, and coordinates the commissioning team to implement the commissioning process. Contractor will engage the CxA under a separate contract.
2. Representatives of the facility user and operation and maintenance personnel.
3. Architect and engineering design professionals.

1.5 CONTRACTOR'S RESPONSIBILITIES

- A. Provide the OPR documentation to the CxA, the Architect, and **[each]** Contractor for information and use.
- B. Assign operation and maintenance personnel and schedule them to participate in commissioning team activities.
- C. Provide the BoD documentation, prepared by the Architect and approved by Owner, to the CxA and **[each]** Contractor for use in developing the commissioning plan, systems manual, and operation and maintenance training plan.

1.6 [EACH] CONTRACTOR'S RESPONSIBILITIES

- A. **[Each]** Contractor shall assign representatives with expertise and authority to act on its behalf and shall schedule them to participate in and perform commissioning process activities including, but not limited to, the following:
 1. Evaluate performance deficiencies identified in test reports and, in collaboration with entity responsible for system and equipment installation, recommend corrective action.
 2. Cooperate with the CxA for resolution of issues recorded in the Issues Log.
 3. Attend commissioning team meetings held in conjunction with the regularly scheduled construction meeting.
 4. Integrate and coordinate commissioning process activities with construction schedule.
 5. Review and accept construction checklists provided by the CxA.
 6. Complete paper or electronic construction checklists as Work is completed and provide to the Commissioning Authority on a weekly basis.
 7. Review and accept commissioning process test procedures provided by the Commissioning Authority.
 8. Complete commissioning process test procedures.

1.7 CONTRACTOR'S RESPONSIBILITIES

- A. Organize and lead the commissioning team.
- B. Provide commissioning plan.
- C. Convene commissioning team meetings.
- D. Provide Project-specific construction checklists and commissioning process test procedures.

- E. Verify the execution of commissioning process activities using random sampling. The sampling rate may vary from 1 to 100 percent. Verification will include, but is not limited to, equipment submittals, construction checklists, training, operating and maintenance data, tests, and test reports to verify compliance with the OPR. When a random sample does not meet the requirement, the CxA will report the failure in the Issues Log.
- F. Prepare and maintain the Issues Log.
- G. Prepare and maintain completed construction checklist log.
- H. Witness systems, assemblies, equipment, and component startup.
- I. Compile test data, inspection reports, and certificates; include them in the systems manual and commissioning process report.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 91 13

SECTION 02 41 19 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Demolition and removal of selected portions of building or structure.
 2. Salvage of existing items to be reused or recycled.

1.2 DEFINITIONS

- A. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged or removed and reinstalled.
- B. Remove and Salvage: Carefully detach from existing construction, in a manner to prevent damage, and deliver to Owner ready for reuse.
- C. Remove and Reinstall: Detach items from existing construction, prepare for reuse, and reinstall where indicated.
- D. Existing to Remain: Existing items of construction that are not to be permanently removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.
- E. Dismantle: To remove by disassembling or detaching an item from a surface, using gentle methods and equipment to prevent damage to the item and surfaces; disposing of items unless indicated to be salvaged or reinstalled.

1.3 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes property of Contractor.
- B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.
1. Carefully salvage in a manner to prevent damage and promptly return to Owner.
- C. Materials to be reused remain the property of the Owner.

1.4 PREINSTALLATION MEETINGS

- A. Predemolition Conference: Conduct conference at Project site.

1.5 INFORMATIONAL SUBMITTALS

- A. Proposed Protection Measures: Submit report, including drawings, that indicates the measures proposed for protecting individuals and property for dust control and for noise control. Indicate proposed locations and construction of barriers.
- B. Schedule of Selective Demolition Activities: Indicate the following:
 - 1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's other tenants' on-site operations are uninterrupted.
 - 2. Interruption of utility services. Indicate how long utility services will be interrupted.
 - 3. Coordination for shutoff, capping, and continuation of utility services.
 - 4. Use of elevator, stairs, entrances, and loading docks.
 - 5. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.
- C. Inventory: Submit a list of items to be removed and salvaged and deliver to Owner prior to start of demolition.
- D. Predemolition Photographs or Video: Show existing conditions of adjoining construction, including finish surfaces, that might be misconstrued as damage caused by demolition operations. Submit before Work begins.

1.6 CLOSEOUT SUBMITTALS

- A. Landfill Records: Indicate receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.

1.7 FIELD CONDITIONS

- A. Owner will occupy portions of building immediately adjacent to selective demolition area in phases beyond phase one. Conduct selective demolition so Owner's operations will not be disrupted.
- B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
- C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- D. Hazardous Materials:
 - 1. If suspected hazardous materials are encountered, do not disturb; immediately notify City. Hazardous materials will be removed by contractor under monitoring of a City consultant under a separate contract.
- E. Storage or sale of removed items or materials on-site is not permitted.

- F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
 - 1. Maintain fire-protection facilities in service during selective demolition operations.

1.8 COORDINATION

- A. Arrange selective demolition schedule so as not to interfere with Owner's operations.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Standards: Comply with ANSI/ASSE A10.6 and NFPA 241.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped before starting selective demolition operations.
- B. If available, review record documents of existing construction provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in record documents.
- C. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.
- D. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Architect and Resident Engineer.
- E. Perform an engineering survey of 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 during selective building demolition operations.
 - 1. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.
- F. Survey of Existing Conditions: Record existing conditions by use of measured drawings, preconstruction photographs or video.

1. Inventory and record the condition of items to be removed and salvaged. Provide photographs or video of conditions that might be misconstrued as damage caused by salvage operations.

3.2 PREPARATION

- A. Refrigerant: Before starting demolition, remove refrigerant from mechanical equipment according to 40 CFR 82 and regulations of authorities having jurisdiction.

3.3 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.
 1. Comply with requirements for existing services/systems interruptions specified in Section 01 14 00 "Work Restrictions."
- B. Existing Services/Systems to be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.
 1. Building Engineer will arrange to shut off indicated services/systems when requested by Contractor. Provide minimum 48 hours' notice when requesting shut-off.
 2. Arrange to shut off indicated utilities with utility companies.
 3. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
 4. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated to be removed.
 - a. Piping to be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
 - b. Piping to be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material.
 - c. Equipment to be Removed: Disconnect and cap services and remove equipment.
 - d. Equipment to be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
 - e. Ducts to be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
 - f. Ducts to be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material.
 - g. Fire Suppression System Partial or Complete Removal: Arrange for bypass of area to be removed so that overall building fire suppression system remains in operation. If continuous operation is not possible, coordinate with local Fire authorities; maintain firewatch during removal operations and until system can be restored to working order. Maintain fire extinguishers on the site.

- C. Ballasts: If ballast is not labeled "No PCBs," or if the label is illegible, contact a ballast recycler for disposal.
- D. Mercury-Containing Devices: Mercury-containing devices include thermostats, silent switches, mechanical switches and relays or contacts. Dispose of these devices with an appropriate recycler.
- E. Nickel-Cadmium and Lead-Acid Batteries: Exit signs, emergency lighting units, alarm systems, smoke detectors and carbon-monoxide detectors may contain nickel-cadmium or lead-acid. Arrange with an appropriate recycler for disposal.

3.4 PROTECTION

- A. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
 - 1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
 - 2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
 - 3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
 - 4. Cover and protect furniture, furnishings, and equipment that have not been removed.
 - 5. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Section 01 50 00 "Temporary Facilities and Controls."

3.5 SELECTIVE DEMOLITION, GENERAL

- A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
 - 1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
 - 2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
 - 3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
 - 4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain fire watch and portable fire-suppression devices during flame-cutting operations and for at least <Insert number> hours after flame-cutting operations.

5. Maintain adequate ventilation when using cutting torches.
6. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
7. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
8. When cutting concrete, masonry, wallboard and any other dust-producing materials, provide temporary barriers to prevent spread of dust into the rest of the building. Provide filters for mechanical systems and air ducts.
9. Dispose of demolished items and materials promptly. Comply with requirements in Section 01 74 19 "Construction Waste Management and Disposal."

B. Removed and Salvaged Items:

1. Store items in a secure area until delivery to Owner.
2. Transport items to Owner's storage area on-site designated by Owner.
3. Protect items from damage during transport and storage.

C. Removed and Reinstalled Items:

1. Clean and repair items to functional condition adequate for intended reuse.
2. Protect items from damage during transport and storage.
3. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

D. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.6 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

- A. Resilient Floor Covering and Glued-down carpets:** Remove floor coverings and adhesive according to recommendations in RFCI's "Recommended Work Practices for the Removal of Resilient Floor Coverings." Do not use methods requiring solvent-based adhesive strippers.

3.7 DISPOSAL OF DEMOLISHED MATERIALS

- A. Remove demolition waste materials from Project site and dispose of them in an EPA-approved construction and demolition waste landfill acceptable to authorities having jurisdiction. and recycle or dispose of them according to Section 01 74 19 "Construction Waste Management and Disposal."**
1. Do not allow demolished materials to accumulate on-site.
 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
 3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.

4. Comply with requirements specified in Section 01 74 19 "Construction Waste Management and Disposal."

B. Burning: Do not burn demolished materials.

3.8 CLEANING

A. Refer to Section 01 73 00 "Execution" for progress cleaning.

3.9 SELECTIVE DEMOLITION SCHEDULE

A. Refer to City Resident Engineer's instructions for phasing.

END OF SECTION 02 41 19

SECTION 05 50 00 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes metal fabrications, bracing and supports for construction specified in other Sections.
- B. Related Requirements:
 - 1. Section 09 22 16 "Non-Structural Metal Framing" for reinforcements in metal-framed partitions for anchoring wall-mounted products.

1.2 ACTION SUBMITTALS

- A. CALgreen Submittals:
 - 1. Product Data for Section 5.504.4.1.1: Provide documentation for adhesives, adhesive bonding primers, adhesive primers, sealants, sealant primers and caulks, including printed statement of VOC content showing compliance with local or regional air pollution control or air quality management district rules where applicable, or SCAQMD Rule 1168 VOC limits as shown in CALgreen Tables 5.504.4.1 and 5.504.4.2.
 - 2. Product Data for Section 5.504.4.1.2: Provide documentation for aerosol adhesives, and smaller unit sizes of adhesives, sealant, and caulking compounds (in units of product, less packaging, which do not weigh more than one (1) pound and do not consist of more than sixteen (16) fluid ounces) comply with statewide VOC standards and prohibitions on use of certain toxic compounds, of CCR Title 17, commencing with Section 94507.
 - 3. Product Data for Section 5.504.4.3: For architectural paints and coatings, provide documentation including printed statement of VOC content showing compliance with Table 1 of the ARB, Architectural Coatings Suggested Control Measure, unless more stringent local limits apply.
 - 4. Product Data for Section 5.504.4.3.1: Aerosol paints and coatings, provide documentation that products meet the PWMIR Limits for ROC in Section 94522 (a)(3) and other requirements, including prohibitions on use of certain toxic compounds and ozone depleting substances, in Section 94522(c)(2 and (d)(2) of CCR Title 17.
 - 5. Product Data for Section 5.504.4.3.1: In areas under the jurisdiction of the BAAQMD, provide documentation that products comply with the percent VOC by weight of product limits of BAAQMD Regulation 8 Rule 49, "Aerosol Paint Products."
- B. Shop Drawings: Submit shop drawings including plans, elevations, sections, details of installation, and attachments to other Work.
 - 1. For installed products indicated to comply with performance requirements, include seal and signature of qualified professional engineer responsible for their preparation.

2. Include plans and elevations at not less than 1" to 1'-0" scale, and include details of sections and connections at not less than 3" to 1'-0" scale.
- C. Delegated-Design Submittal: For installed products indicated to comply with performance requirements, include analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.3 INFORMATIONAL SUBMITTALS

- A. Welding certificates.
- B. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.
- C. Research/Evaluation Reports: For post-installed anchors, from ICC-ES.

1.4 FIELD CONDITIONS

- A. Field Measurements: Where metal fabrications are indicated to fit walls and other construction, verify dimensions by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 40 00 "Quality Requirements," to design metal fabrications indicated below.
- B. Structural Performance:
 1. Countertop and Vanity Framing: Provide countertop and vanity framing capable of withstanding the following structural loads without exceeding the allowable design working stress of the materials involved, including anchors and connections, or of exhibiting excessive deflections in any of the components making up the countertops and vanities:
 - a. All deadloads.
 - b. 500 pound live load placed on the countertop and vanity.
 - c. Deflection at Midspan: $L/1000$ times span or 1/8-inch, whichever is less.
 2. s Horizontal sliding security gate, All-Glass Entrances and Storefront, Framing: Fabricate and install steel support framing capable of supporting all deadloads, and withstanding the live loads imposed on it from the operation of moving components of the system(s).

2.2 METALS

- A. Metal Surfaces, General: For metal fabrications 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, blemishes, or roughness.
- B. Ferrous Metals:
 - 1. Steel Plates, Channels, and Bars: ASTM A 36/A 36M.
 - 2. Steel Tubing: Cold-formed steel tubing complying with ASTM A 500, or hot-formed steel tubing complying with ASTM A 501.
 - 3. Steel Pipe: ASTM A 53, Type S - Seamless, Grade A suitable for close coiling or cold bending, standard weight (Schedule 40) minimum, unless otherwise indicated or required to satisfy performance requirements, black finish.
 - 4. Slotted Channel Framing: Cold-formed metal channels with continuous slot and with flanged edges returned toward web complying with MFMA-4 and fabricated from steel complying with ASTM A 1008/A 1008M. Width, depth, and metal thickness as required to suit performance requirements.
 - 5. Iron Castings: ASTM A 47, Grade 32510 malleable iron or ASTM A 48, Class 30, gray iron.
 - 6. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

2.3 PAINT

- A. Shop Primer for Ferrous Metal: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with performance requirements in FS TT-P-664 and compatible with finish paint systems indicated (or approved equal).
 - 1. 94-258 Series Multi-Prime Fast Dry 2.8 VOC Universal Metal Primer; Pittsburgh Paints.
 - 2. B50 Z Kem Kromik Universal Primer Fast Dry; Sherwin-Williams Co.
 - 3. Series 37H Phenolic Alkyd Primer Chem-Prime; Tnemec.

2.4 MISCELLANEOUS MATERIALS

- A. Fasteners: Zinc-plated fasteners with coating complying with ASTM B 633, Class Fe/Zn 5, of type, grade, and class required by application indicated.
- B. Nonshrink, Nonmetallic Grout: ASTM C 1107, factory-packaged, nonstaining, noncorrosive, nongaseous grout.

2.5 FABRICATION

- A. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. 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.

1. Welded connections may be used where bolted connections are shown.
- B. Shear and punch metals cleanly and accurately. Remove burrs.
- C. Weld corners and seams continuously along entire line of contact. Use full penetration welds. Use materials and methods that minimize distortion and develop strength of base metals. Obtain fusion without undercut or overlap. Remove welding flux immediately. Finish exposed welds smooth and blended.
- D. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Use exposed fasteners of type indicated or, if not indicated, Phillips flat-head (countersunk) screws or bolts. Locate joints where least conspicuous. Make up threaded connections tight so that threads are entirely concealed.
- E. Provide for anchorage of type indicated; coordinate with supporting structure. Fabricate and space anchoring devices and fasteners to secure metal fabrications rigidly in place and to support indicated loads.
- F. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.
- G. Miscellaneous Framing and Supports: Provide steel framing and supports indicated and as necessary to complete the Work and which are not a part of the structural framework to comply with performance requirements.
 1. Fabricate units from structural 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.
 2. Overhead Supports for horizontal sliding metal security gate and All-Glass Entrances and Storefronts: Fabricate supports from continuous steel shapes with attached bearing plates, anchors, and braces. Drill bottom flanges of beams to receive partition track hanger rods; locate holes where indicated on operable partition Shop Drawings.
 3. Countertop Framing: Fabricate countertop framing, using steel shapes and plates, and cold finished mild steel bars at exposed conditions, for support framing and plywood, to the thicknesses, sizes and shapes shown, and as required to produce work of adequate strength and durability. Use proven details of fabrication, as required to achieve proper assembly and alignment of the various components of the Work.

2.6 FINISHES

- A. Finish metal fabrications after assembly. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes. Shop prime ferrous-metal items.
 1. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces by removing oil, grease, and similar contaminants in accordance with SSPC -SP 1 "Solvent Cleaning," followed with SSPC-SP 3, "Power Tool Cleaning."

2. Apply a minimum of one coat of shop primer to uncoated surfaces of metal fabrications, except those to be field welded, and those to be embedded in sprayed-on fireproofing, or masonry, unless otherwise indicated. Comply with SSPC-PA 1, "Paint Application Specification No. 1," for shop painting.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Provide anchorage devices and fasteners for securing metal fabrications to in-place construction. Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, with edges and surfaces level, plumb, and true. Drill holes for bolts to the exact diameter of the bolt. Provide screws threaded full length to the screw head.
 1. Anchor supports for horizontal sliding metal security gate securely to, and rigidly brace from, building structure. Laser level framing.
- 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.
- C. Field Welding: Comply with the following requirements:
 1. Use materials and methods that minimize distortion and develop strength of base metals.
 2. Obtain fusion without undercut or overlap.
 3. Remove welding flux immediately.
 4. Quality of Workmanship:
 - a. At concealed connections: No improvement from mill finish, except preparation necessary for priming is required. Welds are not required to be ground.
 - b. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness, pits, mill marks, nicks, or scratches shows after finishing and contour of welded surface matches that of adjacent surface. Defects and distortions shall not be visible to the eye nor show through painted or polished surfaces.
- D. Touchup surfaces and finishes after erection. For materials exposed to view in the finished Project, clean field welds, bolted connections, and abraded areas and touchup paint with the same material as used for shop painting.
- E. Touchup surfaces and finishes after erection. For materials exposed to view in the finished Project, clean field welds, bolted connections, and abraded areas and touchup paint with anti-corrosive, anti-rust primer that is less than 250 g/L VOC compatible with shop applied primer.

END OF SECTION 05 50 00

SECTION 06 10 53 - MISCELLANEOUS ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes miscellaneous carpentry.

1.2 ACTION SUBMITTALS

- A. Product Data: Submit product data for each type of process and factory-fabricated product indicated.
 - 1. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that materials comply with requirements.
- B. CALgreen Submittals:
 - 1. Product Data for Section 5.504.4.1.1: Provide documentation for adhesives, adhesive bonding primers, adhesive primers, sealants, sealant primers and caulks, including printed statement of VOC content showing compliance with local or regional air pollution control or air quality management district rules where applicable, or SCAQMD Rule 1168 VOC limits as shown in CALgreen Tables 5.504.4.1 and 5.504.4.2.
 - 2. Product Data for Section 5.504.4.1.2: Provide documentation for aerosol adhesives, and smaller unit sizes of adhesives, sealant, and caulking compounds (in units of product, less packaging, which do not weigh more than one (1) pound and do not consist of more than sixteen (16) fluid ounces) comply with statewide VOC standards and prohibitions on use of certain toxic compounds, of CCR Title 17, commencing with Section 94507.
 - 3. Product Data for Section 5.504.4.3: For architectural paints and coatings, provide documentation including printed statement of VOC content showing compliance with Table 1 of the ARB, Architectural Coatings Suggested Control Measure, unless more stringent local limits apply.
 - 4. Product Data for Section 5.504.4.3.1: Aerosol paints and coatings, provide documentation that products meet the PWMIR Limits for ROC in Section 94522 (a)(3) and other requirements, including prohibitions on use of certain toxic compounds and ozone depleting substances, in Section 94522(c)(2 and (d)(2) of CCR Title 17.
 - 5. Product Certificate for Section 5.504.4.5: Provide documentation as required in CALgreen Section 5.504.4.5.3, for hardwood plywood, particleboard and medium density fiberboard composite wood products showing compliance with requirements for formaldehyde as specified in ARB's Air Toxics Control Measure (ATCM) for Composite Wood.

1.3 DELIVERY, STORAGE, AND HANDLING

- A. Stack lumber, plywood, and other panels; for lumber and plywood pressure treated with waterborne chemicals, place spacers between each bundle to provide air circulation.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

- A. Lumber: Comply with DOC PS 20 "American Softwood Lumber Standard" and applicable rules of lumber grading agencies certified by the American Lumber Standards Committee Board of Review.
 - 1. Factory mark each piece of lumber with grade stamp of grading agency.
 - 2. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.
 - 3. Provide dressed lumber, S4S, unless otherwise indicated.
 - 4. Provide dry lumber with 19 percent maximum moisture content at time of dressing for 2-inch nominal thickness or less, unless otherwise indicated.
- B. Wood Panels:
 - 1. Plywood: Comply with DOC PS 1 "Construction and Industrial Plywood" for plywood panels. Use exterior grade for panels in wet conditions.
 - a. Plywood shall comply with requirements for formaldehyde as specified in ARB's Air Toxics Control Measure (ATCM) for Composite Wood. Those materials not exempted under the ATCM must meet the specified emission limits, as shown in Section 01 81 23 "CALgreen Requirements."
 - 2. Thickness: As needed to comply with requirements specified but not less than thickness indicated.

2.2 FIRE-RETARDANT-TREATED MATERIALS

- A. General: Provide chemical fire retardant process tested and labeled by UL with flame spread and smoke developed ratings of 25 or less. Comply with performance requirements in AWWA U1, Use Category UCFA as a minimum for pressure treatment. Size wood before treatment so that minimum cutting will be required after treatment. Kiln dry lumber to a maximum 19 percent moisture content, kiln dry plywood to a maximum 15 percent moisture content, after treatment. Treat indicated items and the following:
 - 1. Wood members required to be treated by Building Code having jurisdiction at the site and wood members specified as fire-retardant-treated.

- B. Fire-retardant-treated lumber and plywood shall comply with VOC content "CALgreen Requirements."
- C. Identify fire-retardant-treated wood with appropriate classification marking of UL.

2.3 WOOD-PRESERVATIVE-TREATED MATERIALS

- A. Wood Preservatives shall comply with VOC content as shown in Section 01 81 23 "CALgreen Requirements."
- B. Preservative Treatment by Pressure Process: AWWPA U1; Use Category UC2 for interior construction not in contact with the ground.
 - 1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
- C. Application: Treat items indicated on Drawings, and the following:
 - 1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
 - 2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.

2.4 MISCELLANEOUS LUMBER

- A. Provide miscellaneous lumber for support or attachment of other construction, including blocking, nailers, and similar members.
- B. For concealed boards, provide lumber with 19 percent maximum moisture content and the following species and grades:
 - 1. Mixed southern pine, No. 2 grade; SPIB.
 - 2. Western Woods; WCLIB or WWPA, No. 2 Grade.

2.5 PANEL PRODUCTS

- A. Concealed Plywood for Countertop Underlayment:
 - 1. APA Exterior sheathing, manufactured with no added urea-formaldehyde, in thickness as indicated but not less than 3/4 inch.
- B. Telephone, Data, Security, and Electrical Equipment Backing Panels:
 - 1. APA, Exposure 1, C-C Plugged, fire-retardant treated, manufactured with no added urea-formaldehyde, in thickness indicated or, if not indicated, not less than 3/4 inch thick.

- C. Medium-Density Fiberboard (fire rated): A sustainable, fire rated, medium density fiberboard (MDF) panel manufactured from 100 percent post industrial recycled wood fiber complying with ANSI A208.2, having a minimum 48 pcf density except that minimum for screw holding capacity on face shall be 230 poundsan ASTM E 84 Class A flame spread rating, minimum 3/4 inch thick, edged and faced as specified, fabricated with binder containing no added urea formaldehyde.

2.6 MISCELLANEOUS MATERIALS

- A. Adhesives, adhesive bonding primers, adhesive primers, sealants, sealant primers and caulks shall comply with local or regional regulations per section 01 81 23 "CALgreen Requirements."
- B. Aerosol adhesives, and smaller unit sizes of adhesives, and sealant or caulking compounds shall comply with regulations per section 01 81 23 "CALgreen Requirements."

2.7 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.
- B. Power-Driven Fasteners: NES NER-272.
- C. Nails, Wire, Brads, and Staples: Select material, type, size, and finish required for each use.
 - 1. ASTM F 1667 for driven fasteners such as nails, spikes and staples.
 - 2. ASTM F 547 for nails used with wood and wood based products.
- D. Wood Screws: Select material, type, size, and finish required for each use. Comply with ASME B18.6.1.
- E. Screws for Fastening to Cold-Formed Metal Framing: ASTM C 954, except with wafer heads and reamer wings, length as recommended by screw manufacturer for material being fastened.
- F. Bolts: Steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers.
- G. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.
 - 1. Material: Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Set carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit carpentry to other construction; scribe and cope as needed for accurate fit. Locate nailers, blocking, and similar supports to comply with requirements for attaching other construction.
- B. Securely attach carpentry work as indicated and according to applicable codes and recognized standards.
- C. Use fasteners of appropriate type and length. Pre-drill members when necessary to avoid splitting wood.

3.2 WOOD BLOCKING AND NAILER INSTALLATION

- A. Install where indicated and where required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.
- B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces, unless otherwise indicated.

3.3 PANEL PRODUCT INSTALLATION

- A. General: Comply with applicable recommendations contained in APA Form No. E30K, "APA Design/Construction Guide: Residential & Commercial," and local utility requirements, if any, for plywood backing panels utilized as indicated.
- B. Fastening Methods: Fasten panels as indicated below:
 - 1. Countertop Underlayment: Bolt to miscellaneous steel framing.
 - 2. Plywood Backing Panels: Secure to wall using proper fastening devices for substrates encountered spaced 12 inches on center maximum at perimeter 1/2 inch from corners and three rows of 3 fasteners each in the backerboard field. Countersink fasteners flush with plywood surface. Butt adjacent panels without lapping.

END OF SECTION 06 10 53

SECTION 06 40 23 - INTERIOR ARCHITECTURAL WOODWORK

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes interior architectural woodwork:
1. Plastic-laminate cabinets.
 2. Plastic-laminate countertops.
 3. Solid-surfacing material countertops.
 4. Quartz-surfacing material countertops.
 5. Wood cabinets.
 6. Wood paneling.
 7. Closet and utility shelving.
 8. Interior frames and jambs.
 9. Interior standing and running trim.
 10. Shop priming of interior woodwork to receive painted finish.
 11. Shop finishing of interior woodwork to receive transparent finish.
- B. Related Requirements:
1. Section 05 50 00 "Metal Fabrications" for concealed countertop supports.
 2. Section 06 10 53 "Miscellaneous Rough Carpentry" for concealed blocking for millwork items.

1.2 ACTION SUBMITTALS

- A. Product Data: Submit product data for each material and product specified and incorporated into items of architectural woodwork during fabrication, finishing, and installation.
1. Cabinet hardware and accessories.
 2. Glass products and glazing materials.
 3. Finishing materials and processes.
 4. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements.
- B. CALgreen Submittals:
1. Product Data for Section 5.504.4.1.1: Provide documentation for adhesives, adhesive bonding primers, adhesive primers, sealants, sealant primers and caulks, including printed statement of VOC content showing compliance with local or regional air pollution control or air quality management district rules where applicable, or SCAQMD Rule 1168 VOC limits as shown in CALgreen Tables 5.504.4.1 and 5.504.4.2.

2. Product Data for Section 5.504.4.1.2: Provide documentation for aerosol adhesives, and smaller unit sizes of adhesives, sealant, and caulking compounds (in units of product, less packaging, which do not weigh more than one (1) pound and do not consist of more than sixteen (16) fluid ounces) comply with statewide VOC standards and prohibitions on use of certain toxic compounds, of CCR Title 17, commencing with Section 94507.
 3. Product Data for Section 5.504.4.3: For architectural paints and coatings, provide documentation including printed statement of VOC content showing compliance with Table 1 of the ARB, Architectural Coatings Suggested Control Measure, unless more stringent local limits apply.
 4. Product Data for Section 5.504.4.3.1: Aerosol paints and coatings, provide documentation that products meet the PWMIR Limits for ROC in Section 94522 (a)(3) and other requirements, including prohibitions on use of certain toxic compounds and ozone depleting substances, in Section 94522(c)(2 and (d)(2) of CCR Title 17.
 5. Product Certificate for Section 5.504.4.5: Provide documentation as required in CALgreen Section 5.504.4.5.3, for hardwood plywood, particleboard and medium density fiberboard composite wood products showing compliance with requirements for formaldehyde as specified in ARB's Air Toxics Control Measure (ATCM) for Composite Wood.
- C. Shop Drawings: Submit shop drawings showing locations of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components. Elevations shall be drawn at a scale of not less than 1/2" = 1'-0" . Details shall be drawn at a scale of not less than 3" = 1'-0" .
1. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
 2. Show locations and sizes of cutouts and holes for plumbing, electrical, computer and telephone equipment and other items installed in architectural woodwork.
 3. Show veneer leaves with dimensions, grain direction, exposed face, and identification numbers indicating the flitch and sequence within the flitch for each leaf.
- D. Samples: Submit samples of the following:
1. Five veneer leaves representative of and selected from each flitch to be used for transparent-finished woodwork.
 2. Three 12 inch by 12 inch sample sets containing a minimum of two or more samples of transparent finished wood-veneer and plastic laminate veneered panel products, fabricated from each core product, for each veneer specified and demonstrating the proposed full range of appearance characteristics to be expected in completed work. Include at least one face-veneer seam in each sample.
 3. Lumber and panel products for transparent finish, for each species and cut, finished on one side and one edge. Furnish lumber in 12 inch lengths, furnish panel samples in 12 inch squares.
 4. Thermoset decorative-overlay surfaced panel products, for each type, color, pattern, and surface finish.
 5. Solid-surfacing materials, 6 inches square.
 6. Quartz-surfacing materials, 6 inches square.
 7. Cabinet Locks: Three samples of each type.
 8. Metal Trim Shapes: Three samples of each type and finish, 12 inches long.

9. Submit samples of each type of door specified showing construction and finishes selected. Samples shall be 12 inch by 12 inch corner section.
10. Submit samples of stainless steel glass rosette cap assemblies in each finish specified.
11. Glass and Acrylic Panels: 12 inches by 12 inches of each type specified.

1.3 CLOSEOUT SUBMITTALS

- A. Maintenance Instructions: Submit maintenance instructions for all countertop materials. Where countertop materials are recommended to be protected with hot pads, provide manufacturers properly sized for the hot equipment designed to be placed thereon.

1.4 QUALITY ASSURANCE

- A. Single-Source Manufacturing and Installation Responsibility: Engage a qualified Manufacturer - acceptable to the Architect - to assume undivided responsibility for woodwork specified in this Section, including fabrication, finishing, and installation. The manufacturer shall have successful experience in the custom fabrication and installation of architectural woodwork comparable to that shown and specified, be a member of the AWI, maintain an organized quality control program, perform its own in-house veneer lay-up work, and who retains facilities with sufficient capacity and quality to produce the required architectural woodwork without causing delay to the Project.
- B. Quality Standard: Fabricate and install all architectural woodwork in accordance with the applicable requirements of Architectural Woodwork Standards, 2nd edition, published jointly by AWI, AWMAC, and WI, unless more stringent requirements are specified or shown.
- C. Fire Performance Characteristics: Provide materials identical to those tested for the following fire performance characteristics per ASTM test methods indicated by UL or other testing and inspecting organizations acceptable to authorities having jurisdiction. Identify treated lumber with classification marking of inspecting and testing organization in the form of separable paper label or, where required by authorities having jurisdiction, of imprint on lumber surfaces that will be concealed from view after installation.
 1. Surface Burning Characteristics for Concealed Blocking, Furring, and Door Subframing: Not exceeding a flame spread of 25, and smoke developed of 50 when tested per ASTM E 84 for 30 minutes.
 2. The fire performance finish requirements for all exposed interior wall and ceiling woodwork (including the paneling but not limited to paneling) substrates in fully sprinklered spaces shall be as follows which has been taken from the IBC 2015, Table 803.9. Footnotes to Table 803.9 that are pertinent to the project are also made a part of this specification.

Use Group	Interior Exit Stairways, Exit Ramps, and Exit Passageways	Corridors and Enclosures for Exit Access Stairways, and Exit Access Ramps	Rooms and Enclosed Spaces
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A-1, and A-2	Class B	Class B	Class C
A-3	Class B	Class B	Class C
B, E, M, R-1	Class B	Class C	Class C
S	Class C	Class C	Class C

Class B: Flame spread 26-75, smoke developed 0-450 when tested in accordance with ASTM E 84.

Class C: Flame spread 76-200, smoke developed 0-450 when tested in accordance with ASTM E 84.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Protect woodwork during transit, delivery, storage, and handling to prevent damage, soilage, and deterioration. Do not deliver woodwork until painting, wet work, grinding, and similar operations that could damage, soil, or deteriorate woodwork have been completed in installation areas. If woodwork must be stored in other than installation areas, store only in areas whose environmental conditions meet requirements specified in "Field Conditions" Article.

1.6 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install woodwork until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at levels planned for building occupants during the remainder of the construction period.
- B. Field Measurements: Where woodwork is indicated to fit to other construction, verify actual dimensions of other construction by accurate field measurements before fabrication of woodwork; and indicate measurements on final shop drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
 - 1. Locate concealed framing, blocking, and reinforcements that support woodwork by field measurements before being enclosed and indicate measurements on shop drawings.
 - 2. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating woodwork without field measurements. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.7 COORDINATION

- A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that interior architectural woodwork can be supported and installed as indicated.

1.8 PREINSTALLATION COORDINATION MEETING

- A. Meet at the Project site, prior to installation of architectural woodwork, to review the substrate preparation, installation and coordination with other trades, special details and conditions, and other topics related to the architectural woodwork. The preinstallation meeting shall include the Architect, the Contractor, architectural woodworker, and any subcontractors affected by the architectural woodwork installation.

PART 2 - PRODUCTS

2.1 WOODWORK FABRICATORS

- A. Fabricators: Subject to compliance with requirements, provide interior architectural woodwork by one of the following:

2.2 MATERIALS

- A. General: Provide materials that comply with requirements of the AWS quality standard for each type of woodwork and quality grade specified.
- B. Composite wood products shall comply with requirements for formaldehyde as specified in ARB's Air Toxics Control Measure (ATCM) for Composite Wood. Those materials not exempted under the ATCM must meet the specified emission limits, as shown in Section 01 81 23 "CALgreen Requirements."
 - 1. Use composite wood products approved by the ARB as no-added formaldehyde (NAF) based resins or ultra-low emitting formaldehyde (ULEF) resins.
- C. Adhesives, adhesive bonding primers, adhesive primers, sealants, sealant primers and caulks shall comply with local or regional regulations per section 01 81 23 "CALgreen Requirements."
- D. Aerosol adhesives, and smaller unit sizes of adhesives, and sealant or caulking compounds shall comply with regulations per section 01 81 23 "CALgreen Requirements."
- E. Lumber Standards: Comply with applicable provisions for grading and workmanship of AWS Architectural Woodwork Standards, Section 3, and the requirements shown and specified; where standards conflict the more stringent shall apply. Provide lumber surfaced 4 sides (S4S) and fabricated to profiles shown. All lumber shall be kiln dried to the moisture content indicated in AWS, Section 2.
 - 1. Furring, Blocking, Shims: No. 1 Common; Southern Pine.
 - 2. Door Subframes: No. 1 Common Southern Pine, fire retardant treated to reduce combustibility.
 - 3. Solid Hardwood for Transparent Finish (WD-01, WB-01): Matching each of the Architect's veneer samples; refer to Finish Schedule on the Drawings for each specie.
- F. Wood Veneers:

1. Species, Matching, and Cut for Transparent Finish: Complying with AWS, Section 4, and the following:
 - a. (WD-01 Specie and figuring as indicated on the Finish Schedule, book matched unless otherwise indicated, minimum 5 inch width leaves, complying with HPVA HP-1, Grade AA, matching Architect's sample.

G. Wood Panel Products:

1. Medium-Density Fiberboard (non-moisture resistant): A sustainable, medium density fiberboard (MDF) panel manufactured from minimum 92 percent preconsumer recycled wood fiber complying with ANSI A208.2, having a minimum 47 pcf density except that minimum for screw holding capacity on face shall be 300 pounds; an ASTM E 84 minimum Class C flame spread rating, minimum 3/4 inches (19 mm) thick, edged and faced as specified, fabricated with binder containing no added urea formaldehyde.
2. Medium-Density Fiberboard (moisture resistant): A sustainable, moisture-resistant, medium density fiberboard (MDF) panel manufactured from minimum 92 percent preconsumer recycled wood fiber complying with ANSI A208.2, having a minimum 48 pcf density except that minimum for screw holding capacity on face shall be 325 pounds respectively; an ASTM E 84 Class C flame spread rating, minimum 3/4 inches thick, edged and faced as specified, fabricated with binder containing no added urea formaldehyde.
3. Medium-Density Fiberboard (fire rated): A sustainable, fire rated, medium density fiberboard (MDF) panel manufactured from minimum 82 percent preconsumer recycled wood fiber complying with ANSI A208.2, having a minimum 48 pcf density except that minimum for screw holding capacity on face shall be 250 pounds; an ASTM E 84 Class A flame spread rating, minimum 3/4 inches thick, edged and faced as specified, fabricated with binder containing no added urea formaldehyde.
4. Medium Density Particleboard: A medium density particleboard (MDP) panel manufactured from 100 percent post industrial recycled wood residuals complying with ANSI A208.1, Type M-3-with a minimum 45 pcf density except that minimum for screw holding capacity on face shall be 247 pounds, an ASTM E 84 minimum Class C flame spread rating; minimum 3/4 inches thick, edged and faced as specified and manufactured with binder containing no added urea-formaldehyde.
5. Hardboard: ANSI A135.4.
6. Veneer-Faced Panel Products (Hardwood Plywood): HPVA HP-1, made with adhesive containing no urea formaldehyde. Available Products:

H. Thermoset Decorative Overlay (Melamine): Particleboard or medium-density fiberboard with surface of thermally fused, melamine-impregnated decorative paper complying with the recommendations of the Composite Panel Association's Technical Bulletin "Laminating Composite Panels."

1. Types: As indicated in the Finish Schedule on the Drawings.

- I. Glass: Clear tempered float glass, complying with ASTM C 1036, Type I, Class 1, Quality q3, and ASTM C 1048 Kind FT, thickness as indicated.
 1. Prior to tempering, cut glass to required sizes and profiles as determined by accurate measurement of supporting standoff hole locations.
 2. Hole Cutting: Unless otherwise recommended by the glass manufacturer, comply with the requirements of ASTM C 1048, Article 7.8 for hole placement, minimum hole diameter, and dimensional tolerances of holes and this specification. Unless otherwise recommended by the glass manufacturer, locate holes not less than 4 inches from glass edges, hole diameter shall be at least 1/8 inch larger than the shank of the screw fastener and screw sleeve spacers used for the rosette assemblies. Chips and flakes at hole edges shall not be permitted, and the inner surfaces of holes shall be smooth polished to match glass panel edges.
 3. Edge Treatment: All glass edges shall have an arrised edge profile (small bevel of width not exceeding 1/16 inch at an angle of approximately 45 degrees to the surface of the glass) with a polished (surface is reflective in appearance similar to the major surface of glass) surface.

- J. High-Pressure Decorative Laminate: Complying with NEMA LD 3 for Horizontal General Purpose Grade (HGS) typically and Vertical General Purpose Grade (VGS) where specified. Nominal thickness for HGS and VGS laminates to be 0.048 inches +/-0.005 inches and 0.028 inches +/- 0.004 inches, respectively. Where high pressure decorative laminate is indicated to be faced with aluminum, provide aluminum sheet goods specifically made for laminating to vertical MDF and particleboard substrates in sheet thickness of 0.025 inches +/- 0.002 inches.
 1. Types: As indicated in the Finish Schedule on the Drawings.
 - a. Provide factory applied protective peel coat to prevent surface damage during fabrication and handling of aluminum faced decorative laminates. Remove protective peel coat after installation in accordance with the manufacturer's recommendations. If the film is left in place after installation, exposure to direct sunlight for a prolonged period may cause a paste residue and create other problems.
 2. Backing Sheets: Non-decorative, high pressure laminate, NEMA LD3, Grade, types and thickness to match face sheets and equalize pull.

- K. Solid-Surfacing Material: Provide material that meets or exceeds ISSFA-2-01 performance standards, consisting of reacted monomers and resins, mineral fillers and pigments and manufactured in sheets of specific thicknesses. Solid surfacing material shall be solid, non-porous, homogeneous, hygienic, renewable, and, when applicable, may feature inconspicuous hygienic seams. Solid surfacing material shall be free from conspicuous internal strengthening fibers.
 1. Types: As indicated in the Finish Schedule on the Drawings.

- L. Quartz-Surfacing Material: Provide material that meets or exceeds National Sanitation Foundation 51 Food Zone Compliance standards, consisting of quartz crystals and proprietary binders and manufactured in sheets of specific thicknesses. Quartz surfacing material shall be solid, non-porous, homogeneous, hygienic, renewable, and, when applicable, may feature inconspicuous hygienic seams. Quartz surfacing material shall be free from conspicuous internal strengthening fibers.
 - 1. Products: Subject to compliance with requirements, provide products scheduled on Drawings.
- M. Adhesives, General: Use only low emitting VOC adhesives that leave no glue lines on finished surfaces of architectural woodwork. Do not use adhesives that contain urea formaldehyde.

2.3 FIRE-RETARDANT-TREATED MATERIALS

- A. General: Where indicated, use materials impregnated with fire-retardant chemical formulations indicated by a pressure process or other means acceptable to authorities having jurisdiction to produce products with fire-test-response characteristics specified.
 - 1. Do not use treated material that does not comply with requirements of referenced woodworking standard. Do not use twisted, warped, bowed, discolored, or otherwise damaged or defective lumber or panel products.
 - 2. Use fire-retardant-treatment formulations that do not bleed through or otherwise adversely affect finishes. Do not use colorants in solution to distinguish treated material from untreated material.
 - 3. Treat only door subframing, blocking and furring items.
- B. Fire-retardant-treated lumber and plywood shall comply with VOC content as shown in Section 01 81 23 "CALgreen Requirements."
- C. Fire-Retardant-Treated Lumber: Materials impregnated with fire-retardant chemical formulations to comply with AWPA U1, Use Category UCFA. Kiln-dry material after treatment to levels required for untreated woodwork.
- D. Fire-Retardant Particleboard: Panels made from softwood particles and fire-retardant chemicals mixed together at time of panel manufacture and complying with fire-test-response characteristics specified.
- E. Fire-Retardant Fiberboard: ANSI A208.2 medium-density fiberboard panels made from softwood fibers, synthetic resins, and fire-retardant chemicals mixed together at time of panel manufacture and complying with fire-test-response characteristics specified.

2.4 CABINET HARDWARE AND ACCESSORIES

- A. General: Provide cabinet hardware and accessory materials for a complete installation of architectural woodwork, except for items specified in Section 08 71 00 "Door Hardware."

- B. Hardware Standard: Comply with BHMA A156.9 for items indicated by referencing BHMA numbers or items referenced to this standard.
- C. Frameless Concealed Hinges for Cabinet Doors (European Type): Concealed all-metal furniture hinges adaptable or engineered for 35 mm hinge cup boring pattern, with minimum 155 degree opening angle, three-dimensional hinge having adjustments located in the steel hinge arm, steel or die-cast zinc hinge cups, mounting plates, and plastic insertion dowels to receive hinge screws. Automatic soft closing shall engage only in the last 10 degrees of swing. All hinge pins and linkages shall be hardened. Complying with BHMA A156.9, B01602. Bright nickel finish (US15).
1. Hinge Quantity: Provide hinge quantity as recommended by hinge manufacturer based on cabinet door width, weight, thickness, door material, and hinge cup selection.
 2. Metal Furniture Hinge Products and Manufacturers: One of the following (or approved equal):
 - a. Basis of Design: Grass Tiomos Series; Grass America, Inc.; Kernersville, NC.
 - b. Blumotion Series; Blum USA; Stanley, NC.
 - c. Salice; Silencia Series 200.
- D. Hidden Gate Hinges: Full mortised, invisible hinges and specifically manufactured for door thickness indicated and fabricated from high strength plated brass or steel, heavy duty zinc alloy or brass castings, and non-removable riveted hinge pins. Each hinge shall be engineered for smooth performance with laminated link construction supplemented by anti-friction materials that reduce friction for smooth, free hinge operation. Complying with BHMA A156.9, B01501.
1. Hinge Quantity: Provide hinge quantity as recommended by hinge manufacturer based on cabinet door width, weight, thickness, door material, and hinge cup selection.
 2. Metal Furniture Hinge Products and Manufacturers: One of the following (or approved equal):
 - a. Basis of Design: "Soss" Hinges; Universal Industrial Products Company, Pioneer, OH.
 - b. Vici Hinges 341.25.xxx; Hafele America; Archdale, NC.
 - c. Soss Hinge 341.07.xxx; Hafele America Co.; Archdale, NC.
- E. Piano Hinges: Continuous type, satin finished stainless steel and complying with BHMA A156.9, B51491.
1. Doug Mockett and Co., Inc. (or approved equal)
 - a. DP3C-26D Satin Chrome finish.
- F. Catches: Magnetic, complying with BHMA A156.9, B03141 for single doors and B03161 for double doors.
1. For Single Doors: One of the following (or approved equal):
 - a. CD41 Single Magnetic Cabinet Catch; Stanley Commercial Hardware.

- b. 900; Rockwood Manufacturing Company, Rockwood, PA.
 - c. 246.94.701 housing x 246.94.702 counterpiece; Hafele America Co. Archdale, NC.
2. For Double Doors: One of the following (or approved equal):
- a. 901; Rockwood Manufacturing Company.
 - b. CD45 Double Magnetic Cabinet Catch; Stanley Commercial Hardware.
- G. Cabinet Shelf Rests: Nickel plated brass or steel, or stainless steel, minimum 6 mm diameter shelf support pegs in sockets, complying with BHMA A156.9, B04013. One of the following (or approved equal):
- 1. Hafele 282.01.701 x 282.50.704; Hafele America, Co.
 - 2. K-10S with K-2 Sleeve; Brusso, Inc.
 - 3. 331 Series Flat Top Shelf Support Pin with 325 Series Insert Grommet; Knappe and Vogt.
- H. Drawer Slides:
- 1. Pencil Drawer Slides: Similar to Accuride 2006 having 3/4 extension carburized steel ball bearing, side mounting, 45 lbs. capacity medium duty load rating, cold rolled steel slide members and ball retainers, bright electro zinc plate finish.
 - 2. Drawers less than 4 inches deep: Similar to Accuride 7432 having full extension carburized steel ball bearing, side mounting, 100 lb. capacity medium duty load rating, cold rolled steel slide members and ball retainers, cushioned in and outstops, detent-in, progressive action, positive stop, bright electro zinc plate finish.
 - 3. Drawers greater than 4 inches but less than 8 inches deep: Similar to Accuride 7432 having full extension carburized steel ball bearing, side mounting, 100 lb. capacity medium duty load rating, cold rolled steel slide members and ball retainers, cushioned in and outstops, detent-in, progressive action, positive stop, bright electro zinc plate finish.
 - 4. Drawers greater than 8 inches deep: Similar to Accuride 4032 having full extension carburized steel ball bearing, rail mounting, 150 lb. capacity heavy duty load rating, cold rolled steel slide members and ball retainers, cushioned in and outstops, detent-in, progressive action, positive stop, bright electro zinc plate finish.
 - 5. Refuse Cabinets: Similar to Accuride 3600-201 having full extension carburized steel ball bearing, bottom mounting, 175 lb. capacity heavy duty load rating, cold rolled steel slide members and ball retainers, cushioned in and outstops, progressive action, positive stop, bright electro zinc plate finish.
- I. Silencers: Provide rubber silencers on jamb and/or head and sill strike areas of all cabinet doors and drawers, 2 for paired doors, and 3 for single doors. Silencers shall be approximately 1/4-inch diameter, color compatible with adjacent finish.
- J. Door and Drawer Locks: All cabinet doors and drawers shall be furnished with locks. Finish exposed portions of locks to match cabinet pull finish. Furnish 2 keys with each lock and key all locks inside one room alike and provide masterkey for all locks in Project.
- 1. Drawers: Provide one of the following lock assemblies or approved equal:
 - a. Cam lock similar to Hafele 235.10.261, 1-3/16 inch cylinder length, chrome plated, with straight and offset cams; Hafele America, Co., Archdale, NC.

- b. Cam lock similar to CompX Type 170 Thick Panel Lock x LP-700 lock plug, satin nickel finish, with surface-mounted strike plate SP-100; CompX Timberline, Neenah, WI.
 2. Single Doors: Provide one of the following lock assemblies or approved equal:
 - a. Latch lock similar to Olympus 998/999 Series x 999-Strike, chrome plated, sized to fit opening; Olympus Lock, Inc., Lynnwood, WA.
 - b. Deadbolt similar to CompX CB-281 cylinder body x LP-700 lock plug, satin nickel finish, with surface-mounted strike plate SP-100; CompX Timberline, Neenah, WI.
 3. Pairs of Doors: Provide the following or approved equal:
 - a. At inactive leaf, Furniture bolt similar to Hafele 252.02.644, polished chrome, with strike 251.60.703; Hafele America, Co.
 - b. At active leaf, provide Single Door lock assembly.
- K. Grommets for Cable Passage through Countertops: 3-inch - verify in field with Architect OD,, metal (satin chrome) grommets and matching metal caps with slot for wire passage.
1. Product: Subject to compliance with requirements, provide "MM Solid Metal series" by Doug Mockett and Co., Inc. , or approved equal
- L. Exposed Hardware Finishes: Unless otherwise specified above, or on the Drawings, all exposed portions of the woodwork hardware shall comply with BHMA A156.18 for BHMA finish number indicated.
1. Satin Stainless Steel: BHMA 630.
- M. Stainless Steel Trim: Custom fabricate stainless steel trim shapes to the sizes, shapes and profiles shown from the following materials. Provide in standard commercial tempers and hardness, as required for fabrication, strength and durability from Type 304 alloy. Form exposed work true to line and level, with flush surfaces and accurate angles. Ease exposed edges to a radius of approximately 1/32 inch radius, unless otherwise shown. Miter exposed corner joints and machine fit to a hairline joint. All sheet goods shall be provided finished one side only. Finish designation shown on the Drawings are NAAMM nomenclature.
1. Sheet and Plate: ASTM A 666.
 2. Bar Stock: ASTM A 276.
 3. Pipe: ASTM A 312, Grade TP 304.
 4. Tubing: ASTM A 554, Grade MT 304.
- N. Resilient Base: Refer to Section 09 65 13 "Resilient Wall Base and Accessories."
- O. Light Fixtures: Approximately 1-1/4 inch high surface mounted continuous undercabinet LED task light, with adjustable rotation of plus or minus 30 degrees. Task lighting shall have end butted, fixture to fixture, ganging with concealed wiring. Provide each ganged section of light fixtures with a single dimmer switch that, when activated, will switch the entire ganged section of light fixtures to either "on" or "off," and also offers dimming from full capacity to 5 percent capacity.

1. Basis-of-Design Manufacturer and Fixture: Workrite Ergonomics Inc.; Verano Series undercabinet lighting or approved equal. Other manufacturers will be considered subject to City's acceptance.
 2. All light fixture components shall be UL Approved and Listed for the applications indicated. Housings shall be constructed of recycled aluminum with water based enamel finish; with transformer to connect to 120 VAC electrical voltage. Provide NEC acceptable wiring, and conduits if required, from light fixtures complete with 3 prong connector for plugging into outlet strips or power receptacles.
 3. Lamp Type and Wattage: Each fixture shall include evenly spaced 1W LED lamps with a color temperature of 3500 degrees Kelvin and a CRI of 92; length as required to suit applications shown; other manufacturers will be considered subject to Architect's acceptance.
- P. Door Hardware: At full sized doors, provide door hardware as scheduled under Section 08 71 00 "Door Hardware."
- Q. Hanging (Zee Clip) Strips: Extruded aluminum zee type interlocking clips; type, size and quantity for the condition of use.
- R. Brushed Aluminum Trim Shapes: Custom fabricate aluminum trim shapes to the sizes, shapes and profiles shown from the following materials. Provide in standard commercial tempers and hardness, as required for fabrication, strength and durability. Form exposed work true to line and level, with flush surfaces and accurate angles. Miter exposed corner joints and machine fit to a hairline joint. Finish designations are NAAMM nomenclature.
1. Plate: Alloy 5005 and ASTM B 209.
 2. Bar Stock: ASTM B 211.
 3. Extrusions: Alloy 6063 and ASTM B 221.
 4. Aluminum Trim Finishes: Provide the following finishes to the exposed surfaces of the fabricated work to the extent indicated (NAAMM nomenclature), with texture and reflectivity as required to match the Architect's sample.
 - a. Class II, Clear Anodic Finish: Complying with AA-M10M32A31 for an Architectural Class II, medium satin, clear natural anodized finish.

2.5 FABRICATION, GENERAL

- A. General: Complete fabrication, including assembly, finishing, and hardware application, before shipment to Project site to the maximum extent possible. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide allowance for scribing, trimming, and fitting. The width of scribe and filler panels shall not exceed 1/2 inch, or 1/2 inch clear dimension from adjacent wall to outside face of cabinet door in a 90 degree position, whichever is greater.
1. Interior Woodwork Grades:
 - a. Premium Grade at transparent-finished woodwork and all work at first floor
 - b. Custom Grade at plastic laminate-finished woodwork and woodwork primed for field painting all floors except first floor. Insert description and/or location of woodwork.

- B. Fabricate woodwork to dimensions, profiles, and details indicated.
 - 1. Reinforcing shown is minimum. Provide additional steel and lumber reinforcing as required to sustain imposed loads and to ensure a rigid assembly.
 - 2. Exposed surfaces shall be free from dents, tool marks, warpage, buckle, glue and open joints, or other defects affecting serviceability or appearance. Accurately fit all joints, corners and miters. Conceal all fasteners. Make threaded connections up tight so that threads are entirely concealed.
- C. Shop cut openings to maximum extent possible, to receive hardware, appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately and use templates or roughing in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.
 - 1. Seal edges of openings in countertops with a coat of varnish.
 - 2. Install glass to comply with applicable requirements in Section 08 80 00 "Glazing" and in GANA's "Glazing Manual." For glass in wood frames, secure glass with removable stops.

2.6 WOOD CABINETS FOR TRANSPARENT FINISH

- A. AWS Type of Cabinet Construction: Flush overlay.
- B. Wood Veneered Surfaces:
 - 1. Wood Veneered Species and Matching:
 - a. Wood Veneer Species: As indicated on the Drawings and in the Finish Schedule.
 - b. Matching:
 - 1) Grain Matching: Run and match grain vertically for drawer fronts, doors, and fixed panels unless otherwise indicated on the Drawings.
 - 2) Matching of Veneer Leaves: Book match unless otherwise indicated.
 - 3) Veneer Matching within Panel Face: Center match unless otherwise indicated.
 - 4) Veneer Matching within Room: Provide cabinet veneers in each room and space from a single flitch with doors, drawer fronts, and other surfaces matched in a sequenced set with continuous match where veneers are interrupted perpendicular to the grain.
- C. Semiexposed Surfaces Other Than Drawer Bodies: Compatible species to that indicated for exposed surfaces, stained to match.
 - 1. Drawer Sides and Backs: Solid-hardwood lumber, stained to match species indicated for exposed surfaces.
 - 2. Drawer Bottoms: Hardwood plywood.
- D. Provide dust panels of 1/4-inch plywood or tempered hardboard above compartments and drawers, unless located directly under tops.

- E. Cabinet Locks: Provide door and drawer locks.

2.7 WOOD CABINETS FOR PLASTIC LAMINATE FINISH

- A. AWS Type of Cabinet Construction: Flush overlay.
- B. Laminate Cladding for Exposed Surfaces: High-pressure decorative of grade indicated.
 - 1. Horizontal Surfaces Other Than Tops: HGS.
 - 2. Postformed Surfaces: HGP.
 - 3. Vertical Surfaces: VGS.
 - 4. Edges: HGS unless otherwise indicated.
 - 5. Colors, Patterns, and Finishes: As indicated on the Drawings and in the Finish Schedule.
- C. Materials for Semiexposed Surfaces Other Than Drawer Bodies: High-pressure decorative laminate, Grade VGS.
 - 1. Drawer Sides and Backs: Solid-hardwood lumber.
 - 2. Drawer Bottoms: Hardwood plywood.
- D. Provide dust panels of 1/4-inch plywood or tempered hardboard above compartments and drawers, unless located directly under tops.
- E. Cabinet Locks: Provide door and drawer locks.

2.8 PLASTIC LAMINATE COUNTERTOPS

- A. General: Comply with AWS Section 11 and as follows.
- B. High-Pressure Decorative Laminate Grade: HGS.
- C. Colors, Patterns, and Finishes: As indicated on the Drawings and in the Finish Schedule.
- D. Edge Treatment: Same as laminate cladding on horizontal surfaces unless otherwise indicated.
- E. Core Material at Sinks: Particleboard or exterior-grade plywood.

2.9 SOLID SURFACING COUNTERTOPS

- A. General: Comply with AWS Section 11 and as follows.
- B. Solid-Surfacing-Material Thickness: 1/2 inch.
- C. Colors, Patterns, and Finishes: As indicated on the Drawings and in the Finish Schedule.
- D. Factory fabricate components to achieve required shapes, sizes, and profiles shown, without cracks, spalling, pits, surface porosity, chipped areas, or blisters.

1. Form all tops in one piece lengths. Provide adhesively bonded backsplashes and aprons in heights indicated. Form edges to profiles shown. If required, use 2 sheets of countertop sheet material laminated together using manufacturer's standard adhesive to form edges. Laminated sections shall be in close contact throughout. Adhesive stains will not be permitted.
 2. Countertops shall be factory cored for plumbing fittings provided under Division 22 Plumbing or as indicated on the Drawings.
- E. Radius corners and edges. Provide 1/8 inch 1/4 inch radius.
- F. Finish exposed surfaces by trimming and grinding smooth.

2.10 QUARTZ SURFACING MATERIAL COUNTERTOPS

- A. General: Comply with AWS Section 11 and as follows.
- B. Surfacing-Material Thickness: 3/4 inch.
- C. Radius corners and edges. Provide 1/8 inch radius.
- D. Colors, Patterns, and Finishes: As indicated by manufacturer's designations in Finish Schedule.
- E. Fabricate tops in one piece, unless otherwise indicated. Comply with quartz-surfacing-material manufacturer's written recommendations for adhesives, sealers, fabrication, and finishing.

2.11 FLUSH WOOD PANELING

- A. Core Material:
1. Opaque Finished Paneling: Medium density fiberboard.
 2. Transparent Finished Paneling: Medium density particleboard or medium density fiberboard.
- B. Veneered Surfaces:
1. Veneer Types:
 - a. Opaque Finished Paneling: Exposed MDF.
 - b. Transparent Finished Paneling: As indicated on the Drawings and in the Finish Schedule.
 2. Transparent Finished Panel Matching:
 - a. Matching of Adjacent Veneer Leaves: Book matched, unless otherwise indicated.
 - b. Veneer Matching With Panel Face: Center balance match, unless otherwise indicated.

c. Panel Matching Method: Match panels to one another within each separate area by the following method:

1) Blueprint sequenced matched panels and components.

C. Edge Detail: Edge veneer banded with continuous hardwood strips matching face veneer. Panel joints to be flush type unless otherwise shown.

2.12 INTERIOR STANDING AND RUNNING TRIM FOR OPAQUE AND TRANSPARENT FINISHES

A. General: Complying with AWS Sections 3 and 6, fabricated from solid hardwood with scarfed joints, profiles as indicated, finishes as indicated.

B. Backout or groove backs of flat trim members and kerf backs of other wide, flat members, except for members with ends exposed in finished work.

C. Wood Species: Poplar for opaque finishes; solid hardwood plank finished with transparent finished wood veneer in veneer cut as indicated on the Drawings to match adjacent transparent finished veneered items.

2.13 FLUSH WOOD DOORS FOR TRANSPARENT FINISH

A. Construction complying with AWI Woodwork Quality Standards: PC-5 ME particleboard core doors with minimum 1/16 inch thick, properly dried low density hardwood or high density hardboard crossbanding and transparent finished wood face veneers of the specie and cut indicated.

1. Vertical Edges: Same species as face, lumber or veneer, sanded eased edges, without visible joints in lock or hinge edges and free of knife and saw marks.
2. Core: Single thickness slab of particleboard complying with ANSI A208.1, 1-LD-2, hot pressed with synthetic resin glue.
3. Bonding: Stiles and rails bonded to core, then entire unit abrasive planed before veneering. Glue lines between the stiles and rails shall be minimum Type II complying with the performance requirements of WDMA TM-6.
4. Crossbanding materials shall extend full width of door with grain running horizontally, tapeless spliced without voids or show through (telegraphing), and directly glued to core and blocking. Sand crossbanding before application of face veneer. Face veneer shall extend full height of door with grain running vertically, tapeless spliced without voids or show through (telegraphing), and directly glued to crossband. Glue lines between the face veneer, crossbanding and blocking shall be of a type to comply with specified warranty using the hot plate process.

B. Prefitting: Fit wood doors to suit frame opening sizes indicated. Comply with the following:

1. Jamb and Head Clearance: 1/8 inch.
2. Paired Door Openings Meeting Edge: 3/16 inch less than nominal door size for each leaf.
3. Sill Clearance: 1/4 inch from finished floor.

- C. Machining: Machine wood doors, paneling and frames, for hardware. Comply with final hardware schedules, shop drawings, and hardware templates.
 - 1. Hardware Location: +/- 1/32 inch.
 - 2. Pulls and Pivots: +1/32 inch, - 0 inches.
- D. Door Thickness: 1-3/4 inch.

2.14 FLUSH WOOD DOORS FOR OPAQUE FINISH

- A. Construction complying with AWI Woodwork Quality Standards: PC-5 CE particleboard core doors with minimum 1/16 inch thick, properly dried low density hardwood or high density hardboard crossbanding and medium density overlay (MDO) or high density fiberboard (HDF) face veneers.
 - 1. Vertical Edges: Same as veneer, sanded eased edges, without visible joints in lock or hinge edges and free of knife and saw marks.
 - 2. Core: Single thickness slab of particleboard complying with ANSI A208.1, 1-LD-2, hot pressed with synthetic resin glue.
 - 3. Bonding: Stiles and rails bonded to core, then entire unit abrasive planed before veneering. Glue lines between the stiles and rails shall be minimum Type II complying with the performance requirements of WDMA TM-6.
 - 4. Crossbanding materials shall extend full width of door with grain running horizontally, tapeless spliced without voids or show through (telegraphing), and directly glued to core and blocking. Sand crossbanding before application of face veneer. Face veneer shall extend full height of door with grain running vertically, and directly glued to crossband. Glue lines between the face veneer, crossbanding and blocking shall be of a type to comply with specified warranty using the hot plate process.
- B. Prefitting: Fit wood doors to suit frame opening sizes indicated. Comply with the following:
 - 1. Jamb and Head Clearance: 1/8 inch.
 - 2. Paired Door Openings Meeting Edge: 3/16 inch less than nominal door size for each leaf.
 - 3. Sill Clearance: 1/4 inch from finished floor.
- C. Machining: Machine wood doors, paneling and frames, for hardware. Comply with final hardware schedules, shop drawings, and hardware templates.
 - 1. Hardware Location: +/- 1/32 inch.
 - 2. Pulls and Pivots: +1/32 inch, - 0 inches.
- D. Door Thickness: 1-3/4 inch.

2.15 SHOP FINISHING

- A. Production finish architectural woodwork at fabrication shop. Defer only final touchup, cleaning, and polishing until after installation.

- B. Priming of interior architectural woodwork with field applied opaque finish required to be performed at fabrication shop are specified in this Section. Refer to Section 09 91 23 "Interior Painting" for finishing opaque finished architectural woodwork.
- C. Preparations for Finishing: Comply with referenced quality standard for sanding, filling countersunk fasteners, sealing concealed surfaces, and similar preparations for finishing architectural woodwork, as applicable to each unit of work.
 - 1. Backpriming: Apply one coat of sealer or primer, compatible with finish coats, to concealed surfaces of woodwork. Apply two coats to back of paneling and to end grain surfaces. Concealed surfaces of plastic-laminate-clad woodwork do not require backpriming when surfaced with plastic laminate, backing paper, or thermoset decorative overlay.
 - 2. Gluing of face veneers shall, where possible, be by the hot plate method; glued surfaces shall be in close contact throughout. Glue stains will not be permitted.
 - 3. Grain of all transparent finished wood shall run in the direction shown, or if not shown, as accepted on the shop drawings.
- D. Exposed Surfaces:
 - 1. Transparent Finish:
 - a. Grade: Premium.
 - b. AWS System 5: Conversion Varnish for close grain woods.
 - c. Staining: Natural to match Architect's sample.
 - d. Sheen: Match Architect's samples.
 - 2. Opaque Finish:
 - a. Grade: Custom.
 - b. AWS System 5: Conversion Varnish.
 - c. Color and Sheen: Match Architect's paint samples.
 - 3. Plastic Laminate Finish: Gluing of plastic laminate surfacing materials shall be by the hot plate method, glued surfaces shall be in close contact throughout. Glue stains shall not be permitted.
 - 4. Solid Surfacing Finish: As scheduled.
 - 5. Quartz Surfacing Finish: As scheduled.
- E. Unexposed Wood Finish: Shop-applied alkyd type primer-sealer.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Condition woodwork to average prevailing humidity conditions in installation areas.

- B. Before installing architectural woodwork, examine shop-fabricated work for completion and complete work as required, including removal of packing and backpriming before installation.

3.2 INSTALLATION

- A. Quality Standard: Install woodwork to comply with requirements of the AWS for the same grade specified in this Section for type of woodwork involved.
 - 1. Install woodwork level, plumb, true, with no distortions, and with no variations in flushness of adjoining surfaces. Shim as required with concealed shims.
 - 2. Scribe and cut woodwork to fit adjoining work, and refinish cut surfaces and repair damaged finish at cuts.
- B. Anchor woodwork to blocking built in or directly attached to substrates. Secure to blocking with countersunk, concealed fasteners and blind nailing as required for complete installation. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with woodwork and matching final finish if transparent finish is indicated.
- C. Standing and Running Trim: Install with minimum number of joints possible, using full-length pieces (from maximum length of lumber available) to greatest extent possible. Do not use pieces less than 96 inches long, except where shorter single-length pieces are necessary. Scarf running joints and stagger in adjacent and related members.
 - 1. Fill gaps, if any, between top of base and wall with plastic wood filler, sand smooth, and finish same as wood base, if finished.
- D. Cabinets: Install without distortion so doors and drawers fit openings properly and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated.
 - 1. Install cabinets without sag, bow, or other variation from a straight line.
 - 2. Maintain veneer sequence matching of cabinets with transparent finish.
 - 3. Fasten wall cabinets through back, near top and bottom, at ends and not more than 16 inches on center with No. 10 wafer-head screws sized for 1-inch penetration into wood blocking, or hanging strips or with No. 10 wafer-head sheet metal screws through metal backing or metal framing behind wall finish.
- E. Countertops: Anchor securely by screwing through corner blocks of base cabinets or other supports into underside of countertop.
 - 1. Calk space between backsplash and wall with silicone sanitary sealant specified in Section 07 92 00 "Joint Sealants."
 - 2. Align adjacent solid-surfacing-material countertops and form seams to comply with manufacturer's written recommendations using adhesive in color to match countertop. Carefully dress joints smooth, remove surface scratches, and clean entire surface.
 - 3. Secure backsplashes to tops with concealed metal brackets at 16 inches on center and to walls with adhesive.

4. **Man-Made Stone Tops:** Dry fit the fire slate. A minimum of 10 percent of the area to be covered should be in direct contact with the fireslate with particular emphasis of eliminating gaps on the contact perimeter greater than 0.25 inches in span and depth. Adjustment of the fire slate material shall be in accordance with the written instructions of the fireslate manufacturer. Field apply sealer to the fire slate in accordance with the sealer manufacturer's instructions.
- F. **Paneling:** Anchor paneling to supporting substrate with concealed panel-hanger clips, by blind nailing on backup strips, splined connection strips, and associated trim and framing. Do not use face fastening, unless otherwise indicated. Space panels so that reveals are parallel and of widths indicated.
- G. **Built-In Desks and Credenzas:** Install without distortion so that doors, and drawers, fit openings properly and are accurately aligned. Adjust hardware to center doors, and drawers, in openings and to provide unencumbered operation. Complete the installation of hardware and accessory items as indicated.
 1. Anchor glass tops securely to supporting framing as indicated on the shop drawings.
- H. **Doors:**
 1. Coordinate installation with the work of other trades to ensure exact fit and perfect alignment. Verify dimensions before proceeding and obtain measurements at job site for work required to be accurately fitted to other construction.
 2. Do not install wood doors until interior wet work, such as tile, terrazzo, and wallboard work are complete and dried in the areas to receive the wood doors.
 3. Do not subject wood doors to abnormal humidity, dryness or heat. Do not expose doors to sudden changes in temperature such as forced heat.
 4. Hang wood doors within frames. Align in frames for uniform clearance at each edge matching clearances specified for factory prefitting.
 5. Field cutting, fitting or trimming, if required, shall be executed in a workmanlike manner. Cuts made at the job site shall be sealed immediately after cutting, using a clear varnish or sealer. Restore finish before installation, if fitting or machining is required at the job site for factory finished doors.
 6. **Hardware Installation:** Install hardware in accordance with the instructions of the door hardware manufacturer; refer to Section 08 71 00 "Door Hardware."
- I. **Stainless Steel Cased Openings at Elevator Door Jambs:** Install stainless steel cased opening work in locations shown, plumb, level and in alignment with previously completed work. Provide concealed fastening as accepted on the shop drawings, and as necessary for a rigid, secure, and permanent installation. Form tight joints with exposed connections accurately and uniformly fitted together. Do not cut or abrade finishes that cannot be completely restored in the field.
- J. Complete the finishing work specified in this Section to extent not completed at shop or before installation of woodwork.

3.3 ADJUSTING AND CLEANING

- A. Repair damaged and defective woodwork to eliminate functional and visual defects; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.
- B. Clean woodwork on exposed and semiexposed surfaces. Touchup shop-applied finishes to restore damaged or soiled areas.
 - 1. Anodized aluminum surfaces shall be cleaned with warm water and mild soaps such as those used for hands or dishes. Do NOT use cleaners that contain abrasives, acids or alkalis, as they will mar the surface. Do NOT clean metal face with solvents, paint thinner or adhesive remover. After washing, always wipe the surface completely dry with a soft, clean cloth. Stubborn stains may be removed with a thin, clean oil and dry cloth.

3.4 PROTECTION

- A. Provide final protection and maintain conditions, in a manner acceptable to manufacturer, that ensures that woodwork will be without damage or deterioration at time of Substantial Completion.

END OF SECTION 06 40 23

SECTION 07 84 13 - PENETRATION FIRESTOPPING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes through-penetration firestop systems for penetrations through the following fire-resistance-rated assemblies, including both empty openings and openings containing penetrating items:
 - 1. Floors.
 - 2. Roofs.
 - 3. Walls and partitions.
 - 4. Smoke barriers.

1.2 ACTION SUBMITTALS

- A. Product Data: Submit product data for each type of through penetration firestop system product indicated.
- B. CALgreen Submittals:
 - 1. Product Data for Section 5.504.4.1: For sealants, adhesives and caulks, provide documentation including printed statement of VOC content showing compliance with SCAQMD Rule 1168 VOC limits and CCR (California Code of Regulations) Title 17 for aerosols.
 - 2. Product Data for Section 5.504.4.1.2: Provide documentation for aerosol adhesives, and smaller unit sizes of adhesives, sealant, and caulking compounds (in units of product, less packaging, which do not weigh more than one (1) pound and do not consist of more than sixteen (16) fluid ounces) comply with statewide VOC standards and prohibitions on use of certain toxic compounds, of CCR Title 17, commencing with Section 94507.

1.3 INFORMATIONAL SUBMITTALS

- A. Through-Penetration Firestopping Schedule: Submit, for information only, a Through-Penetration Firestopping Schedule indicating the type of through-penetration firestop system to be installed for each penetration. Indicate each kind of construction condition penetrated and kind of penetrating item. Include firestop design designation of testing and inspection agency acceptable to the authorities having jurisdiction that evidences compliance with requirements for each condition indicated, and listed in the "Through Penetration Firestopping Schedule" at the end of Part 3 of this Section.
 - 1. Submit documentation, including illustrations, from Underwriters Laboratories applicable to each through-penetration firestop.

2. Where Project conditions require modification of qualified testing and inspecting agency's illustration to suit a particular through-penetration firestop condition, submit illustration, with modifications marked, approved by through-penetration firestop system manufacturer's fire-protection engineer.
- B. Product Certificates: Signed by manufacturers of through-penetration firestop system products certifying that products furnished comply with requirements.
- C. At Project Closeout, submit a Record Schedule, signed by the Installer, of systems installed, the UL design designations, and the location of each system. The submittal must have the Installer's signature.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: A firm or individual certified or licensed, by firestop system manufacturer as experienced and with sufficient trained staff to install manufacturer's products according to specified requirements. A manufacturer's willingness to sell its firestop system materials to Contractor or to an installer engaged by Contractor does not in itself confer qualification on the buyer.
- B. Source Limitations: Obtain through-penetration firestop systems, for each kind of penetration and construction condition indicated, from a single manufacturer.
- C. Fire-Test-Response Characteristics: Provide through-penetration firestop systems that comply with the following requirements and those specified in "Performance Requirements" Article:
 1. Firestop tests are performed by a qualified testing and inspecting agency. A qualified testing and inspecting agency is UL, ITS, or another agency performing testing and follow-up inspection services for firestop systems acceptable to authorities having jurisdiction.
 2. Through-penetration firestop systems identical to those tested per ASTM E 814. Provide rated systems complying with the following requirements.
 - a. Through-penetration firestop systems corresponding to those indicated by reference to through-penetration firestop system designations listed by the following:
 - 1) UL in "Fire Resistance Directory."
 - 2) ITS in "Directory of Listed Products."

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver through-penetration firestop system products to Project site in original, unopened containers or packages with intact and legible manufacturers' labels identifying product and manufacturer; date of manufacture; lot number; shelf life, if applicable; qualified testing and inspecting agency's classification marking applicable to Project; curing time; and mixing instructions for multi-component materials.

- B. Store and handle materials for through-penetration firestop systems to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

1.6 FIELD CONDITIONS

- A. Environmental Limitations: Do not install through-penetration firestop systems when ambient or substrate temperatures are outside limits permitted by through-penetration firestop system manufacturers or when substrates are wet.
- B. Ventilate through-penetration firestop systems per manufacturer's written instructions by natural means or, where this is inadequate, forced-air circulation.

1.7 COORDINATION

- A. Coordinate construction of openings and penetrating items to ensure that through-penetration firestop systems are installed according to specified requirements.
- B. Coordinate sizing and provide through-penetration firestop systems to accommodate sizes of sleeves, openings, core-drilled holes, or cut openings.
- C. Notify Owner's inspecting agency at least seven days in advance of through-penetration firestop system installations; confirm dates and times on days preceding each series of installations.
- D. Do not cover up through-penetration firestop system installations that will become concealed behind other construction until Architect, Owner's inspecting agency and building inspector, if required by authorities having jurisdiction, have examined each installation.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. General: For the following constructions, provide through-penetration firestop systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of assembly penetrated.
 - 1. Fire-resistance-rated non-load-bearing walls, including partitions, with fire-protection-rated openings.
 - 2. Fire-resistance-rated floor assemblies.
 - 3. Fire-resistance-rated roof assemblies.
- B. F-Rated Systems: Provide through-penetration firestop systems with F-ratings indicated, as determined per ASTM E 814 or UL 1479, but not less than that equaling or exceeding fire-resistance rating of constructions penetrated.

- C. T-Rated Systems: For the following conditions, provide through-penetration firestop systems with T-ratings indicated, as well as F-ratings, as determined per ASTM E 814 or UL 1479, where systems protect penetrating items exposed to potential contact with adjacent materials in occupiable floor areas:
1. Floor penetrations located outside wall cavities.
 2. Floor penetrations located outside fire-resistive shaft enclosures.
 3. Penetrations located in construction containing fire-protection-rated openings.
 4. Penetrating items larger than 4 inch diameter nominal pipe or 16 square inch in overall cross-sectional area.
 5. Provide T-rating not less than the required rating of the element penetrated, but not less than 1 hour, minimum.
- D. For through-penetration firestop systems exposed to view, traffic, moisture, and physical damage, provide products that after curing do not deteriorate when exposed to these conditions both during and after construction.
1. For piping penetrations for plumbing and wet-pipe sprinkler systems, provide moisture-resistant through-penetration firestop systems.
 2. For floor penetrations with annular spaces exceeding 4 inches in width and exposed to possible loading and traffic, provide firestop systems capable of supporting floor loads involved either by installing floor plates or by other means.
- E. For penetrations involving insulated piping, provide through-penetration firestop systems not requiring removal of insulation.

2.2 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide through-penetration firestop systems that are UL listed for the penetrations listed in UL-Classified Through Penetration Fire Stopping Assemblies in the Schedule at the end of Part 3 of this Section.

2.3 FIRESTOPPING, GENERAL

- A. Compatibility: Provide through-penetration firestop systems that are compatible with one another, with the substrates forming openings, and with the items, if any, penetrating through-penetration firestop systems, under conditions of service and application, as demonstrated by through-penetration firestop system manufacturer based on testing and field experience.
- B. Adhesives, adhesive bonding primers, adhesive primers, sealants, sealant primers and caulks shall comply with local or regional regulations as identified in CALgreen Section 5.504.4.
- C. Aerosol adhesives, and smaller unit sizes of adhesives, and sealant or caulking compounds shall comply with regulations as identified in CALgreen Section 5.504.4.1.2.

- D. Accessories: Provide components for each through-penetration firestop system needed to install fill materials and to comply with "Performance Requirements" Article. Use only components specified by through-penetration firestop system manufacturer and approved by the qualified testing and inspecting agency for firestop systems indicated. Accessories include, but are not limited to, the following items:
1. Permanent forming/damming/backing materials, including the following:
 - a. Slag-/rock-wool-fiber insulation.
 - b. Sealants used in combination with other forming/damming/backing materials to prevent leakage of fill materials in liquid state.
 - c. Fire-rated form board.
 - d. Fillers for sealants.
 2. Temporary forming materials.
 3. Substrate primers.
 4. Collars.
 5. Steel sleeves.
- E. Gypsum Products: The use of gypsum products for through-penetration firestopping is strictly prohibited.
- F. Acoustical Performance: Provide non-hardening resilient firestop material at penetrations, sleeves and passthroughs in acoustic construction assemblies.
1. Acceptable Products:
 - a. Specified Technologies, Inc. Elastomeric Sealant ES100
 - b. Johns Manville Firetemp CI Caulk.
 - c. 3M Fire Barrier 2001 Silicone RTV Foam.
 - d. Hilti Flexible Firestop Sealant CP 606.
 - e. or approved equal

2.4 FILL MATERIALS

- A. General: Provide through-penetration firestop systems containing the types of fill materials indicated in the Through-Penetration Firestop System Schedule at the end of Part 3 by reference to the types of materials described in this Article. Fill materials are those referred to in directories of the referenced testing and inspecting agencies as fill, void, or cavity materials.
- B. Fire Rated Cable Management Devices: Factory-assembled round metallic sleeve device for use with cable penetrations, containing an integrated smoke seal fabric membrane that can be opened and closed for re-penetration.
- C. Blocks/Plugs: Intumescent flexible block/plug suitable for reuse in re-penetration of openings. Blocks shall allow up to 12 inches of unreinforced annular space.

- D. Drop-In Firestop Devices: Factory-assembled devices for use with combustible or noncombustible penetrants in cored holes within concrete floors. Device shall consist of galvanized steel sleeve lined with an intumescent strip, an extended rectangular flange attached to one end of the sleeve for fastening to concrete floor, and neoprene gasket.
- E. Tub Box Kit: Cast-in place pre-formed plastic tub box kit with three support legs for use with drain piping assembly associated with bathtub installations.
- F. Cast-in-Place Firestop Devices: Factory-assembled devices for use in cast-in-place concrete floors and consisting of an outer metallic sleeve lined with an intumescent strip, a radial extended flange attached to one end of the sleeve for fastening to concrete formwork, and a neoprene gasket.
- G. Latex Sealants: Single-component latex formulations that after cure do not re-emulsify during exposure to moisture.
- H. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.
- I. Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced elastomeric sheet bonded to galvanized steel sheet.
- J. Intumescent Putties: Nonhardening dielectric, water-resistant putties containing no solvents, inorganic fibers, or silicone compounds.
- K. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.
- L. Mortars: Prepackaged, dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers, and lightweight aggregate formulated for mixing with water at Project site to form a nonshrinking, homogeneous mortar.
- M. Pillows/Bags: Reusable, heat-expanding pillows/bags consisting of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents and fire-retardant additives.
- N. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.
- O. Silicone Sealants: Moisture-curing, single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below:
 - 1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces and nonsag formulation for openings in vertical and other surfaces requiring a nonslumping, gunnable sealant, unless indicated firestop system limits use to nonsag grade for both opening conditions.
- P. Adhesives, adhesive bonding primers, adhesive primers, sealants, sealant primers and caulks shall comply with local or regional regulations as identified in CALgreen Section 5.504.4.

- Q. Aerosol adhesives, and smaller unit sizes of adhesives, and sealant or caulking compounds shall comply with regulations as identified in CALgreen Section 5.504.4.1.2.

2.5 MIXING

- A. For those products requiring mixing before application, comply with through-penetration firestop system manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning: Clean out openings immediately before installing through-penetration firestop systems to comply with written recommendations of firestop system manufacturer and the following requirements:
1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of through-penetration firestop systems.
 2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with through-penetration firestop systems. Remove loose particles remaining from cleaning operation.
 3. Remove laitance and form-release agents from concrete.
- B. Priming: Prime substrates where recommended in writing by through-penetration firestop system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.
- C. Masking Tape: Use masking tape to prevent through-penetration firestop systems from contacting adjoining surfaces that will remain exposed on completion of Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from firestop system materials. Remove tape as soon as possible without damaging substrate or disturbing firestop system's seal with substrates.

3.3 THROUGH-PENETRATION FIRESTOP SYSTEM INSTALLATION

- A. General: Install through-penetration firestop systems to comply with "Performance Requirements" Article and firestop system manufacturer's written installation instructions and published drawings for products and applications indicated.
- B. Install forming/damming/backing materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
 - 1. After installing fill materials, remove combustible forming materials and other accessories not indicated as permanent components of firestop systems.
- C. Install fill materials for firestop systems by proven techniques to produce the following results:
 - 1. Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items as required to achieve fire-resistance ratings indicated.
 - 2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
 - 3. For fill materials that will remain exposed after completing Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 FIELD QUALITY CONTROL

- A. Inspecting Agency: Owner may engage a qualified independent inspecting agency to inspect through-penetration firestop systems and to prepare test reports.
 - 1. Inspecting agency will state in each report whether inspected through-penetration firestop systems comply with or deviate from requirements.
- B. Proceed with enclosing through-penetration firestop systems with other construction only after inspection reports are issued.
- C. Where deficiencies are found, repair or replace through-penetration firestop systems so they comply with requirements.

3.5 IDENTIFICATION

- A. Identify through-penetration firestop systems with pressure-sensitive, self-adhesive, preprinted vinyl labels. Attach labels permanently to surfaces of penetrated construction on both sides of each firestop system installation where labels will be visible to anyone seeking to remove penetrating items or firestop systems. Include the following information on labels:
 - 1. The words: "Warning--Through-Penetration Firestop System--Do Not Disturb. Notify Building Management of Any Damage."
 - 2. Contractor's name, address, and phone number.
 - 3. Through-penetration firestop system designation of applicable testing and inspecting agency.

4. Date of installation.
 5. Through-penetration firestop system manufacturer's name.
 6. Installer's name.
- B. Identify fire-resistance-rated construction (including walls, shaft enclosures, partitions, and smoke barriers) with signs or stenciling permanently installed above suspended ceilings or in other concealed spaces. The lettering shall be 3 inches in height and spaced 12 feet (3658 mm) on center:
1. The words _____-HOUR FIRE AND SMOKE WALL - PROTECT ALL PENETRATIONS."
 - a. Replace blank with actual fire-resistance rating.

3.6 CLEANING AND PROTECTION

- A. Clean off excess fill materials adjacent to openings as Work progresses by methods and with cleaning materials that are approved in writing by through-penetration firestop system manufacturers and that do not damage materials in which openings occur.
- B. Provide final protection and maintain conditions during and after installation that ensure through-penetration firestop systems are without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated through-penetration firestop systems immediately and install new materials to produce through-penetration firestop systems complying with specified requirements.
- C. THROUGH-PENETRATION FIRESTOP SYSTEM SCHEDULE

PENETRATION FIRESTOPPING SCHEDULE								
FIRESTOPPING SYSTEMS ARE LISTED USING THE ALPHA-ALPHA-NUMERIC IDENTIFICATION SYSTEM PUBLISHED IN UL'S FIRE RESISTANCE DIRECTORY, VOLS. 2A - 2B								
TYPE OF PENETRANT	CONSTRUCTION							
	FLOOR PENETRATION SYSTEMS (FIRST ALPHA COMPONENT = C OR F)				WALL PENETRATION SYSTEMS (FIRST ALPHA COMPONENT = C OR W)			
	CONCRETE FLOORS WITH A MINIMUM THICKNESS LESS THAN OR EQUAL TO 5 INCHES (127 MM)	CONCRETE FLOORS WITH A MINIMUM THICKNESS OF MORE THAN 5 INCHES (127 MM)	FRAMED FLOORS	FLOOR-CEILING ASSEMBLIES CONSISTING OF CONCRETE WITH MEMBRANE PROTECTION	CONCRETE OR MASONRY WALLS WITH A MINIMUM THICKNESS LESS THAN OR EQUAL TO 8 INCHES (203 MM)	CONCRETE OR MASONRY WALLS WITH A MINIMUM THICKNESS OF MORE THAN 8 INCHES (203 MM)	FRAMED WALLS	COMPOSITE PANEL WALLS
NO PENETRATING ITEMS	C-AJ-0001-0999 or F-A-0001-0999	C-BJ-0001-0999 or F-B-0001-0999	F-C-1001-1999		C-AJ-0001-0999, C-BJ-0001-0999, or W-J-0001-0999		W-L-0001-0999	
METALLIC PIPE, CONDUIT, OR TUBING	C-AJ-1001-1999 or F-A-1001-1999	C-BJ-1001-1999, C-BK-1001-1999, or F-B-1001-1999	F-C-1001-1999	F-E-1001-1999	C-AJ-1001-1999, C-BJ-1001-1999, or W-J-1001-1999	C-BK-1001-1999 or W-K-1001-1999	W-L-1001-1999	W-N-1001-1999
NONMETALLIC PIPE, CONDUIT, OR TUBING	C-AJ-2001-2999 or F-A-2001-2999	C-BJ-2001-2999, C-BK-2001-2999, or F-B-2001-2999	F-C-2001-2999	F-E-2001-2999	C-AJ-2001-2999, C-BJ-2001-2999, or W-J-2001-2999	C-BK-2001-2999 or W-K-2001-2999	W-L-2001-2999	W-N-2001-2999
ELECTRICAL CABLES	C-AJ-3001-3999 or F-A-3001-3999	C-BJ-3001-3999, C-BK-3001-3999, or F-B-3001-3999	F-C-3001-3999	F-E-3001-3999	C-AJ-3001-3999, C-BJ-3001-3999, or W-J-3001-3999	C-BK-3001-3999 or W-K-3001-3999	W-L-3001-3999	
CABLE TRAYS WITH ELECTRICAL CABLES	C-AJ-4001-4999 or F-A-4001-4999	C-BJ-4001-4999 or F-B-4001-4999			C-AJ-4001-4999, C-BJ-4001-4999, or W-J-4001-4999	W-K-4001-4999	W-L-4001-4999	
INSULATED PIPES	C-AJ-5001-5999 or F-A-5001-5999	C-BJ-5001-5999, C-BK-5001-5999, or F-B-5001-5999	F-C-5001-5999	F-E-5001-5999	C-AJ-5001-5999, C-BJ-5001-5999, or W-J-5001-5999	C-BK-5001-5999	W-L-5001-5999	W-N-5001-5999
MISCELLANEOUS ELECTRICAL PENETRANTS	C-AJ-6001-6999 or F-A-6001-6999	C-BJ-6001-6999			C-AJ-6001-6999, C-BJ-6001-6999, or W-BJ-6001-6999		W-L-6001-6999	
MISCELLANEOUS MECHANICAL PENETRANTS	C-AJ-7001-7999 or F-A-7001-7999	C-BJ-7001-7999 or F-B-7001-7999	F-C-7001-7999	F-E-7001-7999	C-AJ-7001-7999, C-BJ-7001-7999, or W-J-7001-7999		W-L-7001-7999	W-N-7001-7999
GROUPINGS OF PENETRATIONS	C-AJ-8001-8999 or F-A-8001-8999	C-BJ-8001-8999 or F-B-8001-8999	F-C-8001-8999	F-E-8001-8999	C-AJ-8001-8999, C-BJ-8001-8999, or W-J-8001-8999		W-L-8001-8999	

Remarks: For each location where a fire-resistance-rated floor or wall assembly is penetrated, provide a UL-listed penetration firestopping system selected from the applicable UL number range listed above that complies with Section 078413 "Penetration Firestopping" and that is suitable for the penetration conditions indicated for the Project.

E

ND OF SECTION 07 84 13

SECTION 07 84 43 - JOINT FIRESTOPPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes fire-resistive joint systems for the following:

1. Floor-to-floor joints.
2. Floor-to-wall joints.
3. Head-of-wall joints.
4. Bottom of wall joints.
5. Wall-to-wall joints.

1.2 COORDINATION

- A. Coordinate construction of joints to ensure that fire-resistive joint systems are installed according to specified requirements.
- B. Coordinate sizing of joints to accommodate fire-resistive joint systems.

1.3 ACTION SUBMITTALS

- A. Product Data: Submit product data for each type of product indicated.
- B. CALgreen Submittals:
1. Product Data for Section 5.504.4.1: For sealants, adhesives and caulks, provide documentation including printed statement of VOC content showing compliance with SCAQMD Rule 1168 VOC limits and CCR (California Code of Regulations) Title 17 for aerosols.
 2. Product Data for Section 5.504.4.1.2: Provide documentation for aerosol adhesives, and smaller unit sizes of adhesives, sealant, and caulking compounds (in units of product, less packaging, which do not weigh more than one (1) pound and do not consist of more than sixteen (16) fluid ounces) comply with statewide VOC standards and prohibitions on use of certain toxic compounds, of CCR Title 17, commencing with Section 94507.

1.4 INFORMATIONAL SUBMITTALS

- A. Fire Resistive Joint System Schedule: Submit, for information only, a Fire Resistive Joint Schedule indicating the type of fire resistive joint system to be installed for each joint. Indicate each kind of construction condition. Include fire resistive joint design designation of testing and inspection agency acceptable to the authorities having jurisdiction that evidences compliance with requirements for each condition indicated.

1. Submit documentation, including illustrations, from a qualified testing and inspecting agency that is applicable to each fire-resistive joint system configuration for construction and penetrating items.
- B. Product Certificates: Signed by manufacturers of fire resistive joint system products certifying that products furnished comply with requirements.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: A firm or individual certified or licensed by the fire resistive joint system manufacturer as experienced and with sufficient trained staff to install manufacturer's products according to specified requirements. A manufacturer's willingness to sell its fire resistive joint system materials to Contractor or to an installer engaged by Contractor does not in itself confer qualification on the buyer.
- B. Source Limitations: Obtain fire-resistive joint systems, for each kind of joint and construction condition indicated, through one source from a single manufacturer.
- C. Fire-Test-Response Characteristics: Provide fire-resistive joint systems that comply with the following requirements and those specified in Part 2 "Performance Requirements" Article:
 1. Fire-resistance tests are performed by a qualified testing and inspecting agency. A qualified testing and inspecting agency is UL or another agency performing testing and follow-up inspection services for fire-resistive joint systems acceptable to authorities having jurisdiction.
 2. Fire-resistive joint systems are identical to those tested per methods indicated in Part 2 "Performance Requirements" Article and comply with the following:
 - a. Fire-resistive joint system products bear classification marking of qualified testing and inspecting agency.
 - b. Fire-resistive joint systems correspond to those indicated by referencing system designations of the qualified testing and inspecting agency.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver fire-resistive joint system products to Project site in original, unopened containers or packages with qualified testing and inspecting agency's classification marking applicable to Project and with intact and legible manufacturers' labels identifying product and manufacturer, date of manufacture, lot number, shelf life, curing time, and mixing instructions for multicomponent materials.
- B. Store and handle materials for fire-resistive joint systems to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

1.7 FIELD CONDITIONS

- A. Environmental Limitations: Do not install fire-resistive joint systems when ambient or substrate temperatures are outside limits permitted by fire-resistive joint system manufacturers or when substrates are wet.
- B. Ventilate fire-resistive joint systems per manufacturer's written instructions by natural means or, if this is inadequate, forced-air circulation.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. General: Provide fire-resistive joint systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of assembly in which fire-resistive joint systems are installed.
- B. Joint Systems In and Between Fire Resistance Rated Constructions: Provide systems with assembly ratings not less than that equaling or exceeding fire-resistance rating of constructions in which joints are located, as determined by UL 2079.

2.2 MANUFACTURERS

- A. Products: Subject to compliance with requirements, provide fire resistive joint systems indicated for each application in the Fire-Resistive Joint System Schedule at the end of Part 3.

2.3 JOINT FIRESTOPPING

- A. Compatibility: Provide joint firestopping systems that are compatible with joint substrates, under conditions of service and application, as demonstrated by fire-resistive joint system manufacturer based on testing and field experience.
- B. Adhesives, adhesive bonding primers, adhesive primers, sealants, sealant primers and caulks shall comply with local or regional regulations as identified in CALgreen Section 5.504.4.
- C. Aerosol adhesives, and smaller unit sizes of adhesives, and sealant or caulking compounds shall comply with regulations as identified in CALgreen Section 5.504.4.1.2.
- D. Accessories: Provide components of joint firestopping system, including forming materials, that are needed to install fill materials and to comply with Part 2 "Performance Requirements" Article. Use only components specified by joint firestopping system manufacturer and approved by the qualified testing and inspecting agency for systems indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for joint configurations, substrates, and other conditions affecting performance of Work.
 - 1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning: Clean joints immediately before installing fire-resistive joint systems to comply with fire-resistive joint system manufacturer's written instructions and the following requirements:
 - 1. Remove from surfaces of joint substrates foreign materials that could interfere with adhesion of fill materials.
 - 2. Clean joint substrates to produce clean, sound surfaces capable of developing optimum bond with fill materials. Remove loose particles remaining from cleaning operation.
 - 3. Remove laitance and form-release agents from concrete.
- B. Priming: Prime substrates where recommended in writing by fire-resistive joint system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.
- C. Masking Tape: Use masking tape to prevent fill materials of fire-resistive joint system from contacting adjoining surfaces that will remain exposed on completion of Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from fire-resistive joint system materials. Remove tape as soon as possible without disturbing fire-resistive joint system's seal with substrates or damaging adjoining surfaces.

3.3 INSTALLATION

- A. Install joint firestopping systems to comply with Part 2 "Performance Requirements" Article and fire-resistive joint system manufacturer's written installation instructions for products and applications indicated.
- B. Install forming/packing/backing materials and other accessories of types required to support fill materials during their application and in position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
- C. Install fill materials for fire-resistive joint systems by proven techniques to produce the following results:
 - 1. Fill voids and cavities formed by openings and forming/packing/backing materials as required to achieve fire-resistance ratings indicated.

2. Apply fill materials so they contact and adhere to substrates formed by joints.
3. For fill materials that will remain exposed after completing Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 FIELD QUALITY CONTROL

- A. Inspecting Agency: Owner may engage a qualified independent inspecting agency to inspect fire-resistive joint systems and to prepare inspection reports.
 1. Inspecting agency will state in each report whether inspected fire-resistive joint systems comply with or deviate from requirements.
- B. Proceed with enclosing joint firestopping systems with other construction only after inspection reports are issued and inspecting agency has approved installed fire-resistive joint systems.
- C. If deficiencies are found, repair or replace fire-resistive joint systems so they comply with requirements.

3.5 CLEANING AND PROTECTING

- A. Clean off excess fill materials adjacent to joints as Work progresses by methods and with cleaning materials that are approved in writing by fire-resistive joint system manufacturers and that do not damage materials in which openings occur.
- B. Provide final protection and maintain conditions during and after installation that ensure fire-resistive joint systems are without damage or deterioration at time of Substantial Completion. If damage or deterioration occurs despite such protection, cut out and remove damaged or deteriorated fire-resistive joint systems immediately and install new materials to produce fire-resistive joint systems complying with specified requirements.

3.6 JOINT FIRESTOPPING SYSTEM SCHEDULE

- A. Designation System for Joints in or between Fire-Resistance-Rated Constructions: Alphanumeric designations listed in UL's "Fire Resistance Directory" under product Category XHBN.
- B. Designation System for Joints at the Intersection of Fire-Resistance-Rated Floor or Floor/Ceiling Assembly: Alphanumeric designations listed in UL's "Fire Resistance Directory" under product Category XHDG.
- C. Floor-to-Floor, Fire-Resistive Joint Systems: UL-Classified (FF-Series) system as required to maintain floor fire rating indicated.
- D. Floor-to-Wall, Fire-Resistive Joint Systems: UL-Classified (FW-Series) system as required to maintain floor to wall fire rating indicated.

- E. Head-of-Wall, Fire-Resistive Joint Systems: UL-Classified (HW-Series) system as required to maintain floor to wall fire rating indicated.
- F. Bottom-of-Wall, Fire-Resistive Joint Systems: UL-Classified (BW Series) systems as required to maintain bottom of wall fire rating indicated.
- G. Wall-To-Wall, Fire-Resistive Joint Systems: UL-Classified (WW-Series) system as required to maintain floor to wall fire rating indicated.

END OF SECTION 07 84 43

SECTION 07 92 00 - JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes joint sealants.

1.2 ACTION SUBMITTALS

- A. Product Data: Submit product data for each joint sealant product indicated.
- B. CALgreen Submittals:
 - 1. Product Data for Section 5.504.4.1: For Adhesives, adhesive bonding primers, adhesive primers, sealants, sealant primers and caulks, provide documentation including printed statement of VOC content showing compliance with SCAQMD Rule 1168 VOC limits and CCR (California Code of Regulations) Title 17 for aerosols.
 - 2. Product Data for Section 5.504.4.1.2: Provide documentation for aerosol adhesives, and smaller unit sizes of adhesives, sealant, and caulking compounds (in units of product, less packaging, which do not weigh more than one (1) pound and do not consist of more than sixteen (16) fluid ounces) comply with statewide VOC standards and prohibitions on use of certain toxic compounds, of CCR Title 17, commencing with Section 94507.
- C. Samples: Submit samples for each exposed joint sealant product indicated.

1.3 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to Project site in original unopened containers. Store and handle materials in compliance with manufacturer's written instructions.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Adhesives, adhesive bonding primers, adhesive primers, sealants, sealant primers and caulks shall comply with local or regional regulations as shown in Section 01 81 23 "CALgreen Requirements."
- B. Aerosol adhesives, and smaller unit sizes of adhesives, and sealant or caulking compounds shall comply with regulations per section 01 81 23 CALgreen Requirements."

- C. Colors: For fully concealed joints, provide the manufacturer's standard color of sealant which has the best overall performance characteristics for the application shown. For exposed joints, the Architect will select colors from the manufacturer's standard colors.

2.2 JOINT SEALANTS

- A. Butt Glazing Sealant: Comply with ASTM C 920, Type S, Grade NS, Class 50; use NT, G, and A, black color unless otherwise indicated.
1. Products and Manufacturers: Provide one of the following:
 - a. 795; Dow Corning.
 - b. Spectrem 2; Tremco, an RPM Co.
 - c. Silpruf SCS 2000; Momentive.
 - d. Sika, Sikasil WS 295.
- B. Sealants for Contact with Food: Comply with 21 CFR 177.2600, NSF Standard 51, and ASTM C 920 for Type S, Grade NS, Class 25, Use NT.
1. Dow Corning; 786 Mildew Resistant Silicone Sealant.
- C. Mildew-Resistant Silicone Sealant (use for joints at plumbing fixtures, toilet room countertops and vanities): Complying with ASTM C 920, Type S (single component), Grade NS (non-sag), class 25, Use NT (non-traffic), Substrate uses G, A, and O; and containing a fungicide for mildew resistance; white color.
1. Products: Provide one of the following:
 - a. Dow Corning; 786 Mildew Resistant Silicone Sealant.
 - b. Momentive; Sanitary SCS 1700.
 - c. Pecora Corporation; 898 Silicone Sanitary Sealant.
 - d. Tremco, an RPM Co.; Tremsil 200 Sanitary.
- D. Two-Part Polyurethane Sealant for Paving Applications:
1. For Paving Applications with Slopes not Exceeding 5% (Self Leveling): ASTM C 920, Type M, Grade P, Class 25; use T (except with a Shore A hardness of 35 or greater) and I (Class 1 or 2) for water immersion; and abrasion resistant,; one of the following:
 - a. Pecora Corporation; Urexpam NR-200.
 - b. Tremco, an RPM Co.; Vulkem, 445SSL.
 - c. Sika; Sikaflex 1c SL.
- E. Latex Sealant: Complying with ASTM C 834, Type OP (opaque sealants):
1. Products: Provide one of the following:
 - a. Pecora Corporation; AC-20 + Silicone.
 - b. DAP Products Inc.; Alex Plus Acrylic Latex Caulk Plus Silicone.

- c. Tremco, an RPM Co.; Tremflex 834.

2.3 JOINT-SEALANT BACKING

- A. General: Provide sealant backings of material and type 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: One of the following preformed, compressible, resilient, nonstaining, nonwaxing, nonextruding backings of flexible plastic foam complying with ASTM C 1330, and of type indicated below. Select shape and density of cylindrical sealant backings in consultation with the manufacturer for proper performance in specific condition of use in each case.
 1. Type C: Closed-cell polyethylene foam material with a surface skin, which is nonabsorbent to liquid water and gas, non-outgassing in unruptured state; one of the following:
 - a. HBR Closed Cell Backer Rod; Nomaco, Inc.
 - b. MasterSeal 920; BASF Master Builders.
 - c. Mile High Foam, Backer Rod Mfg., Inc..

2.4 MISCELLANEOUS MATERIALS

- A. 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 with joint substrates.
- B. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and which will not stain nor mar the finish of surfaces adjacent to joints to which it is applied.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with the recommendations of joint sealant manufacturer and the following requirements:
 1. Remove 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), existing joint sealants, oil, grease, water, and surface dirt.

2. Clean concrete, masonry, unglazed surfaces of tile, and similar porous joint substrate surfaces by brushing, grinding, blast cleaning, 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 from above cleaning operations by vacuuming or blowing out joints with oil-free compressed air.
 3. Remove laitance and form-release agents from concrete.
 4. Clean metal, glass, porcelain enamel, glazed surfaces of tile, and other nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.
- B. Masking Tape: Use masking tape where required to prevent contact of sealant 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.
- C. Installation of Sealant Backings: Install sealant backings of type 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.
- D. Installation of Sealants: Install sealants so they directly contact and fully wet joint substrates, completely filling recesses provided for each joint configuration, and providing uniform, cross-sectional shapes and depths that allow optimum sealant movement capability.
- E. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants to form smooth, uniform, concave shaped beads, to eliminate air pockets, and to ensure contact and adhesion of sealant with sides of joint. Remove excess sealants from surfaces adjacent to joint.
- F. Cleaning: Clean excess sealants or sealant smears adjacent to joints as installation progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.2 JOINT SEALANT SCHEDULE

- A. Interior joints in the following vertical surfaces and horizontal nontraffic surfaces:
1. Control and Expansion Joints on Exposed Interior Surfaces of Exterior Walls: Latex sealant.
 2. Perimeter Joints of Exterior Openings Where Indicated: Latex sealant.
 3. Vertical Control and Expansion Joints in Stone and Tile Surfaces: Latex sealant.
 4. Horizontal Control and Expansion Joints in Stone and Tile Flooring Surfaces: Two-Part Polyurethane Sealant for Paving Applications.
 5. Vertical Control Joints on Exposed Surfaces of Interior Unit Masonry and Concrete Walls and Partitions: Latex sealant.
 6. Joints on Underside of Precast Beams and Planks: Latex sealant.
 7. Perimeter Joints between Interior Wall Surfaces and Frames of Interior Doors, Windows, and Elevator Entrances: Latex sealant.
 8. Perimeter Joints between Scalloped, Bent, or Warped Interior Wallboard Surfaces and Straight Trim: Latex Sealant.

9. Joints between Plumbing Fixtures and Adjoining Walls, Floors, and Counters: Mildew resistant silicone sealant.
10. Joints between Glass, and between Glass and Adjacent Substrates: Butt glazing sealant.

END OF SECTION 07 92 00

SECTION 08 12 13 - HOLLOW METAL FRAMES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes hollow metal door frames.
 - 1. The integration of a security system into the hollow metal door frame work is required. The Contractor shall be responsible for the total and complete coordination of the security system components into the Work.

1.2 ACTION SUBMITTALS

- A. Product Data: Submit product data for each product indicated. Include material descriptions, core descriptions, label compliance, sound and fire-resistance ratings, and finishes for each type of door frame specified.
- B. Shop Drawings: Submit door and frame schedule using same reference designations indicated on Drawings. Include opening size(s), handing of doors, frame throat dimensions, details of each frame type, elevations of door design types, details of construction, location and installation requirements of door hardware and reinforcements, hardware group numbers, details of joints and connections, fire label requirements including fire rating time duration, maximum temperature rise requirements, and smoke label requirements.
 - 1. Indicate routing of electrical conduit and dimensions and locations of cutouts in door frames to accept electric hardware devices.
- C. Construction Samples: Submit approximately 18 by 24 inches , representing the required construction of door frames for Project.
 - 1. Knock-Down Frames: Show profile, corner joint, welded hinge reinforcement, wall anchors, stops, and silencers.

1.3 INFORMATIONAL SUBMITTALS

- A. Certificate of Compliance for Fire Rated Doors: Provide copies of Certificate of Compliance for all fire rated door assemblies, all smoke and draft control door assemblies, and all temperature rise rated door assemblies.

1.4 QUALITY ASSURANCE

- A. Hollow Metal Door Frame Standard: Comply with the applicable provisions and recommendations of the following publications by Hollow Metal Manufacturers Association (HMMA) Div. of National Association of Architectural Metal Manufacturers (NAAMM), unless more stringent requirements are indicated in the Contract Documents:
 - 1. HMMA "Hollow Metal Manual."
 - 2. HMMA 861 "Guide Specifications for Commercial Hollow Metal Doors and Frames."
- B. Manufacturer Qualifications: A firm experienced in manufacturing hollow metal doors and frames similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
 - 1. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 252 Provide metal labels permanently fastened on each door frame which is within the size limitations established by the labeling authority having jurisdiction.
- C. Smoke-Control Door Assemblies: Comply with NFPA 105 or UL 1784.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver door frames palleted, wrapped, or crated to provide protection during transit and Project site storage.
- B. Inspect door frames, on delivery, for damage. Tool marks, rust, blemishes, and other damage on exposed surfaces will not be acceptable. Remove and replace damaged items as directed by Architect. Store door frames at building site in a dry location, off the ground, and in such a manner as to prevent deterioration.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide doors and frames by one of the following:
 - 1. Hollow Metal Door Frames, or approved equal:
 - a. Ceco Door Products; an Assa Abloy Group Company.
 - b. Curries Company; an Assa Abloy Group Company.
 - c. Steelcraft; an Ingersoll-Rand Company.

2.2 MATERIALS

- A. Hot-Rolled Steel Sheets: ASTM A 1011/A 1011M, CS (commercial steel), Type B, free from scale, pitting, coil breaks, surface blemishes, buckles, waves, or other defects, exposed (matte) dull finish, suitable for exposed applications.
- B. Cold-Rolled Steel Sheets: ASTM A 1008/A 1008M, CS (commercial steel), Type B; free of scale, pitting, or surface defects; pickled and oiled. Not less than 16 gauge, thick where frames are indicated to be built into exterior walls, hot dip galvanize after fabrication in compliance with ASTM A153/A153M, Class B.
- C. Inserts, Bolts, and Fasteners: Galvanized steel.
 - 1. Expansion Bolts and Shields: FS FF-S-325, Group III, Type 1 or 2.
 - 2. Machine Screws: FS FF-S-92, carbon steel, Type III cross recessed, design I or II recess, style 2C flat head.
- D. Filler: Sound deadening and heat retarding mineral fiber insulating material.
- E. Glass and Glazing: Refer to Section 08 80 00 "Glazing."

2.3 FRAMES

- A. Fabricate hollow metal frames, formed to profiles indicated, with full 5/8 inch stops, and of the following minimum thicknesses.
 - 1. For interior use, form frames from cold-rolled steel sheet of the following thicknesses:
 - a. Openings up to and Including 48 Inches Wide: 16 gauge.
 - b. Openings More Than 48 Inches Wide: 14 gauge.
- B. Hardware Reinforcement: Fabricate reinforcements from same material as frame to comply with the following. Offset reinforcement so that faces of mortised hardware items are flush with surface of the frame.
 - 1. Hinges and Pivots: 7 gauge thick by 1-1/4 inches wide by 10 inches.
 - 2. Strike, Surface Mounted Hold Open Arms, and Flushbolt Reinforcements: 12 gauge thick by size as required by hardware manufacturer.
 - 3. Closer Reinforcements: 12 gauge thick one piece channel by size as required by hardware manufacturer.
 - 4. Other Hardware Reinforcements: As required for adequate strength and anchorage.
- C. Electrical Requirements: Make provisions for installation of electrical items specified elsewhere; arrange so wiring can be readily removed and replaced.
 - 1. Provide all cutouts and reinforcements required for steel frames to accept security system components.

2. Frames with Electric Hinges and Pivots: Provide welded on UL listed back boxes with metal conduit or raceway to permit wiring from electric hinge or pivot to other electric door hardware.
- D. Mullions and Transom Bars for Sidelights, Transoms, and Borrowed Light Frames: Provide closed or tubular mullions and transom bars where indicated. Fasten mullions and transom bars at crossings and to jambs by butt welding. Reinforce joints between frame members with concealed clip angles or sleeves of same metal and thickness as frame.
- E. Jamb Anchors: Locate jamb anchors above hinges and directly opposite on strike jamb as required to secure frames to adjacent construction. At metal stud partitions locate the additional jamb anchor below the top hinge.
 1. Metal-Stud Partitions: Metal channel stud zee anchor sized to match stud width, welded to back of frames, formed of same material and gauge thickness as frame. Provide at least the number of anchors for each jamb according to the following heights:
 - a. Three anchors per jamb up to 60 inches in height.
 - b. Four anchors per jamb from 60 to 90 inches in height.
 - c. Five anchors per jamb from 90 to 96 inches in height.
 - d. One additional anchor per jamb for each 24 inches or fraction thereof more than 96 inches in height.
- F. Head Strut Supports: Provide 3/8-by-2-inch vertical steel struts extending from top of frame at each jamb to supporting construction above. Bend top of struts to provide flush contact for securing to supporting construction above by bolting, welding, or other suitable anchorage. Provide adjustable wedged or bolted anchorage to frame jamb members to permit height adjustment during installation. Adapt jamb anchors at struts to permit adjustment.
- G. Head Reinforcement: For frames more than 48 inches wide in masonry wall openings, provide continuous steel channel or angle stiffener, 12 gauge thick for full width of opening, welded to back of frame at head. Head reinforcements shall not be used as a lintel or load-bearing member for masonry.
- H. Spreader Bars: Provide removable spreader bar across bottom of frames, attached to jambs and mullions to serve as bracing during shipment and handling and to hold frames in proper position until anchorage and adjacent construction have been completed.
- I. Door Silencer Holes: Drill strike jamb stop to receive three silencers on single door frames and for two silencers on double door frames. Insert plastic plugs in holes to keep holes clear during installation.
- J. Plaster Guards and Removable Access Plates: Provide 26 gauge thick plaster guards or dust-cover boxes of same material as frame, welded to frame at back of hardware cutouts to close off interior of openings and prevent mortar or other materials from obstructing hardware operation. Provide removable access plates in the heads of frames to receive overhead concealed door closers.

2.4 STOPS AND MOLDINGS

- A. Provide continuous stops and moldings around solid, and glazed, panels where indicated.
- B. Form fixed stops and moldings integral with frame, on the exterior (non-secured) side of the frame.
- C. Provide removable stops and moldings formed of 20 gauge thick steel sheets matching hollow metal frames. Secure with countersunk oval head machine screws spaced uniformly not more than 12 inches o.c. Form corners with butted or mitered hairline joints.
- D. Coordinate rabbet width between fixed and removable stops with type of glass or panel and type of installation indicated.

2.5 KNOCKDOWN HOLLOW METAL FRAMES

- A. Provide combination type knockdown hollow metal door frames to be used as both door buck and trim, formed to profiles shown, of minimum 16 gauge thick cold rolled steel.
 - 1. Frames shall be splined, tabbed, and miter fit, knockdown type compatible with adjacent construction conditions.
 - 2. Accurately machine, file, and fit exposed connections with hairline joints.
 - 3. Typical Anchorage: Frames shall be provided with concealed mechanical compression anchors at top of each jamb and each jamb shall be prepared and provided with provision for anchorage at floor line of jamb return face.
 - 4. Miter and anchorage type subject to acceptance of Architect.
- B. Mortise, reinforce, drill and tap frames for mortise type hardware. Provide internal reinforcement for surface type hardware that is to be field drilled and tapped per requirements hereinbefore specified for welded frames and including silencers. Locate hardware in frames to match location specified and in accordance with the hardware schedule and templates.

2.6 FABRICATION

- A. Fabricate door frames rigid, neat in appearance, and free of defects, warp, wave, and buckle. Accurately form metal to sizes and profiles indicated. Accurately machine, file, and fit exposed connections with hairline joints.
- B. Exposed Fasteners: Provide countersunk flat heads for exposed screws and bolts, unless otherwise indicated.
- C. Hardware Preparation: Prepare door frames to receive hardware, including cutouts, reinforcement, mortising, drilling, and tapping, according to final hardware schedule and templates provided by hardware supplier. Secure reinforcement by spot welding. Comply with applicable requirements of ANSI/BHMA A156.115 and A156.115W specifications for door and frame preparation for hardware. Factory-reinforce door frames to receive surface-applied hardware. Factory drill and tap for surface-applied hardware,.

1. Locate hardware as indicated on the Drawings or in Section 08 71 00 "Door Hardware" or, if not indicated, according to HMMA 831, "Recommended Hardware Locations for Custom Hollow Metal Doors and Frames."

2.7 STEEL SHEET FINISHES

- A. General: Clean, treat and prime surfaces of fabricated steel door frame work, inside and out, whether exposed or concealed in the construction.
- B. Surface Preparation: Clean surfaces to comply with SSPC-SP 1, "Solvent Cleaning"; remove dirt, oil, grease, or other contaminants that could impair paint bond. Remove mill scale, shavings, filings, and rust, if present, complying with SSPC-SP 3, "Power Tool Cleaning."
- C. Factory Priming for Field-Painted Finish: Apply shop primer immediately after surface preparation and pretreatment. Apply a sufficient number of coats, baked on, to obtain uniformly smooth exposed surfaces. Touch up surfaces having runs, smears, or bare spots.
 1. Shop Primer: Manufacturer's or fabricator's standard, fast-curing, corrosion-inhibiting, lead- and chromate-free, universal primer complying with ANSI A250.10 acceptance criteria; compatible with substrate and field-applied finish paint system indicated.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Install door frames according to the referenced standards, the Architect reviewed shop drawings, and manufacturer's written recommendations and installation instructions.
- B. Frames: Install frames where indicated. Extend frame anchorages below fills and finishes. Coordinate the installation of built-in anchors for wall and partition construction as required with other work.
 1. Knock-Down Frames: Install knock-down frames in locations shown, in perfect alignment and elevation, plumb, level, straight and true, and free from rack.
 2. Existing Frames (Salvaged from Alteration Work): Install salvaged existing frames in locations indicated.
- C. Glazing: Comply with installation requirements in Section 08 80 00 "Glazing" and with hollow metal manufacturer's written instructions.
 1. Secure stops with countersunk flat or oval head machine screws spaced uniformly not more than 9 inches o.c. and not more than 2 inches o.c. from each corner.
- D. Wood Door Installation: Refer to 08 14 16 "Flush Wood Doors."

- E. Apply hardware in accordance with hardware manufacturer's instructions and Section 08 71 00 "Door Hardware." Drill and tap for machine screws as required. Do not use self tapping sheet metal screws. Adjust door frame installation to provide uniform clearance at head and jambs, and to contact stops uniformly. Adjust hardware items just prior to final inspection. Leave work in complete and proper operating condition.
 - 1. Field cut existing hollow metal door frames indicated to receive new hardware. Field cutting shall be executed in a workmanlike manner and shall not void the existing door frame labeling.

3.2 ADJUSTING AND CLEANING

- A. Final Adjustments: Check and readjust operating hardware items just before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including doors or frames that are warped, bowed, or otherwise unacceptable.
- B. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying primer.
 - 1. Finish Painting: Refer to Section 09 91 23 "Interior Painting."
- C. Remove and replace defective work, including doors or frames that are warped, bowed, or otherwise defective.
- D. Institute protective measures required throughout the remainder of the construction period to ensure that the hollow metal doors and frames will be without damage or deterioration, at time of Substantial Completion.

END OF SECTION 08 12 13

SECTION 08 14 16 - FLUSH WOOD DOORS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes solid core flush wood doors.
 - 1. The integration of a security system into the flush wood door work is required. The Contractor shall be responsible for the total and complete coordination of the security system components into the Work.

1.2 ACTION SUBMITTALS

- A. Product Data: Submit product data for each type of door required. Include factory-finishing specifications.
 - 1. Submit laboratory test report results of hinge loading, cycle/slam, stile edge screw withdrawals, and stile edge split resistance for fire rated doors.
- B. Shop Drawings: Submit shop drawings indicating location, size, thickness, and hand of each door; elevation of each kind of door; construction details not covered in the product data; location and extent of hardware blocking; undercuts, special beveling, and other pertinent data.
 - 1. Indicate dimensions and locations of mortises and holes for hardware of factory machined doors.
 - 2. Indicate dimensions and locations of cutouts.
 - 3. Indicate fire label requirements including fire rating time duration, maximum temperature rise requirements, and smoke label requirements.
 - 4. Indicate routing of electrical conduit and dimensions and locations of cutouts in wood doors to accept electric hardware devices.

1.3 INFORMATIONAL SUBMITTALS

- A. Certificate of Compliance for Fire Rated Doors: Provide copies of testing agency's Certificate of Compliance for all fire rated door assemblies, all smoke and draft control door assemblies, and all temperature rise rated door assemblies.

1.4 QUALITY ASSURANCE

- A. Quality Standard: Comply with the applicable provisions and recommendations of AWI's "Architectural Woodwork Quality Standards Illustrated, 8th Edition, Version 2.0, Section 1300" where standards and specifications conflict the more stringent shall be required.

- B. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 252.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Protect wood doors during transit, storage, and handling to prevent damage, soiling, and deterioration. Comply with requirements of referenced standard and manufacturer's written instructions.
- B. Package doors individually in heavy duty cardboard cartons or poly bags.
- C. Handle wood doors with clean gloves. Lift and carry wood doors when moving them around the site, do not drag wood doors across one another.

1.6 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install doors until wet work , such as masonry, concrete, stone, tile, terrazzo, plastering, wallboard joint treatment, is complete and dried, and HVAC system is operating and will maintain temperature and relative humidity at occupancy levels during the remainder of the construction period. Do not expose doors to sudden changes in temperature such as forced heat used to dry out the site.

1.7 WARRANTY

- A. Special Warranty: Manufacturer's standard form, signed by manufacturer, Installer, and Contractor, in which manufacturer agrees to repair or replace doors that are defective in materials or workmanship for the life of the original installation of the door. A representative of the door manufacturer shall inspect the installed doors and shall note on the warranty that no provisions of the warranty have been nullified in the manufacture and/or installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance to requirements, provide products by one of the following:
 - 1. Algoma Hardwoods, Inc.
 - 2. Eggers Industries, Architectural Door Division.
 - 3. Marshfield Door Systems, Inc.
 - 4. VT Industries.
 - 5. or approved equal.

2.2 DOOR CONSTRUCTION

A. General:

1. Low-Emitting Materials: Provide doors made with adhesives and composite wood products that do not contain added formaldehyde.

B. Doors for Transparent Finish:

1. Grade: Premium, with Grade AA faces.
2. Face Veneer Species and Cut: Maple Veneer Insert species and cut matching Architect's samples and existing condition.
3. Match between Veneer Leaves: match matching Architect's samples and existing conditions.
4. Assembly of Veneer Leaves on Door Faces: Center balance match.
5. Pair and Set Match: Provide for doors hung in same opening or separated only by mullions.
6. Thickness: 1-3/4 inch unless otherwise indicated.
7. Materials:
 - a. Particleboard Core Material: Complying with ANSI A208.1, Grade 1-LD-1 or 1-LD-2.
 - b. Blocking: 5-1/2 inch wide minimum top-rail blocking at doors with closers and bottom rail blocking at doors with kickplates consisting of minimum 1/2 inch wide single length structural composite lumber (SCL) outer band and single length SCL inner band.
 - c. Vertical Edges: 1-3/8 inch wide minimum prior to fitting, 2 ply laminated wood construction consisting of a single piece hardwood outer band, without fingerjoints, and an inner band of SCL. Outer band to match face veneer for transparent finished veneered-faced doors. Trim non-rated door width equally on both jamb edges.
 - d. Crossbanding: Minimum 1/16 inch thick, low density hardwood, composite, or HDH (high density hardboard).
8. Construction: AWI Section 1300, PC-5 ME. Stiles, rails, and blocking bonded to core then entire unit abrasive planed before veneering. Crossbanding materials shall extend full width of door with grain running horizontally, tapeless spliced without voids or show through (telegraphing), and directly glued to core and blocking. Sand cross banding before application of face veneer. Face veneer shall extend full height of door with grain running vertically, tapeless spliced without voids or show through (telegraphing), and directly glued to cross band. Glue lines between face veneer, crossbanding, and blocking shall be of a type to comply with the specified warranty using the hot plate process.

C. Doors for Opaque Finish:

1. Grade: Custom.
2. Face Veneer: Medium-density overlay.
3. Thickness: 1-3/4 inch unless otherwise indicated.
4. Materials:

- a. Particleboard Core Material: Complying with ANSI A208.1, Grade 1-LD-1 or 1-LD-2.
 - b. Blocking: 5-1/2 inch wide minimum top-rail blocking at doors with closers and bottom rail blocking at doors with kickplates consisting of minimum 1/2 inch wide single length structural composite lumber (SCL) outer band and single length SCL inner band.
 - c. Vertical Edges: 1-3/8 inch wide minimum prior to fitting, 2 ply laminated wood construction consisting of a single piece hardwood outer band, without fingerjoints, and an inner band of SCL. Trim non-rated door width equally on both jamb edges.
 - d. Crossbanding: Minimum 1/16 inch thick, low density hardwood, composite, or HDH (high density hardboard).
5. Construction: AWI Section 1300, PC-5 CE. Stiles, rails, and blocking bonded to core then entire unit abrasive planed before veneering. Crossbanding materials shall extend full width of door with grain running horizontally, tapeless spliced without voids or show through (telegraphing), and directly glued to core and blocking. Sand crossbanding before application of face veneer. Face veneer shall extend full height of door with grain running vertically, tapeless spliced without voids or show through (telegraphing), and directly glued to cross band. Glue lines between face veneer, crossbanding, and blocking shall be of a type to comply with the specified warranty using the hot plate process.
- D. Fire Rated Door Construction:
1. Construction: AWI Section 1300, FD-5, with particleboard or mineral core as required to provide fire rating indicated, and faced to match non-rated fire doors. Provide required label(s) on each door.
 2. Blocking: For mineral-core doors, provide composite blocking, of same thickness as core, approved for use in doors of fire ratings indicated, and as follows:
 - a. For doors with closers, 5-1/2 inch wide minimum top-rail blocking consisting of minimum 1/2 inch wide single length mill option hardwood outer band and single length lumber inner band fabricated of same materials as vertical edges.
 - b. Provide either two 4-1/2 inch by 18 inch minimum sized lock blocks on each door stile or a single 10 inch high continuous lock rail located on lockcase body centerlines.
 - c. For doors with surface applied exit devices, provide min. 5" x 10" corner blocking.
 - d. Provide blocking at coat hook locations.
- E. Wood Beads for Light Openings in Wood Doors: Manufacturer's standard flush designed, solid wood, rectangular shaped, back beveled or quirked, beads matching veneer species of door faces. Include glazing compounds or tapes sized for back bevel or quirk provided. Include finish nails for removable stops sized in accordance with wood door manufacturer's recommendations.
- F. Wood-Veneered Beads for Light Openings in Fire Doors: Manufacturer's standard wood-veneered noncombustible beads matching veneer species of door faces and approved for use in doors of fire rating indicated. Include glazing compounds or tapes and concealed metal glazing clips for opening size and fire rating indicated. Include finish nails for removable stops sized as required for fire rating indicated.

2.3 FABRICATION

- A. Factory fit doors to suit frame-opening sizes indicated.
 - 1. Comply with clearance requirements of referenced quality standard for fitting. Comply with requirements in NFPA 80 for fire-rated doors.
- B. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3 unless otherwise indicated to match existing frame hardware preparations. Comply with final hardware schedules, door frame Shop Drawings, AWI Section 1300-G-20, BHMA A156.115-W standards, and hardware templates.
 - 1. Coordinate measurements of hardware mortises in frames to verify dimensions and alignment before factory machining.
 - 2. Locate lock and latchsets in doors to match existing strike locations on existing door frames; locate hinges in doors to match hinge locations on existing door frames.
 - 3. Metal Astragals: Premachine astragals and formed-steel edges for hardware for pairs of fire-rated doors.
- C. Openings: Cut and trim openings through doors to comply with applicable requirements of referenced standards for kind(s) of door(s) required. Install light beads with fasteners spaced for opening size and fire rating indicated. Install wood bead moldings with finish nails and countersink without striking bead. Fill countersunk heads with putty matching wood bead color.

2.4 FACTORY FINISHING

- A. General: Finish doors at factory that are indicated to receive transparent finish.
- B. Grade: Premium.
- C. Finish: Manufacturer's standard finish with performance meeting or exceeding either AWI System TR-4 conversion varnish or AWI System TR-6 catalyzed polyurethane.
- D. Staining: Prepare door faces, stiles, rails, and cutouts, with toners, or stains, prior to the application of finish to match Architect's sample.
- E. Effect and Sheen: Match Architect's sample.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Hardware: Apply hardware to new and existing doors in accordance with hardware manufacturer's instructions and Section 08 71 00 "Door Hardware." For particleboard core doors drill pilot holes of proper size for installing hinge screws. Adjust hardware items just prior to final inspection. Leave work in complete and proper operating condition.

1. Factory wrapping shall be maintained on new doors during construction period, and all hardware shall be installed by cutting the factory wrapping at the mounting location of the hardware item.
- B. General Door Installation Standards: Install doors in locations indicated to comply with manufacturer's written instructions, referenced quality standard, and as indicated. Where standards conflict the more stringent shall apply.
 1. Install fire-rated doors in corresponding fire-rated frames according to fire label requirements.
- C. Factory-Fitted Doors: Align in frames for uniform clearance at each edge, matching clearances specified for factory prefitted, and to contact stops uniformly. Field cutting, fitting or trimming, if required, shall be executed in a workmanlike manner.
 1. Clearances: Provide 1/8 inch at heads, jambs, and between pairs of doors. Provide 1/8 inch from bottom of door to top of decorative floor finish or covering. Where threshold is shown or scheduled, provide 1/4 inch from bottom of door to top of threshold.
- D. Existing Wood Doors (Salvaged from Alteration Work): Install salvaged existing wood doors in locations indicated. Field cutting, fitting or trimming, if required, shall be executed in a workmanlike manner.
- E. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

3.2 ADJUSTING AND PROTECTION

- A. Rehang or replace doors that do not swing or operate freely.
- B. Protection: Protect wood doors to ensure that the wood door work will be without damage or deterioration at the time of Substantial Completion.
 1. Refinish or replace wood doors damaged during installation. Replace any new wood doors that are warped, twisted, demonstrate core show through, are not true in plane, or cannot be refinished to the satisfaction of the Architect.

END OF SECTION 08 14 16

SECTION 08 31 13 - ACCESS DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes access doors and frames.

1.2 COORDINATION

- A. Verification: Obtain specific locations and sizes for required access doors from trades requiring access to concealed equipment, and where shown on the drawings, and indicate on schedule specified in "Submittals" Article.

1.3 ACTION SUBMITTALS

- A. Product Data: Submit product data for each type of access door and frame indicated. Include construction details relative to materials, individual components and profiles, finishes, and fire ratings (if required) for access doors and frames.
- B. CALgreen Submittals:

1.4 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Reflected ceiling plans drawn to scale and coordinating penetrations and ceiling-mounted items with concealed framing, suspension systems, piping, ductwork, and other construction. Show the following:
 - 1. Method of attaching door frames to surrounding construction.
 - 2. Ceiling-mounted items including access doors and frames, lighting fixtures, diffusers, grilles, speakers, sprinklers, and special trim.
- B. Schedule: Provide complete door and frame schedule, including types, general locations, sizes, construction details, latching or locking provisions, and other data pertinent to installation.

1.5 QUALITY ASSURANCE

- A. Single-Source Responsibility: Obtain access doors of each type for entire project from one source from a single manufacturer.
- B. Fire-Rated Access Doors and Frames: Units complying with NFPA 80 and that are labeled and listed by UL, ITS, or another testing and inspecting agency acceptable to authorities having jurisdiction per test method indicated.

1. Vertical Access Doors: NFPA 252 or UL 10B.
- C. Size and Location Verification: Determine specific locations and sizes for access doors needed to gain access to concealed equipment, and indicate on schedule.

PART 2 - PRODUCTS

2.1 MATERIALS

2.2 METALS

- 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.

2.3 ACCESS DOORS AND FRAMES

- A. Flush Access Typical Doors and Trimless Frames for Horizontal Surfaces **KARP FG**: Fabricated from glass fiber reinforced gypsum.
 1. Locations: Gypsum board ceiling surfaces.
 2. Door: Minimum 1/8 inch thick glass fiber reinforced gypsum, set flush with surrounding gypsum wallboard finish surfaces.
 3. Frame: Mud in frameless. Hinges and Latch: None, lay-in manual push up type.

2.4 FABRICATION

- A. General: Provide access door assemblies manufactured as integral units ready for installation.
- B. Glass Fiber Reinforced Gypsum Doors: Fabricate units of monolithic glass fiber reinforced gypsum construction having a shell thickness of between 1/8 to 3/16 inch and weighing approximately 2 pounds per square foot. Edges of doors shall be rabbetted to overlap and rest on the frame.
 1. Provide special sized access doors where required or requested.
- C. Frames:
 1. Provide trimless glass fiber reinforced frames with tapered edges for taping and joint compound installation into gypsum wallboard ceiling assembly, in size to suit thickness of gypsum panels used.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Comply with manufacturer's instructions for installation of access doors. Coordinate installation with work of other trades.
- B. Advise installers of other work about specific requirements relating to access door installation, including sizes of openings to receive access door and frame, as well as locations of supports, inserts, and anchoring devices.
- C. Install access doors flush with adjacent finish surfaces or recessed to receive finish material.
- D. Adjust doors and hardware after installation for proper operation.
- E. Remove and replace panels or frames that are warped, bowed, or otherwise damaged.

END OF SECTION 08 31 13

SECTION 08 71 00 – DOOR HARDWARE

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section includes:

- 1. Mechanical and electrified door hardware for:
 - a. Swinging doors.
 - b. Sliding doors.
 - c. Gates.
- 2. Electronic access control system components, including:
 - a. Biometric access control reader.
 - b. Electronic access control devices.
- 3. Field verification, preparation and modification of existing doors and frames to receive new door hardware.
- 4. Lead-lining door hardware items required for radiation protection at door openings.

B. Exclusions: Unless specifically listed in hardware sets, hardware is not specified in this section for:

- 1. Windows
- 2. Cabinets (casework), including locks in cabinets
- 3. Signage
- 4. Toilet accessories
- 5. Overhead doors

C. Related Sections:

- 1. Division 01 Section "Alternates" for alternates affecting this section.
- 2. Division 07 Section "Joint Sealants" for sealant requirements applicable to threshold installation specified in this section.
- 3. Division 09 sections for touchup finishing or refinishing of existing openings modified by this section.
- 4. Division 26 sections for connections to electrical power system and for low-voltage wiring.

1.03 REFERENCES

- A. UL - Underwriters Laboratories

1. UL 10B - Fire Test of Door Assemblies
 2. UL 10C - Positive Pressure Test of Fire Door Assemblies
 3. UL 1784 - Air Leakage Tests of Door Assemblies
 4. UL 305 - Panic Hardware
- B. DHI - Door and Hardware Institute
1. Sequence and Format for the Hardware Schedule
 2. Recommended Locations for Builders Hardware
 3. Key Systems and Nomenclature
- C. ANSI - American National Standards Institute
1. ANSI/BHMA A156.1 - A156.29, and ANSI/BHMA A156.31 - Standards for Hardware and Specialties
- D. 2013 State of California Building Code

1.04 SUBMITTALS

A. General:

1. Submit in accordance with Conditions of Contract and Division 01 requirements.
2. Highlight, encircle, or otherwise specifically identify on submittals deviations from Contract Documents, issues of incompatibility or other issues which may detrimentally affect the Work.
3. Prior to forwarding submittal, comply with procedures for verifying existing door and frame compatibility for new hardware, as specified in PART 3, "EXAMINATION" article, herein.

B. Action Submittals:

1. Product Data: Product data including manufacturers' technical product data for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.
2. Riser and Wiring Diagrams: After final approval of hardware schedule, submit details of electrified door hardware, indicating:
 - a. Wiring Diagrams: For power, signal, and control wiring and including:
 - 1) Details of interface of electrified door hardware and building safety and security systems.
 - 2) Schematic diagram of systems that interface with electrified door hardware.
 - 3) Point-to-point wiring.
 - 4) Risers.
3. Samples for Verification: If requested by Architect, submit production sample or sample installations of each type of exposed hardware unit in finish indicated, and tagged with full description for coordination with schedule.
 - a. Samples will be returned to supplier in like-new condition. Units that are acceptable to Architect may, after final check of operations, be incorporated into Work, within limitations of key coordination requirements.
4. Door Hardware Schedule: Submit schedule with hardware sets in vertical format as illustrated by Sequence of Format for the Hardware Schedule as published by the Door

and Hardware Institute. Indicate complete designations of each item required for each door or opening, include:

- a. Door Index; include door number, heading number, and Architects hardware set number.
- b. Opening Lock Function Spreadsheet: List locking device and function for each opening.
- c. Type, style, function, size, and finish of each hardware item.
- d. Name and manufacturer of each item.
- e. Fastenings and other pertinent information.
- f. Location of each hardware set cross-referenced to indications on Drawings.
- g. Explanation of all abbreviations, symbols, and codes contained in schedule.
- h. Mounting locations for hardware.
- i. Door and frame sizes and materials.
- j. Name and phone number for local manufacturer's representative for each product.
- k. Operational Description of openings with any electrified hardware (locks, exits, electromagnetic locks, electric strikes, automatic operators, door position switches, magnetic holders or closer/holder units, and access control components).
Operational description should include how door will operate on egress, ingress, and fire and smoke alarm connection.
 - 1) 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 fabrication of other work that is critical in Project construction schedule.

5. Key Schedule:

- a. After Keying Conference, provide keying schedule listing levels of keying as well as explanation of key system's function, key symbols used and door numbers controlled.
- b. Use ANSI/BHMA A156.28 "Recommended Practices for Keying Systems" as guideline for nomenclature, definitions, and approach for selecting optimal keying system.
- c. Provide 3 copies of keying schedule for review prepared and detailed in accordance with referenced DHI publication. Include schematic keying diagram and index each key to unique door designations.
- d. Index keying schedule by door number, keyset, hardware heading number, cross keying instructions, and special key stamping instructions.
- e. Provide one complete bitting list of key cuts and one key system schematic illustrating system usage and expansion.
 - 1) Forward bitting list, key cuts and key system schematic directly to City of San Diego, by means as directed by City of San Diego.
- f. Prepare key schedule by or under supervision of supplier, detailing City of San Diego's final keying instructions for locks.

6. Templates: After final approval of hardware schedule, provide templates for doors, frames and other work specified to be factory prepared for door hardware installation.

C. Informational Submittals:

1. Qualification Data: For Supplier and Installer.
2. Product Certificates for electrified door hardware, signed by manufacturer:
 - a. Certify that door hardware approved for use on types and sizes of labeled fire-rated doors complies with listed fire-rated door assemblies.

3. Certificates of Compliance:
 - a. Certificates of compliance for fire-rated hardware and installation instructions if requested by Architect or Authority Having Jurisdiction.
 - b. Installer Training Meeting Certification: Letter of compliance, signed by Contractor, attesting to completion of installer training meeting specified in "QUALITY ASSURANCE" article, herein.
 - c. Electrified Hardware Coordination Conference Certification: Letter of compliance, signed by Contractor, attesting to completion of electrified hardware coordination conference, specified in "QUALITY ASSURANCE" article, herein.
4. Product Test Reports: For compliance with accessibility requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by qualified testing agency, for door hardware on doors located in accessible routes.
5. Warranty: Special warranty specified in this Section.

D. Closeout Submittals:

1. Operations and Maintenance Data : Provide in accordance with Division 01 and include:
 - a. Complete information on care, maintenance, and adjustment; data on repair and replacement parts, and information on preservation of finishes.
 - b. Catalog pages for each product.
 - c. Name, address, and phone number of local representative for each manufacturer.
 - d. Parts list for each product.
 - e. Final approved hardware schedule, edited to reflect conditions as-installed.
 - f. Final keying schedule
 - g. Copies of floor plans with keying nomenclature
 - h. As-installed wiring diagrams for each opening connected to power, both low voltage and 110 volts.
 - i. Copy of warranties including appropriate reference numbers for manufacturers to identify project.

1.05 QUALITY ASSURANCE

- A. Product Substitutions: Comply with product requirements stated in Division 01 and as specified herein.
 1. Where specific manufacturer's product is named and accompanied by "No Substitute," including make or model number or other designation, provide product specified. (Note: Certain products have been selected for their unique characteristics and particular project suitability.)
 - a. Where no additional products or manufacturers are listed in product category, requirements for "No Substitute" govern product selection.
 2. Where products indicate "acceptable manufacturers" or "acceptable manufacturers and products", provide product from specified manufacturers, subject to compliance with specified requirements and "Single Source Responsibility" requirements stated herein.
- B. Supplier Qualifications and Responsibilities: Recognized architectural hardware supplier with record of successful in-service performance for supplying door hardware similar in quantity, type, and quality to that indicated for this Project.
 1. Warehousing Facilities: In Project's vicinity.

2. Scheduling Responsibility: Preparation of door hardware and keying schedules.
 3. Engineering Responsibility: Preparation of data for electrified door hardware, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.
 4. Coordination Responsibility: Coordinate installation of electronic security hardware with Architect and electrical engineers and provide installation and technical data to Architect and other related subcontractors.
 - a. Upon completion of electronic security hardware installation, inspect and verify that all components are working properly.
- C. Installer Qualifications: Qualified tradesmen, skilled in application of commercial grade hardware with record of successful in-service performance for installing door hardware similar in quantity, type, and quality to that indicated for this Project.
- D. Single Source Responsibility: Obtain each type of door hardware from single manufacturer.
 1. Provide electrified door hardware from same manufacturer as mechanical door hardware, unless otherwise indicated.
 2. Manufacturers that perform electrical modifications and that are listed by testing and inspecting agency acceptable to authorities having jurisdiction are acceptable.
- E. Fire-Rated Door Openings: Provide door hardware for fire-rated openings that complies with NFPA 80 and requirements of authorities having jurisdiction. Provide only items of door hardware that are listed and are identical to products tested by Underwriters Laboratories, Intertek Testing Services, or other testing and inspecting organizations acceptable to authorities having jurisdiction for use on types and sizes of doors indicated, based on testing at positive pressure and according to NFPA 252 or UL 10C and in compliance with requirements of fire-rated door and door frame labels.
- F. Smoke- and Draft-Control Door Assemblies: Where smoke- and draft-control door assemblies are required, provide door hardware that meets requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105.
 1. Air Leakage Rate: Maximum air leakage of 0.3 cfm/sq. ft. (3 cu. m per minute/sq. m) at tested pressure differential of 0.3-inch wg (75 Pa) of water.
- G. Electrified Door Hardware: Listed and labeled as defined in NFPA 70, Article 100, by testing agency acceptable to authorities having jurisdiction.
- H. Means of Egress Doors: Latches do not require more than 15 lbf (67 N) to release latch. Locks do not require use of key, tool, or special knowledge for operation.
- I. Accessibility Requirements: For door hardware on doors in an accessible route, comply with governing accessibility regulations cited in "REFERENCES" article, herein.
 1. Provide operating devices that do not require tight grasping, pinching, or twisting of wrist and that operate with force of not more than 5 lbf (22.2 N).
 2. Maximum opening-force requirements:
 - a. Interior, Non-Fire-Rated Hinged Doors: 5 lbf (22.2 N) applied perpendicular to door.
 - b. Sliding or Folding Doors: 5 lbf (22.2 N) applied parallel to door at latch.
 - c. Fire Doors: Minimum opening force allowable by authorities having jurisdiction.

3. Bevel raised thresholds with slope of not more than 1:2. Provide thresholds not more than 1/2 inch (13 mm) high.
 4. Adjust door closer sweep periods so that, from open position of 70 degrees, door will take at least 3 seconds to move to 3 inches (75 mm) from latch, measured to leading edge of door.
- J. Keying Conference: Conduct conference at Project site to comply with requirements in Division 01.
1. Attendees: City of San Diego, Contractor, Architect, Installer, City of San Diego's security consultant, and Supplier.
 2. Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system including:
 - a. Function of building, flow of traffic, purpose of each area, degree of security required, and plans for future expansion.
 - b. Preliminary key system schematic diagram.
 - c. Requirements for key control system.
 - d. Requirements for access control.
 - e. Address for delivery of keys.
- K. Pre-installation Conference: Conduct conference at Project site.
1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 2. Inspect and discuss preparatory work performed by other trades.
 3. Inspect and discuss electrical roughing-in for electrified door hardware.
 4. Review sequence of operation for each type of electrified door hardware.
 5. Review required testing, inspecting, and certifying procedures.
- L. Coordination Conferences:
1. Installation Coordination Conference: Prior to hardware installation, schedule and hold meeting to review questions or concerns related to proper installation and adjustment of door hardware.
 - a. Attendees: Door hardware supplier, door hardware installer, Contractor.
 - b. After meeting, provide letter of compliance to Architect, indicating when meeting was held and who was in attendance.
 2. Electrified Hardware Coordination Conference: Prior to ordering electrified hardware, schedule and hold meeting to coordinate door hardware with security, electrical, doors and frames, and other related suppliers.
 - a. Attendees: electrified door hardware supplier, doors and frames supplier, electrified door hardware installer, electrical subcontractor, City of San Diego, City of San Diego's security consultant, Architect and Contractor.
 - b. After meeting, provide letter of compliance to Architect, indicating when coordination conference was held and who was in attendance.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up for hardware delivered to Project site.

- B. Tag each item or package separately with identification coordinated with final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package.
 - 1. Deliver each article of hardware in manufacturer's original packaging.
- C. Project Conditions:
 - 1. Maintain manufacturer-recommended environmental conditions throughout storage and installation periods.
 - 2. Provide secure lock-up for door hardware delivered to Project, but not yet installed. Control handling and installation of hardware items so that completion of Work will not be delayed by hardware losses both before and after installation.
- D. Protection and Damage:
 - 1. Promptly replace products damaged during shipping.
 - 2. Handle hardware in manner to avoid damage, marring, or scratching. Correct, replace or repair products damaged during Work.
 - 3. Protect products against malfunction due to paint, solvent, cleanser, or any chemical agent.
- E. Deliver keys to manufacturer of key control system for subsequent delivery to City of San Diego.
- F. Deliver keys and permanent cores to City of San Diego by registered mail or overnight package service.

1.07 COORDINATION

- A. Coordinate layout and installation of floor-recessed door hardware with floor construction. Cast anchoring inserts into concrete. Concrete, reinforcement, and formwork requirements are specified in Division 03.
- B. Installation Templates: Distribute for doors, frames, and other work specified to be factory prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.
- C. Security: Coordinate installation of door hardware, keying, and access control with City of San Diego's security consultant.
- D. Electrical System Roughing-In: Coordinate layout and installation of electrified door hardware with connections to power supplies and building safety and security systems.
- E. Existing Openings: Where hardware components are scheduled for application to existing construction or where modifications to existing door hardware are required, field verify existing conditions and coordinate installation of door hardware to suit opening conditions and to provide proper door operation.
- F. Direct shipments not permitted, unless approved by Contractor.

1.08 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: Years from date of Substantial Completion, for durations indicated.
 - a. Closers:
 - 1) Mechanical: 30 years.
 - b. Exit Devices:
 - 1) Mechanical: 3 years.
 - 2) Electrified: 1 year.
 - c. Locksets:
 - 1) Mechanical: 3 years for Schlage L Series Mortise and 10 years For Schlage ND Series or Falcon T Series Cylindrical locks.
 - 2) Electrified: 1 year.
 - d. Key Blanks: Lifetime
 - 2. Warranty does not cover damage or faulty operation due to improper installation, improper use or abuse.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. The City of San Diego requires use of certain products for their unique characteristics and particular project suitability to insure continuity of existing and future performance and maintenance standards. After investigating available product offerings, the Awarding Authority has elected to prepare proprietary specifications. These products are specified with the notation: "No Substitute."
 - 1. Where "No Substitute" is noted, submittals and substitution requests for other products will not be considered.
- B. Approval of manufacturers and/or products other than those listed as "Scheduled Manufacturer" or "Acceptable Manufacturers" in the individual article for the product category shall be in accordance with QUALITY ASSURANCE article, herein.
- C. Approval of products from manufacturers indicated in "Acceptable Manufacturers" is contingent upon those products providing all functions and features and meeting all requirements of scheduled manufacturer's product.
- D. Hand of Door: Drawings show direction of slide, swing, or hand of each door leaf. Furnish each item of hardware for proper installation and operation of door movement as shown.
- E. Where specified hardware is not adaptable to finished shape or size of members requiring hardware, furnish suitable types having same operation and quality as type specified, subject to Architect's approval.

2.02 MATERIALS

A. Fasteners

1. Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation.
2. Furnish screws for installation with each hardware item. Finish exposed (exposed under any condition) screws to match hardware finish, or, if exposed in surfaces of other work, to match finish of this other work including prepared for paint surfaces to receive painted finish.
3. Provide concealed fasteners for hardware units exposed when door is closed except when no standard units of type specified are available with concealed fasteners. Do not use thru-bolts for installation where bolt head or nut on opposite face is exposed in other work unless thru-bolts are required to fasten hardware securely. Review door specification and advise Architect if thru-bolts are required.
4. Install hardware with fasteners provided by hardware manufacturer.

B. Modification and Preparation of Existing Doors: Where existing door hardware is indicated to be removed and reinstalled.

1. Provide necessary fillers, Dutchmen, reinforcements, and fasteners, compatible with existing materials, as required for mounting new opening hardware and to cover existing door and frame preparations.
2. Use materials which match materials of adjacent modified areas.
3. When modifying existing fire-rated openings, provide materials permitted by NFPA 80 as required to maintain fire-rating.

C. Provide screws, bolts, expansion shields, drop plates and other devices necessary for hardware installation.

1. Where fasteners are exposed to view: Finish to match adjacent door hardware material.

2.03 HINGES

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product: Ives 5BB series
2. Acceptable Manufacturers and Products: Hager BB series, McKinney TA/T4A series, Stanley FBB Series
3. Or approved equal, match existing items where possible. All product substitutions must meet requirements of the 2016 CBC.

B. Requirements:

1. Provide five-knuckle, ball bearing hinges conforming to ANSI/BHMA A156.1.
2. 1-3/4 inch (44 mm) thick doors, up to and including 36 inches (914 mm) wide:
 - a. Exterior: Standard weight, bronze or stainless steel, 4-1/2 inches (114 mm) high
 - b. Interior: Standard weight, steel, 4-1/2 inches (114 mm) high
3. 1-3/4 inch (44 mm) thick doors over 36 inches (914 mm) wide:
 - a. Exterior: Heavy weight, bronze/stainless steel, 5 inches (127 mm) high
 - b. Interior: Heavy weight, steel, 5 inches (127 mm) high

4. 2 inches or thicker doors:
 - a. Exterior: Heavy weight, bronze or stainless steel, 5 inches (127 mm) high
 - b. Interior: Heavy weight, steel, 5 inches (127 mm) high
5. Provide three hinges per door leaf for doors 90 inches (2286 mm) or less in height, and one additional hinge for each 30 inches (762 mm) of additional door height.
6. Where new hinges are specified for existing doors or existing frames, provide new hinges of identical size to hinge preparation present in existing door or existing frame.
7. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:
 - a. Steel Hinges: Steel pins
 - b. Non-Ferrous Hinges: Stainless steel pins
 - c. Out-Swinging Exterior Doors: Non-removable pins
 - d. Out-Swinging Interior Lockable Doors: Non-removable pins
 - e. Interior Non-lockable Doors: Non-rising pins
8. Width of hinges: 4-1/2 inches (114 mm) at 1-3/4 inch (44 mm) thick doors, and 5 inches (127 mm) at 2 inches (51 mm) or thicker doors. Adjust hinge width as required for door, frame, and wall conditions to allow proper degree of opening.
9. Doors 36 inches (914 mm) wide or less furnish hinges 4-1/2 inches (114 mm) high; doors greater than 36 inches (914 mm) wide furnish hinges 5 inches (127 mm) high, heavy weight or standard weight as specified.
10. Provide hinges with electrified options as scheduled in the hardware sets. Provide with sufficient number and wire gage to accommodate electric function of specified hardware. Locate electric hinge at second hinge from bottom or nearest to electrified locking component.
11. Provide mortar guard for each electrified hinge specified.
12. Provide spring hinges where specified. Provide two spring hinges and one bearing hinge per door leaf for doors 90 inches (2286 mm) or less in height. Provide one additional bearing hinge for each 30 inches (762 mm) of additional door height.

2.04 MORTISE LOCKS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product: Schlage L9000 series
2. Acceptable Manufacturers and Products: Corbin-Russwin ML2000 series, Best 45H series, Sargent 8200 series
3. Or approved equal, match existing items where possible. All product substitutions must meet requirements of the 2016 CBC.

B. Requirements:

1. Provide mortise locks conforming to ANSI/BHMA A156.13 Series 1000, Grade 1 Operational, Grade 1 Security, and manufactured from heavy gauge steel, containing components of steel with a zinc dichromate plating for corrosion resistance. Provide lock case that is multi-function and field reversible for handing without opening case. Cylinders: Refer to "KEYING" article, herein.
2. Indicators: Where specified, provide indicator window measuring a minimum 2 inch x 1/2 inch with 180 degree visibility. Provide messages color-coded with full text and/or symbols, as scheduled, for easy visibility.
3. Provide locks with standard 2-3/4 inches (70 mm) backset with full 3/4 inch (19 mm) throw stainless steel mechanical anti-friction latch-bolt. Provide deadbolt with full 1 inch (25 mm) throw, constructed of stainless steel.

4. Provide standard ASA strikes unless extended lip strikes are necessary to protect trim.
5. Provide electrified options as scheduled in the hardware sets. Where scheduled, provide a request to exit (RX) switch that is actuated with rotation of inside lever.
6. Provide motor based electrified locksets with electrified options as scheduled in the hardware sets and comply with the following requirements:
 - a. Universal input voltage – single chassis accepts 12 or 24V DC to allow for changes in the field without changing lock chassis.
 - b. Fail Safe/Fail Secure – changing mode between electrically locked (fail safe) and electrically unlocked (fail secure) is field selectable without opening the lock case
 - c. Low maximum current draw – maximum 0.4 amps to allow for multiple locks on a single power supply.
 - d. Low holding current – maximum 0.01 amps to produce minimal heat, eliminate “hot levers” in electrically locked applications, and to provide reliable operation in wood doors that provide minimal ventilation and air flow.
 - e. Request to Exit Switch (RX) –
 - 1) Modular Design – provide electrified locks capable of using, adding, or changing a modular RX switch without opening the lock case.
 - 2) Monitoring – where scheduled, provide a request to exit (RX) switch that detects rotation of the inside lever.
 - f. Connections – provide quick-connect Molex system standard.
 - g. UL Listed – 3 hour fire door
7. Lever Trim: Solid brass, bronze, or stainless steel, cast or forged in design specified, with wrought roses and external lever spring cages. Provide thru-bolted levers with 2-piece spindles.
 - a. Lever Design: Schlage 06A.

2.05 CYLINDRICAL LOCKS – GRADE 1

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product: Schlage ND Series
2. Acceptable Manufacturers and Products: Best 93K Series, Sargent 11-Line.
3. Or approved equal, match existing items where possible. All product substitutions must meet requirements of the 2016 CBC.

B. Requirements:

1. Provide Schlage ND Series cylindrical locks conforming to the following standards and requirements:
 - a. ANSI/BHMA A156.2 Series 4000, Grade 1.
 - b. UL 10C for 4'-0" x 10'-0" 3-hour fire door.
 - c. Florida Building Code (ASTM E330, E1886, E1996) and Miami Dade (TAS 201, 202, 203) requirements for hurricanes.
2. Cylinders: Refer to “KEYING” article, herein.
3. Provide cylindrical locksets exceeding the ANSI/BHMA A156.2 Grade 1 performance standards for strength, security, and durability in the categories below:
 - a. Abusive Locked Lever Torque Test – minimum 3,100 inch-pounds without gaining access

- b. Offset lever pull – minimum 1,600 foot pounds without gaining access
 - c. Vertical lever impact – minimum 100 impacts without gaining access
 - d. Cycle life - tested to minimum 16 million cycles per ANSI/BHMA A156.2 Cycle Test with no visible lever sag or use of performance aids such as set screws or spacers.
- 4. Provide solid steel anti-rotation through bolts and posts to control excessive rotation of lever.
 - 5. Provide lockset that allows lock function to be changed to over twenty other common functions by swapping easily accessible parts.
 - 6. Provide locks with standard 2-3/4 inches (70 mm) backset, unless noted otherwise, with 1/2 inch latch throw capable of UL listing of 3 hours on a 4' x 10' opening. Provide proper latch throw for UL listing at pairs.
 - 7. Provide locksets with separate anti-rotation thru-bolts, and no exposed screws.
 - 8. Provide independently operating levers with two external return spring cassettes mounted under roses to prevent lever sag.
 - 9. Provide standard ASA strikes unless extended lip strikes are necessary to protect trim.
 - 10. Provide wired electrified options as scheduled in the hardware sets.
 - a. 12 through 24 volt DC operating capability, auto-detecting
 - b. Selectable EL (fail safe)/EU (fail secure) operating mode via switch on chassis
 - c. 0.230A (230mA) maximum current draw
 - d. 0.010A (10mA) holding current
 - e. Modular / “plug in” request to exit switch
 - 11. Lever Trim: Solid cast levers without plastic inserts, and wrought roses on both sides.
 - a. Lever Design: Schlage Sparta.

2.06 EXIT DEVICES

A. Manufacturer and Product:

- 1. Scheduled Manufacturer: Von Duprin 98/35 series
- 2. Or approved equal, match existing items where possible. All product substitutions must meet requirements of the 2016 CBC.

B. Manufacturers and Products:

- 1. Scheduled Manufacturer: To establish standard of quality and design intent, exit device specifications have been based on Von Duprin products. Products of other manufacturers meeting or exceeding design and performance requirements specified herein will be considered for substitution subject to compliance with provisions of Division 01 Section “Product Requirements.”

C. Requirements:

- 1. Provide exit devices tested to ANSI/BHMA A156.3-2014 Grade 1, UL certified to meet maximum 5 pound requirements according to the California Building Code section 11B-309.4,] and UL listed for Panic Exit or Fire Exit Hardware. Cylinders: Refer to “KEYING” article, herein.
- 2. Provide touchpad type exit devices, fabricated of brass, bronze, stainless steel, or aluminum, plated to standard architectural finishes to match balance of door hardware.
- 3. Quiet Operation: Incorporate fluid damper or other device that eliminates noise of exit device operation.

4. Touchpad: Extend minimum of one half of door width, but not the full length of exit device rail. Provide end-cap with two-point attachment to door. Match exit device finish, stainless steel for US26, US26D, US28, US32, and US32D finishes; and for all other finishes, provide compatible finish to exit device. Provide compression springs in devices, latches, and outside trims or controls; tension springs prohibited.
5. Provide rim devices with a dual cylinder or inside thumb turn cylinder option with a visual security indicator that identifies the trims locked/unlocked status of the door from the inside of the room. Indicator in unlocked state presents a 1/2 inch x 1/2 inch white metal flag with black icon at top of device head. Indicator in locked state has no flag present. Provide rim devices without the dual cylinder or inside thumb turn cylinder option capable of being retrofitted with the visual security indicator.
6. Provide exit devices with dead-latching feature for security and for future addition of alarm kits and/or other electrical requirements.
7. Provide exit devices with manufacturer's approved strikes.
8. Provide exit devices cut to door width and height. Locate exit devices at height recommended by exit device manufacturer, allowable by governing building codes, and approved by Architect.
9. Mount mechanism case flush on face of doors, or provide spacers to fill gaps behind devices. Where glass trim or molding projects off face of door, provide glass bead kits.
10. Removable Mullions: 2 inches (51 mm) x 3 inches (76 mm) steel tube. Where scheduled as keyed removable mullion that is removed by use of a keyed cylinder, which is self-locking when re-installed.
11. Where lever handles are specified as outside trim for exit devices, provide heavy-duty lever trims with forged or cast escutcheon plates. Provide vandal-resistant levers that will travel to 90-degree down position when more than 35 pounds of torque are applied, and which can easily be re-set.
 - a. Lever Style: Match lever style of locksets.
12. Provide UL labeled fire exit hardware for fire rated openings.
13. Provide factory drilled weep holes for exit devices used in full exterior application, highly corrosive areas, and where noted in hardware sets.
14. Provide electrified options as scheduled in the hardware sets.

2.07 POWER SUPPLIES

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product: Schlage or Von Duprin PS900 series
2. Acceptable Manufacturers and Products: Precision ELR series, Sargent 3500 series, Dynalock 5000 series, Securitron BPS series, Security Door Controls 600 series
3. Or approved equal, match existing items where possible. All product substitutions must meet requirements of the 2016 CBC.

B. Requirements:

1. Provide power supplies, recommended and approved by manufacturer of electrified locking component, for operation of electrified locks, electrified exit devices, magnetic locks, electric strikes, and other components requiring power supply.
2. Provide appropriate quantity of power supplies necessary for proper operation of electrified locking components as recommended by manufacturer of electrified locking components with consideration for each electrified component using power supply, location of power supply, and approved wiring diagrams. Locate power supplies as directed by Architect.

3. Provide regulated and filtered 24 VDC power supply , and UL class 2 listed.
4. Options:
 - a. Provide power supply, where specified, with internal capability of charging sealed backup batteries 24 VDC, in addition to operating DC load.
 - b. Provide sealed batteries for battery back-up at each power supply where specified.
 - c. Provide keyed power supply cabinet.
5. Provide power supply in an enclosure, complete, and requiring 120VAC to fused input.
6. Provide power supply with emergency release terminals, where specified, that allow release of all devices upon activation of fire alarm system complete with fire alarm input for initiating “no delay” exiting mode.

2.08 CYLINDERS **OPTION FOR EXISTING KEY SYSTEM**

A. Manufacturers:

1. Scheduled Manufacturer: Schlage
2. Acceptable Manufacturers: Unknown
3. Or approved equal, match existing items where possible. All product substitutions must meet requirements of the 2016 CBC.

B. Requirements:

1. Provide permanent cylinders/cores to match City of San Diego’s existing key system, compliant with ANSI/BHMA A156.5; latest revision, Section 12, Grade 1; permanent cylinders; cylinder face finished to match lockset, manufacturer’s series as indicated. Refer to “KEYING” article, herein.
2. Replaceable Construction Cores..
 - a. Provide temporary construction cores replaceable by permanent cores, furnished in accordance with the following requirements.
 - 1) 3 construction control keys
 - 2) 12 construction change (day) keys.
 - b. City of San Diego or City of San Diego’s Representative will replace temporary construction cores with permanent cores.

2.09 KEYING

- A. Provide a factory registered keying system, complying with guidelines in ANSI/BHMA A156.28, incorporating decisions made at keying conference.
- B. Provide cylinders/cores keyed into City of San Diego’s existing factory registered keying system, complying with guidelines in ANSI/BHMA A156.28, incorporating decisions made at keying conference.
- C. Requirements:
 1. Provide permanent cylinders/cores keyed by the manufacturer according to the following key system.
 - a. Master Keying system as directed by the City of San Diego.

2. Forward biting list and keys separately from cylinders, by means as directed by City of San Diego. Failure to comply with forwarding requirements shall be cause for replacement of cylinders/cores involved at no additional cost to City of San Diego.
3. Provide keys with the following features:
 - a. Material: Nickel silver; minimum thickness of .107-inch (2.3mm)
4. Identification:
 - a. Mark permanent cylinders/cores and keys with applicable blind code per DHI publication "Keying Systems and Nomenclature" for identification. Blind code marks shall not include actual key cuts.
 - b. Identification stamping provisions must be approved by the Architect and City of San Diego.
 - c. Stamp cylinders/cores and keys with City of San Diego's unique key system facility code as established by the manufacturer; key symbol and embossed or stamped with "DO NOT DUPLICATE" along with the "PATENTED" or patent number to enforce the patent protection.
 - d. Failure to comply with stamping requirements shall be cause for replacement of keys involved at no additional cost to City of San Diego.
 - e. Forward permanent cylinders/cores to City of San Diego, separately from keys, by means as directed by City of San Diego.
5. Quantity: Furnish in the following quantities.
 - a. Change (Day) Keys: 3 per cylinder/core.
 - b. Permanent Control Keys: 3.
 - c. Master Keys: 6.

2.10 DOOR CLOSERS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product: LCN 1460 series
2. Acceptable Manufacturers and Products: Norton 8501/8501BF series, Sargent 1331 series, Yale 3501/3501BF series
3. Or approved equal, match existing items where possible. All product substitutions must meet requirements of the 2016 CBC.

B. Requirements:

1. Provide door closers conforming to ANSI/BHMA A156.4 Grade 1 requirements by BHMA certified independent testing laboratory.
2. Provide door closers with fully hydraulic, full rack and pinion action cylinder.
3. Closer Body: 1-1/4 inch (32 mm) diameter, with 5/8 inch (16 mm) diameter heat-treated pinion journal.
4. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.
5. Spring Power: Continuously adjustable over full range of closer sizes, and providing reduced opening force as required by accessibility codes and standards.
6. Hydraulic Regulation: By tamper-proof, non-critical valves, with separate adjustment for latch speed, general speed, and back-check.
7. Pressure Relief Valve (PRV) Technology: not permitted.

8. Provide special templates, drop plates, mounting brackets, or adapters for arms as required for details, overhead stops, and other door hardware items interfering with closer mounting.

2.11 DOOR TRIM

A. Manufacturers:

1. Scheduled Manufacturer: Ives
2. Acceptable Manufacturers: Rockwood, Trimco
3. Or approved equal, match existing items where possible. All product substitutions must meet requirements of the 2016 CBC.

B. Requirements:

1. Provide push plates 4 inches (102 mm) wide by 16 inches (406 mm) high by 0.050 inch (1 mm) thick and beveled 4 edges. Where width of door stile prevents use of 4 inches (102 mm) wide plate, adjust width to fit.
2. Provide push bars of solid bar stock, diameter and length as scheduled. Provide push bars of sufficient length to span from center to center of each stile. Where required, mount back to back with pull.
3. Provide offset pulls of solid bar stock, diameter and length as scheduled. Where required, mount back to back with push bar.
4. Provide flush pulls as scheduled. Where required, provide back-to-back mounted model.
5. Provide pulls of solid bar stock, diameter and length as scheduled. Where required, mount back to back with push bar.
6. Provide pull plates 4 inches (102 mm) wide by 16 inches (406 mm) high by 0.050 inch (1 mm) thick, beveled 4 edges, and prepped for pull. Where width of door stile prevents use of 4 inches (102 mm) wide plate, adjust width to fit.
7. Provide wire pulls of solid bar stock, diameter and length as scheduled.
8. Provide decorative pulls as scheduled. Where required, mount back to back with pull.

2.12 PROTECTION PLATES

A. Manufacturers:

1. Scheduled Manufacturer: Ives
2. Acceptable Manufacturers: Rockwood, Trimco
3. Or approved equal, match existing items where possible. All product substitutions must meet requirements of the 2016 CBC.

B. Requirements:

1. Provide kick plates, mop plates, and armor plates minimum of 0.050 inch (1 mm) thick, beveled four edges as scheduled. Furnish with sheet metal or wood screws, finished to match plates.
2. Sizes of plates:
 - a. Kick Plates: 10 inches (254 mm) high by 2 inches (51 mm) less width of door on single doors, 1 inch (25 mm) less width of door on pairs
 - b. Mop Plates: 4 inches (102 mm) high by 2 inches (51 mm) less width of door on single doors, 1 inch (25 mm) less width of door on pairs

- c. Armor Plates: 36 inches (914 mm) high by 2 inches (51 mm) less width of door on single doors, 1 inch (25 mm) less width of door on pairs

2.13 DOOR STOPS AND HOLDERS

A. Manufacturers:

1. Scheduled Manufacturer: Ives
2. Acceptable Manufacturers: Rockwood, Trimco
3. Or approved equal, match existing items where possible. All product substitutions must meet requirements of the 2016 CBC.

B. Provide door stops at each door leaf:

1. Provide wall stops wherever possible. Provide convex type where mortise type locks are used and concave type where cylindrical type locks are used.
2. Where a wall stop cannot be used, provide universal floor stops for low or high rise options.
3. Where wall or floor stop cannot be used, provide medium duty surface mounted overhead stop.

2.14 THRESHOLDS, SEALS, DOOR SWEEPS, AUTOMATIC DOOR BOTTOMS, AND GASKETING

A. Manufacturers:

1. Scheduled Manufacturer: Zero International
2. Acceptable Manufacturers: National Guard, Pemko
3. Or approved equal, match existing items where possible. All product substitutions must meet requirements of the 2016 CBC.

B. Requirements:

1. Provide thresholds, weather-stripping (including door sweeps, seals, and astragals) and gasketing systems (including smoke, sound, and light) as specified and per architectural details. Match finish of other items.
2. Size of thresholds:
 - a. Saddle Thresholds: 1/2 inch (13 mm) high by jamb width by door width
 - b. Bumper Seal Thresholds: 1/2 inch (13 mm) high by 5 inches (127 mm) wide by door width
3. Provide door sweeps, seals, astragals, and auto door bottoms only of type where resilient or flexible seal strip is easily replaceable and readily available.

2.15 SILENCERS

A. Manufacturers:

1. Scheduled Manufacturer: Ives
2. Acceptable Manufacturers: Rockwood, Trimco
3. Or approved equal, match existing items where possible. All product substitutions must meet requirements of the 2016 CBC.

B. Requirements:

1. Provide "push-in" type silencers for hollow metal or wood frames.
2. Provide one silencer per 30 inches (762 mm) of height on each single frame, and two for each pair frame.
3. Omit where gasketing is specified.

2.16 FINISHES

A. Finish: BHMA 626/652 (US26D); except:

1. Hinges at Exterior Doors: BHMA 630 (US32D)
2. Continuous Hinges: BHMA 630 (US32D)
3. Continuous Hinges: BHMA 628 (US28)
4. Push Plates, Pulls, and Push Bars: BHMA 630 (US32D)
5. Protection Plates: BHMA 630 (US32D)
6. Overhead Stops and Holders: BHMA 630 (US32D)
7. Door Closers: Powder Coat to Match
8. Wall Stops: BHMA 630 (US32D)
9. Latch Protectors: BHMA 630 (US32D)
10. Weatherstripping: Clear Anodized Aluminum
11. Thresholds: Mill Finish Aluminum

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Prior to installation of hardware, examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance.
- B. Existing Door and Frame Compatibility: Field verify existing doors and frames receiving new hardware and existing conditions receiving new openings. Verify that new hardware is compatible with existing door and frame preparation and existing conditions.
- C. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Where on-site modification of doors and frames is required:
 1. Carefully remove existing door hardware and components being reused. Clean, protect, tag, and store in accordance with storage and handling requirements specified herein.
 2. Field modify and prepare existing door and frame for new hardware being installed.
 3. When modifications are exposed to view, use concealed fasteners, when possible.
 4. Prepare hardware locations and reinstall in accordance with installation requirements for new door hardware and with:

- a. Steel Doors and Frames: For surface applied door hardware, drill and tap doors and frames according to ANSI/SDI A250.6.
- b. Wood Doors: DHI WDHS.5 "Recommended Hardware Reinforcement Locations for Mineral Core Wood Flush Doors."
- c. Doors in rated assemblies: NFPA 80 for restrictions on on-site door hardware preparation.

3.03 INSTALLATION

- A. Mounting Heights: Mount door hardware units at heights to comply with the following, unless otherwise indicated or required to comply with governing regulations.
 1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
 2. Custom Steel Doors and Frames: HMMA 831.
 3. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."
- B. Install each hardware item in compliance with manufacturer's instructions and recommendations, using only fasteners provided by manufacturer.
- C. Do not install surface mounted items until finishes have been completed on substrate. Protect all installed hardware during painting.
- D. Set units level, plumb and true to line and location. Adjust and reinforce attachment substrate as necessary for proper installation and operation.
- E. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
- F. Install operating parts so they move freely and smoothly without binding, sticking, or excessive clearance.
- G. Hinges: Install types and in quantities indicated in door hardware schedule but not fewer than quantity recommended by manufacturer for application indicated or one hinge for every 30 inches (750 mm) of door height, whichever is more stringent, unless other equivalent means of support for door, such as spring hinges or pivots, are provided.
- H. Intermediate Offset Pivots: Where offset pivots are indicated, provide intermediate offset pivots in quantities indicated in door hardware schedule but not fewer than one intermediate offset pivot per door and one additional intermediate offset pivot for every 30 inches (750 mm) of door height greater than 90 inches (2286 mm).
- I. Lock Cylinders: Install construction cores to secure building and areas during construction period.
 1. Replace construction cores with permanent cores as indicated in keying section.
 2. Furnish permanent cores to City of San Diego for installation.
- J. Wiring: Coordinate with Division 26, ELECTRICAL sections for:
 1. Conduit, junction boxes and wire pulls.
 2. Connections to and from power supplies to electrified hardware.
 3. Connections to fire/smoke alarm system and smoke evacuation system.

4. Connection of wire to door position switches and wire runs to central room or area, as directed by Architect.
 5. Testing and labeling wires with Architect's opening number.
- K. Key Control System: Tag keys and place them on markers and hooks in key control system cabinet, as determined by final keying schedule.
- L. Door Closers: Mount closers on room side of corridor doors, inside of exterior doors, and stair side of stairway doors from corridors. Closers shall not be visible in corridors, lobbies and other public spaces unless approved by Architect.
- M. Closer/holders: Mount closer/holders on room side of corridor doors, inside of exterior doors, and stair side of stairway doors.
- N. Power Supplies: Locate power supplies as indicated or, if not indicated, above accessible ceilings or in equipment room, or alternate location as directed by Architect.
1. Coordination: Coordinate provision with the security systems provider to mitigate excessive or redundant purchase.
 2. Configuration: Provide least number of power supplies required to adequately serve doors with electrified door hardware.
- O. Thresholds: Set thresholds in full bed of sealant complying with requirements specified in Division 07 Section "Joint Sealants."
- P. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they may impede traffic or present tripping hazard.
- Q. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
- R. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.
- S. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.

3.04 ADJUSTING

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.
1. Spring Hinges: Adjust to achieve positive latching when door is allowed to close freely from an open position of 30 degrees.
 2. Electric Strikes: Adjust horizontal and vertical alignment of keeper to properly engage lock bolt.
 3. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.
- B. Occupancy Adjustment: Approximately three months after date of Substantial Completion, the Installer shall examine and readjust each item of door hardware, including adjusting operating forces, as necessary to ensure function of doors, door hardware, and electrified door hardware.

3.05 CLEANING AND PROTECTION

- A. Clean adjacent surfaces soiled by door hardware installation.
- B. Clean operating items as necessary to restore proper function and finish.
- C. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of Substantial Completion.

3.06 DEMONSTRATION

- A. Provide training for City of San Diego's maintenance personnel to adjust, operate, and maintain door hardware and door hardware finishes. Refer to Division 01 Section "Demonstration and Training."

3.07 DOOR HARDWARE SCHEDULE

- A. Locksets, exit devices, and other hardware items are referenced in the following hardware sets for series, type and function. Refer to the above-specifications for special features, options, cylinders/keying, and other requirements.
- B. Hardware Sets:

General Note: The intent of this specification is to match existing key system(s) in the building or as directed by the City of San Diego. Also, there is a substantial existing inventory of door, frame and hardware products that are meant to be reused in their entirety, however, door hardware may be removed and reused from doors that aren't going to be reused. The following hardware sets are to be used as a guide only for their respective room functions. The quantities shown may differ and should be augmented by the existing inventory.

Hardware Group 01 - OFFICES/LOCKING ROOMS

Qty		Description	Catalog Number	Finish	Mfr
4	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	ENTRANCE LOCK	ND53PD RHO	626	SCH
1	EA	PERMANENT CORE	MATCH EXISTING	626	SCH
1	EA	FLOOR STOP	FS439	682	IVE
1	EA	GASKETING	188S-BK	S-Bk	ZER

Hardware Group 02 - OFFICES W/MORTISE LOCKS

Qty		Description	Catalog Number	Finish	Mfr
4	EA	HINGE	5BB1 4.5 X 4.5	652	IVE

DOOR HARDWARE 087100-21

1	EA	OFFICE W/SIM RETRACT	L9056P 06A L583-363	630	SCH
1	EA	PERMANENT CORE	MATCH EXISTING	626	SCH
1	EA	FLOOR STOP	FS439	682	IVE
1	EA	GASKETING	188S-BK	S-Bk	ZER

Hardware Group 03 - OPEN OFFICE/WORK AREAS

Qty		Description	Catalog Number	Finish	Mfr
4	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	CLASSROOM LOCK	ND70PD RHO	626	SCH
1	EA	PERMANENT CORE	MATCH EXISTING	626	SCH
1	EA	FLOOR STOP	FS439	682	IVE
1	EA	GASKETING	188S-BK	S-Bk	ZER

Hardware Group 04 - OPEN OFFICE W/MORTISE LOCKS

Qty		Description	Catalog Number	Finish	Mfr
4	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	CLASSROOM LOCK	L9070P 06A	630	SCH
1	EA	PERMANENT CORE	MATCH EXISTING	626	SCH
1	EA	FLOOR STOP	FS439	682	IVE
1	EA	GASKETING	188S-BK	S-Bk	ZER

Hardware Group 05 - STORAGE ROOMS

Qty		Description	Catalog Number	Finish	Mfr
4	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	STOREROOM LOCK	ND80PD RHO	626	SCH
1	EA	PERMANENT CORE	MATCH EXISTING	626	SCH
1	EA	FLOOR STOP	FS439	682	IVE
3	EA	SILENCER	SR64	GRY	IVE

Hardware Group 06 - STORAGE ROOMS W/MORTISE LOCK

DOOR HARDWARE

087100-22

Qty		Description	Catalog Number	Finish	Mfr
4	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	STOREROOM LOCK	L9080P 06A	630	SCH
1	EA	PERMANENT CORE	MATCH EXISTING	626	SCH
1	EA	FLOOR STOP	FS439	682	IVE
3	EA	SILENCER	SR64	GRY	IVE

Hardware Group 07 - CONFERENCE/NON-LOCKING ROOMS

Qty		Description	Catalog Number	Finish	Mfr
4	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	PASSAGE SET	ND10S RHO	626	SCH
1	EA	FLOOR STOP	FS439	682	IVE
1	EA	GASKETING	188S-BK	S-Bk	ZER

Hardware Group 08 - CONFERENCE/NON-LOCKING ROOMS W/MORTISE LATCH

Qty		Description	Catalog Number	Finish	Mfr
4	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	PASSAGE SET	L9010 06A	630	SCH
1	EA	FLOOR STOP	FS439	682	IVE
1	EA	GASKETING	188S-BK	S-Bk	ZER

Hardware Group 09 - BREAK ROOMS

Qty		Description	Catalog Number	Finish	Mfr
4	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	PASSAGE SET	ND10S RHO	626	SCH
1	EA	SURFACE CLOSER	1461 FC TBSRT	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	FLOOR STOP	FS439	682	IVE
1	EA	GASKETING	188S-BK	S-Bk	ZER

Hardware Group 10 - BREAK ROOMS W/MORTISE LATCH

DOOR HARDWARE

087100-23

Qty		Description	Catalog Number	Finish	Mfr
4	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	PASSAGE SET	L9010 06A	630	SCH
1	EA	SURFACE CLOSER	1461 FC TBSRT	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	FLOOR STOP	FS439	682	IVE
1	EA	GASKETING	188S-BK	S-Bk	ZER

Hardware Group 11 - BUSINESS CENTER WAITING AREA

Qty		Description	Catalog Number	Finish	Mfr
8	EA	HW HINGE	5BB1HW 4.5 X 4.5	652	IVE
2	EA	FIRE EXIT HARDWARE	AX-9827-L-BE-F-LBR-ER36-06-499F-SNB	630	VON
2	EA	SURFACE CLOSER	1461 EDA FC TBSRT	689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
2	EA	FLOOR STOP	FS439	682	IVE
1	EA	GASKETING	188S-BK	S-Bk	ZER
2	EA	MEETING STILE	328AA	AA	ZER

Hardware Group 12 - WELLNESS ROOMS

Qty		Description	Catalog Number	Finish	Mfr
4	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	PRIVACY LOCK	L9040 06A L283-723	630	SCH
1	EA	SURFACE CLOSER	1461 SCUSH FC TBSRT	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	GASKETING	188S-BK	S-Bk	ZER

Hardware Group 13 - PHONE ROOMS

Qty		Description	Catalog Number	Finish	Mfr
4	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	PRIVACY LOCK	L9040 06A L283-723	630	SCH
1	EA	GASKETING	188S-BK	S-Bk	ZER

Hardware Group 14 - HALF-HEIGHT DOUBLE ACTING

Qty		Description	Catalog Number	Finish	Mfr
		DOOR HARDWARE			087100-24

1	EA	SPRING LOADED PIVOT	7813HD X F700-31A TPA	652	BOM
2	EA	PUSH PLATE	8200 4" X 16"	630	IVE

Hardware Group 15 - HALF HEIGHT DOUBLE ACTING DOORS (PR)

Qty		Description	Catalog Number	Finish	Mfr
2	EA	SPRING LOADED PIVOT	7813HD X F700-31A TPA	652	BOM
4	EA	PUSH PLATE	8200 4" X 16"	630	IVE

Hardware Group 16 - BI-PART SLIDING CLOSET DOORS

Qty		Description	Catalog Number	Finish	Mfr
2	EA	BI-PART SLIDING DOOR	9110-72	AL	HAG
1	EA	HOOKED DEADBOLT	MS1850SN-050 (VERIFY BACKSET)	628	ADA
1	EA	MORTISE CYLINDER	26-072 118	626	SCH
1	EA	STRIKE	4001-011	121	ADA
1	EA	MORTISE THUMBTURN	4066	628	ADA
2	EA	DOOR PULL, 1" ROUND	8103EZHD 8" STD	630	IVE

Hardware Group 17 - CARD ACCESSIBLE SUITE ENTRY (IS)

Qty		Description	Catalog Number	Finish	Mfr
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	ELECTRIC HINGE	5BB1 4.5 X 4.5 TW8	652	IVE
1	EA	EU STOREROOM LOCK	ND80PDEU RHO RX	626	SCH
1	EA	PERMANENT CORE	MATCH EXISTING	626	SCH
1	EA	SURFACE CLOSER	1461 FC TBSRT	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	FLOOR STOP	FS439	682	IVE
1	EA	GASKETING	188S-BK	S-Bk	ZER
1	EA	POWER SUPPLY	PS902	LGR	SCE

Hardware Group 18 - CARD ACCESSIBLE SUITE ENTRY (OS)

Qty		Description	Catalog Number	Finish	Mfr
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	ELECTRIC HINGE	5BB1 4.5 X 4.5 TW8	652	IVE
1	EA	EU STOREROOM LOCK	ND80PDEU RHO RX	626	SCH
1	EA	PERMANENT CORE	MATCH EXISTING	626	SCH
1	EA	SURFACE CLOSER	1461 EDA FC TBSRT	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	FLOOR STOP	FS439	682	IVE
1	EA	GASKETING	188S-BK	S-Bk	ZER
1	EA	POWER SUPPLY	PS902	LGR	SCE

Hardware Group 19 - CARD ACCESSIBLE SUITE ENTRY W/PANIC

Qty		Description	Catalog Number	Finish	Mfr
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	ELECTRIC HINGE	5BB1 4.5 X 4.5 TW8	652	IVE
1	EA	ELEC PANIC HARDWARE	RX-AX-98-L-E996-06 SS-FSE-630-SNB	630/630	VON
1	EA	RIM CYLINDER	20-057-ICX	626	SCH
1	EA	PERMANENT CORE	MATCH EXISTING	626	SCH
1	EA	SURFACE CLOSER	1461 EDA FC TBSRT	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	FLOOR STOP	FS439	682	IVE
1	EA	GASKETING	188S-BK	S-Bk	ZER
1	EA	POWER SUPPLY	PS902	LGR	SCE

Hardware Group 20 - CARD ACCESSIBLE SUITE ENTRY W/MORTISE (OS)

Qty		Description	Catalog Number	Finish	Mfr
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	ELECTRIC HINGE	5BB1 4.5 X 4.5 TW8	652	IVE
1	EA	EU MORTISE LOCK	L9092PEU 06A RXDPS	630	SCH
1	EA	PERMANENT CORE	MATCH EXISTING	626	SCH
1	EA	SURFACE CLOSER	1461 EDA FC TBSRT	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	FLOOR STOP	FS439	682	IVE
1	EA	GASKETING	188S-BK	S-Bk	ZER
1	EA	POWER SUPPLY	PS902	LGR	SCE

Hardware Group 21 - CASSED OPENINGS

Hardware Group EX-01 - MODULAR DOOR SYSTEM, REUSE DFH FROM EXISTING INVENTORY

Qty		Description	Catalog Number	Finish	Mfr
4	EA	HINGE	EXISTING	652	UNK
1	EA	OFFICE LOCK	EXISTING	626	UNK
1	EA	DOOR STOP (FLOOR)	EXISTING	626	UNK

Hardware Group EX-02 - MODULAR DOOR SYSTEM, REUSE DFH FROM EXISTING INVENTORY

Qty		Description	Catalog Number	Finish	Mfr
4	EA	HINGE	EXISTING	652	UNK
1	EA	STOREROOM LOCK	EXISTING	626	UNK
1	EA	DOOR STOP (FLOOR)	EXISTING	626	UNK

Hardware Group EX-03 - MODULAR DOOR SYSTEM, REUSE DFH FROM EXISTING INVENTORY

Qty		Description	Catalog Number	Finish	Mfr
4	EA	HINGE	EXISTING	652	UNK
1	EA	PASSAGE LATCH	EXISTING	626	UNK
1	EA	DOOR STOP (FLOOR)	EXISTING	626	UNK

Hardware Group EX-04 - MODULAR DOOR SYSTEM, REUSE DFH FROM EXISTING INVENTORY

Qty		Description	Catalog Number	Finish	Mfr
4	EA	HINGE	EXISTING	652	UNK
1	EA	PASSAGE LATCH	EXISTING	626	UNK
1	EA	CLOSER	EXISTING	689	UNK
1	EA	DOOR STOP (FLOOR)	EXISTING	626	UNK

DOOR HARDWARE

087100-27

Hardware Group EX-05 - EXISTING DFH, REPLACE LATCH WITH LOCK

Qty		Description	Catalog Number	Finish	Mfr
1	EA	CLASSROOM LOCK	ND70PD RHO	626	SCH
1	EA	PERMANENT CORE	MATCH EXISTING BALANCE OF HARDWARE EXISTING	626	SCH

Hardware Group EX-06 - EXISTING DFH, REPLACE LATCH WITH STORAGE LOCK

Qty		Description	Catalog Number	Finish	Mfr
1	EA	STOREROOM LOCK	ND80PD RHO	626	SCH
1	EA	PERMANENT CORE	MATCH EXISTING BALANCE OF HARDWARE EXISTING	626	SCH

Hardware Group EX-07 - CARD ACCESS RETROFIT

Qty		Description	Catalog Number	Finish	Mfr
1	EA	ELECTRIC HINGE	5BB1 4.5 X 4.5 TW8	652	IVE
1	EA	EU STOREROOM LOCK	ND80PDEU RHO RX	626	SCH
1	EA	SURFACE CLOSER	1461 FC TBSRT	689	LCN
1	EA	POWER SUPPLY	PS902 HARDWARE BY DOOR / FRAME MANUFACTURER	LGR	SCE

FIELD DRILLED RACEWAY IN DOOR AND FRAME
DELETE CLOSER IF EXISTING

Hardware Group EX-08 - CARD ACCESS RETROFIT (PR)

Qty		Description	Catalog Number	Finish	Mfr
1	EA	ELECTRIC HINGE	5BB1 4.5 X 4.5 TW8	652	IVE
1	EA	E996 R/VC CONVERSION	050672		VON
1	EA	POWER SUPPLY	PS902 ACCESS CONTROL - WORK OF DIVISION 28 CARD READER - WORK OF DIVISION 28	LGR	SCE

FIELD DRILLED RACEWAY IN DOOR AND FRAME

Hardware Group EX-09 - EXISTING DOORS TO REMAIN OR RELOCATE

EXISTING DOOR, FRAME AND HARDWARE

End of Section

Qty		Description	Catalog Number	Finish	Mfr
		DOOR HARDWARE			087100-28

SECTION 08 80 00 - GLAZING

PART 1 - GENERAL

1.1 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. Doors.
 - 2. Interior borrowed lites.

1.2 ACTION SUBMITTALS

- A. Product Data: Submit product data for each glass product and glazing material indicated.
- B. CALgreen Submittals:
 - 1. Product Data for Section 5.504.4.1: For sealants, adhesives and caulks, provide documentation including printed statement of VOC content showing compliance with SCAQMD Rule 1168 VOC limits and CCR (California Code of Regulations) Title 17 for aerosols.
 - 2. Product Data for Section 5.504.4.1.2: Provide documentation for aerosol adhesives, and smaller unit sizes of adhesives, sealant, and caulking compounds (in units of product, less packaging, which do not weigh more than one (1) pound and do not consist of more than sixteen (16) fluid ounces) comply with statewide VOC standards and prohibitions on use of certain toxic compounds, of CCR Title 17, commencing with Section 94507.
- C. Samples: Label samples to indicate product, characteristics, and locations in the Work. Furnish samples of the following:
 - 1. Except for clear glass, submit samples of each glass type specified, in the form of 12 inch square Samples.
 - 2. Submit samples of each glass type specified where production run varies and defects are expected.
 - 3. Submit samples of applied film adhered to clear glass, in the form of 12 inch square samples.

1.3 INFORMATIONAL SUBMITTALS

- A. Manufacturer Certificates: Submit a letter from glass manufacturer certifying that he has reviewed the glazing details proposed for the Project, including the use of gaskets and sealants, and that each product to be furnished is recommended for the application shown.

- B. Product Certificates: Signed by manufacturers of glass and glazing products certifying that products furnished comply with requirements.
 - 1. Material Certificates: Submit glass treatment certificates signed by manufacturer of the heat-soaked glass products certifying that products furnished comply with requirements.
- C. Warranties: Submit special warranties specified in this Section.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: Submit maintenance data for each applied glass film to be installed or applied, including recommendations and instructions for cleaning, maintenance, removal, and replacement of same.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has completed glazing similar in material, design, and extent to that indicated for Project and whose work has resulted in construction with a record of successful in-service performance.
- B. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to NFPA 252.
 - 1. Subject to compliance with requirements, permanently mark safety glass with certification label of Safety Glazing Certification Council or another certification agency acceptable to authorities having jurisdiction. Locate permanent markings in one corner, and in the same location, of each glass lite in accordance with the requirements of the SGCC labeling guidelines. Markings shall have a nominal size of no greater than 1-inch in diameter, and be located with glass edge clearances, at the corner, by not more than 3/4-inch up and 3/4-inch over.
- 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.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Protect glazing materials according to manufacturer's written instructions and as needed to prevent damage to glass and glazing materials.

1.7 WARRANTY

PART 2 - PRODUCTS

2.1 PRODUCTS AND MANUFACTURERS

- A. Refer to Door Schedule for the extent of glass types and locations. Confirm the levels of heat treatment required for each glass type scheduled as contained in Articles "Performance Requirements" and "Quality Assurance."

2.2 PERFORMANCE REQUIREMENTS

- A. General: Provide and install glazing systems capable of withstanding impact loads without failure of any kind, including loss or breakage of glass, failure of seal or gaskets, exudation of glazing sealants, and excessive deterioration of glazing materials.
- B. Glass Design: Glass thicknesses and heat treatments indicated are minimum requirements. Glazing details shown are for convenience of detailing only and are to be confirmed by the Contractor relative to cited standards and final framing details.
 - 1. At hollow metal framed, provide glass thickness such that the center of glass deflection at a full lateral pressure of 5 psf in a direction normal to the plane of the wall shall not exceed 1/2 inch. Confirm glass thicknesses and heat treatments, as required to meet the performance requirements.

2.3 MATERIALS - GENERAL

2.4 GLAZING SEALANTS

- A. Adhesives, adhesive bonding primers, adhesive primers, sealants, sealant primers and caulks shall comply with local or regional regulations as shown in Section 01 81 23 "CALgreen Requirements."
- B. Aerosol adhesives, and smaller unit sizes of adhesives, and sealant or caulking compounds shall comply with regulations as shown in Section 01 81 23 "CALgreen Requirements."
- C. Butt Glazing Sealants: Refer to Section 07 92 00 "Joint Sealants" for butt glazing sealant.
- D. Glazing Sealant for Fire-Resistive Glazing Products: Identical to product used in test assembly to obtain fire-protection rating.
 - 1. VOC Content: Provide glazing sealants and sealant primers having not more than 100 g/L when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.5 GLAZING GASKETS

- A. Dense Compression Gaskets: Continuous extruded EPDM with cross-sectional profile, physical properties, and tolerances as recommended by the glass manufacturer, and as required to comply with the performance requirements specified and shown, all in compliance with the applicable provisions of ASTM C 864, Option II.

2.6 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 and wet glazing materials contacted in installation.
- B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.
- C. Adhesives, adhesive bonding primers, adhesive primers, sealants, sealant primers and caulks shall comply with local or regional regulations as shown in Section 01 81 23 "CALgreen Requirements."
- D. Aerosol adhesives, and smaller unit sizes of adhesives, and sealant or caulking compounds shall comply with regulations as shown in Section 01 81 23 "CALgreen Requirements."
- E. Setting Blocks: EPDM complying with ASTM C 864 (Option II), blocks, 85 +/- 5 Shore A durometer hardness, 1/16 inch less than the channel width, and length based on the face area the glass unit to be supported in accordance with GANA standards and glass manufacturer recommendations but not less than 4 inches .
- F. Perimeter Insulation for Fire-Resistive Glazing: Identical to product used in test assembly to obtain fire-resistance rating.

2.7 FABRICATION OF GLASS AND OTHER GLAZING PRODUCTS

- A. Fabricate glass and other glazing products in sizes required to glaze 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 standard, to comply with system performance requirements.
 - 1. Edge and Surface Conditions: Comply with the recommendations of AAMA "Structural Properties of Glass" for "clean-cut" edges, except comply with manufacturer's recommendations when they are at variance therewith.
- B. Cutting: Do not nip glass edges. Edges may be wheel cut or sawed and seamed at manufacturer's option. For glass to be cut at site, provide glass 2 inches larger than required in both dimensions, so as to facilitate cutting of clean cut edges without the necessity of seaming or nipping. Do not cut, seam, nip or abrade heat-treated glass.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine glass framing, with glazier and glass framing erector present, for compliance with the following:
 - 1. Compliance with the specified manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
 - 2. Minimum required face or edge clearances.
 - 3. 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 stops, glazing channels, and rabbets which will be in contact with the glazing materials immediately before glazing. Remove coatings which might fail in adhesion or interfere with bond of sealants. Comply with manufacturer's instructions for final wiping of surfaces immediately before application of primers. Wipe metal surfaces with IPA (isopropyl alcohol).
 - 1. Prime surfaces to receive glazing compounds. When priming, comply with wet glazing manufacturer's recommendations.
- B. Inspect each glass unit immediately before installation. Do not install any units which are improperly sized or have damaged edges, scratches or abrasion, or other evidence of damage. Remove labels from glass immediately after installation.
- C. Substrate Preparation for Applied Film: Clean glass surfaces to receive the application of applied film. Remove foreign deposits, including paint spatter and glazing sealant materials that have migrated from glazing channel. Wash with detergent, rinse, and dry each glass surface immediately prior to film application; comply with film manufacturer's instructions and recommendations. Control and limit unnecessary activities, occupancies, air movements, and similar incidents in each space of the building during the time of cleaning and film application so as to ensure the best possible environment for application of film on clean substrates. Comply with environmental conditions as recommended by film manufacturer prior to applying film to glass.

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.
 - 1. All glass units shall be installed in accordance with the glass manufacturer's recommendations.

- a. Butt Glazed Interior Monolithic Glass Units: Mask the surfaces on both sides of the joints to be glazed. Provide wood dowel, with a diameter of at least three times that of the joint width, wrapped in polyethylene tape, and firmly taped to interior face of glass unit to be glazed to act as a backup during glazing operation. Place glazing sealant and tool face of sealant slightly concave using extreme care not to chip or otherwise abrade corners of glass. Allow sealant to fully cure before removing dowel.
- B. Glazing channel dimensions as indicated on Drawings. Provide necessary bite on glass, minimum edge and face clearances, with reasonable tolerances. Adjust as required by Project conditions during installation.
- 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 surfaces indicated to receive glazing materials.
- E. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless more stringent requirements are recommended by glass manufacturer.
 1. For Glass Units Less Than 72 Inches : Locate setting blocks at sill one-quarter of the width in from each end of the glass unless otherwise recommended by the glass manufacturer.
 2. For Glass Units 72 Inches or Greater: Locate setting blocks at sill one-eighth of the width in from each end of the glass, but not less than 6 inches , unless otherwise recommended by the glass manufacturer.
- F. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- G. Set glass lites with uniform pattern, draw, bow, and similar characteristics, producing the greatest possible degree of uniformity in appearance on the entire wall elevation.
 1. Set glass units with void between edge of units and glazing channel.
- H. Where wedge-shaped gaskets are driven into one side of channel to pressurize gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.
- I. Miter cut gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away.

3.4 PROTECTION AND CLEANING

- A. Remove and replace glass that is broken, chipped, cracked, abraded, or damaged in any way and from any source, including natural causes, accidents, and vandalism.

- B. 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 and film as recommended by glass and film manufacturer.

END OF SECTION 08 80 00

SECTION 09 22 16 - NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes non-structural metal framing assemblies.

1.2 PRE-INSTALLATION MEETING

- A. Preconstruction Conference: Prior to start of the non-structural metal framing work, and at the Contractor's direction, meet at Project site and review the installation procedures and coordination with other work. Meeting shall include Contractor, Architect and major material manufacturer as well as the Installer and other subcontractors whose work must be coordinated with the non-structural metal framing and the gypsum wallboard work.

1.3 ACTION SUBMITTALS

- A. Product Data: Submit product data for each product indicated.
- B. CALgreen Submittals.
- C. Samples: Submit full size samples in 12 inch long lengths for each exposed trim accessory indicated.

1.4 QUALITY ASSURANCE

- A. Fire-Test-Response Characteristics: For non-structural metal framing assemblies with fire-resistance ratings, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.
 - 1. Fire-Resistance-Rated Assemblies: Indicated by design designations from UL's "Fire Resistance Directory."

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original packages, containers, or bundles bearing brand name and identification of manufacturer or supplier.
- B. Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic, and other causes.

1.6 FIELD CONDITIONS

- A. Comply with ASTM C 754 requirements or wallboard material manufacturer's written recommendations, whichever are more stringent.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. General: For fire rated assemblies, provide materials, including accessories and fasteners produced by one manufacturer, or, when products of more than one manufacturer are used in a rated system, they shall be acceptable to authorities having jurisdiction.

2.2 PERFORMANCE REQUIREMENTS

- A. Gypsum Board Assembly Deflections:
 - 1. Typical Walls: Wall assemblies shall be constructed for deflection not to exceed 1/240 of the wall height when subjected to a positive and negative pressure of 5 psf.
 - 2. Walls with Tile Finish: Wall assemblies to receive tile finishes shall be constructed for deflection not to exceed 1/360 of the wall height when subjected to a positive and negative pressure of 5 psf.
 - 3. Ceilings, bulkheads, soffits, ceiling transitions, ledges, and coves shall be constructed for a deflection not to exceed 1/360 of the distance between supports.

2.3 STEEL SUSPENDED CEILING FRAMING

- A. Components, General: Provide steel framing members sized and spaced as indicated but not less than that required to comply with ASTM C 754 under the maximum deflection conditions specified under Article 'Assembly Performance Requirements.'
- B. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.0625 inch diameter wire, or double strand of 0.0475 inch diameter wire.
- C. Hanger Attachments to Overhead Decks: Suitable for application indicated, fabricated from corrosion-resistant materials, with eyepins, clips or other devices for attaching hangers and capable of sustaining, without failure, a load equal to 10 times that imposed by the complete ceiling system.
- D. Hangers: As follows:
 - 1. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.162 inch diameter.
- E. Grid Suspension System for Interior Ceilings: ASTM C 645, direct-hung system composed of main beams and cross-furring members that interlock.

2.4 STEEL PARTITION AND SOFFIT FRAMING

- A. General: Provide steel framing members sized and spaced as indicated but not less than that required to comply with ASTM C 754 under the maximum deflection conditions specified under Article 'Assembly Performance Requirements.'
1. In areas where top of partitions are dependent on ceiling system for lateral support, coordinate design and installation to comply with the above deflection limitation.
 2. Steel Sheet Components: Complying with ASTM C 645 requirements for metal and with ASTM A 653/A 653M, G40, hot-dip galvanized zinc coating. No equivalent coatings (EQ) allowed.
- B. Steel Studs and Runners: ASTM C 645, in minimum depth indicated in partition type details; one of the following:
1. Allsteel & Gypsum Products, Inc.
 2. CEMCO.
 3. Clark Dietrich.
 4. Consolidated Fabricators, Corporation.
 5. Craco Manufacturing, Inc.
 6. Custom Stud, Inc.
 7. Marino\WARE.
 8. Phillips Manufacturing Company.
 9. Quail Run Building Materials, Inc.
 10. SCAFCO Corporation.
 11. Southeastern Stud & Components, Inc.
 12. Telling Industries.
 13. The Steel Network.
 14. or approved equal
 15. Minimum Base Metal Thickness:
 - a. Typical: As required to comply with deflection criteria but not less than 0.0179 inch.
 - b. Partitions Supporting Wall Mounted Casework: 0.033 inch minimum thickness.
 16. Depth: As indicated.
- C. Flat Strap and Backing Plate: 36 inch wide by 6 inch high steel sheet for blocking and bracing required for the attachment of surface mounted items and accessories indicated. Locate to span a minimum of 2 studs. Reference plan details for specific thicknesses. Minimum Base Metal Thickness: 30 GA.

2.5 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.

- B. Acoustical Sealant for Exposed and Concealed Joints: Nonsag, paintable, nonstaining, latex sealant, with a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24), complying with ASTM C 834 that effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90. One of the following:
1. SHEETROCK Acoustical Sealant; U.S. Gypsum.
 2. AC-20 FTR; Pecora.
 3. or approved equal
- C. Isolation Strip at Exterior Walls: Adhesive-backed, closed-cell, compressible, non-extruding, sound transmission reducing, vinyl foam tape strips with approximately 13 Shore 00 hardness that allow fastener penetration without foam displacement, 0.75 inch thick, in width 1/2 inch less than window mullion width.
1. V7324 Norton Sealant Tape; gray color.
- D. Wood Blocking and Plywood Concealed in Partition Construction: Fire retardant treated.
- E. Metal Post for Tube Framing at Partial Height Walls: Refer to Section 05 50 00 "Metal Fabrications."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates to which non-structural metal framing attaches or abuts, installed door frames and structural framing with Installer present for compliance with requirements for installation tolerances and other conditions affecting performance of assemblies specified in this Section. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Coordination with Sprayed Fire-Resistive Materials: Coordinate this with existing sprayed on fireproofing.
1. Before sprayed fire-resistive materials are applied, attach offset anchor plates or ceiling runners (tracks) to surfaces indicated to receive sprayed-on fire-resistive materials. Where offset anchor plates are required, provide continuous plates fastened to building structure not more than 24 inches on center.
 2. After sprayed fire-resistive materials are applied, remove them only to extent necessary for installation of the non-structural metal framing and without reducing the fire-resistive material thickness below that which is required to obtain fire-resistance rating indicated. Protect remaining fire-resistive materials from damage.

3.3 INSTALLING STEEL FRAMING, GENERAL

- A. General: Install steel framing to comply with ASTM C 754, ASTM C 840 and the gypsum board manufacturer's recommendations, where standards conflict the more stringent shall apply.
- B. Install supplementary framing, blocking, backerplates and bracing at locations in gypsum board assemblies which are indicated to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction. Comply with details indicated and with gypsum board manufacturer's written recommendations or, if none available, with United States Gypsum's "Gypsum Construction Handbook."
- C. Isolate steel framing from building structure to prevent transfer of loading imposed by structural movement.
 - 1. Isolate ceiling assemblies where they abut or are penetrated by building structure.
 - 2. Isolate partition framing and wall furring where it abuts structure, except at floor. Install slip-type joints at head of assemblies that avoid axial loading of assembly and laterally support assembly.
 - a. Use deep-leg deflection track where indicated.
 - b. Use proprietary firestop track where indicated.

3.4 INSTALLING STEEL SUSPENDED CEILING FRAMING

- A. Suspended Ceiling Framing:
 - 1. Suspend ceiling hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or ceiling suspension system. 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 the location of hangers required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.
 - 3. Attach hangers to structural members. Do not support ceilings from or attach hangers to permanent metal forms, steel deck tabs, steel roof decks, ducts, pipes, or conduit.
 - 4. Secure wire hangers by looping and wire-tying, to eyescrews, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause them to deteriorate or otherwise fail.
 - 5. Secure rod and flat hangers to structure, including intermediate framing members, by attaching to 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.
- B. Installation Tolerances: Install steel framing components for suspended ceilings so members for panel attachment are level to within 1/8 inch in 12 feet measured lengthwise on each member and transversely between parallel members.

- C. Wire-tie or clip furring channels to supports, as required to comply with requirements for assemblies indicated.
- D. Install suspended steel framing components in sizes and spacings indicated, but not less than that required by the referenced steel framing and installation standards unless more stringent spacings are recommended by the gypsum board manufacturer.
- E. Grid Suspension System: Attach perimeter wall track or angle where grid suspension system meets vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.

3.5 INSTALLING STEEL PARTITION AND SOFFIT FRAMING

- A. Install continuous runners (tracks) sized to match studs at floors, ceilings, and structural walls and columns where gypsum board stud assemblies abut other construction. Secure runners to substrates with fasteners spaced a maximum of 24 inches on center unless closer spacing is recommended by the framing manufacturer for the floor and ceiling construction involved. Provide fasteners at all corners and ends of runner tracks.
 - 1. Where studs are installed directly against exterior walls, install foam gasket isolation strip between studs and wall.
 - 2. Install two beads of sealant below floor tracks for acoustical and dust control.
- B. Installation Tolerance: Install each steel framing and furring member so fastening surfaces vary not more than 1/8 inch from the plane formed by the faces of adjacent framing.
- C. Extend partition framing full height to structural supports or substrates above suspended ceilings, except where partitions are indicated to terminate at suspended ceilings and at partial height partitions. Continue framing over frames for doors and openings and frame around ducts penetrating partitions above ceiling to provide support for gypsum board.
 - 1. Cut studs 1/2 inch short of full height to provide perimeter relief.
 - 2. For fire-resistance-rated and STC-rated partitions that extend to the underside of floor/roof slabs and decks or other continuous solid-structure surfaces to obtain ratings, install framing around structural and other members extending below floor/roof slabs and decks, as needed to support gypsum board closures and to make partitions continuous from floor to underside of solid structure.
 - 3. Terminate partition framing at suspended ceilings where indicated.
 - 4. Terminate partial height partition framing as indicated.
- D. Install steel studs and furring in sizes and at spacing indicated but not less than that required by the referenced steel framing installation standard to comply with maximum deflection and minimum loading requirements specified, unless more stringent requirements are recommended by the gypsum board manufacturer:
 - 1. Space studs 16 inches on center, unless otherwise indicated.
- E. Install steel studs so flanges point in the same direction and leading edge or end of each panel can be attached to open (unsupported) edges of stud flanges first.

- F. Install backerplates for support of wall mounted items.
- G. Curved Partitions:
 - 1. Bend track to uniform curve and locate straight lengths so they are tangent to arcs.
 - 2. Support outside (cut) leg of track by clinching steel sheet strip, 1 inch high-by-thickness of track metal, to inside of cut legs using metal lock fasteners.
 - 3. Begin and end each arc with a stud, and space intermediate studs equally along arcs at stud spacing recommended in writing by gypsum board manufacturer for radii indicated. On straight lengths of not less than 2 studs at ends of arcs, place studs 6 inches on center.
- H. Frame door openings to comply with GA-600 and with gypsum board manufacturer's applicable written recommendations, unless otherwise indicated. 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.
 - 1. Install two studs at each jamb, unless otherwise indicated. Install one additional stud no more than 6 inches from jamb studs at single doors greater than 48 inches and at all pairs of doors.
 - 2. Install cripple studs at head adjacent to each jamb stud. Provide runner track and typical studs above door openings with studs spaced not more than 24 inches on center.
 - 3. At all welded frames with fixed anchor clips secure stud reinforcing to jamb anchor clips with not less than two self tapping screws per clip.
 - 4. Extend jamb studs through suspended ceilings and attach to underside of floor or roof structure above.
- I. 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.
- J. Isolation Strip Attachment: Where partitions abut exterior wall window mullions, and partition filler panels are not indicated, adhesively attach isolation strips to window mullions. Center isolation strips on mullion to form a continuous, sound resistant and lightproof, recessed joint seal for the entire length of the interface between the partition studs and trim members and the vertical window mullions.

3.6 CLEANING AND PROTECTION

- A. Clean floors of all non-structural metal framing debris and leave broom clean. Excess material, scaffolding, tools and other equipment are to be removed upon completion of the Work.
- B. Provide final protection and maintain conditions that ensure non-structural metal framing work remains without damage or deterioration at time of Substantial Completion.

END OF SECTION 09 22 16

SECTION 09 29 00 - GYPSUM BOARD

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Interior gypsum board.
 2. Tile backing panels.

1.2 PRE-INSTALLATION MEETING

- A. Prior to start of each type of gypsum board system, and at the Contractor's direction, meet at the site and review the installation procedures and coordination with other Work. Meeting shall include Contractor, Architect and major material manufacturer, as well as the Installer and other subcontractors whose Work must be coordinated with the gypsum board Work.

1.3 ACTION SUBMITTALS

- A. CALgreen Submittals:
1. Product Data for Section 5.504.4.1.1: For sealants, adhesives and caulks, provide documentation including printed statement of VOC content showing compliance with SCAQMD Rule 1168 VOC limits and CCR (California Code of Regulations) Title 17 for aerosols.
 2. Product Data for Section 5.504.4.1.2: Provide documentation for aerosol adhesives, and smaller unit sizes of adhesives, sealant, and caulking compounds (in units of product, less packaging, which do not weigh more than one (1) pound and do not consist of more than sixteen (16) fluid ounces) comply with statewide VOC standards and prohibitions on use of certain toxic compounds, of CCR Title 17, commencing with Section 94507.
- B. Samples: Submit full size samples in 12 inch long lengths for each exposed trim accessory indicated.

1.4 QUALITY ASSURANCE

- A. Single-Source Responsibility for Panel Products: Obtain each type of gypsum board and other panel products from a single manufacturer.
- B. Single-Source Responsibility for Finishing Materials: Obtain finishing materials from either the same manufacturer that supplies gypsum board and other panel products or from a manufacturer acceptable to gypsum board manufacturer.

- C. Mockups: Before beginning gypsum board installation, install mockups of at least 100 sq. ft. in surface area to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Install mockups for the following:
 - a. Each level of gypsum board finish indicated for use in exposed locations.
 - 2. Apply or install final decoration indicated, including painting and wallcoverings, on exposed surfaces for review of mockups.
 - 3. Simulate finished lighting conditions for review of mockups.
 - 4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original packages, containers, or bundles bearing brand name and identification of manufacturer or supplier.
- B. Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic, and other causes. Stack gypsum panels flat to prevent sagging.
- C. Handle gypsum board to prevent damage to edges, ends, and surfaces. Do not bend or otherwise damage metal corner beads and trim.

1.6 FIELD CONDITIONS

- A. Comply with ASTM C 840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.
- B. Installation of gypsum board joint treatments shall not start until the space to receive gypsum board joint treatments is heated to maintain a continuous and uniform temperature of not less than 55 deg F, from one week prior to beginning of joint treatment until joint treatment is completed and thoroughly dry. Ventilation, either natural or supplied by fans, circulators or air conditioning systems shall be provided to remove excess moisture during joint treatment. Temperature requirements may be waived only on recommendation of gypsum board manufacturer.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: For gypsum board assemblies with fire-resistance ratings, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.
 - 1. Fire-Resistance-Rated Assemblies: Indicated by design designations from UL's "Fire Resistance Directory."

2.2 MATERIALS, GENERAL

- A. General: For fire rated assemblies, provide materials, including accessories and fasteners produced by one manufacturer, or, when products of more than one manufacturer are used in a rated system, they shall be acceptable to authorities having jurisdiction.

2.3 INTERIOR GYPSUM BOARD

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. American Gypsum.
 - 2. CertainTeed Corp.
 - 3. Georgia-Pacific Gypsum LLC.
 - 4. Continental Building Products/Lafarge North America Inc.
 - 5. National Gypsum Company.
 - 6. PABCO Gypsum.
 - 7. USG Corporation.
 - 8. or approved equal
- B. Panel Size: Provide in maximum lengths and widths available that will minimize joints in each area and correspond with support system indicated.
- C. Gypsum Board: ASTM C 1396/C 1396M.
 - 1. Type X:
 - a. Thickness: 5/8 inch .
 - b. Long Edges: Tapered.
 - c. Location: Vertical surfaces, where required for fire-resistance-rated assembly, and where indicated on Drawings.
- D. Flexible Gypsum Board for Curved Surfaces: ASTM C 1396/C 1396M, manufactured to bend to fit tight radii and to be more flexible than standard regular-type panels of the same thickness.

1. Thickness: 1/4 inch .
2. Long Edges: Tapered.
3. Location: Apply in double layer at curved assemblies.

E. Moisture and Mold Resistant Board: ASTM C 1396/C 1396M; with moisture- and mold-resistant core and facing surfaces.

1. Core: 5/8 inch.
2. Long Edges: Tapered.
3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.
4. Location: Plumbing walls and Interior ceiling surfaces at Restrooms.

2.4 TILE BACKING PANELS

A. Tile Backing Panels:

1. Glass-Mat, Water-Resistant Backing Board: ASTM C 1178/C 1178M, with core type and in thickness indicated. Available products include:
 - a. G-P Gypsum Corp.; Dens-Shield Tile Backer.
 - b. National Gypsum Company; GOLD BOND Brand E²XP Tile Backer.
 - c. USG; Securock Glass Mat Sheathing.
 - d. or approved equal

B. Panel Size: Provide in maximum lengths and widths available that will minimize joints in each area and correspond with support system indicated.

2.5 TRIM ACCESSORIES

A. Interior Steel Trim Accessories: ASTM C 1047; formed metal sheet steel zinc coated by hot-dipped process. Shapes indicated below by reference to Fig. 1 designations in ASTM C 1047.

1. Cornerbead: Use at outside corners.
2. LC-Bead with both face and back flanges to receive joint compound; use at exposed panel edges.
3. U-Bead with face and back flanges; face flange formed to be left without application of joint compound: Use where indicated.
4. Curved-Edge Cornerbead: With notched or flexible flanges; use at curved openings.
5. Expansion (Control) Joint: One-piece control joint formed with V-shaped slot, with removable strip covering slot opening. Use where indicated.

B. Aluminum Trim Accessories: Extruded aluminum trim with 1/4 inch diameter holes in fins for attachment to gypsum board or studs; longest lengths available in profiles indicated; primed for finish painting; sized for scheduled gypsum board thickness shown.

2.6 JOINT TREATMENT MATERIALS

- A. General: Provide joint treatment materials complying with ASTM C 475 and the recommendations of both the manufacturers of the products and joint treatment materials for each application indicated.
- B. Joint Tape:
 - 1. Interior Gypsum Board: Paper.
 - 2. Tile Backing Panels: As recommended by panel manufacturer.
 - 3. Paperless Gypsum Board: 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 and damaged surface areas, use setting-type taping compound.
 - 2. Embedding and First Coat: For embedding tape and first coat on joints, flanges of trim accessories, and fasteners, use setting-type taping compound.
 - 3. Second Coat: For filling over tape, beads and fasteners. Use setting-type, sandable topping compound.
 - 4. Third Coat: For finishing over tape, beads and fasteners. Use drying-type, all-purpose compound.
 - 5. Skim Coat: For final coat of Level 5 finish, use drying-type, all-purpose compound.

2.7 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.
- B. Acoustical Sealant for Exposed and Concealed Joints: Nonsag, paintable, nonstaining, latex sealant, with a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24), complying with ASTM C 834 that effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90. One of the following:
 - 1. SHEETROCK Acoustical Sealant; U.S. Gypsum.
 - 2. AC-20 FTR; Pecora.
 - 3. or approved equal
- C. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.
- D. Sound Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from slag wool, or rock wool.
 - 1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.
 - 2. Product: Subject to compliance with requirements, provide the following:

- a. Roxul AFB; Roxul Inc.
 - b. Rockwool Acoustic Slabs; Rockwool Ltd.
 - c. SAFB Blankets; Thermafiber LLC.
 - d. or approved equal
- E. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.
- F. Adhesives, adhesive bonding primers, adhesive primers, sealants, sealant primers and caulks shall comply with local or regional regulations as shown in CALgreen Section 5.504.4.1.
- G. Aerosol adhesives, and smaller unit sizes of adhesives, and sealant or caulking compounds shall comply with regulations as shown in CALgreen Section 5.504.4.2.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates to which gypsum board assemblies attach or abut, installed door frames and structural framing with Installer present for compliance with requirements for installation tolerances and other conditions affecting performance of assemblies specified in this Section. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 APPLYING AND FINISHING PANELS

- A. Gypsum Board Application and Finishing Standards: Install and finish gypsum panels to comply with ASTM C 840, GA-216, and the gypsum board manufacturer's recommendations, where standards conflict, the more stringent shall apply. Install specialty gypsum board as specified below except where manufacturer's instructions conflict; follow manufacturer's instructions for specialty performance board to maintain warranty coverage.
- B. Install sound attenuation blankets before installing gypsum panels, unless blankets are readily installed after panels have been installed on one side.
- C. Single-Layer Application:
1. On ceilings, apply gypsum panels before wall/partition board application to the greatest extent possible and at right angles to framing, unless otherwise indicated. Install ceiling board panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in the central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.
 2. On partitions/walls, apply gypsum panels vertically (parallel to framing), unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints or avoid them entirely.
 - a. Stagger abutting end joints not less than one framing member in alternate courses of board.

- b. At high walls, install panels horizontally, unless otherwise indicated or required by fire-resistance-rated assembly.

D. Multilayer Application:

1. 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.
2. On Ceilings: Apply gypsum board indicated for base layers before applying base layers on walls/partitions; apply base layers in same sequence. Apply base layers at right angles to framing members and offset face layer joints one framing member, 16 inches minimum, from parallel base joints, unless otherwise indicated or required by fire-resistance-rated assembly.

E. Single-Layer Fastening Methods: Apply gypsum panels to supports with steel drill screws.

F. Multilayer Fastening Methods: Fasten base layers and face layers separately to supports with screws.

G. Laminating to Substrate: Where gypsum panels are indicated as directly adhered to a substrate (other than studs, 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.

H. Curved Partitions:

1. Install panels horizontally and unbroken, to the extent possible, across curved surface plus 12 inches long straight sections at ends of curves and tangent to them.
2. Wet gypsum panels on surfaces that will become compressed where curve radius prevents using dry panels. Comply with gypsum board manufacturer's written recommendations for curve radii, wetting methods, stacking panels after wetting, and other preparations that precede installing wetted gypsum panels.
3. On convex sides of partitions, begin installation at one end of curved surface and fasten gypsum panels to studs as they are wrapped around curve. On concave side, start fastening panels to stud at center of curve and work outward to panel ends. Fasten panels to framing with screws spaced 12 inches o.c.
4. For double-layer construction, fasten base layer to studs with screws 16 inches o.c. Center gypsum board face layer over joints in base layer, and fasten to studs with screws spaced 12 inches o.c.
5. Allow wetted gypsum panels to dry before applying joint treatment.

I. Tile Backing Panels:

1. Glass-Mat, Water-Resistant Backing Panel: Install with 1/4 inch gap where panels abut other construction or penetrations.

- J. Install gypsum panels with face side out. Do not install imperfect, damaged, or damp panels. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.
- K. 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.
- L. Attach gypsum panels to steel studs so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.
- M. Attach gypsum panels to framing provided at openings and cutouts.
- N. Cover both faces of steel stud partition framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
 - 1. Fit gypsum panels around ducts, pipes, and conduits.
 - 2. Where partitions intersect open exterior and interior wall kickers, and other structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by the wall kickers and other structural members; allow 1/4 to 3/8 inch wide joints to install sealant.
 - 3. Where chase walls are shown, provide bracing between parallel rows of studs. Unless otherwise shown, provide gypsum board braces no less than 1/2 inch thick by 12 inches wide and cut to width of chase. Locate at quarter points in wall height between each pair of parallel studs. Fasten with not less than 3 screws at each stud.
- O. Isolate perimeter of non-load-bearing gypsum board partitions at structural abutments, except floors. Provide 1/4 to 1/2 inch wide spaces at these locations, and trim edges with U-bead edge trim where edges of gypsum panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- P. STC-Rated Assemblies: Seal construction at perimeters, behind control and expansion 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 manufacturer's written recommendations for locating edge trim and closing off sound-flanking paths around or through gypsum board assemblies, including sealing partitions above acoustical ceilings.
- Q. Cut openings in gypsum board for electrical outlets, piping and other penetrations. Maintain close tolerances so that edges will be covered by plates and escutcheons. Cut both face and back paper. Do not install electrical outlets back to back on opposing sides of partitions.
- R. Space fasteners in gypsum panels according to referenced gypsum board application and finishing standard and manufacturer's written recommendations.
 - 1. Space screws a maximum of 12 inches o.c. for vertical applications.
 - 2. Space fasteners in panels that are tile substrates a maximum of 8 inches o.c.
 - 3. Install fasteners not less than 3/8 inch from ends or edges of gypsum board sheets, spacing fasteners opposite each other on adjacent ends or edges.
 - 4. Begin fastening from center of gypsum board and proceed toward edges and corners.

5. Apply pressure on surface of gypsum board adjacent to fasteners being driven to ensure that gypsum board will be secured tightly to supporting members.
 - a. Drive fastener with shank perpendicular to face of board.
 - b. Drive screws with a power screwdriver as recommended by gypsum board manufacturer. Set heads of screws slightly below surface of paper without cutting paper.

3.3 INSTALLING TRIM ACCESSORIES

- A. General: Fasten trim accessories according to manufacturer's written instructions for type, length, and spacing of fasteners.
- B. Install corner beads at external corners.
- C. Install interior trim accessories where edge of gypsum panels would otherwise be exposed or semiexposed. Provide interior trim accessories with face flange formed to receive joint compound.
- D. Install aluminum trim accessories where indicated.
- E. Install control joints in locations indicated and where directed by the Architect for visual effect, or if not indicated or directed by the Architect, provide control joints in accordance with ASTM C 840 which is as follows:
 1. Where a partition, wall or ceiling traverses a construction joint (expansion, seismic, or building control element) in the base building structure.
 2. Where a wall or a partition runs in an uninterrupted straight plane exceeding 30 linear feet.
 3. Control joints in interior ceilings with perimeter relief shall be installed so that linear dimensions between control joints do not exceed 50 feet and total area between control joints does not exceed 2500 square feet.
 4. Control joints in interior ceilings without perimeter relief shall be installed so that linear dimensions between control joints do not exceed 30 linear feet and total area between control joints does not exceed 900 square feet.
 5. A control joint or intermediate blocking shall be installed where ceiling framing members change direction.

3.4 FINISHING GYPSUM BOARD ASSEMBLIES

- A. General: Apply joint treatment at gypsum board joints, flanges of interior trim and aluminum trim accessories, interior angles, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration and levels of gypsum board finish indicated. Produce surfaces free of tool marks and ridges ready for decoration of type indicated. Promptly remove residual joint compound from adjacent surfaces.
- B. Prefill open joints and damaged surface areas.

- C. Apply joint tape over gypsum board joints, except those with trim having flanges not intended for tape.
- D. Glass-Mat, Water-Resistant Backing Panels: Do not use paper tape and joint compound. Finish according to manufacturer's written instructions.
- E. Gypsum Board Finish Levels: Finish panels to levels indicated below, according to ASTM C 840, for locations indicated:
 - 1. Level 1: Embed tape at joints in ceiling plenum areas, concealed areas, and where indicated, unless a higher level of finish is required for fire-resistance-rated assemblies and sound-rated assemblies.
 - 2. Level 2: Embed tape and apply separate first coat of joint compound to tape, fasteners, and trim flanges where panels are substrate for tile and where indicated.
 - 3. Level 3: Typically not used.
 - 4. Level 4: Embed tape and apply separate first, fill, and finish coats of joint compound to tape, fasteners, and trim flanges at panel surfaces that will be exposed to view, unless otherwise indicated.
 - 5. Level 5: Embed tape and apply separate first, fill, and finish coats of joint compound to tape, fasteners, and trim flanges, and apply skim coat of joint compound over entire surface where gypsum board is indicated to receive wall coverings, semi-gloss and high gloss paints, and Italian plaster.

3.5 CLEANING AND PROTECTION

- A. Clean floors of all gypsum board debris and leave broom clean. Excess material, scaffolding, tools and other equipment are to be removed upon completion of the Work.
- B. Provide final protection and maintain conditions that ensure gypsum board assemblies remain without damage or deterioration at time of Substantial Completion.

END OF SECTION 09 29 00

SECTION 09 30 00 - TILING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes ceramic, porcelain, quarry, and glass tile.

1.2 PERFORMANCE REQUIREMENTS

- A. General: Provide floor tiles complying with one of the following standard and performance requirements.
- B. Dynamic Coefficient of Friction (DCOF): For tile installed on walkway surfaces, provide products with the following value as determined by testing identical products by the DCOF AcuTest Method per ANSI 137.1, 2012 Edition.
 - 1. Walkway Surfaces: Minimum 0.42.

1.3 ACTION SUBMITTALS

- A. Product Data: For each product indicated.
- B. CALgreen Submittals:
 - 1. Product Data for Section 5.504.4.1.1: For sealants, adhesives and caulks, provide documentation including printed statement of VOC content showing compliance with SCAQMD Rule 1168 VOC limits and CCR (California Code of Regulations) Title 17 for aerosols.
 - 2. Product Data for Section 5.504.4.1.2: Provide documentation for aerosol adhesives, and smaller unit sizes of adhesives, sealant, and caulking compounds (in units of product, less packaging, which do not weigh more than one (1) pound and do not consist of more than sixteen (16) fluid ounces) comply with statewide VOC standards and prohibitions on use of certain toxic compounds, of CCR Title 17, commencing with Section 94507.
 - 3. Product Data for Section 5.504.4.3: For architectural paints and coatings, provide documentation including printed statement of VOC content showing compliance with Table 1 of the ARB, Architectural Coatings Suggested Control Measure, unless more stringent local limits apply.
 - 4. Product Data for Section 5.504.4.3.1: Aerosol paints and coatings, provide documentation that products meet the PWMIR Limits for ROC in Section 94522 (a)(3) and other requirements, including prohibitions on use of certain toxic compounds and ozone depleting substances, in Section 94522(c)(2 and (d)(2) of CCR Title 17.
 - 5. Product Data for Section 5.504.4.3.1: In areas under the jurisdiction of the BAAQMD, provide documentation that products comply with the percent VOC by weight of product limits of BAAQMD Regulation 8 Rule 49, "Aerosol Paint Products."

- C. Shop Drawings: Submit shop drawings showing the extent of each type of movement joint. Show widths, details, and locations of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces.
- D. Samples: Submit samples showing full range of color and texture variations expected.
 - 1. Full size units of each type, composition, color, and finish of tile. Submit at least three samples of each tile proposed. Where tile size is smaller than 6- by-6-inches, submit sample boards a minimum of 12-by-12-inches showing variation of color and finish.
 - 2. Assembled samples with grouted joints for each color grout and for each type, composition, color, and finish of tile. Minimum size 12-by-12-inches or 3 full tiles.
 - 3. Thresholds in 6-inch lengths, each type.
 - 4. Metal edge strip in 6-inch lengths, each type.

1.4 INFORMATIONAL SUBMITTALS

- A. Test Reports: Submit test reports from qualified independent testing laboratory indicating and interpreting test results relative to compliance of tile products with requirements specified for slip resistance.
- B. Master Grade Certificates: Submit master grade certificates for each shipment, type, and composition of tile, signed by tile manufacturer and Installer.
- C. Product Certificates: Submit manufacturer's certifications for each type of grout and bonding material being provided suitable for the intended use and meet or exceed the referenced standards and the requirements of this Specification.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Instructions: Submit maintenance instructions for each type of product specified.

1.6 QUALITY ASSURANCE

- A. Installer: Engage an installer, with successful commercial tile installations similar in material, design, and scope to that indicated.
- B. Source Limitations for Tile: Obtain tile from one source or producer, and from same production run, and of consistent quality in appearance and physical properties for each contiguous area.

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 requirement in ANSI A137.1 for labeling sealed tile packages.

- B. Prevent damage or contamination to materials by water, freezing, foreign matter, and other causes.

1.8 FIELD 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.
- B. Close spaces to traffic during tile flooring installation.
- C. Close spaces to traffic for 72 hours after tile flooring installation.
- D. Shade all tile, materials and the work area from direct sunlight during the installation as needed to prevent rapid evaporation caused by excessive heat or wind.

PART 2 - PRODUCTS

2.1 TILE PRODUCTS, GENERAL

- A. ANSI Ceramic Tile Standard: Provide Standard grade tile that complies with ANSI A137.1 "Specifications for Ceramic Tile," and ANSI A137.2, "Specifications for Glass Tile," for types, compositions, and other characteristics indicated. Products and Manufacturers: Provide tile matching the Architect's samples which have been selected from the product lines and manufacturers indicated in Finish Schedule on Drawings.
- B. Mounting: For factory-mounted tile, provide back- or edge-mounted tile assemblies as standard with manufacturer, unless otherwise indicated.
- C. Tile Trim Units: Matching characteristics of adjoining flat tile and coordinated with sizes and coursing where applicable.
- D. Rectified Tile Edges: Provide all tile units having a face dimension of greater than 8" x 8" with factory rectified edges.

2.2 ACCESSORY MATERIALS

- A. Thresholds: Fabricate to provide transition between adjacent floor finishes. Bevel edges at 1:2 slope, limit height of bevel to 1/2 inch or less, and finish bevel to match face of threshold.
- B. Waterproofing for Toilet Room and Kitchen Tile Installations:
 - 1. Fabric-Reinforced and Unreinforced Fluid-Applied Product: System consisting of liquid-latex rubber, with a VOC content of 65 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24), and fabric reinforcement which are compatible with mortar bed specified and complying with ANSI A118.10; one of the following:

- a. Custom Building Products; 9240 Waterproofing and Anti-Fracture Membrane. which is manufactured in the plant closest to the geographic location of the project.
 - b. LATICRETE International Inc.; Laticrete 9235 Waterproof Membrane. which is manufactured in the plant closest to the geographic location of the project.
 - c. MAPEI Corporation; Mapelastic AquaDefense, which is manufactured in the plant closest to the geographic location of the project. Ardex; Ardex 8+9 which is manufactured in the plant closest to the geographic location of the project.
2. Adhesives, adhesive bonding primers, adhesive primers, sealants, sealant primers and caulks shall comply with local or regional regulations as shown in CALgreen Section 5.504.4.1.
 3. Aerosol adhesives, and smaller unit sizes of adhesives, and sealant or caulking compounds shall comply with regulations as shown in CALgreen Section 5.504.4.2.
 4. Paints and coatings shall comply with VOC content as shown in CALgreen Section 5.504.4.3.
- C. Crack Isolation Membrane for Tile Installations:
1. Adhesives, adhesive bonding primers, adhesive primers, sealants, sealant primers and caulks shall comply with local or regional regulations as shown in CALgreen Section 5.504.4.1.
 2. Aerosol adhesives, and smaller unit sizes of adhesives, and sealant or caulking compounds shall comply with regulations as shown in CALgreen Section 5.504.4.2.
 3. Paints and coatings shall comply with VOC content as shown in CALgreen Section 5.504.4.3.

2.3 SETTING AND GROUTING MATERIALS

- A. Manufacturers and Plant Locations: Provide products manufactured in the plant closest to the geographic location of the project.
- B. Source Limitations: For each tile installation, obtain compatible formulations of setting and grouting materials and waterproofing materials containing latex or latex additives from a single manufacturer.
- C. Latex-Portland Cement Mortar (Thin Set):
1. Prepackaged dry-mortar mix combined with dry powder latex additive, one of the following:
 - a. For Thin Set Placed over Slabs on Grade: ANSI A118.4 consisting of the following:
 - 1) Ultraflex 2 Mortar; MAPEI Corporation.
 - 2) Laticrete 253 Gold; Laticrete International Inc.
 - 3) Versabond Flex; Custom Building Products.
 - 4) or approved equal

- b. For Thin Set Tile Set over Walls, Membranes and Over Elevated Slabs: ANSI A118.15 consisting of the following:
 - 1) Kerabond Keralastic; MAPEI Corporation.
 - 2) Laticrete 272 mixed with Laticrete 333 Superflex; Laticrete International Inc.
 - 3) or approved equal
- 2. For wall applications, provide nonsagging mortar.
- D. Polymer-Modified Tile Grout (For Typical Applications): ANSI A118.7 compounded with calcium aluminate cement, non-shrinking, efflorescence free grout.
 - 1. Polymer Type: Dry, redispersible latex/polymer powder form, prepackaged with other dry ingredients, one of the following:
 - a. Prism; Custom Building Products.
 - b. Permacolor; Laticrete International Inc.
 - c. Ultracolor Plus FA; Mapei Corporation.
 - d. or approved equal
 - 2. Colors: As selected by Architect from manufacturers standards to match tile being grouted.
- E. Adhesives, adhesive bonding primers, adhesive primers, sealants, sealant primers and caulks shall comply with local or regional regulations as shown in CALgreen Section 5.504.4.1.
- F. Aerosol adhesives, and smaller unit sizes of adhesives, and sealant or caulking compounds shall comply with regulations as shown in CALgreen Section 5.504.4.2.
- G. Paints and coatings shall comply with VOC content as shown in CALgreen Section 5.504.4.3.

2.4 MISCELLANEOUS MATERIALS

- A. Joint Sealants:
 - 1. Typical Surfaces: "Mildew-Resistant Silicone Sealant', as specified in Section 07 92 00 "Joint Sealants."
 - 2. Floor Joints: 'Two-Part Polyurethane Sealant for Paving Applications,' as specified in Section 07 92 00 "Joint Sealants."
- B. 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.
- C. Grout Sealer: Grout manufacturers recommended product for sealing cementitious grout joints and that does not change color or appearance of grout.

- D. Underlayment Product for Leveling and Patching Floors indicated to receive Tiles :
Latex-modified, cement-based formulation provided or approved by manufacturer of
tile-setting materials for installations indicated.
 - 1. Either Ultraplan or Novaplan Underlayment; MAPEI Corporation.
 - 2. NXT Level Plus Underlayment; Laticrete International Inc.
 - 3. or approved equal

- E. Metal Edge Strips for Wall Applications: Metallic, angle or L-shaped, depth to match tile and
setting-bed thickness and having an integral provision for anchorage to substrate; white zinc
alloy exposed-edge material; furnish in longest lengths available.
 - 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. Blanke Corporation.
 - b. Ceramic Tool Company, Inc.
 - c. Schluter Systems L.P.
 - d. or approved equal

- F. Adhesives, adhesive bonding primers, adhesive primers, sealants, sealant primers and caulks
shall comply with local or regional regulations as shown in CALgreen Section 5.504.4.1.

- G. Aerosol adhesives, and smaller unit sizes of adhesives, and sealant or caulking compounds shall
comply with regulations as shown in CALgreen Section 5.504.4.2.

- H. Paints and coatings shall comply with VOC content as shown in CALgreen Section 5.504.4.3.

2.5 MIXING MORTARS AND GROUT

- A. Mix mortars and grouts to comply with referenced standards and mortar and grout
manufacturers' written instructions. Add materials and liquid latex additives in accurate
proportions. 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 PREINSTALLATION MEETING

- A. Prior to the installation of tile, and at the Contractor's direction, meet at the Project site to
review the material selections, substrate preparations, installation procedures, coordination with
other trades, special details and conditions, standard of workmanship, and other pertinent topics
related to the Work. The meeting shall include the Owner, Architect, the Contractor, tile
installer, tile and setting material manufacturer's representatives, and representatives of other
trades or subcontractors affected by the installation.

3.2 EXAMINATION

- A. Examine substrates, areas, and conditions where tile will be installed, with Installer present.
 - 1. Verify that substrates for setting tile are sound and free of voids, bugholes, rock pockets, honeycombs, and protrusions, and which are dry, clean, free of oil, waxy films, and curing compounds. Grind or scarify concrete substrates to remove existing floor adhesive and mortar residues (if any), laitance, films, sealing and curing compounds if they are determined to be present on the substrate.
 - 2. 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 before installing tile.

3.3 PREPARATION

- A. Remove paint, coatings, including curing compounds and other substances that are incompatible with tile-setting materials.
- B. Blending: Color blend tiles at Project site before installing.
 - 1. Furnish the same lots, batches, etc. within the same contiguous areas of the site (i.e. corridors on the same floors, common rooms which adjoin each other, etc.).

3.4 INSTALLATION, GENERAL

- A. Tile Installation Standards: Comply with parts of ANSI A108 Series "Specifications for Installation of Ceramic Tile" and the TCNA's "Handbook for Ceramic, Glass, and Stone Tile Installation" that apply to types of setting and grouting materials and to methods indicated.
- 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. 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. Align joints when adjoining tiles on floor, base, walls, and trim are same size. Lay out tile work and center tile fields in both directions in each space or on each wall area beginning at thresholds. Adjust to minimize tile cutting. 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.
- E. Finished Surfaces: Unless otherwise accepted in the sample installation(s), if any, finished surfaces shall present a flat, even appearance, free from waver, projections, and depressions.

- F. Movement (Contraction, Control, Expansion, and Isolation Joints) Joints: Locate sealant filled movement joints where recommended by the manufacturer of mortar and grout materials, but not less than the requirements of TCNA EJ171 which follows, and as accepted by the Architect. Form movement joints and other sealant-filled joints during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles. Where movement joints are to be butted, the ends shall touch and align.
1. Spacing Guidelines:
 - a. 20 to 25 feet in each direction where interior tile work is not exposed to direct sunlight or moisture.
 - b. 8 to 12 feet in each direction where interior tile work is exposed to direct sunlight and moisture.
 - c. Where tilework abuts restraining surfaces such as perimeter walls, dissimilar floors, curbs, columns, pipes, ceilings, and where changes occur in backing materials, but not at drain strainers.
 - d. In the joint between tiles making up the inside corner of planes.
 - e. All contraction, control, expansion, isolation, seismic and cold joints in the horizontal structure and vertical surfaces shall continue through the tile surfaces, but not through membranes.
 - f. Vertical and Horizontal Joints Widths: Widths for quarry tile and paver tile shall be the same as the grout joint but not less than 1/4 inch or the width of the contraction, control, expansion, seismic, isolation joint whichever is greater; widths for ceramic mosaic tile and glazed wall tile shall not be less than 1/8 inch or the width of the control, expansion, seismic, joint whichever is greater.
 - g. Keep movement joints free from dirt, debris, grout, mortar, and setting bed materials. Prepare joints and apply sealants to comply with requirements in Section 07 92 00 "Joint Sealants."
- G. Metal Edge Strips: Install where exposed edge of wall tile meets other wall finishes that finish flush with or below face of tile and the manufacturer of the field tile does not manufacture a tile edge transition trim. Where metal edge strips are indicated and full length single units are not available, joints are to be butted, ends shall touch and align.
- H. Grout Sealer: Apply grout sealer to cementitious grout joints in tile floors according to grout sealer manufacturer's written instructions. As soon as sealer has penetrated grout joints, remove excess sealer and sealer from tile faces by wiping with soft cloth.

3.5 WATERPROOFING INSTALLATION

- A. Install waterproofing to comply with ANSI A108.13 and waterproofing manufacturer's written instructions to produce waterproof membrane of uniform thickness bonded securely to substrate.

1. Do not install tile over waterproofing until waterproofing has cured, and at each horizontal installation, has been tested for water tightness. Test waterproofing membrane for watertightness by damming the floor drain, and creating a dam at the perimeter of the waterproofed basin followed by filling the basin with water, marking the height, and verifying the same height after 48 hours. Repair leaks before continuing with the installation of subsequent tile.

3.6 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.
 1. Do not install tile or setting materials over crack isolation membrane until membrane has cured.

3.7 FLOOR TILE INSTALLATION

- A. Thinset Tile over Concrete Slabs typical (): Install in accordance with the mortar manufacturer's recommendations and requirements indicated below for setting bed methods, installation methods related to types of subfloor construction, and grout installation methods and grout types. Where recommendations and methods conflict, the manufacturer's recommendations shall apply.
 1. Mortar: Latex-Portland Cement Mortar: ANSI A108.5.
 2. Concrete Subfloors, Interior: TCNA F113.
 - a. With a trowel, having notches sized as recommended by the mortar manufacturer, comb the surface of the mortar with the notched side of the trowel removing excess mortar. Spread only as much mortar as can be covered in the time limits established by the mortar manufacturer's recommendations.
 - b. Wipe the back of each tile, with a damp sponge, to remove all dust or dirt immediately before applying mortar to tiles.
 - c. Immediately after wiping tile backs, but prior to placing tile, the mortar shall be troweled to back of tile for 100 percent coverage to thickness of not less than 1/16-inch.
 - d. Place tiles onto mortar bed, maintaining 1/8-inch wide joints, and true accurate pattern as shown. Exercise care to quickly remove spillage from faces of tile using damp sponge. Rake out joints to depth required to receive grout as tile units are set.
 - e. Prohibit foot and wheel traffic on tiled floors for period of time as recommended by the mortar manufacturer.

3. Grout Installation: Do not begin grouting tiles until they are firmly set and, in no case, in less than 48 hours after they have been installed. Remove spacers, if any, prior to grouting. For typical installations, comply with latex-portland cement: ANSI A108.10. Fill joints of cushion edged tile to the depth of the cushion; fill joints of square edge tile flush with the tile surface. Do not permit mortar, mounting mesh, or spacer material to show through grouted joints. Provide hard finished grout, which is uniform in color, smooth, and without voids, pinholes, or low spots. Tool surfaces with shallow concave profile.
- B. Thinset Tile over Waterproof Membrane (Toilet Rooms): Install in accordance with the mortar manufacturer's recommendations and requirements indicated below for setting bed methods, installation methods related to types of subfloor construction, and grout installation methods and grout types. Where recommendations and methods conflict, the manufacturer's recommendations shall apply.
1. Mortar: Latex-Portland Cement Mortar: ANSI A108.5.
 2. Concrete Subfloors, Interior: TCNA F122 (on ground) and F122A (above ground).
 - a. Apply the mortar to waterproofed slab with the flat side of the trowel.
 - b. With a trowel, having notches sized as recommended by the mortar manufacturer, comb the surface of the mortar with the notched side of the trowel removing excess mortar. Spread only as much mortar as can be covered in the time limits established by the mortar manufacturer's recommendations.
 - c. Wipe the back of each tile, with a damp sponge, to remove all dust or dirt immediately before applying mortar to tiles.
 - d. Immediately after wiping tile backs, but prior to placing tile, the mortar shall be troweled to back of tile for 100 percent coverage to thickness of not less than 1/16-inch.
 - e. Place tiles onto mortar bed, maintaining 1/8-inch wide joints, and true accurate pattern as shown. Exercise care to quickly remove spillage from faces of tile using damp sponge. Rake out joints to depth required to receive grout as tile units are set.
 - f. Prohibit foot and wheel traffic on tiled floors for period of time as recommended by the mortar manufacturer.
 3. Grout Installation: Do not begin grouting tiles until they are firmly set and, in no case, in less than 48 hours after they have been installed. Remove spacers, if any, prior to grouting. For typical installations, comply with latex-portland cement: ANSI A108.10. Fill joints of cushion edged tile to the depth of the cushion; fill joints of square edge tile flush with the tile surface. Do not permit mortar, mounting mesh, or spacer material to show through grouted joints. Provide hard finished grout, which is uniform in color, smooth, and without voids, pinholes, or low spots. Tool surfaces with shallow concave profile.
- C. Thinset Tile over Crack Isolation Membrane: Install in accordance with the mortar manufacturer's recommendations and requirements indicated below for setting bed methods, installation methods related to types of subfloor construction, and grout installation methods and grout types. Where recommendations and methods conflict, the manufacturer's recommendations shall apply.

1. Mortar: Latex-Portland Cement Mortar: ANSI A108.5.
2. Concrete Subfloors, Interior: TCNA F125-Full.
 - a. Apply the mortar to crack isolation membrane covered slab with the flat side of the trowel.
 - b. With a trowel, having notches sized as recommended by the mortar manufacturer, comb the surface of the mortar with the notched side of the trowel removing excess mortar. Spread only as much mortar as can be covered in the time limits established by the mortar manufacturer's recommendations.
 - c. Wipe the back of each tile, with a damp sponge, to remove all dust or dirt immediately before applying mortar to tiles.
 - d. Immediately after wiping tile backs, but prior to placing tile, the mortar shall be troweled to back of tile for 100 percent coverage to thickness of not less than 1/16-inch.
 - e. Place tiles onto mortar bed, maintaining 1/8-inch wide joints, and true accurate pattern as shown. Exercise care to quickly remove spillage from faces of tile using damp sponges. Rake out joints to depth required to receive grout as tile units are set.
 - f. Prohibit foot and wheel traffic on tiled floors for period of time as recommended by the mortar manufacturer.
3. Grout Installation: Do not begin grouting tiles until they are firmly set and, in no case, in less than 48 hours after they have been installed. Remove spacers, if any, prior to grouting. Comply with Latex-portland cement: ANSI A108.10. Fill joints of cushion edged tile to the depth of the cushion; fill joints of square edge tile flush with the tile surface. Do not permit mortar, mounting mesh, or spacer material to show through grouted joints. Provide hard finished grout, which is uniform in color, smooth, and without voids, pinholes, or low spots. Tool surfaces with shallow concave profile.

3.8 WALL TILE INSTALLATION

- A. Install in accordance with the mortar manufacturer's recommendations and requirements indicated below for ANSI setting bed methods, TCNA installation methods related to types of construction, and grout ANSI installation methods and grout types. Where recommendations and methods conflict, the manufacturer's recommendations shall apply.
 1. Latex Portland Cement Mortar Installation (using specified latex portland cement mortar material): ANSI A108.5.
 2. Gypsum Wallboard, Interior (Latex Portland Cement Mortar) Method: TCNA W243, place tiles maintaining 1/8-inch wide joints, and true accurate pattern as shown.
 3. Cementitious Backerboard (Latex Portland Cement Mortar) Method: TCNA W244C, place tiles maintaining 1/8-inch wide joints, and true accurate pattern as shown.
 4. Grout Installation: Do not begin grouting tiles until they are firmly set and, in no case, in less than 48 hours after they have been installed. Remove spacers, if any, prior to grouting. Comply with Latex-portland cement: ANSI A108.10. Fill joints of cushion edged tile to the depth of the cushion; fill joints of square edge tile flush with the tile surface. Do not permit mortar, mounting mesh, or spacer material to show through grouted joints. Provide hard finished grout, which is uniform in color, smooth, and without voids, pinholes, or low spots. Tool surfaces with shallow concave profile.

3.9 RECESSED ACCESS DOOR PANEL INSTALLATION

- A. Install in accordance with the mortar manufacturer's recommendations and requirements indicated below for setting bed methods, installation methods related to types of construction, and grout installation methods and grout types. Where recommendations and methods conflict, the manufacturer's recommendations shall apply. Exercise care to quickly remove spillage from faces of tile using damp sponges. Rake out joints to depth required to receive grout as tile units are set.
1. Latex Portland Cement Mortar Installation (using specified latex portland cement mortar material): ANSI A108.5, applied to access panel manufacturer supplied metal lath welded to panel substrate.
 2. Gypsum Wallboard, Interior (Latex Portland Cement Mortar) Method: TCNA W243, place tiles maintaining 1/8-inch wide joints, and true accurate pattern as shown.
 3. Grout Installation: Do not begin grouting tile units until they are firmly set and, in no case, in less than 48 hours after they have been installed. Remove spacers, if any, prior to grouting. Comply with Latex-portland cement: ANSI A108.10. Fill joints flush with the tile unit surface. Do not permit mortar to show through grouted joints. Provide hard finished grout, which is uniform in color, smooth, and without voids, pinholes, or low spots. Tool surfaces with shallow concave profile.

3.10 CLEANING AND PROTECTING

- A. Cleaning: On completion of placement and grouting, clean all 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.
- B. Finished Tile Work: Leave finished installation clean and free of cracked, chipped, broken, unbonded, and otherwise defective tile work. Replace all cracked, chipped, and broken tile units with matching tile units; patched tile units will not be permitted.
- C. When recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear.
- D. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.

END OF SECTION 09 30 00

SECTION 09 30 33 - STONE TILING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes stone tile.

1.2 PERFORMANCE REQUIREMENTS

- A. General: Provide floor tiles complying with one of the following standards and performance requirements.
- B. Static Coefficient of Friction (SCOF): For tile installed on walkway surfaces, provide products with the following values as determined by testing identical products per ASTM C 1028:
 - 1. Walkway Surfaces: Minimum 0.42.
- C. Dynamic Coefficient of Friction (DCOF): For tile installed on walkway surfaces, provide products with the following value as determined by testing identical products by the DCOF AcuTest Method per ANSI 137.1, 2012 Edition.
 - 1. Walkway Surfaces: Minimum 0.42.

1.3 PRE-INSTALLATION COORDINATION

- A. Pre-Installation Meeting: Prior to the start of interior stonework, a meeting shall be held at the project site to review installation procedures and coordination with other work. The meeting shall include the interior stone subcontractor, Contractor, Architect, , membrane installer(if any), scarification subcontractor (if any), and representatives of other trades affected by the Work.
- B. Coordinate all aspects of the stonework with contiguous work and provide components at the proper time and sequence to avoid delays in the Work.

1.4 ACTION SUBMITTALS

- A. Product Data: Submit product data for each type of stone, setting and grouting material.
 - 1. Include submittal of stone sealer manufacturer's recommended methods for application of impregnator and surface protection coatings based on testing of project specific stone flooring materials.
- B. CALgreen Submittals:

1. Product Data for Section 5.504.4.1.1: For sealants, adhesives and caulks, provide documentation including printed statement of VOC content showing compliance with SCAQMD Rule 1168 VOC limits and CCR (California Code of Regulations) Title 17 for aerosols.
 2. Product Data for Section 5.504.4.1.2: Provide documentation for aerosol adhesives, and smaller unit sizes of adhesives, sealant, and caulking compounds (in units of product, less packaging, which do not weigh more than one (1) pound and do not consist of more than sixteen (16) fluid ounces) comply with statewide VOC standards and prohibitions on use of certain toxic compounds, of CCR Title 17, commencing with Section 94507.
 3. Product Data for Section 5.504.4.3: For architectural paints and coatings, provide documentation including printed statement of VOC content showing compliance with Table 1 of the ARB, Architectural Coatings Suggested Control Measure, unless more stringent local limits apply.
 4. Product Data for Section 5.504.4.3.1: Aerosol paints and coatings, provide documentation that products meet the PWMIR Limits for ROC in Section 94522 (a)(3) and other requirements, including prohibitions on use of certain toxic compounds and ozone depleting substances, in Section 94522(c)(2 and (d)(2) of CCR Title 17.
- C. Shop Drawings: Submit shop drawings indicating plans, elevations, and details showing stone tile sizes, dimensions of tiled areas, joint patterns, and tile patterns.
1. Show the extent of each type of movement joint. Show widths, details, and locations of expansion, contraction, control, and isolation joints in substrates receiving stone and finished stone surfaces.
- D. Samples:
1. Submit sets of 12-inch square samples for each color, grade, finish, type and specie of stone consisting of units not less than full face size indicated for each stone thickness. Include 3 or more units in each set of samples showing the full range of appearance characteristics to be expected in completed Work. Stone delivered to the jobsite, or installed, and which does not fall within the accepted sample range, may be subject to removal and replacement with stone that falls within the accepted sample range at no cost to the Owner.
 - a. Include sealer treatment on one half of exposed stone face for each sample submitted.
 2. Submit one 12 inch long sample of each stone divider and transition strip.
 3. Submit 12 inch long grout Samples for each color grout to be used to grout each type, composition, color, and finish of stone.
 4. Submit a minimum of two samples of stone with setting material and sealant applied to demonstrate that materials do not stain stone tiles.

1.5 INFORMATIONAL SUBMITTALS

- A. Floor Stone Testing Results: Submit test reports from qualified independent testing laboratory indicating and interpreting test results relative to compliance of stone flooring with requirements specified for slip resistance.

- B. Product Certificates: Submit manufacturer's certifications for each type of grout and bonding material being provided are suitable for the intended use and meet or exceed the referenced standards and the requirements of this specification.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: Submit maintenance instructions for each type of product specified.

1.7 QUALITY ASSURANCE

- A. Single Source Responsibility for Stone: Obtain each stone from a single source with resources to provide materials of consistent quality in appearance and physical properties, including the capacity to cut and finish material without delaying the progress of the Work.
- B. Installer Qualifications:
 - 1. Subcontract the stone tile work to a single firm with a successful experience in conventional set stonework comparable to that shown and specified, in not less than one project of similar scope to the satisfaction of the City. The stonework includes, but is not necessarily limited to, the following:
 - a. All preparation for stone tile work, including but not limited to, submittals, site erection, and sample installations as specified herein.
 - b. Interior direct cladding to architectural woodwork and partitions, interior stone flooring, stone thresholds, stair treads, stair risers and stair platform flooring.
 - c. All anchors, supports, inserts and fasteners for the above, fabrication and installation of same.
 - d. All sealants and joint fillers in conjunction with the above.
- C. Floor Stone Testing: Test project specific stone flooring materials (each specie and finish) to verify the dilution rates, visual and physical performance of the impregnator and stone protection coats. Test for slip resistance in accordance with ASTM C 1028 and report the static coefficient of friction for each stone specie and finish.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to Project in undamaged condition.
- B. Store and handle stone and related materials to prevent their deterioration or damage due to moisture, temperature changes, contaminants, corrosion, breakage, chipping, or other causes.
 - 1. Do not use pinch or wrecking bars.
 - 2. Lift with wide-belt type slings where possible; do not use wire rope or ropes containing tar or other substances which might cause staining.
 - 3. Store stones on wood skids or pallets, covered with non-staining, waterproof membrane. Place and stack skids and stones to distribute weight evenly and to prevent breakage or cracking of stones.

4. Protect stone on wood skids or pallets, covered with non-staining, waterproof membrane, but allow air to circulate around stones.
5. Store cementitious materials off the ground, under cover and in dry location.

1.9 FIELD CONDITIONS

- A. Maintain temperatures within range recommended by the mortar and grout manufacturer, but not less than 50 deg F or more than 90 deg F, in spaces during stone setting. After installation maintain temperatures within range recommended by the mortar and grout manufacturer.
- B. Close spaces to traffic during stone flooring installation.
- C. Close spaces to traffic for 72 hours after stone flooring installation.
- D. Shade all stone, materials and the work area from direct sunlight during the installation as needed to prevent rapid evaporation caused by excessive heat or wind.

PART 2 - PRODUCTS

2.1 STONE, GENERAL

- A. Comply with referenced standards and other requirements indicated applicable to each type of material required.
- B. Provide matched blocks from a single quarry for each type, specie, color and quality of stone required. Extract blocks from a single bed of quarry stratum, especially reserved for Project, unless stones from randomly selected blocks are acceptable to Architect for aesthetic effect.
- C. Visual Performance Criteria: All portions of stonework shall be furnished complying with the following criteria, all as reviewed and accepted by the Architect through sample submissions, sample installations, and thereafter on-site observations:
 1. Color Range: Matching Architect's samples; uniform with no discernable variations between pieces in any contiguous area.
 2. Finishing Technique:
 - a. Polished Finish: Uniform highly reflective mirror gloss finish with the full color and crystal structure of the stone visible through the finish. Evidence of swirl shall not be permitted.
 - b. Honed Finish: Uniform throughout. Evidence of swirl shall not be permitted.

2.2 STONE TYPES

- A. General: Comply with ASTM C 503 for marble, ASTM C 615 for granite, ASTM C 1527 for travertine and as follows. Stone shall be sound, durable, and free of imperfections such as spalls, cracks, starts, seams, pits, stain producing minerals, and other defects that will impair its strength, durability and appearance. All material shall be subject to culling as required to match Architect's preselected control samples prior to acquisition and thereafter through all stages of fabrication prior to delivery. Blend tile units at factory/warehouse.
- B. Association Standard for Quality and Fabrication:
 - 1. "Design Manual VII" of Marble Institute of America (MIA).
 - 2. "Specifications for Architectural Granite" as published by the National Building Granite Quarriers Association (NBGQA).
 - 3. "Indiana Limestone Handbook" as published by the Indiana Limestone Institute (ILI).
- C. Species, Finishes, and Suppliers: Provide stone matching the Architect's samples which have been selected from the product lines, suppliers, and quarriers, indicated in the Finish Schedules on the Drawings.

2.3 SETTING AND GROUTING MATERIALS

- A. Manufacturers and Plant Locations:
 - 1. Custom Building Products.
 - 2. LATICRETE International Inc.
 - 3. MAPEI Corporation.
 - 4. or approved equal
- B. Source Limitations: For each type of stone installation, obtain compatible formulations of setting, grouting and waterproof membrane materials containing latex or latex additives from a single manufacturer and designed to work together as a system
- C. Adhesives, adhesive bonding primers, adhesive primers, sealants, sealant primers and caulks shall comply with local or regional regulations as shown in CALgreen Section 5.504.4.1.
- D. Aerosol adhesives, and smaller unit sizes of adhesives, and sealant or caulking compounds shall comply with regulations as shown in CALgreen Section 5.504.4.2.
- E. Paints and coatings shall comply with VOC content as shown in CALgreen Section 5.504.4.3.
- F. Latex-Portland Cement Mortar (Thin-Set) Mortar: ANSI A118.4 consisting of the following:
 - 1. Prepackaged dry-mortar mix combined with liquid-latex additive.
 - 2. For wall applications, provide nonsagging mortar.
 - 3. For setting white and light colored stone tile units use non-staining white, low alkali containing, Portland cement in the mortar that will not show through the stone tile body.
- G. Polymer-Modified Tile Grout: ANSI A118.7.

1. Polymer Type: Dry, redispersible latex/polymer powder form, prepackaged with other dry ingredients and which contain dyes that have a proven track record of not leaching into natural stone. Use sanded grout at joints 1/8 inch wide or greater, use unsanded grout at joints 1/8 inch wide or less and wherever polished stone surfaces are to be grouted.
2. Colors: As selected by Architect from manufacturer's standards to match stone being grouted.

H. Crack Isolation Membrane for Stone Installations:

1. Fabric-Reinforced, Fluid-Applied Product: System consisting of liquid-latex rubber, with a VOC content of 65 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24), and fabric reinforcement which are compatible with mortar bed specified and complying with ANSI A118.12; one of the following:
 - a. Custom Building Products; 9240 Waterproofing and Anti-Fracture Membrane.
 - b. LATICRETE International Inc.; Laticrete 9235 Waterproof Membrane.
 - c. MAPEI Corporation; Mapelastic AquaDefense.
 - d. or approved equal

2.4 ACCESSORIES

- A. General: Use only adhesives formulated for stone and recommended by their manufacturer for the application indicated.
- B. Organic Adhesive For Adhering Stone Base to Gypsum Board Partitions: 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) and non-staining to stone.
- C. Joint Sealants:
 1. Typical Surfaces: 'Mildew-Resistant Silicone sealant', as specified in Section 07 92 00 "Joint Sealants."
 2. Floor Joints: 'Two-Part Polyurethane Sealant for Paving Applications', as specified in Section 07 92 00 "Joint Sealants."
- D. Floor Cleaner: Provide stone cleaners of proper formulation for stone types, finishes, and applications indicated, as recommended by stone supplier and, if a sealer is specified, by sealer manufacturer. Use cleaning agents which do not contain caustic or harsh fillers that will damage stone or stone finishes.
- E. Floor Sealer: Provide stone sealing materials as manufactured by HMK Stone Care System, or approved equal .
 1. Impregnator: Slip resistant, low viscosity, UV resistant, water vapor permeable, silicone based impregnator specifically formulated to penetrate stone and grout pore structures without changing the color or sheen of the stone to which it is applied and which provides an invisible barrier of protection from water, dirt, oil, grease, and alkali infiltration.

- a. S32 Silicone Impregnator.
2. Surface Protection Coating: Slip and scuff resistant, no-rinse type, 100% natural vegetable soap cleanser, which is pH neutral (pH 7), vapor permeable and compatible with impregnator, and which emulsifies dirt and debris on the stone surface while repelling liquids. Will not change the color or sheen of the stone to which it is applied.
 - a. P24 Liquid Stone Soap "No Rinse."
- F. Setting Buttons: Resilient plastic buttons, non-staining to stone, sized to suit joint thicknesses and bed depths of stonework involved.

2.5 STONE TILE FABRICATION

- A. General: Fabricate stone tile in sizes and shapes required to comply with requirements indicated, including details on Drawings and shop drawings.
- B. Accurately cut, dress, drill, fit and finish stonework to shapes, profiles and dimensions shown on Drawings and/or final shop and setting drawings. Make exposed surfaces straight, sharp, true and continuous at joints within the tolerances specified.
 1. Stone Sizes: As indicated.
 2. Stone Thickness: 3/8 inch, unless otherwise shown.
 3. Fabrication Tolerances:
 - a. Size and Squareness:
 - 1) Unit Thickness of 3/8 inch: +/- 1/64 inch in 12 inches for tiles with polished or honed faces; or plus or minus 1/32 inch for tiles with sand-rubbed, natural-cleft, or thermal-finished faces
 - b. Thickness:
 - 1) 3/8 inch Stone Tiles with Smooth Finish: Vary from specified thickness by not more than plus or minus 1/32 inch.
 - 2) 3/8 inch Stone Tiles with Natural-Cleft or Thermal Finish: Vary average thickness of each tile from specified thickness by not more than plus 1/16 inch,.
 4. Cut all joints and edges square and at right angles to face, and with backs parallel to face. Make arrises straight, sharp, true, and continuous at joints.
 5. Clean sawn stones to remove rust stains and free iron particles.
- C. Finish exposed faces of stones to comply with requirements indicated for finish under each type and application of stone required and to match approved samples and field constructed sample installations.

2.6 MORTAR AND GROUT MIXES

- A. Mix mortars and grouts to comply with the requirements of referenced standards and with manufacturers' written instructions including those for accurate proportioning of materials and liquid latex additive content; mix materials with type of equipment, selection of speeds, in proper containers, for time periods, and other procedure needed to produce mortars and grouts of uniform quality and with optimum performance characteristics for application specified or indicated.

PART 3 - EXECUTION

3.1 PREINSTALLATION MEETING

- A. Prior to the installation of stone tile, and at the Contractor's direction, meet at the project site to review the material selections, substrate preparations, installation procedures, coordination with other trades, special details and conditions, standard of workmanship, and other pertinent topics related to the Work. The meeting shall include the Owner, Architect, the Contractor, stone tile installer, stone and setting material manufacturer's representatives, and representatives of other trades or subcontractors affected by the installation.

3.2 EXAMINATION

- A. Examine substrates and areas where the stonework will be installed, with Installer present.
 - 1. Verify that substrates for setting stone floor tile are sound and free of voids, bugholes, rock pockets, honeycombs, and protrusions; and which are dry; clean; free of oil, waxy films, and curing compounds. Grind or scarify concrete substrates to remove existing floor adhesive and mortar residues (if any), laitance, films, sealing and curing compounds if they are determined to be present on the substrate.
 - 2. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind stone tile has been completed before installing stone tile.
 - 3. Verify that joints and cracks in the existing floor substrates are coordinated with the stone joint locations; if not coordinated, adjust joint locations in consultation with Architect.
 - 4. Do not commence installation of flooring materials until floor substrate is within the following tolerances in all directions. If substrate is not within tolerance, level the substrate using a method and a product(s) that is compatible with and acceptable to the setting materials manufacturer.
 - a. Subfloor Surfaces to Receive Thinset and Medium Set Setting Beds: +/- 1/8 inch in 10 feet non-cumulative or as required by the stone tile manufacturer
 - b. Subfloor Surfaces to Receive Thickset Setting Beds: +/- 1/4 inch in 10 feet non-cumulative.
 - c. No valleys or ridges greater than 1/8 inch.
- B. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.3 PREPARATION

- A. Grind concrete substrates to remove existing floor adhesive and mortar residues (if any), films, sealing and curing compounds if they are determined to be present on the substrate.
- B. Blending: Color blend tiles at Project site before installing.
 - 1. Furnish the same lots, batches, etc. within the same contiguous areas of the site (i.e., corridors on the same floors, common rooms which adjoin each other, etc.).

3.4 INSTALLATION, GENERAL

- A. Installation Methods and Standards: Stone setting shall be in accordance with the applicable requirements and recommendations of the Marble Institute of America (MIA), unless otherwise specified or shown.
- B. Stonework shall be installed by skilled mechanics. Employ skilled stone fitters at the site to do necessary field cutting as stones are set.
 - 1. Use power saws with diamond tipped blades to cut stone. Cut lines straight and true, with edges eased slightly to prevent snipping.
- C. Set stone to comply with requirements indicated on Drawings and Shop Drawings. Set stone accurately in locations indicated, with uniform joints of 1/8 inch, unless greater widths are indicated, and with edges and faces aligned. Do not install stone units which are warped, curled, cracked, chipped, or broken, discolored or not properly finished.
- D. Extend stonework into recesses and under or behind equipment and fixtures to form a complete covering without interruptions, unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
- E. Accurately form intersections and returns. Perform cutting and drilling of stone without marring visible surfaces. Fit stone closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap stone. Where cut edges will be visible after installation, finish to match factory-fabricated edges.
- F. Lay stone in grid pattern, unless otherwise indicated. Align joints when adjoining stone units on floor, base, walls, and trim are the same size. Lay out stonework and center stone fields in both directions in each space beginning at thresholds. Lay out stonework and center stone fields in both directions on each wall area. Adjust to minimize cutting.
- G. Divider and Transition Strips: Install divider and transition strips at locations indicated and where exposed edge of stone flooring meets carpet or other flooring which finishes flush with top of stone flooring units.

- H. Movement (Contraction, Control, Expansion, and Isolation Joints) Joints: Locate sealant filled movement joints where recommended by the manufacturer of mortar and grout materials but not less than the requirements of TCNA EJ171 which follows, and as accepted by the Architect. Form movement joints and other sealant-filled joints during installation of setting materials, mortar beds, and stone. Do not saw-cut joints after installing stone.

1. Spacing Guidelines:

- a. Where stone plane abuts restraining surfaces such as perimeter walls, dissimilar floors, curbs, columns, pipes, ceilings, and where changes occur in backing materials, but not at drain strainers.
- b. In the joint between stone units making up the inside corner of planes.
- c. All contraction, control, expansion, isolation, seismic and cold joints in the horizontal structure and vertical surfaces shall continue through the stone surfaces, but not through membranes.
- d. Vertical and Horizontal Joints Widths: Widths for the stone shall be the same as the grout joint but not less than 1/8 inch or the width of the control, expansion, seismic, joint whichever is greater.
- e. Keep movement joints free from dirt, debris, grout, mortar, and setting bed materials. Prepare joints and apply sealants to comply with requirements in Section 07 92 00 "Joint Sealants."

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.
1. Do not install stone or setting materials over crack isolation membrane until membrane has cured.

3.6 STONE FLOOR TILE INSTALLATION

- A. Thinset Stone Tile over Concrete Slabs (Typical): Install in accordance with the mortar manufacturer's recommendations and requirements indicated below for ANSI setting bed methods, TCNA installation methods related to types of subfloor construction, and grout ANSI installation methods and grout types. Where recommendations and methods conflict, the manufacturer's recommendations shall apply.
1. Mortar: Latex-Portland Cement Mortar: ANSI A108.5.
 2. Concrete Subfloors, Interior: TCNA F113 Stone.
 - a. With a trowel, having notches sized as recommended by the mortar manufacturer, comb the surface of the mortar with the notched side of the trowel removing excess mortar. Spread only as much mortar as can be covered in the time limits established by the mortar manufacturer's recommendations.
 - b. Wipe the back of each stone tile, with a damp sponge, to remove all dust or dirt immediately before applying mortar to stone tiles.

- c. Immediately after wiping stone tile backs, but prior to placing stone tile, the mortar shall be troweled to back of stone tile for 100% coverage to thickness of not less than 1/16 inch.
 - d. Place stone tiles onto mortar bed, maintaining 1/8 inch wide joints, and true accurate pattern as shown. Exercise care to quickly remove spillage from faces of stone tile units using damp sponges. Rake out joints to depth required to receive grout as stone tile units are set.
 - e. Prohibit foot and wheel traffic on stone tiled floors for period of time as recommended by the mortar manufacturer.
 3. Grout Installation, Do not begin grouting stone units until they are firmly set and, in no case, in less than 48 hours after they have been installed. Remove spacers, if any, prior to grouting. Comply with Latex-portland cement: ANSI A108.10. Fill joints flush with the stone unit surface. Do not permit mortar to show through grouted joints. Provide hard finished grout, which is uniform in color, smooth, and without voids, pinholes, or low spots. Tool surfaces with shallow concave profile.
- B. Thinset Stone over Crack Isolation Membrane: Install in accordance with the mortar manufacturer's recommendations and requirements indicated below for ANSI setting bed methods, TCNA installation methods related to types of subfloor construction, and grout ANSI installation methods and grout types. Where recommendations and methods conflict, the manufacturer's recommendations shall apply.
 1. Mortar: Latex-Portland Cement Mortar: ANSI A108.5.
 2. Concrete Subfloors, Interior: TCNA F125-Full Stone.
 - a. Apply the mortar to crack isolation membrane covered slab with the flat side of the trowel.
 - b. With a trowel, having notches sized as recommended by the mortar manufacturer, comb the surface of the mortar with the notched side of the trowel removing excess mortar. Spread only as much mortar as can be covered in the time limits established by the mortar manufacturer's recommendations.
 - c. Wipe the back of each stone tile, with a damp sponge, to remove all dust or dirt immediately before applying mortar to stone tiles.
 - d. Immediately after wiping tile backs, but prior to placing stone tile, the mortar shall be troweled to back of tile for 100% coverage to thickness of not less than 1/16-inch.
 - e. Place stone tiles onto mortar bed, maintaining 1/8-inch wide joints, and true accurate pattern as shown. Exercise care to quickly remove spillage from faces of tile using damp sponges. Rake out joints to depth required to receive grout as stone tile units are set.
 - f. Prohibit foot and wheel traffic on tiled floors for period of time as recommended by the mortar manufacturer.
 3. Grout Installation: Do not begin grouting stone units until they are firmly set and, in no case, in less than 48 hours after they have been installed. Remove spacers, if any, prior to grouting. Comply with Latex-portland cement: ANSI A108.10. Fill joints flush with the stone unit surface. Do not permit mortar to show through grouted joints. Provide hard finished grout, which is uniform in color, smooth, and without voids, pinholes, or low spots. Tool surfaces with shallow concave profile.

3.7 STONE TILE WALL INSTALLATION

- A. Install in accordance with the mortar manufacturer's recommendations and requirements indicated below for ANSI setting bed methods, TCNA installation methods related to types of construction, and grout ANSI installation methods and grout types. Where recommendations and methods conflict, the manufacturer's recommendations shall apply. Exercise care to quickly remove spillage from faces of stone using damp sponges. Rake out joints to depth required to receive grout as stone units are set.
1. Latex Portland Cement Mortar Installation (using specified latex portland cement mortar material): ANSI A108.5.
 2. Gypsum Wallboard, Interior (Latex Portland Cement Mortar) Method: TCNA W243 Stone, place tiles maintaining 1/8 inch wide joints, and true accurate pattern as shown.
 3. Grout Installation: Do not begin grouting stone units until they are firmly set and, in no case, in less than 48 hours after they have been installed. Remove spacers, if any, prior to grouting. Comply with Latex-portland cement: ANSI A108.10. Fill joints flush with the stone unit surface. Do not permit mortar to show through grouted joints. Provide hard finished grout, which is uniform in color, smooth, and without voids, pinholes, or low spots. Tool surfaces with shallow concave profile.

3.8 INSTALLATION TOLERANCES

- A. Tolerances: Set stone to comply with the following tolerances:
1. Variation from Plumb: +/- 1/8 inch in 10 feet.
 2. Variation in Level: +/- 1/8 inch in 10 feet,.
 3. Variation in Plane between Adjacent Units (Lipping): +/- 1/32 inch difference between planes of adjacent units.
 4. Variation in Joint Width: +/- 1/32 inch.

3.9 CLEANING, SEALING AND PROTECTION

- A. Cleaning:
1. General: Upon completion of placement and grouting remove latex-portland cement grout residue and haze from stone as soon as possible.
 2. Flooring:
 - a. Curing: Before applying stone impregnator and stone soap allow the setting bed and grout materials to cure a minimum of 21 days.

- b. Floor Preparation: Clean substrates of substances that could impair penetration and bond of the stone impregnator to stone using cleaning solutions, dilution rates, dwell times as recommended by the stone impregnator manufacturer. Apply cleaning solutions using low speed (175 rpm) floor cleaning machine suitable for deep cleaning, and non-damaging to, smooth textured, stone surfaces coupled with a wet vac; by using a mop and bucket; or using auto-scrub brushing techniques each in accordance with the stone impregnator manufacturer's recommendations. If auto-scrub brushing, thoroughly scrub stone flooring using soft medium bristle brush heads, instead of nylon pads, to deep clean textured surfaces and grout joints of polished and honed finished surfaces. Test floor cleaning machine, or auto-scrub brushes, to ensure that they will not harm each of the finishes, and types, of stone flooring prior to cleaning operations. During machine cleaning, or auto-scrubbing, operations monitor the quality and cleanliness of the equipment, or brushes, to assure that they do not become worn or contaminated and scratch the finish of the stone flooring.

B. Sealing:

1. Impregnator Application: Allow floor to thoroughly dry for 24 to 72 hours after floor preparation. Using brush, or roller, applicators apply two thin, even, wet on wet coats of impregnator allowing 5 to 10 minutes between each coat for proper penetration unless otherwise recommended by the impregnator manufacturer. 10 to 15 minutes after final coat is placed, but prior to its surface drying, remove all excess "puddled" impregnator using a white cloth to avoid splotchy/dull areas. Allow 72 hours for impregnator to cure.
2. Surface Protection Coating: Not more than 4 days before occupancy by Owner apply no-rinse stone surface protection coating to stone using dilution rates as recommended by the surface protection coating manufacturer. Apply surface protection coating by using either mop and bucket or auto-scrub brushing techniques in accordance with the surface protection coating manufacturer's recommendations. If scrub brushing, thoroughly scrub stone flooring using soft medium bristle brush heads, instead of nylon pads, to deep clean textured surfaces and grout joints of polished and honed finished surfaces. Test brushes, to ensure that they will not harm each of the finishes, and types, of stone flooring prior to cleaning operations. During auto-scrubbing operations monitor the quality and cleanliness of the brushes, to assure that they do not become worn or contaminated and scratch the finish of the stone flooring. Do not rinse with water as rinsing will remove the stone surface protection coating.

C. Leave finished installation clean and free of warped, curled, cracked, chipped, broken, unbonded, discolored and otherwise defective stone units.

1. Replace warped, curled, cracked, chipped, broken, unbonded, discolored and otherwise defective stone in manner which results in stonework matching approved samples and field-constructed sample installations, showing no evidence of replacement.

D. Protect installed stone work with minimum 40 lb kraft paper or other heavy, breathable, covering and maintain conditions in a manner acceptable to the stone material manufacturers and installer that ensures that stone work is without damage or deterioration at time of Substantial Completion.

END OF SECTION 09 30 33

SECTION 09 51 13 - ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes acoustical panels and exposed suspension systems for ceilings.

1.2 COORDINATION

- A. Coordinate layout and installation of acoustical panels and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

1.3 ACTION SUBMITTALS

- A. CALgreen Submittals:
 - 1. [Product Data for Section 5.504.4.3.1: Submit documentation showing compliance with VOC emission limits defined in the 2009 Collaborative for High Performance Schools (2009 CHPS) criteria and listed on it High Performance Products Database.
- B. Samples: Submit samples for each acoustical panel, for each exposed suspension system member, for each exposed molding and trim, and for each color and texture required, prepared on Samples of size indicated below. Samples shall show the full range of color and texture variations to be expected in the final installation.
 - 1. Acoustical Panel: Set of 6-inch square Samples of each type, color, pattern, and texture.
 - 2. Exposed Suspension System Members, Moldings, and Trim: Set of 12-inch long Samples of each type, finish, and color.

1.4 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish and store at the site where directed, 2 percent of each type of acoustic panel installed in the Project, packaged in manufacturer's unopened cartons and identified as to contents.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an Installer, who is experienced in the installation of materials specified, and who has completed acoustical panel ceilings similar in material, design, and extent to that indicated for this Project with a record of successful in-service performance.
- B. Source Limitations: Obtain each type of acoustical ceiling panel and supporting suspension system through one source from a single manufacturer.

- C. Performance Requirements: In areas where gypsum wallboard partitions are dependent on the ceiling suspension system for lateral support, design and install suspension system components to sustain the imposed load from the completed partition system including a minimum inward and outward pressure of 5 psf normal to the plane of the wall.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver acoustical panels, suspension system components, and accessories to Project site in original, unopened packages and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.
- B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.
- C. Handle acoustical panels carefully to avoid chipping edges or damaging units in any way.

1.7 FIELD CONDITIONS

- A. Environmental Limitations: Do not install acoustical panel ceilings until wet work (painting, drywall, interior tilework, and concrete leveling) in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

PART 2 - PRODUCTS

2.1 METAL SUSPENSION SYSTEMS

- A. Metal Suspension System Standard: Provide manufacturer's standard direct-hung metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable requirements in ASTM C 635.
- B. Overhead Deck Hanger Attachment Devices: Size for five times the design load indicated in ASTM C 635, Table 1, "Direct Hung," unless otherwise indicated.
 - 1. Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with eyepins, clips or other accessory devices for attaching hangers of type indicated, and with capability to sustain, without failure, a load equal to 10 times that imposed by ceiling assembly.
- C. Hangers: As follows:
 - 1. Wire Hangers, Braces, and Ties: Zinc-coated carbon-steel wire; ASTM A 641/A 641M, Class 1 zinc coating, soft temper.

- a. Size: Select wire diameter so its stress at three times hanger design load (ASTM C 635, Table 1, "Direct Hung") will be less than yield stress of wire, but provide not less than 12 gage (0.106-inch) diameter wire.
2. Rod Hangers: ASTM A 510, mild carbon steel.
 - a. Diameter: 1/4-inch.
 - b. Protective Coating: ASTM A 153/A 153M, hot-dip galvanized.
3. Flat Hangers: Commercial-sheet steel, ASTM A 653/A 653M, G60, hot dip galvanized.
 - a. Size: 1 by 3/16 inch by length indicated.
- D. Carrying Channels: ASTM C 754, cold rolled steel channels, 1-1/2-inch, 475 pounds per 1000 feet.
- E. Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that fit acoustical panel edge details and suspension systems indicated; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension system runners; provide in longest standard single piece lengths.
 1. F Moldings: Provide F moldings at ceiling breaks, soffits, bulkheads, and changes in elevation other than vertical walls and columns to the extent indicated. Form from sheet metal of same material and finish as that used for exposed flanges of suspension system runners.
 2. Metal Perimeter Channel Trim: Shapes and profiles to suit conditions indicated; fabricated from extruded aluminum; finished to match exposed flanges of suspension system runners. Provide manufacturer's recommended tee-bar connection clips, and hanging clips, which lock into specially designed bosses on the channel trim and are screw attached to the web of the intersecting suspension system members. Join sections of trim together with manufacturer's standard splice plates and alignment clips.
 3. Perimeter Wing Trim: Shapes and profiles to suit conditions indicated; fabricated from and finished to match exposed panel. Provide manufacturer's recommended connect wing cantilevers, connect splines, connect hooks, connect multi-connection, and installation screws suitable for installation indicated.
- F. Clips: Provide support clips, clamps, fasteners, splines, and other attachment devices as required to align components and to connect components and transfer imposed loads of suspension system.
 1. Provide partition attachment clips, and fasteners for areas where partition ceiling runners are secured to the ceiling suspension system.
 2. Provide attachment clips for runner to angle molding to avoid use of pop rivets.
 3. Provide grid converter accessories as required to change main tee direction 90 degrees from adjacent main tee.
 4. Provide light fixture clips.
 5. Provide hold down clips at entryways to reduce flutter as required.
 6. Provide miter closure clips.

7. Seismic Struts: Manufacturer's standard compression struts designed to accommodate seismic forces.
 8. Seismic Clips: Manufacturer's standard seismic clips designed and spaced to secure acoustical panels in-place.
- G. Manufacturers and Products: Refer to drawings and schedules for extent and types of each metal suspension system required.
- H. Subject to requirements, provide scheduled suspension systems, or comparable products, acceptable to the Architect, by one of the following:
1. Armstrong World Industries, Inc.
 2. or approved equal

2.2 ACOUSTICAL PANELS

- A. Manufacturers and Products: Refer to drawings and schedules for extent and types of each acoustical panel required.
- B. Subject to requirements, provide scheduled acoustical panels, or comparable products, acceptable to the Architect, by one of the following:
1. Armstrong World Industries, Inc.
 2. or approved equal
- C. Acoustical Panel Standard: Provide manufacturer's standard panels according to ASTM E 1264 and designated by type, form, pattern, acoustical rating, and light reflectance unless otherwise indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation, anchorage, with requirements for installation tolerances, and other conditions affecting performance of acoustical panel ceilings.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Layout the Work to center board pattern both directions around Work points shown in each major space or room as shown on the Drawings or directed and, where possible, adjust pattern so that edge pieces will be not less than 1/2 unit in width.

3.3 INSTALLATION

- A. General: Install acoustical panel ceilings to comply with ASTM C 636 and seismic requirements indicated, per manufacturer's written instructions and CISCA's "Ceiling Systems Handbook," and as required to match the accepted sample installation.

- B. Suspend ceiling hangers as follows:
 - 1. Fasten hangers to anchors that extend into decks. Space hangers not more than 48 inches long each member supported directly from hangers; and provide hangers not more than 6 inches from ends of each member. Provide additional hangers for support of fixtures and other items including but not limited to light fixtures and diffusers, as required to prevent overloading of deck attachment, eccentric deflection or rotation of supporting runners.
 - 2. Hangers:
 - a. Secure wire hangers to ceiling suspension members and to supports above with a minimum of 3 tight turns. Connect hangers directly to drilled in anchors (eye screws), or other devices that are secure, and are appropriate for substrate.
 - b. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to drilled in anchors, or other devices that are secure and appropriate for both the structure to which hangers are attached and the type of hanger involved.
 - 3. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 - 4. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of the supporting structure or of the ceiling suspension system.
 - 5. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.
 - 6. Lateral Force Bracing:
 - a. Horizontal restraints shall be provided by four No. 12 gage (2.7 mm) wires secured to the main runner within 2 inches of the cross runner intersection and splayed 90 degrees from each other at an angle not exceeding 45 degrees from the plane of the ceiling. A strut fastened to the main runner shall be extended to and fastened to the structural members supporting the roof or floor above. The strut shall be adequate to resist the vertical component induced by the bracing wires. These horizontal restraint points shall be placed not more than 12 feet on center in both directions with the first point within 6 feet from each wall. Attachment of the restraint wires to the structure above shall be adequate for the load imposed.
 - b. Lateral force bracing members shall be spaced a minimum of 6 inches from all horizontal piping or ductwork that is not provided with bracing restraints for horizontal forces. Bracing wires shall be attached to the grid and to the structure in such a manner that they can support a design load of not less than 200 pounds or the actual design load, whichever is greater, with a safety factor of 2.

- C. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.
 - 1. Typical Edge Molding Attachment: Align moldings accurately and screw attach securely to substrate with concealed fasteners at intervals not more than 16 inches on center and not more than 3 inches from ends, leveling with ceiling suspension system. Miter corners accurately and connect securely.
 - a. Do not use exposed fasteners, including pop rivets, on moldings and trim.
 - 2. Window and Curtain Wall Frame Head Attachment: Unless otherwise indicated, align moldings accurately and secure to window and curtain wall frame heads using manufacturer's recommended double-sided foam white tape, leveling with ceiling suspension system. Miter corners accurately and adhere securely.
 - a. Do not use exposed fasteners, including pop rivets, on moldings and trim.
- D. Install suspension system runners so they are square and securely interlocked with one another. Clip runners to angle moldings do not use exposed fasteners. Finish to lines and levels shown, with maximum deflection not to exceed 1/360 of the span between supports. Laser level accurately in all directions, leveling to a tolerance of 1/8-inch noncumulative. Remove and replace dented, bent, or kinked members.
- E. Install acoustical panels with undamaged edges and fit accurately into suspension system runners and edge moldings. Run grain of units in one direction as accepted on shop drawings. Scribe and cut panels at borders and penetrations to provide a neat, precise fit.
 - 1. For square-edged panels, install panels with edges fully hidden from view by flanges of suspension-system runners and moldings.
 - 2. For reveal-edged panels on suspension-system runners, install panels with bottom of reveal in firm contact with top surface of runner flanges.
 - 3. For reveal-edged panels on suspension system members with box-shaped flanges, install panels with reveal surfaces in firm contact with suspension system surfaces and panel faces flush with bottom face of runners.
 - 4. Paint cut edges of panel remaining exposed after installation; match color of exposed panel surfaces using sealer and coating recommended in writing for this purpose by acoustical panel manufacturer.

3.4 FIELD QUALITY CONTROL

- A. Special Inspections: Engage a qualified special inspector to perform the following special inspections:
 - 1. Compliance of seismic design.
- B. Testing Agency: Engage a qualified testing agency to perform tests and inspections and prepare test reports.

- C. Perform the following tests and inspections of completed installations of acoustical panel ceiling hangers and anchors and fasteners in successive stages. Do not proceed with installations of acoustical panel ceiling hangers for the next area until test results for previously completed installations show compliance with requirements.
 - 1. Extent of Each Test Area: When installation of ceiling suspension systems on each floor has reached 20 percent completion but no panels have been installed.
 - a. Within each test area, testing agency will select one of every 10 power-actuated fasteners and postinstalled anchors used to attach hangers to concrete and will test them for 200 lbf of tension; it will also select one of every two postinstalled anchors used to attach bracing wires to concrete and will test them for 440 lbf of tension.
 - b. When testing discovers fasteners and anchors that do not comply with requirements, testing agency will test those anchors not previously tested until 20 pass consecutively and then will resume initial testing frequency.
- D. Acoustical panel ceiling hangers and anchors and fasteners will be considered defective if they do not pass tests and inspections.
- E. Prepare test and inspection reports.

3.5 CLEANING

- A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 09 51 13

SECTION 09 61 43 - VAPOR-CONTROL FLOORING TREATMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Liquid-applied penetrating vapor control system for new concrete slab existing concrete slab-on-grade substrates to receive adhesive applied floor coverings where on-site moisture vapor transmission exceeds the limitations of the floor covering manufacturer's published recommendations. Provide a complete vapor control system including all items necessary, even if not specifically noted.

B. Related Requirements:

1. Division 09 Sections for scheduled finish flooring.

1.2 DEFINITIONS

- A. pH: Used in this Section to mean "alkalinity" as described in ASTM F 710.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated, including but not limited to the following:
1. Data to indicate compliance with specified requirements.
 2. List of system use and performance history, for the same formulation and system design .
 3. Manufacturer's recommended installation procedures, including the basis for accepting or rejecting actual installation procedures used on the Project.

1.5 INFORMATIONAL SUBMITTALS

- A. Manufacturer Certificates: Manufacturer's certificate that certifies acceptance and exposure to continuous topical water exposure after final cure.
- B. Installer Certificates: Signed by manufacturer certifying that installers comply with specified requirements.

- C. Material Test Reports: Independent test results indicating compliance with the performance requirements.
- D. Moisture Testing Reports: Field test results of moisture testing prior to application.
- E. Field Quality-Control Report: Manufacturer's field reports indicating full compliance by the installer of the specified system and that the system was in full compliance with all requirements of this Section.
- F. Sample Warranties: For special warranties.

1.6 QUALITY ASSURANCE

- A. Applicator's Qualifications: Engage an experienced Installer, approved and certified in writing by the manufacturer as qualified to install treatment in accordance with manufacturer's warranty requirements.
- B. Manufacturer's Qualifications: Formulates synthetic type treatments for vapor emission and alkalinity control installations of similar size and complexity with the system proposed for use.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to site in manufacturer's original, unopened, undamaged containers with identification labels intact.
- B. Store materials in a dry, secure area protected from exposure to harmful weather conditions and at temperature levels as recommended by manufacturer.

1.8 FIELD CONDITIONS

- A. Environmental Limitations: Comply with vapor-control flooring treatment manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting vapor-control flooring treatment application.
- B. Do not install vapor-control flooring treatment until installation areas are enclosed and conditioned.
 - 1. Do not apply vapor-control flooring treatment to unprotected surfaces, or when water is accumulated on the surface of the concrete.
 - 2. Do not apply vapor-control flooring treatment when temperature is lower than, 50 deg F or expected to fall below this temperature within 24 hours from time of application.
 - 3. Allow continuous ventilation and indirect air movement at all times during application and curing process of treatment.
- C. Close spaces to traffic during vapor-control flooring treatment application and for not less than 24 hours after application unless manufacturer recommends a longer period.

1.9 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer and Applicator agree(s) to repair or replace materials that fail in material or workmanship specified in "Performance Requirements" Article within specified warranty period.
 - 1. In the event moisture vapor emission rates exceed specified requirement during warranty period and cause flooring system damage, manufacturer and installer shall provide complete repair and replacement of damage flooring at no cost to Owner. Repair shall include new flooring, adhesives, patching compounds, required accessories and labor charges to provide an acceptable, Owner-approved flooring system.
 - a. Warranty shall not exclude concrete silicates, ACI documents, or curing treatments.
 - 2. Applicator shall warrant that installed system is compatible with specified flooring, and specified floor coverings require no additional cementitious materials, special adhesives or reapplications of system components at additional charge to Owner. Finish flooring installation shall remain standard for all specified flooring.
- B. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. General: Non-corrosive, non-toxic, non-flammable, non-combustible and not labeled as a marine pollutant in liquid or mixed form.
- B. Source Limitations: Obtain components and accessories of concrete moisture-vapor control system through one source from a single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. General: Provide proprietary, synthetic polymer capable of penetrating concrete surfaces and forming a dense, non-removable, seamless membrane to reduce water vapor emissions levels and alkali salts, avoid water vapor damage to other adhered systems, and resistant to most commonly encountered acids/solvents in case of topical spills.
- B. Application of treatment shall reduce water vapor emission to 2 lb of water/1000 sq. ft. in 24 hrs per ASTM F 1869, remain resistant to alkaline pH levels of 14 per ASTM F 710, and resistant to finish flooring delamination.
- C. System Physical Properties: Provide resinous flooring system with the following minimum physical property requirements when tested according to test methods indicated:
 - 1. Water Vapor Transmission (Wet Method): 95 percent vapor reduction compared to untreated ACI Committee 201 durable concrete samples per ASTM E 96.

2. Chemical Resistance, 14pH: 100 percent tolerant, 30 day exposure per ASTM D 1308.
 3. Adhesion Strength: 100 percent concrete cohesive failure per ASTM D 4541.
 4. Post Moisture Testing Results: Capable of controlling 42.0 lbs to 2.0 lbs of water/1,000 sq. ft in 24 hr per ASTM F 1869.
 5. Chemical Resistance, 30 days: Tolerant to 35 percent potassium hydroxide per ASTM D 1308.
 6. In-Situ Relative Humidity: Tolerant to 100 percent exposure per ASTM F 2170.
- D. Regulatory Requirements: Conform to regulation of California Air Resource Board and local air quality/air pollution control district regarding VOC content.

2.3 VAPOR-CONTROL MEMBRANE

- A. Vapor-Control Membrane: Two-component, multi-coat application of a breathable fluid-applied membrane compatible with types of floor covering products indicated; no system failures due to improper installations, and contain no water/alkaline soluble compounds.
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. Diamond Stone Products, Inc.; Diamond-VRS.
 - b. Floor Seal Technology, Inc.; System 6.
 - c. Koester VAP 1 2000; Koester American Corporation.
 - d. Synthetics International; Synthetic 30.
 - e. or approved equal
- B. Primers: Non-porous primer for securing cement topcoat products recommended by vapor control membrane manufacturer and compatible with underlayment and membrane.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Prior to preparation of the Work under this Section, examine installed Work executed under other Sections which affect execution of work under this Section.
- B. Moisture Testing Procedures: Perform the following tests to determine if vapor-control flooring treatment is required.
1. Testing Conditions: Do not conduct moisture testing until final building environmental conditions have been achieved. Maintain temperature between 65 to 85 deg F and relative humidity between 40 to 60 percent for not less than 72 hours prior to and throughout duration of testing.
 2. Perform concrete testing to determine conditions at a minimum of three tests for the 1000 sq. ft. and one additional test for each 1000 sq. ft. thereafter for each of the following methods:

- a. Water Vapor Transmission: Not to exceed 3 lb of water/1000 sq. ft. in 24 hours per ASTM F 1869.
 - b. Internal Relative Humidity: Not to exceed 75 percent RH per ASTM F 2170.
 - c. Digital Alkalinity-pH: Not to exceed 9.0 pH per ASTM F 2170.
 - d. Provide test results with map of test locations and recommendations to the Architect prior to installation of finish flooring.
- C. Upon receipt of written approval from Architect to proceed with Work specified in this Section, examine substrates, areas, and conditions, with Applicator present, for compliance with requirements and conditions affecting performance of the Work.
1. Verify that surfaces are clean and dry according to water-repellent manufacturer's requirements
 2. Inspect for previously applied treatments that may inhibit penetration or performance of vapor control flooring treatment.
 3. Verify that required repairs are complete, cured, and dry before applying treatment.
 4. Proceed with application only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Coordinate work under this Section with Work specified under other Sections to ensure proper and adequate interface of Work.
- B. Protect-adjacent surfaces from drips, spray, damage to walls and base, air pollution of surrounding environment, and other damage from work under this Section.
- C. Surface Preparation:
1. Investigate and inform the treatment manufacturer if concrete additives such as chlorides, plasticizers, or other soluble compounds that can contaminate surfaces have been used in concrete mix.
 2. Before application of flooring treatment, clean substrate of substances that could impair penetration or performance of product according to flooring treatment manufacturer's written instructions.
 3. Shotblast floors, using #420 shot, to remove defective materials and foreign matter such as dust, adhesives, leveling compounds, paint marks, dirt, floor hardeners, paint overspray, bond breakers, oil, grease, curing agents, form release agents, efflorescence, laitance, moisture testing adhesives and steel shot.
 4. Repair cracks, expansion joint, control joints, and open surface honeycombs and fill in accordance with manufacturer's recommendations.
 5. Provide an uncontaminated, absorptive, sound surface. Do not acid etch.
 6. Vacuum surfaces clean prior to application. Do not use clean sweeping agents, dust absorbers or chemical agents to clean concrete.

3.3 APPLICATION

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect the substrate before application of flooring treatment and to instruct Applicator on the product and application method to be used.
- B. Apply in accordance with manufacturer's instructions and recommendations, unless specifically noted otherwise.
 - 1. Comply with regulatory requirements.
 - 2. Close areas to traffic during application and for time period after application recommended in writing by manufacturer.
- C. Apply treatment with manufacturer's representative present.
- D. Cure treatment according to manufacturer's written instructions. Prevent contamination during application and curing processes.
- E. Do not install floor coverings over treatment until after time period recommended in writing by vapor-control flooring treatment manufacturer.

3.4 FIELD QUALITY CONTROL

- A. Testing and Inspection: Engage a qualified testing and inspection agency to perform the following:
 - 1. Schedule inspections and notify the Architect, Project Engineer, and other regulatory agencies, if any, of the time at least 48 hours prior to the inspection.
 - 2. Validation Testing:
 - a. After application of the treatment, test interior concrete floor surfaces scheduled to receive the vapor-control flooring treatment to establish system performance.
 - b. Testing agency to provide validation calcium chloride testing of treated floor areas designated in accordance with ASTM F 869 once the specified system has been installed.
 - 1) At a minimum, test interior slab-on-grade surfaces prior to finish flooring installation and after the spaces to receive finish flooring are brought to an environmental condition matching the designated conditions of use.
 - 2) Provide test kits at the rate of three kits per 1000 sq. ft. and one additional test kit for each additional 1000 sq. ft. or portion thereof; and for validation testing, provide one test kit placed beside every sixth test kit.
 - c. Digital Alkalinity pH Testing: Testing agency shall conduct pH test at each calcium chloride test.
 - d. Vapor emission test readings shall satisfy the manufacturer's published requirements of the finish flooring to be installed. Common acceptable criteria require that vapor emissions not exceed 3 lb of water/1000 sq. ft. in 24 hours, although various manufacturers' actual requirements may vary.

- e. Once test results are known, copies shall be given to Architect, Contractor, and Owner.
- B. If the validation test vapor emission and pH readings exceed the requirements of the finish flooring manufacturer, provide remedial materials and labor, at no additional cost to the Owner, to bring vapor emissions and pH within acceptable limits.

3.5 CLEANING AND PROTECTION

- A. Immediately clean vapor-control flooring treatment from adjoining surfaces and surfaces soiled or damaged by flooring treatment application as work progresses. Correct damage to work of other trades caused by flooring treatment application, as approved by Architect.
- B. Comply with manufacturer's written cleaning instructions.
- C. Provide finish, clean and ready for the application of finish flooring.
- D. Protect each coat during specified cure periods from traffic, topical water, and contaminants.

END OF SECTION 09 61 43

SECTION 09 65 13 - RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes resilient wall base, and moldings.

1.2 ACTION SUBMITTALS

- A. Product Data: Submit product data for each type of product indicated.
- B. CALgreen Submittals:
 - 1. Product Data for Section 5.504.4.1.1: For sealants, adhesives and caulks, provide documentation including printed statement of VOC content showing compliance with SCAQMD Rule 1168 VOC limits and CCR (California Code of Regulations) Title 17 for aerosols.
 - 2. Product Data for Section 5.504.4.1.2: Provide documentation for aerosol adhesives, and smaller unit sizes of adhesives, sealant, and caulking compounds (in units of product, less packaging, which do not weigh more than one (1) pound and do not consist of more than sixteen (16) fluid ounces) comply with statewide VOC standards and prohibitions on use of certain toxic compounds, of CCR Title 17, commencing with Section 94507.
 - 3. Product Data for Section 5.504.4.3: For architectural paints and coatings, provide documentation including printed statement of VOC content showing compliance with Table 1 of the ARB, Architectural Coatings Suggested Control Measure, unless more stringent local limits apply.
 - 4. Product Data for Section 5.504.4.3.1: Aerosol paints and coatings, provide documentation that products meet the PWMIR Limits for ROC in Section 94522 (a)(3) and other requirements, including prohibitions on use of certain toxic compounds and ozone depleting substances, in Section 94522(c)(2 and (d)(2) of CCR Title 17.
 - 5. Compliance with Section 5.504.4.6: Provide documentation verifying that for eighty percent (80%) of the floor area receiving resilient flooring, the installed resilient flooring is:
 - a. Certified under the Resilient Floor Covering Institute (RFCI) FloorScore program;
 - b. Compliant with the VOC-emission limits and testing requirements specified in the California Department of Public Health's 2010 Standard Method for the Testing and Evaluation Chambers, Version 1.1, February 2010;
 - c. Products certified under UL GREENGUARD.
- C. Samples: For each type of product indicated, in manufacturer's standard-size Samples but not less than 12 inches long, of each resilient product color, texture, and pattern required.

1.3 MAINTENANCE MATERIAL SUBMITTALS

- 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. Furnish not less than 10 linear feet for every 500 linear feet or fraction thereof, of each type, color, pattern, and size of resilient product installed.

1.4 FIELD CONDITIONS

- A. Maintain temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F, in spaces to receive floor tile during the following time periods:
 - 1. 48 hours before installation.
 - 2. During installation.
 - 3. 48 hours after installation.
- B. After postinstallation period, maintain temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.
- C. Install resilient products after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. FloorScore Compliance: Resilient base shall comply with requirements of FloorScore certification.

2.2 RESILIENT WALL BASE (RB##)

- A. Products and Manufacturers: As indicated in Finish Schedule on Drawings. Nominal thickness not less than 1/8 inch unless greater thickness is scheduled. All resilient base shall be manufactured from rubber complying with ASTM F 1861, Type TP (rubber, thermoplastic), Group I (solid, homogeneous). Provide all resilient wall base in continuous coils to minimize field butt joints.
- B. Provide all resilient wall bases with a coved base toe style typically; and with straight flat or toeless base style at carpet, unless otherwise indicated in Finish Schedule on Drawings.

2.3 RESILIENT MOLDING ACCESSORY

- A. Description: Reducer strip for resilient floor covering.
- B. Material: Rubber.

- C. Profile and Dimensions: As indicated on the Drawings.

2.4 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based formulation provided or approved by resilient product manufacturers for applications indicated.
- B. Adhesives: Water-resistant type recommended by resilient-product manufacturer for resilient products and substrate conditions indicated.
 - 1. Adhesives, adhesive bonding primers, adhesive primers, sealants, sealant primers and caulks shall comply with local or regional regulations as shown in CALgreen Section 5.504.4.1.
 - 2. Aerosol adhesives, and smaller unit sizes of adhesives, and sealant or caulking compounds shall comply with regulations as shown in CALgreen Section 5.504.4.2.
 - 3. Paints and coatings shall comply with VOC content as shown in CALgreen Section 5.504.4.3.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for installation tolerances, and other conditions affecting performance.
 - 1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.
 - 2. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Prepare substrates according to manufacturer's written recommendations to ensure adhesion of resilient products.
- B. Remove paint, sealers, existing floor covering adhesive residues, substrate coatings and other substances that are incompatible with adhesives to be used for installing resilient stair accessories using mechanical methods recommended by manufacturer. Do not use solvents.
- C. Use trowelable leveling and patching compound to fill cracks, holes, and depressions in substrates indicated to receive resilient stair accessories.
- D. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.
 - 1. Do not install resilient products until they are the same temperature as the space where they are to be installed.

- E. Sweep and vacuum clean substrates to be covered by resilient stair accessories products immediately before installation.

3.3 RESILIENT WALL BASE INSTALLATION

- A. Apply wall base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
- B. Install wall base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.
- C. Tightly adhere wall base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
- D. Job-Formed Corners:
 - 1. Outside Corners: Use straight pieces of maximum lengths possible. Form without producing discoloration (whitening) at bends. Shave back of base at points where bends occur and remove strips perpendicular to length of base that are only deep enough to produce a snug fit without removing more than half the wall base thickness.
 - 2. Inside Corners: Use straight pieces of maximum lengths possible. Form by cutting an inverted V-shaped notch in toe of wall base at the point where corner is formed. Shave back of base where necessary to produce a snug fit to substrate.

3.4 RESILIENT ACCESSORY INSTALLATION

- A. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of floor coverings that would otherwise be exposed.

3.5 CLEANING AND PROTECTION

- A. Remove adhesive and other blemishes from exposed surfaces.
- B. Perform the following operations immediately after completing resilient product installation:
 - 1. Remove adhesive and other blemishes from exposed surfaces.
 - 2. Sweep and vacuum surfaces thoroughly.
 - 3. Damp-mop surfaces to remove marks and soil.
 - a. Do not wash surfaces until after time period recommended by manufacturer.
- C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period. Use protection methods recommended in writing by manufacturer.

END OF SECTION 09 65 13

SECTION 09 65 19 - RESILIENT TILE FLOORING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes resilient floor tile.

1.2 ACTION SUBMITTALS

- A. Product Data: Submit product data for each type of product indicated.
 - 1. Product Data: For sealants, indicating VOC content.
- B. CALgreen Submittals:
 - 1. Product Data for Section 5.504.4.1.1: For sealants, adhesives and caulks, provide documentation including printed statement of VOC content showing compliance with SCAQMD Rule 1168 VOC limits and CCR (California Code of Regulations) Title 17 for aerosols.
 - 2. Product Data for Section 5.504.4.1.2: Provide documentation for aerosol adhesives, and smaller unit sizes of adhesives, sealant, and caulking compounds (in units of product, less packaging, which do not weigh more than one (1) pound and do not consist of more than sixteen (16) fluid ounces) comply with statewide VOC standards and prohibitions on use of certain toxic compounds, of CCR Title 17, commencing with Section 94507.
 - 3. Product Data for Section 5.504.4.3: For architectural paints and coatings, provide documentation including printed statement of VOC content showing compliance with Table 1 of the ARB, Architectural Coatings Suggested Control Measure, unless more stringent local limits apply.
 - 4. Product Data for Section 5.504.4.3.1: Aerosol paints and coatings, provide documentation that products meet the PWMIR Limits for ROC in Section 94522 (a)(3) and other requirements, including prohibitions on use of certain toxic compounds and ozone depleting substances, in Section 94522(c)(2) and (d)(2) of CCR Title 17.
 - 5. Compliance with Section 5.504.4.6: Provide documentation verifying that for eighty percent (80%) of the floor area receiving resilient flooring, the installed resilient flooring is:
 - a. Certified under the Resilient Floor Covering Institute (RFCI) FloorScore program;
 - b. Compliant with the VOC-emission limits and testing requirements specified in the California Department of Public Health™s 2010 Standard Method for the Testing and Evaluation Chambers, Version 1.1, February 2010;
 - c. Compliant with the Collaborative for High Performance Schools California (CA-CHPS) Criteria Interpretation for EQ 7.0 and EQ 7.1 dated July 2012 and listed in the CHPS High Performance Product Database; or
 - d. Products certified under UL GREENGUARD.

- C. Samples: Submit full-size units of each color and pattern of resilient floor tile required.

1.3 CLOSEOUT SUBMITTALS

- A. Maintenance Data: Submit maintenance data for resilient floor tile and floor finish products.

1.4 MAINTENANCE MATERIAL SUBMITTALS

- 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. Floor Tile: Furnish 1 box for every 50 boxes or fraction thereof, of each type, color, and pattern of floor tile installed.

1.5 FIELD CONDITIONS

- A. Maintain temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F, in spaces to receive floor tile during the following time periods:
 - 1. 48 hours before installation.
 - 2. During installation.
 - 3. 48 hours after installation.
- B. After postinstallation period, maintain temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.
- C. Close spaces to traffic during floor covering installation.
- D. Close spaces to traffic for 48 hours after floor covering installation.
- E. Install resilient products after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: For resilient tile flooring, as determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.
 - 1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

2.2 RESILIENT FLOOR TILE

- A. Product(s): As indicated in Finish Schedule on Drawings.

2.3 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based formulation provided or approved by resilient product manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by manufacturer to suit resilient products and substrate conditions indicated.
 - 1. Adhesives, adhesive bonding primers, adhesive primers, sealants, sealant primers and caulks shall comply with local or regional regulations as shown in CALgreen Section 5.504.4.1.
 - 2. Aerosol adhesives, and smaller unit sizes of adhesives, and sealant or caulking compounds shall comply with regulations as shown in CALgreen Section 5.504.4.2.
 - 3. Paints and coatings shall comply with VOC content as shown in CALgreen Section 5.504.4.3.
- C. Metal Edge Strips: Extruded aluminum with mill finish of width shown, of height required to protect exposed edges of tiles, and in maximum available lengths to minimize running joints.
- D. Vinyl Composition Tile Protective Floor Polish: Product recommended by manufacturer to suit resilient products indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for installation tolerances, moisture content, and other conditions affecting performance.
 - 1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Prepare concrete substrates according to manufacturer's written recommendations to ensure adhesion of resilient products.
- B. Concrete Substrates: Prepare according to ASTM F 710.
 - 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
 - 2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by flooring manufacturer. Do not use solvents.

3. Adhesion Testing: Perform tests recommended by flooring manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 10 pH.
4. Moisture Testing: Perform tests recommended by flooring manufacturer, but not less stringent than the following:
 - a. Perform anhydrous calcium chloride test according to ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor emission rate of 3 lb of water/1000 sq. ft. in 24 hours.
 - b. Perform relative humidity test using in situ probes according to ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level.
- C. Use trowelable leveling and patching compound to fill cracks, holes, and depressions in substrates.
- D. Apply primer to concrete slabs, if recommended by the flooring manufacturer, prior to application of adhesive.
- E. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.
 1. Do not install resilient products until they are same temperature as space where they are to be installed.
- F. Sweep and vacuum clean substrates to be covered by resilient products immediately before installation.

3.3 INSTALLATION

- A. Comply with manufacturer's written instructions for installing floor tile.
- B. Lay out tiles so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.
 1. Lay tiles square with room axis unless otherwise indicated.
- C. Match tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.
- D. Scribe, cut, and fit tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, edgings, door frames, thresholds, and nosings. Extend unexposed edges of flooring under set on bases and similar trim work.
- E. Extend tiles into toe spaces, door reveals, closets, and similar openings. Extend floor tile to center of door openings unless indicated otherwise.

- F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent, nonstaining marking device.
- G. Install tiles on covers for telephone and electrical ducts and similar items in finished floor areas. Maintain overall continuity of color and pattern with pieces of tile installed on covers. Tightly adhere tile edges to substrates that abut covers and to cover perimeters.
- H. Adhere tiles to flooring substrates using a full spread of adhesive applied to substrate to produce a completed installation which is smooth, clean and free from imperfections such as open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

3.4 CLEANING AND PROTECTION

- A. Perform the following operations immediately after completing resilient product installation:
 - 1. Remove adhesive and other blemishes from exposed surfaces.
 - 2. Sweep and vacuum surfaces thoroughly.
 - 3. Damp-mop surfaces to remove marks and soil.
 - 4. Do not wash or apply floor polishes until flooring adhesives have cured unless otherwise recommended by the flooring manufacturer.
- B. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period. Use protection methods recommended in writing by manufacturer.
 - 1. Apply protective floor polish to horizontal surfaces that are free from soil, visible adhesive, and surface blemishes using methods as recommended in writing by the floor polish manufacturer. Apply no fewer than 2 coats of floor polish unless additional coats are recommended by the floor polish manufacturer for the application indicated.
 - a. Use commercially available product acceptable to manufacturer.
 - 2. Cover products installed on horizontal surfaces with undyed, untreated building paper until Substantial Completion.
 - 3. Do not move heavy and sharp objects directly over surfaces. Place hardboard or plywood panels over flooring and under objects while they are being moved. Slide or roll objects over panels without moving panels.
- C. Sealers and Finish Coats: Remove soil, visible adhesive, and surface blemishes from resilient terrazzo floor tile surfaces before applying liquid cleaners, sealers, and finish products.
 - 1. Sealer: Apply two base coats of liquid sealer.
 - 2. Finish: Apply two coats of liquid floor finish.
- D. Cover floor tile until Substantial Completion.

END OF SECTION 09 65 19

SECTION 09 68 13 - TILE CARPETING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes carpet tile.

1.2 STANDARDS

- A. Except as modified by governing codes and by the Contract Documents, comply with the applicable provisions and recommendations of the following:
 - 1. The Carpet and Rug Institute "The Carpet Specifiers' Handbook."
 - 2. The Carpet and Rug Institute "CRI 104; Standard for Installation of Commercial Carpet, edition Sept. 2015" (CRI 104).
 - 3. The Carpet and Rug Institute "Green Label Plus" Standards.

1.3 PRE-INSTALLATION MEETINGS

- A. Pre-Installation Conference: Conduct conference at Project site.
 - 1. Review methods and procedures related to carpet tile installation including, but not limited to, the following:
 - a. Review delivery, storage, and handling procedures.
 - b. Review ambient conditions and ventilation procedures.
 - c. Review subfloor preparation procedures.
 - d. Insert agenda items.
- B. Prior to the installation, and at the Contractor's direction, meet at the project site to review the material selections, substrate preparations, installation procedures, coordination with other trades, special details and conditions, standard of workmanship, and other pertinent topics related to the Work. The meeting shall include the Owner, Architect, the Contractor, the installer, material manufacturer's representatives, and representatives of other trades or subcontractors affected by the installation.

1.4 ACTION SUBMITTALS

- A. Product Data: For each product indicated, submit product data, specifications, installation instructions for materials specified herein and other data as may be required to show compliance with the Contract Documents. Include installation recommendations for each type of substrate required.
 - 1. CalGreen Submittals:

- a. Product Data for Section 5.504.4.1.1: For sealants, adhesives and caulks, provide documentation including printed statement of VOC content showing compliance with SCAQMD Rule 1168 VOC limits and CCR (California Code of Regulations) Title 17 for aerosols.
- b. Product Data for Section 5.504.4.1.2: Provide documentation for aerosol adhesives, and smaller unit sizes of adhesives, sealant, and caulking compounds (in units of product, less packaging, which do not weigh more than one (1) pound and do not consist of more than sixteen (16) fluid ounces) comply with statewide VOC standards and prohibitions on use of certain toxic compounds, of CCR Title 17, commencing with Section 94507.
- c. Product Data for Section 5.504.4.4: Submit documentation that all carpet installed within the building interior complies with one of the following:
 - 1) The VOC-emission limits and testing requirements specified in the California Department of Public Health Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers, Version 1.1, February 2010;

B. Shop Drawings: Show the following:

1. Existing floor materials to be removed.
2. Existing floor materials to remain.
3. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet tiles.
4. Carpet tile type, color, and dye lot.
5. Type of subfloor.
6. Type of installation.
7. Pattern of installation, direction, and starting points per floor.
8. Pattern type and location.
9. Type, color, and location of insets and borders.
10. Type, color, and location of edge, transition, and other accessory strips.
11. Pile direction.
12. Transition and other accessory strips.
13. Transition details to other flooring materials.

C. Samples: For each of the products showing full range of color, texture, and pattern variations expected. Prepare samples from same material to be used for the Work. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in Schedules. Submit the following:

1. Carpet Tile: Full-size Samples.
2. Exposed Edge Stripping and Accessory: 12 inch long Samples.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Field Test Reports: Provide signed field test reports for tests indicated below. Indicate results and test locations. Include manufacturer's recommendations.

1. Anhydrous calcium chloride test results.
 2. Relative humidity probe test results.
 3. Alkalinity test results.
- C. Warranty: Submit special warranties specified in this Section.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: Submit copies of instructions for care, cleaning, maintenance and repair of carpet tiles.
1. Each carpet manufacturer shall meet with the authorized Building Services personnel in the presence of the Owner, to review the characteristics of the carpet tile, and to recommend appropriate maintenance procedures, prior to occupancy of the finished spaces.
 2. Include methods for maintaining carpet tile, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.
 3. Include precautions for cleaning materials and methods that could be detrimental to carpet tile.

1.7 MAINTENANCE MATERIAL SUBMITTALS

- A. Extra Materials: Furnish extra materials described below before installation begins, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
1. Carpet Tile: Full-size units equal to 5 percent of amount installed for each type indicated, but not less than 10 sq. yd..

1.8 QUALITY ASSURANCE

- A. Installer Qualifications: Engage a carpet installer, who has completed projects which were similar in material, design and extent to that indicated for the Project - as determined by the Architect - and which have resulted in construction with a record of successful in service performance.
1. In the case where the Installer is actually a Dealer, it is understood that the terms Installer, Dealer, Carpeting Contractor and Contractor shall be one and the same for purposes of this Contract. Installer shall assume responsibility for all of the work, including acquisition of the materials from the manufacturers herein specified.
- B. Mill Inspection: The carpeting may be inspected to determine compliance with the Contract Documents with respect to manufacture, materials, pattern and colors. Inspection may be made at the mill by a representative of the Architect and/or Owner at any time during the process of manufacture.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Comply with CRI 104.
- B. Deliver carpeting in original mill protective wrapping with mill register numbers and tags attached.
- C. Deliver other materials in manufacturer's unopened containers identified with name, brand, type, grade, class, and other qualifying information.
- D. Store materials in a dry location, in such a manner as to prevent damage.

1.10 FIELD CONDITIONS

- A. General: Comply with CRI 104, Section 7.0 "Site Conditions."
- B. Environmental Limitations: Do not deliver or install carpet tile until wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at occupancy levels during remainder of construction.
- C. Do not install carpet tile over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended by carpet tile manufacturer.

1.11 WARRANTY

- A. Special Carpet Manufacturer's Warranty: Written warranty, signed by carpet tile manufacturer agreeing to replace carpet tile that does not comply with requirements or that fails within specified warranty period. Warranty does not include deterioration or failure of carpet tile due to unusual traffic, failure of substrate, vandalism, or abuse. Failures include, but are not limited to, more than 10 percent loss of face fiber, wear, static buildup in excess of 3.0 kV when tested under the Standard Shuffle Test at 70 deg F and 20 percent RH, edge raveling without seam sealers, tuft bind loss, zippering (wet or dry), shrinkage, curling, doming, snags, runs, and delamination. Warrantees shall be full term, not pro-rated for the specified warranty period.
 - 1. Warranty Period: 10 years from date of Substantial Completion.
- B. Special Carpet Tile Installer's Warranty: Written warranty, signed by carpet tile installer agreeing to fix, repair or replace carpet tile that does not comply with requirements or that fails within specified warranty period. Warranty does not include deterioration or failure of carpet tile due to unusual traffic, failure of substrate, vandalism, or abuse. Failures include, but are not limited to, more than edge raveling, shrinkage, curling, doming, and delamination.
 - 1. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 CARPET TILE (CP##)

- A. Carpet Tile Types: Provide manufacturer's commercial grade carpet tile for 100 percent glue-down installation as indicated in Finish Schedule on Drawings.

2.2 INSTALLATION ACCESSORIES

- A. Trowelable Leveling and Patching Compounds: Portland cement-based formulation provided by or recommended by carpet tile manufacturer. Do not use gypsum based compounds.
- B. Adhesives: Water-resistant, mildew-resistant, and nonstaining, pressure sensitive type to suit products and subfloor conditions indicated, that complies with flammability requirements for intended carpet tile, and recommended by manufacturer for releasable installation.
 - 1. VOC Limits: Provide adhesives with VOC content not more than 50 g/L when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- C. Carpet Edging: Provide rubber composition carpet edging in single lengths wherever possible, keeping the number of joints or splices to a minimum. Provide in quantities and locations as job required based upon the recommended good practice of the industry; include in every location where carpet terminates and other flooring continues. Color to match adjacent carpet types.
- D. Floor Sealer: Type as recommended and manufactured by the carpet tile manufacturer for the applications indicated.
 - 1. VOC Limits: Provide floor sealer with VOC content not more than 200 g/L when calculated according to 40 CFR 59, Subpart D (EPA method 24).

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet tile performance. Examine carpet tile for type, color, pattern, and potential defects.
- B. Concrete Subfloors: Verify that concrete slabs comply with ASTM F 710 and the following:
 - 1. Slab substrates are dry and free of curing compounds, sealers, hardeners, and other materials that may interfere with adhesive bond. Determine adhesion and dryness characteristics by performing bond and moisture tests recommended by carpet tile manufacturer.

2. Subfloor finishes comply with requirements specified in Section 03 30 00 "Cast-in-Place Concrete" for slabs receiving carpet tile.
3. Subfloors are free of cracks, ridges, depressions, scale, and foreign deposits.

3.2 PREPARATION

- A. General: Comply with CRI 104, Section 8.0 "Substrate Preparation," and with carpet tile manufacturer's written installation instructions for preparing substrates indicated to receive carpet tile installation.
- B. Coordinate the installation of carpet so as not to delay the occupancy of the site or interfere with the completion of construction.
- C. Examine the substrates, adjoining construction and the conditions under which the Work is to be installed. Verify recommended limits for moisture content and alkalinity of concrete substrates with carpet manufacturer.
 1. Moisture Testing: Perform tests so that each test area does not exceed 1000 sq. ft., and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
 - a. Anhydrous Calcium Chloride Test: ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.
 - b. Relative Humidity Test: Using in situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.
 2. Alkalinity Test: Verify alkalinity of concrete substrates by drilling a 3/8 inch diameter hole approximately 1/4 inch deep, remove all residue; fill with distilled water, allow water to stand 3 minutes and test with a calibrated electronic meter or pH paper. Perform testing at a frequency of not less than once every 1,000 square feet.
 3. Alternative test procedures for moisture content and alkalinity may be acceptable subject to the carpet manufacturer's review and written acceptance.
- D. Concrete Subfloors: Verify that concrete slabs comply with ASTM F 710 and the following:
 1. Provide one of the following:
 - a. Remove coatings, including curing compounds, existing floor covering adhesive residues, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by the carpet manufacturer.
 - b. In lieu of mechanical substrate preparation methods, the Contractor may utilize floor sealer materials and methods of the types and methods as recommended, in writing, by the carpet tile manufacturer. Apply sealer in number of coats, and at the spread rate, as required by the carpet tile manufacturer.

2. Slab substrates are dry and free of curing compounds, sealers, hardeners, and other materials that may interfere with adhesive bond. Determine adhesion and dryness characteristics by performing bond and moisture tests recommended by the carpet tile manufacturer.
 3. Use leveling and patching compounds recommended by flooring manufacturer for filling cracks, holes and depressions in the substrate. Surface shall be smooth, level and at proper elevation. Remove ridges, roughness and protrusions from concrete surfaces by grinding.
- E. Broom and vacuum clean substrates to be covered immediately before installing carpet.
- F. Carpet installation shall not commence until painting and finishing work are complete and ceiling and overhead work is tested, approved, and completed.
- G. Proceed with installation only after unsatisfactory conditions have been corrected

3.3 INSTALLATION

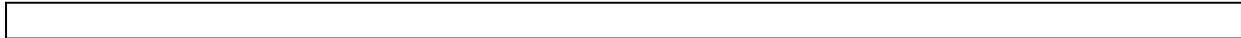
- A. General: Comply with CRI 104, Section 10.0 "Carpet Tile Installation," carpet tile manufacturer's written installation instructions, and as required to match the accepted sample installations. Apply adhesive in accordance with adhesive manufacturer's directions.
- B. Adhere all full size, perimeter tiles, and cut tiles, with a full spread of adhesive. Dry fit cut tiles and apply adhesive to tile back after tile has been cut. Use full uncut tiles down the center of corridors and, where necessary, cut perimeter tiles to butt walls.
1. Cut and fit carpet tile to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet tile manufacturer.
 2. Cut openings in carpet for electrical outlets, piping and other penetrations. Maintain close tolerances so that edges of carpet will be covered by plates and escutcheons.
 3. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.
- C. Butt carpet tile tightly together to form seams without gaps or entrapped pile yarns and aligned with adjoining tiles.
- D. Edge Strip Installation: Install edge strip at every location where edge of carpet is exposed to traffic, unless otherwise indicated. Unless otherwise directed by Architect install in single lengths and secure in accordance with manufacturer's directions.
- E. Traffic over adhesive installations shall be restricted until adhesive has properly cured in accordance with the adhesive manufacturer's recommendations.

3.4 CLEANING AND PROTECTION

- A. **Cleaning:** As the carpeting is installed, remove and dispose of all trimmings, excess pieces of carpeting and laying materials from each area as it is completed. Vacuum carpeting with a commercial vacuum, having a cylindrical brush or beater bar and high suction. Remove adhesives, stains, and soil spots in accordance with the carpet manufacturer's recommendations.

- B. **Protection:** Protect installed carpet tile to comply with CRI 104, Section 11.0 "Post Installation," and against damage as damaged carpeting shall be rejected. Use non-staining cover material for protection. Tape joints of protective covering.
 - 1. Plastic and polyethylene sheet protective coverings shall not be permitted.
 - 2. Remove and replace rejected carpeting with new carpet tile. At the completion of the Work and when directed by the Architect, remove covering, vacuum clean carpeting and remove soiling and stains (if any) to the satisfaction of the Architect.

END OF SECTION 09 68 13



SECTION 09 72 00 - WALL COVERINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes wall coverings and accessories necessary for a complete installation.
- B. Related Sections:
 - 1. Section 09 29 00 "Gypsum Board" for Levels 4 and 5 finishes required under wallcovering.
 - 2. Section 09 91 23 "Interior Painting" for priming wall surfaces.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include data on physical characteristics, durability, fade resistance, and fire-test-response characteristics.
- B. CALgreen Submittals:
 - 1. Product Data for Section 5.504.4.1.1: For sealants, adhesives and caulks, provide documentation including printed statement of VOC content showing compliance with SCAQMD Rule 1168 VOC limits and CCR (California Code of Regulations) Title 17 for aerosols.
 - 2. Product Data for Section 5.504.4.1.2: Provide documentation for aerosol adhesives, and smaller unit sizes of adhesives, sealant, and caulking compounds (in units of product, less packaging, which do not weigh more than one (1) pound and do not consist of more than sixteen (16) fluid ounces) comply with statewide VOC standards and prohibitions on use of certain toxic compounds, of CCR Title 17, commencing with Section 94507.
 - 3. Product Data for Section 5.504.4.3: For architectural paints and coatings, provide documentation including printed statement of VOC content showing compliance with Table 1 of the ARB, Architectural Coatings Suggested Control Measure, unless more stringent local limits apply.
 - 4. Product Data for Section 5.504.4.3.1: Aerosol paints and coatings, provide documentation that products meet the PWMIR Limits for ROC in Section 94522 (a)(3) and other requirements, including prohibitions on use of certain toxic compounds and ozone depleting substances, in Section 94522(c)(2 and (d)(2) of CCR Title 17.

- C. Shop Drawings: Show location and extent of each wall-covering type. Indicate seams and termination points.
- D. Samples: For each type of wall covering and for each color, pattern, texture, and finish specified, full width by 36-inch- long in size.
 - 1. Wall-Covering Sample: From same production run to be used for the Work, with specified treatments applied. Show complete pattern repeat. Mark top and face of fabric.
- E. Product Schedule: For wall coverings. Use same designations indicated on Drawings.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For testing agency.
- B. Product Test Reports: For each wall covering, for tests performed by a qualified testing agency.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For wall coverings to include in maintenance manuals.

1.6 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. Wall-Covering Materials: For each type, color, texture, and finish, full width by length to equal to 5 percent of amount installed but not less than one full roll.

1.7 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install wall coverings until spaces are enclosed and weathertight, wet work in spaces is complete and dry, work above ceilings is complete, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at levels intended for occupants after Project completion during the remainder of the construction period.
- B. Lighting: Do not install wall covering until lighting that matches conditions intended for occupants after Project completion is provided on the surfaces to receive wall covering.
- C. Ventilation: Provide continuous ventilation during installation and for not less than the time recommended by wall-covering manufacturer for full drying or curing.

1.8 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to replace wall covering that does not comply with requirements or that fails within two years from date of Substantial Completion. Warranty does not include deterioration or failure of wall covering from failure of substrate, vandalism, or abuse. Failures include, but are not limited to, blistering, fading, fraying, seam delamination, and discoloration.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: As determined by testing identical wall coverings applied with identical adhesives to substrates according to test method indicated below by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - a. Flame-Spread Index: 25 or less.
 - b. Smoke-Developed Index: 450 or less.
 - 2. Fire-Growth Contribution: No flashover and heat and smoke release according to NFPA 265.

2.2 WALL COVERING PRODUCTS

- A. General: Provide rolls of each type of wall covering from the same run number or dye lot.
- B. Product(s): As indicated in Finish Schedule on Drawings.
- C. Paints and coatings shall comply with VOC content as shown in CALgreen Section 5.504.4.3.

2.3 ACCESSORIES

- A. Adhesive: Mildew-resistant, nonstaining, strippable adhesive, for use with specific wall covering and substrate application indicated and as recommended in writing by wall-covering manufacturer.
 - 1. Adhesives, adhesive bonding primers, adhesive primers, sealants, sealant primers and caulks shall comply with local or regional regulations as shown in CALgreen Section 5.504.4.1.
 - 2. Aerosol adhesives, and smaller unit sizes of adhesives, and sealant or caulking compounds shall comply with regulations as shown in CALgreen Section 5.504.4.2.

- B. Primer/Sealer: Mildew resistant, complying with requirements in Section 09 91 23 "Interior Painting" and recommended in writing by primer/sealer and wall-covering manufacturers for intended substrate.
 - 1. Adhesives, adhesive bonding primers, adhesive primers, sealants, sealant primers and caulks shall comply with local or regional regulations as shown in CALgreen Section 5.504.4.1.
 - 2. Aerosol adhesives, and smaller unit sizes of adhesives, and sealant or caulking compounds shall comply with regulations as shown in CALgreen Section 5.504.4.2.
- C. Seam Tape: As recommended in writing by wall-covering manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for levelness, wall plumbness, maximum moisture content, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions for surface preparation.
- B. Clean substrates of substances that could impair bond of wall covering, including dirt, oil, grease, mold, mildew, and incompatible primers.
- C. Prepare substrates to achieve a smooth, dry, clean, structurally sound surface free of flaking, unsound coatings, cracks, and defects.
 - 1. Gypsum Board: Prime with primer as recommended in writing by primer/sealer manufacturer and wall-covering manufacturer.
 - 2. Painted Surfaces: Treat areas susceptible to pigment bleeding.
- D. Check painted surfaces for pigment bleeding. Sand gloss, semigloss, and eggshell finish with fine sandpaper.
- E. Remove hardware and hardware accessories, electrical plates and covers, light fixture trims, and similar items.
- F. Acclimatize wall-covering materials by removing them from packaging in the installation areas not less than 24 hours before installation.

3.3 WALL-COVERING INSTALLATION

- A. Comply with wall-covering manufacturers' written installation instructions applicable to products and applications indicated.
- B. Cut wall-covering strips in roll number sequence. Change the roll numbers at partition breaks and corners.
- C. Install strips in same order as cut from roll.
 - 1. For solid-color, even-texture, or random-match wall coverings, reverse every other strip.
- D. Install wall covering without lifted or curling edges and without visible shrinkage.
- E. Trim edges and seams for color uniformity, pattern match, and tight closure. Butt seams without overlaps or gaps between strips.
- F. Fully bond wall covering to substrate. Remove air bubbles, wrinkles, blisters, and other defects.

3.4 CLEANING

- A. Remove excess adhesive at seams, perimeter edges, and adjacent surfaces.
- B. Use cleaning methods recommended in writing by wall-covering manufacturer.
- C. Replace strips that cannot be cleaned.
- D. Reinstall hardware and hardware accessories, electrical plates and covers, light fixture trims, and similar items.

END OF SECTION 09 72 00

SECTION 09 91 23 - INTERIOR PAINTING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes surface preparation and field application of paint systems on the following interior substrates:
1. Gypsum board.
 2. Steel.
 3. Aluminum (not anodized or otherwise coated).
 4. Aluminum (anodized).
 5. Wood[**and hardboard**].
 6. Rubber.

1.2 DEFINITIONS

- A. General: The following terms apply to this Section. Gloss level shall be determined according to ASTM D 523.
1. Gloss Level 1(Flat, or Matte): Not more than 5 units at 60 degrees and 10 units at 85 degrees.
 2. Gloss Level 3 (Eggshell): 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees.
 3. Gloss Level 4 (Satin or Low Luster): 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees.
 4. Gloss Level 5 (Semigloss): 35 to 70 units at 60 degrees.
 5. Gloss Level 6 (Gloss): 70 to 85 units at 60-degrees.
 6. Gloss Level 7 (High Gloss): More than 85 units at 60 degrees.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
- B. Sustainable Design Submittals: Submit the following in compliance with Section 01 81 13 "Sustainable Design Requirements":
1. Product Data: For paints and coatings, indicating VOC content.
- C. CALgreen Submittals:

1. Product Data for Section 5.504.4.3: For architectural paints and coatings, provide documentation including printed statement of VOC content showing compliance with Table 1 of the ARB, Architectural Coatings Suggested Control Measure, unless more stringent local limits apply.
 2. Product Data for Section 5.504.4.3.1: Aerosol paints and coatings, provide documentation that products meet the PWMIR Limits for ROC in Section 94522 (a)(3) and other requirements, including prohibitions on use of certain toxic compounds and ozone depleting substances, in Section 94522(c)(2 and (d)(2) of CCR Title 17.
- D. Samples for Verification: For each type of paint system and in each color and gloss of topcoat, with texture to simulate actual conditions.
1. Provide stepped Samples, defining each separate coat, including primers. Use representative colors when preparing Samples for review. Resubmit until required gloss, color, and texture are achieved.
 2. Provide a list of materials and applications for each coat of each Sample. Label each Sample for location and application.
 3. Submit paint samples on hardboard, 12 inches square, of each color and texture required.
- E. 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. VOC content.

1.4 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: 1 gal. of each material and color applied.

1.5 QUALITY ASSURANCE

- A. Applicator Qualifications: Engage an experienced applicator who has completed painting system applications similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance.

1.6 FIELD CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.
- B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
1. Benjamin Moore Family of Products (Benjamin Moore, Coronado, Corotech, Insl-x, LenMar)
 2. PPG Paints (PPG)
 3. Sherwin-Williams Co. (SW)
 4. Vista Paint Corporation (Vista)
 5. or approved equal
- B. **Products:** Subject to compliance with requirements, provide one of the products listed in other Part 2 articles for the paint category indicated.
1. **Proprietary Names:** Use of manufacturer's proprietary product names to designate colors or materials is not intended to imply that products named are required to be used to the exclusion of equivalent products of other manufacturers.

2.2 PAINT, GENERAL

- A. **Material Compatibility:** Provide materials for use within each paint system that are compatible with one another and with the substrates indicated, under conditions of service and application, as demonstrated by manufacturer based on testing and field experience. 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.
- B. **VOC Content:** Products shall comply with the more stringent requirements of EPA 63 FR 176: 48848 and the following:
1. Southwest Air Pollution Control Authority (SWAPCA), SWAPCA 493 "VOC Area Source Rules," latest adopted requirements.
 2. California Air Resources Board (CARB), San Diego County APCD, R67-0, latest adopted requirements.
- C. Architectural Paints and coatings shall comply with VOC content as shown in Section 01 81 23 "CALgreen Requirements."
- D. **Material Quality:** Provide manufacturer's best-quality paint material of the various coating types specified that are factory formulated and recommended by manufacturer for application indicated. Paint-material containers not displaying manufacturer's product identification will not be acceptable.

- E. Colors and Gloss: As indicated in Finish Schedule on Drawings. Reference to a particular manufacturer's number or color name is used only as a convenience for the Architect in order to establish the Project color and gloss requirements. These references are not intended to describe the required generic paint systems. For generic paint system requirements, refer to the "Interior Paint Schedule" at the end of Part 3, as applicable to the respective conditions of use.
1. The selection of paint colors and gloss are indicated by manufacturer and color type; designated as "PT##."
 2. Furnish the same lots, batches, etc. within the same contiguous areas of the building (i.e., corridors on the same floors, common rooms which adjoin each other, etc.).

2.3 PREPARATORY COATS

- A. Primer Sealer, Latex, Interior:
1. Benjamin Moore; Ultra Spec 500 Interior Latex Primer (N534).
 2. PPG; Speedhide Zero Interior Latex Sealer Quick-Drying (6-4900).
 3. SW; ProMar 200 Zero VOC Interior Latex Primer (B28W02600).
 4. or approved equal
- B. Primer, Alkali Resistant, Water Based:
1. Benjamin Moore; Super Spec Masonry Int/Ext Acrylic High Build Primer (N068).
 2. PPG; Perma-Crete Interior/Exterior Alkali-Resistant Primer (4-603).
 3. SW; Loxon Concrete & Masonry Primer Interior/Exterior Latex (A24W8300) or approved equal
- C. Primer, Latex, for Interior Wood:
1. Benjamin Moore; Ultra Spec 500 Interior Latex Primer (N534).
 2. PPG; SEAL GRIP Interior Primer/Finish (17-951).
 3. SW; Premium Wall & Wood Interior Latex Primer (B28W08111)
 4. or approved equal.
- D. Primer, Bonding, Water Based:
1. Benjamin Moore; Insl-x Stix Bonding Primer (SXA-110).
 2. PPG; SEAL GRIP Interior/Exterior Acrylic Universal Primer/Sealer (17-921).
 3. SW; Adhesion Primer Interior/Exterior Latex (B51W8050).
 4. or approved equal
- E. Primer, Acrylic:
1. Benjamin Moore; Super Spec HP Acrylic Metal Primer (P04).
 2. or approved equal
 3. PPG; Pitt Tech Interior/Exterior Primer/Finish DTM Industrial Primer (90-712).
 4. SW; Pro Industrial Pro-Cryl Universal Primer (B66-310 Series).
 5. or approved equal

- F. Where manufacturer does not recommend a separate primer formulation on substrate indicated, use paint specified for finish coat.

2.4 WATER-BASED PAINTS

- A. Latex, Interior, Gloss Level 1 (Flat):

1. Benjamin Moore; Ultra Spec 500 Interior Flat (N536).
2. PPG; SPEEDHIDE zero Interior Zero-VOC Latex Flat (6-4110XI).
3. SW; ProMar 200 Zero VOC Interior Latex Flat (B30-2600 Series).
4. or approved equal

- B. Latex, Interior, Gloss Level 3 (Eggshell).

1. Benjamin Moore; Ultra Spec 500 Interior Eggshell (N538).
2. PPG; SPEEDHIDE zero Interior Zero-VOC Latex Eggshell (6-4310XI).
3. SW; ProMar 200 Zero Interior VOC Latex Eg-Shel (B20-2600 Series).
4. or approved equal

- C. Latex, Interior, Gloss Level 5 (Semigloss):

1. Benjamin Moore; Ultra Spec 500 Interior Semi-Gloss (N539).
2. PPG; SPEEDHIDE zero Interior Zero-VOC Latex Semi-Gloss (6-4510XI).
3. SW; ProMar 200 Zero VOC Latex Semi-Gloss (B31-2600 Series).
4. or approved equal

- D. Latex, Interior, High Performance Architectural, Gloss Level 3 (Eggshell):

1. Benjamin Moore; Corotech PreCatalyzed Waterborne Epoxy Eggshell V342.
2. PPG; Pitt-Glaze WB1 Interior Eggshell Pre-Catalyzed Water-Borne Acrylic Epoxy (16-310).
3. SW; Pro Industrial Pre-Catalyzed Waterbased Epoxy Eg-Shel (K45-150 Series).
4. or approved equal

- E. Latex, Interior, High Performance Architectural, Gloss Level 5 (Semigloss):

1. Benjamin Moore; Corotech PreCatalyzed Waterborne Epoxy SG (V341).
2. PPG; Pitt-Glaze WB1 Interior Semi-Gloss Pre-Catalyzed Water-Borne Acrylic Epoxy (16-510).
3. SW; Pro Industrial Pre-Catalyzed Waterbased Epoxy Semi-Gloss (K46-150 Series).
4. or approved equal

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Applicator present, for compliance with manufacturer's requirements for paint application. Comply with procedures specified in PDCA P4.
 - 1. Proceed with paint application only after unsatisfactory conditions have been corrected and surfaces receiving paint are thoroughly dry.

3.2 PREPARATION

- A. Remove hardware and hardware accessories, cover plates, machined surfaces, lighting fixtures, and similar items already installed that are not to be painted. If removal is impractical or impossible, provide surface-applied protection before surface preparation and painting.
- B. Before applying paint or other surface treatments, clean substrates of substances that could impair bond of paints. Remove oil and grease before cleaning.
 - 1. Schedule cleaning and painting so dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.
- C. Clean and prepare surfaces to be painted according to manufacturer's written instructions for each particular substrate condition and as specified. Provide barrier coats over incompatible primers or remove and reprime.
 - 1. Gypsum Wallboard: Repair all surfaces in gypsum wallboard with wallboard joint finishing compound or spackling compound, filled out flush and sanded smooth. Clean all surfaces and taped joints of dust, dirt and other contaminants and be sure they are thoroughly dry before applying paint.
 - 2. Steel Substrates: Remove rust, loose mill scale, and shop primer, if any. Clean using methods recommended in writing by paint manufacturer.
 - 3. 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.
 - 4. 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.
 - 5. Aluminum Substrates: Remove loose surface oxidation.
 - 6. Anodized Aluminum Substrates: Remove dust, dirt, and other foreign material that might impair bond of paints to substrates. Abrade surface to promote adhesion of subsequently applied paints.
 - 7. Powder-Coated Aluminum Substrates: Remove dust, dirt, and other foreign material that might impair bond of paints to substrates. Abrade surface to promote adhesion of subsequently applied paints.
 - 8. Wood: Clean surfaces of dirt, oil, and other foreign substances with scrapers, mineral spirits, and sandpaper, as required. Sand surfaces exposed to view smooth and dust off.

- a. Scrape and clean small, dry, seasoned knots, and apply a thin coat of white shellac or other recommended knot sealer before applying primer. After priming, fill holes and imperfections in finish surfaces with putty or plastic wood filler. Sand smooth when dried.
 - b. Seal tops, bottoms, and cutouts of unprimed wood doors with a heavy coat of varnish or sealer immediately on delivery.
9. Rubber: Remove dust, dirt, and other foreign material that might impair bond of paints to substrates. Abrade surface to promote adhesion of subsequently applied paints, if necessary.
- D. Mix and prepare paint materials according to manufacturer's written instructions.
1. Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.
 2. Stir material before application to produce a mixture of uniform density. Stir as required during application. Do not stir surface film into material. If necessary, remove surface film and strain material before using.
 3. Use only thinners approved by paint manufacturer and only within recommended limits.
- E. Tint each undercoat a lighter shade to facilitate identification of each coat when multiple coats of same material are applied. Tint undercoats to match the color of the topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.

3.3 APPLICATION

- A. Apply paint according to manufacturer's written instructions. Use applicators and techniques best suited for substrate and type of material being applied.
1. Paint colors, surface treatments, and finishes are indicated in Finish Schedule on Drawings.
 2. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film.
 3. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
 4. Extend coatings in exposed surfaces, as required, to maintain system integrity and provide desired protection.
 - a. The term "exposed surfaces" includes areas visible when permanent or built-in fixtures, grilles, convactor covers, covers for finned-tube radiation, and similar components are in place.
 5. Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces. Before final installation of equipment, paint surfaces behind permanently fixed equipment or furniture with prime coat only.

6. Paint front and back sides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces. Paint access panels, electrical panels, air diffusing outlets, supply and exhaust grilles, louvers, exposed conduit, primed hardware items, primed outlet covers, primed wall and ceiling cover plates and other items in painted areas to match the areas in which they occur unless otherwise directed by the Architect.
- B. Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.
1. The number of coats and film thickness required are the same regardless of application method. Do not apply succeeding coats until previous coat has cured as recommended by manufacturer. If sanding is required to produce a smooth, even surface according to manufacturer's written instructions, sand between applications.
 - a. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn-through or other defects due to insufficient sealing.
 - b. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.
 - c. If undercoats, stains, or other conditions show through final coat of paint, apply additional coats until paint film is of uniform finish, color, and appearance. Give special attention to ensure that edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.
 2. Allow sufficient time between successive coats to permit proper drying. Do not recoat surfaces until paint has dried to where it feels firm, and does not deform or feel sticky under moderate thumb pressure, and until application of another coat of paint does not cause undercoat to lift or lose adhesion.
- C. Apply paints and coatings by brush, roller, spray, or other applicators according to manufacturer's written instructions.
1. Brushes: Use brushes best suited for type of material applied. Use brush of appropriate size for surface or item being painted.
 2. Rollers: Use rollers of carpet, velvet-back, or high-pile sheep's wool as recommended by manufacturer for material and texture required.
 3. Spray Equipment: Use airless spray equipment with orifice size as recommended by manufacturer for material and texture required.
- 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. Apply paint materials no thinner than manufacturer's recommended spreading rate to achieve dry film thickness indicated. Provide total dry film thickness of the entire system as recommended by manufacturer.
- F. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:

1. Paint the following work where exposed in equipment rooms:

2. Paint the following work where exposed in occupied spaces:
 - 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.

3. Paint portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets that are visible from occupied spaces.
 - a. Color: Flat (gloss level 1), nonspecular, black.

- G. Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not complying with requirements.

3.4 MARKING AND IDENTIFICATION

- A. Mark fire-rated and smoke-rated partitions required to have protective openings or penetrations.
 1. Locate markings in accessible concealed floor, floor-ceiling, or attic spaces.
 2. Provide markings within 15 feet of the end of each wall and at intervals not exceeding 30 feet measured horizontally along the partition.
 3. Marking shall include stenciled lettering not less than 3 inches in height with a minimum 3/8 inch stroke.
 4. Apply markings in a contrasting color with the suggested wording "FIRE AND/OR SMOKE BARRIER---PROTECT ALL OPENINGS", or other wording as approved by the Authority Having Jurisdiction.

3.5 CLEANING

- A. At the end of each workday, remove empty cans, rags, rubbish, and other discarded paint materials from Project site.

- B. After completing painting, clean glass and paint-spattered surfaces. Remove spattered paint by washing and scraping without scratching or damaging adjacent finished surfaces.

- C. After completing painting operations in each space or area, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection, if any.

3.6 PROTECTION

- A. Protect work of other trades, whether being painted or not, against damage from paint application. Correct damage to work of other trades by cleaning, repairing or replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- B. Provide "Wet Paint" signs to protect newly painted finishes. After completing painting operations, remove temporary protective wrappings provided by others to protect their work. After work of other trades is complete, touch up and restore damaged or defaced painted surfaces. Comply with procedures specified in PDCA P1.

3.7 INTERIOR PAINTING SCHEDULE

- A. Gypsum Board Substrates:
 - 1. Latex System:
 - a. Primer: Sealer, latex, interior.
 - b. Intermediate Coat: Latex, interior, matching topcoat.
 - c. Topcoat: Latex, interior (gloss as indicated in Finish Schedule).
 - 2. High-Performance Architectural Latex System:
 - a. Primer: Sealer, latex, interior.
 - b. Intermediate Coat: Latex, interior, high performance architectural, matching topcoat.
 - c. Topcoat: Latex, interior, high performance architectural (gloss as indicated in Finish Schedule).
- B. Steel Substrates:
 - 1. High-Performance Architectural Latex System:
 - a. Primer: Acrylic.
 - b. Intermediate Coat: Latex, interior, high performance architectural; matching topcoat.
 - c. Topcoat: Latex, interior, high performance architectural (gloss as indicated in Finish Schedule).
- C. Steel (Factory-Primed) Substrates:
 - 1. High-Performance Architectural Latex System:
 - a. Primer: Acrylic (applied over factory primer).
 - b. Intermediate Coat: Latex, interior, high performance architectural; matching topcoat.
 - c. Topcoat: Latex, interior, high performance architectural (gloss as indicated in Finish Schedule).

- D. Galvanized Metal Substrates:
 - 1. High-Performance Architectural Latex System:
 - a. Primer: Acrylic.
 - b. Intermediate Coat: Latex, interior, high performance architectural; matching topcoat.
 - c. Topcoat: Latex, interior, high performance architectural (gloss as indicated in Finish Schedule).

- E. Aluminum Substrates: Not anodized or otherwise coated.
 - 1. High-Performance Architectural Latex System:
 - a. Primer: Acrylic.
 - b. Intermediate Coat: Latex, interior, high performance architectural; matching topcoat.
 - c. Topcoat: Latex, interior, high performance architectural (gloss as indicated in Finish Schedule).

- F. Aluminum (Anodized) Substrates:
 - 1. High-Performance Architectural Latex System:
 - a. Primer: Acrylic.
 - b. Intermediate Coat: Latex, interior, high performance architectural; matching topcoat.
 - c. Topcoat: Latex, interior, high performance architectural (gloss as indicated in Finish Schedule).

- G. Aluminum (Powder-Coated) Substrates:
 - 1. High-Performance Architectural Latex System:
 - a. Primer: Acrylic.
 - b. Intermediate Coat: Latex, interior, high performance architectural; matching topcoat.
 - c. Topcoat: Latex, interior, high performance architectural (gloss as indicated in Finish Schedule).

- H. Wood[and Hardboard] Substrates:
 - 1. High-Performance Architectural Latex System:
 - a. Primer: Acrylic.
 - b. Intermediate Coat: Latex, interior, high performance architectural; matching topcoat.
 - c. Topcoat: Latex, interior, high performance architectural (gloss as indicated in Finish Schedule).

I. Rubber Substrates:

1. Latex System:

- a. Primer: Acrylic bonding primer or universal acrylic primer.
- b. Intermediate Coat: Latex, interior, matching topcoat.
- c. Topcoat: Latex, interior (gloss as indicated in Finish Schedule).

2. High-Performance Architectural Latex System:

- a. Primer: Acrylic bonding primer or universal acrylic primer.
- b. Intermediate Coat: Latex, interior, high performance architectural, matching topcoat.
- c. Topcoat: Latex, interior, high performance architectural (gloss as indicated in Finish Schedule).

END OF SECTION 09 91 23

SECTION 10 21 13 - TOILET COMPARTMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes toilet compartments and screens as follows:
 - 1. Type: Steel, color-coated finish.
 - 2. Compartment Style: Floor anchored.
 - 3. Screen Style: Wall hung.

1.2 ACTION SUBMITTALS

- A. Product Data: For each product indicated.
- B. Shop Drawings: Include plans, elevations, sections, details of installation, and attachments to other Work.
- C. Samples: For each exposed finish and for each color and pattern required.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Baked Enamel on Steel (match existing):
 - a. Accurate Partitions Corporation.
 - b. Bradley Corporation.
 - c. General Partitions Manufacturing Corporation.
 - d. Global Steel Products Corporation.
 - e. Hadrian Manufacturing, Inc.
 - f. Metpar Corporation.
 - g. or approved equal

2.2 MATERIALS

- A. Panel, Pilaster, and Door Material:

1. Steel Sheets with Color-Coated Finish: Mill-phosphatized, corrosion-resistant steel sheet; stretcher-leveled flatness, ASTM A 591/A 591M, Class C, or ASTM A 653/A 653M; with manufacturer's standard baked finish.
 - a. Color: Matchexisting.
- B. Core Material for Metal-Faced Units: Sound-deadening honeycomb of resin-impregnated kraft paper in thickness required to provide finished thickness of 1 inch minimum for doors, panels, and screens and 1-1/4 inches minimum for pilasters.
- C. Pilaster Shoes and Sleeves (Caps): Stainless steel, not less than 3 inches high.
- D. Stirrup Brackets: Stainless steel .

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.
 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 and entrance-screen doors.
 6. Door Pull: Manufacturer's standard unit at out-swinging doors that complies with regulatory requirements for accessibility. Provide units on both sides of doors at compartments designated as accessible.
- B. Anchorages and Fasteners: Manufacturer's standard exposed fasteners of stainless steel or chrome-plated steel or brass, 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. Toilet Compartments: Floor anchored.
- B. Urinal Screens: Wall hung.
- C. Metal Units: Internally reinforce metal panels for hardware, accessories, and grab bars.

- D. Doors: Unless otherwise indicated, 24 inch wide in-swinging doors for standard toilet compartments and 36 inch wide out-swinging doors with a minimum 32 inch wide clear opening for compartments indicated to be accessible to people with disabilities.
- E. Door Hardware: Stainless steel. Provide units that comply with accessibility requirements of authorities having jurisdiction at compartments indicated to be accessible to people with disabilities.
 - 1. Hinges: Self-closing type, adjustable to hold door open at any angle up to 90 degrees.
 - 2. Latches and Keepers: Surface-mounted unit designed for emergency access and with combination rubber-faced door strike and keeper. Provide units that comply with accessibility requirements of authorities having jurisdiction at compartments indicated to be handicapped accessible.
 - 3. Coat Hook: Combination hook and rubber-tipped bumper, sized to prevent door from hitting compartment-mounted accessories.
 - 4. Door Bumper: Rubber-tipped bumpers at out-swinging doors or entrance screen doors.
 - 5. Door Pull: Provide at out-swinging doors. Provide units on both sides of doors at compartments indicated to be accessible to people with disabilities.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install units rigid, straight, level, and plumb, with not more than 1/2 inch between pilasters and panels and not more than 1 inch between panels and walls. Provide brackets, pilaster shoes, bracing, and other components required for a complete installation. Use theft-resistant exposed fasteners finished to match hardware. Use sex-type bolts for through-bolt applications.
 - 1. Brackets: Align brackets at pilasters with brackets at walls. Locate wall brackets so holes for wall anchors occur in masonry or tile joints.
 - 2. Set hinges on in-swinging doors to hold open approximately 30 degrees from closed position when unlatched. Set hinges on out-swinging doors and swing doors in entrance screens to return to fully closed position.

END OF SECTION 10 21 13

SECTION 10 26 00 - WALL AND DOOR PROTECTION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Wall guards.
- B. Related Requirements:

1.2 ACTION SUBMITTALS

- A. Product Data: For each product indicated.
- B. Shop Drawings: Include locations and extent of impact-resistant wall protection and details of installation.
- C. Samples: For each unit and for each color and texture required.

1.3 CLOSEOUT SUBMITTALS

- A. Maintenance data.

1.4 MAINTENANCE MATERIAL SUBMITTALS

1.5 QUALITY ASSURANCE

- A. Fire-Test-Response Characteristics: Provide components with flame-spread and smoke-developed indices of not more than 25 and 450, respectively, when tested per ASTM E 84 by a testing agency acceptable to authorities having jurisdiction.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Extruded Plastic: Textured, chemical- and stain-resistant, high-impact-resistant, PVC or acrylic-modified vinyl plastic; thickness as indicated; with a minimum impact resistance of 25.4 ft-lbf/in. of width when tested according to ASTM D 256, Test Method A.

2.2 IMPACT-RESISTANT WALL COVERINGS

- A. Semirigid Sheet Wall Covering: Embossed, fiber-backed, impact-resistant plastic sheets, chemical and stain resistant.
 - 1. Trim: Manufacturer's standard, matching moldings and trim as required for complete installation.

2.3 FINISHES

- A. Plastic Color: As selected from manufacturer's full range.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Preparation: Complete finishing operations, including painting, before installing impact-resistant wall protection system components. Before installation, clean substrate to remove dust, debris, and loose particles.
- B. Install impact-resistant wall protection system components level, plumb, and true to line without distortions.
 - 1. Do not use materials with chips, cracks, voids, stains, or other defects that might be visible in the finished Work.
- C. Where splices occur in horizontal runs of more than 20 feet, splice aluminum retainers and plastic covers at different locations along the run.
- D. Immediately on completion of installation, clean plastic covers and accessories using standard ammonia-based household cleaning agent. Clean metal components according to manufacturer's written instructions.
 - 1. Remove excess adhesive using methods and materials recommended by manufacturer.

END OF SECTION 10 26 00

SECTION 12 24 13 - ROLLER WINDOW SHADES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Manually operated roller shades with single rollers.
- B. Related Requirements:

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include styles, material descriptions, construction details, dimensions of individual components and profiles, features, finishes, and operating instructions.
 - 1. Motors: Show nameplate data, ratings, characteristics, and mounting arrangements.
- B. CALgreen Submittals:
 - 1. Product Data for Section 5.504.4.1.1: For sealants, adhesives and caulks, provide documentation including printed statement of VOC content showing compliance with SCAQMD Rule 1168 VOC limits and CCR (California Code of Regulations) Title 17 for aerosols.
 - 2. Product Data for Section 5.504.4.1.2: Provide documentation for aerosol adhesives, and smaller unit sizes of adhesives, sealant, and caulking compounds (in units of product, less packaging, which do not weigh more than one (1) pound and do not consist of more than sixteen (16) fluid ounces) comply with statewide VOC standards and prohibitions on use of certain toxic compounds, of CCR Title 17, commencing with Section 94507.
- C. Shop Drawings: Show location and extent of roller shades. Include elevations, sections, details, and dimensions not shown in Product Data. Show installation details, mountings, attachments to other Work, operational clearances, and relationship to adjoining work.
- D. Coordination Drawings: Reflected ceiling plans drawn to scale and coordinating penetrations and ceiling-mounted items. Show the following:
 - 1. Ceiling suspension system members and attachment to building structure.
 - 2. Shade mounting assembly and attachment.
 - 3. Size and location of access to shade operator, motor, and adjustable components.
 - 4. Minimum Drawing Scale: 1/4 inch = 1 foot .
- E. Samples for Verification:

1. Complete, full-size operating unit not less than 16 inches wide for each type of roller shade indicated.
2. For the following products:
 - a. Shade Material: Not less than 12-inch- square section of fabric, from dye lot used for the Work, with specified treatments applied. Show complete pattern repeat. Mark top and face of material.

1.3 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For roller shades to include in maintenance manuals. Include the following:
 1. Methods for maintaining roller shades and finishes.
 2. Precautions about cleaning materials and methods that could be detrimental to fabrics, finishes, and performance.
 3. Operating hardware.

1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 1. Roller Shades: Full-size units equal to 5 percent of quantity installed for each size, color, and shadeband material indicated, but no fewer than two units.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has completed installation of roller shades 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 roller shades through one source from a single manufacturer.
- C. Fire-Test-Response Characteristics: Provide roller shade band materials with the fire-test-response characteristics indicated, as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:
 1. Flame-Resistance Ratings: Passes NFPA 701.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver shades in factory packages, marked with manufacturer and product name, fire-test-response characteristics, and location of installation using same room designations indicated on Drawings and in a window treatment schedule.

1.8 FIELD CONDITIONS

- A. Environmental Limitations: Do not install roller shades until construction and wet and dirty finish work in spaces, including painting, is complete and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
- B. Field Measurements: Where roller shades are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Allow clearances for operable glazed units' operation hardware throughout the entire operating range. Notify Architect of discrepancies. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Adhesives, adhesive bonding primers, adhesive primers, sealants, sealant primers and caulks shall comply with local or regional regulations as shown in CALgreen Section 5.504.4.1.
- B. Aerosol adhesives, and smaller unit sizes of adhesives, and sealant or caulking compounds shall comply with regulations as shown in CALgreen Section 5.504.4.2.

2.2 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Draper.
 - 2. Lutron.
 - 3. MechoShade Systems, Inc.
 - 4. Nysan Shading Systems Ltd.
 - 5. Sol-R-Shade, DFB, Inc.
 - 6. or approved equal

2.3 MANUALLY OPERATED SHADES WITH SINGLE ROLLERS

- A. Chain-and-Clutch Operating Mechanisms: With continuous-loop bead chain and clutch that stops shade movement when bead chain is released; permanently adjusted and lubricated.
 - 1. Bead Chains: Manufacturer's standard .

- a. Loop Length: Full length of roller shade.
 - b. Limit Stops: Provide upper and lower ball stops.
- B. Rollers: Corrosion-resistant steel or extruded-aluminum tubes of diameters and wall thicknesses required to accommodate operating mechanisms and weights and widths of shadebands indicated without deflection. Provide with permanently lubricated drive-end assemblies and idle-end assemblies designed to facilitate removal of shadebands for service.
- 1. Roller Drive-End Location: Right side of interior face of shade.
 - 2. Direction of Shadeband Roll: match existing on other floors.
- C. Mounting Hardware: Brackets or endcaps, corrosion resistant and compatible with roller assembly, operating mechanism, installation accessories, and mounting location and conditions indicated.
- D. Shadebands:
- 1. Shadeband Material: Light-filtering fabric / match existing.
 - 2. Shadeband Bottom (Hem) Bar: Steel or extruded aluminum.
 - a. Type: Enclosed in sealed pocket of shadeband material.
 - b. Color and Finish: match existing.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, operational clearances, and other conditions affecting performance of the Work.

3.2 ROLLER SHADE INSTALLATION

- A. Install roller shades level, plumb, and aligned with adjacent units according to manufacturer's written instructions.
 - 1. Opaque Shadebands: Located so shadeband is not closer than 2 inches to interior face of glass. Allow clearances for window operation hardware.
- B. Electrical Connections: Connect motor-operated roller shades to building electrical system.
- C. Roller Shade Locations: At exterior windows .

3.3 ADJUSTING

- A. Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.

3.4 CLEANING AND PROTECTION

- A. Clean roller shade surfaces after installation, according to manufacturer's written instructions.
- B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that roller shades are without damage or deterioration at time of Substantial Completion.
- C. Replace damaged roller shades that cannot be repaired, in a manner approved by Architect, before time of Substantial Completion.

3.5 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain roller window shades.

END OF SECTION 12 24 13

SECTION 12 48 53 – AREA RUGS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes custom, hand-knotted rugs.

1.2 STANDARDS

- A. Except as modified by governing codes and by the Contract Documents, comply with the applicable provisions and recommendations of the following:
 - 1. The Carpet and Rug Institute "The Carpet Specifiers' Handbook."
 - 2. The Carpet and Rug Institute "CRI 104 Standard for Installation of Commercial Carpet, edition Sept. 2015."

1.3 SUBMITTALS

- A. Product Data: For each product indicated.
- B. Shop Drawings: Include the following:
 - 1. Seam locations.
 - 2. Pattern type, repeat, location, direction, and starting point.
 - 3. Pile direction.
- C. Samples: For each for each rug and exposed accessory and for each color and pattern required.
- D. Qualification Data: For Installer.
- E. Maintenance data.
- F. Warranties: Special warranties specified in this Section.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Comply with CRI 104.

1.5 PROJECT CONDITIONS

- A. Comply with CRI 104.

- B. Environmental Limitations: Do not install rug until wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

1.6 WARRANTY

- A. Rug Warranty: Manufacturer's standard form in which manufacturer agrees to replace rug that does not comply with requirements or that fails within 20 years from date of Substantial Completion. Warranty does not include deterioration or failure of rug from unusual traffic, failure of substrate, vandalism, or abuse. Failures include, but are not limited to, more than 10 percent loss of face fiber, edge raveling, snags, runs, and delamination.

PART 2 - PRODUCTS

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install parallel to walls and borders.
- B. Provide protection until Substantial Completion.

END OF SECTION 12 48 53

SECTION 12 64 13 - BANQUETTE SEATING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes custom banquettes.

1.2 ACTION SUBMITTALS

- A. CALgreen Submittals:
 - 1. Product Data for Section 5.504.4.1.1: For sealants, adhesives and caulks, provide documentation including printed statement of VOC content showing compliance with SCAQMD Rule 1168 VOC limits and CCR (California Code of Regulations) Title 17 for aerosols.
 - 2. Product Data for Section 5.504.4.1.2: Provide documentation for aerosol adhesives, and smaller unit sizes of adhesives, sealant, and caulking compounds (in units of product, less packaging, which do not weigh more than one (1) pound and do not consist of more than sixteen (16) fluid ounces) comply with statewide VOC standards and prohibitions on use of certain toxic compounds, of CCR Title 17, commencing with Section 94507.
 - 3. Product Data for Section 5.504.4.3: For architectural paints and coatings, provide documentation including printed statement of VOC content showing compliance with Table 1 of the ARB, Architectural Coatings Suggested Control Measure, unless more stringent local limits apply.
 - 4. Product Data for Section 5.504.4.3.1: Aerosol paints and coatings, provide documentation that products meet the PWMIR Limits for ROC in Section 94522 (a)(3) and other requirements, including prohibitions on use of certain toxic compounds and ozone depleting substances, in Section 94522(c)(2 and (d)(2) of CCR Title 17.
- B. Samples for Verification:
 - 1. Seat upholstery fabric, in 24 inch square Samples.
 - 2. Back upholstery fabric, in 24 inch square Samples.
- C. Qualification Data: For Installer and manufacturer (fabricator).

1.3 CLOSEOUT SUBMITTALS

- A. Maintenance Instructions: Submit two copies, covering cleaning procedures, adjustments, flexibility and use for fabric.
 - 1. Instructions shall contain manufacturer's recommended cleaning materials and application methods, including precautions in use of cleaning materials which may be detrimental.

1.4 QUALITY ASSURANCE

- A. Qualification of Banquette Supplier: Experienced in type and size of work specified and capable of submitting at least one business reference, and credit reference.
 - 1. Experience in work of comparable size and complexity.
- B. Flammability: Upholstered items shall be in full compliance with flammability regulations of Bureau of Home Furnishings, California Department of Consumer Affairs: Sections A-E of Technical Information Bulletin No. 117, effective October 1, 1975 NFPA 260. Attached label shall indicate compliance.
- C. Quality Standard: Fabricate and install banquettes in accordance with the applicable requirements of Architectural Woodwork Standards, 1st edition, published jointly by AWI, AWMAC, and WI, unless more stringent requirements are specified or shown.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Wrap or crate prefabricated materials to prevent damage during shipping and installation.
- B. Do not deliver banquettes until painting and similar operations that could damage banquettes have been completed in installation areas.
- C. Extra Materials: Provide upholstery material in full-width quantity to reupholster seating units equal to 10 percent of amount installed, but no fewer than 5 percent of banquette units.

1.6 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install banquettes until building is enclosed, wet work is complete, and HVAC system is operating and will maintain temperature and relative humidity at occupancy levels during the remainder of the construction period.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Fabrics : As scheduled and in conformance with Architect's control samples.
- B. High density, high resilient (HR), fire resistant (FR) foam, conforming to flammability requirements: Provide 2.7-density 31-pound ILD foam with Dacron wrap.
- C. Adhesives, adhesive bonding primers, adhesive primers, sealants, sealant primers and caulks shall comply with local or regional regulations as shown in CALgreen Section 5.504.4.1.
- D. Aerosol adhesives, and smaller unit sizes of adhesives, and sealant or caulking compounds shall comply with regulations as shown in CALgreen Section 5.504.4.2.

2.2 FABRICATION

- A. Backs: Fabricate backs from 2-1/2 inch high density foam over plywood backing.

2.3 UPHOLSTERING

- A. Banquette cushions shall be sewn to shapes indicated, in manner consistent with high use commercial applications.
- B. Square fabric warp and filling (woof, weft) threads and trim to appropriate size prior to cutting patterns.
- C. Cut fabrics on thread. Apply upholstery material to form tailored seats, backs, and ends.
- D. Cushions shall be uniform in width based on each banquette width.
- E. Sewing shall be straight on a line.
- F. Use exposed fastening devices or nails only as approved by Architect. Arrange neatly.
- G. Complete fabrication, including assembly and finishing, to maximum extent possible, before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.
- H. Manufacturer to coordinate with Contractor to determine finished wall sizes. Deduct 1/4 inch from each end of banquette in alcoves in order to assure a proper fit. Provide a template to pre-fit and pre-bolt banquette together in factory and pre-check measurements prior to delivery to assure proper fit.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Before installation, condition banquettes to average prevailing humidity conditions in installation areas.
- B. Before installing banquettes, examine shop-fabricated work for completion and complete work as required, including removal of packing and back priming.

3.2 INSTALLATION

- A. Install banquettes level, plumb, true, and straight with no distortions. Shim as required with concealed shims. Install level and plumb to a tolerance of 1/8 inch in 96 inches. Install with no more than 1/16 inch in 96-inch vertical cup or bow and 1/8 inch in 96-inch horizontal variation from a true plane.

- B. Anchor banquettes to supporting substrate with concealed clips and splined connection strips. Do not use face fastening unless otherwise indicated.

3.3 CLEANING AND PROTECTION

- A. Repair damaged and defective banquettes, where possible, to eliminate functional and visual defects; where not possible to repair, replace banquettes. Adjust for uniform appearance.
- B. Clean banquettes on exposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.
- C. Protect banquettes from soiling or damage until Substantial Completion.

END OF SECTION 12 64 13

SECTION 03 30 00 - CAST-IN-PLACE CONCRETE

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: cast-in place concrete, including formwork, reinforcement, concrete materials, mix design, placement procedures, and finishes

1.3 DEFINITIONS

- A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash and other pozzolans, ground granulated blast-furnace slag, and silica fume; subject to compliance with requirements.

1.4 SUBMITTALS

- A. Product Data: For each type of manufactured material and product indicated.

CAST-IN-PLACE CONCRETE

- C. Design Mixes: For each concrete mix. Submit alternate mix designs when characteristics of materials, project conditions, weather, test results, or other circumstances warrant adjustments.
 - 1. Indicate amounts of mixing water to be withheld for later addition at Project site
 - 2. Submit shrinkage test results with mix design for approval.
- D. Steel Reinforcement Shop Drawings: Details of fabrication, bending, and placement, prepared according to ACI 315, "Details and Detailing of Concrete Reinforcement." Include material, grade, bar schedules, stirrup spacing, bent bar diagrams, arrangement, and supports of concrete reinforcement. Include special reinforcement required for openings through concrete structures.
- E. Formwork Shop Drawings: Prepared by or under the supervision of a qualified professional engineer detailing fabrication, assembly, and support of formwork. Design and engineering of formwork are Contractor's responsibility.
 - 1. Shoring and Reshoring: Indicate proposed schedule and sequence of stripping formwork, shoring removal, and installing and removing reshoring.
- F. Welding Certificates: Copies of certificates for welding procedures and personnel.
- G. Samples: For waterstops, vapor retarder.
- H. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated, based on comprehensive testing of current materials:
- I. Material Certificates: Signed by manufacturers certifying that each of the following items complies with requirements:
 - 1. Cementitious materials and aggregates.
 - 2. Form materials and form-release agents.
 - 3. Steel reinforcement and reinforcement accessories.
 - 4. Fiber reinforcement.
 - 5. Admixtures.
 - 6. Waterstops.
 - 7. Curing materials.
 - 8. Floor and slab treatments.
 - 9. Bonding agents.
 - 10. Adhesives.
 - 11. Vapor retarders.
 - 12. Epoxy joint filler.
 - 13. Joint-filler strips.
 - 14. Repair materials.
- J. Minutes of preinstallation conference.

1.5 QUALITY ASSURANCE

- A. **Installer Qualifications:** An experienced installer who has completed concrete Work 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. **Professional Engineer Qualifications:** A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for formwork and shoring and reshoring installations that are similar to those indicated for this Project in material, design, and extent.
- C. **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.
 - 1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."
- D. **Testing Agency Qualifications:** An independent agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated, as documented according to ASTM E 548.
 - 1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-01 or an equivalent certification program.
 - 2. Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician - Grade I. Testing Agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician - Grade II.
- E. **Source Limitations:** Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, each aggregate from one source, and each admixture from the same manufacturer.
- F. **Welding:** Qualify procedures and personnel according to AWS D1.4, "Structural Welding Code--Reinforcing Steel."
- G. **ACI Publications:** Comply with the following, unless more stringent provisions are indicated:
 - 1. ACI 301, "Specification for Structural Concrete."
 - 2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."
- H. **Preinstallation Conference:** Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."
 - 1. Before submitting design mixtures, review concrete design mixture and examine procedures for ensuring quality of concrete materials. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:
 - a. Contractor's superintendent.

- b. Independent testing agency responsible for concrete design mixtures.
 - c. Ready-mix concrete manufacturer.
 - d. Concrete subcontractor.
2. Review special inspection and testing and inspecting agency procedures for field quality control, concrete finishes and finishing, cold- and hot-weather concreting procedures, curing procedures, construction contraction and isolation joints, and joint-filler strips, semirigid joint fillers, forms and form removal limitations, shoring and reshoring procedures, vapor-retarder installation, anchor rod and anchorage device installation tolerances, steel reinforcement installation, floor and slab flatness and levelness measurement, concrete repair procedures, and concrete protection.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle steel reinforcement to prevent bending and damage.
 1. Avoid damaging coatings on steel reinforcement.
 2. Repair damaged epoxy coatings on steel reinforcement according to ASTM D 3963/D 3963M.
- B. Waterstops: Store waterstops under cover to protect from moisture, sunlight, dirt, oil, and other contaminants.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products specified.
 2. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.

2.2 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.
 1. Plywood, metal, or other approved panel materials.
 2. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:
 - a. High-density overlay, Class 1, or better.

- b. Medium-density overlay, Class 1, or better, mill-release agent treated and edge sealed.
 - c. Structural 1, B-B, or better, mill oiled and edge sealed.
 - d. B-B (Concrete Form), Class 1, or better, mill oiled and edge sealed.
- B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.
- C. Forms for Cylindrical Columns, Pedestals, and Supports: Metal, glass-fiber-reinforced plastic, paper, or fiber tubes that will produce surfaces with gradual or abrupt irregularities not exceeding specified formwork surface class. Provide units with sufficient wall thickness to resist plastic concrete loads without detrimental deformation.
- D. Void Forms: Biodegradable paper surface, treated for moisture resistance, structurally sufficient to support weight of plastic concrete and other superimposed loads.
- E. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch, minimum.
- F. 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.
- 1. Formulate form-release agent with rust inhibitor for steel form-facing materials.
- G. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
- 1. Furnish units that will leave no corrodible metal closer than 1 inch to the plane of the exposed concrete surface.
 - 2. Furnish ties that, when removed, will leave holes not larger than 1 inch in diameter in concrete surface.

2.3 STEEL REINFORCEMENT

- A. Recycled Content of Steel Products: Provide products with an average recycled content of steel products so postconsumer recycled content plus one-half of preconsumer recycled content is not less than 25 percent.
- B. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.
- C. Low-Alloy-Steel Reinforcing Bars: ASTM A 706/A 706M, deformed.
- D. Galvanized Reinforcing Bars: ASTM A 767, hot-dip galvanized after fabrication and bending, of reinforcement type and zinc coating as follows:
- 1. Steel Reinforcement: ASTM A 615, Grade 60, deformed.
 - 2. Steel Reinforcement: ASTM A 706, deformed.
- E. Galvanized Plain-Steel Welded Wire Fabric: ASTM A 185, fabricated from galvanized steel wire into flat sheets.

2.4 REINFORCEMENT ACCESSORIES

- A. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire fabric in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete or fiber-reinforced concrete of greater compressive strength than concrete, and as follows:
 - 1. For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected or CRSI Class 2 stainless-steel bar supports.
- B. Joint Dowel Bars: Plain-steel bars, ASTM A 615/A 615M, Grade 60. Cut bars true to length with ends square and free of burrs.
- C. Zinc Repair Material: ASTM A 780, zinc-based solder, paint containing zinc dust, or sprayed zinc.

2.5 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. Silica Fume: ASTM C 1240, amorphous silica.
- C. Normal-Weight Aggregate: ASTM C 33, uniformly graded, and as follows:
 - 1. Class: Moderate weathering region, but not less than 3M.
 - 2. Nominal Maximum Aggregate Size: 1 inch.
 - 3. Combined Aggregate Gradation: Well graded from coarsest to finest with not more than 18 percent and not less than 8 percent retained on an individual sieve, except that less than 8 percent may be retained on coarsest sieve and on No. 50 sieve, and less than 8 percent may be retained on sieves finer than No. 50.
- D. Lightweight Aggregate: ASTM C 330.
 - 1. Nominal Maximum Aggregate Size: 3/4 inch.
- E. Water: Potable and complying with ASTM C 94.

2.6 ADMIXTURES

- A. General: Admixtures certified by manufacturer to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material and to be compatible with other admixtures and cementitious materials. Do not use admixtures containing calcium chloride.
- B. Air-Entraining Admixture: ASTM C 260.

- C. 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, Type A.
 - 2. Retarding Admixture: ASTM C 494, Type B.
 - 3. Water-Reducing and Retarding Admixture: ASTM C 494, Type D.
 - 4. High-Range, Water-Reducing Admixture: ASTM C 494, Type F.
 - 5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494, Type G.
 - 6. Plasticizing and Retarding Admixture: ASTM C 1017, Type II.

2.7 FIBER REINFORCEMENT

- A. Synthetic Fiber: Fibrillated or monofilament polypropylene fibers engineered and designed for use in concrete, complying with ASTM C 1116, Type III, 1/2 to 1-1/2 inches long.
- B. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
- C. Products: Subject to compliance with requirements, provide one of the following:
 - 1. Fibrillated Fibers:
 - a. Fibrasol F; Axim Concrete Technologies.
 - b. Fibermesh; Fibermesh, Div. of Synthetic Industries.
 - c. Forta; Forta Corporation.
 - d. Grace Fibers; W. R. Grace & Co., Construction Products Div.
 - 2. Monofilament Fibers:
 - a. Fibrasol IIP; Axim Concrete Technologies.
 - b. Fiberstrand 100; Euclid Chemical Co.
 - c. Fibermix Stealth; Fibermesh, Div. of Synthetic Industries.
 - d. Forta Mono; Forta Corporation.
 - e. Grace MicroFiber; W. R. Grace & Co., Construction Products Div.
 - f. Hi-Tech PPM Fiber; Hi-Tech Fibers, Div. of Martin Color-Fi, Inc.

2.8 WATERSTOPS

- A. Flexible Rubber Waterstops: CE CRD-C 572, for embedding in concrete to prevent passage of fluids through joints. Factory fabricate corners, intersections, and directional changes.
 - 1. Profile: Ribbed without center bulb.
- B. 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. PVC Waterstops:

- a. Greenstreak.
 - b. Meadows: W. R. Meadows, Inc.
 - c. Murphy: Paul Murphy Plastics Co.
 - d. Progress Unlimited Inc.
 - e. Sternson Group.
 - f. Tamms Industries Co.; Div. of LaPorte Construction Chemicals North America, Inc.
 - g. Vinylex Corporation.
 - h. Westec Barrier Technologies; Div. of Western Textile Products, Inc.
- C. Self-Expanding Strip Waterstops: Manufactured rectangular or trapezoidal strip, sodium bentonite or other hydrophylic material for adhesive bonding to concrete.
1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Volclay Waterstop-RX; Colloid Environmental Technologies Co.
 - b. Conseal CS-231; Concrete Sealants Inc.
 - c. Swellseal Joint; De Neef Construction Chemicals (U.S.) Inc.
 - d. Hydrotite; Greenstreak.
 - e. Mirastop; Mirafi Moisture Protection, Div. of Royal Ten Cate (USA), Inc.
 - f. Adeka Ultra Seal; Mitsubishi International Corporation.
 - g. Superstop; Progress Unlimited Inc.

2.9 FLOOR AND SLAB TREATMENTS

- A. Penetrating Liquid Floor Treatment (Sealer/Hardener): Chemically reactive, waterborne solution of inorganic silicate or silicate materials and proprietary components; odorless; colorless; that penetrates, hardens, and densifies concrete surfaces.
- B. Products: Subject to compliance with requirements, provide one of the following:
 1. Penetrating Liquid Floor Treatment:
 - a. Titan Hard; Burke Group, LLC (The).
 - b. Chemisil Plus; ChemMasters.
 - c. Intraseal; Conspec Marketing & Manufacturing Co., Inc.
 - d. Ashford Formula; Curecrete Chemical Co., Inc.
 - e. Day-Chem Sure Hard; Dayton Superior Corporation.
 - f. Euco Diamond Hard; Euclid Chemical Co.
 - g. Seal Hard; L&M Construction Chemicals, Inc.
 - h. Vexcon Starseal PS; Vexcon Chemicals, Inc.

2.10 CURING MATERIALS

- A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.

1. Products:
 - a. Axim Concrete Technologies; Cimfilm.
 - b. Burke by Edoco; BurkeFilm.
 - c. ChemMasters; Spray-Film.
 - d. Conspec Marketing & Manufacturing Co., Inc., a Dayton Superior Company; Aquafilm.
 - e. Dayton Superior Corporation; Sure Film.
 - f. Euclid Chemical Company (The); Eucobar.
 - g. Kaufman Products, Inc.; Vapor Aid.
 - h. Lambert Corporation; Lambco Skin.
 - i. L&M Construction Chemicals, Inc.; E-Con.
 - j. MBT Protection and Repair, Div. of ChemRex; Confilm.
 - k. Meadows, W. R., Inc.; Sealtight Evapre.
 - l. Metalcrete Industries; Waterhold.
 - m. Nox-Crete Products Group, Kinsman Corporation; Monofilm.
 - n. Sika Corporation, Inc.; SikaFilm.
 - o. Symons Corporation, a Dayton Superior Company; Finishing Aid.
 - p. Unitex; Pro-Film.
 - q. US Mix Products Company; US Spec Monofilm ER.
 - r. Vexcon Chemicals, Inc.; Certi-Vex EnvioAssist.

- 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.

1. Products:

- a. Anti-Hydro International, Inc.; AH Curing Compound #2 DR WB.
- b. Burke by Edoco; Aqua Resin Cure.
- c. ChemMasters; Safe-Cure Clear.
- d. Conspec Marketing & Manufacturing Co., Inc., a Dayton Superior Company; W.B. Resin Cure.
- e. Dayton Superior Corporation; Day Chem Rez Cure (J-11-W).
- f. Euclid Chemical Company (The); Kurez DR VOX.
- g. Kaufman Products, Inc.; Thinfilm 420.
- h. Lambert Corporation; Aqua Kure-Clear.
- i. L&M Construction Chemicals, Inc.; L&M Cure R.
- j. Meadows, W. R., Inc.; 1100 Clear.
- k. Nox-Crete Products Group, Kinsman Corporation; Resin Cure E.
- l. Symons Corporation, a Dayton Superior Company; Resi-Chem Clear Cure.
- m. Tamms Industries, Inc.; Horncure WB 30.
- n. Unitex; Hydro Cure 309.
- o. US Mix Products Company; US Spec Maxcure Resin Clear.

- p. Vexcon Chemicals, Inc.; Certi-Vex Envioecure 100.

2.11 RELATED MATERIALS

- A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber.
- B. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.
- C. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements, and as follows:
 - 1. Types I and II, non-load bearing, IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.
- D. Reglets: Fabricate reglets of not less than 0.0217-inch-thick galvanized steel sheet. Temporarily fill or cover face opening of reglet to prevent intrusion of concrete or debris.
- E. Dovetail Anchor Slots: Hot-dip galvanized steel sheet, not less than 0.0336 inch thick, with bent tab anchors. Temporarily fill or cover face opening of slots to prevent intrusion of concrete or debris.

2.12 REPAIR MATERIALS

- A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.
 - 1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
 - 2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
 - 3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by underlayment manufacturer.
 - 4. Compressive Strength: Not less than 4100 psi at 28 days when tested according to ASTM C 109/C 109M.
- B. Repair Topping: Traffic-bearing, cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/4 inch.
 - 1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
 - 2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
 - 3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by topping manufacturer.
 - 4. Compressive Strength: Not less than 5700 psi at 28 days when tested according to ASTM C 109/C 109M.

2.13 CONCRETE MIXTURES, GENERAL

- 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.
 - 1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.
- B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
 - 1. Fly Ash: 25 percent.
 - 2. Combined Fly Ash and Pozzolan: 25 percent.
 - 3. Silica Fume: 10 percent.
- C. Limit water-soluble, chloride-ion content in hardened concrete to 0.06 percent by weight of cement.
- D. Admixtures: Use admixtures according to manufacturer's written instructions.
 - 1. Use 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 for heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a water-cementitious materials ratio below 0.50.
 - 4. Use corrosion-inhibiting admixture in concrete mixtures where indicated.

2.14 CONCRETE MIXTURES FOR BUILDING ELEMENTS

- A. Slabs/Ramp: Proportion normal-weight concrete mixture as follows:
 - 1. Minimum Compressive Strength: See Structural Drawings.
 - 2. Slump Limit: 4 inches, plus or minus 1 inch.
 - 3. Air Content: 5-1/2 percent, plus or minus 1.5 percent at point of delivery for 1-1/2-inch nominal maximum aggregate size.
 - 4. Air Content: Do not allow air content of troweled finished floors to exceed 3 percent.

2.15 FABRICATING REINFORCEMENT

- A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.16 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94 and ASTM C 1116, 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.

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 concrete 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. Limit concrete surface irregularities, designated by ACI 347R as abrupt or gradual, as follows:
 1. Class A, 1/8 inch for smooth-formed finished surfaces.
 2. Class B, 1/4 inch Class C, 1/2 inch Class D, 1 inch for rough-formed finished surfaces.
- D. Construct forms tight enough to prevent loss of concrete mortar.
- E. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical. Kerf wood inserts for forming keyways, reglets, recesses, and the like, for easy removal.
 1. Do not use rust-stained steel form-facing material.
- F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.
- G. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.
- H. Chamfer exterior corners and edges of permanently exposed concrete.
- I. Do not chamfer corners or edges of concrete.
- J. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.
- K. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
- L. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

- M. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

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.
 - 1. Install anchor bolts, accurately located, to elevations required.
 - 2. Install reglets to receive top edge of foundation sheet waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.
 - 3. Install dovetail anchor slots in concrete structures as indicated.

3.3 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.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that would reduce bond to concrete.
- C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.
 - 1. Weld reinforcing bars according to AWS D1.4, where indicated.
- D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
- E. Install welded wire reinforcement in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.
- F. At shear walls, use A706 reinforcement.

3.4 JOINTS

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. Contraction Joints in Slabs/Ramps: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness, as follows:

1. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.

3.5 WATERSTOPS

- A. Flexible Waterstops: Install in construction joints as indicated to form a continuous diaphragm. Install in longest lengths practicable. Support and protect exposed waterstops during progress of Work. Field-fabricate joints in waterstops according to manufacturer's written instructions.
- B. Self-Expanding Strip Waterstops: Install in construction joints and at other locations indicated, according to manufacturer's written instructions, bonding or mechanically fastening and firmly pressing into place. Install in longest lengths practicable.

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. Do not add water to concrete during delivery, at Project site, or during placement, unless approved by Architect.
- C. Before placing concrete, water may be added at Project site, subject to limitations of ACI 301.
 1. Do not add water to concrete after adding high-range water-reducing admixtures to mix.
- D. Deposit concrete continuously or in 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 specified. Deposit concrete to avoid segregation.
- E. 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. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.
 2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
 3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.
- F. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.

1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
 2. Maintain reinforcement in position on chairs during concrete placement.
 3. Screed slab surfaces with a straightedge and strike off to correct elevations.
 4. Slope surfaces uniformly to drains where required.
 5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.
- G. Cold-Weather Placement: Comply with ACI 306.1 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 average high and low temperature is expected to fall below 40 deg F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
 2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
 3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.
- H. Hot-Weather Placement: Comply with ACI 301 and as follows:
1. Maintain concrete temperature below 90 deg F 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. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

3.7 FINISHING FORMED SURFACES

- A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defective areas repaired and patched. Remove fins and other projections exceeding ACI 347R limits for class of surface specified.
- 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 defective areas. Remove fins and other projections exceeding 1/8 inch in height.
1. Apply to concrete surfaces exposed to public view or to be covered with a coating or covering material applied directly to concrete, such as waterproofing, dampproofing, veneer plaster, or painting.
 2. Do not apply rubbed finish to smooth-formed finish.
- C. Rubbed Finish: Apply the following to smooth-formed finished concrete:
1. Smooth-Rubbed Finish: Not later than one day after form removal, moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform

- color and texture. Do not apply cement grout other than that created by the rubbing process.
2. Grout-Cleaned Finish: Wet concrete surfaces and apply grout of a consistency of thick paint to coat surfaces and fill small holes. Mix one part portland cement to one and one-half parts fine sand with a 1:1 mixture of bonding admixture and water. Add white portland cement in amounts determined by trial patches so color of dry grout will match adjacent surfaces. Scrub grout into voids and remove excess grout. When grout whitens, rub surface with clean burlap and keep surface damp by fog spray for at least 36 hours.
 3. Cork-Floated Finish: Wet concrete surfaces and apply a stiff grout. Mix one part portland cement and one part fine sand with a 1:1 mixture of bonding agent and water. Add white portland cement in amounts determined by trial patches so color of dry grout will match adjacent surfaces. Compress grout into voids by grinding surface. In a swirling motion, finish surface with a cork float.
- D. 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.

3.8 FINISHING FLOORS AND SLABS

- A. General: Comply with recommendations in ACI 302.1R for screeding, restraighening, 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.
 1. Apply scratch finish to surfaces indicated and to surfaces to receive concrete floor topping or mortar setting beds for ceramic or quarry tile, portland cement terrazzo, and other bonded cementitious floor finishes.
- 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 restraighening until surface is left with a uniform, smooth, granular texture.
 1. Apply float finish to surfaces indicated, to surfaces to receive trowel finish, and to floor and slab surfaces to be covered with fluid-applied or sheet waterproofing, built-up or membrane roofing, or sand-bed terrazzo.
- D. Trowel Finish: After applying float finish, apply first trowel finish 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. Apply a trowel finish to surfaces indicated and to floor and slab surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin film-finish coating system
 2. Finish surfaces to the following tolerances, measured within 24 hours according to ASTM E 1155/E 1155M for a randomly trafficked floor surface:

- a. Specified overall values of flatness, F(F) 35; and levelness, F(L) 25; with minimum local values of flatness, F(F) 24; and levelness, F(L) 17; for slabs-on-grade.
 - b. Specified overall values of flatness, F(F) 30; and of levelness, F(L) 20; with minimum local values of flatness, F(F) 24; and of levelness, F(L) 15; for suspended slabs.
- E. Trowel and Fine-Broom Finish: Apply a partial trowel finish, stopping after second troweling, to surfaces indicated and to surfaces where ceramic or quarry tile is to be installed by either thickset or thin-set method. Immediately after second troweling, and when concrete is still plastic, slightly scarify surface with a fine broom.
- F. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, and ramps, and elsewhere as indicated.
1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

3.9 MISCELLANEOUS CONCRETE ITEMS

- A. Filling In: Fill in holes and openings left in concrete structures, unless otherwise indicated, after work of other trades is in place. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete Work.
- B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.
- C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on Drawings. Set anchor bolts for machines and equipment at correct elevations, complying with diagrams or templates of manufacturer furnishing machines and equipment.
- D. Steel Pan Stairs: Provide concrete fill for steel pan stair treads, landings, and associated items. Cast-in inserts and accessories as shown on Drawings. Screed, tamp, and trowel-finish concrete surfaces.

3.10 CONCRETE PROTECTION 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 with recommendations in ACI 305R 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. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing by one or a combination of the following methods:
- D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.
- E. 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 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. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
 - a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.
 - b. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.
 - c. Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer certifies will not interfere with bonding of floor covering used on Project.
 - 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.
 - a. After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer.

3.11 LIQUID FLOOR TREATMENTS

- A. Penetrating Liquid Floor Treatment: Prepare, apply, and finish penetrating liquid floor treatment according to manufacturer's written instructions.
 - 1. Remove curing compounds, sealers, oil, dirt, laitance, and other contaminants and complete surface repairs.
 - 2. Do not apply to concrete that is less than seven days old.
 - 3. Apply liquid until surface is saturated, scrubbing into surface until a gel forms; rewet; and repeat brooming or scrubbing. Rinse with water; remove excess material until surface is dry. Apply a second coat in a similar manner if surface is rough or porous.

- B. Sealing Coat: Uniformly apply a continuous sealing coat of curing and sealing compound to hardened concrete by power spray or roller according to manufacturer's written instructions.

3.12 JOINT FILLING

- A. Prepare, clean, and install joint filler according to manufacturer's written instructions.
 - 1. Defer joint filling until concrete has aged at least six months. Do not fill joints until construction traffic has permanently ceased.
- B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.
- C. Install semirigid joint filler full depth in saw-cut joints and at least 2 inches deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

3.13 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.
- B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part portland cement to two and one-half parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.
- C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
 - 1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension in solid concrete but not less than 1 inch in depth. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
 - 2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
 - 3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.
- D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
 - 1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch wide or that

- penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
2. After concrete has cured at least 14 days, correct high areas by grinding.
 3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
 4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.
 5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
 6. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least 3/4 inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mix as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
 7. Repair random cracks and single holes 1 inch or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.
- E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.
- F. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.14 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Owner will engage a special inspector and qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Inspections:
1. See Structural Drawings for primary list of Special Inspections.
 2. Steel reinforcement placement.
 3. Steel reinforcement welding.
 4. Headed bolts and studs.
 5. Verification of use of required design mixture.
 6. Concrete placement, including conveying and depositing.
 7. Curing procedures and maintenance of curing temperature.
 8. Verification of concrete strength before removal of shores and forms from beams and slabs.

- C. Concrete Tests: 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 one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd., but less than 25 cu. yd., plus one set for each additional 50 cu. yd. or fraction thereof.
 2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
 3. Air Content: ASTM C 231, pressure method, for normal-weight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
 4. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F and below and when 80 deg F and above, and one test for each composite sample.
 5. Compression Test Specimens: ASTM C 31.
 - a. Cast and field cure three sets of two standard cylinder specimens for each composite sample.
 6. Compressive-Strength Tests: ASTM C 39; test one set of two laboratory-cured specimens at 7 days and one set of two specimens at 28 days.
 - a. Test one set of two field-cured specimens at 7 days and one set of two specimens at 28 days.
 - b. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.
 7. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
 8. Strength of each concrete mixture will be satisfactory if every average of any three 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.
 9. Test results shall be reported in writing to Architect, 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- and 28-day tests.
 10. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
 11. 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 Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods as directed by Architect.
 12. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

13. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.
 - D. Measure floor and slab flatness and levelness according to ASTM E 1155 within 48 hours of finishing.

END OF SECTION 03 33 00

SECTION 22 05 17 - SLEEVES AND SLEEVE SEALS FOR PLUMBING PIPING

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. Sleeves.
 - 2. Stack-sleeve fittings.
 - 3. Silicone sealants.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.4 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.

PART 2 - PRODUCTS

2.1 SLEEVES

- A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized, with plain ends and integral welded waterstop collar or equal.

2.2 STACK-SLEEVE FITTINGS

- A. Description: Manufactured, galvanized cast-iron sleeve with integral clamping flange for use in waterproof floors and roofs. Include clamping ring, bolts, and nuts for membrane flashing.
 - 1. Underdeck Clamp: Clamping ring with setscrews.

2.3 SLEEVE-SEAL SYSTEMS

A. Description:

1. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements.

2.4 SILICONE SEALANTS

- ### **A.**
- Silicone, S, P, 25, T, NT: Single-component, pourable, plus 25 percent and minus 25 percent movement capability, traffic- and nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade P, Class 25, Uses T and NT. Grade P Pourable (self-leveling) formulation is for opening in floors and other horizontal surfaces that are not fire rated or equal.

PART 3 - EXECUTION

3.1 SLEEVE INSTALLATION

- #### **A.**
- Install sleeves for piping passing through penetrations in floors.
- #### **B.**
- For sleeves that will have sleeve-seal system installed, select sleeves of size large enough to provide 1-inch annular clear space between piping and concrete slabs.
- #### **C.**
- Fire-Resistance-Rated Penetrations, Horizontal Assembly Penetrations, and Smoke Barrier Penetrations: Maintain indicated fire or smoke rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with fire- and smoke-stop materials. Comply with requirements for firestopping and fill materials specified in Section 07 84 13 "Penetration Firestopping."

3.2 STACK-SLEEVE-FITTING INSTALLATION

- #### **A.**
- Install stack-sleeve fittings in existing slabs.
1. Install fittings that are large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation.
 2. Secure flashing between clamping flanges for pipes penetrating floors with membrane waterproofing.
 3. Install section of cast-iron soil pipe to extend sleeve to 2 inches above finished floor level.
 4. Extend cast-iron sleeve fittings below floor slab as required to secure clamping ring if ring is specified.
 5. Use silicone sealant to seal the space around outside of stack-sleeve fittings.

- B. Fire-Resistance-Rated Penetrations, Horizontal Assembly Penetrations, and Smoke Barrier Penetrations: Maintain indicated fire or smoke rating of floors at pipe penetrations. Seal pipe penetrations with fire- and smoke-stop materials. Comply with requirements for firestopping specified in Section 07 84 13 "Penetration Firestopping."

3.3 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:
 - 1. Leak Test: After allowing for a full cure, test sleeves and sleeve seals for leaks. Repair leaks and retest until no leaks exist.
- B. Sleeves and sleeve seals will be considered defective if they do not pass tests and inspections.
- C. Prepare test and inspection reports.

3.4 SLEEVE AND SLEEVE-SEAL SCHEDULE

- A. Use sleeves and sleeve seals for the following piping-penetration applications:
 - 1. Concrete Slabs above Grade:
 - a. Piping Smaller than NPS 6 4 inches: Stack-sleeve fittings.

END OF SECTION 22 05 17

SECTION 22 05 18 - ESCUTCHEONS FOR PLUMBING PIPING

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. Escutcheons.

1.3 DEFINITIONS

- A. Existing Piping to Remain: Existing piping that is not to be removed and that is not otherwise indicated to be removed and salvaged, or removed and reinstalled.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. BrassCraft Manufacturing Co.; a Masco company.
 - 2. Dearborn Brass.
 - 3. Jones Stephens Corp.
 - 4. or approved equal.

2.2 ESCUTCHEONS

- A. One-Piece, Steel Type: With polished, chrome-plated finish and setscrew fastener.
- B. One-Piece, Stainless-Steel Type: With polished stainless-steel finish.

- C. One-Piece, Cast-Brass Type: With polished, chrome-plated finish and setscrew fastener.

2.3 FLOOR PLATES

- A. Split Floor Plates: Cast brass with concealed hinge.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install escutcheons for piping penetrations of walls, ceilings, and finished floors.
- B. Install escutcheons with ID to closely fit around pipe, tube, and insulation of insulated piping and with OD that completely covers opening.
 - 1. Escutcheons for New Piping and Relocated Existing Piping:
 - a. Piping with Fitting or Sleeve Protruding from Wall: One-piece, deep pattern.
 - b. Chrome-Plated Piping: One-piece cast brass with polished, chrome-plated finish.
 - c. Insulated Piping: One-piece steel with polished, chrome-plated finish.
 - 2. Escutcheons for Existing Piping to Remain:
 - a. Chrome-Plated Piping: Split-casting, stamped steel with concealed hinge with polished, chrome-plated finish.
 - b. Insulated Piping: Split-plate, stamped steel with concealed hinge with polished, chrome-plated finish
- C. Install floor plates for piping penetrations of equipment-room floors.

3.2 FIELD QUALITY CONTROL

- A. Using new materials, replace broken and damaged escutcheons and floor plates.

END OF SECTION 22 05 18

SECTION 22 05 23.12 - BALL VALVES FOR PLUMBING PIPING

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. Brass ball valves – Lead-free

1.3 DEFINITIONS

- A. CWP: Cold working pressure.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of valve.
 - 1. Certification that products comply with NSF 61 Annex G and NSF 372.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Prepare valves for shipping as follows:
 - 1. Protect internal parts against rust and corrosion.
 - 2. Protect threads, flange faces, and soldered ends.
 - 3. Set ball valves open to minimize exposure of functional surfaces.
- B. Use the following precautions during storage:
 - 1. Maintain valve end protection.
 - 2. Store valves indoors and maintain at higher-than-ambient-dew-point temperature. If outdoor storage is necessary, store valves off the ground in watertight enclosures.
- C. Use sling to handle large valves; rig sling to avoid damage to exposed parts. Do not use operating handles or stems as lifting or rigging points.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR VALVES

- A. Source Limitations for Valves: Obtain each type of valve from single source from single manufacturer.
- B. ASME Compliance:
 - 1. ASME B1.20.1 for threads for threaded end valves.
 - 2. ASME B16.1 for flanges on iron valves.
 - 3. ASME B16.5 for flanges on steel valves.
 - 4. ASME B16.10 and ASME B16.34 for ferrous valve dimensions and design criteria.
 - 5. ASME B16.18 for solder-joint connections.
 - 6. ASME B31.9 for building services piping valves.
- C. NSF Compliance: NSF 61 Annex G and NSF 372 for valve materials for potable-water service.
- D. Valve Pressure-Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.
- E. Valve Sizes: Same as upstream piping unless otherwise indicated.
- F. Valves in Insulated Piping:
 - 1. Include 2-inch stem extensions.
 - 2. Extended operating handles of nonthermal-conductive material and protective sleeves that allow operation of valves without breaking vapor seals or disturbing insulation.
 - 3. Memory stops that are fully adjustable after insulation is applied.

2.2 BRASS BALL VALVES

- A. Brass Ball Valves, Two-Piece with Full Port and Brass Trim:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Apollo Valves; Conbraco Industries, Inc.
 - b. NIBCO INC.
 - c. Red White Valve Corp.
 - d. or approved equal.
 - 2. Description:
 - a. Standard: MSS SP-110.
 - b. CWP Rating: 600 psig.
 - c. Body Design: Two piece.

- d. Body Material: Forged brass.
- e. Ends: Threaded and soldered.
- f. Seats: PTFE.
- g. Stem: Brass.
- h. Ball: Chrome-plated brass.
- i. Port: Full.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine valve interior for cleanliness, freedom from foreign matter, and corrosion. Remove special packing materials, such as blocks, used to prevent disc movement during shipping and handling.
- B. Operate valves in positions from fully open to fully closed. Examine guides and seats made accessible by such operations.
- C. Examine threads on valve and mating pipe for form and cleanliness.
- D. Examine mating flange faces for conditions that might cause leakage. Check bolting for proper size, length, and material. Verify that gasket is of proper size, that its material composition is suitable for service, and that it is free from defects and damage.
- E. Do not attempt to repair defective valves; replace with new valves.

3.2 VALVE INSTALLATION

- A. Install valves with unions or flanges at each piece of equipment arranged to allow service, maintenance, and equipment removal without system shutdown.
- B. Locate valves for easy access and provide separate support where necessary.
- C. Install valves in horizontal piping with stem at or above center of pipe.
- D. Install valves in position to allow full stem movement.
- E. Install valve tags. Comply with requirements in Section 220553 "Identification for Plumbing Piping and Equipment" for valve tags and schedules.

3.3 GENERAL REQUIREMENTS FOR VALVE APPLICATIONS

- A. If valves with specified CWP ratings are unavailable, the same types of valves with higher CWP ratings may be substituted.
- B. Select valves with the following end connections:

1. For Copper Tubing, NPS 2 and Smaller: Threaded ends except where solder-joint valve-end option is indicated in valve schedules below.
2. For Copper Tubing, NPS 2-1/2 to NPS 4: Flanged ends except where threaded valve-end option is indicated in valve schedules below.

3.4 DOMESTIC HOT- AND COLD-WATER VALVE SCHEDULE

A. Pipe NPS 2 and Smaller:

1. Brass Valves: May be provided with solder-joint ends instead of threaded ends.
2. Brass ball valve, one piece.
3. Brass ball valves, two-piece with full port and brass trim.
4. Bronze ball valves, two-piece with full port and trim.
5. Brass ball valves, three-piece with full port and brass trim.

END OF SECTION 22 05 23.12

SECTION 22 05 29 - HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT

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. Metal pipe hangers and supports.
 - 2. Trapeze pipe hangers.
 - 3. Fastener systems.
 - 4. Pipe positioning systems.

1.3 DEFINITIONS

- A. MSS: Manufacturers Standardization Society of The Valve and Fittings Industry Inc.

1.4 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design trapeze pipe hangers and equipment supports, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- B. Structural Performance: Hangers and supports for plumbing piping and equipment shall withstand the effects of gravity loads and stresses within limits and under conditions indicated according to ASCE/SEI 7.
 - 1. Design supports for multiple pipes, including pipe stands, capable of supporting combined weight of supported systems, system contents, and test water.
 - 2. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.
 - 3. Design seismic-restraint hangers and supports for piping and equipment.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.

- B. Shop Drawings: Show fabrication and installation details and include calculations for the following; include Product Data for components:
 - 1. Trapeze pipe hangers.
 - 2. Pipe stands.
 - 3. Equipment supports.
- C. Delegated-Design Submittal: For trapeze hangers 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. Detail fabrication and assembly of trapeze hangers.
 - 2. Design Calculations: Calculate requirements for designing trapeze hangers.

1.6 INFORMATIONAL SUBMITTALS

- A. Welding certificates.

1.7 QUALITY ASSURANCE

- A. Structural Steel Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- B. Pipe Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code.

PART 2 - PRODUCTS

2.1 METAL PIPE HANGERS AND SUPPORTS

- A. Carbon-Steel Pipe Hangers and Supports:
 - 1. Description: MSS SP-58, Types 1 through 58, factory-fabricated components.
 - 2. Galvanized Metallic Coatings: Pregalvanized or hot dipped.
 - 3. Nonmetallic Coatings: Plastic coating, jacket, or liner.
 - 4. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion to support bearing surface of piping.
 - 5. Hanger Rods: Continuous-thread rod, nuts, and washer made of stainless steel.

2.2 TRAPEZE PIPE HANGERS

- A. Description: MSS SP-69, Type 59, shop- or field-fabricated pipe-support assembly made from structural carbon-steel shapes with MSS SP-58 carbon-steel hanger rods, nuts, saddles, and U-bolts.

2.3 FASTENER SYSTEMS

- A. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.
- B. Mechanical-Expansion Anchors: Insert-wedge-type, stainless- steel anchors, for use in hardened portland cement concrete; with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

2.4 PIPE POSITIONING SYSTEMS

- A. Description: IAPMO PS 42, positioning system of metal brackets, clips, and straps for positioning piping in pipe spaces; for plumbing fixtures in commercial applications.

2.5 EQUIPMENT SUPPORTS

- A. Description: Welded, shop- or field-fabricated equipment support made from structural carbon-steel shapes.

2.6 MISCELLANEOUS MATERIALS

- A. Structural Steel: ASTM A 36/A 36M, carbon-steel plates, shapes, and bars; black and galvanized.
- B. Grout: ASTM C 1107, factory-mixed and -packaged, dry, hydraulic-cement, nonshrink and nonmetallic grout; suitable for interior and exterior applications.
 - 1. Properties: Nonstaining, noncorrosive, and nongaseous.
 - 2. Design Mix: 5000-psi, 28-day compressive strength.

PART 3 - EXECUTION

3.1 HANGER AND SUPPORT INSTALLATION

- A. Metal Pipe-Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Install hangers, supports, clamps, and attachments as required to properly support piping from the building structure.
- B. Metal Trapeze Pipe-Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Arrange for grouping of parallel runs of horizontal piping, and support together on field-fabricated trapeze pipe hangers.

1. Pipes of Various Sizes: Support together and space trapezes for smallest pipe size or install intermediate supports for smaller diameter pipes as specified for individual pipe hangers.
 2. Field fabricate from ASTM A 36/A 36M, carbon-steel shapes selected for loads being supported. Weld steel according to AWS D1.1/D1.1M.
- C. Fastener System Installation:
1. Install powder-actuated fasteners for use in lightweight concrete or concrete slabs less than 4 inches thick in concrete after concrete is placed and completely cured. Use operators that are licensed by powder-actuated tool manufacturer. Install fasteners according to powder-actuated tool manufacturer's operating manual.
 2. Install mechanical-expansion anchors in concrete after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.
- D. Pipe Positioning-System Installation: Install support devices to make rigid supply and waste piping connections to each plumbing fixture.
- E. Install hangers and supports complete with necessary attachments, inserts, bolts, rods, nuts, washers, and other accessories.
- F. Equipment Support Installation: Fabricate from welded-structural-steel shapes.
- G. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.
- H. Install lateral bracing with pipe hangers and supports to prevent swaying.
- I. Load Distribution: Install hangers and supports so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.
- J. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and to not exceed maximum pipe deflections allowed by ASME B31.9 for building services piping.
- K. Insulated Piping:
1. Attach clamps and spacers to piping.
 - a. Piping Operating above Ambient Air Temperature: Clamp may project through insulation.
 - b. Piping Operating below Ambient Air Temperature: Use thermal-hanger shield insert with clamp sized to match OD of insert.
 - c. Do not exceed pipe stress limits allowed by ASME B31.9 for building services piping.
 2. Install MSS SP-58, Type 39, protection saddles if insulation without vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.

- a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.
- 3. Install MSS SP-58, Type 40, protective shields on cold piping with vapor barrier. Shields shall span an arc of 180 degrees.
 - a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.
- 4. Shield Dimensions for Pipe: Not less than the following:
 - a. NPS 1/4 to NPS 3-1/2: 12 inches long and 0.048 inch thick.
 - b. NPS 4: 12 inches long and 0.06 inch thick.
 - c. NPS 5 and NPS 6: 18 inches long and 0.06 inch thick.
 - d. NPS 8 to NPS 14: 24 inches long and 0.075 inch thick.
 - e. NPS 16 to NPS 24: 24 inches long and 0.105 inch thick.
- 5. Pipes NPS 8 and Larger: Include wood or reinforced calcium-silicate-insulation inserts of length at least as long as protective shield.
- 6. Thermal-Hanger Shields: Install with insulation same thickness as piping insulation.

3.2 EQUIPMENT SUPPORTS

- A. Fabricate structural-steel stands to suspend equipment from structure overhead or to support equipment above floor.
- B. Grouting: Place grout under supports for equipment and make bearing surface smooth.
- C. Provide lateral bracing, to prevent swaying, for equipment supports.

3.3 METAL FABRICATIONS

- A. Cut, drill, and fit miscellaneous metal fabrications for trapeze pipe hangers and equipment supports.
- B. Fit exposed connections together to form hairline joints. Field weld connections that cannot be shop welded because of shipping size limitations.
- C. Field Welding: Comply with AWS D1.1/D1.1M procedures for shielded, metal arc welding; appearance and quality of welds; and methods used in correcting welding work; and 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. Finish welds at exposed connections so no roughness shows after finishing and so contours of welded surfaces match adjacent contours.

3.4 ADJUSTING

- A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.
- B. Trim excess length of continuous-thread hanger and support rods to 1-1/2 inches.

3.5 HANGER AND SUPPORT SCHEDULE

- A. Specific hanger and support requirements are in Sections specifying piping systems and equipment.
- B. Comply with MSS SP-69 for pipe-hanger selections and applications that are not specified in piping system Sections.
- C. Use hangers and supports with galvanized metallic coatings for piping and equipment that will not have field-applied finish.
- D. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.
- E. Use carbon-steel pipe hangers and supports and metal trapeze pipe hangers and attachments for general service applications.
- F. Use stainless-steel pipe hangers attachments for hostile environment applications.
- G. Use padded hangers for piping that is subject to scratching.
- H. Use thermal-hanger shield inserts for insulated piping and tubing.
- I. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system 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. Extension Hinged or Two-Bolt Split Pipe Clamps (MSS Type 12): For suspension of noninsulated, stationary pipes NPS 3/8 to NPS 3.

6. Adjustable Pipe Saddle Supports (MSS Type 38): For stanchion-type support for pipes NPS 2-1/2 to NPS 36 if vertical adjustment is required, with steel-pipe base stanchion support and cast-iron floor flange.
 7. Single-Pipe Rolls (MSS Type 41): For suspension of pipes NPS 1 to NPS 30, from two rods if longitudinal movement caused by expansion and contraction might occur.
 8. Adjustable Roller Hangers (MSS Type 43): For suspension of pipes NPS 2-1/2 to NPS 24, from single rod if horizontal movement caused by expansion and contraction might occur.
 9. Complete Pipe Rolls (MSS Type 44): For support of pipes NPS 2 to NPS 42 if longitudinal movement caused by expansion and contraction might occur but vertical adjustment is not necessary.
 10. Pipe Roll and Plate Units (MSS Type 45): For support of pipes NPS 2 to NPS 24 if small horizontal movement caused by expansion and contraction might occur and vertical adjustment is not necessary.
 11. Adjustable Pipe Roll and Base Units (MSS Type 46): For support of pipes NPS 2 to NPS 30 if vertical and lateral adjustment during installation might be required in addition to expansion and contraction.
- J. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers NPS 3/4 to NPS 24.
 2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers NPS 3/4 to NPS 24 if longer ends are required for riser clamps.
- K. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel Turnbuckles (MSS Type 13): For adjustment up to 6 inches for heavy loads.
 2. Steel Clevises (MSS Type 14): For 120 to 450 deg F piping installations.
 3. Swivel Turnbuckles (MSS Type 15): For use with MSS Type 11, split pipe rings.
 4. Malleable-Iron Sockets (MSS Type 16): For attaching hanger rods to various types of building attachments.
 5. Steel Weldless Eye Nuts (MSS Type 17): For 120 to 450 deg F piping installations.
- L. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel or Malleable Concrete Inserts (MSS Type 18): For upper attachment to suspend pipe hangers from concrete ceiling.
- M. Saddles and Shields: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel-Pipe-Covering Protection Saddles (MSS Type 39): To fill interior voids with insulation that matches adjoining insulation.
 2. Protection Shields (MSS Type 40): Of length recommended in writing by manufacturer to prevent crushing insulation.

3. Thermal-Hanger Shield Inserts: For supporting insulated pipe.
- N. Comply with MSS SP-69 for trapeze pipe-hanger selections and applications that are not specified in piping system Sections.
 - O. Comply with MFMA-103 for metal framing system selections and applications that are not specified in piping system Sections.
 - P. Use mechanical-expansion anchors instead of building attachments where required in concrete construction.
 - Q. Use pipe positioning systems in pipe spaces behind plumbing fixtures to support supply and waste piping for plumbing fixtures.

END OF SECTION 22 05 29

SECTION 22 05 53 - IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

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. Equipment labels.
 - 2. Pipe labels.
 - 3. Valve tags.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples: For color, letter style, and graphic representation required for each identification material and device.
- C. Equipment Label Schedule: Include a listing of all equipment to be labeled with the proposed content for each label.
- D. Valve numbering scheme.
- E. Valve Schedules: For each piping system to include in maintenance manuals.

PART 2 - PRODUCTS

2.1 EQUIPMENT LABELS

- A. Metal Labels for Equipment:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Brimar Industries, Inc.
 - b. Craftmark Pipe Markers.
 - c. Seton Identification Products.

- d. or approved equal.
 - 2. Material and Thickness: Brass, 0.032-inch minimum thickness, and having predrilled or stamped holes for attachment hardware.
 - 3. Letter Color: Black.
 - 4. Background Color: White.
 - 5. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
 - 6. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-quarters the size of principal lettering.
 - 7. Fasteners: Stainless-steel self-tapping screws.
 - 8. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- B. Label Content: Include equipment's Drawing designation or unique equipment number, Drawing numbers where equipment is indicated (plans, details, and schedules), and the Specification Section number and title where equipment is specified.

2.2 PIPE LABELS

- A. General Requirements for Manufactured Pipe Labels: Preprinted, color-coded, with lettering indicating service, and showing flow direction.
- B. Self-Adhesive Pipe Labels: Printed plastic with contact-type, permanent-adhesive backing.
- C. Pipe Label Contents: Include identification of piping service using same designations or abbreviations as used on Drawings; also include pipe size and an arrow indicating flow direction.
 - 1. Flow-Direction Arrows: Integral with piping-system service lettering to accommodate both directions or as separate unit on each pipe label to indicate flow direction.
 - 2. Lettering Size: Size letters according to ASME A13.1 for piping.

2.3 VALVE TAGS

- A. Valve Tags: Stamped or engraved with 1/4-inch letters for piping system abbreviation and 1/2-inch numbers.
 - 1. Tag Material: Brass, 0.032-inch minimum thickness, and having predrilled or stamped holes for attachment hardware.
 - 2. Fasteners: Brass wire-link chain.
- B. Valve Schedules: For each piping system, on 8-1/2-by-11-inch bond paper. Tabulate valve number, piping system, system abbreviation (as shown on valve tag), location of valve (room or space), normal-operating position (open, closed, or modulating), and variations for identification. Mark valves for emergency shutoff and similar special uses.

1. Valve-tag schedule shall be included in operation and maintenance data.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Clean piping and equipment surfaces of substances that could impair bond of identification devices, including dirt, oil, grease, release agents, and incompatible primers, paints, and encapsulants.

3.2 GENERAL INSTALLATION REQUIREMENTS

- A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.
- B. Coordinate installation of identifying devices with locations of access panels and doors.
- C. Install identifying devices before installing acoustical ceilings and similar concealment.

3.3 EQUIPMENT LABEL INSTALLATION

- A. Install or permanently fasten labels on each major item of mechanical equipment.
- B. Locate equipment labels where accessible and visible.

3.4 PIPE LABEL INSTALLATION

- A. Piping Color Coding: Painting of piping is specified in Section 099123 "Interior Painting."
- B. Pipe Label Locations: Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed locations as follows:
 1. Near each valve and control device.
 2. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.
 3. Near penetrations through walls, floors, ceilings, and inaccessible enclosures.
 4. At access doors, manholes, and similar access points that permit view of concealed piping.
 5. Near major equipment items and other points of origination and termination.
 6. Spaced at maximum intervals of along each run. Reduce intervals to 25 feet in areas of congested piping and equipment.
 7. On piping above removable acoustical ceilings. Omit intermediately spaced labels.

- C. Directional Flow Arrows: Arrows shall be used to indicate direction of flow in pipes, including pipes where flow is allowed in both directions.
- D. Pipe Label Color Schedule:
 - 1. Domestic Water Piping
 - a. Background: Safety green.
 - b. Letter Colors: White.
 - 2. Sanitary Waste Piping:
 - a. Background Color: Safety black.
 - b. Letter Color: White.

3.5 VALVE-TAG INSTALLATION

- A. Install tags on valves and control devices in piping systems, except check valves, valves within factory-fabricated equipment units, shutoff valves, faucets, convenience and lawn-watering hose connections, and similar roughing-in connections of end-use fixtures and units. List tagged valves in a valve schedule.
- B. Valve-Tag Application Schedule: Tag valves according to size, shape, and color scheme and with captions similar to those indicated in the following subparagraphs:
 - 1. Valve-Tag Size and Shape:
 - a. Cold Water: 1-1/2 inches,.
 - b. Hot Water: 1-1/2 inches,.
 - 2. Valve-Tag Colors:
 - a. Cold Water: Natural.
 - b. Hot Water: Natural.
 - 3. Letter Colors:
 - a. Cold Water: White.
 - b. Hot Water: White.

END OF SECTION 22 05 53

SECTION 22 07 19 - PLUMBING PIPING 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 insulating the following plumbing piping services:
 - 1. Domestic cold-water piping.
 - 2. Domestic hot-water piping.
 - 3. Supplies and drains for handicap-accessible lavatories and sinks.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include thermal conductivity, water-vapor permeance thickness, and jackets (both factory- and field-applied, if any).
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
 - 1. Detail application of protective shields, saddles, and inserts at hangers for each type of insulation and hanger.
 - 2. Detail insulation application at pipe expansion joints for each type of insulation.
 - 3. Detail insulation application at elbows, fittings, flanges, valves, and specialties for each type of insulation.
 - 4. Detail removable insulation at piping specialties, equipment connections, and access panels.
 - 5. Detail application of field-applied jackets.
 - 6. Detail application at linkages of control devices.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified Installer.
- B. Material Test Reports: From a qualified testing agency acceptable to authorities having jurisdiction indicating, interpreting, and certifying test results for compliance of insulation materials, sealers, attachments, cements, and jackets, with requirements indicated. Include dates of tests and test methods employed.
- C. Field quality-control reports.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Skilled mechanics who have successfully completed an apprenticeship program or another craft training program certified by the Department of Labor, Bureau of Apprenticeship and Training.
- B. Surface-Burning Characteristics: For insulation and related materials, as determined by testing identical products according to ASTM E 84 by a testing agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing agency.
 - 1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.
 - 2. Insulation Installed Outdoors: Flame-spread index of 75 or less, and smoke-developed index of 150 or less.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Packaging: Insulation material containers shall be marked by manufacturer with appropriate ASTM standard designation, type and grade, and maximum use temperature.

1.7 COORDINATION

- A. Coordinate sizes and locations of supports, hangers, and insulation shields specified in Section 22 05 29 "Hangers and Supports for Plumbing Piping and Equipment."
- B. Coordinate clearance requirements with piping Installer for piping insulation application. Before preparing piping Shop Drawings, establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.

1.8 SCHEDULING

- A. Schedule insulation application after pressure testing systems. Insulation application may begin on segments that have satisfactory test results.
- B. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

PART 2 - PRODUCTS

2.1 INSULATION MATERIALS

- A. Products shall not contain asbestos, lead, mercury, or mercury compounds.

- B. Products that come in contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C 871.
- C. Mineral-Fiber, Preformed Pipe Insulation:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Johns Manville; a Berkshire Hathaway company.
 - b. Owens Corning.
 - c. or approved equal.
 - 2. Type I, 850 Deg F Materials: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 547, Type I, Grade A, with factory-applied ASJ-SSL. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.

2.2 FACTORY-APPLIED JACKETS

- A. Insulation system schedules indicate factory-applied jackets on various applications. 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.
 - 2. ASJ-SSL: ASJ with self-sealing, pressure-sensitive, acrylic-based adhesive covered by a removable protective strip; complying with ASTM C 1136, Type I.
 - 3. FSK Jacket: Aluminum-foil, fiberglass-reinforced scrim with kraft-paper backing; complying with ASTM C 1136, Type II.

2.3 TAPES

- A. ASJ Tape: White vapor-retarder tape matching factory-applied jacket with acrylic adhesive, complying with ASTM C 1136.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Compac Corporation.
 - b. Venture Tape.
 - c. or approved equal.
 - 2. Width: 3 inches.
 - 3. Thickness: 11.5 mils.
 - 4. Adhesion: 90 ounces force/inch in width.
 - 5. Elongation: 2 percent.
 - 6. Tensile Strength: 40 lbf/inch in width.
 - 7. ASJ Tape Disks and Squares: Precut disks or squares of ASJ tape.

2.4 PROTECTIVE SHIELDING GUARDS

- A. Protective Shielding Piping Enclosures:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Truebro.
 - b. Zurn Industries, LLC.
 - c. or approved equal.
 - 2. Description: Manufactured plastic enclosure for covering plumbing fixture hot- and cold-water supplies and trap and drain piping. Comply with ADA requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of insulation application.
 - 1. Verify that systems to be insulated have been tested and are free of defects.
 - 2. Verify that surfaces to be insulated are clean and dry.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.

3.3 GENERAL INSTALLATION REQUIREMENTS

- A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of piping including fittings, valves, and specialties.
- B. Install insulation materials, forms, vapor barriers or retarders, jackets, and thicknesses required for each item of pipe system as specified in insulation system schedules.
- C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.
- D. Install insulation with longitudinal seams at top and bottom of horizontal runs.
- E. Install multiple layers of insulation with longitudinal and end seams staggered.

- F. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.
- G. Keep insulation materials dry during application and finishing.
- H. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.
- I. Install insulation with least number of joints practical.
- J. Install insulation with factory-applied jackets as follows:
 - 1. Draw jacket tight and smooth.
 - 2. Cover circumferential joints with 3-inch-wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip, spaced 4 inches o.c.
 - 3. Overlap jacket longitudinal seams at least 1-1/2 inches. Install insulation with longitudinal seams at bottom of pipe. Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at 2 inches o.c.
 - a. For below-ambient services, apply vapor-barrier mastic over staples.
 - 4. Cover joints and seams with tape, according to insulation material manufacturer's written instructions, to maintain vapor seal.
 - 5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to pipe flanges and fittings.
- K. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.
- L. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.
- M. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.
- N. For above-ambient services, do not install insulation to the following:
 - 1. Vibration-control devices.
 - 2. Testing agency labels and stamps.
 - 3. Nameplates and data plates.
 - 4. Cleanouts.

3.4 PENETRATIONS

- A. Insulation Installation at Fire-Rated Wall and Partition Penetrations: Install insulation continuously through penetrations of fire-rated walls and partitions.

1. Comply with requirements in Section 07 84 13 "Penetration Firestopping" for firestopping and fire-resistive joint sealers.

B. Insulation Installation at Floor Penetrations:

1. Pipe: Install insulation continuously through floor penetrations.
2. Seal penetrations through fire-rated assemblies. Comply with requirements in Section 07 84 13 "Penetration Firestopping."

3.5 GENERAL PIPE INSULATION INSTALLATION

A. Requirements in this article generally apply to all insulation materials except where more specific requirements are specified in various pipe insulation material installation articles.

B. Insulation Installation on Fittings, Valves, Strainers, Flanges, and Unions:

1. Install insulation over fittings, valves, strainers, flanges, unions, and other specialties with continuous thermal and vapor-retarder integrity unless otherwise indicated.
2. Insulate pipe elbows using preformed fitting insulation or mitered fittings made from same material and density as adjacent pipe insulation. Each piece shall be butted tightly against adjoining piece and bonded with adhesive. Fill joints, seams, voids, and irregular surfaces with insulating cement finished to a smooth, hard, and uniform contour that is uniform with adjoining pipe insulation.
3. Insulate tee fittings with preformed fitting insulation or sectional pipe insulation of same material and thickness as used for adjacent pipe. Cut sectional pipe insulation to fit. Butt each section closely to the next and hold in place with tie wire. Bond pieces with adhesive.
4. Insulate valves using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. For valves, insulate up to and including the bonnets, valve stuffing-box studs, bolts, and nuts. Fill joints, seams, and irregular surfaces with insulating cement.
5. Insulate strainers using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. Fill joints, seams, and irregular surfaces with insulating cement. Insulate strainers so strainer basket flange or plug can be easily removed and replaced without damaging the insulation and jacket. Provide a removable reusable insulation cover. For below-ambient services, provide a design that maintains vapor barrier.
6. Stencil or label the outside insulation jacket of each union with the word "union." Match size and color of pipe labels.

C. Insulate instrument connections for thermometers, pressure gages, pressure temperature taps, test connections, flow meters, sensors, switches, and transmitters on insulated pipes. Shape insulation at these connections by tapering it to and around the connection with insulating cement and finish with finishing cement, mastic, and flashing sealant.

3.6 INSTALLATION OF CELLULAR-GLASS INSULATION

A. Insulation Installation on Straight Pipes and Tubes:

1. Secure each layer of insulation to pipe with wire or bands and tighten bands without deforming insulation materials.
2. Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.
3. For insulation with factory-applied jackets on above-ambient services, secure laps with outward clinched staples at 6 inches o.c.
4. For insulation with factory-applied jackets on below-ambient services, do not staple longitudinal tabs. Instead, secure tabs with additional adhesive as recommended by insulation material manufacturer and seal with vapor-barrier mastic and flashing sealant.

B. Insulation Installation on Pipe Fittings and Elbows:

1. Install preformed sections of same material as straight segments of pipe insulation when available. Secure according to manufacturer's written instructions.
2. When preformed sections of insulation are not available, install mitered sections of cellular-glass insulation. Secure insulation materials with wire or bands.

C. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed sections of cellular-glass insulation to valve body.
2. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
3. Install insulation to flanges as specified for flange insulation application.

3.7 INSTALLATION OF MINERAL-FIBER INSULATION

A. Insulation Installation on Straight Pipes and Tubes:

1. Secure each layer of preformed pipe insulation to pipe with wire or bands and tighten bands without deforming insulation materials.
2. Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.
3. For insulation with factory-applied jackets on above-ambient surfaces, secure laps with outward clinched staples at 6 inches o.c.
4. For insulation with factory-applied jackets on below-ambient surfaces, do not staple longitudinal tabs. Instead, secure tabs with additional adhesive as recommended by insulation material manufacturer and seal with vapor-barrier mastic and flashing sealant.

B. Insulation Installation on Pipe Fittings and Elbows:

1. Install preformed sections of same material as straight segments of pipe insulation when available.

2. When preformed insulation elbows and fittings are not available, install mitered sections of pipe insulation, to a thickness equal to adjoining pipe insulation. Secure insulation materials with wire or bands.

C. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed sections of same material as straight segments of pipe insulation when available.
2. When preformed sections are not available, install mitered sections of pipe insulation to valve body.
3. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
4. Install insulation to flanges as specified for flange insulation application.

3.8 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Perform tests and inspections.
- C. Tests and Inspections:
 1. Inspect pipe, fittings, strainers, and valves, randomly selected by Architect, by removing field-applied jacket and insulation in layers in reverse order of their installation. See Section 014000 "Quality Requirements" for retesting and reinspecting requirements and Section 017300 "Execution" for requirements for correcting the Work.
- D. All insulation applications will be considered defective Work if sample inspection reveals noncompliance with requirements.

3.9 INDOOR PIPING INSULATION SCHEDULE

- A. Domestic Cold Water:
 1. [NPS 1] 1" and Smaller: Insulation shall be the following:
 - a. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1/2 inch thick.
 2. [NPS 1-1/4] 1" and Larger: Insulation shall be the following:
 - a. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1 inch thick.
- B. Domestic Hot and Recirculated Hot Water:
 1. [NPS 1-1/4] 1" and Smaller: Insulation shall be the following:
 - a. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1/2 inch thick.

3.10 UNDERGROUND, FIELD-INSTALLED INSULATION JACKET

- A. For underground direct-buried piping applications, install underground direct-buried jacket over insulation material.

END OF SECTION 22 07 19

SECTION 22 11 16 - DOMESTIC WATER PIPING

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. Copper tube and fittings.
 - 2. Piping joining materials.

1.3 ACTION SUBMITTALS

- A. Product Data: For transition fittings and dielectric fittings.

1.4 INFORMATIONAL SUBMITTALS

- A. System purging and disinfecting activities report.
- B. Field quality-control reports.

1.5 FIELD CONDITIONS

- A. Interruption of Existing Water Service: Do not interrupt water service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary water service according to requirements indicated:
 - 1. Notify Architect no fewer than two days in advance of proposed interruption of water service.
 - 2. Do not interrupt water service without Architect's written permission.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

- A. Comply with requirements in "Piping Schedule" Article (Section 22 11 16, 3.10) for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.
- B. Potable-water piping and components shall comply with NSF 14 and NSF 61 Annex G.
- C. Comply with NSF 372 for low lead.

2.2 COPPER TUBE AND FITTINGS

- A. Hard Copper Tube: ASTM B 88, Type L water tube, drawn temper.
- B. Cast-Copper, Solder-Joint Fittings: ASME B16.18, pressure fittings.
- C. Wrought-Copper, Solder-Joint Fittings: ASME B16.22, wrought-copper pressure fittings.
- D. Bronze Flanges: ASME B16.24, Class 150, with solder-joint ends.
- E. Copper Unions:
 - 1. MSS SP-123.
 - 2. Cast-copper-alloy, hexagonal-stock body.
 - 3. Ball-and-socket, metal-to-metal seating surfaces.
 - 4. Solder-joint or threaded ends.

PART 3 - EXECUTION

3.1 EARTHWORK

- A. Not used

3.2 PIPING INSTALLATION

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of domestic water piping. Indicated locations and arrangements are used to size pipe and calculate friction loss, expansion, and other design considerations. Install piping as indicated unless deviations to layout are approved on coordination drawings.
- B. Install shutoff valve, hose-end drain valve, strainer, pressure gage, and test tee with valve inside the building at each domestic water-service entrance.

- C. Install shutoff valve immediately upstream of each dielectric fitting.
- D. Install domestic water piping level without pitch and plumb.
- E. Install piping concealed from view and protected from physical contact by building occupants unless otherwise indicated and except in equipment rooms and service areas.
- F. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal, and coordinate with other services occupying that space.
- G. Install piping to permit valve servicing.
- H. Install piping free of sags and bends.
- I. Install fittings for changes in direction and branch connections.
- J. Install unions in copper tubing at final connection to each piece of equipment, machine, and specialty.
- K. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Section 22 05 17 "Sleeves and Sleeve Seals for Plumbing Piping."
- L. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified in Section 22 05 17 "Sleeves and Sleeve Seals for Plumbing Piping."
- M. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Section 22 05 18 "Escutcheons for Plumbing Piping."

3.3 JOINT CONSTRUCTION

- A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- B. Remove scale, slag, dirt, and debris from inside and outside of pipes, tubes, and fittings before assembly.
- C. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
 - 1. Apply appropriate tape or thread compound to external pipe threads.
 - 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged.
- D. Soldered Joints for Copper Tubing: Apply ASTM B 813, water-flushable flux to end of tube. Join copper tube and fittings according to ASTM B 828 or CDA's "Copper Tube Handbook."

3.4 HANGER AND SUPPORT INSTALLATION

- A. Comply with requirements for pipe hanger, support products, and installation in Section 22 05 29 "Hangers and Supports for Plumbing Piping and Equipment."
 - 1. Vertical Piping: MSS Type 8 or 42, clamps.
 - 2. Individual, Straight, Horizontal Piping Runs:
 - a. 100 Feet and Less: MSS Type 1, adjustable, steel clevis hangers.
 - b. Longer Than 100 Feet: MSS Type 43, adjustable roller hangers.
 - c. Longer Than 100 Feet if Indicated: MSS Type 49, spring cushion rolls.
 - 3. Multiple, Straight, Horizontal Piping Runs 100 Feet or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
 - 4. Base of Vertical Piping: MSS Type 52, spring hangers.
- B. Support vertical piping and tubing at base and at each floor.
- C. Rod diameter may be reduced one size for double-rod hangers, to a minimum of 3/8 inch.
- D. Install hangers for copper tubing with the following maximum horizontal spacing and minimum rod diameters:
 - 1. NPS 3/4 and Smaller: 60 inches with 3/8-inch rod.
 - 2. NPS 1 and NPS 1-1/4: 72 inches with 3/8-inch rod.
 - 3. NPS 1-1/2 and NPS 2: 96 inches with 3/8-inch rod.
 - 4. NPS 2-1/2: 108 inches with 1/2-inch rod.
 - 5. NPS 3 to NPS 5: 10 feet with 1/2-inch rod.
 - 6. NPS 6: 10 feet with 5/8-inch rod.
 - 7. NPS 8: 10 feet with 3/4-inch rod.

3.5 CONNECTIONS

- A. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. When installing piping adjacent to equipment and machines, allow space for service and maintenance.
- C. Connect domestic water piping to water-service piping with shutoff valve; extend and connect to the following:
 - 1. Water Heaters: Cold-water inlet and hot-water outlet piping in sizes indicated, but not smaller than sizes of water heater connections.
 - 2. Plumbing Fixtures: Cold- and hot-water-supply piping in sizes indicated, but not smaller than that required by plumbing code.
 - 3. Equipment: Cold- and hot-water-supply piping as indicated, but not smaller than equipment connections. Provide shutoff valve and union for each connection. Use flanges instead of unions for NPS 2-1/2 and larger.

3.6 IDENTIFICATION

- A. Identify system components. Comply with requirements for identification materials and installation in Section 22 05 53 "Identification for Plumbing Piping and Equipment."
- B. Label pressure piping with system operating pressure.

3.7 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:
 - 1. Piping Inspections:
 - a. Do not enclose, cover, or put piping into operation until it has been inspected and approved by authorities having jurisdiction.
 - b. During installation, notify authorities having jurisdiction at least one day before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction:
 - 1) Roughing-in Inspection: Arrange for inspection of piping before concealing or closing in after roughing in and before setting fixtures.
 - 2) Final Inspection: Arrange for authorities having jurisdiction to observe tests specified in "Piping Tests" Subparagraph below and to ensure compliance with requirements.
 - c. Reinspection: If authorities having jurisdiction find that piping will not pass tests or inspections, make required corrections and arrange for reinspection.
 - d. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.
 - 2. Piping Tests:
 - a. Fill domestic water piping. Check components to determine that they are not air bound and that piping is full of water.
 - b. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit a separate report for each test, complete with diagram of portion of piping tested.
 - c. Leave new, altered, extended, or replaced domestic water piping uncovered and unconcealed until it has been tested and approved. Expose work that was covered or concealed before it was tested.
 - d. Cap and subject piping to static water pressure of 50 psig above operating pressure, without exceeding pressure rating of piping system materials. Isolate test source and allow it to stand for four hours. Leaks and loss in test pressure constitute defects that must be repaired.
 - e. Repair leaks and defects with new materials, and retest piping or portion thereof until satisfactory results are obtained.
 - f. Prepare reports for tests and for corrective action required.

- B. Domestic water piping will be considered defective if it does not pass tests and inspections.
- C. Prepare test and inspection reports.

3.8 ADJUSTING

- A. Perform the following adjustments before operation:
 - 1. Open shutoff valves to fully open position.
 - 2. Remove plugs used during testing of piping and for temporary sealing of piping during installation.
 - 3. Remove and clean strainer screens. Close drain valves and replace drain plugs.
 - 4. Remove filter cartridges from housings and verify that cartridges are as specified for application where used and are clean and ready for use.
 - 5. Check plumbing specialties and verify proper settings, adjustments, and operation.

3.9 CLEANING

- A. Clean and disinfect potable domestic water piping as follows:
 - 1. Purge new piping and parts of existing piping that have been altered, extended, or repaired before using.
 - 2. Use purging and disinfecting procedures prescribed by authorities having jurisdiction; if methods are not prescribed, use procedures described in either AWWA C651 or AWWA C652 or follow procedures described below:
 - a. Flush piping system with clean, potable water until dirty water does not appear at outlets.
 - b. Fill and isolate system according to either of the following:
 - 1) Fill system or part thereof with water/chlorine solution with at least 50 ppm of chlorine. Isolate with valves and allow to stand for 24 hours.
 - c. Flush system with clean, potable water until no chlorine is in water coming from system after the standing time.
 - d. Repeat procedures if biological examination shows contamination.
 - e. Submit water samples in sterile bottles to authorities having jurisdiction.

3.10 PIPING SCHEDULE

- A. Transition and special fittings with pressure ratings at least equal to piping rating may be used in applications below unless otherwise indicated.
- B. Flanges and unions may be used for aboveground piping joints unless otherwise indicated.
- C. Fitting Option: Extruded-tee connections and brazed joints may be used on aboveground copper tubing.

D. Aboveground domestic water piping, NPS 2 and smaller, shall be the following:

1. Hard copper tube, ASTM B 88, Type L; solder-joint fittings; and soldered joints.

END OF SECTION 22 11 16

SECTION 22 13 16 - SANITARY WASTE AND VENT PIPING

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. Hubless, cast-iron soil pipe and fittings.
 - 2. Copper tube and fittings.
 - 3. Specialty pipe fittings.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For hubless, single-stack drainage system. Include plans, elevations, sections, and details.

1.4 INFORMATIONAL SUBMITTALS

- A. Seismic Qualification Certificates: For waste and vent piping, accessories, and components, from manufacturer.
 - 1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
 - 2. Detailed description of piping anchorage devices on which the certification is based and their installation requirements.
- B. Field quality-control reports.

1.5 FIELD CONDITIONS

- A. Interruption of Existing Sanitary Waste Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary service according to requirements indicated:
 - 1. Notify Architect no fewer than two days in advance of proposed interruption of sanitary waste service.

2. Do not proceed with interruption of sanitary waste service without Architect's written permission.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Components and installation shall be capable of withstanding the following minimum working pressure unless otherwise indicated:
 1. Soil, Waste, and Vent Piping: 10-foot head of water.
- B. Seismic Performance: Soil, waste, and vent piping and support and installation shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

2.2 PIPING MATERIALS

- A. Piping materials shall bear label, stamp, or other markings of specified testing agency.
- B. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.

2.3 HUBLESS, CAST-IRON SOIL PIPE AND FITTINGS

- A. Pipe and Fittings: CISPI 301.
- B. CISPI, Hubless-Piping Couplings:
 1. Standards: ASTM C 1277 and CISPI 310.
 2. Description: Stainless-steel corrugated shield with stainless-steel bands and tightening devices; and ASTM C 564, rubber sleeve with integral, center pipe stop.
- C. Heavy-Duty, Hubless-Piping Couplings:
 1. Standards: ASTM C 1277 and ASTM C 1540.
 2. Description: Stainless-steel shield with stainless-steel bands and tightening devices; and ASTM C 564, rubber sleeve with integral, center pipe stop.

2.4 COPPER TUBE AND FITTINGS

- A. Copper Type DWV Tube: ASTM B 306, drainage tube, drawn temper.
- B. Copper Drainage Fittings: ASME B16.23, cast copper or ASME B16.29, wrought copper, solder-joint fittings.
- C. Hard Copper Tube: ASTM B 88, Type L and Type M, water tube, drawn temper.

- D. Soft Copper Tube: ASTM B 88, Type L, water tube, annealed temper.
- E. Solder: ASTM B 32, lead free with ASTM B 813, water-flushable flux.

PART 3 - EXECUTION

3.1 PIPING INSTALLATION

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems.
 - 1. Install piping as indicated unless deviations to layout are approved on coordination drawings.
- B. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.
- C. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- D. Install piping at indicated slopes.
- E. Install piping free of sags and bends.
- F. Install fittings for changes in direction and branch connections.
- G. Make changes in direction for soil and waste drainage and vent piping using appropriate branches, bends, and long-sweep bends.
 - 1. 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.
 - 2. Use long-turn, double Y-branch and 1/8-bend fittings if two fixtures are installed back to back or side by side with common drain pipe.
 - a. Straight tees, elbows, and crosses may be used on vent lines.
 - 3. Do not change direction of flow more than 90 degrees.
 - 4. Use proper size of standard increasers and reducers if pipes of different sizes are connected.
 - a. Reducing size of waste piping in direction of flow is prohibited.
- H. Install soil and waste and vent piping at the following minimum slopes unless otherwise indicated:
 - 1. Building Sanitary Waste: 2 percent downward in direction of flow for piping NPS 4 and smaller.
 - 2. Horizontal Sanitary Waste Piping: 2 percent downward in direction of flow.
 - 3. Vent Piping: 1 percent down toward vertical fixture vent or toward vent stack.

- I. 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."
- J. Install aboveground copper tubing according to CDA's "Copper Tube Handbook."
- K. Plumbing Specialties:
 - 1. Install drains in sanitary waste gravity-flow piping.
 - a. Comply with requirements for drains specified in Section 22 13 19 "Sanitary Waste Piping Specialties."
- L. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.
- M. Install sleeves for piping penetrations of walls, ceilings, and floors.
 - 1. Comply with requirements for sleeves specified in Section 22 05 17 "Sleeves and Sleeve Seals for Plumbing Piping."
- N. Install sleeve seals for piping penetrations of concrete walls and slabs.
 - 1. Comply with requirements for sleeve seals specified in Section 22 05 17 "Sleeves and Sleeve Seals for Plumbing Piping."
- O. Install escutcheons for piping penetrations of walls, ceilings, and floors.
 - 1. Comply with requirements for escutcheons specified in Section 22 05 18 "Escutcheons for Plumbing Piping."

3.2 JOINT CONSTRUCTION

- A. Join hubless, cast-iron soil piping according to CISPI 310 and CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for hubless-piping coupling joints.
- B. Join copper tube and fittings with soldered joints according to ASTM B 828. Use ASTM B 813, water-flushable, lead-free flux and ASTM B 32, lead-free-alloy solder.

3.3 HANGER AND SUPPORT INSTALLATION

- A. Comply with requirements for pipe hanger and support devices and installation specified in Section 220529 "Hangers and Supports for Plumbing Piping and Equipment."
- B. Support horizontal piping and tubing within 12 inches of each fitting and coupling.
- C. Support vertical piping and tubing at base and at each floor.
- D. Rod diameter may be reduced one size for double-rod hangers, with 3/8-inch minimum rods.

- E. Install hangers for cast-iron soil piping with the following maximum horizontal spacing and minimum rod diameters:
 - 1. NPS 1-1/2 and NPS 2: 60 inches with 3/8-inch rod.
 - 2. NPS 3: 60 inches with 1/2-inch rod.
 - 3. NPS 4 and NPS 5: 60 inches with 5/8-inch rod.
 - 4. NPS 6 and NPS 8: 60 inches with 3/4-inch rod.
 - 5. NPS 10 and NPS 12: 60 inches with 7/8-inch rod.
 - 6. Spacing for 10-foot lengths may be increased to 10 feet. Spacing for fittings is limited to 60 inches.
- F. Install supports for vertical cast-iron soil piping every 15 feet.
- G. Install hangers for copper tubing with the following maximum horizontal spacing and minimum rod diameters:
 - 1. NPS 1-1/4: 72 inches with 3/8-inch rod.
 - 2. NPS 1-1/2 and NPS 2: 96 inches with 3/8-inch rod.
 - 3. NPS 2-1/2: 108 inches with 1/2-inch rod.
 - 4. NPS 3 and NPS 5: 10 feet with 1/2-inch rod.
 - 5. NPS 6: 10 feet with 5/8-inch rod.
 - 6. NPS 8: 10 feet with 3/4-inch rod.
- H. Install supports for vertical copper tubing every 10 feet.

3.4 CONNECTIONS

- A. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Connect waste and vent piping to the following:
 - 1. Plumbing Fixtures: Connect waste piping in sizes indicated, but not smaller than required by plumbing code.
 - 2. Plumbing Specialties: Connect waste and vent piping in sizes indicated, but not smaller than required by plumbing code.

3.5 IDENTIFICATION

- A. Identify exposed sanitary waste and vent piping.
- B. Comply with requirements for identification specified in Section 22 05 53 "Identification for Plumbing Piping and Equipment."

3.6 FIELD QUALITY CONTROL

- A. During installation, notify authorities having jurisdiction at least 24 hours before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction.
 - 1. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.
 - 2. Final Inspection: Arrange for final inspection by authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.
- B. Reinspection: If authorities having jurisdiction find that piping will not pass test or inspection, make required corrections and arrange for reinspection.
- C. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.
- D. Test sanitary waste and vent piping according to procedures of authorities having jurisdiction or, in absence of published procedures, as follows:
 - 1. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired.
 - a. If testing is performed in segments, submit separate report for each test, complete with diagram of portion of piping tested.
 - 2. Leave uncovered and unconcealed new, altered, extended, or replaced waste and vent piping until it has been tested and approved.
 - a. Expose work that was covered or concealed before it was tested.
 - 3. Roughing-in Plumbing Test Procedure: Test waste and vent piping except outside leaders on completion of roughing-in.
 - a. Close openings in piping system and fill with water to point of overflow, but not less than 10-foot head of water.
 - b. From 15 minutes before inspection starts to completion of inspection, water level must not drop.
 - c. Inspect joints for leaks.

3.7 CLEANING AND PROTECTION

- A. Clean interior of piping. Remove dirt and debris as work progresses.
- B. Protect sanitary waste and vent piping during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.
- C. Place plugs in ends of uncompleted piping at end of day and when work stops.

3.8 PIPING SCHEDULE

- A. Aboveground, soil and waste piping NPS 4 and smaller shall be the following:
 - 1. Service class, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
 - 2. Hubless, cast-iron soil pipe and fittings; CISPI heavy-duty hubless-piping couplings; and coupled joints.
 - 3. Stainless-steel pipe and fittings, sealing rings, and gasketed joints.
 - 4. Copper Type DWV tube, copper drainage fittings, and soldered joints.

- B. Aboveground, vent piping NPS 4 and smaller shall be the following:
 - 1. Service class, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
 - 2. Hubless, cast-iron soil pipe and fittings; CISPI heavy-duty hubless-piping couplings; and coupled joints.

END OF SECTION 22 13 16

SECTION 22 13 19 - SANITARY WASTE PIPING 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. Cleanouts.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include rated capacities, operating characteristics, and accessories.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For sanitary waste piping specialties to include in emergency, operation, and maintenance manuals.

PART 2 - PRODUCTS

2.1 ASSEMBLY DESCRIPTIONS

- A. Sanitary waste piping specialties shall bear label, stamp, or other markings of specified testing agency.

2.2 CLEANOUTS

- A. Cast-Iron Exposed Cleanouts:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Jay R. Smith Mfg. Co.
 - b. MIFAB, Inc.
 - c. Zurn Industries, LLC.

- d. or approved equal.
- 2. Standard: ASME A112.36.2M.
- 3. Size: Same as connected drainage piping
- 4. Body Material: Hubless, cast-iron soil pipe test tee as required to match connected piping.
- 5. Closure: , brass plug.
- 6. Closure Plug Size: Same as or not more than one size smaller than cleanout size.

B. Cast-Iron Wall Cleanouts:

- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Jay R. Smith Mfg. Co.
 - b. MIFAB, Inc.
 - c. Zurn Industries, LLC.
 - d. or approved equal.
- 2. Standard: ASME A112.36.2M. Include wall access.
- 3. Size: Same as connected drainage piping.
- 4. Body: Hubless, cast-iron soil pipe test tee as required to match connected piping.
- 5. Closure Plug:
 - a. Countersunk head.
 - b. Drilled and threaded for cover attachment screw.
 - c. Size: Same as or not more than one size smaller than cleanout size.
- 6. Wall Access: Round, deep, chrome-plated bronze cover plate with screw.
- 7. Wall Access: Round Square, nickel-bronze, wall-installation frame and cover.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install cleanouts in aboveground piping and building drain piping according to the following, unless otherwise indicated:
 - 1. Size same as drainage piping up to NPS 4. Use NPS 4 for larger drainage piping unless larger cleanout is indicated.
 - 2. Locate at each change in direction of piping greater than 45 degrees.
 - 3. Locate at minimum intervals of 50 feet for piping NPS 4 and smaller and 100 feet for larger piping.
 - 4. Locate at base of each vertical soil and waste stack.

- B. For floor cleanouts for piping below floors, install cleanout deck plates with top flush with finished floor.
- C. For cleanouts located in concealed piping, install cleanout wall access covers, of types indicated, with frame and cover flush with finished wall.
- D. Install flashing fittings on sanitary stack vents and vent stacks that extend through roof.
- E. Install sleeve and sleeve seals with each riser and stack passing through floors with waterproof membrane.

3.2 CONNECTIONS

- A. Comply with requirements in Section 22 13 16 "Sanitary Waste and Vent Piping" for piping installation requirements. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install piping adjacent to equipment to allow service and maintenance.

3.3 LABELING AND IDENTIFYING

- A. Distinguish among multiple units, inform operator of operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations, in addition to identifying unit.
 - 1. Nameplates and signs are specified in Section 22 05 53 "Identification for Plumbing Piping and Equipment."

3.4 FIELD QUALITY CONTROL

- A. Tests and Inspections:
 - 1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
 - 2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

3.5 PROTECTION

- A. Protect drains during remainder of construction period to avoid clogging with dirt or debris and to prevent damage from traffic or construction work.
- B. Place plugs in ends of uncompleted piping at end of each day or when work stops.

END OF SECTION 22 13 19

SECTION 22 33 00 - ELECTRIC, DOMESTIC-WATER HEATERS

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. Commercial, light-duty, storage, electric, domestic-water heaters.
 2. Flow-control, electric, tankless, domestic-water heaters.
 3. Domestic-water heater accessories.

1.3 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Commercial domestic-water heaters shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
 1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."

1.4 ACTION SUBMITTALS

- A. Product Data: For each type and size of domestic-water heater indicated. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

1.5 INFORMATIONAL SUBMITTALS

- A. Seismic Qualification Data: For commercial domestic-water heaters, accessories, and components, from manufacturer.
 1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
 2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
 3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

- B. Product Certificates: For each type of commercial and tankless, electric, domestic-water heater, from manufacturer.
- C. Domestic-Water Heater Labeling: Certified and labeled by testing agency acceptable to authorities having jurisdiction.
- D. Source quality-control reports.
- E. Field quality-control reports.
- F. Warranty: Sample of special warranty.

1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For electric, domestic-water heaters to include in emergency, operation, and maintenance manuals.

1.7 QUALITY ASSURANCE

- 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.
- B. ASHRAE/IESNA Compliance: Applicable requirements in ASHRAE/IESNA 90.1.
- C. ASME Compliance: Where ASME-code construction is indicated, fabricate and label commercial, domestic-water heater storage tanks to comply with ASME Boiler and Pressure Vessel Code: Section VIII, Division 1.
- D. NSF Compliance: Fabricate and label equipment components that will be in contact with potable water to comply with NSF 61 Annex G, "Drinking Water System Components - Health Effects."

1.8 COORDINATION

- A. Coordinate sizes and locations of platform bases with actual equipment provided.

1.9 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of electric, domestic-water heaters that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures including storage tank and supports.
 - b. Faulty operation of controls.

- c. Deterioration of metals, metal finishes, and other materials beyond normal use.
- 2. Warranty Periods: From date of Substantial Completion.
 - a. Commercial, Light-Duty, Storage, Electric, Domestic-Water Heaters:
 - 1) Storage Tank: Three years.
 - 2) Controls and Other Components: Three years.
 - b. Electric, Tankless, Domestic-Water Heaters: One year.

PART 2 - PRODUCTS

2.1 COMMERCIAL, ELECTRIC, DOMESTIC-WATER HEATERS

- A. Commercial, Light-Duty, Storage, Electric, Domestic-Water Heaters:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Bradford White Corporation.
 - b. Lochinvar, LLC.
 - c. Smith, A. O. Corporation.
 - d. or approved equal.
 - 2. Standard: UL 174.
 - 3. Storage-Tank Construction: Steel, vertical arrangement.
 - a. Tappings: ASME B1.20.1 pipe thread.
 - b. Pressure Rating: 150 psig.
 - c. Interior Finish: Comply with NSF 61 Annex G barrier materials for potable-water tank linings, including extending lining material into tappings.
 - 4. Factory-Installed Storage-Tank Appurtenances:
 - a. Anode Rod: Replaceable magnesium.
 - b. Dip Tube: Required unless cold-water inlet is near bottom of tank.
 - c. Drain Valve: ASSE 1005.
 - d. Insulation: Comply with ASHRAE/IESNA 90.1.
 - e. Jacket: Steel with enameled finish.
 - f. Heat-Trap Fittings: Inlet type in cold-water inlet and outlet type in hot-water outlet.
 - g. Heating Elements: Two; electric, screw-in immersion type; wired for simultaneous operation unless otherwise indicated. Limited to 12 kW total.
 - h. Temperature Control: Adjustable thermostat.
 - i. Safety Control: High-temperature-limit cutoff device or system.

- j. Relief Valve: ASME rated and stamped for combination temperature-and-pressure relief valves. Include relieving capacity at least as great as heat input, and include pressure setting less than domestic-water heater working-pressure rating. Select relief valve with sensing element that extends into storage tank.

B. Capacity and Characteristics:

1. Capacity: Varies. Refer to plumbing sheets.
2. Recovery: at 100 deg F. Refer to plumbing sheets.
3. Temperature Setting: at 120 deg F.
4. Power Demand: Refer to plumbing sheets.
5. Heating Elements:
 - a. Number of Elements: One.
 - b. Kilowatts Each Element: 2.5 kw.
 - c. Number of Stages: One.
6. Electrical Characteristics:
 - a. Volts: 277.
 - b. Phases: One.
 - c. Hertz: 60.

2.2 ELECTRIC, TANKLESS, DOMESTIC-WATER HEATERS

A. Flow-Control, Electric, Tankless, Domestic-Water Heaters:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Chronomite Laboratories, Inc.
 - b. Eemax, Inc.
 - c. or approved equal.
2. Standard: UL 499 for electric, tankless, (domestic-water heater) heating appliance.
3. Construction: Copper piping or tubing complying with NSF 61 Annex G barrier materials for potable water, without storage capacity.
 - a. Connections: ASME B1.20.1 pipe thread.
 - b. Pressure Rating: 150 psig.
 - c. Heating Element: Resistance heating system.
 - d. Temperature Control: Flow-control fitting.
 - e. Safety Control: High-temperature-limit cutoff device or system.
 - f. Jacket: Aluminum or steel with enameled finish or plastic.
4. Support: Bracket for wall mounting.
5. Capacity and Characteristics:

- a. Flow Rate: 1.2 gpm.
- b. Maximum Temperature Setting: 110 deg F.
- c. Power Demand: 8.31 kw.
- d. Electrical Characteristics:
 - 1) Volts: 277.
 - 2) Phases: Three.
 - 3) Hertz: 60.
 - 4) Minimum Circuit Ampacity: 30.

2.3 DOMESTIC-WATER HEATER ACCESSORIES

A. Domestic-Water Compression Tanks:

1. Manufacturers: Subject to compliance with requirements, but are not limited to, the following:
 - a. AMTROL, Inc.
 - b. Flexcon Industries.
 - c. or approved equal.
2. Description: Steel pressure-rated tank constructed with welded joints and factory-installed butyl-rubber diaphragm. Include air precharge to minimum system-operating pressure at tank.
3. Construction:
 - a. Tappings: Factory-fabricated steel, welded to tank before testing and labeling. Include ASME B1.20.1 pipe thread.
 - b. Interior Finish: Comply with NSF 61 Annex G barrier materials for potable-water tank linings, including extending finish into and through tank fittings and outlets.
 - c. Air-Charging Valve: Factory installed.
4. Capacity and Characteristics:
 - a. Working-Pressure Rating: 150 psig.
 - b. Capacity Acceptable: 2 gal. minimum.
 - c. Air Precharge Pressure: 50 psi.

B. Drain Pans: Corrosion-resistant metal with raised edge. Comply with ANSI/CSA LC 3. Include dimensions not less than base of domestic-water heater, and include drain outlet not less than NPS 3/4 with ASME B1.20.1 pipe threads or with ASME B1.20.7 garden-hose threads.

C. Piping-Type Heat Traps: Field-fabricated piping arrangement according to ASHRAE/IESNA 90.1.

D. Pressure Relief Valves: ASME rated and stamped. Include pressure setting less than domestic-water heater working-pressure rating.

- E. Domestic-Water Heater Mounting Brackets: Manufacturer's factory-fabricated steel bracket for wall mounting, capable of supporting domestic-water heater and water.

PART 3 - EXECUTION

3.1 DOMESTIC-WATER HEATER INSTALLATION

- A. Electric, Tankless, Domestic-Water Heater Mounting: Install electric, tankless, domestic-water heaters on wall bracket.
 - 1. Maintain manufacturer's recommended clearances.
 - 2. Arrange units so controls and devices that require servicing are accessible.
 - 3. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 4. Install anchor bolts to elevations required for proper attachment to supported equipment.
 - 5. Anchor domestic-water heaters to substrate.
- B. Install electric, domestic-water heaters level and plumb, according to layout drawings, original design, and referenced standards. Maintain manufacturer's recommended clearances. Arrange units so controls and devices needing service are accessible.
 - 1. Install shutoff valves on domestic-water-supply piping to domestic-water heaters and on domestic-hot-water outlet piping. Comply with requirements for shutoff valves specified in Section 22 05 23.12 "Ball Valves for Plumbing Piping."
- C. Install commercial, electric, domestic-water heaters with seismic-restraint devices.
- D. Install pressure relief valves in water piping for electric, domestic-water heaters without storage. Extend commercial-water-heater relief-valve outlet, with drain piping same as domestic-water piping in continuous downward pitch, and discharge by positive air gap onto closest Service sink and/or floor drain.
- E. Install water-heater drain piping as indirect waste to spill by positive air gap into open drains or over floor drains. Install hose-end drain valves at low points in water piping for electric, domestic-water heaters that do not have tank drains.
- F. Assemble and install inlet and outlet piping manifold kits for multiple electric, domestic-water heaters. Fabricate, modify, or arrange manifolds for balanced water flow through each electric, domestic-water heater. Include shutoff valve and thermometer in each domestic-water heater inlet and outlet, and throttling valve in each electric, domestic-water heater outlet. Comply with requirements for valves specified in Section 22 05 23.12 "Ball Valves for Plumbing Piping."
- G. Install piping-type heat traps on inlet and outlet piping of electric, domestic-water heater storage tanks without integral or fitting-type heat traps.
- H. Fill electric, domestic-water heaters with water.

- I. Charge domestic-water compression tanks with air.

3.2 CONNECTIONS

- A. Comply with requirements for piping specified in Section 22 11 16 "Domestic Water Piping." Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Where installing piping adjacent to electric, domestic-water heaters, allow space for service and maintenance of water heaters. Arrange piping for easy removal of domestic-water heaters.

3.3 IDENTIFICATION

- A. Identify system components. Comply with requirements for identification specified in Section 22 05 53 "Identification for Plumbing Piping and Equipment."

3.4 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
 - 1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
 - 2. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
 - 3. Operational Test: After electrical circuitry has been energized, start units to confirm proper operation.
 - 4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- B. Electric, domestic-water heaters will be considered defective if they do not pass tests and inspections. Comply with requirements in Section 01 40 00 "Quality Requirements" for retesting and reinspecting requirements and Section 01 73 00 "Execution" for requirements for correcting the Work.
- C. Prepare test and inspection reports.

3.5 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain commercial and tankless, electric, domestic-water heaters.

END OF SECTION 22 33 00

SECTION 22 42 16.16 - COMMERCIAL SINKS

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. Service sinks.
 2. Handwash sinks.
 3. Sink faucets.
 4. Supply fittings.
 5. Waste fittings.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for sinks.
 2. Include rated capacities, operating characteristics and furnished specialties and accessories.

1.4 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Counter cutout templates for mounting of counter-mounted lavatories.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For sinks to include in maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 1. Faucet Washers and O-Rings: Equal to 10 percent of amount of each type and size installed.

2. Faucet Cartridges and O-Rings: Equal to 5 percent of amount of each type and size installed.

PART 2 - PRODUCTS

2.1 SERVICE SINKS

- A. Service Sinks MS-1: Enameled, cast iron, floor mounted.
 1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. Zurn Industries, LLC.
 - b. or approved equal.
 2. Fixture:
 - a. Standard: ASME A112.19.1/CSA B45.2.
 - b. Style: With front apron and raised back.
 - c. Nominal Size: 28 by 28 inches.
 - d. Color: White.
 - e. Drain: Grid with NPS 3 outlet.
 - f. Rim Guard: Coated wire.
 3. Faucet: Refer to plumbing fixture schedule.

2.2 HANDWASH SINKS

- A. Handwash Sinks S-1: Stainless steel, counter mounted.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Elkay Manufacturing Co.
 - b. Just Manufacturing.
 - c. or approved equal.
 2. Fixture:
 - a. Standards: ASME A112.19.3/CSA B45.4 and NSF/ANSI 2.
 - b. Type: Basin with radius corners, back for faucet, and support brackets.
 - c. Nominal Size: 22 by 19-1/2 by 6 inches.
 3. Faucet: Refer to plumbing schedule.
 4. Supply Fittings: Comply with requirements in "Supply Fittings" Article.
 5. Waste Fittings:

- a. Standard: ASME A112.18.2/CSA B125.2.
- b. Single Bowl:
 - 1) Drain: Cup with stopper and NPS 1-1/2 tailpiece.
 - 2) Drain Piping: NPS 1-1/2 chrome-plated, tubular-brass direct waste without trap, separate waste piping, and wall flange.

2.3 SINK FAUCETS

- A. NSF Standard: Comply with NSF/ANSI 61 Annex G, "Drinking Water System Components - Health Effects," for faucet-spout materials that will be in contact with potable water.
- B. Sink Faucets: Manual type, single-control mixing valve.
 - 1. Commercial, Solid-Brass Faucets.
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) Chicago Faucets; Geberit Company.
 - 2) Symmons.
 - 3) T&S Brass and Bronze Works, Inc.
 - 4) or approved equal.
 - 2. General-Duty, Solid-Brass Faucets.
 - 3. Copper- or Brass-Underbody Faucets.
 - 4. Standard: ASME A112.18.1/CSA B125.1.
 - 5. General: Include hot- and cold-water indicators; coordinate faucet inlets with supplies and fixture hole punchings; coordinate outlet with spout and sink receptor.
 - 6. Body Type: Widespread 8" center set.
 - 7. Body Material: Commercial, solid brass.
 - 8. Finish: Polished chrome plate.
 - 9. Maximum Flow Rate: 1.5 GPM.
 - 10. Handle(s): Lever.
 - 11. Mounting Type: Deck, exposed.
 - 12. Spout Type: Swivel gooseneck.
 - 13. Vacuum Breaker: Not required.
 - 14. Spout Outlet: Aerator.

2.4 SUPPLY FITTINGS

- A. NSF Standard: Comply with NSF/ANSI 61 Annex G, "Drinking Water System Components - Health Effects," for supply-fitting materials that will be in contact with potable water.
- B. Standard: ASME A112.18.1/CSA B125.1.

- C. Supply Piping: Chrome-plated brass pipe or chrome-plated copper tube matching water-supply piping size. Include chrome-plated brass or stainless-steel wall flange.
- D. Supply Stops: Chrome-plated brass, one-quarter-turn, ball-type or compression valve with inlet connection matching supply piping.
- E. Risers:
 1. NPS 3/8.
 2. ASME A112.18.6, braided or corrugated stainless-steel flexible hose.

2.5 WASTE FITTINGS

- A. Standard: ASME A112.18.2/CSA B125.2.
- B. Drain: Grid type with NPS 1-1/2 offset and straight tailpiece.
- C. Trap:
 1. Size: NPS 1-1/2.
 2. Material: Chrome-plated, two-piece, cast-brass trap and swivel elbow with 0.032-inch-thick brass tube to wall; and chrome-plated brass or steel wall flange.
 3. Material: Stainless-steel, two-piece trap and swivel elbow with 0.012-inch-thick stainless-steel tube to wall; and stainless-steel wall flange.

2.6 GROUT

- A. Standard: ASTM C 1107/C 1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.
- B. Characteristics: Nonshrink; recommended for interior and exterior applications.
- C. Design Mix: 5000-psi, 28-day compressive strength.
- D. Packaging: Premixed and factory packaged.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine roughing-in of water supply and sanitary drainage and vent piping systems to verify actual locations of piping connections before sink installation.
- B. Examine walls, floors, and counters for suitable conditions where sinks will be installed.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install sinks level and plumb according to roughing-in drawings.
- B. Set floor-mounted sinks in leveling bed of cement grout.
- C. Install water-supply piping with stop on each supply to each sink faucet.
 - 1. Install stops in locations where they can be easily reached for operation.
- D. Install wall flanges or escutcheons at piping wall penetrations in exposed, finished locations. Use deep-pattern escutcheons if required to conceal protruding fittings. Comply with escutcheon requirements specified in Section 22 05 18 "Escutcheons for Plumbing Piping."
- E. Seal joints between sinks and counters, floors, and walls using sanitary-type, one-part, mildew-resistant silicone sealant. Match sealant color to fixture color. Comply with sealant requirements specified in Section 07 92 00 "Joint Sealants."
- F. Install protective shielding pipe covers and enclosures on exposed supplies and waste piping of accessible sinks. Comply with requirements in Section 22 07 19 "Plumbing Piping Insulation."

3.3 CONNECTIONS

- A. Connect sinks with water supplies, stops, and risers, and with traps, soil, waste, and vent piping. Use size fittings required to match fixtures.
- B. Comply with water piping requirements specified in Section 22 11 16 "Domestic Water Piping."
- C. Comply with soil and waste piping requirements specified in Section 22 13 16 "Sanitary Waste and Vent Piping."

3.4 ADJUSTING

- A. Operate and adjust sinks and controls. Replace damaged and malfunctioning sinks, fittings, and controls.
- B. Adjust water pressure at faucets to produce proper flow.

3.5 CLEANING AND PROTECTION

- A. After completing installation of sinks, inspect and repair damaged finishes.
- B. Clean sinks, faucets, and other fittings with manufacturers' recommended cleaning methods and materials.
- C. Provide protective covering for installed sinks and fittings.
- D. Do not allow use of sinks for temporary facilities unless approved in writing by Owner.

END OF SECTION 22 42 16.16

SECTION 23 05 53 - IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

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. Equipment labels.
 - 2. Warning signs and labels.
 - 3. Duct labels.
 - 4. Warning tags.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For color, letter style, and graphic representation required for each identification material and device.
- C. Equipment Label Schedule: Include a listing of all equipment to be labeled with the proposed content for each label.
- D. Valve numbering scheme.
- E. Valve Schedules: For each piping system to include in maintenance manuals.

PART 2 - PRODUCTS

2.1 EQUIPMENT LABELS

- A. Metal Labels for Equipment:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Brady Corporation.
 - b. Brimar Industries, Inc.

- c. Carlton Industries, LP.
 - d. Champion America.
 - e. Craftmark Pipe Markers.
 - f. emedco.
 - g. Kolbi Pipe Marker Co.
 - h. LEM Products Inc.
 - i. Marking Services, Inc.
 - j. Seton Identification Products.
 - k. or approved equal.
2. Material and Thickness: stainless steel, 0.025-inch minimum thickness, and having predrilled or stamped holes for attachment hardware.
 3. Letter Color: White.
 4. Background Color: Black.
 5. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
 6. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-quarters the size of principal lettering.
 7. Fasteners: Stainless-steel rivets.
 8. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

B. Plastic Labels for Equipment:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Brady Corporation.
 - b. Brimar Industries, Inc.
 - c. Carlton Industries, LP.
 - d. Champion America.
 - e. Craftmark Pipe Markers.
 - f. emedco.
 - g. Kolbi Pipe Marker Co.
 - h. LEM Products Inc.
 - i. Marking Services, Inc.
 - j. Seton Identification Products.
 - k. or approved equal.
2. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick, and having predrilled holes for attachment hardware.
3. Letter Color: White.
4. Background Color: Black.
5. Maximum Temperature: Able to withstand temperatures up to 160 deg F.
6. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.

7. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-quarters the size of principal lettering.
 8. Fasteners: Stainless-steel rivets.
 9. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- C. Label Content: Include equipment's Drawing designation or unique equipment number, Drawing numbers where equipment is indicated (plans, details, and schedules), and the Specification Section number and title where equipment is specified.
- D. Equipment Label Schedule: For each item of equipment to be labeled, on 8-1/2-by-11-inch bond paper. Tabulate equipment identification number, and identify Drawing numbers where equipment is indicated (plans, details, and schedules) and the Specification Section number and title where equipment is specified. Equipment schedule shall be included in operation and maintenance data.

2.2 WARNING SIGNS AND LABELS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Brady Corporation.
 2. Brimar Industries, Inc.
 3. Carlton Industries, LP.
 4. Champion America.
 5. Craftmark Pipe Markers.
 6. emedco.
 7. LEM Products Inc.
 8. Marking SeVICES Inc.
 9. National Marker Company.
 10. Seton Identification Products.
 11. Stranco, Inc.
 12. or approved equal.
- B. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick, and having predrilled holes for attachment hardware.
- C. Letter Color: Black.
- D. Background Color: Yellow.
- E. Maximum Temperature: Able to withstand temperatures up to 160 deg F.
- F. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.

- G. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-quarters the size of principal lettering.
- H. Fasteners: Stainless-steel rivets.
- I. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- J. Label Content: Include caution and warning information plus emergency notification instructions.

2.3 DUCT LABELS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Brady Corporation.
 2. Brimar Industries, Inc.
 3. Carlton Industries, LP.
 4. Champion America.
 5. Craftmark Pipe Markers.
 6. emedco.
 7. Kolbi Pipe Marker Co.
 8. LEM Products Inc.
 9. Marking Sevices Inc.
 10. Seton Identification Products.
 11. or approved equal.
- B. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/16 inch thick, and having predrilled holes for attachment hardware.
- C. Letter Color: Black.
- D. Background Color: White.
- E. Maximum Temperature: Able to withstand temperatures up to 160 deg F.
- F. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
- G. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-quarters the size of principal lettering.
- H. Fasteners: Stainless-steel self-tapping screws.

- I. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- J. Duct Label Contents: Include identification of duct service using same designations or abbreviations as used on Drawings; also include duct size and an arrow indicating flow direction.
 - 1. Flow-Direction Arrows: Integral with duct system service lettering to accommodate both directions or as separate unit on each duct label to indicate flow direction.

2.4 WARNING TAGS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Brady Corporation.
 - 2. Brimar Industries, Inc.
 - 3. Carlton Industries, LP.
 - 4. Champion America.
 - 5. Craftmark Pipe Markers.
 - 6. emedco.
 - 7. Kolbi Pipe Marker Co.
 - 8. LEM Products Inc.
 - 9. Marking Sevices Inc.
 - 10. Seton Identification Products.
 - 11. or approved equal.
- B. Description: Preprinted or partially preprinted accident-prevention tags of plasticized card stock with matte finish suitable for writing.
 - 1. Size: 3 by 5-1/4 inches minimum.
 - 2. Fasteners: Reinforced grommet and wire or string.
 - 3. Nomenclature: Large-size primary caption such as "DANGER," "CAUTION," or "DO NOT OPERATE."
 - 4. Color: Safety-yellow background with black lettering.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Clean piping and equipment surfaces of substances that could impair bond of identification devices, including dirt, oil, grease, release agents, and incompatible primers, paints, and encapsulants.

3.2 GENERAL INSTALLATION REQUIREMENTS

- A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.
- B. Coordinate installation of identifying devices with locations of access panels and doors.
- C. Install identifying devices before installing acoustical ceilings and similar concealment.

3.3 EQUIPMENT LABEL INSTALLATION

- A. Install or permanently fasten labels on each major item of mechanical equipment.
- B. Locate equipment labels where accessible and visible.

3.4 DUCT LABEL INSTALLATION

- A. Install plastic-laminated duct labels with permanent adhesive on air ducts in the following color codes:
 - 1. Blue: For cold-air supply ducts.
 - 2. Yellow: For hot-air supply ducts.
 - 3. Green: For exhaust-, outside-, relief-, return-, and mixed-air ducts.
- B. Stenciled Duct Label Option: Stenciled labels showing service and flow direction may be provided instead of plastic-laminated duct labels, at Installer's option.
- C. Locate labels near points where ducts enter into and exit from concealed spaces and at maximum intervals of 50 feet in each space where ducts are exposed or concealed by removable ceiling system.

3.5 WARNING-TAG INSTALLATION

- A. Write required message on, and attach warning tags to, equipment and other items where required.

END OF SECTION 23 05 53

SECTION 23 05 93 - TESTING, ADJUSTING, AND BALANCING FOR HVAC

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. Balancing Air Systems:
 - a. Constant-volume air systems.
 - b. Dual-duct systems.
 - c. Variable-air-volume systems.
 - 2. Testing, Adjusting, and Balancing Equipment:
 - a. Motors.
 - 3. Testing, adjusting, and balancing existing systems and equipment.
 - 4. Duct leakage tests.
 - 5. Control system verification.

1.3 DEFINITIONS

- A. AABC: Associated Air Balance Council.
- B. BAS: Building automation systems.
- C. TAB: Testing, adjusting, and balancing.
- D. TAB Specialist: An independent entity meeting qualifications to perform TAB work.
- E. TDH: Total dynamic head.

1.4 PREINSTALLATION MEETINGS

- A. TAB Conference: If requested by the Owner, conduct a TAB conference at Project site after approval of the TAB strategies and procedures plan to develop a mutual understanding of the details. Provide a minimum of 14 days' advance notice of scheduled meeting time and location.
 - 1. Minimum Agenda Items:

- a. The Contract Documents examination report.
- b. The TAB plan.
- c. Needs for coordination and cooperation of trades and subcontractors.
- d. Proposed procedures for documentation and communication flow.

1.5 ACTION SUBMITTALS

- A. Sustainable Design Submittals:
 1. Air-Balance Report: Documentation indicating that Work complies with ASHRAE 62.1, Section 7.2.2 - "Air Balancing."
 2. TAB Report: Documentation indicating that Work complies with ASHRAE/IES 90.1, Section 6.7.2.3 - "System Balancing."

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: Within 30 days of Contractor's Notice to Proceed, submit documentation that the TAB specialist and this Project's TAB team members meet the qualifications specified in "Quality Assurance" Article.
- B. Contract Documents Examination Report: Within 60 days of Contractor's Notice to Proceed, submit the Contract Documents review report as specified in Part 3.
- C. Strategies and Procedures Plan: Within 60 days of Contractor's Notice to Proceed, submit TAB strategies and step-by-step procedures as specified in "Preparation" Article.
- D. System Readiness Checklists: Within 60 days of Contractor's Notice to Proceed, submit system readiness checklists as specified in "Preparation" Article.
- E. Examination Report: Submit a summary report of the examination review required in "Examination" Article.
- F. Certified TAB reports.
- G. Sample report forms.
- H. Instrument calibration reports, to include the following:
 1. Instrument type and make.
 2. Serial number.
 3. Application.
 4. Dates of use.
 5. Dates of calibration.

1.7 QUALITY ASSURANCE

- A. TAB Specialists Qualifications: Certified by AABC.
 - 1. TAB Field Supervisor: Employee of the TAB specialist and certified by AABC.
 - 2. TAB Technician: Employee of the TAB specialist and certified by AABC as a TAB technician.
- B. Instrumentation Type, Quantity, Accuracy, and Calibration: Comply with requirements in ASHRAE 111, Section 4, "Instrumentation."
- C. ASHRAE 62.1 Compliance: Applicable requirements in ASHRAE 62.1, Section 7.2.2 - "Air Balancing."
- D. ASHRAE/IES 90.1 Compliance: Applicable requirements in ASHRAE/IES 90.1, Section 6.7.2.3 - "System Balancing."

1.8 FIELD CONDITIONS

- A. Partial Owner Occupancy: Owner may occupy completed areas of building before Substantial Completion. Cooperate with Owner during TAB operations to minimize conflicts with Owner's operations.

PART 2 - PRODUCTS (Not Applicable)

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 installed systems for balancing devices, such as test ports, gage cocks, thermometer wells, flow-control devices, balancing valves and fittings, and manual volume dampers. Verify that locations of these balancing devices are applicable for intended purpose and are accessible.
- C. Examine the approved submittals for HVAC systems and equipment.
- D. Examine design data including HVAC system descriptions, statements of design assumptions for environmental conditions and systems output, and statements of philosophies and assumptions about HVAC system and equipment controls.
- E. Examine ceiling plenums and underfloor air plenums used for supply, return, or relief air to verify that they are properly separated from adjacent areas. Verify that penetrations in plenum walls are sealed and fire-stopped if required.

- F. Examine equipment performance data including fan curves.
 - 1. Relate performance data to Project conditions and requirements, including system effects that can create undesired or unpredicted conditions that cause reduced capacities in all or part of a system.
 - 2. Calculate system-effect factors to reduce performance ratings of HVAC equipment when installed under conditions different from the conditions used to rate equipment performance. To calculate system effects for air systems, use tables and charts found in AMCA 201, "Fans and Systems," or in SMACNA's "HVAC Systems - Duct Design." Compare results with the design data and installed conditions.
- G. Examine system and equipment installations and verify that field quality-control testing, cleaning, and adjusting specified in individual Sections have been performed.
- H. Examine test reports specified in individual system and equipment Sections.
- I. Examine HVAC equipment and verify that bearings are greased, belts are aligned and tight, filters are clean, and equipment with functioning controls is ready for operation.
- J. Examine terminal units, such as variable-air-volume boxes, and verify that they are accessible and their controls are connected and functioning.
- K. Examine heat-transfer coils for correct piping connections and for clean and straight fins.
- L. Examine operating safety interlocks and controls on HVAC equipment.
- M. Report deficiencies discovered before and during performance of TAB procedures. Observe and record system reactions to changes in conditions. Record default set points if different from indicated values.

3.2 PREPARATION

- A. Prepare a TAB plan that includes the following:
 - 1. Equipment and systems to be tested.
 - 2. Strategies and step-by-step procedures for balancing the systems.
 - 3. Instrumentation to be used.
 - 4. Sample forms with specific identification for all equipment.
- B. Perform system-readiness checks of HVAC systems and equipment to verify system readiness for TAB work. Include, at a minimum, the following:
 - 1. Airside:
 - a. Verify that leakage and pressure tests on air distribution systems have been satisfactorily completed.
 - b. Duct systems are complete with terminals installed.
 - c. Volume, smoke, and fire dampers are open and functional.

- d. Clean filters are installed.
- e. Fans are operating, free of vibration, and rotating in correct direction.
- f. Variable-frequency controllers' startup is complete and safeties are verified.
- g. Automatic temperature-control systems are operational.
- h. Ceilings are installed.
- i. Windows and doors are installed.
- j. Suitable access to balancing devices and equipment is provided.

3.3 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" and in this Section.
- B. Cut insulation, ducts, and equipment cabinets for installation of test probes to the minimum extent necessary for TAB procedures.
 - 1. After testing and balancing, patch probe holes in ducts with same material and thickness as used to construct ducts.
 - 2. After testing and balancing, install test ports and duct access doors that comply with requirements in Section 23 33 00 "Air Duct Accessories."
 - 3. Install and join new insulation that matches removed materials. Restore insulation, coverings, vapor barrier, and finish according to Section 23 07 13 "Duct Insulation."
- 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.

3.4 GENERAL PROCEDURES FOR BALANCING AIR SYSTEMS

- A. Prepare test reports for both fans and outlets. Obtain manufacturer's outlet factors and recommended testing procedures. Cross-check the summation of required outlet volumes with required fan volumes.
- B. Prepare schematic diagrams of systems' "as-built" duct layouts.
- C. For variable-air-volume systems, develop a plan to simulate diversity.
- D. Determine the best locations in main and branch ducts for accurate duct-airflow measurements.
- E. Check airflow patterns from the outdoor-air louvers and dampers and the return- and exhaust-air dampers through the supply-fan discharge and mixing dampers.
- F. Locate start-stop and disconnect switches, electrical interlocks, and motor starters.
- G. Verify that motor starters are equipped with properly sized thermal protection.

- H. Check dampers for proper position to achieve desired airflow path.
- I. Check for airflow blockages.
- J. Check condensate drains for proper connections and functioning.
- K. Check for proper sealing of air-handling-unit components.
- L. Verify that air duct system is sealed as specified in Section 23 31 13 "Metal Ducts."

3.5 PROCEDURES FOR CONSTANT-VOLUME AIR SYSTEMS

- A. Adjust fans to deliver total indicated airflows within the maximum allowable fan speed listed by fan manufacturer.
 - 1. Measure total airflow.
 - a. Set outside-air, return-air, and relief-air dampers for proper position that simulates minimum outdoor-air conditions.
 - b. Where duct conditions allow, measure airflow by Pitot-tube traverse. If necessary, perform multiple Pitot-tube traverses to obtain total airflow.
 - c. Where duct conditions are not suitable for Pitot-tube traverse measurements, a coil traverse may be acceptable.
 - d. If a reliable Pitot-tube traverse or coil traverse is not possible, measure airflow at terminals and calculate the total airflow.
 - 2. Measure fan static pressures as follows:
 - a. Measure static pressure directly at the fan outlet or through the flexible connection.
 - b. Measure static pressure directly at the fan inlet or through the flexible connection.
 - c. Measure static pressure across each component that makes up the air-handling system.
 - d. Report artificial loading of filters at the time static pressures are measured.
 - 3. Obtain approval from Architect for adjustment of fan speed higher or lower than indicated speed. Comply with requirements in HVAC Sections for air-handling units for adjustment of fans, belts, and pulley sizes to achieve indicated air-handling-unit performance.
 - 4. Do not make fan-speed adjustments that result in motor overload. Consult equipment manufacturers about fan-speed safety factors. Modulate dampers and measure fan-motor amperage to ensure that no overload occurs. Measure amperage in full-cooling, full-heating, economizer, and any other operating mode to determine the maximum required brake horsepower.
- B. Adjust volume dampers for main duct, submain ducts, and major branch ducts to indicated airflows.
 - 1. Measure airflow of submain and branch ducts.
 - 2. Adjust submain and branch duct volume dampers for specified airflow.

3. Re-measure each submain and branch duct after all have been adjusted.
- C. Adjust air inlets and outlets for each space to indicated airflows.
1. Set airflow patterns of adjustable outlets for proper distribution without drafts.
 2. Measure inlets and outlets airflow.
 3. Adjust each inlet and outlet for specified airflow.
 4. Re-measure each inlet and outlet after they have been adjusted.
- D. Verify final system conditions.
1. Re-measure and confirm that minimum outdoor, return, and relief airflows are within design. Readjust to design if necessary.
 2. Re-measure and confirm that total airflow is within design.
 3. Re-measure all final fan operating data, rpms, volts, amps, and static profile.
 4. Mark all final settings.
 5. Test system in economizer mode. Verify proper operation and adjust if necessary.
 6. Measure and record all operating data.
 7. Record final fan-performance data.

3.6 PROCEDURES FOR DUAL-DUCT SYSTEMS

- A. Adjust the dual-duct systems as follows:
1. Verify that the system static pressure sensor is located two-thirds of the distance down the duct from the fan discharge. On systems with separate hot-deck and cold-deck fans, verify the location of the sensor on each deck.
 2. Verify that the system is under static pressure control.
 3. Select the terminal unit that is furthest from the supply-fan. Measure inlet static pressure, and adjust system static pressure control set point so the entering static pressure for the terminal unit is not less than the sum of the terminal-unit manufacturer's recommended minimum inlet static pressure plus the static pressure needed to overcome terminal-unit discharge system losses.
 4. Calibrate and balance each terminal unit's hot deck and cold deck for maximum and minimum design airflow as follows:
 - a. Adjust controls so that terminal is calling for full cooling. Some controllers require starting with minimum set point. Verify calibration procedure for specific project.
 - b. Measure airflow and adjust calibration factors as required for design cold-deck maximum airflow and hot-deck minimum airflow. Record calibration factors.
 - c. When maximum airflow is correct, balance the air outlets downstream from terminal units.
 - d. Adjust controls so that terminal is calling for full heating.
 - e. Measure airflow and adjust calibration factors as required for design cold-deck minimum airflow and hot-deck maximum airflow. Record calibration factors. If no minimum calibration is available, note any deviation from design airflow.

5. After terminals have been calibrated and balanced, test and adjust system for total airflow. Adjust fans to deliver total design airflows within the maximum allowable fan speed listed by fan manufacturer.
 - a. Set outside-air, return-air, and relief-air dampers for proper position that simulates minimum outdoor-air conditions.
 - b. Set terminals for maximum airflow. If system design includes diversity (cooling coil or fan), adjust terminals for maximum and minimum airflow so that connected total matches cooling coil or fan selection and simulates actual load in the building. In systems with separate hot-deck and cold-deck fans, diversity consideration applies to each individual fan.
 - c. Where duct conditions allow, measure airflow by Pitot-tube traverse. If necessary, perform multiple Pitot-tube traverses to obtain total airflow.
 - d. Where duct conditions are not suitable for Pitot-tube traverse measurements, a coil traverse may be acceptable.
 - e. If a reliable Pitot-tube traverse or coil traverse is not possible, measure airflow at terminals and calculate the total airflow.
6. Measure the fan(s) static pressures as follows:
 - a. Measure static pressure directly at the fan outlet or through the flexible connection.
 - b. Measure static pressure directly at the fan inlet or through the flexible connection.
 - c. Measure static pressure across each component that makes up the air-handling system.
 - d. Report any artificial loading of filters at the time static pressures are measured.
7. Set final return and outside airflow to the fan(s) while operating at maximum return airflow and minimum outdoor airflow.
 - a. Balance the return-air ducts and inlets the same as described for constant-volume air systems.
 - b. Verify that all terminal units are meeting design airflow under system maximum flow.
8. Re-measure the inlet static pressure at the most critical terminal unit and adjust the system static pressure set point to the most energy-efficient set point to maintain the optimum system static pressure. Record set point and give to controls contractor.
9. Verify final system conditions as follows:
 - a. Re-measure and confirm that minimum outdoor, return, and relief airflows are within design. Readjust to match design if necessary.
 - b. Re-measure and confirm that total airflow is within design.
 - c. Re-measure final fan operating data, rpms, volts, amps and static profile.
 - d. Mark final settings.
 - e. Test system in economizer mode. Verify proper operation and adjust if necessary. Measure and record all operating data.
 - f. Verify tracking between supply and return fans.
10. Record final fan-performance data.

3.7 PROCEDURES FOR VARIABLE-AIR-VOLUME SYSTEMS

- A. Adjust the variable-air-volume systems as follows:
1. Verify that the system static pressure sensor is located two-thirds of the distance down the duct from the fan discharge.
 2. Verify that the system is under static pressure control.
 3. Select the terminal unit that is most critical to the supply-fan airflow. Measure inlet static pressure, and adjust system static pressure control set point so the entering static pressure for the critical terminal unit is not less than the sum of the terminal-unit manufacturer's recommended minimum inlet static pressure plus the static pressure needed to overcome terminal-unit discharge system losses.
 4. Calibrate and balance each terminal unit for maximum and minimum design airflow as follows:
 - a. Adjust controls so that terminal is calling for maximum airflow. Some controllers require starting with minimum airflow. Verify calibration procedure for specific project.
 - b. Measure airflow and adjust calibration factor as required for design maximum airflow. Record calibration factor.
 - c. When maximum airflow is correct, balance the air outlets downstream from terminal units.
 - d. Adjust controls so that terminal is calling for minimum airflow.
 - e. Measure airflow and adjust calibration factor as required for design minimum airflow. Record calibration factor. If no minimum calibration is available, note any deviation from design airflow.
 - f. When in full cooling or full heating, ensure that there is no mixing of hot-deck and cold-deck airstreams unless so designed.
 - g. On constant volume terminals, where room pressure is to be maintained, verify that the airflow remains constant over the full range of full cooling to full heating. Note any deviation from design airflow or room pressure.
 5. After terminals have been calibrated and balanced, test and adjust system for total airflow. Adjust fans to deliver total design airflows within the maximum allowable fan speed listed by fan manufacturer.
 - a. Set outside-air, return-air, and relief-air dampers for proper position that simulates minimum outdoor-air conditions.
 - b. Set terminals for maximum airflow. If system design includes diversity, adjust terminals for maximum and minimum airflow so that connected total matches fan selection and simulates actual load in the building.
 - c. Where duct conditions allow, measure airflow by Pitot-tube traverse. If necessary, perform multiple Pitot-tube traverses to obtain total airflow.
 - d. Where duct conditions are not suitable for Pitot-tube traverse measurements, a coil traverse may be acceptable.
 - e. If a reliable Pitot-tube traverse or coil traverse is not possible, measure airflow at terminals and calculate the total airflow.
 6. Measure fan static pressures as follows:

- a. Measure static pressure directly at the fan outlet or through the flexible connection.
 - b. Measure static pressure directly at the fan inlet or through the flexible connection.
 - c. Measure static pressure across each component that makes up the air-handling system.
 - d. Report any artificial loading of filters at the time static pressures are measured.
7. Set final return and outside airflow to the fan while operating at maximum return airflow and minimum outdoor airflow.
- a. Balance the return-air ducts and inlets the same as described for constant-volume air systems.
 - b. Verify that terminal units are meeting design airflow under system maximum flow.
8. Re-measure the inlet static pressure at the most critical terminal unit and adjust the system static pressure set point to the most energy-efficient set point to maintain the optimum system static pressure. Record set point and give to controls contractor.
9. Verify final system conditions as follows:
- a. Re-measure and confirm that minimum outdoor, return, and relief airflows are within design. Readjust to match design if necessary.
 - b. Re-measure and confirm that total airflow is within design.
 - c. Re-measure final fan operating data, rpms, volts, amps, and static profile.
 - d. Mark final settings.
 - e. Test system in economizer mode. Verify proper operation and adjust if necessary. Measure and record all operating data.
 - f. Verify tracking between supply and return fans.

3.8 PROCEDURES FOR MOTORS

- A. Motors 1/2 HP and Larger: Test at final balanced conditions and record the following data:
1. Manufacturer's name, model number, and serial number.
 2. Motor horsepower rating.
 3. Motor rpm.
 4. Phase and hertz.
 5. Nameplate and measured voltage, each phase.
 6. Nameplate and measured amperage, each phase.
 7. Starter size and thermal-protection-element rating.
 8. Service factor and frame size.
- B. Motors Driven by Variable-Frequency Controllers: Test manual bypass of controller to prove proper operation.

3.9 CONTROLS VERIFICATION (FOR RELOCATED EQUIPMENT ONLY)

- A. In conjunction with system balancing, perform the following:

1. Verify temperature control system is operating within the design limitations.
2. Verify that controllers are calibrated and function as intended.
3. Verify that controller set points are as indicated.
4. Verify the operation of lockout or interlock systems.
5. Verify the operation of valve and damper actuators.
6. Verify that controlled devices are properly installed and connected to correct controller.
7. Verify that controlled devices travel freely and are in position indicated by controller: open, closed, or modulating.
8. Verify location and installation of sensors to ensure that they sense only intended temperature, humidity, or pressure.

- B. Reporting: Include a summary of verifications performed, remaining deficiencies, and variations from indicated conditions.

3.10 PROCEDURES FOR TESTING, ADJUSTING, AND BALANCING EXISTING SYSTEMS

- A. Perform a preconstruction inspection of existing equipment that is to remain and be reused.
1. Measure and record the operating speed, airflow, and static pressure of each fan.
 2. Measure motor voltage and amperage. Compare the values to motor nameplate information.
 3. Check the refrigerant charge.
 4. Check the condition of filters.
 5. Check the condition of coils.
 6. Check the operation of the drain pan and condensate-drain trap.
 7. Check bearings and other lubricated parts for proper lubrication.
 8. Report on the operating condition of the equipment and the results of the measurements taken. Report deficiencies.
- B. Before performing testing and balancing of existing systems, inspect existing equipment that is to remain and be reused to verify that existing equipment has been cleaned and refurbished. Verify the following:
1. New filters are installed.
 2. Coils are clean and fins combed.
 3. Drain pans are clean.
 4. Fans are clean.
 5. Bearings and other parts are properly lubricated.
 6. Deficiencies noted in the preconstruction report are corrected.
- C. Perform testing and balancing of existing systems to the extent that existing systems are affected by the renovation work.
1. Compare the indicated airflow of the renovated work to the measured fan airflows, and determine the new fan speed and the face velocity of filters and coils.

2. Verify that the indicated airflows of the renovated work result in filter and coil face velocities and fan speeds that are within the acceptable limits defined by equipment manufacturer.
3. If calculations increase or decrease the airflow rates and water flow rates by more than 5 percent, make equipment adjustments to achieve the calculated rates. If increase or decrease is 5 percent or less, equipment adjustments are not required.
4. Balance each air outlet.

3.11 TOLERANCES

- A. Set HVAC system's airflow rates 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.
- B. Maintaining pressure relationships as designed shall have priority over the tolerances specified above.

3.12 PROGRESS REPORTING

- A. Initial Construction-Phase Report: Based on examination of the Contract Documents as specified in "Examination" Article, prepare a report on the adequacy of design for systems balancing devices. Recommend changes and additions to systems balancing devices to facilitate proper performance measuring and balancing. Recommend changes and additions to HVAC systems and general construction to allow access for performance measuring and balancing devices.
- B. Status Reports: Prepare weekly progress reports to describe completed procedures, procedures in progress, and scheduled procedures. Include a list of deficiencies and problems found in systems being tested and balanced. Prepare a separate report for each system and each building floor for systems serving multiple floors.

3.13 FINAL REPORT

- A. General: Prepare a certified written report; tabulate and divide the report into separate sections for tested systems and balanced systems.
 1. Include a certification sheet at the front of the report's binder, signed and sealed by the certified testing and balancing engineer.
 2. Include a list of instruments used for procedures, along with proof of calibration.
 3. Certify validity and accuracy of field data.
- B. Final Report Contents: In addition to certified field-report data, include the following:
 1. Fan curves.
 2. Manufacturers' test data.
 3. Field test reports prepared by system and equipment installers.

4. Other information relative to equipment performance; do not include Shop Drawings and Product Data.

C. General Report Data: In addition to form titles and entries, include the following data:

1. Title page.
2. Name and address of the TAB specialist.
3. Project name.
4. Project location.
5. Architect's name and address.
6. Engineer's name and address.
7. Contractor's name and address.
8. Report date.
9. Signature of TAB supervisor who certifies the report.
10. Table of Contents with the total number of pages defined for each section of the report. Number each page in the report.
11. Summary of contents including the following:
 - a. Indicated versus final performance.
 - b. Notable characteristics of systems.
 - c. Description of system operation sequence if it varies from the Contract Documents.
12. Nomenclature sheets for each item of equipment.
13. Data for terminal units, including manufacturer's name, type, size, and fittings.
14. Notes to explain why certain final data in the body of reports vary from indicated values.
15. Test conditions for fans and pump performance forms including the following:
 - a. Settings for outdoor-, return-, and exhaust-air dampers.
 - b. Conditions of filters.
 - c. Cooling coil, wet- and dry-bulb conditions.
 - d. Face and bypass damper settings at coils.
 - e. Fan drive settings including settings and percentage of maximum pitch diameter.
 - f. Inlet vane settings for variable-air-volume systems.
 - g. Settings for supply-air, static-pressure controller.
 - h. Other system operating conditions that affect performance.

D. System Diagrams: Include schematic layouts of air and hydronic distribution systems. Present each system with single-line diagram and include the following:

1. Quantities of outdoor, supply, return, and exhaust airflows.
2. Duct, outlet, and inlet sizes.
3. Pipe and valve sizes and locations.
4. Terminal units.
5. Balancing stations.
6. Position of balancing devices.

E. Air-Handling-Unit Test Reports: For air-handling units with coils, include the following:

1. Unit Data:
 - a. Unit identification.
 - b. Location.
 - c. Make and type.
 - d. Model number and unit size.
 - e. Manufacturer's serial number.
 - f. Unit arrangement and class.
 - g. Discharge arrangement.
 - h. Sheave make, size in inches, and bore.
 - i. Center-to-center dimensions of sheave and amount of adjustments in inches.
 - j. Number, make, and size of belts.
 - k. Number, type, and size of filters.

2. Motor Data:
 - a. Motor make, and frame type and size.
 - b. Horsepower and rpm.
 - c. Volts, phase, and hertz.
 - d. Full-load amperage and service factor.
 - e. Sheave make, size in inches, and bore.
 - f. Center-to-center dimensions of sheave and amount of adjustments in inches.

3. Test Data (Indicated and Actual Values):
 - a. Total airflow rate in cfm.
 - b. Total system static pressure in inches wg.
 - c. Fan rpm.
 - d. Discharge static pressure in inches wg.
 - e. Filter static-pressure differential in inches wg.
 - f. Cooling-coil static-pressure differential in inches wg.
 - g. Heating-coil static-pressure differential in inches wg.
 - h. Outdoor airflow in cfm.
 - i. Return airflow in cfm.
 - j. Outdoor-air damper position.
 - k. Return-air damper position.

F. Apparatus-Coil Test Reports:

1. Coil Data:
 - a. System identification.
 - b. Location.
 - c. Coil type.
 - d. Number of rows.
 - e. Fin spacing in fins per inch o.c.
 - f. Make and model number.
 - g. Face area in sq. ft..
 - h. Tube size in NPS.

- i. Tube and fin materials.
 - j. Circuiting arrangement.
 - 2. Test Data (Indicated and Actual Values):
 - a. Airflow rate in cfm.
 - b. Average face velocity in fpm.
 - c. Air pressure drop in inches wg.
 - d. Outdoor-air, wet- and dry-bulb temperatures in deg F.
 - e. Return-air, wet- and dry-bulb temperatures in deg F.
 - f. Entering-air, wet- and dry-bulb temperatures in deg F.
 - g. Leaving-air, wet- and dry-bulb temperatures in deg F.
 - h. Water flow rate in gpm.
 - i. Water pressure differential in feet of head or psig.
 - j. Entering-water temperature in deg F.
 - k. Leaving-water temperature in deg F.
 - l. Refrigerant expansion valve and refrigerant types.
 - m. Refrigerant suction pressure in psig.
 - n. Refrigerant suction temperature in deg F.
 - o. Inlet steam pressure in psig.
- G. Electric-Coil Test Reports: For electric, duct and terminal unit coils, and electric coils installed in central-station air-handling units, include the following:
- 1. Unit Data:
 - a. System identification.
 - b. Location.
 - c. Coil identification.
 - d. Capacity in Btu/h.
 - e. Number of stages.
 - f. Connected volts, phase, and hertz.
 - g. Rated amperage.
 - h. Airflow rate in cfm.
 - i. Face area in sq. ft..
 - j. Minimum face velocity in fpm.
 - 2. Test Data (Indicated and Actual Values):
 - a. Heat output in Btu/h.
 - b. Airflow rate in cfm.
 - c. Air velocity in fpm.
 - d. Entering-air temperature in deg F.
 - e. Leaving-air temperature in deg F.
 - f. Voltage at each connection.
 - g. Amperage for each phase.
- H. Fan Test Reports: For supply, return, and exhaust fans, include the following:

1. Fan Data:
 - a. System identification.
 - b. Location.
 - c. Make and type.
 - d. Model number and size.
 - e. Manufacturer's serial number.
 - f. Arrangement and class.
 - g. Sheave make, size in inches, and bore.
 - h. Center-to-center dimensions of sheave and amount of adjustments in inches.

2. Motor Data:
 - a. Motor make, and frame type and size.
 - b. Horsepower and rpm.
 - c. Volts, phase, and hertz.
 - d. Full-load amperage and service factor.
 - e. Sheave make, size in inches, and bore.
 - f. Center-to-center dimensions of sheave, and amount of adjustments in inches.
 - g. Number, make, and size of belts.

3. Test Data (Indicated and Actual Values):
 - a. Total airflow rate in cfm.
 - b. Total system static pressure in inches wg.
 - c. Fan rpm.
 - d. Discharge static pressure in inches wg.
 - e. Suction static pressure in inches wg.

- I. Round, Flat-Oval, and Rectangular Duct Traverse Reports: Include a diagram with a grid representing the duct cross-section and record the following:
 1. Report Data:
 - a. System and air-handling-unit number.
 - b. Location and zone.
 - c. Traverse air temperature in deg F.
 - d. Duct static pressure in inches wg.
 - e. Duct size in inches.
 - f. Duct area in sq. ft..
 - g. Indicated airflow rate in cfm.
 - h. Indicated velocity in fpm.
 - i. Actual airflow rate in cfm.
 - j. Actual average velocity in fpm.
 - k. Barometric pressure in psig.

- J. Air-Terminal-Device Reports:
 1. Unit Data:

- a. System and air-handling unit identification.
 - b. Location and zone.
 - c. Apparatus used for test.
 - d. Area served.
 - e. Make.
 - f. Number from system diagram.
 - g. Type and model number.
 - h. Size.
 - i. Effective area in sq. ft..
2. Test Data (Indicated and Actual Values):
- a. Airflow rate in cfm.
 - b. Air velocity in fpm.
 - c. Preliminary airflow rate as needed in cfm.
 - d. Preliminary velocity as needed in fpm.
 - e. Final airflow rate in cfm.
 - f. Final velocity in fpm.
 - g. Space temperature in deg F.

K. Instrument Calibration Reports:

- 1. Report Data:
 - a. Instrument type and make.
 - b. Serial number.
 - c. Application.
 - d. Dates of use.
 - e. Dates of calibration.

3.14 VERIFICATION OF TAB REPORT

- A. The TAB specialist's test and balance engineer shall conduct the inspection in the presence of Construction Manager.
- B. Architect or Owner or Construction Manager shall randomly select measurements, documented in the final report, to be rechecked. Rechecking shall be limited to either 10 percent of the total measurements recorded or the extent of measurements that can be accomplished in a normal 8-hour business day.
- C. If rechecks yield measurements that differ from the measurements documented in the final report by more than the tolerances allowed, the measurements shall be noted as "FAILED."
- D. If the number of "FAILED" measurements is greater than 10 percent of the total measurements checked during the final inspection, the testing and balancing shall be considered incomplete and shall be rejected.
- E. If TAB work fails, proceed as follows:

1. TAB specialists shall recheck all measurements and make adjustments. Revise the final report and balancing device settings to include all changes; resubmit the final report and request a second final inspection.
 2. If the second final inspection also fails, Owner may contract the services of another TAB specialist to complete TAB work according to the Contract Documents and deduct the cost of the services from the original TAB specialist's final payment.
 3. If the second verification also fails, the Architect may contact AABC Headquarters regarding the AABC National Performance Guaranty.
- F. Prepare test and inspection reports.

3.15 ADDITIONAL TESTS

- A. Within 90 days of completing TAB, perform additional TAB to verify that balanced conditions are being maintained throughout and to correct unusual conditions.
- B. Seasonal Periods: If initial TAB procedures were not performed during near-peak summer and winter conditions, perform additional TAB during near-peak summer and winter conditions.

END OF SECTION 23 05 93

SECTION 23 07 13 - DUCT 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 insulating the following duct services:
 - 1. Indoor, concealed supply return, and outdoor air ducts and plenums.
- B. Related Sections:
 - 1. Section 23 31 13 "Metal Ducts" for duct liners.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include thermal conductivity, water-vapor permeance thickness, and jackets (both factory- and field-applied if any).
- B. Sustainable Design Submittals:
 - 1. Product Data: For adhesives, indicating VOC content.
 - 2. Laboratory Test Reports: For adhesives, indicating compliance with requirements for low-emitting materials.
 - 3. Product Data: For coatings, indicating VOC content.
 - 4. Laboratory Test Reports: For coatings, indicating compliance with requirements for low-emitting materials.
 - 5. Product Data: For sealants, indicating VOC content.
 - 6. Laboratory Test Reports: For sealants, indicating compliance with requirements for low-emitting materials.
- C. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
 - 1. Detail application of protective shields, saddles, and inserts at hangers for each type of insulation and hanger.
 - 2. Detail insulation application at elbows, fittings, dampers, specialties and flanges for each type of insulation.
 - 3. Detail application of field-applied jackets.
 - 4. Detail application at linkages of control devices.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified Installer.
- B. Material Test Reports: From a qualified testing agency acceptable to authorities having jurisdiction indicating, interpreting, and certifying test results for compliance of insulation materials, sealers, attachments, cements, and jackets, with requirements indicated. Include dates of tests and test methods employed.
- C. Field quality-control reports.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Skilled mechanics who have successfully completed an apprenticeship program or another craft training program certified by the Department of Labor, Bureau of Apprenticeship and Training.
- B. Surface-Burning Characteristics: For insulation and related materials, as determined by testing identical products according to ASTM E 84, by a testing agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing agency.
 - 1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Packaging: Insulation material containers shall be marked by manufacturer with appropriate ASTM standard designation, type and grade, and maximum use temperature.

1.7 COORDINATION

- A. Coordinate sizes and locations of supports, hangers, and insulation shields specified in Section 23 05 29 "Hangers and Supports for HVAC Piping and Equipment."
- B. Coordinate clearance requirements with duct Installer for duct insulation application. Before preparing ductwork Shop Drawings, establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.
- C. Coordinate installation and testing of heat tracing.

1.8 SCHEDULING

- A. Schedule insulation application after pressure testing systems and, where required, after installing and testing heat tracing. Insulation application may begin on segments that have satisfactory test results.
- B. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

PART 2 - PRODUCTS

2.1 INSULATION MATERIALS

- A. Comply with requirements in "Duct Insulation Schedule, General" (Section 23 07 13, 3.9), "Indoor Duct and Plenum Insulation Schedule" (Section 23 07 13, 3.10), and "Aboveground, Outdoor Duct and Plenum Insulation Schedule" articles for where insulating materials shall be applied.
- B. Products shall not contain asbestos, lead, mercury, or mercury compounds.
- C. Products that come in contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C 871.
- D. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable according to ASTM C 795.
- E. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.
- F. Mineral-Fiber Blanket Insulation: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 553, Type II and ASTM C 1290, Type III with factory-applied FSK jacket. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. CertainTeed Corporation.
 - b. Johns Manville; a Berkshire Hathaway company.
 - c. Knauf Insulation.
 - d. Manson Insulation Inc.
 - e. Owens Corning.
 - f. or approved equal.

2.2 ADHESIVES

- A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated unless otherwise indicated.
- B. Mineral-Fiber Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Childers Brand; H. B. Fuller Construction Products.
 - b. Eagle Bridges - Marathon Industries.
 - c. Foster Brand; H. B. Fuller Construction Products.
 - d. Mon-Eco Industries, Inc.
 - e. or approved equal.
 - 2. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- C. ASJ Adhesive, and FSK Jacket Adhesive: Comply with MIL-A-3316C, Class 2, Grade A for bonding insulation jacket lap seams and joints.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Childers Brand; H. B. Fuller Construction Products.
 - b. Eagle Bridges - Marathon Industries.
 - c. Foster Brand; H. B. Fuller Construction Products.
 - d. Mon-Eco Industries, Inc.
 - e. or approved equal.
 - 2. Adhesive shall have a VOC content of 80 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 - 3. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

2.3 MASTICS

- A. Materials shall be compatible with insulation materials, jackets, and substrates; comply with MIL-PRF-19565C, Type II.
 - 1. VOC Content: 300 g/L or less.
 - 2. Low-Emitting Materials: Mastic coatings shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the

Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

- B. Vapor-Barrier Mastic: Water based; suitable for indoor use on below ambient services.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Childers Brand; H. B. Fuller Construction Products.
 - b. Foster Brand; H. B. Fuller Construction Products.
 - c. Knauf Insulation.
 - d. Vimasco Corporation.
 - e. or approved equal.
 2. Water-Vapor Permeance: ASTM E 96/E 96M, Procedure B, 0.013 perm at 43-mil dry film thickness.
 3. Service Temperature Range: Minus 20 to plus 180 deg F.
 4. Solids Content: ASTM D 1644, 58 percent by volume and 70 percent by weight.
 5. Color: White.
- C. Breather Mastic: Water based; suitable for indoor and outdoor use on above ambient services.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Childers Brand; H. B. Fuller Construction Products.
 - b. Eagle Bridges - Marathon Industries.
 - c. Foster Brand; H. B. Fuller Construction Products.
 - d. Knauf Insulation.
 - e. Mon-Eco Industries, Inc.
 - f. Vimasco Corporation.
 - g. or approved equal.
 2. Water-Vapor Permeance: ASTM F 1249, 1.8 perms at 0.0625-inch dry film thickness.
 3. Service Temperature Range: Minus 20 to plus 180 deg F.
 4. Solids Content: 60 percent by volume and 66 percent by weight.
 5. Color: White.

2.4 LAGGING ADHESIVES

- A. Description: Comply with MIL-A-3316C, Class I, Grade A and shall be compatible with insulation materials, jackets, and substrates.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- a. Childers Brand; H. B. Fuller Construction Products.
 - b. Foster Brand; H. B. Fuller Construction Products.
 - c. Vimasco Corporation.
 - d. or approved equal.
2. Adhesives shall have a VOC content of 50 g/L or less.
 3. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
 4. Fire-resistant, water-based lagging adhesive and coating for use indoors to adhere fire-resistant lagging cloths over duct insulation.
 5. Service Temperature Range: 0 to plus 180 deg F.
 6. Color: White.

2.5 SEALANTS

A. FSK Sealants:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Childers Brand; H. B. Fuller Construction Products.
 - b. Eagle Bridges - Marathon Industries.
 - c. Foster Brand; H. B. Fuller Construction Products.
 - d. Mon-Eco Industries, Inc.
 - e. or approved equal.
2. Materials shall be compatible with insulation materials, jackets, and substrates.
3. Fire- and water-resistant, flexible, elastomeric sealant.
4. Service Temperature Range: Minus 40 to plus 250 deg F.
5. Color: Aluminum.
6. Sealant shall have a VOC content of 420 g/L or less.
7. Sealant shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

B. ASJ Flashing Sealants:

1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. Childers Brand; H. B. Fuller Construction Products.
 - b. or approved equal.
2. Materials shall be compatible with insulation materials, jackets, and substrates.

3. Fire- and water-resistant, flexible, elastomeric sealant.
4. Service Temperature Range: Minus 40 to plus 250 deg F.
5. Color: White.
6. Sealant shall have a VOC content of 420 g/L or less.
7. Sealant shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

2.6 FACTORY-APPLIED JACKETS

- A. Insulation system schedules indicate factory-applied jackets on various applications. 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.
 2. ASJ-SSL: ASJ with self-sealing, pressure-sensitive, acrylic-based adhesive covered by a removable protective strip; complying with ASTM C 1136, Type I.
 3. FSK Jacket: Aluminum-foil, fiberglass-reinforced scrim with kraft-paper backing; complying with ASTM C 1136, Type II.
 4. FSP Jacket: Aluminum-foil, fiberglass-reinforced scrim with polyethylene backing; complying with ASTM C 1136, Type II.

2.7 FIELD-APPLIED FABRIC-REINFORCING MESH

- A. Woven Glass-Fiber Fabric: Approximately 6 oz./sq. yd. with a thread count of 5 strands by 5 strands/sq. in. for covering ducts.
 1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. Childers Brand; H. B. Fuller Construction Products.
 - b. or approved equal.
- B. Woven Polyester Fabric: Approximately 1 oz./sq. yd. with a thread count of 10 strands by 10 strands/sq. in., in a Leno weave, for ducts.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Foster Brand; H. B. Fuller Construction Products.
 - b. Vimasco Corporation.
 - c. or approved equal.

2.8 FIELD-APPLIED CLOTHS

- A. Woven Glass-Fiber Fabric: Comply with MIL-C-20079H, Type I, plain weave, and presized a minimum of 8 oz./sq. yd..
1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. Alpha Associates, Inc.
 - b. or approved equal.

2.9 TAPES

- A. ASJ Tape: White vapor-retarder tape matching factory-applied jacket with acrylic adhesive, complying with ASTM C 1136.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Avery Dennison Corporation, Specialty Tapes Division.
 - b. Compac Corporation.
 - c. Ideal Tape Co., Inc., an American Biltrite Company.
 - d. Knauf Insulation.
 - e. Venture Tape.
 - f. or approved equal.
 2. Width: 3 inches.
 3. Thickness: 11.5 mils.
 4. Adhesion: 90 ounces force/inch in width.
 5. Elongation: 2 percent.
 6. Tensile Strength: 40 lbf/inch in width.
 7. ASJ Tape Disks and Squares: Precut disks or squares of ASJ tape.
- B. FSK Tape: Foil-face, vapor-retarder tape matching factory-applied jacket with acrylic adhesive; complying with ASTM C 1136.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Avery Dennison Corporation, Specialty Tapes Division.
 - b. Compac Corporation.
 - c. Ideal Tape Co., Inc., an American Biltrite Company.
 - d. Knauf Insulation.
 - e. Venture Tape.
 - f. or approved equal.
 2. Width: 3 inches.

3. Thickness: 6.5 mils.
4. Adhesion: 90 ounces force/inch in width.
5. Elongation: 2 percent.
6. Tensile Strength: 40 lbf/inch in width.
7. FSK Tape Disks and Squares: Precut disks or squares of FSK tape.

C. Aluminum-Foil Tape: Vapor-retarder tape with acrylic adhesive.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Avery Dennison Corporation, Specialty Tapes Division.
 - b. Compac Corporation.
 - c. Ideal Tape Co., Inc., an American Biltrite Company.
 - d. Knauf Insulation.
 - e. Venture Tape.
 - f. or approved equal.
2. Width: 2 inches.
3. Thickness: 3.7 mils.
4. Adhesion: 100 ounces force/inch in width.
5. Elongation: 5 percent.
6. Tensile Strength: 34 lbf/inch in width.

2.10 SECUREMENTS

A. Bands:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. ITW Insulation Systems; Illinois Tool Works, Inc.
 - b. RPR Products, Inc.
 - c. or approved equal.
2. Stainless Steel: ASTM A 167 or ASTM A 240/A 240M, Type 316; 0.015 inch thick, 3/4 inch wide with wing seal.
3. Springs: Twin spring set constructed of stainless steel with ends flat and slotted to accept metal bands. Spring size determined by manufacturer for application.

B. Insulation Pins and Hangers:

1. Capacitor-Discharge-Weld Pins: Copper- or zinc-coated steel pin, fully annealed for capacitor-discharge welding, 0.135-inch- diameter shank, length to suit depth of insulation indicated.

- a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) AGM Industries, Inc.
 - 2) Gemco.
 - 3) Hardcast, Inc.
 - 4) Midwest Fasteners, Inc.
 - 5) Nelson Stud Welding.
 - 6) or approved equal.

2. Metal, Adhesively Attached, Perforated-Base Insulation Hangers: Baseplate welded to projecting spindle that is capable of holding insulation, of thickness indicated, securely in position indicated when self-locking washer is in place. Comply with the following requirements:
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) AGM Industries, Inc.
 - 2) Gemco.
 - 3) Midwest Fasteners, Inc.
 - 4) or approved equal.

 - b. Baseplate: Perforated, galvanized carbon-steel sheet, 0.030 inch thick by 2 inches square.

 - c. Spindle: Stainless steel, fully annealed, 0.106-inch-diameter shank, length to suit depth of insulation indicated.

 - d. Adhesive: Recommended by hanger manufacturer. Product with demonstrated capability to bond insulation hanger securely to substrates indicated without damaging insulation, hangers, and substrates.

3. Nonmetal, Adhesively Attached, Perforated-Base Insulation Hangers: Baseplate fastened to projecting spindle that is capable of holding insulation, of thickness indicated, securely in position indicated when self-locking washer is in place. Comply with the following requirements:
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) Gemco.
 - 2) Midwest Fasteners, Inc.
 - 3) or approved equal.

 - b. Baseplate: Perforated, nylon sheet, 0.030 inch thick by 1-1/2 inches in diameter.

 - c. Spindle: Nylon, 0.106-inch-diameter shank, length to suit depth of insulation indicated, up to 2-1/2 inches.

- d. Adhesive: Recommended by hanger manufacturer. Product with demonstrated capability to bond insulation hanger securely to substrates indicated without damaging insulation, hangers, and substrates.
4. Self-Sticking-Base Insulation Hangers: Baseplate welded to projecting spindle that is capable of holding insulation, of thickness indicated, securely in position indicated when self-locking washer is in place. Comply with the following requirements:
- a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) AGM Industries, Inc.
 - 2) Gemco.
 - 3) Hardcast, Inc.
 - 4) Midwest Fasteners, Inc.
 - 5) or approved equal.
 - b. Baseplate: Galvanized carbon-steel sheet, 0.030 inch thick by 2 inches square.
 - c. Spindle: Stainless steel, fully annealed, 0.106-inch-diameter shank, length to suit depth of insulation indicated.
 - d. Adhesive-backed base with a peel-off protective cover.
5. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch-thick, stainless-steel sheet, with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches in diameter.
- a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) AGM Industries, Inc.
 - 2) Gemco.
 - 3) Hardcast, Inc.
 - 4) Midwest Fasteners, Inc.
 - 5) Nelson Stud Welding.
 - 6) or approved equal.
 - b. Protect ends with capped self-locking washers incorporating a spring steel insert to ensure permanent retention of cap in exposed locations.
6. Nonmetal Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch-thick nylon sheet, with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches in diameter.
- a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) Gemco.
 - 2) Midwest Fasteners, Inc.

- 3) or approved equal.
- C. Staples: Outward-clinching insulation staples, nominal 3/4-inch-wide, stainless steel or Monel.
- D. Wire: 0.062-inch soft-annealed, stainless steel.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. C & F Wire.
 - b. or approved equal.

2.11 CORNER ANGLES

- A. Aluminum Corner Angles: 0.040 inch thick, minimum 1 by 1 inch, aluminum according to ASTM B 209, Alloy 3003, 3005, 3105, or 5005; Temper H-14.
- B. Stainless-Steel Corner Angles: 0.024 inch thick, minimum 1 by 1 inch, stainless steel according to ASTM A 167 or ASTM A 240/A 240M, Type 316.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of insulation application.
 - 1. Verify that systems to be insulated have been tested and are free of defects.
 - 2. Verify that surfaces to be insulated are clean and dry.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.

3.3 GENERAL INSTALLATION REQUIREMENTS

- A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of ducts and fittings.
- B. Install insulation materials, vapor barriers or retarders, jackets, and thicknesses required for each item of duct system as specified in insulation system schedules.

- C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.
- D. Install insulation with longitudinal seams at top and bottom of horizontal runs.
- E. Install multiple layers of insulation with longitudinal and end seams staggered.
- F. Keep insulation materials dry during application and finishing.
- G. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.
- H. Install insulation with least number of joints practical.
- I. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.
 - 1. Install insulation continuously through hangers and around anchor attachments.
 - 2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.
 - 3. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.
- J. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.
- K. Install insulation with factory-applied jackets as follows:
 - 1. Draw jacket tight and smooth.
 - 2. Cover circumferential joints with 3-inch-wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip, spaced 4 inches o.c.
 - 3. Overlap jacket longitudinal seams at least 1-1/2 inches. Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at 4 inches o.c.
 - a. For below ambient services, apply vapor-barrier mastic over staples.
 - 4. Cover joints and seams with tape, according to insulation material manufacturer's written instructions, to maintain vapor seal.
 - 5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to duct flanges and fittings.
- L. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.

- M. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.
- N. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.

3.4 PENETRATIONS

- A. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.
- B. Insulation Installation at Fire-Rated Wall and Partition Penetrations: Terminate insulation at fire damper sleeves for fire-rated wall and partition penetrations. Externally insulate damper sleeves to match adjacent insulation and overlap duct insulation at least 2 inches.
 - 1. Comply with requirements in Section 07 84 13 "Penetration Firestopping."
- C. Insulation Installation at Floor Penetrations:
 - 1. Duct: For penetrations through fire-rated assemblies, terminate insulation at fire damper sleeves and externally insulate damper sleeve beyond floor to match adjacent duct insulation. Overlap damper sleeve and duct insulation at least 2 inches.
 - 2. Seal penetrations through fire-rated assemblies. Comply with requirements in Section 07 84 13 "Penetration Firestopping."

3.5 INSTALLATION OF MINERAL-FIBER INSULATION

- A. Blanket Insulation Installation on Ducts and Plenums: Secure with adhesive and insulation pins.
 - 1. Apply adhesives according to manufacturer's recommended coverage rates per unit area, for 50 percent coverage of duct and plenum surfaces.
 - 2. Apply adhesive to entire circumference of ducts and to all surfaces of fittings and transitions.
 - 3. Install either capacitor-discharge-weld pins and speed washers or cupped-head, capacitor-discharge-weld pins on sides and bottom of horizontal ducts and sides of vertical ducts as follows:
 - a. On duct sides with dimensions 18 inches and smaller, place pins along longitudinal centerline of duct. Space 3 inches maximum from insulation end joints, and 16 inches o.c.
 - b. On duct sides with dimensions larger than 18 inches, place pins 16 inches o.c. each way, and 3 inches maximum from insulation joints. Install additional pins to hold insulation tightly against surface at cross bracing.
 - c. Pins may be omitted from top surface of horizontal, rectangular ducts and plenums.
 - d. Do not overcompress insulation during installation.
 - e. Impale insulation over pins and attach speed washers.

- f. Cut excess portion of pins extending beyond speed washers or bend parallel with insulation surface. Cover exposed pins and washers with tape matching insulation facing.
 - 4. For ducts and plenums with surface temperatures below ambient, install a continuous unbroken vapor barrier. Create a facing lap for longitudinal seams and end joints with insulation by removing 2 inches from one edge and one end of insulation segment. Secure laps to adjacent insulation section with 1/2-inch outward-clinching staples, 1 inch o.c. Install vapor barrier consisting of factory- or field-applied jacket, adhesive, vapor-barrier mastic, and sealant at joints, seams, and protrusions.
 - a. Repair punctures, tears, and penetrations with tape or mastic to maintain vapor-barrier seal.
 - b. Install vapor stops for ductwork and plenums operating below 50 deg F at 18-foot intervals. Vapor stops shall consist of vapor-barrier mastic applied in a Z-shaped pattern over insulation face, along butt end of insulation, and over the surface. Cover insulation face and surface to be insulated a width equal to two times the insulation thickness, but not less than 3 inches.
 - 5. Overlap unfaced blankets a minimum of 2 inches on longitudinal seams and end joints. At end joints, secure with steel bands spaced a maximum of 18 inches o.c.
 - 6. Install insulation on rectangular duct elbows and transitions with a full insulation section for each surface. Install insulation on round and flat-oval duct elbows with individually mitered gores cut to fit the elbow.
 - 7. Insulate duct stiffeners, hangers, and flanges that protrude beyond insulation surface with 6-inch-wide strips of same material used to insulate duct. Secure on alternating sides of stiffener, hanger, and flange with pins spaced 6 inches o.c.
- B. Board Insulation Installation on Ducts and Plenums: Secure with adhesive and insulation pins.
- 1. Apply adhesives according to manufacturer's recommended coverage rates per unit area, for 50 percent coverage of duct and plenum surfaces.
 - 2. Apply adhesive to entire circumference of ducts and to all surfaces of fittings and transitions.
 - 3. Install either capacitor-discharge-weld pins and speed washers or cupped-head, capacitor-discharge-weld pins on sides and bottom of horizontal ducts and sides of vertical ducts as follows:
 - a. On duct sides with dimensions 18 inches and smaller, place pins along longitudinal centerline of duct. Space 3 inches maximum from insulation end joints, and 16 inches o.c.
 - b. On duct sides with dimensions larger than 18 inches, space pins 16 inches o.c. each way, and 3 inches maximum from insulation joints. Install additional pins to hold insulation tightly against surface at cross bracing.
 - c. Pins may be omitted from top surface of horizontal, rectangular ducts and plenums.
 - d. Do not overcompress insulation during installation.
 - e. Cut excess portion of pins extending beyond speed washers or bend parallel with insulation surface. Cover exposed pins and washers with tape matching insulation facing.

4. For ducts and plenums with surface temperatures below ambient, install a continuous unbroken vapor barrier. Create a facing lap for longitudinal seams and end joints with insulation by removing 2 inches from one edge and one end of insulation segment. Secure laps to adjacent insulation section with 1/2-inch outward-clinching staples, 1 inch o.c. Install vapor barrier consisting of factory- or field-applied jacket, adhesive, vapor-barrier mastic, and sealant at joints, seams, and protrusions.
 - a. Repair punctures, tears, and penetrations with tape or mastic to maintain vapor-barrier seal.
 - b. Install vapor stops for ductwork and plenums operating below 50 deg F at 18-foot intervals. Vapor stops shall consist of vapor-barrier mastic applied in a Z-shaped pattern over insulation face, along butt end of insulation, and over the surface. Cover insulation face and surface to be insulated a width equal to two times the insulation thickness, but not less than 3 inches.
5. Install insulation on rectangular duct elbows and transitions with a full insulation section for each surface. Groove and score insulation to fit as closely as possible to outside and inside radius of elbows. Install insulation on round and flat-oval duct elbows with individually mitered gores cut to fit the elbow.
6. Insulate duct stiffeners, hangers, and flanges that protrude beyond insulation surface with 6-inch-wide strips of same material used to insulate duct. Secure on alternating sides of stiffener, hanger, and flange with pins spaced 6 inches o.c.

3.6 FIELD-APPLIED JACKET INSTALLATION

- A. Where glass-cloth jackets are indicated, install directly over bare insulation or insulation with factory-applied jackets.
 1. Draw jacket smooth and tight to surface with 2-inch overlap at seams and joints.
 2. Embed glass cloth between two 0.062-inch-thick coats of lagging adhesive.
 3. Completely encapsulate insulation with coating, leaving no exposed insulation.
- B. Where FSK jackets are indicated, install as follows:
 1. Draw jacket material smooth and tight.
 2. Install lap or joint strips with same material as jacket.
 3. Secure jacket to insulation with manufacturer's recommended adhesive.
 4. Install jacket with 1-1/2-inch laps at longitudinal seams and 3-inch-wide joint strips at end joints.
 5. Seal openings, punctures, and breaks in vapor-retarder jackets and exposed insulation with vapor-barrier mastic.

3.7 FIRE-RATED INSULATION SYSTEM INSTALLATION

- A. Where fire-rated insulation system is indicated, secure system to ducts and duct hangers and supports to maintain a continuous fire rating.

- B. Insulate duct access panels and doors to achieve same fire rating as duct.
- C. Install firestopping at penetrations through fire-rated assemblies.

3.8 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- B. Perform tests and inspections.
- C. Tests and Inspections:
 - 1. Inspect ductwork, randomly selected by Architect, by removing field-applied jacket and insulation in layers in reverse order of their installation. Extent of inspection shall be limited to two location(s) for each duct system defined in the "Duct Insulation Schedule, General" Article.
- D. All insulation applications will be considered defective Work if sample inspection reveals noncompliance with requirements.

3.9 DUCT INSULATION SCHEDULE, GENERAL

- A. Plenums and Ducts Requiring Insulation:
 - 1. Indoor, concealed supply return, and outdoor air ducts and plenums.
 - 2. Indoor, exposed supply and outdoor air (Section 23 31 13 – metal ducts).
- B. Items Not Insulated:
 - 1. Fibrous-glass ducts.
 - 2. Metal ducts with duct liner of sufficient thickness to comply with energy code and ASHRAE/IESNA 90.1.
 - 3. Factory-insulated flexible ducts.
 - 4. Factory-insulated plenums and casings.
 - 5. Flexible connectors.
 - 6. Vibration-control devices.
 - 7. Factory-insulated access panels and doors.

3.10 INDOOR DUCT AND PLENUM INSULATION SCHEDULE

- A. Concealed, rectangular, round or flat-oval, supply-air duct return and plenum insulation shall be:
 - 1. Mineral-Fiber Blanket: 1-1/2 inches thick and 0.75-lb/cu. ft. nominal density.
- B. All exposed ductwork (not including mechanical equipment spaces) shall use internal lining. See Section 23 31 13 – Metal Ducts.

END OF SECTION 23 07 13

SECTION 23 31 13 - METAL DUCTS

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. Single-wall rectangular ducts and fittings.
2. Single-wall round ducts and fittings.
3. Sheet metal materials.
4. Duct liner.
5. Sealants and gaskets.
6. Hangers and supports.

- B. Related Sections:

1. Section 23 05 93 "Testing, Adjusting, and Balancing for HVAC" for testing, adjusting, and balancing requirements for metal ducts.
2. Section 23 33 00 "Air Duct Accessories" for dampers, duct-mounting access doors and panels, turning vanes, and flexible ducts.

1.3 PERFORMANCE REQUIREMENTS

- A. Delegated Duct Design: Duct construction, including sheet metal thicknesses, seam and joint construction, reinforcements, and hangers and supports, shall comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" and performance requirements and design criteria indicated in "Duct Schedule" Article.
- B. Structural Performance: Duct hangers and supports shall withstand the effects of gravity loads and stresses within limits and under conditions described in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible"
- C. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of the following products:

1. Liners and adhesives.
 2. Sealants and gaskets.
- B. Sustainable Design Submittals:
1. Product Data: For adhesives, indicating VOC content.
 2. Laboratory Test Reports: For adhesives, indicating compliance with requirements for low-emitting materials.
 3. Product Data: For sealants, indicating VOC content.
 4. Laboratory Test Reports: For sealants, indicating compliance with requirements for low-emitting materials.
- C. Shop Drawings:
1. Fabrication, assembly, and installation, including plans, elevations, sections, components, and attachments to other work.
 2. Factory- and shop-fabricated ducts and fittings.
 3. Duct layout indicating sizes, configuration, liner material, and static-pressure classes.
 4. Elevation of top of ducts.
 5. Dimensions of main duct runs from building grid lines.
 6. Fittings.
 7. Reinforcement and spacing.
 8. Seam and joint construction.
 9. Penetrations through fire-rated and other partitions.
 10. Equipment installation based on equipment being used on Project.
 11. Locations for duct accessories, including dampers, turning vanes, and access doors and panels.
 12. Hangers and supports, including methods for duct and building attachment, seismic restraints, and vibration isolation.
- D. Delegated-Design Submittal:
1. Sheet metal thicknesses.
 2. Joint and seam construction and sealing.
 3. Reinforcement details and spacing.
 4. Materials, fabrication, assembly, and spacing of hangers and supports.

1.5 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
1. Duct installation in congested spaces, indicating coordination with general construction, building components, and other building services. Indicate proposed changes to duct layout.
 2. Suspended ceiling components.
 3. Structural members to which duct will be attached.
 4. Size and location of initial access modules for acoustical tile.
 5. Penetrations of smoke barriers and fire-rated construction.

6. Items penetrating finished ceiling including, but not limited to, the following:

- a. Luminaires.
- b. Air outlets and inlets.
- c. Speakers.
- d. Sprinklers.
- e. Access panels.
- f. Perimeter moldings.
- g. Some and securing detection devices.

B. Welding certificates.

C. Field quality-control reports.

1.6 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel," for hangers and supports. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum," for aluminum supports. AWS D9.1M/D9.1, "Sheet Metal Welding Code," for duct joint and seam welding.

B. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel," for hangers and supports.
2. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum," for aluminum supports.
3. AWS D9.1M/D9.1, "Sheet Metal Welding Code," for duct joint and seam welding.

C. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1, Section 5 - "Systems and Equipment" and Section 7 - "Construction and System Start-up."

D. ASHRAE/IES Compliance: Applicable requirements in ASHRAE/IES 90.1, Section 6.4.4 - "HVAC System Construction and Insulation."

PART 2 - PRODUCTS

2.1 SINGLE-WALL RECTANGULAR DUCTS AND FITTINGS

A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" based on indicated static-pressure class unless otherwise indicated.

B. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-1, "Rectangular Duct/Transverse Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

- C. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-2, "Rectangular Duct/Longitudinal Seams," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
- D. Elbows, Transitions, Offsets, Branch Connections, and Other Duct Construction: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 4, "Fittings and Other Construction," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

2.2 SINGLE-WALL ROUND DUCTS AND FITTINGS

- A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 3, "Round, Oval, and Flexible Duct," based on indicated static-pressure class unless otherwise indicated.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Ductmate Industries, Inc.
 - b. Elgen Manufacturing.
 - c. Linx Industries (formerly Lindab).
 - d. McGill AirFlow LLC.
 - e. MKT Metal Manufacturing.
 - f. SEMCO LLC.
 - g. Set Duct Manufacturing.
 - h. Sheet Metal Connectors, Inc.
 - i. Spiral Manufacturing Co., Inc.
 - j. Stamped Fittings Inc.
 - k. or approved equal.
- B. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-1, "Round Duct Transverse Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
 - 1. Transverse Joints in Ducts Larger Than 60 Inches in Diameter: Flanged.
- C. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-2, "Round Duct Longitudinal Seams," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

1. Fabricate round ducts larger than 90 inches in diameter with butt-welded longitudinal seams.
 2. Fabricate flat-oval ducts larger than 72 inches in width (major dimension) with butt-welded longitudinal seams.
- D. Tees and Laterals: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-5, "90 Degree Tees and Laterals," and Figure 3-6, "Conical Tees," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

2.3 SHEET METAL MATERIALS

- A. General Material Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.
- B. Galvanized Sheet Steel: Comply with ASTM A 653/A 653M.
1. Galvanized Coating Designation: G90.
 2. Finishes for Surfaces Exposed to View: Mill phosphatized.
- C. Reinforcement Shapes and Plates: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.
- D. Tie Rods: Galvanized steel, 1/4-inch minimum diameter for lengths 36 inches or less; 3/8-inch minimum diameter for lengths longer than 36 inches.

2.4 DUCT LINER

- A. Flexible Elastomeric Duct Liner: Preformed, cellular, closed-cell, sheet materials complying with ASTM C 534, Type II, Grade 1; and with NFPA 90A or NFPA 90B.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Aeroflex USA, Inc.
 - b. Armacell LLC.
 - c. Ductmate Industries, Inc.
 - d. K-Flex USA.
 - e. or approved equal.
 2. Surface-Burning Characteristics: Maximum flame-spread index of 25 and maximum smoke-developed index of 50 when tested according to UL 723; certified by an NRTL.
 3. Liner Adhesive: As recommended by insulation manufacturer and complying with NFPA 90A or NFPA 90B.

- a. Adhesive shall have a VOC content of 80 g/L or less.
 - b. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- B. Insulation Pins and Washers:
1. Cupped-Head, Capacitor-Discharge-Weld Pins: Copper- or zinc-coated steel pin, fully annealed for capacitor-discharge welding, 0.135-inch- diameter shank, length to suit depth of insulation indicated with integral 1-1/2-inch galvanized carbon-steel washer.
 2. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch-thick stainless steel; with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches in diameter.
- C. Shop Application of Duct Liner: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 7-11, "Flexible Duct Liner Installation."
1. Adhere a single layer of indicated thickness of duct liner with at least 90 percent adhesive coverage at liner contact surface area. Attaining indicated thickness with multiple layers of duct liner is prohibited.
 2. Apply adhesive to transverse edges of liner facing upstream that do not receive metal nosing.
 3. Butt transverse joints without gaps, and coat joint with adhesive.
 4. Fold and compress liner in corners of rectangular ducts or cut and fit to ensure butted-edge overlapping.
 5. Do not apply liner in rectangular ducts with longitudinal joints, except at corners of ducts, unless duct size and dimensions of standard liner make longitudinal joints necessary.
 6. Apply adhesive coating on longitudinal seams in ducts with air velocity of 2500 fpm.
 7. Secure liner with mechanical fasteners 4 inches from corners and at intervals not exceeding 12 inches transversely; at 3 inches from transverse joints and at intervals not exceeding 18 inches longitudinally.
 8. Secure transversely oriented liner edges facing the airstream with metal nosings that have either channel or "Z" profiles or are integrally formed from duct wall. Fabricate edge facings at the following locations:
 - a. Fan discharges.
 - b. Intervals of lined duct preceding unlined duct.
 - c. Upstream edges of transverse joints in ducts where air velocities are higher than 2500 fpm or where indicated.
 9. Secure insulation between perforated sheet metal inner duct of same thickness as specified for outer shell. Use mechanical fasteners that maintain inner duct at uniform distance from outer shell without compressing insulation.
 - a. Sheet Metal Inner Duct Perforations: 3/32-inch diameter, with an overall open area of 23 percent.

10. Terminate inner ducts with buildouts attached to fire-damper sleeves, dampers, turning vane assemblies, or other devices. Fabricated buildouts (metal hat sections) or other buildout means are optional; when used, secure buildouts to duct walls with bolts, screws, rivets, or welds.

2.5 SEALANT AND GASKETS

- A. General Sealant and Gasket Requirements: Surface-burning characteristics for sealants and gaskets shall be a maximum flame-spread index of 25 and a maximum smoke-developed index of 50 when tested according to UL 723; certified by an NRTL.
- B. Two-Part Tape Sealing System:
 1. Tape: Woven cotton fiber impregnated with mineral gypsum and modified acrylic/silicone activator to react exothermically with tape to form hard, durable, airtight seal.
 2. Tape Width: 6 inches.
 3. Sealant: Modified styrene acrylic.
 4. Water resistant.
 5. Mold and mildew resistant.
 6. Maximum Static-Pressure Class: 10-inch wg, positive and negative.
 7. Service: Indoor and outdoor.
 8. Service Temperature: Minus 40 to plus 200 deg F.
 9. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum.
 10. Sealant shall have a VOC content of 420 g/L or less.
 11. Sealant shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- C. Water-Based Joint and Seam Sealant:
 1. Application Method: Brush on.
 2. Solids Content: Minimum 65 percent.
 3. Shore A Hardness: Minimum 20.
 4. Water resistant.
 5. Mold and mildew resistant.
 6. VOC: Maximum 75 g/L (less water).
 7. Maximum Static-Pressure Class: 10-inch wg, positive and negative.
 8. Service: Indoor or outdoor.
 9. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum sheets.
- D. Flanged Joint Sealant: Comply with ASTM C 920.
 1. General: Single-component, acid-curing, silicone, elastomeric.
 2. Type: S.

3. Grade: NS.
 4. Class: 25.
 5. Use: O.
 6. Sealant shall have a VOC content of 420 g/L or less.
 7. Sealant shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- E. Flange Gaskets: Butyl rubber, neoprene, or EPDM polymer with polyisobutylene plasticizer.

2.6 HANGERS AND SUPPORTS

- A. Hanger Rods for Noncorrosive Environments: Cadmium-plated steel rods and nuts.
- B. Hanger Rods for Corrosive Environments: Electrogalvanized, all-thread rods or galvanized rods with threads painted with zinc-chromate primer after installation.
- C. Strap and Rod Sizes: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 5-1, "Rectangular Duct Hangers Minimum Size," and Table 5-2, "Minimum Hanger Sizes for Round Duct."
- D. Steel Cables for Galvanized-Steel Ducts: Galvanized steel complying with ASTM A 603.
- E. Steel Cable End Connections: Cadmium-plated steel assemblies with brackets, swivel, and bolts designed for duct hanger service; with an automatic-locking and clamping device.
- F. Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.
- G. Trapeze and Riser Supports:
 1. Supports for Galvanized-Steel Ducts: Galvanized-steel shapes and plates.

PART 3 - EXECUTION

3.1 DUCT INSTALLATION

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of duct system. Indicated duct locations, configurations, and arrangements were used to size ducts and calculate friction loss for air-handling equipment sizing and for other design considerations. Install duct systems as indicated unless deviations to layout are approved on Shop Drawings and Coordination Drawings.
- B. Install ducts according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" unless otherwise indicated.

- C. Install ducts in maximum practical lengths.
- D. Install ducts with fewest possible joints.
- E. Install factory- or shop-fabricated fittings for changes in direction, size, and shape and for branch connections.
- F. Unless otherwise indicated, install ducts vertically and horizontally, and parallel and perpendicular to building lines.
- G. Install ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building.
- H. Install ducts with a clearance of 1 inch, plus allowance for insulation thickness.
- I. Route ducts to avoid passing through transformer vaults and electrical equipment rooms and enclosures.
- J. Where ducts pass through non-fire-rated interior partitions and exterior walls and are exposed to view, cover the opening between the partition and duct or duct insulation with sheet metal flanges of same metal thickness as the duct. Overlap openings on four sides by at least 1-1/2 inches.
- K. Protect duct interiors from moisture, construction debris and dust, and other foreign materials. Comply with SMACNA's "IAQ Guidelines for Occupied Buildings Under Construction," Appendix G, "Duct Cleanliness for New Construction Guidelines."

3.2 INSTALLATION OF EXPOSED DUCTWORK

- A. Protect ducts exposed in finished spaces from being dented, scratched, or damaged.
- B. Trim duct sealants flush with metal. Create a smooth and uniform exposed bead. Do not use two-part tape sealing system.
- C. Grind welds to provide smooth surface free of burrs, sharp edges, and weld splatter. When welding stainless steel with a No. 3 or 4 finish, grind the welds flush, polish the exposed welds, and treat the welds to remove discoloration caused by welding.
- D. Maintain consistency, symmetry, and uniformity in the arrangement and fabrication of fittings, hangers and supports, duct accessories, and air outlets.
- E. Repair or replace damaged sections and finished work that does not comply with these requirements.

3.3 DUCT SEALING

- A. Seal ducts for duct static-pressure, seal classes, and leakage classes specified in "Duct Schedule" Article according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
- B. Seal ducts at a minimum to the following seal classes according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible":
 - 1. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
 - 2. Outdoor, Supply-Air Ducts: Seal Class A.
 - 3. Outdoor, Exhaust Ducts: Seal Class C.
 - 4. Conditioned Space, Supply-Air Ducts in Pressure Classes 2-Inch wg and Lower: Seal Class C.
 - 5. Conditioned Space, Exhaust Ducts: Seal Class B.
 - 6. Conditioned Space, Return-Air Ducts: Seal Class C.

3.4 HANGER AND SUPPORT INSTALLATION

- A. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 5, "Hangers and Supports."
- B. Building Attachments: Concrete inserts, powder-actuated fasteners, or structural-steel fasteners appropriate for construction materials to which hangers are being attached.
 - 1. Where practical, install concrete inserts before placing concrete.
 - 2. Install powder-actuated concrete fasteners after concrete is placed and completely cured.
 - 3. Use powder-actuated concrete fasteners for standard-weight aggregate concretes or for slabs more than 4 inches thick.
 - 4. Do not use powder-actuated concrete fasteners for lightweight-aggregate concretes or for slabs less than 4 inches thick.
 - 5. Do not use powder-actuated concrete fasteners for seismic restraints.
- C. Hanger Spacing: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 5-1, "Rectangular Duct Hangers Minimum Size," and Table 5-2, "Minimum Hanger Sizes for Round Duct," for maximum hanger spacing; install hangers and supports within 24 inches of each elbow and within 48 inches of each branch intersection.
- D. Hangers Exposed to View: Threaded rod and angle or channel supports.
- E. Support vertical ducts with steel angles or channel secured to the sides of the duct with welds, bolts, sheet metal screws, or blind rivets; support at each floor and at a maximum intervals of 16 feet.
- F. Install upper attachments to structures. Select and size upper attachments with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

3.5 CONNECTIONS

- A. Make connections to equipment with flexible connectors complying with Section 23 33 00 "Air Duct Accessories."
- B. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for branch, outlet and inlet, and terminal unit connections.

3.6 PAINTING

- A. Paint interior of metal ducts that are visible through registers and grilles and that do not have duct liner. Apply one coat of flat, black, latex paint over a compatible galvanized-steel primer.

3.7 FIELD QUALITY CONTROL

- A. Perform tests and inspections.

3.8 DUCT CLEANING

- A. Clean new duct system(s) before testing, adjusting, and balancing.
- B. Use service openings for entry and inspection.
 - 1. Create new openings and install access panels appropriate for duct static-pressure class if required for cleaning access. Provide insulated panels for insulated or lined duct. Patch insulation and liner as recommended by duct liner manufacturer. Comply with Section 23 33 00 "Air Duct Accessories" for access panels and doors.
 - 2. Disconnect and reconnect flexible ducts as needed for cleaning and inspection.
 - 3. Remove and reinstall ceiling to gain access during the cleaning process.
- C. Particulate Collection and Odor Control:
 - 1. When venting vacuuming system inside the building, use HEPA filtration with 99.97 percent collection efficiency for 0.3-micron-size (or larger) particles.
 - 2. When venting vacuuming system to outdoors, use filter to collect debris removed from HVAC system, and locate exhaust downwind and away from air intakes and other points of entry into building.
- D. Clean the following components by removing surface contaminants and deposits:
 - 1. Air outlets and inlets (registers, grilles, and diffusers).
 - 2. Supply, return, and exhaust fans including fan housings, plenums (except ceiling supply and return plenums), scrolls, blades or vanes, shafts, baffles, dampers, and drive assemblies.

3. Air-handling unit internal surfaces and components including mixing box, coil section, air wash systems, spray eliminators, condensate drain pans, humidifiers and dehumidifiers, filters and filter sections, and condensate collectors and drains.
4. Coils and related components.
5. Return-air ducts, dampers, actuators, and turning vanes except in ceiling plenums and mechanical equipment rooms.
6. Supply-air ducts, dampers, actuators, and turning vanes.
7. Dedicated exhaust and ventilation components and makeup air systems.

E. Mechanical Cleaning Methodology:

1. Clean metal duct systems using mechanical cleaning methods that extract contaminants from within duct systems and remove contaminants from building.
2. Use vacuum-collection devices that are operated continuously during cleaning. Connect vacuum device to downstream end of duct sections so areas being cleaned are under negative pressure.
3. Use mechanical agitation to dislodge debris adhered to interior duct surfaces without damaging integrity of metal ducts, duct liner, or duct accessories.
4. Clean fibrous-glass duct liner with HEPA vacuuming equipment; do not permit duct liner to get wet. Replace fibrous-glass duct liner that is damaged, deteriorated, or delaminated or that has friable material, mold, or fungus growth.
5. Clean coils and coil drain pans according to NADCA 1992. Keep drain pan operational. Rinse coils with clean water to remove latent residues and cleaning materials; comb and straighten fins.
6. Provide drainage and cleanup for wash-down procedures.
7. Antimicrobial Agents and Coatings: Apply EPA-registered antimicrobial agents if fungus is present. Apply antimicrobial agents according to manufacturer's written instructions after removal of surface deposits and debris.

3.9 START UP

- A. Air Balance: Comply with requirements in Section 23 05 93 "Testing, Adjusting, and Balancing for HVAC."

3.10 DUCT SCHEDULE

A. Supply Ducts:

1. Ducts Connected to Fan Coil Units and Terminal Units:
 - a. Pressure Class: Positive 2-inch wg.
 - b. Minimum SMACNA Seal Class: C.
 - c. SMACNA Leakage Class for Rectangular: 24.
 - d. SMACNA Leakage Class for Round and Flat Oval: 24.
2. Ducts Connected to Constant-Volume Air-Handling Units:

- a. Pressure Class: Positive 2-inch wg.
 - b. Minimum SMACNA Seal Class: B.
 - c. SMACNA Leakage Class for Rectangular: 12.
 - d. SMACNA Leakage Class for Round and Flat Oval: 12.
3. Ducts Connected to Variable-Air-Volume Air-Handling Units:
- a. Pressure Class: Positive 3-inch wg.
 - b. Minimum SMACNA Seal Class: B.
 - c. SMACNA Leakage Class for Rectangular: 6.
 - d. SMACNA Leakage Class for Round: 6.
4. Ducts Connected to Equipment Not Listed Above:
- a. Pressure Class: Positive 2-inch wg.
 - b. Minimum SMACNA Seal Class: B.
 - c. SMACNA Leakage Class for Rectangular: 6.
 - d. SMACNA Leakage Class for Round and Flat Oval: 6.
- B. Exhaust Ducts:
1. Ducts Connected to Fans Exhausting (ASHRAE 62.1, Class 1 and 2) Air and outside air:
- a. Pressure Class: Negative 2-inch wg.
 - b. Minimum SMACNA Seal Class: B if negative pressure, and A if positive pressure.
 - c. SMACNA Leakage Class for Rectangular: 24.
 - d. SMACNA Leakage Class for Round and Flat Oval: 12.
- C. Intermediate Reinforcement:
1. Galvanized-Steel Ducts: Galvanized steel.
- D. Exposed Duct Liner:
- 1. Supply and Return Air, Ducts and Plenums: Flexible elastomeric, 1 inch thick.
 - 2. Transfer Ducts: Flexible elastomeric, 1 inch thick.
- E. Elbow Configuration:
1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-2, "Rectangular Elbows."
- a. Velocity 1000 fpm or Lower:
 - 1) Radius Type RE 1 with minimum 0.5 radius-to-diameter ratio.
 - 2) Mitered Type RE 4 without vanes.
 - b. Velocity 1000 to 1500 fpm:

- 1) Radius Type RE 1 with minimum 1.0 radius-to-diameter ratio.
 - 2) Radius Type RE 3 with minimum 0.5 radius-to-diameter ratio and two vanes.
 - 3) Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-3, "Vanes and Vane Runners," and Figure 4-4, "Vane Support in Elbows."
- c. Velocity 1500 fpm or Higher:
- 1) Radius Type RE 1 with minimum 1.5 radius-to-diameter ratio.
 - 2) Radius Type RE 3 with minimum 1.0 radius-to-diameter ratio and two vanes.
 - 3) Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-3, "Vanes and Vane Runners," and Figure 4-4, "Vane Support in Elbows."
2. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-2, "Rectangular Elbows."
- a. Radius Type RE 1 with minimum 1.5 radius-to-diameter ratio.
 - b. Radius Type RE 3 with minimum 1.0 radius-to-diameter ratio and two vanes.
 - c. Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-3, "Vanes and Vane Runners," and Figure 4-4, "Vane Support in Elbows."
3. Round Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-4, "Round Duct Elbows."
- a. Minimum Radius-to-Diameter Ratio and Elbow Segments: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 3-1, "Mitered Elbows." Elbows with less than 90-degree change of direction have proportionately fewer segments.
 - 1) Velocity 1000 fpm or Lower: 0.5 radius-to-diameter ratio and three segments for 90-degree elbow.
 - 2) Velocity 1000 to 1500 fpm: 1.0 radius-to-diameter ratio and four segments for 90-degree elbow.
 - 3) Velocity 1500 fpm or Higher: 1.5 radius-to-diameter ratio and five segments for 90-degree elbow.
 - 4) Radius-to Diameter Ratio: 1.5.
 - b. Round Elbows, 12 Inches and Smaller in Diameter: Stamped or pleated.
 - c. Round Elbows, 14 Inches and Larger in Diameter: Standing seam.

F. Branch Configuration:

1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-6, "Branch Connection."

- a. Rectangular Main to Rectangular Branch: 45-degree entry.
 - b. Rectangular Main to Round Branch: Spin in.
2. Round: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-5, "90 Degree Tees and Laterals," and Figure 3-6, "Conical Tees." Saddle taps are permitted in existing duct.
- a. Velocity 1000 fpm or Lower: 90-degree tap.
 - b. Velocity 1000 to 1500 fpm: Conical tap.
 - c. Velocity 1500 fpm or Higher: 45-degree lateral.

END OF SECTION 23 31 13

SECTION 23 33 00 - AIR DUCT 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. Backdraft and pressure relief dampers.
 - 2. Manual volume dampers.
 - 3. Flange connectors.
 - 4. Turning vanes.
 - 5. Remote damper operators.
 - 6. Duct-mounted access doors.
 - 7. Flexible connectors.
 - 8. Duct accessory hardware.
- B. Related Requirements:
 - 1. Section 23 33 46 "Flexible Ducts" for insulated and non-insulated flexible ducts.
 - 2. Section 23 37 23 "HVAC Gravity Ventilators" for roof-mounted ventilator caps.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. For duct silencers, include pressure drop and dynamic insertion loss data. Include breakout noise calculations for high transmission loss casings.
- B. Sustainable Design Submittals:
 - 1. Product data showing compliance with ASHRAE 62.1.
- C. Shop Drawings: For duct accessories. Include plans, elevations, sections, details and attachments to other work.
 - 1. Detail duct accessories fabrication and installation in ducts and other construction. Include dimensions, weights, loads, and required clearances; and method of field assembly into duct systems and other construction. Include the following:

- a. Special fittings.
- b. Manual volume damper installations.

1.4 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which ceiling-mounted access panels and access doors required for access to duct accessories are shown and coordinated with each other, using input from Installers of the items involved.
- B. Source quality-control reports.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For air duct accessories to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 ASSEMBLY DESCRIPTION

- A. Comply with NFPA 90A, "Installation of Air Conditioning and Ventilating Systems," and with NFPA 90B, "Installation of Warm Air Heating and Air Conditioning Systems."
- B. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.

2.2 MATERIALS

- A. Galvanized Sheet Steel: Comply with ASTM A 653/A 653M.
 - 1. Galvanized Coating Designation: G90.
 - 2. Exposed-Surface Finish: Mill phosphatized.
- B. Reinforcement Shapes and Plates: Galvanized-steel reinforcement where installed on galvanized sheet metal ducts; compatible materials for aluminum and stainless-steel ducts.
- C. Tie Rods: Galvanized steel, 1/4-inch minimum diameter for lengths 36 inches or less; 3/8-inch minimum diameter for lengths longer than 36 inches.

2.3 BACKDRAFT AND PRESSURE RELIEF DAMPERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Greenheck Fan Corporation.
 - 2. Pottorff.
 - 3. Ruskin Company.
 - 4. or approved equal.
- B. Description: Gravity balanced.
- C. Maximum Air Velocity: 1000 fpm.
- D. Maximum System Pressure: 2-inch wg.
- E. Frame: Hat-shaped, 0.094-inch-thick, galvanized sheet steel, with welded corners or mechanically attached and mounting flange.
- F. Blades: Multiple single-piece blades, center pivoted, maximum 6-inch width, 0.050-inch-thick aluminum sheet with sealed edges.
- G. Blade Action: Parallel.
- H. Blade Seals: Neoprene, mechanically locked.
- I. Blade Axles:
 - 1. Material: Stainless steel.
 - 2. Diameter: 0.20 inch.
- J. Tie Bars and Brackets: Galvanized steel.
- K. Return Spring: Adjustable tension.
- L. Bearings: synthetic pivot bushings.
- M. Accessories:
 - 1. Adjustment device to permit setting for varying differential static pressure.
 - 2. Counterweights and spring-assist kits for vertical airflow installations.
 - 3. Screen Mounting: Front mounted in sleeve.
 - a. Sleeve Thickness: 20 gage minimum.
 - b. Sleeve Length: 6 inches minimum.
 - 4. Screen Material: Aluminum.
 - 5. Screen Type: Insect.
 - 6. 90-degree stops.

2.4 MANUAL VOLUME DAMPERS

- A. Standard, Steel, Manual Volume Dampers:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. McGill AirFlow LLC.
 - b. Nailor Industries Inc.
 - c. Pottorff.
 - d. Ruskin Company.
 - e. or approved equal.
 2. Standard leakage rating, with linkage outside airstream.
 3. Suitable for horizontal or vertical applications.
 4. Frames:
 - a. Frame: Hat-shaped, 0.094-inch-thick, galvanized sheet steel.
 - b. Mitered and welded corners.
 - c. Flanges for attaching to walls and flangeless frames for installing in ducts.
 5. Blades:
 - a. Multiple or single blade.
 - b. Parallel- or opposed-blade design.
 - c. Stiffen damper blades for stability.
 - d. Galvanized-steel, 0.064 inch thick.
 6. Blade Axles: Galvanized steel.
 7. Bearings:
 - a. Oil-impregnated stainless-steel sleeve.
 - b. Dampers in ducts with pressure classes of 3-inch wg or less shall have axles full length of damper blades and bearings at both ends of operating shaft.
 8. Tie Bars and Brackets: Galvanized steel.

2.5 FLANGE CONNECTORS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. CL WARD & Family Inc.
 2. Ductmate Industries, Inc.
 3. Hardecast, Inc.
 4. Nexus PDQ.
 5. Ward Industries; a brand of Hart & Cooley, Inc.
 6. or approved equal.

- B. Description: Add-on or roll-formed, factory-fabricated, slide-on transverse flange connectors, gaskets, and components.
- C. Material: Galvanized steel.
- D. Gage and Shape: Match connecting ductwork.

2.6 TURNING VANES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Ductmate Industries, Inc.
 2. Duro Dyne Inc.
 3. METALAIRE, Inc.
 4. or approved equal.
- B. Manufactured Turning Vanes for Metal Ducts: Curved blades of galvanized sheet steel; support with bars perpendicular to blades set; set into vane runners suitable for duct mounting.
 1. Acoustic Turning Vanes: Fabricate airfoil-shaped aluminum extrusions with perforated faces and fibrous-glass fill.
- C. Manufactured Turning Vanes for Nonmetal Ducts: Fabricate curved blades of resin-bonded fiberglass with acrylic polymer coating; support with bars perpendicular to blades set; set into vane runners suitable for duct mounting.
- D. General Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible"; Figures 4-3, "Vanes and Vane Runners," and 4-4, "Vane Support in Elbows."
- E. Vane Construction: Double wall.

2.7 REMOTE DAMPER OPERATORS (FOR ALL HARD LID LOCATIONS)

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Pottorff.
 2. Ventfabrics, Inc.
 3. Young Regulator Company.
 4. or approved equal.
- B. Description: Cable system designed for remote manual damper adjustment.
- C. Tubing: Aluminum.
- D. Cable: Stainless steel.

- E. Wall-Box Mounting: Recessed.
- F. Wall-Box Cover-Plate Material: Stainless steel.

2.8 DUCT-MOUNTED ACCESS DOORS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Ductmate Industries, Inc.
 - 2. Flexmaster U.S.A., Inc.
 - 3. Greenheck Fan Corporation.
 - 4. McGill AirFlow LLC.
 - 5. Pottorff.
 - 6. or approved equal.
- B. Duct-Mounted Access Doors: Fabricate access panels according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible"; Figures 7-2, "Duct Access Doors and Panels," and 7-3, "Access Doors - Round Duct."
 - 1. Door:
 - a. Double wall, rectangular.
 - b. Galvanized sheet metal with insulation fill and thickness as indicated for duct pressure class.
 - c. Vision panel.
 - d. Hinges and Latches: 1-by-1-inchbutt or piano hinge and cam latches.
 - e. Fabricate doors airtight and suitable for duct pressure class.
 - 2. Frame: Galvanized sheet steel, with bend-over tabs and foam gaskets.
 - 3. Number of Hinges and Locks:
 - a. Access Doors Less Than 12 Inches Square: No hinges and two sash locks.
 - b. Access Doors up to 18 Inches Square: Continuous and two sash locks.
 - c. Access Doors up to 24 by 48 Inches: Continuous and two compression latches with outside and inside handles.
 - d. Access Doors Larger Than 24 by 48 Inches: Continuous and two compression latches with outside and inside handles.

2.9 DUCT ACCESS PANEL ASSEMBLIES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. 3M.
 - 2. CL WARD & Family Inc.
 - 3. Ductmate Industries, Inc.
 - 4. Flame Gard, Inc.

5. or approved equal.
- B. Labeled according to UL 1978 by an NRTL.
 - C. Panel and Frame: Minimum thickness 0.0428-inch stainless steel.
 - D. Fasteners: Stainless steel. Panel fasteners shall not penetrate duct wall.
 - E. Gasket: Comply with NFPA 96; grease-tight, high-temperature ceramic fiber, rated for minimum 2000 deg F.
 - F. Minimum Pressure Rating: 10-inch wg, positive or negative.

2.10 FLEXIBLE CONNECTORS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Ductmate Industries, Inc.
 2. Duro Dyne Inc.
 3. Ventfabrics, Inc.
 4. or approved equal.
- B. Materials: Flame-retardant or noncombustible fabrics.
- C. Coatings and Adhesives: Comply with UL 181, Class 1.
- D. Metal-Edged Connectors: Factory fabricated with a fabric strip 3-1/2 inches wide attached to two strips of 2-3/4-inch-wide, 0.028-inch-thick, galvanized sheet steel or 0.032-inch-thick aluminum sheets. Provide metal compatible with connected ducts.
- E. Indoor System, Flexible Connector Fabric: Glass fabric double coated with neoprene.
 1. Minimum Weight: 26 oz./sq. yd..
 2. Tensile Strength: 480 lbf/inch in the warp and 360 lbf/inch in the filling.
 3. Service Temperature: Minus 40 to plus 200 deg F.
- F. Outdoor System, Flexible Connector Fabric: Glass fabric double coated with weatherproof, synthetic rubber resistant to UV rays and ozone.
 1. Minimum Weight: 24 oz./sq. yd..
 2. Tensile Strength: 530 lbf/inch in the warp and 440 lbf/inch in the filling.
 3. Service Temperature: Minus 50 to plus 250 deg F.
- G. High-Temperature System, Flexible Connectors: Glass fabric coated with silicone rubber.
 1. Minimum Weight: 16 oz./sq. yd..
 2. Tensile Strength: 285 lbf/inch in the warp and 185 lbf/inch in the filling.
 3. Service Temperature: Minus 67 to plus 500 deg F.

- H. High-Corrosive-Environment System, Flexible Connectors: Glass fabric with chemical-resistant coating.
 - 1. Minimum Weight: 14 oz./sq. yd..
 - 2. Tensile Strength: 450 lbf/inch in the warp and 340 lbf/inch in the filling.
 - 3. Service Temperature: Minus 67 to plus 500 deg F.

- I. Thrust Limits: Combination coil spring and elastomeric insert with spring and insert in compression, and with a load stop. Include rod and angle-iron brackets for attaching to fan discharge and duct.
 - 1. Frame: Steel, fabricated for connection to threaded rods and to allow for a maximum of 30 degrees of angular rod misalignment without binding or reducing isolation efficiency.
 - 2. Outdoor Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
 - 3. Minimum Additional Travel: 50 percent of the required deflection at rated load.
 - 4. Lateral Stiffness: More than 80 percent of rated vertical stiffness.
 - 5. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.
 - 6. Elastomeric Element: Molded, oil-resistant rubber or neoprene.
 - 7. Coil Spring: Factory set and field adjustable for a maximum of 1/4-inch movement at start and stop.

2.11 DUCT ACCESSORY HARDWARE

- A. Instrument Test Holes: Cast iron or cast aluminum to suit duct material, including screw cap and gasket. Size to allow insertion of pitot tube and other testing instruments and of length to suit duct-insulation thickness.

- B. Adhesives: High strength, quick setting, neoprene based, waterproof, and resistant to gasoline and grease.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. 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.

- B. Install duct accessories of materials suited to duct materials; use galvanized-steel accessories in galvanized-steel ducts, stainless-steel accessories in stainless-steel ducts, and aluminum accessories in aluminum ducts.

- C. Compliance with ASHRAE/IESNA 90.1-2004 includes Section 6.4.3.3.3 - "Shutoff Damper Controls," restricts the use of backdraft dampers, and requires control dampers for certain

applications. Install backdraft dampers at inlet of exhaust fans or exhaust ducts as close as possible to exhaust fan unless otherwise indicated.

- D. Install volume dampers at points on supply, return, and exhaust systems where branches extend from larger ducts. Where dampers are installed in ducts having duct liner, install dampers with hat channels of same depth as liner, and terminate liner with nosing at hat channel.
 - 1. Install steel volume dampers in steel ducts.
 - 2. Install aluminum volume dampers in aluminum ducts.
- E. Set dampers to fully open position before testing, adjusting, and balancing.
- F. Install test holes at fan inlets and outlets and elsewhere as indicated.
- G. Install duct access doors on sides of ducts to allow for inspecting, adjusting, and maintaining accessories and equipment at the following locations:
 - 1. On both sides of duct coils.
 - 2. Upstream and downstream from duct filters.
 - 3. At outdoor-air intakes and mixed-air plenums.
 - 4. At drain pans and seals.
 - 5. Downstream from manual volume dampers, control dampers, backdraft dampers, and equipment.
 - 6. Adjacent to and close enough to fire or smoke dampers, to reset or reinstall fusible links. Access doors for access to fire or smoke dampers having fusible links shall be pressure relief access doors and shall be outward operation for access doors installed upstream from dampers and inward operation for access doors installed downstream from dampers.
 - 7. At each change in direction and at maximum 50-foot spacing.
 - 8. Upstream and downstream from turning vanes.
 - 9. Control devices requiring inspection.
 - 10. Elsewhere as indicated.
- H. Install access doors with swing against duct static pressure.
- I. Access Door Sizes:
 - 1. One-Hand or Inspection Access: 8 by 5 inches.
 - 2. Two-Hand Access: 12 by 6 inches.
 - 3. Head and Hand Access: 18 by 10 inches.
 - 4. Head and Shoulders Access: 21 by 14 inches.
 - 5. Body Access: 25 by 14 inches.
 - 6. Body plus Ladder Access: 25 by 17 inches.
- J. Label access doors according to Section 23 05 53 "Identification for HVAC Piping and Equipment" to indicate the purpose of access door.
- K. Install flexible connectors to connect ducts to equipment.

- L. Connect terminal units to supply ducts directly or with maximum. Do not use flexible ducts to change directions.
- M. Connect diffusers to ducts directly or with maximum 60-inch lengths of flexible duct clamped in place.
- N. Connect flexible ducts to metal ducts with draw bands.
- O. Install duct test holes where required for testing and balancing purposes.
- P. Install thrust limits at centerline of thrust, symmetrical on both sides of equipment. Attach thrust limits at centerline of thrust and adjust to a maximum of 1/4-inch movement during start and stop of fans.

3.2 FIELD QUALITY CONTROL

- A. Tests and Inspections:
 - 1. Operate dampers to verify full range of movement.
 - 2. Inspect locations of access doors and verify that purpose of access door can be performed.
 - 3. Inspect turning vanes for proper and secure installation.
 - 4. Operate remote damper operators to verify full range of movement of operator and damper.

END OF SECTION 23 33 00

SECTION 23 33 46 - FLEXIBLE DUCTS

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-insulated flexible ducts.
 - 2. Insulated flexible ducts.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.4 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which ceiling-mounted access panels and access doors required for access to duct accessories are shown and coordinated with each other, using input from installers of the items involved.

PART 2 - PRODUCTS

2.1 ASSEMBLY DESCRIPTION

- A. Comply with NFPA 90A, "Installation of Air Conditioning and Ventilating Systems," and with NFPA 90B, "Installation of Warm Air Heating and Air Conditioning Systems."
- B. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.
- C. Comply with the Air Diffusion Council's "ADC Flexible Air Duct Test Code FD 72-R1."
- D. Comply with ASTM E 96/E 96M, "Test Methods for Water Vapor Transmission of Materials."

2.2 INSULATED FLEXIBLE DUCTS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Flexmaster U.S.A., Inc.
 2. JP Lamborn Co.
 3. McGill AirFlow LLC.
 4. Thermaflex; a Flex-Tek Group company.
 5. Ward Industries; a brand of Hart & Cooley, Inc.
 6. or approved equal.
- B. Insulated, Flexible Duct: UL 181, Class 1, two-ply vinyl film supported by helically wound, spring-steel wire; fibrous-glass insulation; aluminized vapor-barrier film.
1. Pressure Rating: 10-inch wg positive and 1.0-inch wg negative.
 2. Maximum Air Velocity: 4000 fpm.
 3. Temperature Range: Minus 10 to plus 160 deg F.
 4. Insulation R-Value: R4.2.

2.3 FLEXIBLE DUCT CONNECTORS

- A. Clamps: Stainless-steel band with cadmium-plated hex screw to tighten band with a worm-gear action in sizes 3 through 18 inches, to suit duct size.
- B. Non-Clamp Connectors: Adhesive plus sheet metal screws.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install flexible ducts 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.
- B. Install in indoor applications only. Flexible ductwork should not be exposed to UV lighting.
- C. Connect terminal units to supply ducts directly. Do not use flexible ducts to change directions.
- D. Connect diffusers boots to ducts directly or with maximum 60-inch lengths of flexible duct clamped or strapped in place.
- E. Connect flexible ducts to metal ducts with draw bands.
- F. Install duct test holes where required for testing and balancing purposes.
- G. Installation:

1. Install ducts fully extended.
2. Do not bend ducts across sharp corners.
3. Bends of flexible ducting shall not exceed a minimum of one duct diameter.
4. Avoid contact with metal fixtures, water lines, pipes, or conduits.
5. Install flexible ducts in a direct line, without sags, twists, or turns.

H. Supporting Flexible Ducts:

1. Suspend flexible ducts with bands 1-1/2 inches wide or wider and spaced a maximum of 48 inches apart. Maximum centerline sag between supports shall not exceed 1/2 inch per 12 inches.
2. Install extra supports at bends placed approximately one duct diameter from center line of the bend.
3. Ducts may rest on ceiling joists or truss supports. Spacing between supports shall not exceed the maximum spacing per manufacturer's written installation instructions.
4. Vertically installed ducts shall be stabilized by support straps at a maximum of 72 inches o.c.

END OF SECTION 23 33 46

SECTION 23 37 13.13 - AIR DIFFUSERS

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. Linear slot diffusers.
 2. Ceiling-integral continuous slot diffusers.
 3. High-capacity, modular-core supply grille diffusers.
- B. Related Requirements:
1. Section 23 33 00 "Air Duct Accessories" for fire and smoke dampers and volume-control dampers not integral to diffusers.
 2. Section 23 37 13.23 "Air Registers and Grilles" for adjustable-bar register and grilles, fixed-face registers and grilles, and linear bar grilles.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
1. Data Sheet: Indicate materials of construction, finish, and mounting details; and performance data including throw and drop, static-pressure drop, and noise ratings.
 2. Diffuser Schedule: Indicate drawing designation, room location, quantity, model number, size, and accessories furnished.

1.4 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
1. Ceiling suspension assembly members.
 2. Method of attaching hangers to building structure.
 3. Size and location of initial access modules for acoustical tile.
 4. Ceiling-mounted items including lighting fixtures, diffusers, grilles, speakers, sprinklers, access panels, and special moldings.
 5. Duct access panels.

- B. Source quality-control reports.

PART 2 - PRODUCTS

2.1 LINEAR SLOT DIFFUSERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Titus (Model FL).
 - 2. Krueger (Model 1900).
 - 3. Price Industries (Model AS).
 - 4. or approved equal.
- B. Devices shall be specifically designed for variable-air-volume flows.
- C. Material - Shell: Aluminum.
- D. Material - Pattern Controller and Tees: Aluminum.
- E. Finish - Face and Shell: Baked enamel, black.
- F. Finish - Pattern Controller: Baked enamel, black.
- G. Finish - Tees: Baked enamel, white.
- H. Accessories: Plaster frame.

2.2 CEILING-INTEGRAL CONTINUOUS DIFFUSERS (1st FLOOR WAITING AREA AND CONFERENCE ROOMS)

- A. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - 1. Titus (Model ML-TZ), or approved equal
- B. Straight and curved sections as required to accommodate layout.
- C. Mitered tees and corners.
- D. Material: Aluminum, extruded, heavy wall.
- E. Finishes:
 - 1. Exterior: Standard white.
 - 2. Interior: Standard black.
- F. Mounting: Ceiling System.

- G. Plenum: Insulated.
- H. Other Features:
 - 1. Painted interior.
 - 2. Blank-offs.
 - 3. Pattern Controller.

2.3 HIGH-CAPACITY, MODULAR-CORE SUPPLY GRILLE DIFFUSERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Titus (Model MCD).
 - 2. Krueger (Model 1240).
 - 3. Price Industries (Model SMCD).
 - 4. or approved equal.
- B. Throw: Extended distance for airflow rates.
- C. Material: Aluminum.
- D. Cores per Unit: Four.
- E. Finish: White baked acrylic.
- F. Border: 1-1/2-inch width with countersunk screw holes.
- G. Blades:
 - 1. Airfoil, individually adjustable horizontally.
 - 2. Set in modules.
- H. Modules: Removable; rotatable.
- I. Mounting: Surface or lay in as indicated on schedule.
- J. Accessory: Opposed-blade steel damper (Only where indicated on drawings and schedules).

2.4 SOURCE QUALITY CONTROL

- A. Verification of Performance: Rate diffusers according to ASHRAE 70, "Method of Testing for Rating the Performance of Air Outlets and Inlets."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas where diffusers are installed for compliance with requirements for installation tolerances and other conditions affecting performance of equipment.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install diffusers level and plumb.
- B. Ceiling-Mounted Outlets and Inlets: Drawings indicate general arrangement of ducts, fittings, and accessories. Air outlet and inlet locations have been indicated to achieve design requirements for air volume, noise criteria, airflow pattern, throw, and pressure drop. Make final locations where indicated, as much as practical. For units installed in lay-in ceiling panels, locate units in the center of panel. Where architectural features or other items conflict with installation, notify Architect for a determination of final location.
- C. Install diffusers with airtight connections to ducts and to allow service and maintenance of dampers, air extractors, and fire dampers.

3.3 ADJUSTING

- A. After installation, adjust diffusers to air patterns indicated, or as directed, before starting air balancing.

END OF SECTION 23 37 13.13

SECTION 23 37 13.23 - REGISTERS AND GRILLES

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 face registers and grilles.
 - 2. Linear bar grilles.
- B. Related Requirements:
 - 1. Section 23 33 00 "Air Duct Accessories" for fire and smoke dampers and volume-control dampers not integral to registers and grilles.
 - 2. Section 23 37 13.13 "Air Diffusers" for various types of air diffusers.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Data Sheet: Indicate materials of construction, finish, and mounting details; and performance data including throw and drop, static-pressure drop, and noise ratings.
 - 2. Register and Grille Schedule: Indicate drawing designation, room location, quantity, model number, size, and accessories furnished.

1.4 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
 - 1. Ceiling suspension assembly members.
 - 2. Method of attaching hangers to building structure.
 - 3. Size and location of initial access modules for acoustical tile.
 - 4. Ceiling-mounted items including lighting fixtures, diffusers, grilles, speakers, sprinklers, access panels, and special moldings.
 - 5. Duct access panels.
- B. Source quality-control reports.

PART 2 - PRODUCTS

2.1 REGISTERS

- A. Perforated Face Register:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Titus (Model PAR).
 - b. Krueger. (Model S80P).
 - c. Price Industries (Model PDDR).
 - d. or approved equal.
 2. Material: Steel.
 3. Finish: Baked enamel, white.
 4. Frame: 1 inch wide.
 5. Mounting: Lay in or ceiling mounted (as indicated on schedules).
 6. Damper Type: OBD (as indicated on schedules).

2.2 GRILLES

- A. Linear Bar Return Grilles
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Titus (Model FL).
 - b. Krueger (Model 1900).
 - c. Price Industries (Model AS).
 - d. or approved equal.
 2. Material: Aluminum.
 3. Finish: Baked enamel, white.
 4. Face Arrangement: Slots.
 5. Distribution plenum.
 - a. Internal insulation.
 - b. Inlet damper.
 6. Frame: 1 inch wide.
 7. Mounting: Lay in and concealed.
- B. Egg Crate Return and Exhaust Grilles
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Titus (Model 50F).
 - b. Krueger (Model EG).
 - c. Price Industries (Model 80).
 - d. or approved equal.
 2. Material: Aluminum.
 3. Finish: Baked enamel, white.
 4. Face Arrangement: Egg crate.
 5. Frame: 1 inch wide.
 6. Mounting: Lay in or ceiling MTP (as indicated in schedules).

7. Options:
 - a. Sight-resistant core
 8. Damper MPE: Opposed blade damper (as indicated in schedules).
- C. Return and Exhaust Grilles
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Titus (Model 350F).
 - b. Krueger (Model 5580).
 - c. Price Industries (Model 600).
 - d. or approved equal.
 2. Material: Aluminum.
 3. Finish: Baked enamel, white.
 4. Face Arrangement: Egg crate.
 5. Frame: 1 inch wide.
 6. Mounting: Lay in or ceiling MTP (as indicated in schedules).
 7. Damper MPE: Opposed blade damper (as indicated in schedules).

2.3 SOURCE QUALITY CONTROL

- A. Verification of Performance: Rate registers and grilles according to ASHRAE 70, "Method of Testing for Rating the Performance of Air Outlets and Inlets."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas where registers and grilles are installed for compliance with requirements for installation tolerances and other conditions affecting performance of equipment.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install registers and grilles level and plumb.
- B. Outlets and Inlets Locations: Drawings indicate general arrangement of ducts, fittings, and accessories. Air outlet and inlet locations have been indicated to achieve design requirements for air volume, noise criteria, airflow pattern, throw, and pressure drop. Make final locations where indicated, as much as practical. For units installed in lay-in ceiling panels, locate units in the center of panel. Where architectural features or other items conflict with installation, notify Architect for a determination of final location.
- C. Install registers and grilles with airtight connections to ducts and to allow service and maintenance of dampers, air extractors, and fire dampers.

3.3 ADJUSTING

- A. After installation, adjust registers and grilles to air patterns indicated, or as directed, before starting air balancing.

END OF SECTION 23 37 13.23

SECTION 23 37 23 - HVAC GRAVITY VENTILATORS

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. Louvered-penthouse ventilators.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. For louvered-penthouse ventilators specified to bear AMCA seal, include printed catalog pages showing specified models with appropriate AMCA Certified Ratings Seals.
- B. Shop Drawings: For gravity ventilators. Include plans, elevations, sections, details, ventilator attachments to curbs, and curb attachments to roof structure.
 - 1. Show weep paths, gaskets, flashing, sealant, and other means of preventing water intrusion.

1.4 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Roof framing plans and other details, drawn to scale, on which the following items are shown and coordinated with each other, based on input from installers of the items involved:
 - 1. Structural members to which roof curbs and ventilators will be attached.
 - 2. Sizes and locations of roof openings.

1.5 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel according to the following:
 - 1. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum."
 - 2. AWS D1.3, "Structural Welding Code - Sheet Steel."

1.6 COORDINATION

- A. Coordinate sizes and locations of roof curbs, equipment supports, and roof penetrations with actual equipment provided.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Aluminum Extrusions: ASTM B 221, Alloy 6063-T5 or T-52.
- B. Aluminum Sheet: ASTM B 209, Alloy 3003 or 5005 with temper as required for forming or as otherwise recommended by metal producer for required finish.
- C. Stainless-Steel Sheet: ASTM A 666, Type 304, with No. [4] [6] finish.

2.2 FABRICATION, GENERAL

- A. Factory or shop fabricate gravity ventilators to minimize field splicing and assembly. Disassemble units to the minimum extent as necessary for shipping and handling. Clearly mark units for reassembly and coordinated installation.
- B. Fabricate frames, including integral bases, to fit in openings of sizes indicated, with allowances made for fabrication and installation tolerances, adjoining material tolerances, and perimeter sealant joints.
- C. Fabricate units with closely fitted joints and exposed connections accurately located and secured.
- D. Fabricate supports, anchorages, and accessories required for complete assembly.
- E. Perform shop welding by AWS-certified procedures and personnel.

2.3 LOUVERED-PENTHOUSE VENTILATORS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Greenheck Fan Corporation. (Model WRH)
 - 2. Loren Cook Company. (Model TRE)
 - 3. Ruskin Company. (Model PHB)
 - 4. or approved equals.
- B. Construction: All-welded assembly with aluminum louvers, mitered corners, and aluminum sheet roof. Use stainless steel screws for assembly.

- C. Frame and Blade Material and Nominal Thickness: Extruded aluminum, of thickness required to comply with structural performance requirements, but not less than 0.080 inch for frames and 0.080 inch for blades.
 - 1. AMCA Seal: Mark units with the AMCA Certified Ratings Seal.
- D. Roof Curbs: Galvanized-steel sheet; with mitered and welded corners; 1-1/2-inch-thick, rigid fiberglass insulation adhered to inside walls; and 1-1/2-inch wood nailer. Size as required to fit roof opening and ventilator base.
 - 1. Configuration: Built-in raised cant and mounting flange.
 - 2. Overall Height: 12 inches.
- E. Insect Screening: Stainless-steel, 18-by-18 mesh, 0.009-inch wire.
- F. Accessories:
 - 1. Counter-balanced Backdraft Dampers:
 - a. Location: Penthouse neck.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install gravity ventilators level, plumb, and at indicated alignment with adjacent work.
- B. Install gravity ventilators with clearances for service and maintenance.
- C. Install perimeter reveals and openings of uniform width for sealants and joint fillers, as indicated.
- D. Install concealed gaskets, flashings, joint fillers, and insulation as installation progresses.
- E. Label gravity ventilators according to requirements specified in Section 230553 "Identification for HVAC Piping and Equipment."
- F. Protect galvanized and nonferrous-metal surfaces from corrosion or galvanic action by applying a heavy coating of bituminous paint on surfaces that will be in contact with concrete, masonry, or dissimilar metals.
- G. 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.

3.2 CONNECTIONS

- A. Duct installation and connection requirements are specified in Section 233113 "Metal Ducts." Drawings indicate general arrangement of ducts and duct accessories.

3.3 ADJUSTING

- A. Adjust damper linkages for proper damper operation.

END OF SECTION 23 37 23

SECTION 26 05 19 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Copper building wire rated 600 V or less.
 - 2. Connectors, splices, and terminations rated 600 V and less.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Product Schedule: Indicate type, use, location, and termination locations.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For testing agency.
- B. Field quality-control reports.

1.5 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Member company of NETA.
 - 1. Testing Agency's Field Supervisor: Certified by NETA to supervise on-site testing.

PART 2 - PRODUCTS

2.1 COPPER BUILDING WIRE

- A. Description: Flexible, insulated and uninsulated, drawn copper current-carrying conductor with an overall insulation layer or jacket, or both, rated 600 V or less.

- B. 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. Belden Inc.
 - 2. Okonite Company (The).
 - 3. Southwire Company.
 - 4. Or approved equal.
- C. Standards:
 - 1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
 - 2. RoHS compliant.
 - 3. Conductor and Cable Marking: Comply with wire and cable marking according to UL's "Wire and Cable Marking and Application Guide."
- D. Conductors: Copper, complying with ASTM B 3 for bare annealed copper and with ASTM B 8 for stranded conductors.
- E. Conductor Insulation:
 - 1. Type THHN and Type THWN-2: Comply with UL 83.

2.2 CONNECTORS AND SPLICES

- A. Description: Factory-fabricated connectors, splices, and lugs of size, ampacity rating, material, type, and class for application and service indicated; listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
- B. Lugs: One piece, seamless, designed to terminate conductors specified in this Section.
 - 1. Material: Copper.
 - 2. Type: One hole with standard barrels.
 - 3. Termination: Crimp.

PART 3 - EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

- A. Feeders: Copper; Stranded for No. 12 AWG and larger.
- B. Branch Circuits: Copper. Stranded for No. 12 AWG and larger.

3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

- A. Exposed Feeders: Type THHN/THWN, single conductors in raceway.
- B. Feeders Concealed in Ceilings, Walls, Partitions, and Crawlspace: Type THHN/THWN, single conductors in raceway.
- C. Exposed Branch Circuits, Including in Crawlspace: Type THHN/THWN, single conductors in raceway.
- D. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN/THWN, single conductors in raceway.
- E. Branch Circuits Concealed in Cellular Metal Floor Raceways below Slabs-on-Grade: Type THHN/THWN, single conductors.
 - 1. Connections between raceways and furniture shall be provided by furniture manufacturer.
 - 2. Ampacity of conductors shall be de-rated per CEC Table 310.15(B)(3).
 - 3. Splices and taps are not allowed.
 - 4. No conductor larger than 1/0 AWG shall be installed.

3.3 INSTALLATION OF CONDUCTORS AND CABLES

- A. Conceal cables in finished walls, ceilings, and floors unless otherwise indicated.
- B. Complete raceway installation between conductor and cable termination points according to Section 26 05 33 "Raceways and Boxes for Electrical Systems" prior to pulling conductors and cables.
- C. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.
- D. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.
- E. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.
- F. Support cables according to Section 26 05 29 "Hangers and Supports for Electrical Systems."

3.4 CONNECTIONS

- A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B.
- B. Make splices, terminations, and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.
- C. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches of slack.

3.5 IDENTIFICATION

- A. Identify and color-code conductors and cables according to Section 26 05 53 "Identification for Electrical Systems."
- B. Identify each spare conductor at each end with identity number and location of other end of conductor, and identify as spare conductor.

3.6 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRICAL PENETRATIONS

- A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies.

3.7 FIRESTOPPING

- A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly.

3.8 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Perform tests and inspections.
 - 1. After installing conductors and cables and before electrical circuitry has been energized, test feeder conductors for compliance with requirements.
 - 2. Perform each of the following visual and electrical tests:
 - a. Inspect exposed sections of conductor and cable for physical damage and correct connection according to the single-line diagram.
 - b. Test bolted connections for high resistance using one of the following:
 - 1) A low-resistance ohmmeter.

2) Calibrated torque wrench.

- c. Inspect compression-applied connectors for correct cable match and indentation.
- d. Inspect for correct identification.
- e. Inspect cable jacket and condition.
- f. Insulation-resistance test on each conductor for ground and adjacent conductors. Apply a potential of 500-V dc for 300-V rated cable and 1000-V dc for 600-V rated cable for a one-minute duration.
- g. Continuity test on each conductor and cable.
- h. Uniform resistance of parallel conductors.

C. Cables will be considered defective if they do not pass tests and inspections.

D. Prepare test and inspection reports to record the following:

- 1. Procedures used.
- 2. Results that comply with requirements.
- 3. Results that do not comply with requirements, and corrective action taken to achieve compliance with requirements.

END OF SECTION 26 05 19

SECTION 26 05 26 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this Section.

1.2 SUMMARY

- A. Section includes grounding and bonding systems and equipment.
- B. Section includes grounding and bonding systems and equipment.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.

1.4 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Certified by NETA.

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

- 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.
- B. Comply with UL 467 for grounding and bonding materials and equipment.

2.2 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. Burndy; Part of Hubbell Electrical Systems.
 2. Dossert; AFL Telecommunications LLC.
 3. ERICO International Corporation.
 4. ILSCO.

5. Or approved equal.

2.3 CONDUCTORS

- A. Insulated Conductors: Copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.
- B. Bare Copper Conductors:
 1. Solid Conductors: ASTM B 3.
 2. Stranded Conductors: ASTM B 8.
 3. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, 1/4 inch in diameter.
 4. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.
 5. Bonding Jumper: Copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.

2.4 CONNECTORS

- A. Listed and labeled by an NRTL acceptable to authorities having jurisdiction for applications in which used and for specific types, sizes, and combinations of conductors and other items connected.
- B. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.
- C. Bus-Bar Connectors: Compression type, copper or copper alloy, with two wire terminals.
- D. Cable-to-Cable Connectors: Compression type, copper or copper alloy.
- E. Cable Tray Ground Clamp: Mechanical type, zinc-plated malleable iron.
- F. Conduit Hubs: Mechanical type, terminal with threaded hub.
- G. Ground Rod Clamps: Mechanical type, copper or copper alloy, terminal with hex head bolt.
- H. Water Pipe Clamps:
 1. Mechanical type, two pieces with stainless-steel bolts.

PART 3 - EXECUTION

3.1 APPLICATIONS

- A. Conductors: Install solid conductor for No. 8 AWG and smaller, and stranded conductors for No. 6 AWG and larger unless otherwise indicated.

- B. Conductor Terminations and Connections:
 - 1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
 - 2. Underground Connections: Welded connectors except at test wells and as otherwise indicated.
 - 3. Connections to Ground Rods at Test Wells: Bolted connectors.
 - 4. Connections to Structural Steel: Welded connectors.

3.2 GROUNDING UNDERGROUND DISTRIBUTION SYSTEM COMPONENTS

- A. Comply with IEEE C2 grounding requirements.

3.3 EQUIPMENT GROUNDING

- A. Install insulated equipment grounding conductors with all feeders and branch circuits.
- B. Install insulated equipment grounding conductors with the following items, in addition to those required by NFPA 70:
 - 1. Feeders and branch circuits.
 - 2. Lighting circuits.
 - 3. Receptacle circuits.
 - 4. Single-phase motor and appliance branch circuits.
 - 5. Three-phase motor and appliance branch circuits.
 - 6. Flexible raceway runs.
- C. Air-Duct Equipment Circuits: Install insulated equipment grounding conductor to duct-mounted electrical devices operating at 120 V and more, including air cleaners, heaters, dampers, humidifiers, and other duct electrical equipment. Bond conductor to each unit and to air duct and connected metallic piping.
- D. Water Heater, Heat-Tracing, and Antifrost Heating Cables: Install a separate insulated equipment grounding conductor to each electric water heater and heat-tracing cable. Bond conductor to heater units, piping, connected equipment, and components.

3.4 INSTALLATION

- A. Grounding Conductors: Route along shortest and straightest paths possible unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.
- B. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance except where routed through short lengths of conduit.
 - 1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.

2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install bonding so vibration is not transmitted to rigidly mounted equipment.
- C. Bonding Interior Metal Ducts: Bond metal air ducts to equipment grounding conductors of associated fans, blowers, electric heaters, and air cleaners. Install bonding jumper to bond across flexible duct connections to achieve continuity.
- D. Connections: Make connections so possibility of galvanic action or electrolysis is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact are galvanically compatible.
 1. Use electroplated or hot-tin-coated materials to ensure high conductivity and to make contact points closer in order of galvanic series.
 2. Make connections with clean, bare metal at points of contact.
 3. Make aluminum-to-steel connections with stainless-steel separators and mechanical clamps.
 4. Make aluminum-to-galvanized-steel connections with tin-plated copper jumpers and mechanical clamps.
 5. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.

3.5 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Perform tests and inspections.
- C. Tests and Inspections:
 1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.
 2. Inspect physical and mechanical condition. Verify tightness of accessible, bolted, electrical connections with a calibrated torque wrench according to manufacturer's written instructions.
- D. Grounding system will be considered defective if it does not pass tests and inspections.

END OF SECTION 26 05 26

SECTION 26 05 29 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

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 slotted support systems.
 - 2. Conduit and cable support devices.
 - 3. Support for conductors in vertical conduit.
 - 4. Structural steel for fabricated supports and restraints.
 - 5. Mounting, anchoring, and attachment components, including powder-actuated fasteners, mechanical expansion anchors, concrete inserts, clamps, through bolts, toggle bolts, and hanger rods.
 - 6. Fabricated metal equipment support assemblies.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for the following:
 - a. Slotted support systems, hardware, and accessories.
 - b. Clamps.
 - c. Hangers.
 - d. Sockets.
 - e. Eye nuts.
 - f. Fasteners.
 - g. Anchors.
 - h. Saddles.
 - i. Brackets.
 - 2. Include rated capacities and furnished specialties and accessories.
- B. Shop Drawings: Signed and sealed by a qualified professional engineer. For fabrication and installation details for electrical hangers and support systems.

1. Hangers. Include product data for components.
2. Slotted support systems.
3. Equipment supports.
4. Vibration Isolation Base Details: Detail fabrication including anchorages and attachments to structure and to supported equipment. Include adjustable motor bases, rails, and frames for equipment mounting.

1.4 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Reflected ceiling plan(s) and other details, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
1. Suspended ceiling components.
 2. Ductwork, piping, fittings, and supports.
 3. Structural members to which hangers and supports will be attached.
 4. Size and location of initial access modules for acoustical tile.
 5. Items penetrating finished ceiling, including the following:
 - a. Luminaires.
 - b. Air outlets and inlets.
 - c. Speakers.
 - d. Sprinklers.
 - e. Access panels.
 - f. Projectors.
- B. Seismic Qualification Data: Certificates, for hangers and supports for electrical equipment and systems, accessories, and components, from manufacturer.
1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
 2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
- C. Welding certificates.

1.5 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M.
- B. Welding Qualifications: Qualify procedures and personnel according to the following:
1. AWS D1.1/D1.1M.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Hangers and supports shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
 - 1. The term "withstand" means "the supported equipment and systems will remain in place without separation of any parts when subjected to the seismic forces specified and the supported equipment and systems will be fully operational after the seismic event."
 - 2. Component Importance Factor: 1.5.
- B. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Flame Rating: Class 1.
 - 2. Self-extinguishing according to ASTM D 635.

2.2 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

- A. Steel Slotted Support Systems: Preformed steel channels and angles with minimum 13/32-inch-diameter holes at a maximum of 8 inches o.c. in at least one surface.
 - 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. Allied Tube & Conduit; a part of Atkore International.
 - b. B-line, an Eaton business.
 - c. ERICO International Corporation.
 - d. GS Metals Corp.
 - e. Thomas & Betts Corporation; A Member of the ABB Group.
 - f. Unistrut; Part of Atkore International.
 - g. Or approved equal.
 - 2. Standard: Comply with MFMA-4 factory-fabricated components for field assembly.
 - 3. Material for Channel, Fittings, and Accessories: Galvanized steel.
 - 4. Channel Width: 1-1/4 inches.
 - 5. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
 - 6. Nonmetallic Coatings: Manufacturer's standard PVC, polyurethane, or polyester coating applied according to MFMA-4.
 - 7. Painted Coatings: Manufacturer's standard painted coating applied according to MFMA-4.
 - 8. Protect finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

- B. Conduit and Cable Support Devices: Stainless-steel hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.
- C. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for nonarmored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be made of malleable iron.
- D. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M steel plates, shapes, and bars; black and galvanized.
- E. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:
 - 1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
 - 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) Hilti, Inc.
 - 2) ITW Ramset/Red Head; Illinois Tool Works, Inc.
 - 3) MKT Fastening, LLC.
 - 4) Or approved equal.
 - 2. Mechanical-Expansion Anchors: Insert-wedge-type, [**zinc-coated**] [**stainless**] steel, for use in hardened portland cement concrete, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) B-line, an Eaton business.
 - 2) Empire Tool and Manufacturing Co., Inc.
 - 3) Hilti, Inc.
 - 4) ITW Ramset/Red Head; Illinois Tool Works, Inc.
 - 5) Or approved equal.
 - 3. Concrete Inserts: Steel or malleable-iron, slotted support system units are similar to MSS Type 18 units and comply with MFMA-4 or MSS SP-58.
 - 4. Clamps for Attachment to Steel Structural Elements: MSS SP-58 units are suitable for attached structural element.
 - 5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
 - 6. Toggle Bolts: All-steel springhead type.
 - 7. Hanger Rods: Threaded steel.

2.3 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

- A. Description: Welded or bolted structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.

PART 3 - EXECUTION

3.1 APPLICATION

- A. Comply with the following standards for application and installation requirements of hangers and supports, except where requirements on Drawings or in this Section are stricter:
 - 1. NECA 1.
 - 2. NECA 101
- B. Comply with requirements for raceways and boxes specified in Section 26 05 33 "Raceways and Boxes for Electrical Systems."
- C. Maximum Support Spacing and Minimum Hanger Rod Size for Raceways: Space supports for EMT, IMC, and RMC as required by NFPA 70. Minimum rod size shall be 1/4 inch in diameter.
- D. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.
 - 1. Secure raceways and cables to these supports with two-bolt conduit clamps.

3.2 SUPPORT INSTALLATION

- A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this article.
- B. Raceway Support Methods: In addition to methods described in NECA 1, EMT and RMC may be supported by openings through structure members, according to NFPA 70.
- C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.
- D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:
 - 1. To Wood: Fasten with lag screws or through bolts.

2. To New Concrete: Bolt to concrete inserts.
 3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
 4. To Existing Concrete: Expansion anchor fasteners.
 5. Instead of expansion anchors, powder-actuated driven threaded studs provided with lock washers and nuts may be used in existing standard-weight concrete 4 inches thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inches thick.
 6. To Steel: Welded threaded studs complying with AWS D1.1/D1.1M, with lock washers and nuts.
 7. To Light Steel: Sheet metal screws.
 8. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate by means that comply with seismic-restraint strength and anchorage requirements.
- E. Drill holes for expansion anchors in concrete at locations and to depths that avoid the need for reinforcing bars.

3.3 INSTALLATION OF FABRICATED METAL SUPPORTS

- A. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.
- B. Field Welding: Comply with AWS D1.1/D1.1M.

3.4 CONCRETE BASES

- A. Construct concrete bases of dimensions indicated, but not less than 4 inches larger in both directions than supported unit, and so anchors will be a minimum of 10 bolt diameters from edge of the base.
- B. Use 3000-psi, 28-day compressive-strength concrete. Concrete materials, reinforcement, and placement requirements are specified in
- C. Anchor equipment to concrete base as follows:
 1. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 2. Install anchor bolts to elevations required for proper attachment to supported equipment.
 3. Install anchor bolts according to anchor-bolt manufacturer's written instructions.

3.5 PAINTING

- A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
 - 1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils.
- B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION 26 05 29

SECTION 26 05 33 - RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Metal conduits and fittings.
 - 2. Boxes, enclosures, and cabinets.

1.3 DEFINITIONS

- A. GRC: Galvanized rigid steel conduit.
- B. IMC: Intermediate metal conduit.

1.4 ACTION SUBMITTALS

- A. Product Data: For surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.
- B. Shop Drawings: For custom enclosures and cabinets. Include plans, elevations, sections, and attachment details.

1.5 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Conduit routing plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of items involved:
 - 1. Structural members in paths of conduit groups with common supports.
 - 2. HVAC and plumbing items and architectural features in paths of conduit groups with common supports.
- B. Source quality-control reports.

PART 2 - PRODUCTS

2.1 METAL CONDUITS AND FITTINGS

A. Metal Conduit:

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. AFC Cable Systems; a part of Atkore International.
 - b. Allied Tube & Conduit; a part of Atkore International.
 - c. Anamet Electrical, Inc.
 - d. O-Z/Gedney; a brand of Emerson Industrial Automation.
 - e. Western Tube and Conduit Corporation.
 - f. Or approved equal.
2. Listing and Labeling: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
3. GRC: Comply with ANSI C80.1 and UL 6.
4. IMC: Comply with ANSI C80.6 and UL 1242.
5. EMT: Comply with ANSI C80.3 and UL 797.
6. FMC: Comply with UL 1; zinc-coated steel.
7. LFMC: Flexible steel conduit with PVC jacket and complying with UL 360.

B. Metal Fittings:

1. Comply with NEMA FB 1 and UL 514B.
2. Listing and Labeling: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
3. Fittings, General: Listed and labeled for type of conduit, location, and use.
4. Fittings for EMT:
 - a. Material: Steel.
 - b. Type: compression.
5. Expansion Fittings: PVC or steel to match conduit type, complying with UL 651, rated for environmental conditions where installed, and including flexible external bonding jumper.

- C. Joint Compound for IMC or GRC: Approved, as defined in NFPA 70, by authorities having jurisdiction for use in conduit assemblies, and compounded for use to lubricate and protect threaded conduit joints from corrosion and to enhance their conductivity.

2.2 BOXES, ENCLOSURES, AND CABINETS

- 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. Crouse-Hinds, an Eaton business.
 2. EGS/Appleton Electric.
 3. Erickson Electrical Equipment Company.
 4. Hoffman; a brand of Pentair Equipment Protection.
 5. Hubbell Incorporated; Wiring Device-Kellems.
 6. Thomas & Betts Corporation; A Member of the ABB Group.
 7. Wiremold / Legrand.
 8. Or approved equal.
- B. General Requirements for Boxes, Enclosures, and Cabinets: Boxes, enclosures, and cabinets installed in wet locations shall be listed for use in wet locations.
- C. Sheet Metal Outlet and Device Boxes: Comply with NEMA OS 1 and UL 514A.
- D. Metal Floor Boxes:
1. Material: Cast metal.
 2. Type: Semi-adjustable.
 3. Shape: Round.
 4. Listing and Labeling: Metal floor boxes shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- E. Luminaire Outlet Boxes: Nonadjustable, designed for attachment of luminaire weighing 50 lb. Outlet boxes designed for attachment of luminaires weighing more than 50 lb shall be listed and marked for the maximum allowable weight.
- F. Paddle Fan Outlet Boxes: Nonadjustable, designed for attachment of paddle fan weighing 70 lb.
1. Listing and Labeling: Paddle fan outlet boxes shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- G. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.
- H. Device Box Dimensions: 4 inches square by 2-1/8 inches deep.
- I. Hinged-Cover Enclosures: Comply with UL 50 and NEMA 250, Type 1 with continuous-hinge cover with flush latch unless otherwise indicated.
1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.
- J. Cabinets:

1. NEMA 250, Type 1 galvanized-steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel.
2. Hinged door in front cover with flush latch and concealed hinge.
3. Key latch to match panelboards.
4. Metal barriers to separate wiring of different systems and voltage.
5. Accessory feet where required for freestanding equipment.

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

- A. Indoors: Apply raceway products as specified below unless otherwise indicated:
 1. Exposed, Not Subject to Physical Damage: EMT.
 2. Exposed and Subject to Severe Physical Damage: GRC. Raceway locations include the following:
 - a. Loading dock.
 - b. Corridors used for traffic of mechanized carts, forklifts, and pallet-handling units.
 - c. Mechanical rooms.
 3. Concealed in Ceilings and Interior Walls and Partitions: EMT.
 4. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.
 5. Damp or Wet Locations: GRC.
 6. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 4 stainless steel in institutional and commercial kitchens and damp or wet locations.
- B. Minimum Raceway Size: 3/4-inch trade size.
- C. Raceway Fittings: Compatible with raceways and suitable for use and location.
 1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings unless otherwise indicated. Comply with NEMA FB 2.10.
 2. EMT: Use compression, steel fittings. Comply with NEMA FB 2.10.
 3. Flexible Conduit: Use only fittings listed for use with flexible conduit. Comply with NEMA FB 2.20.
- D. Do not install aluminum conduits, boxes, or fittings in contact with concrete or earth.

3.2 INSTALLATION

- A. Comply with requirements in Section 26 05 29 "Hangers and Supports for Electrical Systems" for hangers and supports.

- B. Comply with NECA 1 and NECA 101 for installation requirements except where requirements on Drawings or in this article are stricter. Comply with NECA 102 for aluminum conduits. Comply with NFPA 70 limitations for types of raceways allowed in specific occupancies and number of floors.
- C. Do not fasten conduits onto the bottom side of a metal deck roof.
- D. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.
- E. Complete raceway installation before starting conductor installation.
- F. Arrange stub-ups so curved portions of bends are not visible above finished slab.
- G. Install no more than the equivalent of three 90-degree bends in any conduit run except for control wiring conduits, for which fewer bends are allowed. Support within 12 inches of changes in direction.
- H. Make bends in raceway using large-radius preformed ells. Field bending shall be according to NFPA 70 minimum radii requirements. Use only equipment specifically designed for material and size involved.
- I. Conceal conduit within finished walls, ceilings, and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines.
- J. Support conduit within 12 inches of enclosures to which attached.
- K. Stub-Ups to Above Recessed Ceilings:
 - 1. Use EMT or RMC for raceways.
 - 2. Use a conduit bushing or insulated fitting to terminate stub-ups not terminated in hubs or in an enclosure.
- L. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.
- M. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors including conductors smaller than No. 4 AWG.
- N. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install bushings on conduits up to 1-1/4-inch trade size and insulated throat metal bushings on 1-1/2-inch trade size and larger conduits terminated with locknuts. Install insulated throat metal grounding bushings on service conduits.
- O. Install raceways square to the enclosure and terminate at enclosures with locknuts. Install locknuts hand tight plus 1/4 turn more.

- P. Do not rely on locknuts to penetrate nonconductive coatings on enclosures. Remove coatings in the locknut area prior to assembling conduit to enclosure to assure a continuous ground path.
- Q. Cut conduit perpendicular to the length. For conduits 2-inch trade size and larger, use roll cutter or a guide to make cut straight and perpendicular to the length.
- R. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire. Cap underground raceways designated as spare above grade alongside raceways in use.
- S. Install raceway sealing fittings at accessible locations according to NFPA 70 and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings according to NFPA 70.
- T. Install devices to seal raceway interiors at accessible locations. Locate seals so no fittings or boxes are between the seal and the following changes of environments. Seal the interior of all raceways at the following points:
 - 1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
 - 2. Where otherwise required by NFPA 70.
- U. Comply with manufacturer's written instructions for solvent welding RNC and fittings.
- V. Expansion-Joint Fittings:
 - 1. Install fitting(s) that provide expansion and contraction for at least 0.00041 inch per foot of length of straight run per deg F of temperature change for PVC conduits. Install fitting(s) that provide expansion and contraction for at least 0.000078 inch per foot of length of straight run per deg F of temperature change for metal conduits.
 - 2. Install expansion fittings at all locations where conduits cross building or structure expansion joints.
 - 3. Install each expansion-joint fitting with position, mounting, and piston setting selected according to manufacturer's written instructions for conditions at specific location at time of installation. Install conduit supports to allow for expansion movement.
- W. Flexible Conduit Connections: Comply with NEMA RV 3. Use a maximum of 72 inches of flexible conduit for recessed and semirecessed luminaires, equipment subject to vibration, noise transmission, or movement; and for transformers and motors.
 - 1. Use LFMC in damp or wet locations subject to severe physical damage.
- X. Mount boxes at heights indicated on Drawings. If mounting heights of boxes are not individually indicated, give priority to ADA requirements. Install boxes with height measured to bottom of box unless otherwise indicated.
- Y. Horizontally separate boxes mounted on opposite sides of walls so they are not in the same vertical channel.

- Z. Locate boxes so that cover or plate will not span different building finishes.
- AA. Support boxes of three gangs or more from more than one side by spanning two framing members or mounting on brackets specifically designed for the purpose.
- BB. Fasten junction and pull boxes to or support from building structure. Do not support boxes by conduits.
- CC. Set metal floor boxes level and flush with finished floor surface.

3.3 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRICAL PENETRATIONS

- A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies.

3.4 FIRESTOPPING

- A. Install firestopping at penetrations of fire-rated floor and wall assemblies.

3.5 PROTECTION

- A. Protect coatings, finishes, and cabinets from damage and deterioration.
 - 1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.

END OF SECTION 26 05 33

SECTION 26 05 53 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Color and legend requirements for raceways, conductors, and warning labels and signs.
 - 2. Labels.
 - 3. Tapes and stencils.
 - 4. Cable ties.
 - 5. Fasteners for labels and signs.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for electrical identification products.
- B. Identification Schedule: For each piece of electrical equipment and electrical system components to be an index of nomenclature for electrical equipment and system components used in identification signs and labels. Use same designations indicated on Drawings.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Comply with ASME A13.1 and IEEE C2.
- B. Comply with NFPA 70.
- C. Comply with 29 CFR 1910.144 and 29 CFR 1910.145.
- D. Comply with ANSI Z535.4 for safety signs and labels.

- E. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, shall comply with UL 969.

2.2 COLOR AND LEGEND REQUIREMENTS

- A. Raceways and Cables Carrying Circuits at 600 V or Less:
 - 1. Black letters on an orange field.
 - 2. Legend: Indicate voltage and system or service type.
- B. Color-Coding for Phase- and Voltage-Level Identification, 600 V or Less: Use colors listed below for ungrounded feeder and branch-circuit conductors.
 - 1. Color shall be factory applied or field applied for sizes larger than No. 8 AWG if authorities having jurisdiction permit.
 - 2. Colors for 208/120-V Circuits:
 - a. Phase A: Black.
 - b. Phase B: Red.
 - c. Phase C: Blue.
 - 3. Colors for 480/277-V Circuits:
 - a. Phase A: Brown.
 - b. Phase B: Orange.
 - c. Phase C: Yellow.
 - 4. Color for Neutral: White.
 - 5. Color for Equipment Grounds: Green.
- C. Warning Label Colors:
 - 1. Identify system voltage with black letters on an orange background.
- D. Warning labels and signs shall include, but are not limited to, the following legends:
 - 1. Multiple Power Source Warning: "DANGER - ELECTRICAL SHOCK HAZARD - EQUIPMENT HAS MULTIPLE POWER SOURCES."
 - 2. Workspace Clearance Warning: "WARNING - OSHA REGULATION - AREA IN FRONT OF ELECTRICAL EQUIPMENT MUST BE KEPT CLEAR FOR 36 INCHES."
- E. Equipment Identification Labels:
 - 1. Black letters on a white field.

2.3 LABELS

- A. Vinyl Wraparound Labels: Preprinted, flexible labels laminated with a clear, weather- and chemical-resistant coating and matching wraparound clear adhesive tape for securing label ends.
- B. Equipment Labels: Engraved, laminated acrylic or Melamine label; Punched or drilled for screw mounting. Black letters on a white background. Minimum letter height shall be 3/8 inch.

2.4 TAPES AND STENCILS

- A. Marker Tapes: Vinyl or vinyl-cloth, self-adhesive wraparound type, with circuit identification legend machine printed by thermal transfer or equivalent process.
- B. Self-Adhesive Vinyl Tape: Colored, heavy duty, waterproof, fade resistant; not less than 3 mils thick by 1 to 2 inches wide; compounded for outdoor use.

2.5 CABLE TIES

- A. General-Purpose Cable Ties: Fungus inert, self-extinguishing, one piece, self-locking, and Type 6/6 nylon.
 - 1. Minimum Width: 3/16 inch.
 - 2. Tensile Strength at 73 Deg F according to ASTM D 638: 12,000 psi.
 - 3. Temperature Range: Minus 40 to plus 185 deg F.
 - 4. Color: Black, except where used for color-coding.

2.6 MISCELLANEOUS IDENTIFICATION PRODUCTS

- A. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Self-Adhesive Identification Products: Before applying electrical identification products, clean substrates of substances that could impair bond, using materials and methods recommended by manufacturer of identification product.

3.2 INSTALLATION

- A. Verify and coordinate identification names, abbreviations, colors, and other features with requirements in other Sections requiring identification applications, Drawings, Shop Drawings,

manufacturer's wiring diagrams, and operation and maintenance manual. Use consistent designations throughout Project.

- B. Install identifying devices before installing acoustical ceilings and similar concealment.
- C. Verify identity of each item before installing identification products.
- D. Apply identification devices to surfaces that require finish after completing finish work.
- E. Install signs with approved legend to facilitate proper identification, operation, and maintenance of electrical systems and connected items.
- F. System Identification for Raceways and Cables under 600 V: Identification shall completely encircle cable or conduit. Place identification of two-color markings in contact, side by side.
 - 1. Secure tight to surface of conductor, cable, or raceway.
- G. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, and signal connections.
- H. Emergency Operating Instruction Signs: Install instruction signs with white legend on a red background with minimum 3/8-inch-high letters for emergency instructions at equipment used for power transfer.
- I. Elevated Components: Increase sizes of labels, signs, and letters to those appropriate for viewing from the floor.
- J. Vinyl Wraparound Labels:
 - 1. Secure tight to surface of raceway or cable at a location with high visibility and accessibility.
 - 2. Attach labels that are not self-adhesive type with clear vinyl tape, with adhesive appropriate to the location and substrate.
- K. Self-Adhesive Wraparound Labels: Secure tight to surface at a location with high visibility and accessibility.
- L. Self-Adhesive Labels:
 - 1. On each item, install unique designation label that is consistent with wiring diagrams, schedules, and operation and maintenance manual.
 - 2. Unless otherwise indicated, provide a single line of text with 1/2-inch-high letters on 1-1/2-inch-high label; where two lines of text are required, use labels 2 inches high.
- M. Marker Tapes: Secure tight to surface at a location with high visibility and accessibility.
- N. Self-Adhesive Vinyl Tape: Secure tight to surface at a location with high visibility and accessibility.

1. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding.
- O. Tape and Stencil: Comply with requirements in painting Sections for surface preparation and paint application.
- P. Laminated Acrylic or Melamine Plastic Signs:
1. Attach signs that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.
 2. Unless otherwise indicated, provide a single line of text with 1/2-inch-high letters on 1-1/2-inch-high sign; where two lines of text are required, use labels 2 inches high.
- Q. Cable Ties: General purpose, for attaching tags, except as listed below:

3.3 IDENTIFICATION SCHEDULE

- A. Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment. Install access doors or panels to provide view of identifying devices.
- B. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, pull points, and locations of high visibility. Identify by system and circuit designation.
- C. Accessible Raceways and Metal-Clad Cables, 600 V or Less, for Service, Feeder, and Branch Circuits, More Than 30 A and 120 V to Ground: Identify with self-adhesive raceway labels or vinyl tape applied in bands.
1. Locate identification at changes in direction, at penetrations of walls and floors, at 50-foot maximum intervals in straight runs, and at 25-foot maximum intervals in congested areas.
- D. Power-Circuit Conductor Identification, 600 V or Less: For conductors in vaults, pull and junction boxes use vinyl wraparound labels or self-adhesive wraparound labels to identify the phase.
1. Locate identification at changes in direction, at penetrations of walls and floors, at 50-foot maximum intervals in straight runs, and at 25-foot maximum intervals in congested areas.
- E. Instructional Signs: Self-adhesive labels, including the color code for grounded and ungrounded conductors.
- F. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting: Drilled labels and screw mounted.
1. Apply to exterior of door, cover, or other access.

2. For equipment with multiple power or control sources, apply to door or cover of equipment, including, but not limited to, the following:
 - a. Power-transfer switches.
 - b. Controls with external control power connections.
- G. Emergency Operating Instruction Signs: Laminated acrylic or melamine plastic signs with white legend on a red background with minimum 3/8-inch-high letters for emergency instructions at equipment used for power transfer.
- H. Equipment Identification Labels:
 1. Indoor Equipment: Laminated acrylic or melamine plastic sign, with 2 cadmium – plated screws.
 2. Equipment to Be Labeled:
 - a. Panelboards: Typewritten directory of circuits in the location provided by panelboard manufacturer. Panelboard identification shall be in the form of a engraved, laminated acrylic or melamine label.
 - b. Enclosures and electrical cabinets.
 - c. Access doors and panels for concealed electrical items.
 - d. Switchboards.
 - e. Transformers: Label that includes tag designation indicated on Drawings for the transformer, feeder, and panelboards or equipment supplied by the secondary.
 - f. Emergency system boxes and enclosures.
 - g. Enclosed switches.
 - h. Enclosed circuit breakers.
 - i. Battery racks.
 - j. Power-generating units.
 - k. Monitoring and control equipment.

END OF SECTION 26 05 53

SECTION 26 09 23 - LIGHTING CONTROL DEVICES

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. Standalone daylight-harvesting switching and dimming controls.
 - 2. Indoor occupancy and vacancy sensors.
 - 3. Switchbox-mounted occupancy sensors.
 - 4. Emergency shunt relays.
- B. Related Requirements:
 - 1. Section 26 27 26 "Wiring Devices" for wall-box dimmers, non-networkable wall-switch occupancy sensors, and manual light switches.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings:
 - 1. Show installation details for the following:
 - a. Vacancy sensors.
 - 2. Interconnection diagrams showing field-installed wiring.
 - 3. Include diagrams for power, signal, and control wiring.

1.4 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Reflected ceiling plan(s) and elevations, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
 - 1. Suspended ceiling components.
 - 2. Structural members to which equipment will be attached.
 - 3. Items penetrating finished ceiling, including the following:

- a. Luminaires.
 - b. Air outlets and inlets.
 - c. Speakers.
 - d. Sprinklers.
 - e. Access panels.
 - f. Control modules.
- B. Field quality-control reports.
 - C. Sample Warranty: For manufacturer's warranties.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For each type of lighting control device to include in operation and maintenance manuals.
- B. Software and Firmware Operational Documentation:
 - 1. Software operating and upgrade manuals.
 - 2. Program Software Backup: On manufacturer's website. Provide names, versions, and website addresses for locations of installed software.
 - 3. Device address list.
 - 4. Printout of software application and graphic screens.

1.6 WARRANTY

- A. Manufacturer's Warranty: Manufacturer and Installer agree to repair or replace lighting control devices that fail(s) in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Faulty operation of lighting control software.
 - b. Faulty operation of lighting control devices.
 - 2. Warranty Period: [Two] year(s) from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 DAYLIGHT-HARVESTING DIMMING CONTROLS

- 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. Hubbell Building Automation, Inc.
 - 2. Leviton Manufacturing Co., Inc.
 - 3. Lithonia Lighting; Acuity Brands Lighting, Inc.

4. Or approved equal.
- B. System Description: Sensing daylight and electrical lighting levels, the system adjusts the indoor electrical lighting levels. As daylight increases, the lights are dimmed.
1. Lighting control set point is based on two lighting conditions:
 - a. When no daylight is present (target level).
 - b. When significant daylight is present.
 2. System programming is done with two hand-held, remote-control tools.
 - a. Initial setup tool.
 - b. Tool for occupants to adjust the target levels by increasing the set point up to 25 percent, or by minimizing the electric lighting level.
- C. Ceiling-Mounted Dimming Controls: Solid-state, light-level sensor unit, with integrated power pack mounted on luminaire, to detect changes in indoor lighting levels that are perceived by the eye.
- D. Electrical Components, Devices, and Accessories:
1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
 2. Sensor Output: 0- to 10-V dc to operate luminaires. Sensor is powered by controller unit.
 3. Light-Level Sensor Set-Point Adjustment Range: 20 to 60 fc.
- E. Power Pack: Digital controller capable of accepting 4 RJ45 inputs with two outputs rated for 20-A incandescent LED load at 120- and 277-V ac, for 16-A LED at 120- and 277-V ac, and for 1 hp at 120-V ac. Sensor has 24-V dc Class 2 power source, as defined by NFPA 70.

2.2 INDOOR OCCUPANCY AND VACANCY SENSORS

- 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. Cooper Industries, Inc.
 2. Hubbell Building Automation, Inc.
 3. Intermatic, Inc.
 4. Leviton Manufacturing Co., Inc.
 5. Lithonia Lighting; Acuity Brands Lighting, Inc.
 6. Philips Lighting Controls.
 7. Sensor Switch, Inc.
 8. Or approved equal.
- B. General Requirements for Sensors:
1. Ceiling-mounted, solid-state indoor vacancy sensors.

2. Dual technology.
 3. Integrated power pack.
 4. Hardwired connection to switch; and BAS and lighting control system.
 5. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
 6. Operation:
 - a. Vacancy Sensor: Unless otherwise indicated, lights are manually turned on and sensor turns lights off when the room is unoccupied; with a time delay for turning lights off, adjustable over a minimum range of 1 to 15 minutes.
 7. Sensor Output: Contacts rated to operate the connected relay, complying with UL 773A.
 8. Power: Line voltage.
 9. Power Pack: Dry contacts rated for 20-A LED load at 120- and 277-V ac, for 13-A tungsten at 120-V ac, and for 1 hp at 120-V ac. Sensor has 24-V dc, 150-mA, Class 2 power source, as defined by NFPA 70.
 10. Mounting:
 - a. Sensor: Suitable for mounting in any position on a standard outlet box.
 - b. Relay: Externally mounted through a 1/2-inch knockout in a standard electrical enclosure.
 - c. Time-Delay and Sensitivity Adjustments: Recessed and concealed behind hinged door.
 11. Indicator: Digital display, to show when motion is detected during testing and normal operation of sensor.
 12. Bypass Switch: Override the "on" function in case of sensor failure.
 13. Automatic Light-Level Sensor: Adjustable from 2 to 200 fc; turn lights off when selected lighting level is present.
- C. Dual-Technology Type: Ceiling mounted; detect occupants in coverage area using PIR and ultrasonic detection methods. The particular technology or combination of technologies that control on-off functions is selectable in the field by operating controls on unit.
1. Sensitivity Adjustment: Separate for each sensing technology.
 2. Detector Sensitivity: Detect occurrences of 6-inch-minimum movement of any portion of a human body that presents a target of not less than 36 sq. in., and detect a person of average size and weight moving not less than 12 inches in either a horizontal or a vertical manner at an approximate speed of 12 inches/s.
 3. Detection Coverage (Standard Room): Detect occupancy anywhere within a circular area of 1000 sq. ft. when mounted on a 96-inch-high ceiling.

2.3 SWITCHBOX-MOUNTED OCCUPANCY SENSORS

- 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. Cooper Industries, Inc.
 2. Hubbell Building Automation, Inc.

3. Leviton Manufacturing Co., Inc.
 4. Lithonia Lighting; Acuity Brands Lighting, Inc.
 5. Lutron Electronics Co., Inc.
 6. Sensor Switch, Inc.
 7. Or approved equal.
- B. General Requirements for Sensors: Automatic-wall-switch occupancy sensor with manual on-off switch, suitable for mounting in a single gang switchbox, with provisions for connection to BAS.
1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application, and shall comply with California Title 24.
 2. Occupancy Sensor Operation: Unless otherwise indicated, turn lights on when coverage area is occupied, and turn lights off when unoccupied; with a time delay for turning lights off, adjustable over a minimum range of 1 to 15 minutes.
 3. Operating Ambient Conditions: Dry interior conditions, 32 to 120 deg F.
 4. Switch Rating: Not less than 800-VA ballast or LED load at 120 V, 1200-VA ballast or LED load at 277 V, and 800-W incandescent.
- C. Wall-Switch Sensor Tag WS2:
1. Standard Range: 210-degree field of view, with a minimum coverage area of 900 sq. ft..
 2. Sensing Technology: PIR.
 3. Switch Type: SP, manual "on," automatic "off."
 4. Capable of controlling load in three-way application.
 5. Voltage: Dual voltage, 120 and 277 V.
 6. Ambient-Light Override: Concealed, field-adjustable, light-level sensor from 10 to 150 fc. The switch prevents the lights from turning on when the light level is higher than the set point of the sensor.
 7. Concealed, "off" time-delay selector at 30 seconds and 5, 10, and 20 minutes.
 8. Color: White.
 9. Faceplate: Color matched to switch.

2.4 EMERGENCY SHUNT RELAY

- A. Description: NC, electrically held relay, arranged for wiring in parallel with manual or automatic switching contacts; complying with UL 924.

2.5 CONDUCTORS AND CABLES

- A. Power Wiring to Supply Side of Remote-Control Power Sources: Not smaller than No. 12 AWG. Comply with requirements in Section 26 05 19 "Low-Voltage Electrical Power Conductors and Cables."
- B. Classes 2 and 3 Control Cable: Multiconductor cable with stranded-copper conductors not smaller than No. 18 AWG. Comply with requirements in Section 26 05 19 "Low-Voltage Electrical Power Conductors and Cables."

- C. Class 1 Control Cable: Multiconductor cable with stranded-copper conductors not smaller than No. 14 AWG. Comply with requirements in Section 26 05 19 "Low-Voltage Electrical Power Conductors and Cables."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine lighting control devices before installation. Reject lighting control devices that are wet, moisture damaged, or mold damaged.
- B. Examine walls and ceilings for suitable conditions where lighting control devices will be installed.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 SENSOR INSTALLATION

- A. Comply with NECA 1.
- B. Coordinate layout and installation of ceiling-mounted devices with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, smoke detectors, fire-suppression systems, and partition assemblies.
- C. Install and aim sensors in locations to achieve not less than 90-percent coverage of areas indicated. Do not exceed coverage limits specified in manufacturer's written instructions.

3.3 WIRING INSTALLATION

- A. Comply with NECA 1.
- B. Wiring Method: Comply with Section 26 05 19 "Low-Voltage Electrical Power Conductors and Cables." Minimum conduit size is 1/2 inch.
- C. Wiring within Enclosures: Comply with NECA 1. Separate power-limited and nonpower-limited conductors according to conductor manufacturer's written instructions.
- D. Size conductors according to lighting control device manufacturer's written instructions unless otherwise indicated.
- E. Splices, Taps, and Terminations: Make connections only on numbered terminal strips in junction, pull, and outlet boxes; terminal cabinets; and equipment enclosures.

3.4 IDENTIFICATION

- A. Identify components and power and control wiring according to Section 26 05 53 "Identification for Electrical Systems."
 - 1. Identify controlled circuits in lighting contactors.
 - 2. Identify circuits or luminaires controlled by photoelectric and occupancy sensors at each sensor.
- B. Label time switches and contactors with a unique designation.

3.5 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to evaluate lighting control devices and perform tests and inspections.
- B. Perform the following tests and inspections:
 - 1. Operational Test: After installing time switches and sensors, and after electrical circuitry has been energized, start units to confirm proper unit operation.
 - 2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- C. Lighting control devices will be considered defective if they do not pass tests and inspections.
- D. Prepare test and inspection reports.

3.6 ADJUSTING

- A. Occupancy Adjustments: When requested within 12 months from date of Substantial Completion, provide on-site assistance in adjusting lighting control devices to suit actual occupied conditions. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose.
 - 1. For occupancy and motion sensors, verify operation at outer limits of detector range. Set time delay to suit Owner's operations.
 - 2. For daylighting controls, adjust set points and deadband controls to suit Owner's operations.
 - 3. Align high-bay occupancy sensors using manufacturer's laser aiming tool.

3.7 SOFTWARE SERVICE AGREEMENT

- A. Technical Support: Beginning at Substantial Completion, service agreement shall include software support for two years.

- B. Upgrade Service: At Substantial Completion, update software to latest version. Install and program software upgrades that become available within two years from date of Substantial Completion. Upgrading software shall include operating system and new or revised licenses for using software.
 - 1. Upgrade Notice: At least 30 days to allow Owner to schedule and access the system and to upgrade computer equipment if necessary.

3.8 DEMONSTRATION

- A. Coordinate demonstration of products specified in this Section with demonstration requirements for low-voltage, programmable lighting control systems specified in Section 26 09 43.16 "Addressable-Luminaire Lighting Controls" and Section 26 09 43.23 "Relay-Based Lighting Controls."
- B. Train Owner's maintenance personnel to adjust, operate, and maintain lighting control devices.

END OF SECTION 26 09 23

SECTION 26 09 26 - LIGHTING CONTROL PANELBOARDS

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: Lighting controls using electrically operated circuit breakers.
- B. Related Requirements:
 - 1. Section 260923 "Lighting Control Devices" for time switches, photoelectric switches, occupancy sensors and vacancy sensors connected to building automation or lighting control systems, multipole contactors, and emergency shunt relays.

1.3 DEFINITIONS

- A. DDC: Direct digital control.
- B. IP: Internet protocol.
- C. Low Voltage: As defined in NFPA 70 for circuits and equipment operating at less than 50 V or for remote-control, signaling power-limited circuits.
- D. Monitoring: Acquisition, processing, communication, and display of equipment status data, metered electrical parameter values, power quality evaluation data, event and alarm signals, tabulated reports, and event logs.
- E. PC: Personal computer; sometimes plural as "PCs."
- F. RS-485: A serial network protocol, similar to RS-232, complying with TIA-485-A.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for control modules, power distribution components, manual switches and plates, and conductors and cables.

2. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.
- B. Shop Drawings: For each lighting control panelboard and related equipment.
1. Include dimensioned plans, elevations, sections, and details. Show tabulations of installed devices, equipment features, and ratings.
 2. Detail enclosure types and details for types other than NEMA 250, Type 1.
 3. Detail bus configuration and current and voltage ratings.
 4. Short-circuit current rating of panelboards and overcurrent protective devices.
 5. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.
 6. Include diagrams for power, signal, and control wiring.
 7. Block Diagram: Show interconnections between new and existing components specified in this Section and devices furnished with power distribution system components. Indicate data communication paths and identify networks, data buses, data gateways, concentrators, and other devices to be used. Describe characteristics of network and other data communication lines.

1.5 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Submit evidence that lighting controls are compatible with connected monitoring and control devices and systems specified in other Sections.
1. Show interconnecting signal and control wiring and interfacing devices that prove compatibility of inputs and outputs.
 2. For networked controls, list network protocols and provide statements from manufacturers that input and output devices comply with interoperability requirements of the network protocol.
- B. Qualification Data: For testing agency.
- C. Seismic Qualification Data: Certificates, for panelboards, accessories, and components, from manufacturer.
1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
 2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
 3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
- D. Field quality-control reports.

1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For lighting controls to include in emergency, operation, and maintenance manuals.
- B. Software and Firmware Operational Documentation:
 - 1. Software operating and upgrade manuals.
 - 2. Program Software Backup: On manufacturer's website. Provide names, versions, and website addresses for locations of installed software.
 - 3. Printout of software application and graphic screens.
 - 4. Device address list.

1.7 QUALITY ASSURANCE

- A. Testing Agency Qualifications:
 - 1. Member company of NETA.
 - a. Testing Agency's Field Supervisor: Certified by NETA to supervise on-site testing.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Handle and prepare panelboards for installation according to NECA 407.

1.9 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of lighting control panelboards that fail in materials or workmanship within specified warranty period.
 - 1. 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. Eaton.
 - 2. General Electric Company; GE Energy Management - Electrical Distribution.
 - 3. Lithonia Lighting; Acuity Brands Lighting, Inc.
 - 4. NexLight.
 - 5. Or approved equal.

- B. Source Limitations: Obtain lighting controls and power distribution components from single manufacturer.

2.2 SYSTEM DESCRIPTION

- A. Input signal from field-mounted or onboard signal source shall open or close one or more electrically operated circuit breakers in the lighting control panelboards. Any combination of inputs shall be programmable to any combination outputs.
- B. 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.
- C. Comply with 47 CFR, Subpart A and Subpart B, for Class A digital devices.

2.3 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Panelboards shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
 - 1. The term "withstand" means "the unit will remain in place without separation of any parts when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."
- B. Expansion Requirements: Capacity for future expansion of number of control functions by 25 percent of current capacity; to include equipment ratings, housing capacities, spare spaces for circuit breakers, terminals, number of conductors in control cables, and control software.
- C. Source Limitations: Obtain the following from a single manufacturer:
 - 1. Panelboards.
 - 2. Circuit breakers.
 - 3. Controllers.
 - 4. Slave panel controllers.

2.4 CONTROLLERS

- A. Description: Controllers shall contain the power supply and electronic control for operating and monitoring remotely operated branch circuit breakers.
 - 1. Comply with UL 916; with a microprocessor-based, solid-state, 365-day timing and control unit.
 - 2. Power Supply: Powered from the panelboard, sized to provide control power for the operation of the remotely operated circuit breakers, controller, bus system, low-voltage inputs, field-installed occupancy sensors, and low-voltage photo sensors.
 - 3. Integral keypad and digital-display front panel for local setup, including the following:

- a. Blink notice, time adjustable from software.
 - b. Ability to log and display remotely operated breaker-on-time.
 - c. Upgradeable firmware, so that the latest production features may be added in the future without replacing the module.
4. Nonvolatile memory shall retain all setup configurations. After a power failure, the controller shall automatically reboot and return to normal system operation.
 5. Ethernet Communications: Comply with ASHRAE 135 protocols.
 - a. Each input connected to the controller shall control any remotely operated breaker in any other networked lighting control panel.
 - b. A schedule programmed at one controller shall be able to control any remotely operated breaker in any other networked lighting control panel.
 6. Time Synchronization: The timing unit shall be updated not less than every 24 hour(s) with the network time server.
 7. Web Server: Display information listed below over a standard Web-enabled server for displaying information over a standard Web browser.
 - a. A secure, password-protected login screen for modifying operational parameters, accessible to authorized users via webpage interface.
 - b. Separate webpage, showing status of each main and slave lighting control panel, with the arrangement of breakers on the page matching the physical appearance of the panel. Status shall include breaker nametags, pole configuration, location in panel, actual contact state (on-off/tripped/manual), and breaker-on-time and blink information in real time.
 - c. Panel summary showing the master and slave panels connected to the controller.
 - d. Controller diagnostic information.
 - e. Show front panel mimic screens for setting up controller parameters, input types, zones, and operating schedules. These mimic screens shall also allow direct breaker control and zone overrides.
 8. Alarm and E-mail Notification: Automatically initiate alarms based on preconfigured conditions listed below and routing alarm alerts as set at the control panel.
 - a. General Alarms: Power loss, nonresponding breakers, loss and restoration of sub-net communications, loss and restoration of serial port communications, and loss and restoration of DDC system for HVAC commands.
 - b. Specific Alarms: Input status, zone status, breaker-on-time status (0 to 99999 hours).
 - c. E-mail Notification: Automatically route e-mail messages to five individual e-mail addresses. Within the body text of the e-mail, include a link that automatically redirects the user to the associated panels' status webpage.

2.5 CONTROL NETWORK

- A. Panel Controllers: Networked with other lighting control panel controllers in a peer-to-peer configuration using Ethernet 10Base-T network or two wire system.

- B. Compliance with ASHRAE 135: Controllers shall support serial MS/TP and Ethernet IP communications, and shall be able to communicate directly via DDC system for HVAC RS-485 serial networks and Ethernet 10Base-T networks as a native device.

2.6 MANUAL SWITCHES AND PLATES

- A. Keypads: Programmable and designed to control lighting applications and functions associated with the equipment of this Section. The units shall be able to control any system output device, including remotely operated circuit breakers, relays, dimmers, and analog outputs.
- B. Push-Button Switches: Modular, momentary-contact, low-voltage type.
 - 1. Match color specified in Section 262726 "Wiring Devices."
- C. Wall Plates: Single- and multigang plates as specified in Section 262726 "Wiring Devices."
- D. Legend: Engraved or permanently silk-screened on wall plate where indicated. Use designations indicated on Drawings.

2.7 CONDUCTORS AND CABLES

- A. Power Wiring to Supply Side of Class 2 Power Source: Not smaller than No. 12 AWG. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables."
- B. Class 2 and Class 3 Control Cables: Multiconductor cable with copper conductors not smaller than No. 18 AWG. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables."
- C. Class 1 Control Cables: Multiconductor cable with copper conductors not smaller than No. 14 AWG. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables."
- D. Network Cabling: Unshielded, twisted-pair cable with copper conductors, Category 5e.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Receive, inspect, handle, and store panelboards according to NECA 407.
- B. Examine panelboards before installation. Reject panelboards that are, damaged, rusted, or water saturated.
- C. Examine elements and surfaces to receive panelboards for compliance with installation tolerances and other conditions affecting performance of the Work.

- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 WIRING INSTALLATION

- A. Comply with NECA 1.
- B. Wiring Method: Install cables in raceways and cable trays, except within consoles, cabinets, desks, and counters and except in accessible ceiling spaces and in gypsum board partitions where unenclosed wiring method may be used. Conceal raceways and cables, except in unfinished spaces.
 - 1. Comply with requirements for raceways and boxes specified in Section 260533 "Raceways and Boxes for Electrical Systems."
- C. Wiring Method: Conceal conductors and cables in accessible ceilings, walls, and floors where possible.
- D. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points with no excess and without exceeding manufacturer's limitations on bending radii. Install lacing bars and distribution spools.

3.3 PANELBOARD INSTALLATION

- A. Comply with NECA 1.
- B. Install panelboards and accessories according to NECA 407.
- C. Comply with mounting and anchoring requirements specified in Section 260548.16 "Seismic Controls for Electrical Systems."
- D. Mounting Height: 90 inches to top of trim above finished floor unless otherwise indicated.
- E. Mount panelboard cabinet plumb and rigid without distortion of box. Mount recessed panelboards with fronts uniformly flush with wall finish and mating with back box.
- F. Install filler plates in unused spaces.

3.4 IDENTIFICATION

- A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."
- B. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs complying with Section 260553 "Identification for Electrical Systems."
- C. Create a directory to indicate loads served by each circuit; incorporate Owner's final room designations. Obtain approval before installing. Use a computer or typewriter to create directory; handwritten directories are unacceptable.

- D. Panelboard Nameplates: Label each panelboard with a nameplate complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

3.5 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.
- C. Perform the following tests and inspections:
 - 1. Visual and Mechanical Inspection:
 - a. Verify equipment nameplate.
 - b. Inspect physical and mechanical conditions.
 - c. Inspect anchorage, alignment, and grounding.
 - d. Verify that unit is clean.
 - e. Operate circuit breaker to ensure smooth operation.
 - f. Inspect bolted electrical connections for high resistance, using one or more of the following methods:
 - 1) Using a low-resistance ohmmeter.
 - 2) Verify bolted connections, using a calibrated torque wrench method according to manufacturer's published data.
 - g. Inspect operating mechanism, contacts, and arc chutes in unsealed units.
 - h. Perform adjustments for final protective device settings according to coordination study.
 - 2. Electrical Tests:
 - a. Measure resistance through bolted connections with low-resistance ohmmeter.
 - b. Contact/pole resistance test.
 - c. Insulation resistance tests on all control wiring with respect to ground. Applied potential shall be 500 V dc for 300-V rated cable and 1000 V dc for 600-V rated cable. Test duration shall be one minute. Follow manufacturer's recommendations for solid-state units.
 - d. Verify correct operation of auxiliary features.
- D. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
- E. Perform the following infrared scan tests and inspections, and prepare reports.
- F. Acceptance Testing Preparation:

1. Test insulation resistance for each panelboard bus, component, connecting supply, feeder, and control circuit.
2. Test continuity of each circuit.

G. Panelboard will be considered defective if it does not pass tests and inspections.

H. Prepare test and inspection reports, including a certified report that identifies panelboards included and describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations made after remedial action.

3.6 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.
2. Confirm correct communication wiring, initiate communications between panels, and program the lighting control system according to approved zone configuration schedules, time-of-day schedules, and input override assignments.

3.7 ADJUSTING

A. Occupancy Adjustments: When requested within 12 months from date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose.

3.8 SOFTWARE SERVICE AGREEMENT

A. Technical Support: Beginning at Substantial Completion, service agreement shall include software support for two years.

B. Upgrade Service: At Substantial Completion, update software to latest version. Install and program software upgrades that become available within two years from date of Substantial Completion. Upgrading software shall include operating system and new or revised licenses for using software.

1. Upgrade Notice: At least 30 days to allow Owner to schedule and access the system and to upgrade computer equipment if necessary.

3.9 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain control modules.

END OF SECTION 26 09 26

SECTION 26 24 16 - PANELBOARDS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Distribution panelboards.
 - 2. Lighting and appliance branch-circuit panelboards.
 - 3. Load centers.
 - 4. Electronic-grade panelboards.

1.3 DEFINITIONS

- A. ATS: Acceptance testing specification.
- B. GFCI: Ground-fault circuit interrupter.
- C. GFEP: Ground-fault equipment protection.
- D. HID: High-intensity discharge.
- E. MCCB: Molded-case circuit breaker.
- F. SPD: Surge protective device.
- G. VPR: Voltage protection rating.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of panelboard.
 - 1. Include materials, switching and overcurrent protective devices, SPDs, accessories, and components indicated.
 - 2. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes.
- B. Shop Drawings: For each panelboard and related equipment.

1. Include dimensioned plans, elevations, sections, and details.
2. Show tabulations of installed devices with nameplates, conductor termination sizes, equipment features, and ratings.
3. Include evidence of NRTL listing for series rating of installed devices.
4. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For testing agency.
- B. Panelboard Schedules: For installation in panelboards.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: ISO 9001 or 9002 certified.

PART 2 - PRODUCTS

2.1 DISCONNECTING AND OVERCURRENT PROTECTIVE DEVICES

- 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. Eaton.
 2. General Electric Company; GE Energy Management - Electrical Distribution.
 3. SIEMENS Industry, Inc.; Energy Management Division.
 4. Square D; by Schneider Electric.
 5. Or approved equal.
- B. MCCB: Comply with UL 489, with interrupting capacity to meet available fault currents.
 1. Thermal-Magnetic Circuit Breakers:
 - a. Inverse time-current element for low-level overloads.
 - b. Instantaneous magnetic trip element for short circuits.
 - c. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.
 2. MCCB Features and Accessories:
 - a. Standard frame sizes, trip ratings, and number of poles.
 - b. Breaker handle indicates tripped status.
 - c. UL listed for reverse connection without restrictive line or load ratings.
 - d. Lugs: Mechanical style, suitable for number, size, trip ratings, and conductor materials.

- e. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HID for feeding fluorescent and HID lighting circuits.
- f. Multipole units enclosed in a single housing with a single handle.

2.2 IDENTIFICATION

- A. Circuit Directory: Directory card inside panelboard door, mounted in transparent card holder.
 - 1. Circuit directory shall identify specific purpose with detail sufficient to distinguish it from all other circuits.
- B. Circuit Directory: Computer-generated circuit directory mounted inside panelboard door with transparent plastic protective cover.
 - 1. Circuit directory shall identify specific purpose with detail sufficient to distinguish it from all other circuits.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install overcurrent protective devices and controllers not already factory installed.
 - 1. Set field-adjustable, circuit-breaker trip ranges.
 - 2. Tighten bolted connections and circuit breaker connections using calibrated torque wrench or torque screwdriver per manufacturer's written instructions.
- B. Install filler plates in unused spaces.

3.2 IDENTIFICATION

- A. Identify field-installed conductors, interconnecting wiring, and components; install warning signs complying with requirements in Section 26 05 53 "Identification for Electrical Systems."
- B. Create a directory to indicate installed circuit loads; incorporate Owner's final room designations. Obtain approval before installing. Handwritten directories are not acceptable. Install directory inside panelboard door.

3.3 FIELD QUALITY CONTROL

- A. Acceptance Testing Preparation:
 - 1. Test insulation resistance for each panelboard bus, component, connecting supply, feeder, and control circuit.

2. Test continuity of each circuit.

B. Tests and Inspections:

1. Perform each visual and mechanical inspection and electrical test for low-voltage air circuit breakers stated in NETA ATS, Paragraph 7.6 Circuit Breakers.
2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.

3.4 ADJUSTING

- A. Adjust moving parts and operable components to function smoothly, and lubricate as recommended by manufacturer.

END OF SECTION 26 24 16

SECTION 26 27 26 - WIRING DEVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 1. Standard-grade receptacles, 125 V, 20 A.
 2. GFCI receptacles, 125 V, 20 A.
 3. Toggle switches, 120/277 V, 20 A.
 4. Occupancy sensors.
 5. Digital timer light switches.
 6. Wall-box dimmers.
 7. Wall plates.
 8. Floor service fittings.
 9. Poke-through assemblies.

1.3 DEFINITIONS

- A. BAS: Building automation system.
- B. EMI: Electromagnetic interference.
- C. GFCI: Ground-fault circuit interrupter.
- D. Pigtail: Short lead used to connect a device to a branch-circuit conductor.
- E. RFI: Radio-frequency interference.
- F. SPD: Surge protective device.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: List of legends and description of materials and process used for premarking wall plates.

1.5 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.

1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For wiring devices to include in all manufacturers' packing-label warnings and instruction manuals that include labeling conditions.

PART 2 - PRODUCTS

2.1 GENERAL WIRING-DEVICE REQUIREMENTS

- A. Wiring Devices, Components, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
- B. Comply with NFPA 70.
- C. Devices that are manufactured for use with modular plug-in connectors may be substituted under the following conditions:
 - 1. Connectors shall comply with UL 2459 and shall be made with stranding building wire.
 - 2. Devices shall comply with requirements in this Section.
- D. Devices for Owner-Furnished Equipment:
 - 1. Receptacles: Match plug configurations.
 - 2. Cord and Plug Sets: Match equipment requirements.
- E. Device Color:
 - 1. Wiring Devices Connected to Normal Power System: White unless otherwise indicated or required by NFPA 70 or device listing.
 - 2. Wiring Devices Connected to Essential Electrical System: Red.
- F. Wall Plate Color: For plastic covers, match device color.
- G. Source Limitations: Obtain each type of wiring device and associated wall plate from single source from single manufacturer.

2.2 STANDARD-GRADE RECEPTACLES, 125 V, 20 A

- A. Duplex Receptacles, 125 V, 20 A:

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. Eaton (Arrow Hart).
 - b. Hubbell Incorporated; Wiring Device-Kellems.
 - c. Leviton Manufacturing Co., Inc.
 - d. Pass & Seymour/Legrand (Pass & Seymour).
 - e. Or approved equal.
2. Configuration: NEMA WD 6, Configuration 5-20R.
3. Standards: Comply with UL 498 and FS W-C-596.

2.3 GFCI RECEPTACLES, 125 V, 20 A

A. Duplex GFCI Receptacles, 125 V, 20 A:

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. Eaton (Arrow Hart).
 - b. Hubbell Incorporated; Wiring Device-Kellems.
 - c. Leviton Manufacturing Co., Inc.
 - d. Pass & Seymour/Legrand (Pass & Seymour).
 - e. Or approved equal.
2. Description: Integral GFCI with "Test" and "Reset" buttons and LED indicator light.
3. Configuration: NEMA WD 6, Configuration 5-20R.
4. Standards: Comply with UL 498, UL 943 Class A, and FS W-C-596.

2.4 TOGGLE SWITCHES, 120/277 V, 20 A

A. Single-Pole Switches, 120/277 V, 20 A:

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. Eaton (Arrow Hart).
 - b. Hubbell Incorporated; Wiring Device-Kellems.
 - c. Leviton Manufacturing Co., Inc.
 - d. Pass & Seymour/Legrand (Pass & Seymour).
 - e. Or approved equal.
2. Standards: Comply with UL 20 and FS W-S-896.

B. Three-Way Switches, 120/277 V, 20 A:

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. Eaton (Arrow Hart).
 - b. Hubbell Incorporated; Wiring Device-Kellems.
 - c. Leviton Manufacturing Co., Inc.
 - d. Pass & Seymour/Legrand (Pass & Seymour).
 - e. Or approved equal.
2. Comply with UL 20 and FS W-S-896.

2.5 OCCUPANCY SENSORS

A. Wall Switch Sensor Light Switch, Dual Technology:

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. Eaton (Arrow Hart).
 - b. Hubbell Incorporated; Wiring Device-Kellems.
 - c. Leviton Manufacturing Co., Inc.
 - d. Pass & Seymour/Legrand (Pass & Seymour).
 - e. Or approved equal.
2. Description: Switchbox-mounted, combination lighting-control sensor and conventional switch lighting-control unit using dual technology.
3. Standards: Comply with UL 20.
4. Rated 960 W at 120 V ac for tungsten lighting, 10 A at 120 V ac or 10 A at 277 V ac for fluorescent or LED lighting, and 1/4 hp at 120 V ac.
5. Adjustable time delay of 15 minutes.
6. Automatic Light-Level Sensor: Adjustable from 2 to 200 fc.
7. Connections: Provisions for connection to BAS.

2.6 DIMMERS

A. Wall-Box Dimmers:

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. Eaton (Arrow Hart).
 - b. Hubbell Incorporated; Wiring Device-Kellems.

- c. Leviton Manufacturing Co., Inc.
 - d. Pass & Seymour/Legrand (Pass & Seymour).
 - e. Or approved equal.
2. Description: Modular, full-wave, solid-state dimmer switch with integral, quiet on-off switches, with audible frequency and EMI/RFI suppression filters.
 3. Control: Continuously adjustable slider; with single-pole or three-way switching.
 4. Standards: Comply with UL 1472.
 5. LED Lamp Dimmer Switches: Modular; compatible with LED lamps; trim potentiometer to adjust low-end dimming; capable of consistent dimming with low end not greater than 20 percent of full brightness.

2.7 WALL PLATES

- A. Single Source: Obtain wall plates from same manufacturer of wiring devices.
- B. Single and combination types shall match corresponding wiring devices.
 1. Plate-Securing Screws: Metal with head color to match plate finish.
 2. Material for Finished Spaces: Smooth, high-impact thermoplastic.
 3. Material for Unfinished Spaces: Smooth, high-impact thermoplastic.

2.8 FLOOR SERVICE FITTINGS

- A. Flush-Type Floor Service Fittings:
 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. Eaton (Arrow Hart).
 - b. Hubbell Premise Wiring.
 - c. Wiremold / Legrand.
 - d. Or approved equal.
 2. Description: Type: Modular, flush-type, units suitable for wiring method used, with cover flush with finished floor.
 3. Service Plate and Cover: Rectangular, solid brass with satin finish.
 4. Power Receptacle: NEMA WD 6 Configuration 5-20R, gray finish, unless otherwise indicated.
 5. Data Communication Outlet: Blank cover with bushed cable opening.

2.9 POKE-THROUGH ASSEMBLIES

- A. Description: Factory-fabricated and -wired assembly of below-floor junction box with multichanneled, through-floor raceway/firestop unit and detachable matching floor service-outlet assembly.
- B. 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. Hubbell Incorporated; Wiring Device-Kellems.
 - 2. Pass & Seymour/Legrand (Pass & Seymour).
 - 3. Square D; by Schneider Electric.
 - 4. Wiremold / Legrand.
 - 5. Or approved equal.
- C. Size: Selected to fit nominal 4-inch cored holes in floor and matched to floor thickness.
- D. Fire Rating: Unit is listed and labeled for fire rating of floor-ceiling assembly.
- E. Closure Plug: Arranged to close unused 4-inch cored openings and reestablish fire rating of floor.
- F. Wiring Raceways and Compartments: For a minimum of four No. 12 AWG conductors.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Comply with NECA 1, including mounting heights listed in that standard, unless otherwise indicated.
- B. Coordination with Other Trades:
 - 1. Protect installed devices and their boxes. Do not place wall finish materials over device boxes, and do not cut holes for boxes with routers that are guided by riding against outside of boxes.
 - 2. Keep outlet boxes free of plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other material that may contaminate the raceway system, conductors, and cables.
 - 3. Install device boxes in brick or block walls so that the cover plate does not cross a joint unless the joint is troweled flush with the face of the wall.
 - 4. Install wiring devices after all wall preparation, including painting, is complete.
- C. Conductors:
 - 1. Do not strip insulation from conductors until right before they are spliced or terminated on devices.

2. Strip insulation evenly around the conductor using tools designed for the purpose. Avoid scoring or nicking of solid wire or cutting strands from stranded wire.
3. The length of free conductors at outlets for devices shall comply with NFPA 70, Article 300, without pigtails.
4. Existing Conductors:
 - a. Cut back and pigtail, or replace all damaged conductors.
 - b. Straighten conductors that remain and remove corrosion and foreign matter.
 - c. Pigtailling existing conductors is permitted, provided the outlet box is large enough.

D. Device Installation:

1. Replace devices that have been in temporary use during construction and that were installed before building finishing operations were complete.
2. Keep each wiring device in its package or otherwise protected until it is time to connect conductors.
3. Do not remove surface protection, such as plastic film and smudge covers, until the last possible moment.
4. Connect devices to branch circuits using pigtails that are not less than 6 inches in length.
5. When there is a choice, use side wiring with binding-head screw terminals. Wrap solid conductor tightly clockwise, two-thirds to three-fourths of the way around terminal screw.
6. Use a torque screwdriver when a torque is recommended or required by manufacturer.
7. When conductors larger than No. 12 AWG are installed on 15- or 20-A circuits, splice No. 12 AWG pigtails for device connections.
8. Tighten unused terminal screws on the device.
9. When mounting into metal boxes, remove the fiber or plastic washers used to hold device-mounting screws in yokes, allowing metal-to-metal contact.

E. Receptacle Orientation:

1. Install ground pin of vertically mounted receptacles down, and on horizontally mounted receptacles to the right.

F. Device Plates: Do not use oversized or extra-deep plates. Repair wall finishes and remount outlet boxes when standard device plates do not fit flush or do not cover rough wall opening.

G. Dimmers:

1. Install dimmers within terms of their listing.
2. Verify that dimmers used for fan-speed control are listed for that application.
3. Install unshared neutral conductors on line and load side of dimmers according to manufacturers' device, listing conditions in the written instructions.

H. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical and with grounding terminal of receptacles on top. Group adjacent switches under single, multigang wall plates.

- I. Adjust locations of floor service outlets and service poles to suit arrangement of partitions and furnishings.

3.2 GFCI RECEPTACLES

- A. Install non-feed-through GFCI receptacles where protection of downstream receptacles is not required.

3.3 IDENTIFICATION

- A. Comply with Section 26 05 53 "Identification for Electrical Systems."
- B. Identify each receptacle with panelboard identification and circuit number. Use hot, stamped, or engraved machine printing with black-filled lettering on face of plate, and durable wire markers or tags inside outlet boxes.

3.4 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:
 - 1. Test Instruments: Use instruments that comply with UL 1436.
 - 2. Test Instrument for Receptacles: Digital wiring analyzer with digital readout or illuminated digital-display indicators of measurement.
- B. Tests for Receptacles:
 - 1. Line Voltage: Acceptable range is 105 to 132 V.
 - 2. Percent Voltage Drop under 15-A Load: A value of 6 percent or higher is unacceptable.
 - 3. Ground Impedance: Values of up to 2 ohms are acceptable.
 - 4. GFCI Trip: Test for tripping values specified in UL 1436 and UL 943.
 - 5. Using the test plug, verify that the device and its outlet box are securely mounted.
- C. Test straight-blade for the retention force of the grounding blade according to NFPA 99. Retention force shall be not less than 4 oz.
- D. Wiring device will be considered defective if it does not pass tests and inspections.
- E. Prepare test and inspection reports.

END OF SECTION 26 27 26

SECTION 26 28 16 - ENCLOSED SWITCHES AND CIRCUIT BREAKERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Fusible switches.
 - 2. Enclosures.

1.3 DEFINITIONS

- A. NC: Normally closed.
- B. NO: Normally open.
- C. SPDT: Single pole, double throw.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of enclosed switch, circuit breaker, accessory, and component indicated. Include nameplate ratings, dimensioned elevations, sections, weights, and manufacturers' technical data on features, performance, electrical characteristics, ratings, accessories, and finishes.
 - 1. Enclosure types and details for types other than NEMA 250, Type 1.
 - 2. Current and voltage ratings.
 - 3. Short-circuit current ratings (interrupting and withstand, as appropriate).
 - 4. Include evidence of a nationally recognized testing laboratory (NRTL) listing for series rating of installed devices.
 - 5. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices, accessories, and auxiliary components.
- B. Shop Drawings: For enclosed switches and circuit breakers.
 - 1. Include plans, elevations, sections, details, and attachments to other work.
 - 2. Include wiring diagrams for power, signal, and control wiring.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified testing agency.
- B. Seismic Qualification Data: Certificates, for enclosed switches and circuit breakers, accessories, and components, from manufacturer.
 - 1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
 - 2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
 - 3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
- C. Field quality-control reports.

1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For enclosed switches and circuit breakers to include in emergency, operation, and maintenance manuals.
 - 1. Include the following:
 - a. Manufacturer's written instructions for testing and adjusting enclosed switches and circuit breakers.

1.7 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Fuses: Equal to 10 percent of quantity installed for each size and type, but no fewer than three of each size and type.

1.8 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Accredited by NETA.
 - 1. Testing Agency's Field Supervisor: Currently certified by NETA to supervise on-site testing.

1.9 FIELD CONDITIONS

- A. Environmental Limitations: Rate equipment for continuous operation under the following conditions unless otherwise indicated:

1. Ambient Temperature: Not less than minus 22 deg F and not exceeding 104 deg F.
2. Altitude: Not exceeding 6600 feet.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Enclosed switches and circuit breakers shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
 1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."

2.2 GENERAL REQUIREMENTS

- A. Source Limitations: Obtain enclosed switches and circuit breakers, overcurrent protective devices, components, and accessories, within same product category, from single manufacturer.
- B. Product Selection for Restricted Space: Drawings indicate maximum dimensions for enclosed switches and circuit breakers, including clearances between enclosures, and adjacent surfaces and other items. Comply with indicated maximum dimensions.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by an NRTL, and marked for intended location and application.
- D. Comply with NFPA 70.

2.3 FUSIBLE SWITCHES

- 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. ABB Inc.
 2. Eaton.
 3. General Electric Company.
 4. SIEMENS Industry, Inc.; Energy Management Division.
 5. Square D; by Schneider Electric.
 6. Or approved equal.
- B. Type HD, Heavy Duty:
 1. Single throw.
 2. Three pole.
 3. 600-V ac.

4. 200 A and smaller.
5. UL 98 and NEMA KS 1, horsepower rated, with clips or bolt pads to accommodate indicated fuses.
6. Lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.

C. Accessories:

1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
3. Class R Fuse Kit: Provides rejection of other fuse types when Class R fuses are specified.
4. Lugs: Mechanical type, suitable for number, size, and conductor material.
5. Service-Rated Switches: Labeled for use as service equipment.

2.4 ENCLOSURES

- A. Enclosed Switches and Circuit Breakers: UL 489, NEMA KS 1, NEMA 250, and UL 50, to comply with environmental conditions at installed location.
- B. Enclosure Finish: The enclosure shall be gray baked enamel paint, electrodeposited on cleaned, phosphatized steel (NEMA 250 Type 1).

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine elements and surfaces to receive enclosed switches and circuit breakers for compliance with installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
 1. Commencement of work shall indicate Installer's acceptance of the areas and conditions as satisfactory.

3.2 ENCLOSURE ENVIRONMENTAL RATING APPLICATIONS

- A. Enclosed Switches and Circuit Breakers: Provide enclosures at installed locations with the following environmental ratings.
 1. Indoor, Dry and Clean Locations: NEMA 250, Type 1.

3.3 INSTALLATION

- A. Coordinate layout and installation of switches, circuit breakers, and components with equipment served and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.
- B. Install individual wall-mounted switches and circuit breakers with tops at uniform height unless otherwise indicated.
- C. Temporary Lifting Provisions: Remove temporary lifting of eyes, channels, and brackets and temporary blocking of moving parts from enclosures and components.
- D. Install fuses in fusible devices.
- E. Comply with NFPA 70 and NECA 1.

3.4 IDENTIFICATION

- A. Comply with requirements in Section 26 05 53 "Identification for Electrical Systems."
 - 1. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs.
 - 2. Label each enclosure with engraved metal or laminated-plastic nameplate.

3.5 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Tests and Inspections for Switches:
 - 1. Visual and Mechanical Inspection:
 - a. Inspect physical and mechanical condition.
 - b. Inspect anchorage, alignment, grounding, and clearances.
 - c. Verify that the unit is clean.
 - d. Verify blade alignment, blade penetration, travel stops, and mechanical operation.
 - e. Verify that fuse sizes and types match the Specifications and Drawings.
 - f. Verify that each fuse has adequate mechanical support and contact integrity.
 - g. Inspect bolted electrical connections for high resistance using one of the two following methods:
 - 1) Use a low-resistance ohmmeter.
 - a) Compare bolted connection resistance values to values of similar connections. Investigate values that deviate from those of similar bolted connections by more than 50 percent of the lowest value.

- 2) Verify tightness of accessible bolted electrical connections by calibrated torque-wrench method in accordance with manufacturer's published data or NETA ATS Table 100.12.
 - a) Bolt-torque levels shall be in accordance with manufacturer's published data. In the absence of manufacturer's published data, use NETA ATS Table 100.12.
 - h. Verify that operation and sequencing of interlocking systems is as described in the Specifications and shown on the Drawings.
 - i. Verify correct phase barrier installation.
 - j. Verify lubrication of moving current-carrying parts and moving and sliding surfaces.
- C. Enclosed switches and circuit breakers will be considered defective if they do not pass tests and inspections.
- D. Prepare test and inspection reports.
 1. Test procedures used.
 2. Include identification of each enclosed switch and circuit breaker tested and describe test results.
 3. List deficiencies detected, remedial action taken, and observations after remedial action.

3.6 ADJUSTING

- A. Adjust moving parts and operable components to function smoothly, and lubricate as recommended by manufacturer.

END OF SECTION 26 28 16

SECTION 26 51 19 - LED INTERIOR LIGHTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this Section.

1.2 SUMMARY

- A. Section includes the following types of LED luminaires:
 - 1. Cylinder.
 - 2. Downlight.
 - 3. Recessed, linear.
 - 4. Strip light.
 - 5. Surface mount, linear.
 - 6. Suspended, linear.
- B. Related Requirements:
 - 1. Section 26 09 23 "Lighting Control Devices" for automatic control of lighting, including time switches, photoelectric relays, occupancy sensors, and multipole lighting relays and contactors.

1.3 DEFINITIONS

- A. CCT: Correlated color temperature.
- B. CRI: Color Rendering Index.
- C. Fixture: See "Luminaire."
- D. IP: International Protection or Ingress Protection Rating.
- E. LED: Light-emitting diode.
- F. Lumen: Measured output of lamp and luminaire, or both.
- G. Luminaire: Complete lighting unit, including lamp, reflector, and housing.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
1. Arrange in order of luminaire designation.
 2. Include data on features, accessories, and finishes.
 3. Include physical description and dimensions of luminaires.
 4. Include emergency lighting units, including batteries and chargers.
 5. Include life, output (lumens, CCT, and CRI), and energy-efficiency data.
 6. Photometric data and adjustment factors based on laboratory tests, complying with IES "Lighting Measurements Testing and Calculation Guides" for each luminaire type. The adjustment factors shall be for lamps and accessories identical to those indicated for the luminaire as applied in this Project IES LM-79 and IES LM-80.
 - a. Manufacturers' Certified Data: Photometric data certified by manufacturer's laboratory with a current accreditation under the National Voluntary Laboratory Accreditation Program for Energy Efficient Lighting Products.
- B. Shop Drawings: For nonstandard or custom luminaires.
1. Include plans, elevations, sections, and mounting and attachment details.
 2. Include details of luminaire assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
 3. Include diagrams for power, signal, and control wiring.
- C. Product Schedule: For luminaires and lamps. Use same designations indicated on Drawings.

1.5 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Reflected ceiling plan(s) and other details, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
1. Luminaires.
 2. Suspended ceiling components.
 3. Partitions and millwork that penetrate the ceiling or extend to within 12 inches of the plane of the luminaires.
 4. Structural members to which equipment and luminaires will be attached.
 5. Initial access modules for acoustical tile, including size and locations.
 6. Items penetrating finished ceiling, including the following:
 - a. Other luminaires.
 - b. Air outlets and inlets.
 - c. Speakers.
 - d. Sprinklers.
 - e. Access panels.
 - f. Ceiling-mounted projectors.

7. Moldings.
- B. Qualification Data: For testing laboratory providing photometric data for luminaires.
 - C. Seismic Qualification Data: For luminaires, accessories, and components, from manufacturer.
 1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
 2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
 3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
 - D. Product Certificates: For each type of luminaire.
 - E. Product Test Reports: For each type of luminaire, for tests performed by manufacturer and witnessed by a qualified testing agency.
 - F. Sample warranty.

1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For luminaires and lighting systems to include in operation and maintenance manuals.
 1. Provide a list of all lamp types used on Project; use ANSI and manufacturers' codes.

1.7 QUALITY ASSURANCE

- A. Luminaire Photometric Data Testing Laboratory Qualifications: Provided by an independent agency, with the experience and capability to conduct the testing indicated, that is an NRTL as defined by OSHA in 29 CFR 1910.7, accredited under the NVLAP for Energy Efficient Lighting Products, and complying with the applicable IES testing standards.
- B. Provide luminaires from a single manufacturer for each luminaire type.
- C. Each luminaire type shall be binned within a three-step MacAdam Ellipse to ensure color consistency among luminaires.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Protect finishes of exposed surfaces by applying a strippable, temporary protective covering before shipping.

1.9 WARRANTY

- A. Warranty: Manufacturer and Installer agree to repair or replace components of luminaires that fail in materials or workmanship within specified warranty period.
- B. Warranty Period: Five year(s) from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Luminaires and lamps shall be labeled vibration and shock resistant.
 - 1. The term "withstand" means "the luminaire will remain in place without separation of any parts when subjected to the seismic forces specified and the luminaire will be fully operational during and after the seismic event."
- B. Ambient Temperature: 5 to 104 deg F.
 - 1. Relative Humidity: Zero to 95 percent.
- C. Altitude: Sea level to 1000 feet.

2.2 LUMINAIRE REQUIREMENTS

- 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.
- B. Factory-Applied Labels: Comply with UL 1598. Include recommended lamps. Locate labels where they will be readily visible to service personnel, but not seen from normal viewing angles when lamps are in place.
 - 1. Label shall include the following lamp characteristics:
 - a. "USE ONLY" and include specific lamp type.
 - b. Lamp diameter, shape, size, wattage, and coating.
 - c. CCT and CRI.
- C. Recessed luminaires shall comply with NEMA LE 4.
- D. California Title 24 compliant.

2.3 DECORATIVE CYLINDER

- 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. Contech Lighting
 2. Focal Point.
 3. Lithonia Lighting; Acuity Brands Lighting, Inc.
 4. Or approved equal.
- B. Nominal Operating Voltage: 120 V ac 277 V ac.
- C. Lamp:
1. Minimum 250 lm.
 2. Minimum allowable efficacy of 80 lm/W.
 3. CRI of minimum 80. CCT of 4100 K.
 4. Rated lamp life of 50,000 hours to L70.
 5. Dimmable from 100 percent to 0 percent of maximum light output.
 6. Internal driver.
 7. User-Replaceable Lamps:
 - a. Bulb shape complying with ANSI C78.79.
 - b. Lamp base complying with ANSI C81.61 or IEC 60061-1.
 8. Lens Thickness: At least 0.125-inch minimum unless otherwise indicated.
- D. Housings:
1. Extruded-aluminum housing and heat sink.
 2. Clear powder-coat finish.
- E. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Components are designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.
- F. Diffusers and Globes:
1. Clear glass.
 2. Lens Thickness: At least 0.125-inch minimum unless otherwise indicated.
- G. With integral mounting provisions.
- H. Standards:
1. ENERGY STAR certified.
 2. RoHS compliant.
 3. UL Listing: Listed for damp location.

2.4 DOWNLIGHT

- 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. Focal Point LLC.
 2. Juno Lighting Group by Schneider Electric.
 3. Lighting Science Group.
 4. Lithonia Lighting; Acuity Brands Lighting, Inc.
 5. Or approved equal.
- B. Nominal Operating Voltage: 120 V ac 277 V ac.
- C. Lamp:
1. Minimum 1000 lm.
 2. Minimum allowable efficacy of 80 lm/W.
 3. CRI of minimum 80. CCT of 4100 K.
 4. Rated lamp life of 50,000 hours to L70.
 5. Dimmable from 100 percent to 0 percent of maximum light output.
 6. Internal driver.
 7. User-Replaceable Lamps:
 - a. Bulb shape complying with ANSI C78.79.
 - b. Lamp base complying with ANSI C81.61 or IEC 60061-1.
 8. Lens Thickness: At least 0.125-inch minimum unless otherwise indicated.
- D. Housings:
1. Extruded-aluminum housing and heat sink.
 2. Clear powder-coat finish.
 3. Universal mounting bracket.
 4. Integral junction box with conduit fittings.
- E. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.
- F. Diffusers and Globes:
1. Fixed lens.
 2. Wide light distribution.
 3. Clear glass.
 4. Acrylic Diffusers: One hundred percent virgin acrylic plastic, with high resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.
 5. Glass: Annealed crystal glass unless otherwise indicated.
 6. Lens Thickness: At least 0.125-inch minimum unless otherwise indicated.

G. Standards:

1. ENERGY STAR certified.
2. RoHS compliant.
3. UL Listing: Listed for damp location.
4. Recessed luminaires shall comply with NEMA LE 4.

2.5 RECESSED, LINEAR

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. Focal Point LLC.
2. Lithonia Lighting; Acuity Brands Lighting, Inc.
3. Or approved equal.

B. Nominal Operating Voltage: 120 V ac 277 V ac.

C. Lamp:

1. Minimum 1500 lm.
2. Minimum allowable efficacy of 85 lm/W.
3. CRI of minimum 80. CCT of 4100 K.
4. Rated lamp life of 50,000 hours to L70.
5. Dimmable from 100 percent to 0 percent of maximum light output.
6. Internal driver.
7. User-Replaceable Lamps:
 - a. Bulb shape complying with ANSI C78.79.
 - b. Lamp base complying with ANSI C81.61 or IEC 60061-1.
8. Lens Thickness: At least 0.125-inch minimum unless otherwise indicated.

D. Housings:

1. Extruded-aluminum housing and heat sink.
2. Clear powder-coat finish.
3. With integral mounting provisions.

E. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Components are designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.

F. Diffusers and Globes:

1. Prismatic acrylic.

2. Acrylic Diffusers: One hundred percent virgin acrylic plastic, with high resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.
3. Lens Thickness: At least 0.125-inch minimum unless otherwise indicated.

G. Standards:

1. ENERGY STAR certified.
2. RoHS compliant.
3. UL Listing: Listed for damp location.
4. NEMA LE 4.

2.6 SUSPENDED, LINEAR

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. Focal Point LLC.
2. Lithonia Lighting; Acuity Brands Lighting, Inc.
3. Or approved equal.

B. Nominal Operating Voltage: 120 V ac 277 V ac 12 V dc 24 V dc.

C. Lamp:

1. Minimum 3,000 lm.
2. Minimum allowable efficacy of 85 lm/W.
3. CRI of minimum 80 . CCT of 4100 K.
4. Rated lamp life of 50,000 hours to L70.
5. Dimmable from 100 percent to 0 percent of maximum light output.
6. Internal driver.
7. User-Replaceable Lamps:
 - a. Bulb shape complying with ANSI C78.79.
 - b. Lamp base complying with ANSI C81.61 or IEC 60061-1.
8. Lens Thickness: At least 0.125-inch minimum unless otherwise indicated.

D. Housings:

1. Extruded-aluminum housing and heat sink.
2. Clear powder-coat finish.
3. With integral mounting provisions.

E. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Components are designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.

F. Diffusers and Globes:

1. Prismatic acrylic.
2. Acrylic Diffusers: One hundred percent virgin acrylic plastic, with high resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.
3. Lens Thickness: At least 0.125-inch minimum unless otherwise indicated.

G. Standards:

1. ENERGY STAR certified.
2. RoHS compliant.
3. UL Listing: Listed for damp location.

2.7 SUSPENDED, NONLINEAR

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. Pablo Lighting
2. Focal Point LLC.
3. Or approved equal.

B. Nominal Operating Voltage: 120 V ac.

C. Lamp:

1. Minimum 1,400 lm.
2. Minimum allowable efficacy of 85 lm/W.
3. CRI of minimum 80. CCT of 4100 K.
4. Rated lamp life of 50,000 hours to L70.
5. Dimmable from 100 percent to 0 percent of maximum light output.
6. Internal driver.
7. User-Replaceable Lamps:
 - a. Bulb shape complying with ANSI C78.79.
 - b. Lamp base complying with ANSI C81.61.
8. Lens Thickness: At least 0.125-inch minimum unless otherwise indicated.

D. Housings:

1. Extruded-aluminum housing and heat sink.
2. Clear powder-coat finish.
3. Universal mounting bracket.
4. Integral junction box with conduit fittings.

E. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Components are

designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.

F. Diffusers and Globes:

1. Prismatic glass.
2. Glass: Annealed crystal glass unless otherwise indicated.
3. Lens Thickness: At least 0.125-inch minimum unless otherwise indicated.

G. Standards:

1. ENERGY STAR certified.
2. RoHS compliant.
3. UL Listing: Listed for damp location.

2.8 MATERIALS

A. Metal Parts:

1. Free of burrs and sharp corners and edges.
2. Sheet metal components shall be steel unless otherwise indicated.
3. Form and support to prevent warping and sagging.

B. Steel:

1. ASTM A 36/A 36M for carbon structural steel.
2. ASTM A 568/A 568M for sheet steel.

C. Galvanized Steel: ASTM A 653/A 653M.

D. Aluminum: ASTM B 209.

2.9 METAL FINISHES

- A. Variations in finishes are unacceptable in the same piece. Variations in finishes of adjoining components are acceptable if they are within the range of approved Samples and if they can be and are assembled or installed to minimize contrast.

2.10 LUMINAIRE SUPPORT

- A. Comply with requirements in Section 26 05 29 "Hangers and Supports for Electrical Systems" for channel and angle iron supports and nonmetallic channel and angle supports.
- B. Single-Stem Hangers: 1/2-inch steel tubing with swivel ball fittings and ceiling canopy. Finish same as luminaire.
- C. Wires: ASTM A 641/A 641 M, Class 3, soft temper, zinc-coated steel, 12 gage.

- D. Rod Hangers: 3/16-inch minimum diameter, cadmium-plated, threaded steel rod.
- E. Hook Hangers: Integrated assembly matched to luminaire, line voltage, and equipment with threaded attachment, cord, and locking-type plug.

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 luminaire to verify actual locations of luminaire and electrical connections before luminaire installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Comply with NECA 1.
- B. Install luminaires level, plumb, and square with ceilings and walls unless otherwise indicated.
- C. Install lamps in each luminaire.
- D. Installation of luminaires, relocated or new, along with associated lighting controls may cause disturbance of existing asbestos. Contractor to examine and provide any required abatement, as required, for installation of the luminaires and controls.
- E. Supports:
 - 1. Sized and rated for luminaire weight.
 - 2. Able to maintain luminaire position after cleaning and relamping.
 - 3. Provide support for luminaire without causing deflection of ceiling or wall.
 - 4. Luminaire-mounting devices shall be capable of supporting a horizontal force of 100 percent of luminaire weight and a vertical force of 400 percent of luminaire weight.
- F. Flush-Mounted Luminaires:
 - 1. Secured to outlet box.
 - 2. Attached to ceiling structural members at four points equally spaced around circumference of luminaire.
 - 3. Trim ring flush with finished surface.
- G. Wall-Mounted Luminaires:
 - 1. Attached using through bolts and backing plates on either side of wall.

2. Do not attach luminaires directly to gypsum board.

H. Suspended Luminaires:

1. Ceiling Mount:
 - a. Two 5/32-inch- diameter aircraft cable supports adjustable to 10 feet in length.
 - b. Pendant mount with 5/32-inch- diameter aircraft cable supports adjustable to 10 feet in length.
2. Stem-Mounted, Single-Unit Luminaires: Suspend with twin-stem hangers. Support with approved outlet box and accessories that hold stem and provide damping of luminaire oscillations. Support outlet box vertically to building structure using approved devices.
3. Continuous Rows of Luminaires: Use tubing or stem for wiring at one point and tubing or rod for suspension for each unit length of luminaire chassis, including one at each end.
4. Do not use ceiling grid as support for pendant luminaires. Connect support wires or rods to building structure.

I. Ceiling-Grid-Mounted Luminaires:

1. Secure to any required outlet box.
2. Secure luminaire to the luminaire opening using approved fasteners in a minimum of four locations, spaced near corners of luminaire.
3. Use approved devices and support components to connect luminaire to ceiling grid and building structure in a minimum of four locations, spaced near corners of luminaire.

- J. Comply with requirements in Section 26 05 19 "Low-Voltage Electrical Power Conductors and Cables" for wiring connections.

3.3 IDENTIFICATION

- A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 26 05 53 "Identification for Electrical Systems."

3.4 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:
1. Operational Test: After installing luminaires, switches, and accessories, and after electrical circuitry has been energized, test units to confirm proper operation.
 2. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to battery power and retransfer to normal.
- B. Luminaire will be considered defective if it does not pass operation tests and inspections.
- C. Prepare test and inspection reports.

3.5 ADJUSTING

- A. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting the direction of aim of luminaires to suit occupied conditions. Make up to two visits to Project during other-than-normal hours for this purpose. Some of this work may be required during hours of darkness.
1. During adjustment visits, inspect all luminaires. Replace lamps or luminaires that are defective.
 2. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.
 3. Adjust the aim of luminaires in the presence of the Architect.

END OF SECTION 26 51 19

SECTION 26 52 13 - EMERGENCY AND EXIT LIGHTING

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. Emergency lighting units.
 - 2. Exit signs.
 - 3. Luminaire supports.

1.3 DEFINITIONS

- A. CCT: Correlated color temperature.
- B. CRI: Color Rendering Index.
- C. Emergency Lighting Unit: A lighting unit with internal or external emergency battery powered supply and the means for controlling and charging the battery and unit operation.
- D. Fixture: See "Luminaire" Paragraph.
- E. Lumen: Measured output of lamp and luminaire, or both.
- F. Luminaire: Complete lighting unit, including lamp, reflector, and housing.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of emergency lighting unit, exit sign, and emergency lighting support.
 - 1. Include data on features, accessories, and finishes.
 - 2. Include physical description of the unit and dimensions.
 - 3. Battery and charger for light units.
 - 4. Include life, output of luminaire (lumens, CCT, and CRI), and energy-efficiency data.
 - 5. Include photometric data and adjustment factors based on laboratory tests, complying with IES LM-45, for each luminaire type.

- a. Testing Agency Certified Data: For indicated luminaires and signs, photometric data certified by a qualified independent testing agency. Photometric data for remaining luminaires and signs shall be certified by manufacturer.
- B. Shop Drawings: For nonstandard or custom luminaires.
 - 1. Include plans, elevations, sections, and mounting and attachment details.
 - 2. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
 - 3. Include diagrams for power, signal, and control wiring.
- C. Product Schedule:
 - 1. For emergency lighting units. Use same designations indicated on Drawings.
 - 2. For exit signs. Use same designations indicated on Drawings.

1.5 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Reflected ceiling plan(s) and other details, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
 - 1. Luminaires.
 - 2. Suspended ceiling components.
 - 3. Partitions and millwork that penetrate the ceiling or extend to within 12 inches of the plane of the luminaires.
 - 4. Structural members to which equipment will be attached.
 - 5. Size and location of initial access modules for acoustical tile.
 - 6. Items penetrating finished ceiling including the following:
 - a. Other luminaires.
 - b. Air outlets and inlets.
 - c. Speakers.
 - d. Ceiling-mounted projectors.
 - e. Sprinklers.
 - f. Access panels.
 - 7. Moldings.
- B. Qualification Data: For testing laboratory providing photometric data for luminaires.
- C. Product Certificates: For each type of luminaire.
- D. Seismic Qualification Data: For luminaires, accessories, and components, from manufacturer.
 - 1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.

2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
 3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
 4. Provide seismic qualification certificate for each piece of equipment.
- E. Product Test Reports: For each luminaire for tests performed by a qualified testing agency.
- F. Sample Warranty: For manufacturer's warranty.

1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For luminaires and lighting systems to include in emergency, operation, and maintenance manuals.
1. Provide a list of all lamp types used on Project; use ANSI and manufacturers' codes.

1.7 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
1. Luminaire-mounted, emergency battery pack: One for every 20 emergency lighting units. Furnish at least one of each type.
 2. Diffusers and Lenses: One for every 100 of each type and rating installed. Furnish at least one of each type.

1.8 QUALITY ASSURANCE

- A. Luminaire Photometric Data Testing Laboratory Qualifications: Provided by an independent agency, with the experience and capability to conduct the testing indicated, that is an NRTL as defined by OSHA in 29 CFR 1910.7, accredited under the National Volunteer Laboratory Accreditation Program for Energy Efficient Lighting Products, and complying with the applicable IES testing standards.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Protect finishes of exposed surfaces by applying a strippable, temporary protective covering before shipping.

1.10 WARRANTY

- A. Warranty: Manufacturer and Installer agree to repair or replace components of luminaires that fail in materials or workmanship within specified warranty period.
1. Warranty Period: Two year(s) from date of Substantial Completion.

- B. Special Warranty for Emergency Lighting Batteries: Manufacturer's standard form in which manufacturer of battery-powered emergency lighting unit agrees to repair or replace components of rechargeable batteries that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period for Emergency Power Unit Batteries: Five years from date of Substantial Completion. Full warranty shall apply for the entire warranty period.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Luminaires shall withstand the effects of earthquake motions determined according to ASCE/SEI 7. Luminaires and lamps shall be labeled vibration and shock resistant.
 - 1. The term "withstand" means "the luminaire will remain in place without separation of any parts when subjected to the seismic forces specified and the luminaire will be fully operational during and after the seismic event."

2.2 GENERAL REQUIREMENTS FOR EMERGENCY LIGHTING

- 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.
- B. NRTL Compliance: Fabricate and label emergency lighting units, exit signs, and batteries to comply with UL 924.
- C. Comply with NFPA 70 and NFPA 101.
- D. Comply with NEMA LE 4 for recessed luminaires.
- E. Lamp Base: Comply with ANSI C81.61 or IEC 60061-1.
- F. Bulb Shape: Complying with ANSI C79.1.
- G. Internal Type Emergency Power Unit: Self-contained, modular, battery-inverter unit, factory mounted within luminaire body and compatible with driver.
 - 1. Emergency Connection: Operate one lamp(s) continuously at an output of 1100 lumens each upon loss of normal power. Connect unswitched circuit to battery-inverter unit and switched circuit to luminaire ballast.
 - 2. Operation: Relay automatically turns lamp on when power-supply circuit voltage drops to 80 percent of nominal voltage or below. Lamp automatically disconnects from battery when voltage approaches deep-discharge level. When normal voltage is restored, relay disconnects lamps from battery, and battery is automatically recharged and floated on charger.

3. Environmental Limitations: Rate equipment for continuous operation under the following conditions unless otherwise indicated:
 - a. Ambient Temperature: Less than 0 deg F or exceeding 104 deg F, with an average value exceeding 95 deg F over a 24-hour period.
 - b. Humidity: More than 95 percent (condensing).
4. Test Push-Button and Indicator Light: Visible and accessible without opening luminaire 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.
5. Battery: Sealed, maintenance-free, nickel-cadmium type.
6. Charger: Fully automatic, solid-state, constant-current type with sealed power transfer relay.
7. Integral Self-Test: Factory-installed electronic device automatically initiates code-required test of unit emergency operation at required intervals. Test failure is annunciated by an integral audible alarm and a flashing red LED.

2.3 EXIT SIGNS

- A. General Requirements for Exit Signs: Comply with UL 924; for sign colors, visibility, luminance, and lettering size, comply with authorities having jurisdiction.
- B. Internally Lighted Signs:
 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. Evenlite, Inc.
 - b. Lithonia Lighting; Acuity Brands Lighting, Inc.
 - c. Or approved equal.
 2. Operating at nominal voltage of 120 V ac 277 V ac.
 3. Lamps for AC Operation: LEDs; 50,000 hours minimum rated lamp life.
 4. Self-Powered Exit Signs (Battery Type): Internal emergency power unit.

2.4 MATERIALS

- A. Metal Parts:
 1. Free of burrs and sharp corners and edges.
 2. Sheet metal components shall be steel unless otherwise indicated.
 3. Form and support to prevent warping and sagging.

- B. Doors, Frames, and Other Internal Access:
 1. Smooth operating, free of light leakage under operating conditions.
 2. Designed to permit relamping without use of tools.
 3. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.
- C. Diffusers and Globes:
 1. Prismatic acrylic.
 2. Glass: Annealed crystal glass unless otherwise indicated.
 3. Acrylic: 100 percent virgin acrylic plastic, with high resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.
 4. Lens Thickness: At least 0.125 inch minimum unless otherwise indicated.
- D. Housings:
 1. Extruded aluminum housing and heat sink.
 2. Clear powder coat finish.
- E. Conduit: Electrical metallic tubing, minimum 3/4 inch in diameter.

2.5 METAL FINISHES

- A. 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 LUMINAIRE SUPPORT COMPONENTS

- A. Comply with requirements in Section 26 05 29 "Hangers and Supports for Electrical Systems" for channel and angle iron supports and nonmetallic channel and angle supports.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for conditions affecting performance of luminaires.
- B. Examine roughing-in for luminaire to verify actual locations of luminaire and electrical connections before luminaire installation.
- C. Examine walls, floors, roofs, and ceilings for suitable conditions where emergency lighting luminaires will be installed.

- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Comply with NECA 1.
- B. Install luminaires level, plumb, and square with ceilings and walls unless otherwise indicated.
- C. Install lamps in each luminaire.
- D. Installation of luminaires, relocated or new, along with associated lighting controls may cause disturbance of existing asbestos. Contractor to examine and provide any required abatement, as required, for installation of the luminaires and controls.
- E. Supports:
 - 1. Sized and rated for luminaire and emergency power unit weight.
 - 2. Able to maintain luminaire position when testing emergency power unit.
 - 3. Provide support for luminaire and emergency power unit without causing deflection of ceiling or wall.
 - 4. Luminaire-mounting devices shall be capable of supporting a horizontal force of 100 percent of luminaire and emergency power unit weight and vertical force of 400 percent of luminaire weight.
- F. Wall-Mounted Luminaire Support:
 - 1. Attached to a minimum 20-gage backing plate attached to wall structural members.
 - 2. Do not attach luminaires directly to gypsum board.
- G. Suspended Luminaire Support:
 - 1. Pendants and Rods: Where longer than 48 inches, brace to limit swinging.
 - 2. Stem-Mounted, Single-Unit Luminaires: Suspend with twin-stem hangers. Support with approved outlet box and accessories that hold stem and provide damping of luminaire oscillations. Support outlet box vertically to building structure using approved devices.
 - 3. Continuous Rows of Luminaires: Use tubing or stem for wiring at one point and tubing or rod for suspension for each unit length of luminaire chassis, including one at each end.
 - 4. Do not use ceiling grid as support for pendant luminaires. Connect support wires or rods to building structure.
- H. Ceiling Grid Mounted Luminaires:
 - 1. Secure to any required outlet box.
 - 2. Secure emergency power unit using approved fasteners in a minimum of four locations, spaced near corners of emergency power unit.
 - 3. Use approved devices and support components to connect luminaire to ceiling grid and building structure in a minimum of four locations, spaced near corners of luminaire.

3.3 IDENTIFICATION

- A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 26 05 53 "Identification for Electrical Systems."

3.4 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:
 - 1. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to battery power and retransfer to normal.
- B. Luminaire will be considered defective if it does not pass operation tests and inspections.
- C. Prepare test and inspection reports.

3.5 STARTUP SERVICE

- A. Perform startup service:
 - 1. Charge batteries minimum of 24 hours and conduct one-hour discharge test.

3.6 ADJUSTING

- A. Adjustments: Within 12 months of date of Substantial Completion, provide on-site visit to do the following:
 - 1. Inspect all luminaires. Replace lamps, batteries, signs, or luminaires that are defective.
 - a. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.
 - 2. Conduct short-duration tests on all emergency lighting.

END OF SECTION 26 52 13

SUPPLEMENTARY SPECIAL PROVISIONS
APPENDICES

APPENDIX A
NOTICE OF EXEMPTION

NOTICE OF EXEMPTION

(Check one or both)

TO: RECORDER/COUNTY CLERK
P.O. Box 1750, MS A-33
1600 PACIFIC HWY, ROOM 260
SAN DIEGO, CA 92101-2422

FROM: CITY OF SAN DIEGO
PUBLIC WORKS DEPARTMENT
525 B STREET, SUITE 750, MS 908A
SAN DIEGO, CA 92101

____ OFFICE OF PLANNING AND RESEARCH
1400 TENTH STREET, ROOM 121
SACRAMENTO, CA 95814

PROJECT/WBS No.: S-17009.02.06

PROJECT TITLE: 101 Ash St. Tenant Improvements

PROJECT LOCATION-SPECIFIC: 101 Ash St., San Diego, CA 92101, in Downtown/Centre City, in Council District 3

PROJECT LOCATION-CITY/COUNTY: San Diego/San Diego

DESCRIPTION OF NATURE, PURPOSE, AND BENEFICIARIES OF PROJECT: The scope of work consists of tenant improvements which include the demolition of selected existing walls and the construction of new partition walls, replacement and reconfiguration of acoustical ceiling, replacement of selected flooring, upgrades to the existing mechanical, electrical, plumbing, and information technology and audio/video systems, as well as the construction of fenced enclosures for storage at the basement levels.

NAME OF PUBLIC AGENCY APPROVING PROJECT: City of San Diego

NAME OF PERSON OR AGENCY CARRYING OUT PROJECT: City of San Diego Public Works Department,
Contact: Juan Baligad; Ph: (619) 533-5473
525 B Street, Suite 750, San Diego, CA 92101

EXEMPT STATUS: (CHECK ONE)

- MINISTERIAL (SEC. 21080(b)(1); 15268);
- DECLARED EMERGENCY (SEC. 21080(b)(3); 15269(a));
- EMERGENCY PROJECT (SEC. 21080(b)(4); 15269 (b)(c))
- CATEGORICAL EXEMPTION: 15301 EXISTING FACILITIES
- STATUTORY EXEMPTIONS:

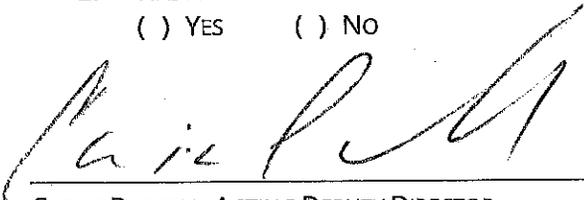
REASONS WHY PROJECT IS EXEMPT: The City of San Diego conducted an environmental review which determined that the project meets the categorical exemption criteria set forth in CEQA State Guidelines, Section 15301, which allow alterations and minor additions to existing facilities that involve only negligible or no expansion of existing use; where the project does not affect the use or purpose of the building, and where the exceptions listed in Section 15300.2 would not apply. No environmentally sensitive lands would be affected.

LEAD AGENCY CONTACT PERSON: Juan Baligad

TELEPHONE: (619) 533-5473

IF FILED BY APPLICANT:

- 1. ATTACH CERTIFIED DOCUMENT OF EXEMPTION FINDING.
- 2. HAS A NOTICE OF EXEMPTION BEEN FILED BY THE PUBLIC AGENCY APPROVING THE PROJECT?
() YES () NO



CARRIE PURCELL, ACTING DEPUTY DIRECTOR

8/25/17
DATE

CHECK ONE:

- SIGNED BY LEAD AGENCY
- SIGNED BY APPLICANT

DATE RECEIVED FOR FILING AT OPR:

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.)

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SUBJECT FIRE HYDRANT METER PROGRAM (FORMERLY: CONSTRUCTION METER PROGRAM)	PAGE 2 OF 10	EFFECTIVE DATE October 15, 2002
	SUPERSEDES DI 55.27	DATED April 21, 2000

- 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.

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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.

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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.

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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

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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

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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

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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.

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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. These 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.

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- 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).

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



Application for Fire Hydrant Meter (EXHIBIT A)

(For Office Use Only)

NS REQ	FAC#
DATE	BY

METER SHOP (619) 527-7449

Meter Information

Application Date	Requested Install Date:
------------------	-------------------------

Fire Hydrant Location: (Attach Detailed Map//Thomas Bros. Map Location or Construction drawing.) <u>Zip:</u>	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:	<input type="checkbox"/>	<input type="checkbox"/> 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: <small>(PERSON IN ACCOUNTS PAYABLE)</small>			Phone: ()
Site Contact Name and Title:			Phone: ()
Responsible Party Name:			Title:
Cal ID#			Phone: ()
Signature:		Date:	
<small>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</small>			

Fire Hydrant Meter Removal Request	Requested Removal Date:
Provide Current Meter Location if Different from Above:	
Signature:	Title: Date:
Phone: ()	Pager: ()

<input type="checkbox"/> City Meter	<input type="checkbox"/> 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

SAMPLE CITY INVOICE WITH SPEND CURVE

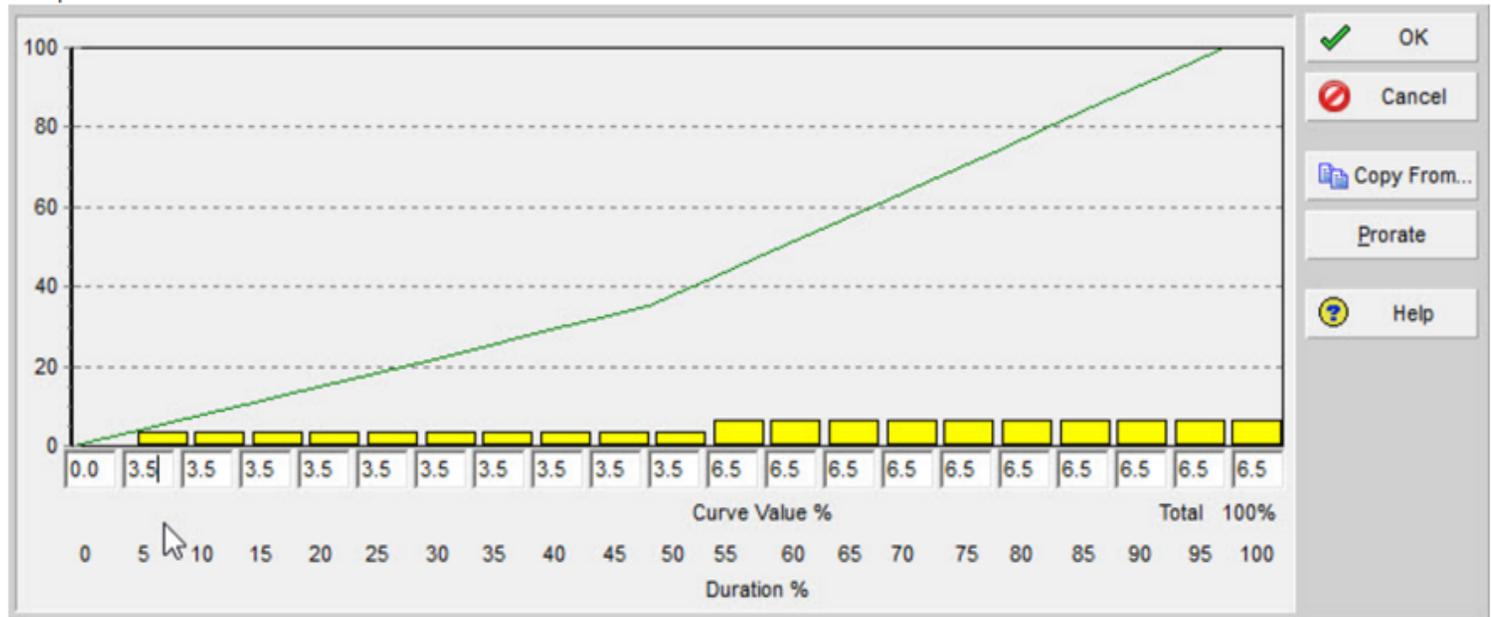
Sample Project Spend Curve

Sample Date Entries Required

Incremental Curve Value
Duration % Increment

0.0%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	6.5%	6.5%	6.5%	6.5%	6.5%	6.5%	6.5%	6.5%	6.5%	6.5%
0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%	70%	75%	80%	85%	90%	95%	100%

Sample Screenshot from Primavera P6



APPENDIX E

LOCATION MAP WITH ADJACENT PROJECTS

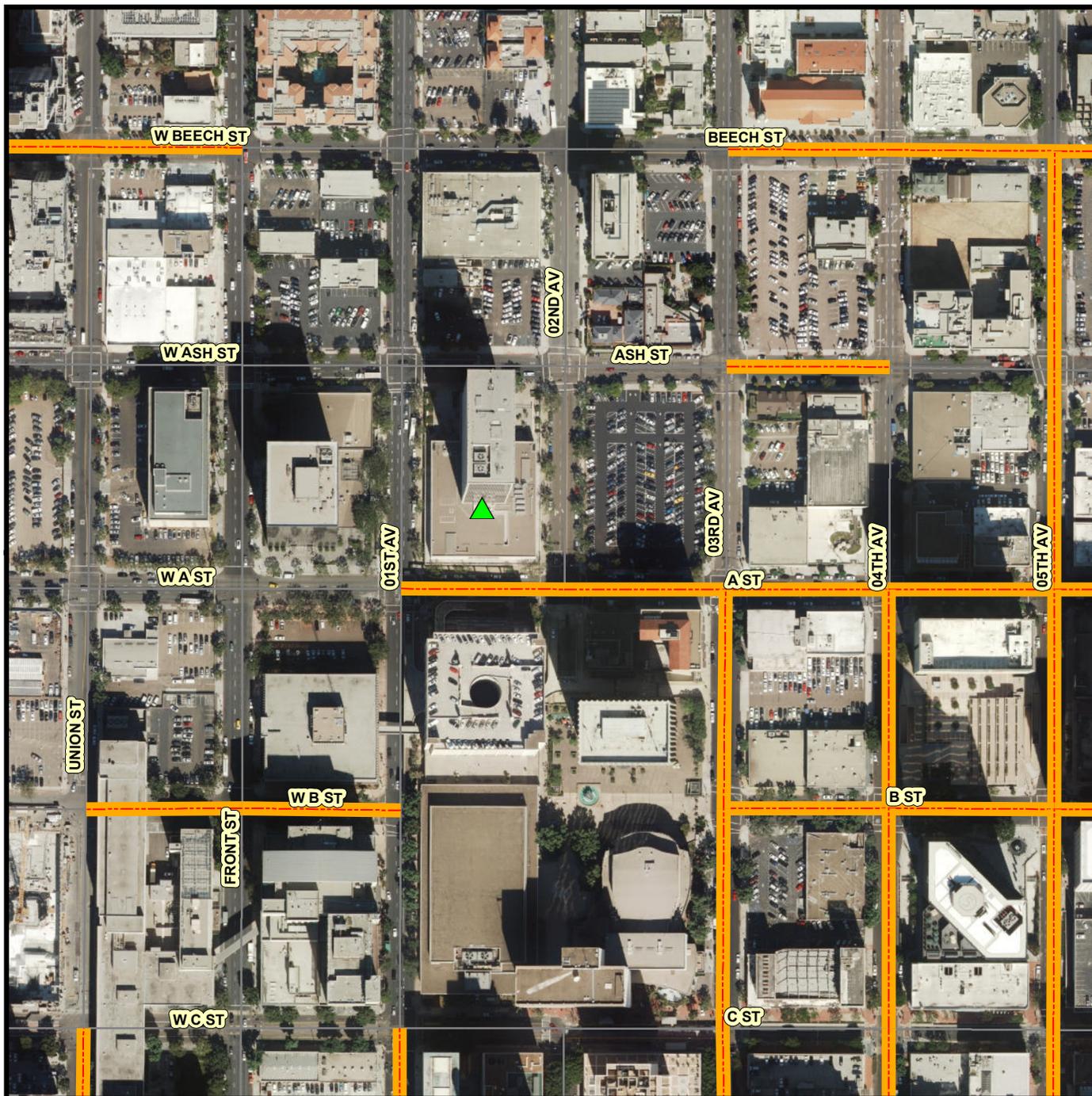
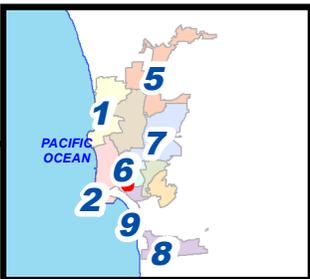
101 Ash St TI
Nearby Projects

SENIOR ENGINEER
Jason Grani
619-533-7525

PROJECT MANAGER
Jorge Acevedo
619-533-6657

PROJECT ENGINEER
Marlon Pérez
619-533-4658

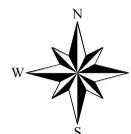
FOR QUESTIONS ABOUT THIS PROJECT
Call: 619-533-4207
Email: engineering@sandiego.gov



Legend

S-17009

GS Streets - Overlay B-00105



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APPENDIX F

ASBESTOS ABATEMENT SPECIFICATIONS

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APPENDIX - ASBESTOS ABATEMENT

Part 1 , GENERAL

1.1 SCOPE OF WORK

- a. The ABATEMENT CONTRACTOR shall provide all labor, equipment, tools and materials for the mitigation, removal and disposal of all asbestos containing materials as it relates to the 101 Ash Street Tenant Improvements (TI's).
- b. ABATEMENT CONTRACTOR Responsibility: The ABATEMENT CONTRACTOR shall assume full responsibility and liability for the compliance with all applicable Federal, State, and local regulations relating to work practices, transportation, disposal, and protection of workers, visitors to the site, and persons occupying areas adjacent to the site. The ABATEMENT CONTRACTOR shall hold the OWNER and the PROJECT MONITOR harmless for failure to comply with any applicable work, transportation, disposal, safety, health or other regulation on the part of himself, his employees, or his subcontractors. Any fines imposed on the GENERAL CONTRACTOR, OWNER, or PROJECT MONITOR by any regulatory agency as a result of the ABATEMENT CONTRACTOR's non-compliance with environmental regulations shall be paid or reimbursed by the ABATEMENT CONTRACTOR.
- c. Throughout the construction portion of the project if the GENERAL CONTRACTOR or any of its sub-contractors comes in contact with asbestos containing materials and disturbs the material, potentially causing a fiber release, the area shall be immediately vacated of all personnel following the procedures outlined in Section 1.8, F.,10b., of this Specification. All emergency response cleanup operations shall be completed by the ABATEMENT CONTRACTOR. The ABATEMENT CONTRACTOR must be able to respond to emergency release episodes within four hours from when contacted. The PROJECT MONITOR will verify the thoroughness of the cleanup activities and release the work area back over to the GENERAL CONTRACTOR once visual and air clearance has been achieved.
- d. The disturbance or dislocation of asbestos containing materials may cause asbestos fibers to be released into the building`s atmosphere, thereby creating a potential health hazard to other trades working in the area and building occupants. Apprise all workers, supervisory personnel, subcontractors and consultants who will be at the job site of the seriousness of the hazard and of proper work procedures which must be followed.
- e. Where in the performance of the work, workers, supervisory personnel, subcontractors, or consultants may encounter, disturb, or otherwise function in the immediate vicinity of any identified asbestos containing materials, take appropriate continuous measures as necessary to protect all building occupants from the potential hazard of exposure to airborne asbestos. Such measures shall include the procedures and methods described herein, and compliance with regulations of applicable federal, state and local agencies.

- f. The Abatement work shall be performed within agreed upon work hours submitted prior to project start which does not include designated City holidays.
- g. Only the freight elevator and stairwells shall be used to bring any equipment onto the various floors. ABATEMENT CONTRACTOR is responsible for providing the elevator padding to protect the wall finishes. Pads need to be in place before the elevator can be used. Additional protective material shall be placed on the floor in the elevator and all other areas of the building as-needed to protect from damage.
- h. Before the beginning of the work related to asbestos abatement, ABATEMENT CONTRACTOR shall hold a safety construction meeting with all asbestos related supervisors, workers, and other contractors on-site that provides an overview of the accepted asbestos work plan, decontamination procedures specific to this project (decontamination procedures shall be on paper with copies for all present), and disposal plan for this project. Meeting shall include the GENERAL CONTRACTOR, PROJECT MONITOR, OWNER, and any other designated City representative. Meeting time shall be provided for the PROJECT MONITOR to introduce themselves and identify their role in this project.
- i. The ABATEMENT CONTRACTOR shall inform himself of the conditions for the project, and is responsible for verifying the quantities and location of all work to be performed as outlined in this section. Failure to do so shall not relieve the ABATEMENT CONTRACTOR of his obligation to furnish all materials and labor necessary to carry out the provisions of this specification.
- j. An asbestos containing materials survey has been performed. The purpose of the survey was to identify asbestos containing materials that may be impacted during this project. The survey was limited to readily accessible suspect materials. Appendix A provides a summary of the survey and sample results. It shall be the ABATEMENT CONTRACTOR's responsibility to visit the site before starting work, and to assess the exact amounts and types of asbestos containing materials, as well as the physical difficulty involved in its removal.

NOTE: The following work (and other work listed in the RFP) may require a skilled trade's person to enter containment where asbestos exposure is possible. Under these circumstances, these trades' personnel will have to be asbestos and respirator trained, have appropriate medical clearance, and current fit test for respirator.

ALL LEVELS:

1. Asbestos containing fireproofing is present on the main structural support beams, throughout the decking, within wall cavities and interstitial spaces. Any wall or ceiling demolition must be performed by the ABATEMENT CONTRACTOR. Any wall partitions that can be detached without accessing the plenum area are excluded from this requirement.

2. The ABATEMENT CONTRACTOR will be required to provide pre/post cleaning to the plenum areas and spot removal of fireproofing from the decking *if needed* to accommodate anchoring of new and/or modified wall, ceiling, electrical, mechanical or plumbing systems. Removal, cleaning and anchor installation activities will take place under full containment utilizing engineering controls such as negative air machines, HEPA vacuums and decontamination chambers.
 3. Asbestos containing vinyl floor tile and mastic was also identified throughout all levels. Currently there are only plans to remove the existing vinyl flooring within designated areas on Level 2, but if it is to be impacted elsewhere the ABATEMENT CONTRACTOR shall additionally remove flooring and mastics under a negative pressure enclosure consistent with the requirements detailed in this specification.
 4. Care must be taken when working within plenum areas or wall cavities. Asbestos containing pipe insulation or other suspect materials may be present that were not identified during the asbestos survey. Asbestos containing pipe and boiler insulation was identified in good shape on the mechanical levels but no work is scheduled to take place that will impact materials.
- k. The work shall be performed as follows:
- i. Work Area for which asbestos fireproofing spot removal will take place.
 - (1) The entire Work Area for that phase of work shall have a minimum of two layers of fire resistant polyethylene sheeting of at least four millimeter in thickness on the walls, floors and covering all items. Depending on location of ceiling access, it may not be necessary to have the plastic extend to all exterior walls. A three unit decontamination unit shall be installed in accordance with this specification prior to any asbestos removal beginning.
 - (2) General sequence of work where fireproofing will be removed is as follows:

Note: All wall partitions to be removed should be detached and set aside prior to the establishment of the negative pressure enclosure. This will help in decreasing the amount of preparation time needed in building the containment. If this is not possible without accessing the plenum areas then wall partitions should remain.

 - (a) GENERAL CONTRACTOR will identify and mark tiles they will need removed for access to install anchors. System of marking tiles shall be agreed upon prior to start. Marking system shall not damage the ceiling tile or grid. ABATEMENT CONTRACTOR is responsible for repairing, cleaning, or replacing any damage to the ceiling system.
 - (b) ABATEMENT CONTRACTOR arrives on-site and stages all equipment and supplies.

- (c) PROJECT MONITOR reviews the equipment and related maintenance records, especially focusing on any device that utilizes HEPA filtration. Verification will also take place by the PROJECT MONITOR of personnel and related paperwork to ensure all asbestos certifications and medical paperwork are current.
 - (d) HVAC system will be deactivated and remain off until abatement activities are complete and air clearances have been achieved. Critical barriers shall be installed over all supply and return openings.
 - (e) The ABATEMENT CONTRACTOR begins installation of primary containment.
 - (f) The entire primary containment and engineering controls shall be fully operational and reviewed by the PROJECT MONITOR prior to start.
 - (g) Once ceiling access is started, all personnel inside the primary containment Work Area shall be asbestos certified and wearing appropriate personal protective equipment as listed in the specification.
- (3) Work sequence inside the containment shall consist of:
- (a) Gently remove the previously marked ceiling tile and HEPA vacuum it. Tiles shall be moved to location where they will not receive damage. ABATEMENT CONTRACTOR is responsible for having replacement tiles on-site for broken or damaged tiles. NOTE: The replacement tiles shall match the existing tiles in color, style, and size.
 - (b) HEPA vacuum the immediate area around the ceiling tile that was removed.
 - (c) Once all ceiling tiles that were previously marked by the GENERAL CONTRACTOR have been removed and surfaces cleaned the PROJECT MONITOR will conduct both visual and air clearances of the containment.
 - (d) Upon verification that air clearances have passed the GENERAL CONTRACTOR will be allowed into the containment to mark locations where fireproofing needs to be spot abated to accommodate anchor installation.
 - (e) Once spot abatement locations have been clearly marked the ABATEMENT CONTRACTOR will pre-wet the areas to be spot abated utilizing a penetrating encapsulant.

- (f) The GENERAL CONTRACTOR and ABATEMENT CONTRACTOR must take into consideration any overspray on conduits, ducting, hangars, or any other items within the plenum that may be impacted as a result of the construction work. All overspray that may be impacted shall also be cleaned by the abatement contractor prior to construction work taking place.
- (g) Conduct the spot abatement and cleaning using a minimum of two workers so that the material is placed directly into a waste bag.
- (h) ABATEMENT CONTRACTOR shall conduct a final HEPA vacuum and wipe down of the immediate area above the ceiling, horizontal surfaces below the removal area and the ceiling grid and remove the first layer of plastic from the walls and floors. The outer layer of plastic and critical barriers shall remain until all work is complete above the ceiling and ceiling tiles have been reinstalled.
- (i) PROJECT MONITOR will perform a visual inspection verifying that all marked fireproofing was removed and no visible debris remains.
- (j) The PROJECT MONITOR will then run a second round of air clearances prior to releasing the Work Area to the GENERAL CONTRACTOR.
- (k) GENERAL CONTRACTOR shall enter the containment at this time and install their anchors.
- (l) Following completion of all work above the ceiling the ABATEMENT CONTRACTOR shall reinstall ceiling tiles, clean all surrounding areas, and remove the final layer of plastic and critical barriers. The PROJECT MONITOR will perform one final visual inspection to verify the thoroughness of the final cleaning and containment removal.

1.2 DEFINITIONS

- A. Accredited or Accreditation (when referring to a person or laboratory): A person or laboratory accredited in accordance with section 206 of Title II of the Toxic Substances Control Act (TSCA).
- B. Aerosol: A system consisting of particles, solid or liquid, suspended in air.
- C. Air Cell: Insulation normally used on pipes and duct work that is comprised of corrugated cardboard which is frequently comprised of asbestos combined with cellulose or refractory binders.
- D. Air Monitoring: The process of measuring the fiber content of a specific volume of air.

- E. Amended Water: Water to which a surfactant has been added to decrease the surface tension to 35 or less dynes.
- F. Asbestos: The asbestiform varieties of serpentine (chrysotile), riebeckite (crocidolite), cummingtonite-grunerite, anthophyllite, and actinolite-tremolite. For purposes of determining respiratory and worker protection both the asbestiform and non-asbestiform varieties of the above minerals and any of these materials that have been chemically treated and/or altered shall be considered as asbestos.
- G. Asbestos Containing Material (ACM): Any material containing more than 1% by weight of asbestos of any type or mixture of types.
- H. Asbestos containing Building Material (ACBM): Surfacing ACM, thermal system insulation ACM, or miscellaneous ACM that is found in or on interior structural members or other parts of a building.
- I. Asbestos Containing Waste Material: Any material which is or is suspected of being or any material contaminated with an asbestos containing material which is to be removed from a Work Area for disposal.
- J. Asbestos debris: Pieces of ACBM that can be identified by color, texture, or composition, or means dust, if the dust is determined by an accredited inspector to be ACM.
- K. Authorized Visitor: The Owner, the OWNER's representative, testing lab personnel, the Architect/Engineer, emergency personnel or a representative of any federal, state and local regulatory or other agency having authority over the project.
- L. Barrier: Any surface that seals off the Work Area to inhibit the movement of fibers.
- M. Breathing Zone: A hemisphere forward of the shoulders with a radius of approximately 6 to 9 inches.
- N. California Code of Regulations (CCR): The CCR is a codification of the regulations of the various State Agencies.
- O. Ceiling Concentration: The concentration of an airborne substance that shall not be exceeded.
- P. Certified Industrial Hygienist (C.I.H.): An industrial hygienist certified in Comprehensive Practice by the American Board of Industrial Hygiene.
- Q. Class 1 or Class II Landfill: A disposal facility or part of a facility where hazardous waste is placed in or on land and which is not a land treatment facility, a surface impoundment, or an injection well.

- R. Code of Federal Regulations (CFR): The basic component of the Federal Register publication system. The CFR is a codification of the regulations of the various Federal Agencies.
- S. Competent Person: An agent of the ABATEMENT CONTRACTOR who is a Competent Person as defined in 8 CCR 1529. This person must be capable of identifying existing and predictable asbestos hazards in the surroundings or working conditions and who has authorization by the ABATEMENT CONTRACTOR to take prompt corrective measures to eliminate them.
- T. Curtained Doorway: Device to allow ingress and egress from one room to another while permitting minimal air movement between the rooms.
- U. Demolition: The wrecking or taking out of any building component, system, finish or assembly of a facility together with any related handling operations.
- V. Disposal Bag: A properly labeled 6 mil thick leak tight plastic bags used for transporting asbestos waste from work and to disposal site.
- W. Equipment Decontamination Enclosure System: Series of areas used for decontamination materials and equipment, typically consisting of a designated area of the Work Area (wash down station), washroom, holding room, container room, and an uncontaminated area.
 - 1. Wash Down Station: A designated section of the Work Area adjacent to the Equipment Decontamination Enclosure System. At this station there shall be a gross contamination removal shower with a filtration capability of 0.5 microns or less.
 - 2. Washroom: A room between the Work Area and the holding area in the equipment decontamination enclosure system. The washroom comprises an airlock.
 - 3. Holding Room: A chamber between the washroom and an uncontaminated area in the equipment decontamination enclosure system. The holding area comprises an airlock.
 - 4. Container Room: A chamber between the holding room and an uncontaminated area in the equipment decontamination enclosure system. The container room comprises an airlock.
- X. Encapsulant: A material that surrounds or embeds asbestos fibers in an adhesive matrix, to prevent release of fibers.
 - 1. Bridging encapsulant: an encapsulant that forms a discrete layer on the surface of an in situ asbestos matrix.

2. Penetrating encapsulant: an encapsulant that is absorbed by the in situ asbestos matrix without leaving a discrete surface layer.
 3. Removal encapsulant: a penetrating encapsulant specifically designed to minimize fiber release during removal of asbestos containing materials rather than for in situ encapsulation.
- Y. Encapsulation: Treatment of asbestos containing materials, with an encapsulant.
- Z. Enclosure: The construction of an air-tight, impermeable, permanent barrier around asbestos containing material to control the release of asbestos fibers into the air.
- AA. Filter: A media component used in respirators to remove solid or liquid particles from the inspired air.
- BB. Friable Asbestos Material: Material that contains more than 1.0% asbestos by weight and that can be crumbled, pulverized, or reduced to powder by hand pressure when dry. Mechanical means may also render a material friable.
- CC. GENERAL CONTRACTOR: The GENERAL CONTRACTOR refers to the individual or company that has been issued the primary award for all construction related activities, and is responsible for the hiring of skilled trades persons and sub-contractors needed to complete the work required in the contract documents.
- DD. Glovebag: A sack (typically constructed of 6 mil transparent polyethylene or polyvinylchloride plastic) with inward projecting long sleeve gloves, which are designed to enclose an object from which an asbestos containing material is to be removed.
- EE. Hazardous Waste (includes the definition identified in California Title 22): As defined in RCRA the term "hazardous waste" means a solid waste, or combination of solid wastes, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may:
1. Cause, or significantly contribute to an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or
 2. Pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed.
 3. As defined in the regulations, a solid waste is hazardous if it meets one of four conditions:
 - a. Exhibits a characteristic of a hazardous waste (40 CFR Sections 261.20 through 262.24).
 - b. Has been listed as hazardous (40 CFR Section 261.31 through 261.33).

- c. Is a mixture containing a listed hazardous waste and a non-hazardous solid waste (unless the mixture is specifically excluded or no longer exhibits any of the characteristics of hazardous waste).
 - d. Is not excluded from regulation as a hazardous waste.

- FF. HEPA Filter: A High Efficiency Particulate Air (HEPA) filter capable of trapping and retaining 99.97% of asbestos fibers greater than 0.3 microns in diameter.

- GG. HEPA Filter Vacuum Collection Equipment (or vacuum cleaner): High efficiency particulate air filtered vacuum collection equipment with a filter system capable of collecting and retaining asbestos fibers. Filters should be of 99.97% efficiency for retaining fibers of 0.3 microns or larger.

- HH. Negative Pressure Respirator: A respirator in which the air pressure inside the respiratory inlet covering is positive during exhalation in relation to the air pressure of the outside atmosphere and negative during inhalation in relation to the air pressure of the outside atmosphere.

- II. Negative Pressure Ventilation System: A pressure differential and ventilation system.

- JJ. OWNER: The OWNER is the City's Asbestos, Lead and Mold Program (ALMP) Manager, designated ALMP Project Manager or the Public Works Department Resident Engineer.

- KK. Permissible Exposure Limit (PEL): employee exposure to asbestos at concentration no greater than 0.1 fibers /cc of air averaged over an 8-hour period TWA.

- LL. Personal Monitoring: Sampling of the asbestos fiber concentrations within the breathing zone of an employee.

- MM. Pressure Differential and Ventilation System: A local exhaust system, utilizing HEPA filtration capable of maintaining a pressure differential with the inside of the Work Area at a lower pressure than any adjacent area, and which cleans re-circulated air or generates a constant air flow from adjacent areas into the Work Area.

- NN. PROJECT MONITOR: The PROJECT MONITOR is a full time representative of the OWNER at the job site during the asbestos related work. The PROJECT MONITOR has the authority to stop the work upon verbal order if requirement of the Contract Documents or regulations are not met, or if in the sole judgment of the PROJECT MONITOR, the interests of the OWNER, safety of any person or the OWNER's property are jeopardized by the work.

- OO. Protection Factor: The ratio of the ambient concentration of an airborne substance to the concentration of the substance inside the respirator at the breathing zone of the wearer. The protection factor is a measure of the degree of protection provided by a respirator to the wearer.

- PP. Repair: Returning damaged ACBM to an undamaged condition or to an intact state so as to prevent fiber release.
- QQ. Respirator: A device designed to protect the wearer from the inhalation of harmful atmospheres.
- RR. Substantial Competition: The work of this contract is substantially complete when clearance criteria set forth in the Contract Documents are met and the Work Area may be re-occupied by the OWNER.
- SS. Surfactant: A chemical wetting agent added to water to improve penetration, thus reducing the quantity of water required for a given operation or area.
- TT. Time Weighted Average (TWA): The average concentration of a contaminant in air during a specific time period.
- UU. TSDF: A hazardous waste transfer, treatment, storage, or disposal facility which has received a permit, a grant of interim status, or a variance or is otherwise authorized by law to receive specific hazardous wastes
- VV. Visible Emissions: Any emissions containing particulate asbestos material that are visually detectable without the aid of instruments. This does not include condensed uncombined water vapor.
- WW. Wet Cleaning: The process of eliminating asbestos contamination from building surfaces and objects by using cloths, mops, or other cleaning utensils which have been dampened with amended water or diluted removal encapsulant and afterwards thoroughly decontaminated or disposed of as asbestos-contaminated waste.
- XX. Work Area: The area where asbestos-related work or removal operations are performed which is defined and/or isolated to prevent the spread of asbestos dust, fibers or debris, and entry by unauthorized personnel. Work Area is a Regulated Area as defined by 8 CCR 1529.

1.3 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

- A. Applicability of Standards: Except where the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
- B. Publication Dates: Comply with the standards in effect as of the date of the Contract Documents.
- C. Conflicting Requirements: Where compliance with 2 or more standards is specified and where the standards may establish different or conflicting requirements for minimum

quantities or quality levels, refer requirements that are different but apparently equal and uncertainties to the PROJECT MONITOR for a decision before proceeding.

1. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of the requirements. Refer uncertainties to the PROJECT MONITOR for a decision before proceeding.
- D. Copies of Standards: Each entity engaged in construction on the Project is required to be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
1. Where copies of standards are needed to perform a required construction activity, the ABATEMENT CONTRACTOR shall obtain copies directly from the publication source.
- E. Abbreviations and Names: Trade association names and titles of general standards are frequently abbreviated. Where such acronyms or abbreviations are used in the Specifications or other Contract Documents, they mean the recognized name of the trade association, standards generating organization, authority having jurisdiction, or other entity applicable to the context of the text provision. Refer to the "Encyclopedia of Associations," published by Gale Research Co., available in most libraries.
- F. Abbreviations and Names: Trade association names and titles of general standards are frequently abbreviated. The following acronyms or abbreviations, as referenced in Contract Documents, are defined to mean the associated names. Names and addresses are subject to change and are believed, but not assured, to be accurate and up-to-date as of date of the Contract Documents.

AIHA	American Industrial Hygiene Association 475 Wolf Ledges Parkway Akron, OH 44311 (216) 762-7294
AIA	American Institute of Architects 1735 New York Ave. NW Washington, DC 20006 (202) 626-7474
ANSI	American National Standards Institute 11 West 42nd St., 13th Floor (212) 642-4900
ASHRAE	American Society for Heating, Refrigerating,

and Air Conditioning Engineers
1791 Tullie Circle NE
Atlanta, GA 30329
(404) 636-8400

ASME	American Society of Mechanical Engineers 345 East 47th Street New York, NY 10017 (212) 705-7722
ASPE	American Society of Plumbing Engineers 3716 Thousand Oaks Boulevard, Suite 210 Westlake, CA 91362 (805) 495-7120
ASTM	American Society for Testing and Materials 1916 Race St. Philadelphia, PA 19103 (215) 299-5400
AWCI	Association of the Wall and Ceiling Industries-International 25 K Street, NW (202) 783-2924
CGA	Compressed Gas Association 1235 Jefferson Davis Highway Arlington, VA 22202 (703) 979-0900
CS	Commercial Standard of NBS (U.S. Dept. of Commerce) Government Printing Office Washington, DC 20402 (202) 377-2000
FS	Federal Specification (General Services Admin.) Obtain from your Regional GSA Office, or purchase from GSA Specifications Unit (WFSIS) 7th and D Streets, S.W. Washington, DC 20406 (202)472-2205 or 2140
GA	Gypsum Association 1603 Orrington Ave. Evanston; IL 60201 (312)491-1744
IESNA	Illuminating Engineering Society of North America

345 E. 47th St.
New York, NY 10017
(212) 705-7926

NBS	National Bureau of Standards (U.S. Dept. of Commerce) Gaithersburg, MD 20234 (301)921-1000
NEC	National Electrical Code (by NFPA)
NFPA	National Fire Protection Assoc. One Batterymarch Park P.O. Box 9101 (800) 344-3555 Quincy, MA 02269-9101 (617) 770-3000
NRCA	National Roofing Contractors Association 6250 River Road Rosemont, IL 60018 (312)318-6722
PS	Product Standard of NBS (U.S. Dept. of Commerce) Government Printing Office Washington, DC 20402 (202)783-3238
RFCI	Resilient Floor Coverings Institute 966 Hungerford Drive, Suite 12-B Rockville, MD 20805 (301)340-8580
UL	Underwriters Laboratories 333 Pfingsten Rd. Northbrook, IL 60062 (708) 272-8800

- G. Federal Government Agencies: Names and titles of federal government standard or Specification producing agencies are often abbreviated. The following acronyms or abbreviations referenced in the Contract Documents indicate names of standard or Specification producing agencies of the federal government. Names and addresses are subject to change and are believed, but are not assured, to be accurate and up-to-date as of the date of the Contract Documents.

CFR	Code of Federal Regulations (Available from the Government Printing Office)
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N. Capitol St. between G and H St. NW
Washington, DC 20402
(202) 783-3238
(Material is usually first published in the "Federal Register")

CCR	California Code of Regulations (Available from Barclays Law Publishers) 400 Oyster Point Blvd (415) 244-6611 P.O. Box 3066 South San Francisco, CA 94080
CPSC	Consumer Product Safety Commission 5401 Westbard Ave. Bethesda, MD 20207 (800) 638-2772
DTSC	Department of Toxic Substances Council Region 4 (310) 590-4868 245 W. Broadway, Suite 350 Long Beach, CA 90802
EPA	Environmental Protection Agency 401 M St., SW Washington, DC 20460 (202) 382-2090
HUD	Department of Housing and Urban Development Office of Lead Based Paint Abatement and Poisoning Prevention Room B-133 451 7th St. SW, Washington, DC 20410 (202) 755-1805
MSHA	Mine Safety and Health Administration (U.S. Department of Commerce) 4015 Wilson Blvd Arlington, VA 22203 (703) 235-1565
NIOSH	National Institute of Occupational Safety and Health U.S. Dept. of Labor, Room N-3718 200 Constitution Ave, N.W. Washington, D.C. 20210 (800) 35-NIOSH
NIST	National Institute of Standards and Technology

(U.S. Department of Commerce)
Gaithersburg, MD 20899
(301) 975-2000

OSHA Occupational Safety and Health Administration
(U.S. Department of Labor)
200 Constitution Ave., NW
Washington, DC 20210
(202) 219-6091

Federal Requirements: which govern asbestos abatement work or hauling and disposal of hazardous waste include but are not limited to the following:

1. OSHA: U.S. Department of Labor, Occupational Safety and Health Administration, (OSHA), including but not limited to:

- 29 CFR 1910.134 - Respiratory Protection
- 29 CFR 1926.20 - General safety and health provisions
- 29 CFR 1926.21 - Safety training and education
- 29 CFR 1926.23 - First Aid
- 29 CFR 1926.24 - Fire Protection
- 29 CFR 1926.25 - Housekeeping
- 29 CFR 1926.28 - Personal protective equipment
- 29 CFR 1926.51(f) - Washing facilities
- 29 CFR 1926.55 - Gases, vapors, fumes, dusts, and mists
- 29 CFR 1926.56 - Illumination
- 29 CFR 1926.57 - Ventilation
- 29 CFR 1926.59 - Hazard Communication Standard
- 29 CFR 1926.58 - Asbestos Construction Standard
- 29 CFR 1926.103 - Respiratory protection;
- 29 CFR 1926.353 - Ventilation: Welding, cutting or heating of metals of toxic significance

29 CFR 1926.300, 301, 302 - Hand and power tools

29 CFR 1926.451 - Scaffolding

29 CFR 1926.500, 502, 503 - Fall Protection

2. DOT: U. S. Department of Transportation, including but not limited to:

49 CFR 171 through 179 - Hazardous Substances

3. EPA: U. S. Environmental Protection Agency (EPA), including but not limited to:

40 CFR 260, 261, 262, 263 and 264 - Resource Conservation and Recovery Act (RCRA)

40 CFR 763 - Asbestos Abatement Projects

California State Requirements: which govern asbestos abatement work or hauling and disposal of hazardous waste include but are not limited to the following:

8 CCR 5144 - Respiratory Protection

8 CCR 1509 - General safety and health provisions;

8 CCR 1510 - Safety training and education;

8 CCR 1512 - First Aid

8 CCR 1513 - Housekeeping;

8 CCR 1514 - Personal protective equipment;

8 CCR 1527 - Washing facilities;

8 CCR 1528 - Gases, vapors, fumes, dusts, and mists;

8 CCR 1523 - Illumination

8 CCR 1530 - Ventilation;

8 CCR 5194 - Hazard Communication Standard;

8 CCR 1529 - Asbestos Construction Standard

8 CCR 1531 - Respiratory protection;

8 CCR 1530 - Ventilation: Welding, cutting or heating of metals of toxic significance.

8 CCR 1707 - Hand and power tools.

8 CCR 1637 - Scaffolding & Fall Protection

8 CCR 5156, 5157 - Confined Spaces
and 5158

22 CCR Div 4.5 - Management of Hazardous Waste

Health & Safety Code, - Hazardous Waste Control Law
Div 20, Chapter 6.5

- H. Local Requirements: Abide by all local requirements which govern asbestos abatement work or hauling and disposal of hazardous waste materials.
- I. Building Codes: Comply with applicable provision of state and/or local building and construction codes that govern any part of the work.
- J. Model Codes: In the absence of an applicable adopted state or local building code which governs work involved in the asbestos abatement project, comply with the applicable provisions of the BOCA National Codes/1993 published by International Conference for Building Officials or the SBCCI Standard Codes published by Southern Building Code Congress International.

1.4 SUBMITTALS

- A. ABATEMENT CONTRACTOR shall submit complete copies of all submittals in accordance with this section. Submittals shall be bound and organized by tabs labeled with matching paragraph numbers listed in 1.4.
- B. No work shall begin until a complete set of submittals listed below are returned with the OWNER's stamp indicating that the submittals have been accepted. Acceptance by the OWNER shall not be construed to imply approval of any particular method or sequence for addressing health, safety, and environmental concerns or to relieve the ABATEMENT CONTRACTOR of the responsibility to adequately protect the environment as well as the health and safety of all workers involved in this project, all OWNER's employees, agents and other contractors in adjacent areas. ABATEMENT CONTRACTOR is solely responsible for all Work performed.
- C. ABATEMENT CONTRACTOR shall submit the following with their bid documents:
 - 1. Identify two projects that the ABATEMENT CONTRACTOR has performed in the past five (5) years similar to scope of this project utilizing similar means and methods.

Information shall include name of project, address, contact person name, dates of project, scope of work, and phone number, and name and phone number of any monitoring company that performed on-site observation. Failure to provide evidence of experience as defined above may disqualify the CONTRACTOR as a responsible bidder.

2. A signed and notarized statement disclosing all citations, notices of violations, and/or criminal or civil convictions from any regulator or court in the past three (3) years. A history of violations may disqualify the ABATEMENT CONTRACTOR as a responsible bidder.
- D. As soon as possible following the Notice to Proceed date, submit the following to the OWNER:
1. Submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notice, receipts for fee payments, judgments, and similar documents, correspondence and records established in conjunction with compliance with standards and regulations bearing upon performance of the Work. This includes but is not limited to:
 - a. Any permits required by federal, state, and local regulations including demolition permits, generators, and other regulated equipment that will be used on this project.
 - b. Any licenses necessary to carry out the work of this contract.
 - c. Copy of Air Pollution Control District (APCD) notification of asbestos work exceeding 160 square feet. ABATEMENT CONTRACTOR shall submit to APCD at least ten working days prior to the start of work.
- E. Prior to commencement of work, examine areas in which work will be performed with the PROJECT MONITOR. Prepare a listing of damage to structure, surfaces, equipment or of surrounding properties which could be misconstrued as damage resulting from the work. Photograph or videotape existing conditions as necessary to document conditions. Submit to OWNER prior to starting work.
- F. Prior to the start of work, submit all the following to the OWNER:
1. Asbestos Abatement Work Plan: In addition to information required in this section, Work Plan shall contain all information required under 8 CCR 1529 Submit a detailed job-specific plan that includes:
 - a. The procedures proposed for use in complying with the requirements of this specification and all applicable regulations.
 - b. Detailed drawings that identify the location, size, layout and details of the Work Areas, any equipment, disposal storage, restrooms, and worker

decontamination facilities. If floors are broke up into phases then the different phase areas for each floor shall be clearly marked.

- c. The sequencing of abatement work and the interface of trades involved in the performance of work. Provide a time line that details each major phase of work activity and anticipated time it will occur during for each floor.
 - d. The methods to be used to assure the safety of adjoining floors and visitors to the site.
 - e. Detailed description of engineering controls which will be put in place to eliminate the potential for fiber release or migration outside of the containment area
2. Work site coordination submittals including:
- a. Contingency and Spill Plan: Prepare a contingency plan for emergencies including fire, accident, power failure, or any other event that may require modification or abridgement of decontamination or Work Area isolation procedures. Include in plan specific procedures for decontamination or Work Area isolation. Plan should be specific for all types of hazardous materials or situations specific to this work site. Note that nothing in this specification should impede safe exiting or providing of adequate medical attention in the event of an emergency.
 - b. Telephone numbers and locations of emergency services including but not limited to fire, ambulance, doctor, hospital, police, power company, telephone company.
 - c. Notifications:
 - (1) Notify emergency service agencies including fire, ambulance, police or other agency that may service the abatement work site in case of an emergency. Notification is to include methods of entering Work Area, emergency entry and exit locations, modifications to fire notification or firefighting equipment, and other information needed by agencies providing emergency services.
 - (2) Notifications of Emergency: Any individual at the job site may notify emergency service agencies if necessary without effect on this contract or the Contract Sum.
 - (3) Provide submittal identifying person responsible for responding to project site emergencies twenty-four hours a day, seven days a week.
3. CONTRACTOR qualifications and personnel information submittals that include but are not limited to:

- a. Provide all staff names, certifications, and experience. Identify their duties and responsibilities on this project. CONTRACTOR shall have the following minimum levels of qualified supervision on the project site:
 - (1) General Superintendent: Provide a full-time General Superintendent who is experienced in administration and supervision of asbestos abatement projects including work practices, protective measures for building and personnel, disposal procedures, etc. This person is the CONTRACTOR`s representative responsible for compliance with all applicable federal, state and local regulations and guidelines, particularly those relating to asbestos abatement and hazardous waste. Should, in the opinion of the OWNER, any language barrier exist between the on-site superintendent and the OWNER or PROJECT MONITOR, the ABATEMENT CONTRACTOR shall employ a qualified full-time interpreter or provide a new on-site superintendent at no additional cost to the OWNER. Shall be AHERA certified as asbestos supervisor.
 - (2) Foreman: Provide a Foreman to directly supervise and direct no more than 10 abatement workers. Each Foreman will act as the Competent Person as required by 8 CCR 1529 for the workers the foreman is directing. The Foreman has oversight authority over the workers and reports to the General Superintendent. If there are 10 or fewer abatement workers on the project the General Superintendent may fill the Foreman's position. Shall be AHERA certified as asbestos supervisor.
 - (3) Experience and Training: The General Superintendent and foreman shall meet all the requirements as a Competent Person as required by OSHA 8 CCR 1529. They shall have completed training in EPA Asbestos Supervisor Training. They shall have experience with projects of similar type and size.
 - (4) Workers: All asbestos abatement workers shall have current EPA asbestos abatement training.
 - (5) Certificate of Worker's Acknowledgment: Submit an original signed copy of the Certificate of Worker's Acknowledgment found in Appendix C, for each worker and supervisor who is to be at the job site or enter the Work Area.
4. Provide submittals related to respiratory protection as follows:
 - a. Copy of ABATEMENT CONTRACTOR`s respiratory protection program.
 - b. Submit level of respiratory protection intended for each operation required

by the project. This should include a narrative specific to what criteria was used to select the respirators to be used on this project, including historical data. Historical data should consist of the following:

- (1) Date of measurements
 - (2) Operation monitored
 - (3) Sampling and analytical methods used and evidence of their accuracy
 - (4) Number, duration, and results of samples taken
 - (5) Workers name, social security number and job classification
 - (6) Type of respirator worn by workers
 - (7) Type of material including laboratory results identifying the asbestos concentration
 - (8) Control Methods
 - (9) Work Practices
 - (10) Training and experience level of workers and supervisors
- c. Copies of each worker's medical evaluation permitting them to wear a respirator
 - d. Copies of each worker's current fit test for each type of respirator used on this project
5. Medical submittals include but are not limited to the following:
- a. Provide full medical examinations for all workers performing asbestos abatement and at first use of negative pressure respirators.
 - b. Medical evaluation to include:
 - (1) A detailed work and medical history
 - (2) A thorough physical examination
 - (3) Evaluation of pulmonary status
 - (4) A blood pressure measurement
 - (5) Any other laboratory or other test which is recommended by the

examining physician

- c. The medical evaluation must be provided prior to the start of the asbestos project and/or assignment requiring the use of negative pressure respirators
6. Hazardous waste management submittals shall include but not be limited to the following in accordance with the City of San Diego's "White Book" Section 306.3.3.4:
 - a. Identification of hazardous wastes as associated with the scope of work and that will be generated by the means and methods used by the ABATEMENT CONTRACTOR
 - b. Provide estimates for the quantities of waste to be generated and disposed of. Include a description of what type of container will be used for each type of waste
 - c. Name, address, phone number, company representative name, EPA Generator Identification number, insurance certificate for minimum \$1,000,000 pollution liability, and certifications/licenses/permits, for each company that will be managing the transportation, treatment, storage and/or disposal of the waste generated from this project.
 - d. Provide name, address, phone number, company representative name, and all related State Hazardous waste accreditation paperwork for all laboratories that will be used in performing waste characterization.
 - e. Identify the disposal method which shall be utilized for each type of waste generated. Specific disposal methods for some wastes are required and noted in this specification. The City's preference is in the following order:
 - (1) Recycle
 - (2) Incinerate
 - (3) Landfill
7. ABATEMENT CONTRACTOR shall provide copies of notification given to all rental equipment companies that will be supplying this project that their equipment will be used on an asbestos abatement project.
8. Provide complete product information and intended use for all equipment that will be used in the performance of work on this project. Including but not limited to the following:
 - a. All equipment that will be used to perform abatement work. Include description of removal methods to be used for each substrate condition including manufacturers' operating instructions and recommendations for

equipment usage.

- b. Scaffolding: submit list of rolling and fixed scaffolding intended for use on the project. Submit sufficient detail to indicate compliance with applicable worker safety regulations or other requirements. Scaffolding over twenty feet shall be signed off by professional engineer. OSHA scaffold permit shall be submitted if required.
 - c. Hot water heater: Submit manufacturers name, model number, size in gallons, heating capacity, power requirements.
 - d. Decontamination Unit Sub-panel: Submit product data.
 - e. Ground Fault Circuit Interrupters (GFCI): Submit product data.
 - f. Lamps and Light Fixtures: Submit product data.
 - g. Self-Contained Toilet Units: Provide product data and name of sub-contractor used for servicing self-contained toilets. Submit method to be used for servicing.
 - h. First Aid Supplies: Provide list of contents of first aid kit. Submit in form of check list.
 - i. Fire Extinguishers: Provide product data. Submit schedule indicating location at job site.
9. Provide complete product information and manufactures instructions on all equipment used as engineering pollution controls including but not limited to negative air machines and HEPA vacuums. Include maintenance records for all equipment that uses any type of filtration device that clearly shows filter changes and number of hours on current filters. All machinery and filters shall be clean prior to bringing to work site. PROJECT MONITOR shall inspect all equipment brought to site prior to its operation.
- a. Submit design of pressure differential system to the OWNER for review. Do not begin work until submittal is returned with the OWNER's action stamp indicating that the submittal is returned for unrestricted use. Include in the submittal at a minimum:
 - (1) Number of HEPA filtered fan units required and the calculations necessary to determine the number of machines
 - (2) Description of projected air flow within Work Area and methods required to provide adequate air flow in all portions of the Work Area
 - (3) Anticipated pressure differential across Work Area enclosures

- (4) Description of methods of testing for correct air flow and pressure differentials
 - (5) Manufacturer's product data on the HEPA filtered fan units to be used
 - (6) Location of the machines in the Work Area
 - (7) Method of supplying adequate power to the machines and designation of electrical panel(s) which will be supplying the power
 - (8) Description of work practices to insure that airborne dust travels away from workers
 - (9) Manufacturer's product data on equipment used to monitor pressure differential between inside and outside of Work Area
 - (10) Manufacturer's product data on auxiliary generator to be used
 - (11) Manufacturer's product data on auxiliary power switch to be used
 - (12) Schematic diagram of power and auxiliary power supply to HEPA filtered fan units
10. On a weekly basis: Submit printout from pressure differential monitoring equipment. Mark printout with date and start of time for each day. Use printout paper that indicates elapsed time in intervals no greater than hours. Indicate on each day's record times of starting and stopping abatement work, type of work in progress, breaks for lunch or other purposes, periods of stop work, and filter changes. Cut printout into segments by day, attach to 8 ½" by 11" paper. Label with project name, ABATEMENT CONTRACTOR's name and date.
 11. Provide copies of all SDS, manufactures instructions for use, and how ABATEMENT CONTRACTOR will use, for all products used on this project.
 12. Daily Construction reports: Prepare a daily construction report, recording the following information concerning events at the site and provide one copy of this log to OWNER on a daily basis:
 - a. Meetings; purpose, attendees, brief discussion and significant decisions.
 - b. Visitations; authorized and unauthorized
 - c. Log of those entering and leaving Work Area including personnel, by name.
 - d. Accidents

- e. Special or unusual events, i.e. Barrier breaching, Equipment failures, accidents
- f. Documentation of CONTRACTOR's completion of the following:
 - (1) Inspection of Work Area preparation prior to start of removal and daily thereafter.
 - (2) Removal of any sheet plastic barriers
 - (3) ABATEMENT CONTRACTOR's inspections prior to encapsulating, enclosure or any other operation that will conceal the condition of the substrate from which such materials have been removed.
 - (4) Removal of waste materials from Work Area
 - (5) Decontamination of equipment (list items)
- g. List of subcontractors at the site
- h. Approximate count of personnel at the site
- i. High and low temperatures, general weather conditions
- j. Stoppages, delays, shortages, losses
- k. Meter readings and similar recordings
- l. Emergency procedures
- m. Orders and requests of governing authorities
- n. Change Orders received/implemented
- o. Services connected/disconnected
- p. Equipment or system tests and start-ups
- q. Partial Completions
- r. Substantial Completions authorized
- s. ABATEMENT CONTRACTOR's final inspection
- t. Log of waste as accumulated - shall include:
 - (1) Date

- (2) Barrel/container number (ABATEMENT CONTRACTOR shall use permanent barrel or container marking system)
 - (3) Waste description
 - (4) Accumulation start date
13. Except as otherwise indicated, submit special reports directly to the OWNER within one day of occurrence requiring special report and to others affected by occurrence.
14. Reporting Unusual Events: When an event of unusual and significant nature occurs at site, within 24 hours prepare and submit a written special report to the OWNER listing chain of events, persons participating, and response by ABATEMENT CONTRACTOR's personnel, evaluation of results or effects, and similar pertinent information. When such events are known or predictable in advance, advise the City in advance at earliest possible date.
15. Reporting Accidents: Prepare and submit written reports of significant accidents, at site and anywhere else work is in progress. Reports must be submitted to the OWNER within 24 hours after the accident occurs. Record and document data and actions; comply with industry standards. For this purpose, a significant accident is defined to include events where personal injury is sustained, or property loss of substance is sustained, where the event posed a significant threat of loss or personal injury, or where an OSHA 200 Log is required. A copy of an OSHA 200 Log may be submitted for this purpose.
16. Report Discovered Conditions: When an unusual condition is discovered during the work (e.g. leaks, corrosion) prepare and submit a written special report to the OWNER indicating condition discovered.

G. Submit the following at the conclusion of the project:

1. Provide a bound closeout package that includes all information generated from this project.

1.5 AIR MONITORING, STOP WORK LEVELS, & CLEARANCE SAMPLING

- A. Not in Contract Sum: This Section describes work being performed by the City's PROJECT MONITOR. This work is not in the Contract Sum except for OSHA personnel compliance sampling that is the responsibility of the ABATEMENT CONTRACTOR.
- B. The PROJECT MONITOR will use air monitoring to verify that the area beyond the Work Area and outside environment remains lower than 0.005 fibers/cc. This Section also describes the action required if the levels are exceeded. This section also identifies the clearance sampling levels.

- C. Corrective Work triggered by this Section is part of the contract sum and is to be performed by the ABATEMENT CONTRACTOR at no additional cost to the City.
- D. Personnel monitoring: The PROJECT MONITOR will not be performing air monitoring to meet ABATEMENT CONTRACTOR's OSHA requirements for personnel sampling. ABATEMENT CONTRACTOR shall provide sample results to the PROJECT MONITOR. Personnel samples shall be provided on a same day turn around basis for the first three days of work. Same day turn around shall be provided if the work activity changes and no personnel air monitoring has been performed for the same activity on this project. OSHA exposure monitoring shall be performed on a daily basis during abatement on personnel with the highest potential exposure. All other results shall be submitted to the PROJECT MONITOR and the OWNER within 24 hours of when sample was taken.
- E. Work Area Isolation: The purpose of the City's air monitoring is to detect faults in the Work Area isolation such as:
 - 1. Contamination of the building outside of the Work Area with airborne asbestos fibers.
 - 2. Failure of filtration or rupture in the pressure differential system.
 - 3. Should any of the above occur immediately cease asbestos abatement activities until the fault is corrected. Do not recommence work until authorized by the City's PROJECT MONITOR.
- F. Work Area Airborne Fiber Count: The PROJECT MONITOR may monitor airborne fiber counts in the Work Area. The purpose of this air monitoring will be to detect airborne asbestos concentrations which may challenge the ability of the Work Area isolation procedures to protect the balance of the building or outside of the building from contamination by airborne fibers.
- G. Stop action levels
 - 1. Inside Work Area
 - a. Maintain an average airborne count in the Work Area of less than 0.5 fibers per cubic centimeter. If the fiber counts rise above this figure for any sample taken, revise work procedures to lower fiber counts.
 - b. If the Time Weighted Average (TWA) fiber count for any work shift or 8 hour period exceeds 0.5 fibers per cubic centimeter, stop all work, leave Pressure Differential System in operation and notify City's PROJECT MONITOR. After correcting cause of high fiber levels, do not recommence work for 24 hours unless otherwise authorized, in writing, by City's PROJECT MONITOR.
 - c. If airborne fiber counts exceed 1.0 fibers per cubic centimeter for any period

of time cease all work except corrective action until fiber counts fall below 0.5 fibers per cubic centimeter and notify City's PROJECT MONITOR. After correcting cause of high fiber levels, do not recommence work for 24 hours unless otherwise authorized, in writing, by City's PROJECT MONITOR.

2. Outside Work Area

- a. If any air sample taken outside of the Work Area exceeds .005 fibers/cc, immediately and automatically stop all work except corrective action. The ABATEMENT CONTRACTOR and PROJECT MONITOR will determine the source of the high reading.
- b. If the high reading was the result of a failure of Work Area isolation measures initiate the following actions:
 - (1) Immediately erect new critical barriers as set forth in this specification to isolate the affected area from the balance of the building. Erect critical barriers at the next existing structural isolation of the involved space (e.g. wall, ceiling, floor).
 - (2) Decontaminate the affected area in accordance with this specification.
 - (3) Require that respiratory protection as set forth in this specification be worn in affected area until area is cleared for re-occupancy in accordance with this section.
 - (4) Leave Critical Barriers in place until completion of work and ensure that the operation of the pressure differential system in the Work Area results in a flow of air from the balance of the building into the affected area.
 - (5) If the exit from the clean room of the personnel decontamination unit enters the affected area, establish a decontamination facility consisting of a shower room and changing room as set forth in this specification at entry point to affected area.
 - (6) After Certification of Visual Inspection in the Work Area has been signed, final clearance will be taken within the entire area as set forth in this specification.
- c. If the high reading was the result of other causes initiate corrective action as determined by the City's PROJECT MONITOR.
- d. Complete corrective work with no change in the Contract Sum if high airborne fiber counts were caused by Contractor's activities. The Contract Sum and schedule will be adjusted for additional work caused by high airborne fiber counts beyond the Contractor's control.

H. Fibers Counted

1. The following procedure will be used to resolve any disputes regarding fiber types when a project has been stopped due to excessive airborne fiber counts.
 - a. Large Fibers: "Airborne Fibers" referred to above include all fibers regardless of composition as counted by phase contrast microscopy (PCM), unless additional analysis by transmission or scanning electron microscopy demonstrates to the satisfaction of the PROJECT MONITOR that non-asbestos fibers are being counted. "Airborne Fibers" counted in samples analyzed by scanning or transmission electron microscopy shall be asbestos fibers, greater than 5 microns in length and greater than 0.25 microns in diameter. For purposes of stop action levels, subsequent to analysis by electron microscopy, the number of "Airborne Fibers" shall be determined by multiplying the number of fibers, regardless of composition, counted by PCM by a number equal to asbestos fibers counted divided by all fibers counted in the electron microscopy analysis.
 - b. Small Structures: "Airborne Fibers" referred to above include asbestos structures (fibers, bundles, clusters or matrices) of any diameter and any length greater than 0.5 microns.

I. Analytical methods

1. The following methods will be used by the PROJECT MONITOR in analyzing filters used to collect air samples. Sampling rates may be varied from printed standards to allow for high volume sampling.
2. Phase Contrast Microscopy (PCM) will be performed using the NIOSH 7400 method using the "A" counting rules.
3. Transmission Electron Microscopy will be performed using the analysis method set forth in the AHERA regulation 40 CFR Part 763 Appendix A.

J. Sampling methodology

1. Samples will be collected on 25 mm cassettes as follows:
 - a. PCM: 0.8 micrometer mixed cellulose ester.
 - b. TEM: 0.45 micrometer mixed cellulose ester.
2. Sample volumes collected will vary depending upon the analytical method used.

K. Clearance Sampling:

1. Clearance sampling will not begin until the visual inspection described in Section 1.6 has been completed and certified by the PROJECT MONITOR.
2. Clearance criteria:
 - a. Decontamination is complete when every sample is at or below the following levels. If clearance levels are not satisfactory, the decontamination is incomplete and re-cleaning per Section 1.6. Project Decontamination is required at no additional cost to the City. Additional clearance testing required because of non-satisfactory clearance levels shall be charged to the ABATEMENT CONTRACTOR.
 - (1) PCM Clearance Sampling: <0.01 fibers/cc
 - (2) TEM Clearance Sampling: <70 structures/mm²

1.6 PROJECT DECONTAMINATION

- A. Work of This Section includes the decontamination of air in the Work Area which has been, or may have been, contaminated by the elevated airborne asbestos fiber levels generated during abatement activities, or which may previously have had elevated fiber levels due to friable asbestos containing materials in the space.
- B. Work of This Section includes the cleaning, decontamination, and removal of temporary facilities installed prior to abatement work, including:
 1. Secondary, Primary and Critical Barriers erected by work of Section 1.1 and 3.1
 2. Decontamination Unit erected by work of Section 1.8
 3. Pressure Differential System installed by work of Section 3.2.
- C. Decontamination of primary containments related to ceiling access and fireproofing spot abatement:
 1. Previous Work: During completion of the asbestos abatement work specified in other sections, any gross debris generated by the asbestos abatement work will have been removed from area.
 2. Start of Work: Work of this section begins with the cleaning of the containment barriers. At start of work the following will be in place:
 - a. Primary Barrier: The first layer of plastic sheeting on the floor and walls.
 - b. Critical Barrier: An airtight barrier between the Work Area and other portions of the building or the outside. This includes plastic sheeting placed over lighting fixtures, clocks, ventilation openings, doorways, convectors, speakers and other openings.

- c. Decontamination Units: For personnel and equipment in operating condition.
 - d. Pressure Differential System: In operation.
3. First cleaning
- a. First Cleaning: Carry out a first cleaning of all surfaces in the containment including items of remaining sheeting, tools, ladders, scaffolding and/or staging by use of damp cleaning and mopping, and/or a High Efficiency Particulate Air (HEPA) filtered vacuum. (Note: A HEPA vacuum may fail if used with wet material.) Do not perform dry dusting or dry sweeping. Use each surface of a cleaning cloth one time only and then dispose of as contaminated waste. Continue this cleaning until there is no visible debris from removed materials or residue on plastic sheeting or other surfaces.
 - b. Remove all pre-filters in air handling system(s) and dispose of as asbestos containing waste in accordance with requirements of Section 3.3.
 - c. A complete visual inspection of the entire Work Area will be performed by PROJECT MONITOR including: ceiling, walls, floor, plastic sheeting, seals over ventilation openings, doorways, windows, and other openings. .
 - d. Temporary lighting: Provide a minimum of 100 foot candles of lighting on all surfaces in the areas to be subjected to visual inspection. Provide hand-held lights providing 150 foot candles at 4 feet capable of reaching all locations in Work Area.
 - e. Lifts: Provide ladders, scaffolding, and lifts as required to provide access to all surfaces in the area to be subjected to visual inspection. Access is to allow touching of all surfaces.
 - f. After passing visual inspection, the containment shall be encapsulated. Wait approximately 2 - 4 hours after encapsulation to allow HEPA filtered fan units to clean air of airborne asbestos fibers. Use oscillating fans as necessary to assure circulation of air in all parts of Work Area.
 - g. After the encapsulant has been allowed to dry, air samples will be taken and analyzed in accordance with the procedure for Phase Contrast Microscopy set forth in Section 1.5.
 - h. If clearance criteria are not met, repeat final cleaning and continue decontamination procedure from that point.
 - i. If clearance criteria are met, remove remaining plastic, equipment, and engineering controls in accordance with this specification.

D. Removal of Work Area isolation

1. After all requirements of Section 1.5 have been met:
 - a. Remove the Pressure Differential System. Seal HEPA filtered fan units, HEPA vacuums and similar equipment with 6 mil plastic sheet and duct tape to form a tight seal at intake end before being moved from Work Area.
 - b. Remove Personnel Decontamination Unit.
 - c. Remove the Critical Barriers separating the Work Area from the rest of the building. Remove any small quantities of residual material found upon removal of the plastic sheeting with wet wiping, HEPA filtered vacuum cleaners and local area protection. If significant quantities, as determined by the PROJECT MONITOR, are found then the entire area affected shall be decontaminated as specified in Section 1.6.
 - d. Remove all equipment, materials, debris from the work site.
 - e. Dispose of all asbestos containing waste material as specified in Section 3.3.

E. Substantial completion of abatement work:

1. Abatement Work is Substantially Complete upon meeting the requirements of this Section, and Section 1.5, including submission of:
 - a. Certificate of Visual Inspection found in Appendix D. This certification is to be completed by the ABATEMENT CONTRACTOR and submitted to the PROJECT MONITOR when ready for visual inspection. PROJECT MONITOR will then perform visual inspection with ABATEMENT CONTRACTOR's representative that completed "Certificate of Visual Inspection" and when visual criteria are met, PROJECT MONITOR will sign the form.
2. Receipts documenting proper disposal as required by Section 3.3 Disposal of Hazardous Waste
3. Punch list detailing repairs to be made and incomplete items

1.7 CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS:

- A. General: Provide temporary connection to existing utilities or provide temporary facilities as required herein or as necessary to carry out the work. Use qualified tradesmen for installation of temporary services and facilities. Locate temporary services and facilities where they will serve the entire project adequately and result in minimum interference with the performance of the Work.

1. Require that tradesmen accomplishing this work be licensed as required by local authority for the work performed.

B. Scaffolding:

1. Relocate, modify and extend services and facilities as required during the course of work so as to accommodate the entire work of the project.
2. Provide all scaffolding, ladders and/or staging, etc. as necessary to accomplish the work of this contract. Scaffolding may be of suspension type; or standing type such as metal tube and coupler, tubular welded frame, pole or outrigger type or cantilever type. The type, erection and use of all scaffolding shall comply with all applicable OSHA provisions.
3. Equip rungs of all metal ladders, etc. with an abrasive non-slip surface.
4. Provide a nonskid surface on all scaffold surfaces subject to foot traffic.
5. Require that a Competent Person supervise the erection, movement, and dismantling of scaffolding in accordance with OSHA 8 CCR 1637.
6. During the erection and/or moving of scaffolding, care must be exercised so that the plastic floor covering is not damaged.
7. Clean as necessary debris from non-slip surfaces.
8. At the completion of abatement work clean all construction aids within the Work Area, wrap in one layer of 6 mil plastic sheet and seal before removal from the Work Area.

C. Water Service

1. Temporary Water Service Connection: All connections to the City's water system shall be done at the ABATEMENT CONTRACTOR's expense using a temporary construction meter and shall include backflow protection. Valves shall be temperature and pressure rated for operation of the temperatures and pressures encountered. After completion of use, connections and fittings shall be removed without damage or alteration to existing water piping and equipment. Leaking or dripping valves shall be piped to the nearest drain or located over an existing sink or grade where water will not damage existing finishes or equipment.
2. Water Hoses: Employ heavy-duty abrasion-resistant hoses with a pressure rating greater than the maximum pressure of the water distribution system to provide water into each Work Area and to each Decontamination Unit. Provide fittings as required to allow for connection to existing wall hydrants or spouts, as well as temporary water heating equipment, branch piping, showers, shut-off nozzles and equipment.

3. Water Heater: Provide UL rated 40 gallon electric water heater to supply hot water for the Decontamination Unit shower. Activate from 30 amp circuit breaker located within the Decontamination Unit subpanel. Provide with relief valve compatible with water heater operation; pipe relief valve down to drip pan on floor with type L copper. Drip pans shall consist of a 12" X 12" X 6" (30 cm x 30 cm x 15 cm) deep pan, made of 19 gauge galvanized steel, with handles. A 3-quart (3 L) kitchen saucepan may be substituted for this purpose. Drip pan shall be securely fastened to the water heater with bailing wire or similar material. Wiring of the water heater shall be in compliance with NEMA, NECA, and UL standards.
4. General: Water connection (without charge) to City's existing potable water system is limited to one 3/4" pipe-size connection, and a maximum flow of 10 g.p.m. each to hot and cold water supply. Install using vacuum breakers or other backflow preventer as required by the City.
5. Maintain hose connections and outlet valves in leak-proof condition. Where finish work below an outlet might be damaged by spillage or leakage, provide a drip pan of suitable size to minimize the possibility of water damage. Drain water promptly from pans as it accumulates.

D. Electrical service & equipment:

1. General: Comply with applicable NEMA, NECA and UL standards and governing regulations for materials and layout of temporary electric service. Provide equipment which is compatible with existing electrical characteristics and available power. If existing power is either incompatible or inadequate for performance of the Work, provide auxiliary generators(s) located outside of the Work Area.
2. Temporary Power: Provide service to Decontamination Unit subpanel with minimum 60 amp, 2 pole circuit breaker or fused disconnect connected to the main distribution panel. Subpanel and disconnect shall be sized and equipped to accommodate all electrical equipment required for completion of the work.
3. Voltage Differences: Provide identification warning signs at power outlets which are other than 110-120 volt power. Provide polarized outlets for plug-in type outlets, to prevent insertion of 110-120 volt plugs into higher voltage outlets. Dry type transformers shall be provided where required to provide voltages necessary for work operations.
4. Ground Fault Protection: Equip all circuits for any purpose entering Work Area with ground fault circuit interrupters (GFCI). Locate GFCI's exterior to Work Area so that all circuits are protected prior to entry to Work Area. Provide circuit breaker type ground fault circuit interrupters (GFCI) equipped with test button and reset switch for all circuits to be used for any purpose in Work Area, decontamination units, exterior, or as otherwise required by national electrical code, OSHA or other authority. Locate in panel exterior to Work Area.

5. Electrical Power Cords: Use only grounded extension cords; use "hard-service" cords where exposed to abrasion and traffic. Use single lengths or use waterproof connectors to connect separate lengths of electric cords, if single lengths will not reach areas of work.
6. Lamps and Light Fixtures: Provide sealed quartz halogen construction lights, general service incandescent lamps or fluorescent lamps of wattage indicated or required for adequate illumination as required by the work or this Section. Protect lamps with guard cages where fixtures are exposed to breakage by construction operations. Provide lighting with a secure base to insure that they will not be knocked over. Keep lights away from combustible materials.
7. Circuit Protection: Protect each tool or extension cord with a ground fault circuit interrupter (GFCI) of proper size. GFCI can be type that plugs into existing duplex outlets. Insure that outlet is properly grounded before installation of GFCI.
8. General: Provide a weatherproof, grounded temporary electric power service and distribution system of sufficient size, capacity, and power characteristics to accommodate performance of work during the construction period. Install temporary lighting adequate to provide sufficient illumination for safe work and traffic conditions in every area of work.
9. Lockout: Lockout all existing power to or through the Work Area as described below. Unless specifically noted otherwise existing power and lighting circuits to the Work Area are not to be used. All power and lighting to the Work Area is to be provided from temporary electrical panel described below.
 - a. Lockout power to Work Area by switching off all breakers serving power or lighting circuits in Work Area. Label breakers with tape over breaker with notation "DANGER circuit being worked on". Lock panel and have all keys under control of GENERAL CONTRACTOR's Superintendent or PROJECT MONITOR.
 - b. Lockout power to circuits running through Work Area wherever possible by switching off all breakers serving these circuits. Label breakers with tape over breaker with notation "DANGER circuit being worked on". Sign and date danger tag. Lock panel and supply keys to ABATEMENT CONTRACTOR, City and PROJECT MONITOR. If circuits cannot be shut down for any reason, label at 4'-0" on center with tags reading, "DANGER live electric circuit. Electrocutation hazard."
10. Temporary Electrical Panel: Provide temporary electrical panel at ABATEMENT CONTRACTOR's expense, sized and equipped to accommodate all electrical equipment and lighting required by the work. Connect temporary panel to existing electrical. Protect with circuit breaker or fused disconnect. Locate temporary panel as directed by the OWNER or PROJECT MONITOR.

11. Power Distribution System: Provide circuits of adequate size and proper characteristics for each use. In general run wiring overhead, and rise vertically where wiring will be least exposed to damage from construction operations.
12. Circuit Protection: Protect each circuit with a ground fault circuit interrupter (GFCI) of proper size located in the temporary panel. Do not use outlet type GFCI devices.
13. Temporary Wiring: in the Work Area shall be type UF non-metallic sheathed cable located overhead and exposed for surveillance. Do not wire temporary lighting with plain, exposed (insulated) electrical conductors. Provide liquid tight enclosures or boxes for wiring devices.
14. Number of Branch Circuits: Provide sufficient branch circuits as required by the work. All branch circuits are to originate at temporary electrical panel. At minimum provide the following:
15. For power tools and task lighting, provide one temporary 4-gang outlet in the following locations. Provide a separate 110-120 Volt, 20 Amp circuit for each 4-gang outlet (4 outlets per circuit).
16. One outlet in the Work Area for each 2,500 square feet of Work Area
 - a. One outlet at each decontamination unit, located in equipment room
17. 110-120 volt 20 amp branch circuits with 4-gang outlet for City's exclusive use while conducting air sampling during the work as follows:
 - a. One in each Work Area
 - b. One at clean side of each Decontamination Unit.
18. Temporary lighting - regulated areas: Provide sufficient temporary lighting to ensure proper workmanship everywhere; by combined use of daylight, general lighting, and portable plug-in task lighting. Circuit Protection: Protect each light with a ground fault circuit interrupter (GFCI) of proper size. GFCI can be type that plugs into existing duplex outlets. Insure that outlet is properly grounded before installation of GFCI.
19. ABATEMENT CONTRACTOR shall provide power and sufficient power chords for all monitoring and sampling requirements of the City's PROJECT MONITOR.

E. Fire extinguishers:

1. Provide type "ABC" dry chemical extinguishers, or a combination of several extinguishers of NFPA recommended types for the exposures in each case. Comply with the applicable recommendations of NFPA Standard 10 "Standard for Portable

Fire Extinguishers". Locate the appropriate class of fire extinguishers where they are most convenient and effective for their intended purpose.

F. Storage facilities:

1. Storage: On-site storage space is limited and should be discussed with the OWNER and documented in writing prior to making any arrangements. Security of all equipment and hazardous waste is responsibility of ABATEMENT CONTRACTOR.

1.8 WORKER PROTECTION

- A. Provide worker protection as required by the most stringent OSHA and/or EPA standards applicable to the work. The following procedures are minimums to be adhered to regardless of asbestos concentration in the Work Area.
- B. Competent person: Provide on-site, full time competent person (or persons) to ensure that the worker protection program is effective. Competent person shall be certified as an Asbestos Supervisor under the AHERA guidelines.
- C. All workers are to be accredited as Abatement Workers as required by the AHERA regulation 40 CFR 763 Appendix C to Subpart E, April 30, 1987.
- D. State and Local License: All workers are to be trained, certified and accredited as required by state or local code or regulation.
- E. Exposure assessment:
 1. Prior to the completion of an exposure assessment of the tasks being conducted, the employer should follow the regulations as if the employee was exposed above the PEL. The employee(s) must be notified in writing within 5 days of receipt of the results representing their exposure. Where exposure is above the PEL, employees must be informed of this fact and advised of corrective action to be taken. Monitoring and analysis must have an accuracy (to a confidence level of 95%) of not less than plus or minus 25% for airborne asbestos levels equal to or greater than 0.1 fibers/cc.
 2. Personal protective equipment for all asbestos related work is to include protective work clothing and equipment, change areas, washing facilities, and training. The only difference in protective equipment for the different types of tasks is respiratory protection which is to be provided in accordance with Section 1.9.
- F. Decontamination facilities:
 1. Provide a Personnel Decontamination Unit consisting of a serial arrangement of connected rooms or spaces, Changing Room, Drying Room, Shower Room, and Equipment Room. Require all persons without exception to pass through this Decontamination Unit for entry into and exiting from the Work Area for any

purpose. Do not allow parallel routes for entry or exit. Do not remove equipment or materials through Personnel Decontamination Unit. Provide temporary lighting within Decontamination Units as necessary to reach a lighting level of 100 foot candles.

2. Changing Room (clean room): Provide a room that is physically and visually separated from the rest of the building for the purpose of changing into protective clothing.
 - a. Construct using plastic sheeting at least 6 mil in thickness to provide an airtight seal between the Changing Room and the rest of the building
 - b. Locate so that access to Work Area from Changing Room is through Shower Room
 - c. Separate Changing Room from the building by a sheet plastic flapped doorway
 - d. Require workers to remove all street clothes in this room, dress in clean, disposable coveralls, and don respiratory protection equipment. Do not allow asbestos-contaminated items to enter this room. Require Workers to enter this room either from outside the structure dressed in street clothes, or unclothed from the showers
 - e. An existing room may be utilized as the Changing Room if it is suitably located and of a configuration whereby workers may enter the Changing Room directly from the Shower Room. Protect all surfaces of room with sheet plastic as set forth in this specification.
 - f. Maintain floor of changing room dry and clean at all times. Do not allow overflow water from shower to wet floor in changing room
 - g. Damp wipe all surfaces twice after each shift change with a disinfectant solution
 - h. Provide posted information for all emergency phone numbers and procedures
3. Airlock: Provide an airlock between Drying Room and Changing Room. This is a transit area for workers
 - a. Separate this room from Drying Room and Changing Room by sheet plastic flapped doorways
 - b. Separate this room from the rest of the building with airtight walls fabricated of 6 mil plastic sheeting

- c. Separate this room from the Drying and Changing Rooms with airtight walls fabricated of 6 mil plastic sheeting
4. Drying Room: Provide a drying room as an airlock and a place for workers to dry after showering
- a. Construct room by providing a pan continuous with or draining to Shower Room pan; Install a freely draining wooden or non-skid metal floor in pan at elevation of top of pan
 - b. Separate this room from the rest of the building with airtight walls fabricated of 6 mil plastic sheeting
 - c. Separate this room from the Changing Room and Shower Room with airtight walls fabricated of 6 mil plastic sheeting
 - d. Separate from Changing Room by a sheet plastic flapped doorway
 - e. Provide a continuously adequate supply of disposable bath towels
5. Shower Room: Provide a completely watertight operational shower to be used for transit by cleanly dressed workers heading for the Work Area from the Changing Room, or for showering by workers headed out of the Work Area after undressing in the Equipment Room
- a. Construct room by providing a shower pan and 2 shower walls in a configuration that will cause water running down walls to drip into pan; Install a freely draining wooden floor in shower pan at elevation of top of pan
 - b. Separate this room from the rest of the building with airtight walls fabricated of 6 mil plastic sheeting
 - c. Separate this room from the Drying Room and Airlock with airtight walls fabricated of 6 mil plastic sheeting
 - d. Provide splash proof entrances to Drying Room and Airlock with doors
 - e. Provide shower head and controls
 - f. Provide temporary extensions of existing hot and cold water and drainage, as necessary for a complete and operable shower
 - g. Provide a soap dish and a continuously adequate supply of soap and maintain in sanitary condition
 - h. Arrange so that water from showering does not splash into the Changing or

Equipment Rooms

- i. Arrange water shut off and drain pump operation controls so that a single individual can shower without assistance from either inside or outside of the Work Area.
 - j. Provide flexible hose shower head
 - k. Pump waste water to drain or to storage for use in amended water. If pumped to drain, provide 20 micron and 5 micron waste water filters in line to drain or waste water storage. Change filters daily or more often if necessary. Locate filters inside shower unit so that water lost during filter changes is caught by shower pan.
 - l. Provide hose bib
6. Airlock: Provide an airlock between Shower Room and Equipment Room. This is a transit area for workers. Separate this room from Equipment Room by a sheet plastic flap doorway.
- a. Separate this room from the rest of the building with airtight walls fabricated of 6 mil plastic sheeting.
 - b. Separate this room from the Equipment Room and Shower Room with airtight walls fabricated of 6 mil plastic sheeting.
 - c. Separate from Equipment Room by a sheet plastic flapped doorway.
7. Equipment Room (contaminated area): Require work equipment, footwear and additional contaminated work clothing to be left here. This is a change and transit area for workers.
- a. Separate this room from the Work Area by a 6 mil plastic sheeting flapped doorway.
 - b. Separate this room from the rest of the building with airtight walls fabricated of 6 mil plastic sheeting.
 - c. Separate this room from the Shower Room and Work Area with airtight walls fabricated of 6 mil plastic sheeting.
 - d. Provide a drop cloth layer of sheet plastic on floor in the Equipment Room for every shift change expected. Roll drop cloth layer of plastic from Equipment Room into Work Area after each shift change. Replace before next shift change. Provide a minimum of two (2) layers of plastic at all times. Use only clear plastic to cover floors.

8. Airlock: Provide an airlock between Equipment Room and Work Area. This is a transit area for workers.
 - a. Separate this room from Equipment Room and Work Area by a sheet plastic flapped doorway.
 - b. Separate this room from the rest of the building with airtight walls fabricated of 6 mil plastic sheeting.
 - c. Separate this room from the Equipment Room and Work Area with airtight walls fabricated of 6 mil plastic sheeting.
9. Work Area: Separate Work Area from the Equipment Room by plastic sheeting barriers. If the airborne asbestos level in the Work Area is expected to be high, as in dry removal, add an intermediate cleaning space between the Equipment Room and the Work Area. Damp wipe clean all surfaces after each shift change. Provide one additional floor layer of 6 mil plastic sheeting per shift change and remove contaminated layer after each shift.
10. Decontamination Sequence: Require that all workers adhere to the following sequence when entering or leaving the Work Area.
 - a. Entering Work Area: Each time Work Area is entered remove street clothes and put on new disposable coverall, new head cover, and a clean respirator with cartridges appropriate for the abatement work to be performed. Reinforce coverall seams and secure gloves to coveralls with duct tape. Proceed through Change Room, don foot covers, hood, gloves, etc., and enter Work Area.
 - (1) Any additional clothing and equipment left in Equipment Room needed by the worker are put on in the Equipment Room.
 - (2) Worker proceeds to Work Area.
 - b. Exiting Work Area:
 - (1) Before leaving the Work Area, require the worker to remove all gross contamination and debris from overalls and feet.
 - (2) The worker then proceeds to the Equipment Room and removes all clothing except respiratory protection equipment.
 - (3) Extra work clothing such as boots, hard hats, goggles, and gloves are to be stored in contaminated end of the Equipment Room.
 - (4) Disposable coveralls are placed in a bag for disposal with other material.

- (5) Require that Decontamination procedures found in this specification be followed by all individuals leaving the Work Area.
- (6) After showering, the worker moves to the Changing Room and dresses in either new coveralls for another entry or street clothes if leaving.

G. Equipment decontamination unit

1. Provide an Equipment Decontamination Unit consisting of a serial arrangement of rooms, Clean Room, Holding Room, Wash Room for removal of equipment and material from Work Area. Do not allow personnel to enter or exit Work Area through Equipment Decontamination Unit.
2. Wash Down Station: Provide an enclosed Shower Unit located in Work Area just outside Wash Room as an equipment, bag and container cleaning station.
 - a. Fabricate waterproof floor extending 6'0" beyond Wash Down station in all directions. Install seamless waterproof membrane over area and extend over curbs on all four sides. Form curbs from 2" x 4" lumber laid on the flat.
 - b. Waterproof membrane is to be fabricated from elastomeric membrane or 10 mil plastic sheeting.
 - c. Do not allow water to collect on waterproof membrane. Remove continuously with a wet vacuum or mops.
3. Wash Room: provide wash room for cleaning of bagged or containerized asbestos containing waste materials passed from the Work Area.
 - a. Construct wash room of nominal 2" x 4" wood framing and plastic sheeting at least 6 mil in thickness and located so that packaged materials, after being wiped clean, can be passed to the Holding Room.
 - b. Separate this room from the Work Area by a single flapped door of 6 mil plastic sheeting.
 - (1) Provide a drop cloth layer of plastic on floor in the Wash Room for every load-out operation. Roll this drop cloth layer of plastic from Wash Room into Work Area after each load-out. Provide a minimum of two (2) layers of plastic at all times. Use only clear plastic to cover floors.
4. Holding Room: Provide Holding Room as a drop location for bagged asbestos containing materials passed from the Wash Room. Construct Holding Room of nominal 2" x 4" wood framing and plastic sheeting at least 6 mil in thickness and located so that bagged materials cannot be passed from the Wash Room through

the Holding Room to the Clean Room.

- a. Separate this room from the adjacent rooms by flap doors fabricated from 6 mil sheet plastic.
5. Clean Room: provide Clean Room to isolate the Holding Room from the building exterior. If possible locate to provide direct access to the Holding Room from the building exterior.

Erect Critical and Primary Barriers as described in this specification in an existing space. If no space exists construct Clean Room of 2" x 4" wood framing and plastic sheeting, at least 6 mil in thickness.

- a. Separate this room from the exterior by a single flap door of 6 mil plastic sheeting.
6. Load-out Area: The load-out area is the transfer area from the building to a truck or dumpster. It may be the Clean Room of the Equipment Decontamination unit or a separate room or loading dock area. Erect Critical and Primary barriers as described in this specification in load-out area.
- a. During transfer of material from load-out area erect primary barriers as described in this specification as necessary to seal path from load-out area to truck or dumpster.
7. Decontamination Sequence: Take all equipment or material from the Work Area through the Equipment Decontamination Unit according to the following procedure:
- a. At wash down station, thoroughly wet clean contaminated equipment or sealed plastic bags and pass into Wash Room.
 - b. When passing equipment or containers into the Wash Room, close all doorways of the Equipment Decontamination Unit, other than the doorway between the Wash down Station and the Wash Room. Keep all outside personnel clear of the Equipment Decontamination Unit.
 - c. Once inside the washroom, wet clean the bags and/or equipment.
 - d. When cleaning is complete pass items into Holding Room. Close all doorways except the doorway between the Holding room and the Clean Room.
 - e. Workers from the building exterior enter Holding Area and remove decontaminated equipment and/or containers for disposal.
 - f. Require these workers to wear full protective clothing and appropriate

respiratory protection.

- g. At no time is a worker from an uncontaminated area to enter the enclosure when a removal worker is inside.

H. Construction of the decontamination units

1. Walls and Ceiling: Construct airtight walls and ceiling using plastic sheeting, at least 6 mil in thickness. Attach to existing building components or a temporary framework.
2. Floors: Use 2 layers (minimum) of 6 mil plastic sheeting to cover floors in all areas of the Decontamination Units. Use only clear plastic to cover floors.
3. Doors: Fabricated from three (3) overlapping sheets with openings a minimum of three feet (3') wide. Configure so that sheeting overlaps adjacent surfaces. Weigh sheets at bottoms as required so that they quickly close after being released. Put arrows on sheets to indicate direction of overlap and/or travel. Provide a minimum of six feet (6') between entrance and exit of any room. Provide a minimum of three feet (3') between doors to airlocks.
4. If the Decontamination area is located within an area containing friable asbestos on overhead ceilings, ducts, piping, etc., provide the area with a minimum 1/4 inch hardboard or 1/2 inch plywood "ceiling" with plastic sheeting, at least 6 mil in thickness covering the top of the "ceiling".
5. Visual Barrier: Where the Decontamination area is immediately adjacent to, and within view of occupied areas, provide a visual barrier of black plastic sheeting at least 6 mil in thickness so that worker privacy is maintained and work procedures are not visible to building occupants. Where the area adjacent to the Decontamination area is accessible to the public, construct a solid barrier on the public side of the sheeting to protect the sheeting. Construct barrier with wood or metal studs covered with minimum 1/4 inch thick hardboard or 1/2 inch plywood. Where the solid barrier is provided, sheeting need not be opaque.
6. Alternate methods of providing Decontamination facilities may be submitted to the PROJECT MONITOR for approval. Do not proceed with any such method(s) without written authorization of the PROJECT MONITOR.
7. Electrical: Provide subpanel at Changing Room to accommodate all removal equipment. Power subpanel directly from a building electrical panel. Connect all electrical branch circuits in Decontamination unit and particularly any pumps in shower room to a ground fault circuit protection device.

I. Cleaning of decontamination units

1. Clean debris and residue from inside of Decontamination Units on a daily basis or

as otherwise indicated on Contract Drawings. HEPA vacuum and wet wipe all surfaces after each shift change. Clean debris from shower pans on a daily basis.

2. If the Changing Room of the Personnel Decontamination Unit becomes contaminated with asbestos containing debris all work shall immediately cease and a detailed cleaning of entire Decontamination Unit occur. This includes HEPA vacuuming and wet wiping the entire Decontamination Unit walls, floors and ceiling. Abatement work may proceed after the onsite abatement supervisor and project monitor have performed a visual inspection of the Decontamination Unit. A note of the occurrence must be made in the daily job log of the abatement supervisor and project monitor.

J. Signs

1. Post an approximately 20 inch by 14 inch manufactured caution sign at each entrance to the Work Area displaying the following legend with letter sizes and styles of a visibility required by 8 CCR 1529:
 - a. Provide signs in both English and Spanish.

LEGEND

DANGER
ASBESTOS
MAY CAUSE CANCER
CAUSES DAMAGE TO LUNGS
AUTHORIZED PERSONNEL ONLY
WEAR RESPIRATORY PROTECTION AND
PROTECTIVE CLOTHING IN THIS AREA

K. Certificate of worker's acknowledgment:

1. In Appendix C is a Certificate of Worker Training. After each worker has been included in the ABATEMENT CONTRACTOR's Respiratory Protection Program, completed the training program and medical examination, secure a fully executed copy of this form.

1.9 RESPIRATORY PROTECTION

A. Description of work

1. Instruct and train each worker involved in asbestos abatement in proper respiratory use and require that each worker wear a respiratory, properly fitted on the face in the Work Area from the start of any operation which may expose the worker above the permissible exposure limit (PEL) until the Work Area is completely decontaminated. Use respiratory protection appropriate for the asbestos levels encountered in the work place or as required for other toxic or

oxygen deficient situations encountered.

B. General:

1. Respiratory Protection Program: Comply with ANSI Z88.2 - 1992 "Practices for Respiratory Protection" and OSHA 8 CCR 1544, 1529.
2. Require that respiratory protection be used at all times that there is any possibility of airborne asbestos levels exceeding the permissible exposure level required in OSHA 8 CCR 1529.
3. Require that a respirator be worn by anyone in a Work Area at all times, regardless of activity, during a period that starts with any operation which could cause disturbance of asbestos, until the area has met the requirements of Section 1.5 or Section 1.6.
4. Regardless of Airborne Asbestos Levels: Require that the minimum level of respiratory protection used be half-face air purifying respirators with high efficiency filters.
5. Do not allow the use of single use, disposable, or quarter face respirators for any purpose.

C. Fit testing:

1. Initial Fitting: Fit types of respirator to be worn by each individual. Require that an individual use only a respirator for which training and fit testing has been provided. Require that fit testing be repeated annually, and at any time a respirator is replaced.
2. On a Monthly Basis, check the fit of each worker's respirator by having irritant smoke blown onto the respirator from a smoke tube.
3. Upon Each Wearing: Require that each time an air purifying respirator is put on it be checked for fit with a positive and negative pressure fit check.
4. Fit testing of tight fitting atmosphere supplying respirators and tight fitting powered air purifying respirators shall be accomplished by performing quantitative or qualitative fit testing in the negative pressure mode, regardless of the mode of operation (negative or positive pressure) that is used for respiratory protection.

D. Permissible exposure limit (PEL):

1. Permissible Exposure Limit (PEL-TWA) - 0.1 fiber/cc
2. Action Level (TWA) - 0.1 fiber/cc

- E. Air purifying respirators: Appropriate type of respiratory shall be determined by ABATEMENT CONTRACTOR.
1. Negative pressure: Half or full face mask: Supply a sufficient quantity of respirator HEPA filters approved for asbestos, so that workers can change filters as necessary. Require that respirators be wet rinsed, and filters discarded or covered with duct tape, each time a worker leaves the Work Area. Store respirators and filters at the job site in the changing room and protect totally from exposure to asbestos prior to their use. Respirator cartridges must be replaced whenever a worker experiences increased breathing resistance.
 2. Powered air purifying: Half or full face mask: Supply a sufficient quantity of high efficiency respirator filters approved for asbestos so that workers can change filters at any time that flow through the face piece decreases to the level at which the manufacturer recommends filter replacement. Require that regardless of flow, filter cartridges be replaced after 40 hours of use. Require that HEPA elements in filter cartridges be protected from wetting during personal decontamination. Require entire exterior housing of respirator, including blower unit, filter cartridges, hoses, battery pack, face mask, belt, and cords, be washed each time a worker leaves the Work Area. Caution should be used to avoid shorting battery pack during washing. Provide an extra battery pack for each respirator so that one can be charging while one is in use.
 3. ABATEMENT CONTRACTOR shall provide necessary respirators, HEPA cartridges, and other personal protective equipment listed in this specification for two City representatives on a daily basis.

Part 2 , PRODUCTS

2.1 MISCELLANEOUS PRODUCTS

- A. Plastic Sheeting: Provide flame resistant polyethylene film that conforms to requirements set forth by the National Fire Protection Association Standard 701, Small Scale Fire Test for Flame-resistant Textiles and Films. Provide largest size possible to minimize seams, 4 to 6 millimeter thick or higher as indicated, frosted or black as indicated.
- B. Reinforced Polyethylene Sheet: Where plastic sheet is the only separation between the Work Area and building exterior, provide translucent, nylon reinforced, laminated, flame resistant, polyethylene film that conforms to requirements set forth by the National Fire Protection Association Standard 701, Small Scale Fire Test for Flame-resistant Textiles and Films. Provide largest size possible to minimize seams, 4 or 6 mil thick as indicated, frosted or black as indicated.
- C. Tape: Provide duct tape in 2" or 3" widths as indicated, with an adhesive which is formulated to stick aggressively to sheet plastic.

- D. Spray Adhesive: Provide spray adhesive in aerosol cans which is specifically formulated to stick tenaciously to sheet plastic.
- E. Shower Pan: Provide one piece waterproof shower pan 4' x 8' by 6" deep. Fabricate from seamless fiberglass minimum 1/16" thick reinforced with wood, 18 ga. stainless or galvanized steel with welded seems, copper or lead with soldered seams, or a seamless liner of minimum 60 mil thick elastomeric membrane.
- F. Shower Walls: Provide 8' long by approximately 7' high walls fabricated from rigid, impervious, waterproof material, either corrugated fiberglass roofing or equivalent. Structurally support as necessary for stability.
- G. Shower Heads & Controls: Provide a factory-made shower head producing a spray of water which can be adjusted for spray size and intensity. Feed shower with water mixed from hot and cold supply lines. Arrange so that control of water temperature, flow rate, and shut off is from inside shower without outside aid.
- H. Filters: Provide cascaded filter units on drain lines from showers or any other water source carrying asbestos-contaminated water from the Work Area. Provide units with disposable filter elements as indicated below. Connect so that discharged water passes primary filter and output passes through final filter.
 - 1. Primary Filter - Passes particles 100 microns and smaller
 - 2. Final Filter - Passes particles .5 microns and smaller
- I. For Wash Down Station provide leak tight shower enclosure with integrated drain pan fabricated from fiberglass or other durable waterproof material, approximately 3' x 3' square with minimum 6' high sides and back. Structurally support as necessary for stability. Equip with hose bib, as specified in this section, mounted at approximately 4'-0" above drain pan. Connect drain to a reservoir, pump water from reservoir through filters to a drain or store and use for amended water. Mount filters inside shower stall on back wall beneath hose bib.
- J. Sump Pump: Provide totally submersible waterproof sump pump with integral float switch. Provide unit sized to pump 2 times the flow capacity of all showers or hoses supplying water to the sump, through the filters specified herein when they are loaded to the extent that replacement is required. Provide unit capable of pumping debris, sand, plaster or other materials washed off during decontamination procedures without damage to mechanism of pump. Adjust float switch so that a minimum of 3" remains between top of liquid and top of sump pan.
- K. Surfactant: Submit product data, use instructions and recommendations from manufacturer of surfactant intended for use. Include data substantiating that material complies with requirements.
- L. Removal Encapsulant: Submit material safety data sheet, product data, use instructions

and recommendations from manufacturer of removal encapsulant intended for use. Include data substantiating that material complies with requirements.

2.2 PROTECTIVE CLOTHING:

- A. Disposable Coveralls: Provide disposable full body coveralls and disposable head covers, and require that they be worn by all workers in the Work Area. Provide a sufficient number for all required changes, for all workers in the Work Area. Dispose of coveralls as clothing waste at the end of each day.
- B. Coveralls: Provide cloth full body coveralls and hats; require that they be worn by all workers in the Work Area. Require that workers change out of coverall in the Equipment Section of the Change Room. Dispose of coverall as clothing waste at completion of all work.
- C. Shoe Covers: Provide disposable shoe covers and require that they be worn by all workers in the Work Area. Shoe covers must be replaced each time a worker leaves the Work Area. Shoe covers are disposed as clothing waste in the Equipment Section of the Change Room.
- D. Boots: Provide work boots with non-skid soles, and where required by OSHA, foot protection, for all workers. Provide boots at no cost to workers. Do not allow boots to be removed from the Work Area for any reason, after being contaminated with asbestos. Dispose of boots with clothing waste at the end of the work, or bag and take to next project. Boots that are non-porous may be decontaminated and removed from Work Area.
- E. Hard Hats: Provide head protection (hard hats) as required by OSHA for all workers, and provide 4 spares for use by the PROJECT MONITOR and City. Require hard hats to be worn at all times that work is in progress that may potentially cause head injury. Provide hard hats of type with plastic strap type suspension. Require hats to remain in the Work Area throughout the work. Thoroughly clean and decontaminate hats before removing them from Work Area at the end of the project.
- F. Goggles and Face Shields: Provide eye and face protection (goggles or face shields) as required by OSHA for all workers involved in scraping, spraying, stripping or any other activity which may potentially cause eye or face injury. Thoroughly clean and decontaminate goggles or face shields before removing them from Work Area at the end of the project.
- G. Gloves: Provide work gloves to all workers and require that they be worn at all times in the Work Area. Chemical resistant gloves must be provided when using chemical strippers to remove asbestos. Gloves must be secured to the coveralls using duct tape to protect arms and hands from the chemical strippers. Do not remove gloves from Work Area. Dispose of as clothing waste at the end of the work.
- H. Disposable coveralls, head covers, gloves, and footwear covers shall be provided by the

ABATEMENT CONTRACTOR for the City PROJECT MONITOR, and other authorized representatives who may inspect the job site as needed

2.3 RESPIRATORY

- A. Respirators, and respirator filters, disposable coveralls, head covers, and footwear covers shall be provided by the ABATEMENT CONTRACTOR for the City PROJECT MONITOR, and other authorized representatives who may inspect the job site as needed.
- B. Respirator Product Data: Submit manufacturer's product information for each component used, including NIOSH Certifications for each component in an assembly and/or for entire assembly.

2.4 HEPA FILTERED FAN UNITS

- A. General: Supply the required number of HEPA filtered fan units to the site in accordance with these specifications. Use units that meet the following requirements.
- B. Cabinet: Constructed of durable materials able to withstand damage from rough handling and transportation. Provide units whose cabinets are:
 - 1. Factory-sealed to prevent asbestos from being released during use, transport, or maintenance
 - 2. Arranged to provide access to and replacement of all air filters from intake end
 - 3. Mounted on casters or wheels
- C. Fans: Rate capacity of fan according to usable air moving capacity under actual operating conditions.
- D. HEPA Filters: Provide units whose final filter is the HEPA type with the filter media (folded into closely pleated panels) completely sealed on all edges with a structurally rigid frame.
 - 1. Provide units with a continuous rubber gasket located between the filter and the filter housing to form a tight seal.
 - 2. Provide HEPA filters that are individually tested and certified by the manufacturer to have an efficiency of not less than 99.97 percent when challenged with 0.3 um dioctylphthalate (DOP) particles when tested in accordance with Military Standard Number 282 and Army Instruction Manual 136-300-175A. Provide filters that bear a UL586 label to indicate ability to perform under specified conditions.
 - 3. Provide filters that are marked with: the name of the manufacturer, serial number, air flow rating, efficiency and resistance, and the direction of test air flow.
- E. Pre-filters, which protect the final filter by removing the larger particles, are required to

prolong the operating life of the HEPA filter. Two stages of pre-filtration are required. Provide units with the following pre-filters:

1. First stage pre-filter: low efficiency type (e.g., for particles 100 um and larger)
 2. Second stage (or intermediate) filter: medium efficiency (e.g., effective for particles down to 5 um)
- F. Provide units with pre-filters and intermediate filters installed either on or in the intake grid of the unit and held in place with special housings or clamps.
- G. Instrumentation: Provide units equipped with:
1. Manometer to measure the pressure drop across filters and indicate when filters have become loaded and need to be changed.
 2. A table indicating the usable air handling capacity for various static pressure readings on the manometer affixed near the gauge for reference, or the manometer reading indicating at what point the filters should be changed, noting Cubic Feet per Minute (CFM) air delivery at that point
 3. Elapsed time meter to show the total accumulated hours of operation
- H. Safety and Warning Devices: Provide units with the following safety and warning devices:
1. Electrical (or mechanical) lockout to prevent fan from operating without a HEPA filter
 2. Automatic shutdown system to stop fan in the event of a rupture in the HEPA filter or blocked air discharge
 3. Warning lights to indicate normal operation (green), too high a pressure drop across the filters (i.e., filter overloading) (yellow), and too low of a pressure drop (i.e., rupture in HEPA filter or obstructed discharge) (red)
 4. Audible alarm if unit shuts down due to operation of safety systems
- I. Electrical components: Provide units with electrical components approved by the National Electrical Manufacturers Association (NEMA) and Underwriter's Laboratories (UL). Each unit is to be equipped with overload protection sized for the equipment. The motor, fan, fan housing, and cabinet are to be grounded.
- J. Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:
- K. Manufacturer: Subject to compliance with requirements, provide products of the

following:

Part 3 , EXECUTION

3.1 CONTAINMENT SYSTEM

- A. Securing Work Area: Secure Work Area from access by public, staff or users of the area. Accomplish this where possible, by locking doors, gates, or other means of access to the area.
- B. Work Area is the location where asbestos abatement work occurs. It is a variable of the extent of work of the Contract. It may be a portion of a room, a single room, or a complex of rooms. A "Work Area" is considered contaminated during the work, and must be isolated from the balance of the building, and decontaminated at the completion of the asbestos control work.
- C. Completely isolate the Work Area from other parts of the building so as to prevent asbestos containing dust or debris from passing beyond the isolated area. Should the area beyond the Work Area(s) become contaminated with asbestos containing dust or debris as a consequence of the work, clean those areas in accordance with the procedures indicated in this specification. Perform all such required cleaning or decontamination at no additional cost to owner.
- D. Place all tools, scaffolding, staging, etc. necessary for the work in the area to be isolated prior to completion of Work Area isolation.
- E. Remove uncontaminated equipment, and/or supplies from the Work Area before commencing work, or completely cover with two (2) layers of plastic sheeting, at least 6 mil in thickness, securely taped in place with duct tape. Such equipment shall be considered outside the Work Area unless covering plastic or seal is breached.
- F. Disable ventilating systems or any other system bringing air into or out of the Work Area. Disable system by disconnecting wires, removing circuit breakers, by lockable switch or other positive means that will prevent accidental premature restarting of equipment.
- G. Lockout power to Work Area by switching off all breakers serving power or lighting circuits in Work Area. Label breakers with tape over breaker with notation "DANGER circuit being worked on". Lock panel and have all keys under control of GENERAL CONTRACTOR's Superintendent and the PROJECT MONITOR.
- H. Lockout power to circuits running through Work Area wherever possible by switching off all breakers or removing fuses serving these circuits. Label breakers with tape over breaker with notation "DANGER circuit being worked on". Lock panel and have all keys under control of GENERAL CONTRACTOR's Superintendent or OWNER's designated representative. If circuits cannot be shut down for any reason, label at intervals 4'-0" on center with tags reading, "DANGER live electric circuit. Electrocution hazard." Label circuits in hidden locations but which may be affected by the work in a similar manner.

I. Emergency exits

1. Provide emergency exits and emergency lighting as set forth below:
 - a. Emergency Exits: At each existing exit door from the Work Area provide the following means for emergency exiting:
 - b. Arrange exit door so that it is secure from outside the Work Area but permits exiting from the Work Area.
 - c. Mark outline of door on Primary and Critical Barriers with luminescent paint at least 1" wide. Hang a razor knife on a string beside outline. Arrange Critical and Primary barriers so that they can be easily cut with one pass of razor knife. Paint words "EMERGENCY EXIT" inside outline with luminescent paint in letters at least one foot high and 2" thick.

J. Control Access

1. Isolate the Work Area to prevent entry by building occupants into Work Area or surrounding controlled areas. Accomplish isolation by the following:
2. Submit to PROJECT MONITOR a list of doors and other openings that must be secured to isolate Work Area. Include on list notation if door or opening is in an indicated exit route.
3. After receiving written authorization from the City's PROJECT MONITOR, lock all doors into Work Area, or, if doors cannot be locked, chain shut. Cover any signs that direct emergency exiting, either outside or inside of Work Area, to locked doors. Do not obstruct doors required for emergency exits from Work Area or from building.
4. Modify elevator controls to prevent elevators from stopping at doors in Work Areas. This work is to be performed by a qualified elevator technician.
5. Locked Access: Arrange Work Area so that the only access into Work Area is through lockable doors to personnel and equipment decontamination units.
 - a. Provide four (4) keys for each door to the PROJECT MONITOR and maintain one key in clean room of decontamination unit.
6. Provide Warning Signs at each locked door leading to Work Area reading as follows:
 - a. Print text in both English and Spanish:

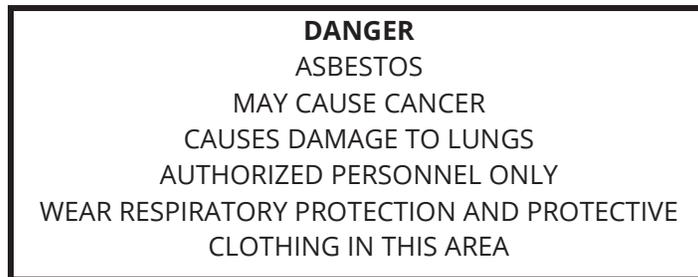
<u>Legend</u>	<u>Notation</u>
KEEP OUT	3" Sans Serif Gothic or Block
BEYOND THIS POINT	1" Sans Serif Gothic or Block
ASBESTOS ABATEMENT WORK	1" Sans Serif Gothic or Block
IN PROGRESS	1" Sans Serif Gothic or Block
BREATHING ASBESTOS DUST MAY BE HAZARDOUS TO YOUR HEALTH	14 Point Gothic

7. Provide Warning Signs at each locked door leading to Work Area reading as follows:

<u>Legend</u>	<u>Notation</u>
KEEP OUT	3" Sans Serif Gothic or Block
CONSTRUCTION	1" Sans Serif Gothic or Block
WORK AREA	1" Sans Serif Gothic or Block
PROTECTIVE CLOTHING REQUIRED BEYOND THIS POINT	14 Point Gothic

8. Immediately inside door and outside critical barriers post an approximately 20 inch by 14 inch manufactured caution sign displaying the following legend with letter sizes and styles of a visibility required by 29 CFR 1926:

LEGEND



Provide spacing between respective lines at least equal to the height of the respective upper line.

- K. Alternative methods of enclosure

1. This contract price should be based for all methods of containing the Work Area as listed in this specification. If the ABATEMENT CONTRACTOR has a method that will meet all safety criteria established by the PROJECT MONITOR and will save money or time, they may submit it as an alternative work plan. This alternative method's submittal will be in addition to the required work plan that meets the requirements of this specification. All cost savings will be equally shared between the ABATEMENT CONTRACTOR and the City. Do not proceed with any such alternative method(s) without prior written approval of the City's PROJECT MONITOR.

L. Critical Barriers

1. Completely Separate the Work Area from other portions of the building, and the outside by closing all openings with sheet plastic barriers at least 6 mil in thickness, or by sealing cracks leading out of Work Area with duct tape.
2. Individually seal all ventilation openings (supply and exhaust), doorways, windows, and other openings into the Work Area with duct tape alone or with plastic sheeting at least 6 mil in thickness, taped securely in place with duct tape. Contractor is responsible for providing any materials necessary to establish an effective seal if duct tape and plastic sheeting is determined to be not effective by the City's PROJECT MONITOR. Maintain seal until all work including Project Decontamination is completed.
3. Provide Sheet Plastic barriers at least 6 mil in thickness as required to seal openings completely from the Work Area into adjacent areas. Seal the perimeter of all sheet plastic barriers with duct tape or spray adhesive or any additional materials necessary.
4. Mechanically Support sheet plastic independently of duct tape or spray adhesive seals so that seals do not support the weight of the plastic. Following are acceptable methods of supporting sheet plastic barriers. Alternative support methods may be used if approved in writing by the City's PROJECT MONITOR.
 - a. Plywood squares 6" x 6" x 3/8" held in place with one 6d smooth masonry nail or electro galvanized common nail driven through center of the plywood and duct tape on plastic so that plywood clamps plastic to the wall. Locate plywood squares at each end, corner and at maximum 4 feet on centers.
 - b. Nylon or polypropylene rope or wire with a maximum unsupported span of 10 feet, minimum 1/4" in diameter suspended between supports securely fastened on either side of opening at maximum 1 foot below ceiling. Tighten rope so that it has 2" maximum dip. Drape plastic over rope from outside Work Area so that a two foot long flap of plastic extends over rope into Work Area. Staple or wire plastic to itself 1" below rope at maximum 6" on centers to form a sheath over rope. Lift flap and seal to ceiling with duct tape or spray cement. Seal loop at bottom of flap with duct tape. Erect entire assembly so that it hangs vertically without a "shelf" upon which debris could

collect.

5. Provide Pressure Differential System per Section 3.2

M. Prepare Area

1. Scaffolding: If fixed scaffolding is to be used to provide access HEPA vacuum and wet clean area prior to scaffolding installation.
2. Remove all electrical and mechanical items, such as lighting fixtures, clocks, diffusers, registers, escutcheon plates, etc. which cover any part of the surface to be worked on with the work as long as the removal does not disturb contaminated areas.
3. Remove all general construction items such as cabinets, casework, door and window trim, moldings, ceilings, trim, etc., which cover the surface of the work as required to prevent interference with the work. Clean, decontaminate and reinstall all such materials, upon completion of all removal work with materials, finishes, and workmanship to match existing installations before start of work.
4. Clean all contaminated furniture, equipment, and or supplies with a HEPA filtered vacuum cleaner or by wet cleaning, as specified in this specification, prior to being moved or covered. All equipment furniture, etc. is to be deemed contaminated unless specifically declared as uncontaminated on the drawings or in writing by the City's PROJECT MONITOR.
5. Clean All Surfaces in Work Area with a HEPA filtered vacuum or by wet wiping prior to the installation of primary barrier.

N. Primary Barrier

1. Protect building and other surfaces in the Work Area from damage from water and high humidity or from contamination from asbestos containing debris, slurry or high airborne fiber levels by covering with a primary barrier as described below.
2. Sheet Plastic: Protect surfaces in the Work Area with two (2) layers of plastic sheeting on floor and walls, or as otherwise directed on the Contract Drawings or in writing by the City's PROJECT MONITOR. Perform work in the following sequence.
 - a. Cover Floor of Work Area with 2 individual layers of clear plastic sheeting, each at least 6 mil in thickness, turned up walls at least 12 inches. Form a sharp right angle bend at junction of floor and wall so that there is no radius which could be stepped on causing the wall attachment to be pulled loose. Both spray glue and duct tape all seams in floor covering. Locate seams in top layer six feet from, or at right angles to, seams in bottom layer. Install sheeting so that top layer can be removed independently of bottom layer.

- b. Cover all walls in Work Area including "Critical Barrier" sheet plastic barriers with one layer of plastic sheeting, at least 6 mil in thickness, mechanically supported and sealed with duct tape or spray glue in the same manner as "Critical Barrier" sheet plastic barriers. Tape all joints including the joining with the floor covering with duct tape or as otherwise indicated on the Contract Documents or in writing by the City's PROJECT MONITOR.
- c. Repair of Damaged Plastic Sheeting: Remove and replace plastic sheeting which has been damaged by removal operations or where seal has failed allowing water to seep between layers. Remove affected sheeting and wipe down entire area. Install new sheet plastic only when area is completely dry.
- d. Install an additional layer of plastic as a drop cloth to protect the secondary layer from debris generated by the asbestos abatement work. Additional protection for primary and secondary floor barriers may be necessary during the demolition of ceiling system. Care should be taken by Contractor to protect the floor sheeting. If PROJECT MONITOR determines that the demolition has damaged the floor sheeting he/she shall request the Contractor to replace damaged floor sheeting as a part of this contract.

O. Isolation Area

- 1. Maintain isolation areas between the Work Area and adjacent building area:
 - a. In locations shown on the plans.
 - b. In unoccupied rooms located between Work Area and adjacent occupied portions of the building.
 - c. In locations where separation between Work Area and occupied portions of building is formed by sheet plastic and/or temporary barriers.
- 2. Form isolation area by controlling access to the space in the same manner as a Work Area. Physically isolate the space from the Work Area and adjacent areas. Accomplish physical isolation by:
 - a. Installing critical barriers in unoccupied space.

P. Stop Work

- 1. If the Critical or Primary barrier falls or is breached in any manner stop work immediately. Do not start work until authorized in writing by the City's PROJECT MONITOR.

Q. Extension of Work Area: If the Critical Barrier is breached in any manner that could allow the passage of asbestos debris or airborne fibers, then add affected area to the Work Area, enclose it as required by this Section of the specification and decontaminate it as

described in this specification.

R. Drop Cloth Barrier

1. Use a secondary layer of plastic as a drop cloth to protect the primary layer from debris generated by the asbestos abatement work is specified in the appropriate work sections.

3.2 NEGATIVE PRESSURE ENCLOSURE

A. Monitoring

1. Continuously monitor and record the pressure differential between the Work Area and outside of the Work Area with a monitoring device incorporating a continuous recorder such as a strip chart or other graphic recorder.

B. Quality assurance:

1. Relative Pressure in Work Area: Continuously maintain the Work Area at an air pressure that is lower than that in any surrounding space, or at any location in the immediate proximity outside of the envelope. This pressure differential when measured across any physical or critical barrier must equal or exceed a static pressure of: -0.02 inches of water.

C. Air circulation in the Work Area:

1. Air Circulation: For purposes of this section air circulation refers to either the introduction of outside air to the Work Area or the circulation and cleaning of air within the Work Area.
2. Air circulation in the Work Area is a minimum requirement intended to help maintain airborne dust levels that do not significantly challenge the Work Area isolation measures. The ABATEMENT CONTRACTOR may also use this air circulation as part of the engineering controls in his worker protection program.
3. Determining the air circulation requirements: Provide a fully operational air circulation system supplying a minimum of the following air circulation rate:
 - a. 6 air changes per hour
4. Determine number of units needed to achieve required air circulation according to the following procedure:
 - a. Determine the volume of the Work Area in cubic feet by multiplying floor area by ceiling height. Determine total air circulation requirement in cubic feet per minute (CFM) for the Work Area by multiplying this volume by the air change rate and dividing by 60.

- b. Calculate air circulation required in cubic feet of air per minute (CFM) by the following formula:

$$\text{CFM required} = \text{Volume of Work Area (cu. ft.)} \times \frac{\text{Number of air changes per hour}}{60 \text{ (minutes per hour)}}$$

- c. Divide the air circulation requirement (CFM) above by capacity of HEPA filtered fan unit(s) used. Capacity of a unit for purposes of this section is the capacity in cubic feet per minute with fully loaded filters (pressure differential which causes loaded filter warning light to come on) in the machine's labeled operating characteristics.

$$\text{Number of Units Needed} = \frac{\text{air circulation requirement (CFM)}}{\text{Capacity of Unit with Loaded Filters}}$$

- d. Add one (1) additional unit as a backup in case of equipment failure or machine shutdown for filter changing.

D. Exhaust system:

- 1. Pressure differential isolation and air circulation in the Work Area are to be accomplished by an exhaust system as described below.
 - a. Exhaust all units from the Work Area to meet air circulation requirement of this section.
 - b. Location of HEPA Filtered Fan Units: Locate fan unit(s) so that makeup air enters Work Area primarily through decontamination facilities and traverses Work Area as much as possible. This may be accomplished by positioning the HEPA filtered fan unit(s) at a maximum distance from the worker access opening or other makeup air sources. The location of negative air exhaust systems including exhaust ducting must be depicted on a diagram for each containment area and reviewed by the PROJECT MONITOR before work can start.
 - c. Place end of unit, its intake duct or its exhaust duct through an opening in the plastic barrier or wall covering. Seal plastic around the unit or duct with tape.
 - d. Vent all negative air machines to the outside of building. Exhaust duct shall be secured to window via a manifold supplied by Contractor.
 - e. Mount units to exhaust directly or through disposable ductwork.
 - f. Use only new ductwork except for sheet metal connections and elbows.

- g. Use ductwork and fittings of same diameter or larger than discharge connection on fan unit.
 - h. Use inflatable, disposable plastic ductwork in lengths not greater than 100 feet.
 - i. Use spiral wire-reinforced flex duct in lengths not greater than 50 feet.
 - j. Arrange exhaust as required to inflate duct to a rigidity sufficient to prevent flapping.
 - k. If direction of discharge from fan unit is not aligned with duct use sheet metal elbow to change direction. Use six feet of spiral wire reinforced flex duct at each direction change.
- 2. If unable to vent to the exterior of the building and this is agreed upon by the PROJECT MONITOR, vent each HEPA filtered fan unit to inlet of second unit. Vent second unit to a controlled area in building as agreed upon with the PROJECT MONITOR. Ensure that controlled area is isolated by critical barriers at all times that units are in operation.
 - 3. Decontamination Units: Arrange Work Area and decontamination units so that the majority of makeup air comes through the Decontamination Units. Use only personnel or equipment Decontamination Unit at any time and seal the other so that make up air passes through unit in use.
 - 4. Supplemental Makeup Air Inlets: Provide where required for proper air flow through the Work Area in location approved by the PROJECT MONITOR by making openings in the plastic sheeting that allow air from outside the Work Area into the Work Area. Locate auxiliary makeup air inlets as far as possible from the fan unit(s) (e.g., on an opposite wall), off the floor (preferably near the ceiling), and away from barriers that separate the Work Area from occupied clean areas. Cover with flaps to reseal automatically if the pressure differential system should shut down for any reason. Spray flap and around opening with spray adhesive so that if flap closes meeting surfaces are both covered with adhesive. Use adhesive that forms contact bond when dry.
- E. Recirculation system:
- 1. Pressure differential isolation and air circulation in the Work Area are to be accomplished by a recirculation system as described below.
 - 2. Re-circulate air in the Work Area through HEPA filtered fan units to accomplish air circulation requirements of this section.
 - 3. Location of Fan Units: Locate HEPA filtered fan units so that air is circulated

through all parts of the Work Area, and so that required pressure is maintained at all parts of Work Area geometry. Move units as necessary so that in any location where asbestos is being disturbed, the discharge from one HEPA filtered fan unit is blowing contamination away from workers. Direct air flow in these locations so that it is predominantly toward workers' backs at the breathing zone elevation.

F. Air circulation in decontamination units:

1. Pressure Differential Isolation: Continuously maintain the pressure differential required for the Work Area in the:
 - a. Personnel Decontamination Unit: Across the Shower Room with the Equipment Room at a lower pressure than the Clean room.
 - b. Equipment Decontamination Unit: Across the Holding Room with the Wash Room at a lower pressure than the Clean Room.
2. Air Circulation: Continuously maintain air circulation in Decontamination Units at same level as required for Work Area.
3. Air Movement: Arrange air circulation through the Personnel Decontamination Unit so that it produces a movement of air from the Clean Room through the Shower Room into the Equipment Room. Maintain continuous minimum velocities of Sixty (60) feet per minute (0.305 m/s) in the breathing zone area of the shower and thirty (30) feet per minute (0.15 m/s) in all other locations of the shower.

G. Use of the pressure differential and air circulation system:

1. General: Each unit shall be serviced by a dedicated minimum 115V-20A circuit with ground fault circuit interrupter (GFCI) supplied from temporary power installed under requirements of this specification. Do not use existing branch circuits to power fan units.
2. Testing the System: Test pressure differential system before any asbestos is disturbed. After the Work Area has been prepared, the decontamination facility set up, and the fan unit(s) installed, start the unit(s) (one at a time). Demonstrate operation and testing of pressure differential system to PROJECT MONITOR.
3. Demonstrate condition of equipment for each HEPA filtered fan unit and pressure differential monitoring equipment including proper operation of the following:
 - a. Squareness of HEPA Filter;
 - b. Condition of seals;
 - c. Proper operation of all lights;

- d. Proper operation of automatic shut down if exhaust is blocked;
 - e. Proper operation of alarms;
 - f. Proper operation of manometer ;
 - g. Proper operation and calibration of pressure monitoring equipment.
4. Demonstrate Operation of the pressure differential system to the PROJECT MONITOR. This demonstration is to include, but is not be limited to, the following:
- a. Plastic barriers and sheeting move lightly in toward Work Area;
 - b. Curtain of decontamination units move lightly in toward Work Area;
 - c. There is a noticeable movement of air through the Decontamination Unit;
 - d. Use smoke tube to demonstrate air movement from Clean Room through Shower Room to Equipment Room;
 - e. Use smoke tubes to demonstrate a definite motion of air across all areas in which work is to be performed;
 - f. Use a differential pressure meter or manometer to demonstrate the required pressure differential at every barrier separating the Work Area from the balance of the equipment, ductwork or outside;
 - g. Modify the Pressure Differential System as necessary to demonstrate successfully the above.
5. Use of System During Abatement Operations:
- a. Start fan units before beginning work (before any asbestos is disturbed). After abatement work has begun, run units continuously to maintain a constant pressure differential and air circulation until decontamination of the Work Area is complete. Do not turn off units at the end of the work shift or when abatement operations temporarily stop.
 - b. Do not shut down air pressure differential system during encapsulating procedures, unless authorized by the PROJECT MONITOR in writing. Supply sufficient pre-filters to allow frequent changes.
 - c. Start abatement work at a location farthest from the fan units and proceed toward them. If an electric power failure occurs, immediately stop all abatement work and do not resume until power is restored and fan units are operating again.

- d. At completion of abatement work, allow fan units to run as specified in this specification, to remove airborne dust that may have been generated during abatement work and cleanup and to purge the Work Area with clean makeup air. The units may be required to run for a longer time after decontamination, if very finely divided asbestos was generated by the work.
6. Dismantling the System:
- a. When a final inspection and the results of final air tests indicate that the area has been decontaminated, fan units may be removed from the Work Area. Before removal from the Work Area, remove and properly dispose of pre-filter, decontaminate exterior of machine and seal intake to the machine with 6 mil plastic sheeting to prevent environmental contamination from the filters. Wrap entire machine including unit housing, caster wheels, instrument face, etc. in 6 mil plastic.

3.3 DISPOSAL OF HAZARDOUS WASTE:

- A. This Section describes the disposal of hazardous waste generated while performing work for this project and includes packaging, labeling, storage, containment, and disposal of hazardous wastes. Disposal of the asbestos containing waste shall be landfill. Disposal methods for a particular hazardous waste other than asbestos will be approved on a case by case basis and shall be properly disposed in accordance with specification and all applicable regulations. All disposal should be done in accordance with the City of San Diego's "White Book" Section 803-4 Hazardous Substances Management Plan.
- B. Employee training: Any contracted employee who handles hazardous waste must be trained to ensure compliance with the regulations. All contracted staff working at the job site must be able to respond effectively to emergency situations including chemical spills (22 CCR 66265.16).
- C. Waste minimization:
 - 1. The ABATEMENT CONTRACTOR is required to make all reasonable efforts to minimize the amount of hazardous waste generated from this project.
- D. Waste characterization:
 - 1. All waste generated on site must be tested within 10 days of generation to determine if it meets hazardous waste criteria as specified in 22 CCR Division 4.5 or any other pertinent law or regulation. ABATEMENT CONTRACTOR shall also provide:
 - a. Planned hazardous waste disposal method, all transporters, and disposal facilities to be utilized.
 - b. All hazardous waste containers shall have a permanent paint marking system

and hazardous waste labeled completed and attached once waste has started to accumulate.

- c. ABATEMENT CONTRACTOR shall separate all waste as generated.
2. Representative samples of all solid or liquid waste other than asbestos shall be analyzed and the results compared to the Total Threshold Limit Concentration (TTLC) for all metals listed.
 - a. If any of the results exceed the TTLC criteria, the waste must be managed as hazardous waste.
 - b. If all the results are less than the TTLC and less than ten times the Soluble Threshold Limit Concentration (STLC), the waste can be managed as non-hazardous waste.
 - c. If all results are less than the TTLC, but, some of the results are greater than ten times the STLC, the sample shall be further analyzed for those specific metals using the Waste Extraction Test (WET). If the results from the WET are less than the STLC, the waste can be managed as non-hazardous waste.
 3. Additional testing for other constituents besides TTLC may be required by the PROJECT MONITOR or the Disposal Company to accurately identify the waste or to adequately determine the waste is non-hazardous, non-regulated, or type of waste requiring special handling.
 4. In addition to the State required testing, if the waste is to be disposed of at a treatment, storage, and disposal facility outside of California or if proof is required to show it is not a federally regulated waste, the federal Toxicity Characteristic Leachate Procedure may also be required.
 5. Any other potential hazardous waste generated shall be tested in accordance with 22 CCR Division 4.5 within ten (10) days to determine if hazardous waste and the required disposal.
- E. Pre-transportation requirements:
1. Any packaging used to ship hazardous waste off site such as a container, roll-off bin, tank or other device, must comply with 49 CFR Parts 173, 178, 179 and be labeled and prepared for transportation in accordance with 22 CCR Article 3.
 2. The hazardous waste label must be affixed and filled out when the first amount of hazardous waste is placed in the container. The label must include the initial accumulation date.
 3. All additional pre-transportation labeling, marking or placarding must be conducted prior to transporting off site and in accordance with 22 CCR Chapter 12,

Article 3.

4. All containers used to package the hazardous waste must be compatible with the waste (22 CCR 66265.172), maintained in good condition (22 CCR 66265.171) and kept closed unless adding or removing waste (22 CCR 66265.173). All containers and tanks of hazardous waste must be managed in a way which minimizes the threat of fire, explosion, or any unplanned sudden or non-sudden release of hazardous waste to the air, soil or surface water which could threaten human health or the environment. Management techniques include containment areas capable of holding the contents of largest container within the containment area. Properly store and secure waste at all times. Do not leave hazardous waste in uncovered or unlocked trucks or dumpsters.
5. The ABATEMENT CONTRACTOR will perform inspections of their hazardous waste management areas at least weekly to ensure compliance with the regulations (22 CCR 66265.174).

F. Transportation and disposal requirements:

1. The PROJECT MONITOR will supply the ABATEMENT CONTRACTOR with the EPA Generator Identification number for each work site. These numbers are site specific and will only be used on hazardous waste disposal documentation for the appropriate site where the waste was generated.
2. A hazardous waste manifest will be completed in accordance with 22 CCR Chapter 12, Article 2 for each shipment of hazardous waste leaving the work site.
3. The submission of each manifest to the PROJECT MONITOR will be done as specified in Part 1, Section 1.3 of this document. A Certificate of Destruction or Recycling is required for each manifest where that method of disposal was used.
4. Only an OWNER pre-approved, licensed hazardous waste transportation company shall transport hazardous waste off site to a disposal location in accordance with 22 CCR Chapter 13. When the amount of hazardous waste generated at the site is 220 pounds or 25 gallons, the ABATEMENT CONTRACTOR shall arrange for disposal within 90 days or the end of the project, whichever comes first.

G. Management of specified wastes:

1. Non-Hazardous Solid Waste (As Determined By Testing)
 - a. Properly store and secure waste at all times. Do not leave debris in the yard or in uncovered or unlocked trucks or dumpsters. Do not contaminate the debris with asbestos or any other hazardous waste. Transport waste in covered or enclosed trucks or dumpsters.
2. NON-HAZARDOUS LIQUID WASTE: (As Determined By Testing)

- a. Dispose of liquid waste by pouring into sanitary sewage system may occur if permission is received from the Industrial Waste Program at (858) 527-7600. Do not dispose of liquid waste by pouring onto ground or into storm drain.
3. Hazardous Materials Containers
- a. All empty hazardous material containers must be managed as specified in 22 CCR 66261.7 and outlined as follows:
 - (1) A container is empty if the entire contents of a hazardous material has been used and if:
 - (a) No liquid can pour or drain from the container when it is held in any orientation (e.g. inverted, tilted, etc.)
 - (b) If not a liquid, all solid hazardous material has been removed by a physical method so that no more than a thin uniform film remains in the container.
 - (2) The hazardous material that is removed from the container is used as a material or disposed of as a hazardous waste.
 - (3) Mark each container with the date it was emptied. Manage the container within one year by one of the following methods:
 - (a) Reclaim the scrap value of the container.
 - (b) Send the container off for reconditioning or re-manufacturing.
 - (c) Send the container back to the manufacturer.
 - (4) For containers 5 gallons capacity or less, once the container is empty, it may be disposed of to the regular trash.
 - (5) Aerosol spray containers may be disposed of in the regular trash if the contents and propellant have been emptied to the maximum extent practical under normal use (i.e., the spray mechanism was not defective and thus allowed discharge of the contents and propellant.)
 - (6) A compressed gas cylinder is empty when the pressure in the container approaches atmospheric.

3.4 REMOVAL OF ASBESTOS CONTAINING MATERIALS

- A. Installation of Critical and Primary Barriers, and Work Area Isolation Procedures are set forth in this specification shall be in place and have been reviewed by the PROJECT

MONITOR prior to any removal taking place.

B. Wet Removal

1. Thoroughly wet to satisfaction of City of San Diego's PROJECT MONITOR Asbestos containing Materials to be removed prior to stripping and/or tooling to reduce fiber dispersal into the air. Accomplish wetting by a fine spray (mist) of amended water or removal encapsulant. Saturate material sufficiently to wet to the substrate without causing excess dripping. Allow time for amended water or removal encapsulant to penetrate material thoroughly. If amended water is used, spray material repeatedly during the work process to maintain a continuously wet condition. If a removal encapsulant is used, apply in strict accordance with manufacturer's written instructions. Where necessary, carefully strip away while simultaneously spraying amended water or removal encapsulant on the installation to minimize dispersal of asbestos fibers into the air.
2. Mist Work Area continuously with amended water whenever necessary to reduce airborne fiber levels.
3. Remove saturated Asbestos Containing Material in small sections from all areas. Do not allow material to dry out. As it is removed, simultaneously pack material **while still wet** into disposal bags. Evacuate air from disposal bags with a HEPA filtered vacuum cleaner before sealing. Twist neck of bags, bend over and seal with minimum three wraps of duct tape. Clean outside of bags and move to Wash Down Station adjacent to Material Decontamination Unit. **No asbestos containing material shall remain on the floor overnight.**
4. Fireproofing: Spray asbestos containing fireproofing with a penetrating encapsulant in a two foot radius from the center of the anchor location. Allow time encapsulant to penetrate materials to substrate. Do not over-saturate to cause excess dripping. Scrape materials from substrate in large enough area for anchors as needed. Remove materials in manageable quantities and control the descent to staging or floor below. Remove residue remaining on metal decking after scraping using stiff nylon bristled hand brush.
5. Vinyl Floor Tile and Mastic: All flooring and mastics must be adequately wetted throughout the removal process. No dry-sweeping shall occur during cleanup.

APPENDIX A

The following is a summary of the asbestos containing materials identified for 101 Ash Street:

Material Type	Material Location	Asbestos Content
Fireproofing	Spray applied on all structural steel and decking on all levels	5-10% Chrysotile
Vinyl Containing Floor Tile and Mastic	Throughout all levels including under carpeting	Tile: No Asbestos Detected Mastic: 4-6% Chrysotile
Thermal System Insulation	Throughout all levels on pipes in plenums and wall cavities; Throughout mechanical rooms on pipes and boilers	Not sampled. Components are adequately labeled "Asbestos" throughout building
Fire Doors	Throughout all levels	Assumed

Asbestos Laboratory Results on following pages



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Department
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San Diego, CA 92123

Date Entered: 04/10/2017

Analyzed By: Group

Date Analyzed: 04/11/17

Customer PO / Claim#:

Contract Number:

Job Site: Project No. 7385

Date Sampled

Who Sampled

Lab Notes: 72 HR TAT

04/10/2017

George Katsikaris

POLARIZED LIGHT MICROSCOPY ANALYSIS REPORT - EPA-600/R-93/116 AND EPA-600/M4-82-020

Analysis Number: 156032-1

Customer Number: 001-B-19

Classification:

Description: Vinyl Mat Flooring - NE Kitchen

Results: A: Non-Asbestos: Non-Fibrous Black/ Multi Vinyl Mat Flooring
B: Non-Asbestos: Non-Fibrous Tan Mastic

Analysis Number: 156032-2

Customer Number: 002-B-19

Classification:

Description: Vinyl Basecove / Glue - NE Wtr Htr Clo

Results: Non-Asbestos: Non-Fibrous Tan Cove Base Mastic

Analysis Number: 156032-3

Customer Number: 003-B-19

Classification:

Description: Vinyl Basecove / Glue - NE Wtr Htr Clo

Results: Non-Asbestos: Non-Fibrous Tan Cove Base Mastic

Analysis Number: 156032-4

Customer Number: 004-B-19

Classification:

Description: 2x2 Ceiling Tile - AV 2

Results: Non-Asbestos: 20% Cellulose Fibers and 20% Glass Fibers in Gray Ceiling Tile

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POLARIZED LIGHT MICROSCOPY ANALYSIS REPORT - EPA-600/R-93/116 AND EPA-600/M4-82-020

Analysis Number: 156032-5**Customer Number:** 005-B-19**Classification:****Description:** 2x2 Ceiling Tile - NE Hallway**Results:** Non-Asbestos: 20% Cellulose Fibers and 20% Glass Fibers in Gray Ceiling Tile**Analysis Number:** 156032-6**Customer Number:** 006-B-19**Classification:****Description:** 2x2 Ceiling Tile - NE Sto.1**Results:** Non-Asbestos: 20% Cellulose Fibers and 20% Glass Fibers in Gray Ceiling Tile**Analysis Number:** 156032-7**Customer Number:** 007-B-19**Classification:****Description:** 2x2 Ceiling Tile - Dep. Chief PO2**Results:** Non-Asbestos: 20% Cellulose Fibers and 20% Glass Fibers in Gray Ceiling Tile**Analysis Number:** 156032-8**Customer Number:** 008-B-19**Classification:****Description:** 12x12 VCT - Elevator Lobby**Results:**
A: Non-Asbestos: 25% Cellulose Fibers in Gray Sheet Vinyl
B: Non-Asbestos: Non-Fibrous Tan Mastic

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POLARIZED LIGHT MICROSCOPY ANALYSIS REPORT - EPA-600/R-93/116 AND EPA-600/M4-82-020

Analysis Number: 156032-9

Customer Number: 009-B-19

Classification:

Description: Vinyl Sheet Flooring - SE Kit./BrkRm

Results: A: Non-Asbestos: 25% Cellulose Fibers in Gray Sheet Vinyl
B: Non-Asbestos: Non-Fibrous Tan Mastic

Analysis Number: 156032-10

Customer Number: 010-B-19

Classification:

Description: VSF - SE Kit/Jan Clo

Results: A: Non-Asbestos: 25% Cellulose Fibers in Gray Sheet Vinyl
B: Non-Asbestos: Non-Fibrous Tan Mastic

Analysis Number: 156032-11

Customer Number: 011-B-19

Classification:

Description: Plaster - SE Data Closet

Results: A: Non-Asbestos: Non-Fibrous White Color Coat
B: Non-Asbestos: Non-Fibrous Gray Plaster

Analysis Number: 156032-12

Customer Number: 012-B-19

Classification:

Description: Drywall Composite - Electrical Closet

Results: Non-Asbestos: 20% Cellulose Fibers in White Composite Wall System

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POLARIZED LIGHT MICROSCOPY ANALYSIS REPORT - EPA-600/R-93/116 AND EPA-600/M4-82-020

Analysis Number: 156032-13

Customer Number: 013-B-19

Classification:

Description: Drywall Composite - Data Closet

Results: Non-Asbestos: 20% Cellulose Fibers in White Composite Wall System

Analysis Number: 156032-14

Customer Number: 014-B-19

Classification:

Description: Drywall Composite - NE Wtr Htr Clo

Results: Non-Asbestos: 20% Cellulose Fibers in White Composite Wall System

Analysis Number: 156032-15

Customer Number: 015-B-19

Classification:

Description: Acoustic Ceiling - AV 1

Results: Non-Asbestos: 3% Cellulose Fibers in White Acoustic Ceiling

Analysis Number: 156032-16

Customer Number: 016-B-19

Classification:

Description: Carpet Mastic - AV 1

Results: Non-Asbestos: Non-Fibrous Brown Mastic

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Analysis Number: 156032-17

Customer Number: 017-B-19

Classification:

Description: Exposed Mastic - NE Wtr Htr Clo

Results: Non-Asbestos: Non-Fibrous Brown Mastic

Analysis Number: 156032-18

Customer Number: 018-B-19

Classification:

Description: Overspray - Sto Rm 1 Pipe Chase

Results: Non-Asbestos: 1% Cellulose Fibers In Gray Overspray

Analysis Number: 156032-19

Customer Number: 019-B-19

Classification:

Description: 12' VCT w/Mastic - N. Center Office Area

Results:
A: Non-Asbestos: Non-Fibrous Tan/Red Floor Tile
B: Asbestos: 6% Chrysotile in Black Mastic

Analysis Number: 156032-20

Customer Number: 020-B-19

Classification:

Description: 12' VCT w/Mastic - Electrical Hallway

Results:
A: Non-Asbestos: Non-Fibrous Tan/Red Floor Tile
B: Asbestos: 6% Chrysotile in Black Mastic

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POLARIZED LIGHT MICROSCOPY ANALYSIS REPORT - EPA-600/R-93/116 AND EPA-600/M4-82-020

Analysis Number: 156032-21

Customer Number: 021-B-18

Classification:

Description: Drywall Composite - NE Hallway

Results: Non-Asbestos: 20% Cellulose Fibers in White Composite Wall System

Analysis Number: 156032-22

Customer Number: 022-B-18

Classification:

Description: Drywall Composite - NE Hallway

Results: Non-Asbestos: 20% Cellulose Fibers in White Composite Wall System

Analysis Number: 156032-23

Customer Number: 023-B-18

Classification:

Description: Drywall Composite - Elec. Hallway

Results: Non-Asbestos: 20% Cellulose Fibers in White Composite Wall System

Analysis Number: 156032-24

Customer Number: 024-B-18

Classification:

Description: Drywall Composite - SW Office

Results: Non-Asbestos: 20% Cellulose Fibers in White Composite Wall System

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POLARIZED LIGHT MICROSCOPY ANALYSIS REPORT - EPA-600/R-93/116 AND EPA-600/M4-82-020

Analysis Number: 156032-25

Customer Number: 025-B-18

Classification:

Description: 2x2 Ceiling Tile - SW Office

Results: Non-Asbestos: 20% Cellulose Fibers and 20% Glass Fibers in Gray Ceiling Tile

Analysis Number: 156032-26

Customer Number: 026-B-18

Classification:

Description: 2x2 Ceiling Tile - S. Breakroom

Results: Non-Asbestos: 20% Cellulose Fibers and 20% Glass Fibers in Gray Ceiling Tile

Analysis Number: 156032-27

Customer Number: 027-B-18

Classification:

Description: 2x2 Ceiling Tile - S. Kitchenette

Results: Non-Asbestos: 20% Cellulose Fibers and 20% Glass Fibers in Gray Ceiling Tile

Analysis Number: 156032-28

Customer Number: 028-B-18

Classification:

Description: White Basecove w/ Mastic - S. Kitchenette

Results: Non-Asbestos: Non-Fibrous Cove Base Mastic

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POLARIZED LIGHT MICROSCOPY ANALYSIS REPORT - EPA-600/R-93/116 AND EPA-600/M4-82-020

Analysis Number: 156032-29

Customer Number: 029-B-18

Classification:

Description: White Basecove w/ Mastic - Elec. Hallway

Results: Non-Asbestos: Non-Fibrous Cove Base Mastic

Analysis Number: 156032-30

Customer Number: 030-B-18

Classification:

Description: White Basecove w/ Mastic - NW Conf. Room

Results: Non-Asbestos: Non-Fibrous Cove Base Mastic

Analysis Number: 156032-31

Customer Number: 031-B-18

Classification:

Description: Drywall Composite - NE Hallway

Results: Non-Asbestos: Non-Fibrous Gray Flooring

Analysis Number: 156032-32

Customer Number: 032-B-18

Classification:

Description: Vinyl Mat Flooring - Exercise Room

Results: Non-Asbestos: Non-Fibrous Gray Flooring

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POLARIZED LIGHT MICROSCOPY ANALYSIS REPORT - EPA-600/R-93/116 AND EPA-600/M4-82-020

Analysis Number: 156032-33

Customer Number: 033-B-18

Classification:

Description: Plaster - Electrical Hallway Closet

Results: Non-Asbestos: Non-Fibrous White Plaster

Analysis Number: 156032-34

Customer Number: 034-B-14

Classification:

Description: Multi - Layer Floor Tile w/Mastic - IDF

Results:
A: Non-Asbestos: 25% Cellulose Fibers in Gray Sheet Vinyl
B: Non-Asbestos: Non-Fibrous Tan Mastic
C: Non-Asbestos: Non-Fibrous Tan Floor Tile
D: Asbestos: 6% Chrysotile in Black Mastic
E: Non-Asbestos: Non-Fibrous Tan Floor Tile
F: Asbestos: 6% Chrysotile in Black Mastic

Analysis Number: 156032-35

Customer Number: 035-B-17

Classification:

Description: Multi - Layer Floor Tile w/Mastic - Storage

Results:
A: Non-Asbestos: Non-Fibrous Gray Floor Tile
B: Asbestos: 6% Chrysotile in Black Mastic
C: Non-Asbestos: Non-Fibrous Gray Floor Tile
D: Asbestos: 6% Chrysotile in Black Mastic

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POLARIZED LIGHT MICROSCOPY ANALYSIS REPORT - EPA-600/R-93/116 AND EPA-600/M4-82-020

Analysis Number: 156032-36

Customer Number: 036-B-17

Classification:

Description: 12" VCT with Mastic - SE Work Area

Results:

A: Non-Asbestos: Non-Fibrous Gray Floor Tile
B: Non-Asbestos: Non-Fibrous Tan/Green Mastic
C: Non-Asbestos: Non-Fibrous Gray Floor Tile
D: Non-Asbestos: Non-Fibrous Tan Mastic
E: Non-Asbestos: Non-Fibrous Tan Floor Tile
F: Asbestos: 6% Chrysotile in Black Mastic

Analysis Number: 156032-37

Customer Number: 037-B-17

Classification:

Description: Drywall Composite - SE Work Area

Results:

Non-Asbestos: 10% Cellulose Fibers and 1% Glass Fibers in White Composite Wall System

Analysis Number: 156032-38

Customer Number: 038-B-17

Classification:

Description: Drywall Composite - NW Conf. Room

Results:

Non-Asbestos: 10% Cellulose Fibers and 1% Glass Fibers in Off-White Composite Wall System

Analysis Number: 156032-39

Customer Number: 039-B-17

Classification:

Description: Drywall Composite - Break Room

Results:

Non-Asbestos: 10% Cellulose Fibers and 1% Glass Fibers in White Composite Wall System

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POLARIZED LIGHT MICROSCOPY ANALYSIS REPORT - EPA-600/R-93/116 AND EPA-600/M4-82-020

Analysis Number: 156032-40

Customer Number: 040-B-17

Classification:

Description: Plaster Wall - Phone Closet

Results: Non-Asbestos: 1% Cellulose Fibers in Gray Plaster

Analysis Number: 156032-41

Customer Number: 041-B-17

Classification:

Description: Plaster Wall - Electrical Room

Results:
A: Non-Asbestos: Non-Fibrous White Color Coat
B: Non-Asbestos: 1% Cellulose Fibers in Gray Plaster

Analysis Number: 156032-42

Customer Number: 042-B-17

Classification:

Description: Plaster Wall - Electrical Room

Results:
A: Non-Asbestos: Non-Fibrous White Color Coat
B: Non-Asbestos: 1% Cellulose Fibers in Gray Plaster

Analysis Number: 156032-43

Customer Number: 043-B-16

Classification:

Description: 12" VCT with Mastic - Elevator Lobby

Results: Non-Asbestos: Non-Fibrous Gray Floor Tile

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APPROVED BY:

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LELANO S. PITT, CIH

Dated: 04/11/2017

REVIEWED BY:

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Michelle Lavalley

Page 11 of 19



H.M. Pitt Labs, Inc.

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Lab Number: 156032-210873

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San Diego, CA 92123

Date Entered: 04/10/2017

Analyzed By: Group

Date Analyzed: 04/11/17

Customer PO / Claim#:

Contract Number:

Job Site: Project No. 7385

Date Sampled

Who Sampled

Lab Notes: 72 HR TAT

04/10/2017

George Katsikaris

POLARIZED LIGHT MICROSCOPY ANALYSIS REPORT - EPA-600/R-93/116 AND EPA-600/M4-82-020

Analysis Number: 156032-44

Customer Number: 044-B-16

Classification:

Description: Multi-Layer VCT with Mastic - Elec. Floor Chase

Results:

A: Non-Asbestos: Non-Fibrous Gray Floor Tile
B: Asbestos: 3% Chrysotile in Black Floor Tile Mastic (1% Cellulose Fibers Also Present)
C: Non-Asbestos: Non-Fibrous Brown Floor Tile
D: Asbestos: 4% Chrysotile in Black Floor Tile Mastic (1% Cellulose Fibers Also Present)

Analysis Number: 156032-45

Customer Number: 045-B-16

Classification:

Description: Multi-Layer VCT with Mastic - Main Floor

Results:

A: Non-Asbestos: Non-Fibrous White Floor Tile
B: Asbestos: 5% Chrysotile in Black Floor Tile Mastic
C: Non-Asbestos: Non-Fibrous White Floor Tile
D: Asbestos: 5% Chrysotile in Black Floor Tile Mastic

Analysis Number: 156032-46

Customer Number: 046-B-16

Classification:

Description: 1x4" Ceiling Tile - Hallway

Results:

Non-Asbestos: 50% Mineral Wool in White/Gray Ceiling Tile

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APPROVED BY:

LELAND S. PITT, CIH

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Customer PO / Claim#:

Contract Number:

Job Site: Project No. 7385

Date Sampled

Who Sampled

Lab Notes: 72 HR TAT

04/10/2017

George Katsikaris

POLARIZED LIGHT MICROSCOPY ANALYSIS REPORT - EPA-600/R-93/116 AND EPA-600/M4-82-020

Analysis Number: 156032-47

Customer Number: 047-B-16

Classification:

Description: Acoustic Ceiling - Wrk Rm Proj Dist Area

Results: Non-Asbestos: 15% Cellulose Fibers in White Acoustic Ceiling

Analysis Number: 156032-48

Customer Number: 048-B-16

Classification:

Description: Ceiling Tile - Main Floor

Results: Non-Asbestos: 80% Glass Fibers in White Ceiling Tile

Analysis Number: 156032-49

Customer Number: 049-B-16

Classification:

Description: Drywall Composite - Soffit Center

Results: Non-Asbestos: 10% Cellulose Fibers and 1% Glass Fibers in White Composite Wall System

Analysis Number: 156032-50

Customer Number: 050-B-16

Classification:

Description: Drywall Composite - Soffit North

Results: Non-Asbestos: 1% Cellulose Fibers in White Composite Wall System

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Page 13 of 19



H.M. Pitt Labs, Inc.

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Job Site: Project No. 7385

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04/10/2017

George Katsikaris

Lab Notes: 72 HR TAT

POLARIZED LIGHT MICROSCOPY ANALYSIS REPORT - EPA-600/R-93/116 AND EPA-600/M4-82-020

Analysis Number: 156032-51

Customer Number: 051-B-16

Classification:

Description: Drywall Composite - Soffit NE

Results: Non-Asbestos: 1 Cellulose Fibers in White Composite Wall System

Analysis Number: 156032-52

Customer Number: 052-B-15

Classification:

Description: 12" VCT with Mastic - NE Break Room

Results:
A: Non-Asbestos: Non-Fibrous White Floor Tile
B: Asbestos: 5% Chrysotile in Black Mastic

Analysis Number: 156032-53

Customer Number: 053-B-15

Classification:

Description: Cloth Wall Partition - Workload Mgmt Rm

Results: Non-Asbestos: 80% Synthetic Fibers in White Woven Fibers

Analysis Number: 156032-54

Customer Number: 054-B-14

Classification:

Description: Overspray - Electrical Room

Results: Asbestos: 5% Chrysotile in Gray Insulation (3% Cellulose Fibers Also Present)

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Dated: 04/11/2017

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Lab Notes: 72 HR TAT

04/10/2017

George Katsikaris

POLARIZED LIGHT MICROSCOPY ANALYSIS REPORT - EPA-600/R-93/116 AND EPA-600/M4-82-020

Analysis Number: 156032-55

Customer Number: 055-B-13

Classification:

Description: Drywall Composite - IDF Area

Results: Non-Asbestos: 10% Cellulose Fibers and 1% Glass Fibers in White Composite Wall System

Analysis Number: 156032-56

Customer Number: 056-B-13

Classification:

Description: Drywall Composite - IDF Area

Results: Non-Asbestos: 10% Cellulose Fibers and 1% Glass Fibers in White Composite Wall System

Analysis Number: 156032-57

Customer Number: 057-B-13

Classification:

Description: Drywall Composite - IDF Area

Results: Non-Asbestos: 10% Cellulose Fibers and 1% Glass Fibers in White Composite Wall System

Analysis Number: 156032-58

Customer Number: 058-B-13

Classification:

Description: Acoustic Ceiling - IDF Area

Results: Non-Asbestos: 15% Cellulose Fibers in White Acoustic Ceiling

-
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Lab Notes: 72 HR TAT

04/10/2017

George Katsikaris

POLARIZED LIGHT MICROSCOPY ANALYSIS REPORT - EPA-600/R-93/116 AND EPA-600/M4-82-020

Analysis Number: 156032-59

Customer Number: 059-B-13

Classification:

Description: 2x42" Ceiling Tile - IDF Area

Results: Non-Asbestos: 40% Cellulose Fibers and 30% Mineral Wool in White/Gray Ceiling Tile

Analysis Number: 156032-60

Customer Number: 060-B-13

Classification:

Description: 2x42" Ceiling Tile - IDF Area

Results: Non-Asbestos: 40% Cellulose Fibers and 30% Mineral Wool in White/Gray Ceiling Tile

Analysis Number: 156032-61

Customer Number: 061-B-13

Classification:

Description: Basecove with Mastic - IDF Area

Results: Non-Asbestos: Non-Fibrous Yellow Cove Base Mastic

Analysis Number: 156032-62

Customer Number: 062-B-13

Classification:

Description: Plaster Wall - Utility Closet

Results: Non-Asbestos: Non-Fibrous Gray Plaster

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Job Site: Project No. 7385

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Lab Notes: 72 HR TAT

04/10/2017

George Katsikaris

POLARIZED LIGHT MICROSCOPY ANALYSIS REPORT - EPA-600/R-93/116 AND EPA-600/M4-82-020

Analysis Number: 156032-63

Customer Number: 063-B-13

Classification:

Description: 12" VCT with Mastic - Floor Cable Chase

Results:

A: Non-Asbestos: Non-Fibrous Gray Floor Tile
B: No-Asbestos: 1% Cellulose Fibers in Yellow Floor Tile Mastic
C: Non-Asbestos: Non-Fibrous White Floor Tile
D: Non-Asbestos: 1% Cellulose Fibers in Yellow Floor Tile Mastic

Analysis Number: 156032-64

Customer Number: 064-B-12

Classification:

Description: Acoustic Ceiling - Wrk Rm Proj Dist

Results:

Non-Asbestos: 15% Cellulose Fibers in White Acoustic Ceiling

Analysis Number: 156032-65

Customer Number: 065-B-12

Classification:

Description: Drywall Composite - Wrk Rm Proj Dist

Results:

Non-Asbestos: 10% Cellulose Fibers and 1% Glass Fibers in White Composite Wall System

Analysis Number: 156032-66

Customer Number: 066-B-11

Classification:

Description: Drywall Composite - Break Room Soffit

Results:

Non-Asbestos: 10% Cellulose Fibers and 1% Glass Fibers in White Composite Wall System

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Date Analyzed: 04/11/17

Customer PO / Claim#:

Contract Number:

Job Site: Project No. 7385

Date Sampled

Who Sampled

Lab Notes: 72 HR TAT

04/10/2017

George Katsikaris

POLARIZED LIGHT MICROSCOPY ANALYSIS REPORT - EPA-600/R-93/116 AND EPA-600/M4-82-020

Analysis Number: 156032-67

Customer Number: 067-B-11

Classification:

Description: Drywall Composite - Break Room Soffit

Results: Non-Asbestos: 10% Cellulose Fibers and 1% Glass Fibers in White Composite Wall System

Analysis Number: 156032-68

Customer Number: 068-B-11

Classification:

Description: Drywall Composite - Break Room Soffit

Results: Non-Asbestos: 10% Cellulose Fibers and 1% Glass Fibers in White Composite Wall System

Analysis Number: 156032-69

Customer Number: 069-B-09

Classification:

Description: Acoustic Ceiling - Soffit

Results: Non-Asbestos: 15% Cellulose Fibers in White Acoustic Ceiling

Analysis Number: 156032-70

Customer Number: 070-B-09

Classification:

Description: Acoustic Ceiling - Soffit

Results: Non-Asbestos: 15% Cellulose Fibers in White Acoustic Ceiling

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Date Analyzed: 04/11/17

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Contract Number:

Job Site: Project No. 7385

Date Sampled

Who Sampled

Lab Notes: 72 HR TAT

04/10/2017

George Katsikaris

POLARIZED LIGHT MICROSCOPY ANALYSIS REPORT - EPA-600/R-93/116 AND EPA-600/M4-82-020

Analysis Number: 156032-71

Customer Number: 071-B-09

Classification:

Description: Acoustic Ceiling - Soffit

Results: Non-Asbestos: 15% Cellulose Fibers in White Acoustic Ceiling

Analysis Number: 156032-72

Customer Number: 072-B-09

Classification:

Description: Wallboard with Cloth Partition - Conf. Rm

Results:
A: Non-Asbestos: 25% Cellulose Fibers in Gray Wallboard
B: Non-Asbestos: 80% Synthetic Fibers in White Woven Fibers

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Dated: 04/11/2017

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Date Analyzed: 04/18/17

Customer PO / Claim#:

Contract Number:

Job Site: Project No. 7385

Date Sampled

Who Sampled

Lab Notes: 24 HR RUSH

04/17/2017

George Katsikaris

POLARIZED LIGHT MICROSCOPY ANALYSIS REPORT - EPA-600/R-93/116 AND EPA-600/M4-82-020

Analysis Number: 156137-12

Customer Number: 073-9-B

Classification:

Description: Plaster Ceiling - Women's Restroom

Results:
A: Non-Asbestos: Non-Fibrous White Color Coat
B: Non-Asbestos: Non-Fibrous Tan Plaster

Analysis Number: 156137-13

Customer Number: 074-9-B

Classification:

Description: Plaster Ceiling - Women's Restroom

Results:
A: Non-Asbestos: Non-Fibrous White Color Coat
B: Non-Asbestos: Non-Fibrous Gray Plaster

Analysis Number: 156137-14

Customer Number: 075-8-B

Classification:

Description: Drywall Composite - IDF

Results: Non-Asbestos: 20% Cellulose Fibers in White Composite

Analysis Number: 156137-15

Customer Number: 076-8-B

Classification:

Description: Drywall Composite - IDF

Results: Non-Asbestos: 20% Cellulose Fibers in White Composite

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Dated: 04/18/2017

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Job Site: Project No. 7385

Date Sampled **Who Sampled**
04/17/2017 George Katsikaris

Lab Notes: 24 HR RUSH

POLARIZED LIGHT MICROSCOPY ANALYSIS REPORT - EPA-600/R-93/116 AND EPA-600/M4-82-020

Analysis Number: 156137-16

Customer Number: 077-8-B

Classification:

Description: Acoustical Ceiling Spray - Soffit

Results: Non-Asbestos: Non-Fibrous White Acoustic Ceiling

Analysis Number: 156137-17

Customer Number: 078-8-B

Classification:

Description: Base Cove w/ Mastic - IDF

Results: Non-Asbestos: Non-Fibrous Tan Cove Base Mastic

Analysis Number: 156137-18

Customer Number: 079-7-B

Classification:

Description: Plaster - Soffit

Results: Non-Asbestos: Non-Fibrous Gray Plaster

Analysis Number: 156137-19

Customer Number: 080-7-B

Classification:

Description: Heat Curtain - Electrical Room

Results: Non-Asbestos: 80% Glass Fibers in White Wrap

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APPROVED BY:

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Dated: 04/18/2017

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Michelle Lavallee



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Job Site: Project No. 7385

Date Sampled **Who Sampled**
04/17/2017 George Katsikaris

Lab Notes: 24 HR RUSH

POLARIZED LIGHT MICROSCOPY ANALYSIS REPORT - EPA-600/R-93/116 AND EPA-600/M4-82-020

Analysis Number: 156137-20

Customer Number: 081-7-B

Classification:

Description: Drywall Composite - Electrical Room

Results: Non-Asbestos: 20% Cellulose Fibers in White Composite Wall System

Analysis Number: 156137-21

Customer Number: 082-4-B

Classification:

Description: Acoustical Ceiling Spray - IDF

Results: Non-Asbestos: Non-Fibrous Tan Acoustic Ceiling

Analysis Number: 156137-1

Customer Number: 083-3-B

Classification:

Description: 2x4" Ceiling Tile - Electrical Room

Results: Non-Asbestos: 25% Cellulose Fibers and 20% Glass Fibers in Gray Ceiling Tile

Analysis Number: 156137-2

Customer Number: 084-3-B

Classification:

Description: Base Cove w/ Mastic - Electrical Room

Results: Non-Asbestos: Non-Fibrous Brown Cove Base Mastic

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APPROVED BY:

Leland S. Pitt
LELAND S. PITT, CIH

Dated: 04/18/2017

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04/17/2017

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POLARIZED LIGHT MICROSCOPY ANALYSIS REPORT - EPA-600/R-93/116 AND EPA-600/M4-82-020

Analysis Number: 156137-3**Customer Number:** 085-2-B**Classification:****Description:** VCT w/ Mastic - NW Work Area**Results:**
A: Non-Asbestos: Non-Fibrous Tan Floor Tile
B: Asbestos: 4% Chrysotile in Black/Tan Mastic**Analysis Number:** 156137-4**Customer Number:** 086-2-B**Classification:****Description:** Acoustical Ceiling Spray - N Hallway**Results:** Non-Asbestos: 10% Cellulose Fibers in White Acoustic Ceiling**Analysis Number:** 156137-5**Customer Number:** 087-2-B**Classification:****Description:** 2x4" Ceiling Tile (Smooth) - NW Hallway**Results:** Non-Asbestos: 20% Cellulose Fibers and 20% Glass Fibers in Gray Ceiling Tile**Analysis Number:** 156137-6**Customer Number:** 088-2-B**Classification:****Description:** 2x4" Ceiling Tile (Rough) - NW Hallway**Results:** Non-Asbestos: 20% Cellulose Fibers and 20% Glass Fibers

- All samples tested as submitted to the lab. H.M. PITT LABS, INC. does not assume responsibility for the accuracy of the information submitted with the samples unless done by an employee of H.M. PITT LABS, INC.
- These test results relate only to the sample(s) identified above.
- This report may not be used to claim endorsement by NVLAP or any agency of the Federal Government.
- This report shall not be reproduced, except in full, without written approval of H.M. Pitt Labs, Inc.
- Samples are archived for 2 years from date of receipt and will be disposed of properly following this period.
- Quantitative value is based on PLM CVES (Calibrated Visual Estimates) with a detection limit of <1%.

APPROVED BY:

LELAND S. PITT, CIH

Dated: 04/18/2017**REVIEWED BY:**

Michelle Lavallee

Page 4 of 6



H.M. Pitt Labs, Inc.
4901 Morena Blvd · Ste 203 · San Diego, CA 92117

Lab Number: 156137-211049

Tel: 619-474-8548 · Fax: 858-412-3305

Company:

City of San Diego Environmental Services
Department
9601 Ridgehaven Court, Suite 310
San Diego, CA 92123

Date Entered: 04/17/2017
Analyzed By: Michelle Lavallee

Date Analyzed: 04/18/17
Customer PO / Claim#:
Contract Number:

Job Site: Project No. 7385

Date Sampled **Who Sampled**
04/17/2017 George Katsikaris

Lab Notes: 24 HR RUSH

POLARIZED LIGHT MICROSCOPY ANALYSIS REPORT - EPA-600/R-93/116 AND EPA-600/M4-82-020

Analysis Number: 156137-7

Customer Number: 089-1-B

Classification:

Description: Drywall Composite - S Kitchen Wall

Results: Non-Asbestos: 20% Cellulose Fibers in White Composite Wall System

Analysis Number: 156137-8

Customer Number: 090-1-B

Classification:

Description: Drywall Composite - SW Office

Results: Non-Asbestos: 20% Cellulose Fibers in White Composite Wall System

Analysis Number: 156137-9

Customer Number: 091-1-B

Classification:

Description: Drywall Composite - South Office

Results: Non-Asbestos: 20% Cellulose Fibers in White Composite Wall System

Analysis Number: 156137-10

Customer Number: 092-1-B

Classification:

Description: Drywall Composite - Coffee Area Ceiling

Results: Non-Asbestos: 20% Cellulose Fibers in White Composite Wall System

- All samples tested as submitted to the lab. H.M. PITT LABS, INC. does not assume responsibility for the accuracy of the information submitted with the samples unless done by an employee of H.M. PITT LABS, INC.
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- Quantitative value is based on PLM CVES (Calibrated Visual Estimates) with a detection limit of <1%.

APPROVED BY:

Leland S. Pitt

LELANO S. PITT, CIH

Dated: 04/18/2017

REVIEWED BY:

Michelle Lavallee

Michelle Lavallee



H.M. Pitt Labs, Inc.

4901 Morena Blvd · Ste 203 · San Diego, CA 92117

Lab Number: 156137-211049

Tel: 619-474-8548 · Fax: 858-412-3305

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Date Entered: 04/17/2017

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Customer PO / Claim#:

Contract Number:

Job Site: Project No. 7385

Date Sampled

Who Sampled

Lab Notes: 24 HR RUSH

04/17/2017

George Katsikaris

POLARIZED LIGHT MICROSCOPY ANALYSIS REPORT - EPA-600/R-93/116 AND EPA-600/M4-82-020

Analysis Number: 156137-11

Customer Number: 093-1-B

Classification:

Description: VCT w/ Mastic - SE Area

Results:
A: Non-Asbestos: Non-Fibrous Tan Floor Tile
B: Asbestos: 5% Chrysotile in Black Mastic

-
- All samples tested as submitted to the lab. H.M. PITT LABS, INC. does not assume responsibility for the accuracy of the information submitted with the samples unless done by an employee of H.M. PITT LABS, INC.
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 - Quantitative value is based on PLM CVES (Calibrated Visual Estimates) with a detection limit of <1%.

APPROVED BY:

LELANO S. PITT, CIH

Dated: 04/18/2017

REVIEWED BY:

Michelle Lavallee

Page 6 of 6

APPENDIX B

SUBMITTAL CHECKLIST

All submittal information is required as identified in Section 1.4. This check list is a guide to assist the ABATEMENT CONTRACTOR in completing their submittals and may not be all inclusive of submittals required by specification.

With bid documents, ABATEMENT CONTRACTOR shall submit:

- Two projects within the past five (5) years that are similar to scope of this project
 - Project name
 - Address
 - Contact person name and phone #
 - Scope of work
 - Dates of projects
 - Name of monitoring company, contact, and phone #

- Signed & notarized statement disclosing all OSHA and EPA citations, violations and/or criminal or civil convictions in the past (3) years

Within 10 business days of Notice to Proceed date:

Permits, Licenses, Certifications, etc.

Prior to the project beginning:

- Work plan
 - Procedures that will be used
 - Drawings - show the different phase areas for each weekend and each floor
 - Sequence of work - include time line showing each major function that will occur each weekend
 - Methods to assure site and adjoining property safety
 - Method to ensure compliance with background levels
 - Method to reduce level of asbestos in Work Area

- Work site coordination
 - Contingency plan
 - Telephone and locations of emergency services
 - Notifications
 - ABATEMENT CONTRACTOR 24 hour emergency contact list with phone/pager #s

- ABATEMENT CONTRACTOR qualifications and personnel information
 - Staff names, certifications, and experience. Identify their duties on this project.
 - Certificates of worker's acknowledgment (form found in Appendix C)

- Respiratory Protection
 - Copy of respiratory protection program
 - Identification of respirators to be used on this project, related justification, dates of measurements and historical data
 - Work practices

- Medical related submittals as defined in Section 1.4
 - Medical history for all employees entering performing or entering the Work Area
 - Physical examination verification
 - Medical proof that employee can wear assigned respirator

- Hazardous waste management
 - Identification of wastes associated with the scope of work
 - Estimates of quantities of wastes to be generated along with type of container
 - Name, address, phone #, company representative name for each company managing the transpiration, treatment, storage, recycle and/or disposal
 - Name, address, phone #, company representative name, and related accreditation for all laboratories
 - Identify disposal location

- Rental equipment notifications

- Equipment and product information

- MSDSs for all products used on this project

- During the project:
 - Draft hazardous waste manifest 10 days prior to transport
 - Daily construction reports as identified in Section 1.4
 - Discovered conditions and unusual events
 - Daily personnel laboratory results
 - Weekly printout of differential monitoring equipment
 - Visual inspection certification

- At conclusion of project:
 - Bound close out package

APPENDIX C

CERTIFICATE OF WORKER'S ACKNOWLEDGMENT

PROJECT NAME: _____ DATE: _____

PROJECT ADDRESS: _____

CONTRACTOR'S NAME: _____

Working with asbestos can be dangerous. Inhaling asbestos fibers has been linked with various types of cancer. If you smoke and inhale asbestos fibers the chance that you will develop lung cancer is greater than that of the non-smoking public.

Your employer's contract with the City for the above project requires that: You be supplied with the proper respirator and be trained in its use. You be trained in safe work practices and in the use of the equipment found on the job. You receive a medical examination. These things are to have been done at no cost to you.

RESPIRATORY PROTECTION: You must have been trained in the proper use of respirators, and informed of the type respirator to be used on the above referenced project. You must be given a copy of the written respiratory protection manual issued by your employer. You must be equipped at no cost with the respirator to be used on the above project.

TRAINING COURSE: You must have been trained in the dangers inherent in handling asbestos and breathing asbestos dust and in proper work procedures and personal and area protective measures. The topics covered in the course must have included the following:

- Physical characteristics of asbestos
- Health hazards associated with asbestos
- Respiratory protection
- Use of protective equipment
- Pressure Differential Systems
- Work practices including hands on or on-job training
- Personal decontamination procedures
- Air monitoring, personal and area

MEDICAL EXAMINATION: You must have had a medical examination within the past 12 months at no cost to you. This examination must have included: health history, pulmonary function tests and may have included an evaluation of a chest x-ray.

By signing this document you are acknowledging only that the City has advised you of your rights to training and protection relative to your employer, the Contractor.

Signature: _____ Social Security No. _____

Printed Name: _____ Witness: _____

APPENDIX D

ASBESTOS & LEAD MANAGEMENT PROGRAM

CERTIFICATION OF VISUAL INSPECTION

Project #: _____ Location: _____

CONTRACTOR CERTIFICATION OF VISUAL INSPECTION

The contractor hereby certifies that he has visually inspected the Work Area (all surfaces including pipes, beams, ledges, walls, ceiling and floor, Decontamination Unit, sheet plastic, etc.) and has found no dust, debris or residue to the best of his knowledge.

by: _____
Signature Date

Print Name

Print Title

OWNER'S REPRESENTATIVE CERTIFICATION OF VISUAL INSPECTION

The owner's representative hereby certifies that he has visually inspected the Work Area (all surfaces including pipes, beams, ledges, walls, ceiling and floor, Decontamination Unit, sheet plastic, etc.) and has found no dust, debris or residue to the best of his knowledge.

by: _____
Signature Date

Print Name

Print Title

APPENDIX G
SAMPLE OF PUBLIC NOTICE



CONSTRUCTION NOTICE

PROJECT TITLE

Work on your street will begin within one week to replace the existing water mains servicing your community.

The work will consist of:

- Saw-cutting and trench work on Ingulf Street from Morena Boulevard to Galveston Street to install new water mains, water laterals and fire hydrants.
• Streets where trenching takes place will be resurfaced and curb ramps will be upgraded to facilitate access for persons with disabilities where required.
• This work is anticipated to be complete in your community by December 2016.

How your neighborhood may be impacted:

- Water service to some properties during construction will be provided by a two-inch highline pipe that will run along the curb. To report a highline leak call 619-515-3525.
• Temporary water service disruptions are planned. If planned disruptions impact your property, you will receive advance notice.
• Parking restrictions will exist because of the presence of construction equipment and materials.
• "No Parking" signs will be displayed 72 hours in advance of the work.
• Cars parked in violation of signs will be TOWED.

Hours and Days of Operation:

Monday through Friday X:XX AM to X:XX PM.

City of San Diego Contractor:

Company Name, XXX-XXX-XXXX



CONSTRUCTION NOTICE

PROJECT TITLE

Work on your street will begin within one week to replace the existing water mains servicing your community.

The work will consist of:

- Saw-cutting and trench work on Ingulf Street from Morena Boulevard to Galveston Street to install new water mains, water laterals and fire hydrants.
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• Parking restrictions will exist because of the presence of construction equipment and materials.
• "No Parking" signs will be displayed 72 hours in advance of the work.
• Cars parked in violation of signs will be TOWED.

Hours and Days of Operation:

Monday through Friday X:XX AM to X:XX PM.

City of San Diego Contractor:

Company Name, XXX-XXX-XXXX

APPENDIX H

ADVANCE METERING INFRASTRUCTURE (AMI) DEVICE PROTECTION

Protecting AMI Devices in Meter Boxes and on Street Lights

The Public Utilities Department (PUD) has begun the installation of the Advanced Metering Infrastructure (AMI) technology as a new tool to enhance water meter reading accuracy and efficiency, customer service and billing, and to be used by individual accounts to better manage the efficient use of water. **All AMI devices shall be protected per Section 5-2, "Protection", of the 2015 Whitebook.**

AMI technology allows water meters to be read electronically rather than through direct visual inspection by PUD field staff. This will assist PUD staff and customers in managing unusual consumption patterns which could indicate leaks or meter tampering on a customer's property.

Three of the main components of an AMI system are the:

- A. Endpoints, see Photo 1:

Photo 1



- B. AMI Antenna attached to Endpoint (antenna not always required), see Photo 2:

Photo 2



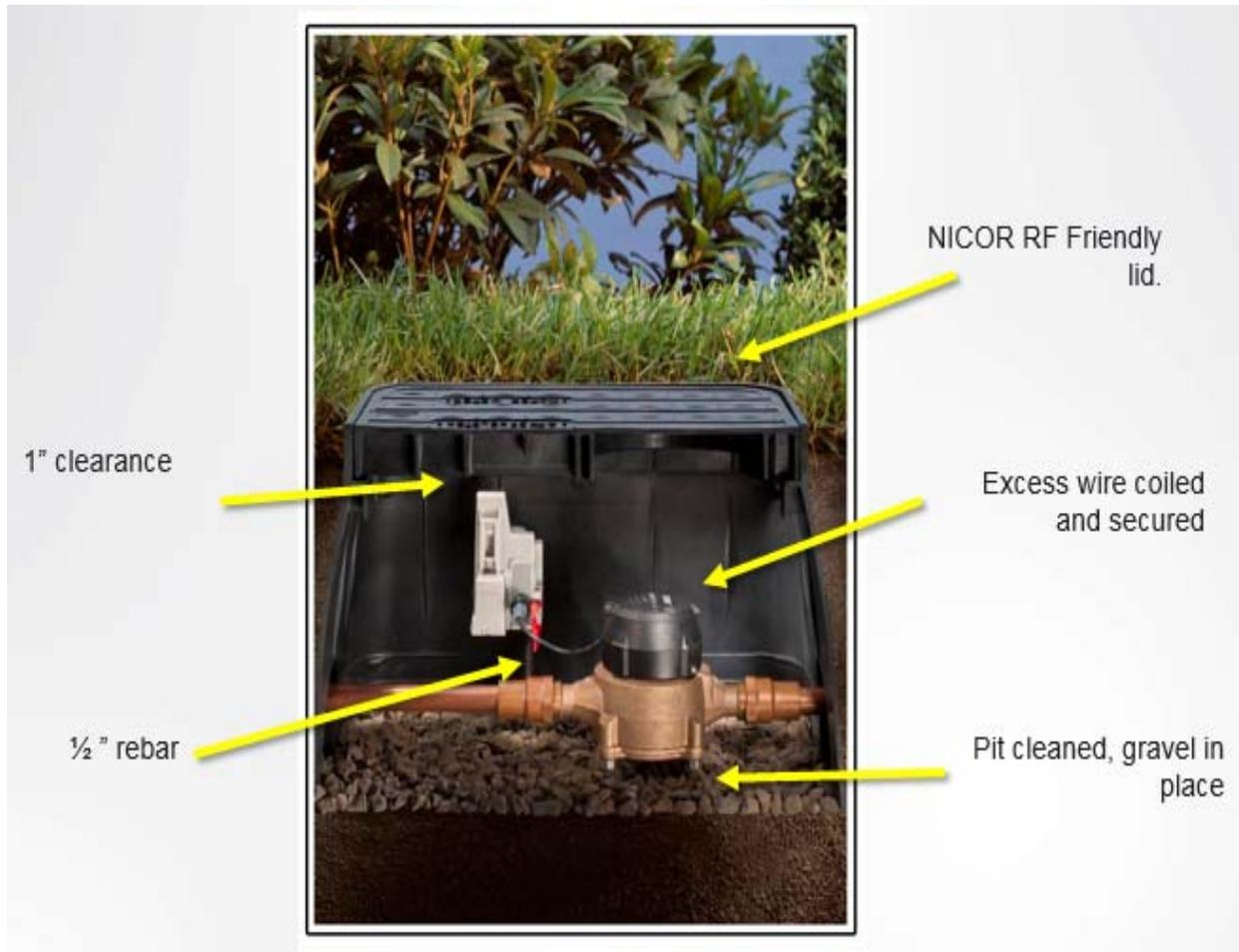
- Network Devices, see Photo 3:

Photo 3



AMI endpoints transmit meter information to the AMI system and will soon be on the vast majority of meters in San Diego. These AMI devices provide interval consumption data to the PUD's Customer Support Division. If these devices are damaged or communication is interrupted, this Division will be alerted of the situation. The endpoints are installed in water meter boxes, coffins, and vaults adjacent to the meter. A separate flat round antenna may also be installed through the meter box lid. This antenna is connected to the endpoint via cable. The following proper installation shall be implemented when removing the lid to avoid damaging the antenna, cable, and/or endpoint. Photo 4 below demonstrates a diagram of the connection:

Photo 4



The AMI device ERT/Endpoint/Transmitter shall be positioned and installed as discussed in this Appendix. If the ERT/Endpoint/Transmitter is disturbed, it shall be re-installed and returned to its original installation with the end points pointed upwards as shown below in Photo 5.

The PUD's code compliance staff will issue citations and invoices to you for any damaged AMI devices that are not re-installed as discussed in the Contract Document

Photo 5 below shows a typical installation of an AMI endpoint on a water meter.

Photo 5

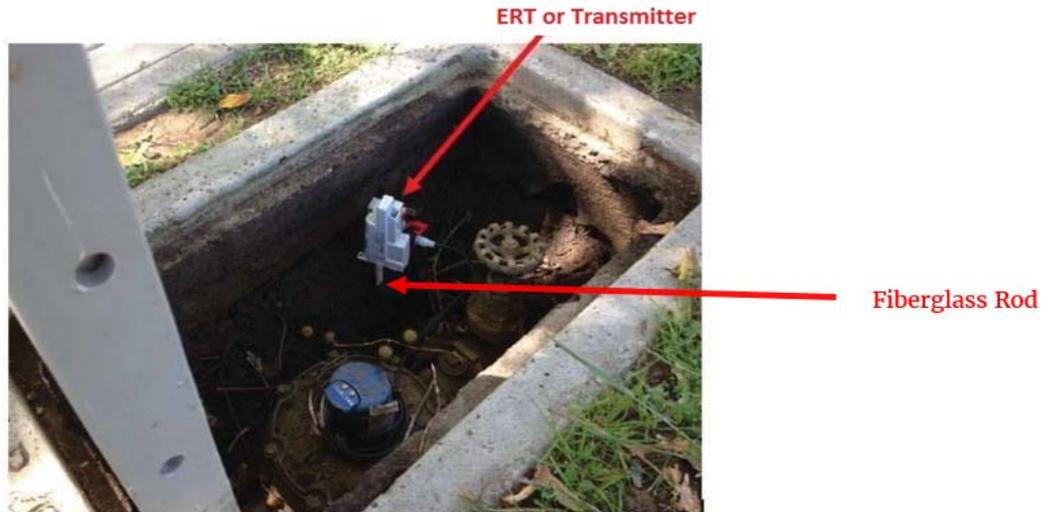


Photo 6 below is an example of disturbance that shall be avoided:

Photo 6



You are responsible when working in and around meter boxes. If you encounter these endpoints, use proper care and do not disconnect them from the registers on top of the water meter. If the lid has an antenna drilled through, do not change or tamper with the lid and inform the Resident Engineer immediately about the location of that lid. Refer to Photo 7 below:

Photo 7



Another component of the AMI system are the Network Devices. The Network Devices are strategically placed units (mainly on street light poles) that collect interval meter reading data from multiple meters for transmission to the Department Control Computer. **If you come across any of these devices on street lights that will be removed or replaced (refer to Photos 8 and 9 below), notify AMI Project Manager Arwa Sayed at (619) 362-0121 immediately.**

Photo 8 shows an installed network device on a street light. On the back of each Network Device is a sticker with contact information. See Photo 9. **Call PUD Water Emergency Repairs at 619-515-3525 if your work will impact these street lights.** These are assets that belong to the City of San Diego and you shall be responsible for any costs of disruption of this network.

Photo 8



Network Device

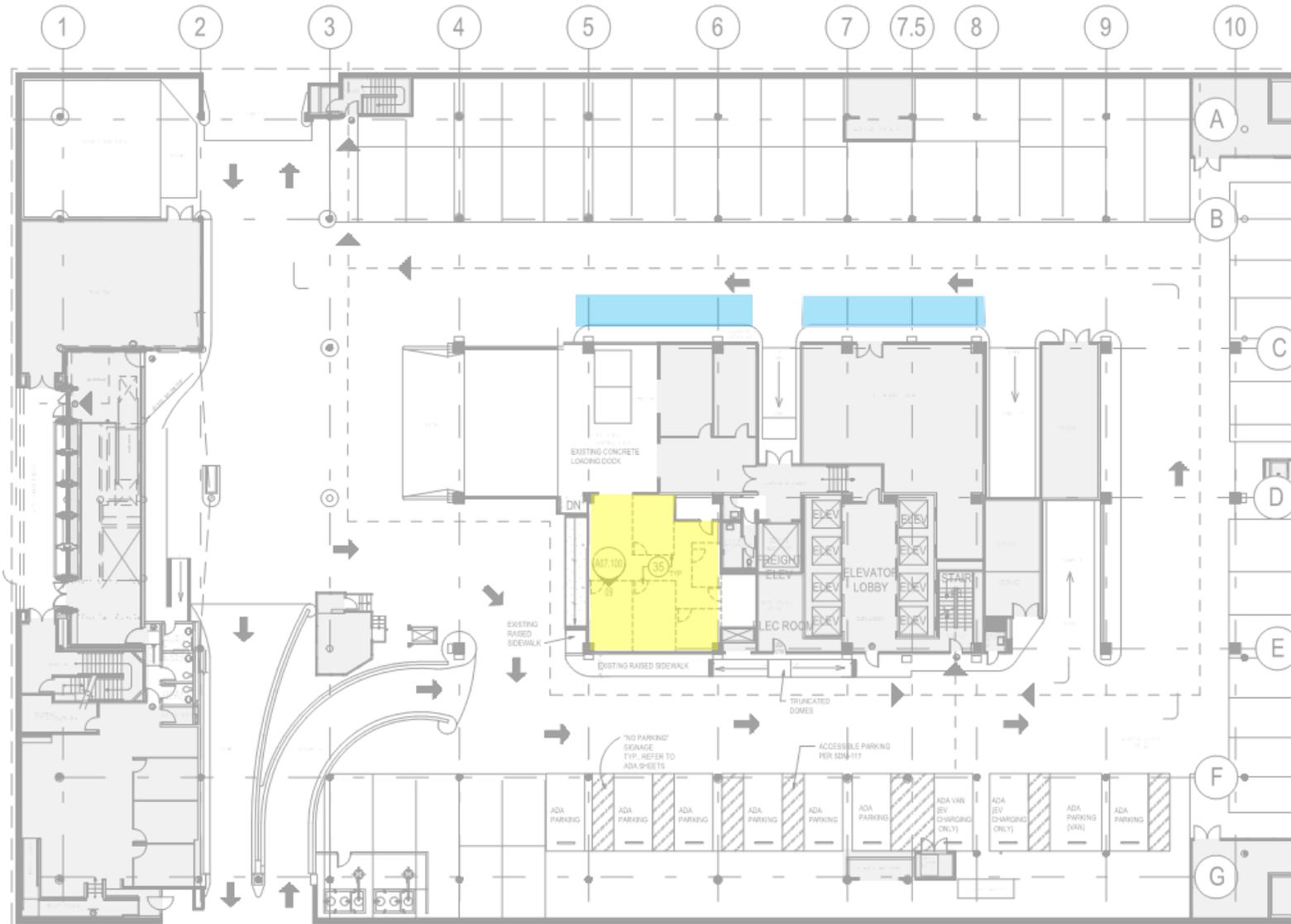
Photo 9



If you encounter any bad installations, disconnected/broken/buried endpoints, or inadvertently damage any AMI devices or cables, notify the Resident Engineer immediately. The Resident Engineer will then immediately contact the AMI Project Manager, Arwa Sayed, at (619) 362-0121.

APPENDIX I
CONTRACTOR'S STAGING AND PARKING AREAS

Contractor's Staging and Parking Areas



Legend

- Contractor's Parking Area
- Contractor's Staging Area

Basement Level "A"

APPENDIX J

AUDIO VISUAL SYSTEMS SPECS

APPENDIX J
AUDIO VISUAL SYSTEMS

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Attachments:

A1 – Bill of Materials – City of San Diego - Audio Visual

OVERVIEW

This project involves the installation of an audio visual systems for City of San Diego.

The Audio Visual Contractor will be responsible for providing and installing a complete and functional audio visual system in accordance with the specifications contained in this document. All work shall be installed in compliance with Industry Standards, Local & NEC Codes

SECTION I – INSTRUCTIONS TO BIDDERS (NOT USED)

- A. Reference to the Owner’s General Conditions
- C. General Conditions
- D. Bidder’s Conference.

SECTION II – GENERAL SPECIFICATION

A. Definitions of Terms

1. The terms “General Contractor” or “GC” shall refer to Qmitted.
2. The term “Architect” shall refer to Gensler.
3. The term “Construction Manager” or “CM” shall refer to Resident Engineer.
4. The term “Design Team” shall refer to the Owner, GC, Architect, Construction Manager.
5. The term “Bidder” shall refer to a Audio Visual Contractor (AVC) submitting a bid response to this specification.
6. The term “Contractor” shall refer to the Audio Visual Contractor (AVC) who has been awarded the contract for the subject job and who has responsibility for performance of the work specified herein. This term shall be considered gender non-specific.
7. The term “NIC” shall refer to material and work which is Not In Contract and for which the Contractor is not responsible except as otherwise detailed herein.
8. The term “OFE” shall refer to “Owner Furnished Equipment”, which will be provided by the Owner. The Contractor shall be responsible for removing any “re-use” equipment from the Owner’s existing premises, and re-installing and integrating this equipment in good working order as detailed herein.
9. “Supply” as used in this section means “to supply, complete with instructions, for installation by others”.
10. “Provide” as used in this section means “to furnish, install and make operable”.
11. “By Others” as used in this section and on the contract drawings means “not included in this subcontract, supplied as part of another subcontract”.
12. “Or As Approved” as used in this section and on the contract drawings means “substitution only after written approval by the Design Team”.
13. The term “shall” is mandatory; the term “will” is informative; the term “should” is Advisory; and the term “provide” means furnish and install.

A.1 Supplemental General Conditions

1. The Contractor shall be responsible for delivering a turnkey system to the Owner.
2. The Contractor represents that he is familiar with, and has expertise in the Work of this nature and scope. The Contractor further agrees that he shall provide all Work as may be required to make a complete job of that which may not be fully defined in the Contract documents. The NIC and OFE equipment and materials are specifically exempt from this requirement.

3. The Contractor shall comply with all of the legal regulations, including OSHA safety regulations and regulations of municipal, city, local, and other government agencies having jurisdiction concerning the Work of the Contractor. The Contractor shall give all notices and comply with all laws, ordinances, codes, rules, and regulations bearing on the conduct of the Work. If the Contractor performs any Work, which is contrary to such laws, ordinances, codes, rules and regulations, he shall make all changes to comply therewith and bear all costs arising there from.
4. Because drawings are, in general, diagrammatic, the Contractor shall coordinate all installations with the Design Team, based on the field conditions.
5. All permits required for any part of the Contractor's Work shall be procured and paid for by the Contractor. The Contractor shall determine all permits required and transmit this information to the Design Team.
6. The Contractor warrants that he and his/her subcontractors are licensed by the State and as required by local ordinances.
7. The Contractor must state if he intends to utilize a sub-contractor, and provide the sub-contractor's name and address. The sub-contractor shall comply with all the same rules, regulations, laws, codes, licenses, etc. as required by the Contractor and as specified herein. The Design Team reserves the right to approve or disapprove any sub-contractor proposed by Contractor.
8. Prior to ordering equipment, the Contractor shall field verify all conditions, with respect to dimensions and placement of equipment. Any and all discrepancies from the contract documents shall be brought to the attention of the Design Team.
9. The Contractor shall furnish software necessary to operate software controlled audiovisual sub-systems e.g. remote control system. This software shall, in every case, be provided by the manufacturer(s) of the sub-system, and shall be installed and tested prior to delivery of equipment at site.
10. The Contractor shall generate all shop drawings and information for the complete installation and wiring of the system. The Contractor shall provide the on-site installation and wiring, and shall provide on-going supervision and coordination during the implementation phase.
11. The Contractor shall be responsible for the initial adjustment of the systems as herein prescribed and shall provide all test equipment for the system checkout and acceptance tests. Contractor shall provide on-the-job training in the operation and maintenance of the systems for personnel designated by the Owner.
12. The Contractor shall be responsible to provide and maintain his/her own storage facility. If this storage facility is required to be on-site, it shall be the Contractor's responsibility to coordinate the size and spatial requirements with the Owner and/or their representatives. The Contractor shall assume full responsibility for both their storage facility and all contents therein, unless otherwise indicated by the Design Team.
13. The Contractor shall be responsible to supply, maintain and secure all tools, test equipment (including any computer equipment) and safety equipment. Neither the Design Team, nor any agent of the Owner, will accept any responsibility for the loss, theft, disappearance of, or damage to, the equipment, tools, materials or supplies of the Contractor, its employees agents or sub-contractors.

14. The Contractor shall utilize good housekeeping practice with respect to his/her Work including cleanup of all dirt and debris created by the Contractor during his installation operations on a daily basis.
15. The Contractor shall at his own expense collect and dispose of packing and debris in at the end of each working shift. Note that this project is being LEED certified; all refuse (where applicable) shall be recycled.
16. The Contractor shall provide protection necessary to safeguard his/her own Work from damage by his/her own operations and others. Unless the Contractor proves to the Design Team's satisfaction that their Work has been damaged by others, the Contractor shall, at his/her own cost and expense, promptly repair, adjust and clean all defective installations as shown on the punch list prepared by the Design Team.
17. All of the Contractor's Work shall be tested and inspected by all authorities having jurisdiction and in accordance with all Specifications. The Contractor shall coordinate and cooperate fully and shall provide at no additional cost to the Owner, manpower, blueprints, facilities, scaffolds, etc. to reasonably assist the inspectors.
18. The Contractor shall examine the site and the Contract Documents and review with the Design Team the designated areas of access, delivery, and storage for the Contractor's use. The Contractor agrees that such areas are satisfactory and sufficient for his/her needs in the prosecution of his Work in conformance with the terms of this Contract.
19. Should any questions of union jurisdiction arise, the Contractor shall immediately take steps to settle such disputes and shall use such labor as may be determined to have jurisdiction, at no additional cost to the Owner. Should he fail to take expeditious action, he shall be responsible for any time lost because of delays arising from such a dispute.
20. The Owner reserves the right to furnish any materials necessary for the Project.
21. Notify the Design Team of any omissions, discrepancies or ambiguities in the documents so a clarification may be issued. Notify the Design Team if exception is taken to any statement, indication or criterion in the bid and/or contract documents.
22. Obtain all other contract documents, including architectural, structural, mechanical and electrical, and check to ensure there are no conflicts with work of this section. Notify the Design Team of all such conflicts, with any suggested alteration to resolve conflicts.
23. Submit all above notifications in writing to the Design Team no less than 14 days prior to bid opening date. Lack of notification shall be understood to indicate acceptance of all requirements of the contract documents, and any future claims shall be rejected.

B. Project Management

1. After the award of contract, the Contractor shall provide to the Design Team, as a part of the prefabrication submittal, the name of the Project Manager that will provide all duties and responsibilities as specified herein, during the term of the project.
2. The Design Team reserves the right to approve or disapprove the individual that shall be designated as the Project Manager.
3. If at any point during the term of the project, and for any reason, the Project Manager is replaced, it shall be the responsibility of the Contractor to submit such information to the Design Team expeditiously for approval prior to any position replacement.

4. The Project Manager shall maintain the ability of making all managerial decisions on behalf of the Contractor on a day-to-day basis, and shall retain the authority of accepting notices of deduction, inspection reports, payment schedules and any other project related correspondence on behalf of the Contractor.
5. The Project Manager shall schedule and attend weekly project management meetings, during which time all system related issues are discussed, scheduled, confirmed and/or resolved.
6. The Project Manager will supervise the attendance of the Contractor's personnel at any safety training and/or meetings as mandated by the Construction Manager.
7. The project management meetings shall continue weekly until such time that the Contractor and Design Team schedule otherwise. The scheduling of the project management-meetings shall be approved by the Design Team prior to commencement.
8. The Project Manager shall be available during business hours.
9. In the event that the Project Manager is not available within the allotted time frame, the Contractor may designate another employee to temporarily act as the Project Manager in all correspondence with the Design Team.
10. The Contractor shall ensure that any individual temporarily assuming the duties of the Project Manager is at equal or higher level in the Contractor's managerial hierarchy.
11. Upon notification by the Owner, of any project related installation issue, or issue that may contradict the system specifications as stated herein, the Project Manager shall respond to such issue, verbally and/or in writing within an eight (8) hour period.
12. Responses to such issues as stated above, shall include a clear understanding of the issue, along with a tentative plan of action, reflecting milestones and/or deadlines to resolve the issue.
13. The Project Manager shall follow-up their initial response with a written response to the issue within twenty-four (24) hours of identification of the issue.
14. The Project Manager shall provide a Gantt chart showing the projected project milestones and update the Gantt chart as requested by the Design Team to reflect the status of each key milestone as the project installation progresses.
15. As the system installation progresses, the Project Manager shall be capable of discussing any or all of the above mentioned items at the request of the Owner, and shall address each item, as it relates to the current status of the system installation, at the weekly project management meetings.

C. Quality Assurance-Material

1. All electrical equipment and materials shall have the listing of the Underwriters' Laboratories, Inc., and shall bear the labels attesting to UL listing, and types approved by the authorities having jurisdiction.
2. All equipment shall be equal to or exceed the minimum requirements of TIA/EIA, IEEE, ASME, ANSI and Underwriters' Laboratories.
3. The Contractor shall supply the latest model available at the time of order placement for each piece of equipment.
4. The Contractor, upon receiving notice from Owner that the Contractor has furnished inferior, improper or unsound Work or materials (including equipment) (whether worked or unworked), or

Work or materials at variance with that which is specified, will, within twenty-four (24) hours, proceed to remove such Work or materials and make good all other Work or materials damaged thereby, and, at the option of the Owner, the Contractor shall immediately replace such Work or materials with Work or materials as specified. The removal, replacement and repair shall be performed at such times and with manpower sufficient, in the judgment of the Owner, so as not to avoid disturbance to occupants, or other ongoing work.

5. If the Contractor does not remove such unsound Work within a reasonable time, the Owner may remove it and may store the material at the expense of the Contractor. If the Contractor does not pay the expenses of such removal within ten (10) days' time thereafter, the Owner may, upon ten (10) days' written notice, sell such materials at auction or at private sale and shall account for the net proceeds thereof, after deducting all the costs and expenses that should have been borne by the Contractor and all expenses of the sale.
6. The Design Team shall have the authority at all times, until Final Completion and acceptance of the Work, to inspect and reject Work and materials which in its judgment are not in conformity with the Drawings and Specifications, and its decision in regard to character and value of Work shall be final and conclusive on both contracting parties.
7. If the Design Team permits said Work or materials to remain, the Owner shall be allowed the difference in value or shall at its election have the right to have said Work or materials repaired or replaced, as well as the damage caused thereby, at the expense of the Contractor, at any time within one year after the completion of the entire project, or within such longer period as may be covered by any guaranty; and neither payments made to the Contractor, nor any other acts of the Design Team, shall be construed as evidence of acceptance, waiver or estoppel.
8. Any expense incurred by the Owner in connection with the foregoing shall be borne by the Contractor, and the Owner may withhold money due to the Contractor or recover money already paid to the Contractor, to the extent of such expense.

D. Quality Assurance-Labor

1. Work shall be done by persons skilled in this trade in strict accordance with the requirements and/or specifications of the manufacturers of the material being used.
2. Coordinate work with that of all other trades affecting, or affected by, work of this Section. Cooperate with such trades to assure steady progress of all work under Contract.
3. All permits required for any part of the Contractor's Work shall be procured and paid for by the Contractor. The Contractor shall determine all permits required and transmit this information to the Owner.
4. The Contractor warrants that he/she is licensed by the State and/or as required by local ordinances.
5. The Contractor must state if he intends to utilize a subcontractor, and provide the subcontractor's name and address.
 - a. The subcontractor shall comply with all the same rules, regulations, laws, codes, licenses, etc. as required by the Contractor and as specified herein.
 - b. The Owner reserves the right to approve or disapprove any subcontractor proposed by Contractor.

E. Status Reports

1. After the award of contract, the Contractor is responsible for providing weekly field and status reports outlining his progress on the project. These reports should include information on the work completed during the week, the work to be completed during the upcoming week and any potential scheduling issues. The following should be included in this Status Report:
 - a. Expected date of project submittals, including equipment cut sheets, shop drawings, control system interface designs, etc.
 - b. Anticipated completion date and percentage complete of in-house rack fabrication and testing, prior to shipping to the job-site.
 - c. Representative members of the Design Team shall inspect the racks prior to shipping to the job site.
 - d. Anticipated completion date and percentage complete of control system programming, prior to shipping to the job-site.
 - e. Schedule and percentage complete of on -site wiring and supervision.
 - f. Schedule and percentage complete of on-site installation.
 - g. Schedule for Owner training.
 - h. Schedule for systems checkout and turnover to the Owner.
2. The field and status reports are to be e-mailed to the Design Team weekly by 3:00pm on Friday.
3. Field and status reports are to commence the second week following contract signing and conclude with all the audiovisual punch-list items are complete.

F. Owner Furnished Equipment

1. The Contractor shall be responsible for removing and/or obtaining OFE equipment from the Owner's location and bringing it back to their facility. At the Contractor's facility, Contractor shall ascertain that the OFE equipment is performing at or above factory specifications.
2. If the equipment is not operating "as-new", or is missing accessories necessary to properly integrate the equipment into the system as intended, the Contractor shall provide a proposal, including a time line, for returning the equipment to "as-new" condition and providing the needed accessories.
3. Coordinate the integration of existing components or new components provided by the Owner into the specified systems. Provide required mounting hardware, rack panels, cable, connectors, etc. to ensure proper operation of the OFE systems.

G. Codes, Permits and Inspections

1. All audiovisual work shall meet or exceed the latest requirements of all National, State, City, County, Municipal and other authorities having jurisdiction over the audiovisual work and the project.
2. Any portion of the audiovisual work which is not subject to the requirements of an electrical code, published by a specific authority having jurisdiction over such work, shall be governed by the National Electrical Code and any and all applicable sections of the National Fire Code, as published by the National Fire Protection Association.

3. Installation procedures, methods and conditions shall be in compliance with the latest requirements of the Federal Occupational Safety and Health Administration (OSHA), the Americans with Disabilities Act (ADA) and the Architectural Barriers Act (ABA).
4. The Contractor is responsible for all costs incurred to meet these codes and conditions.

H. Conformance with Existing Systems

1. Many of the systems and facilities in this scope of work are similar in nature to existing systems and facilities. Wherever possible, in order to share existing resources and minimize training requirements, the required hardware, system functionality and system flow should conform to the existing systems. This includes, but is not limited to, the following:
 - a. Commonality in equipment.
 - b. Commonality in operation.
 - c. Commonality in room control layout.
2. It is the responsibility of the Contractor to inspect the existing systems, prior to beginning design and fabrication, to ensure that the design is consistent with the existing systems.

I. Contractor's Documentation

1. Prior to fabrication, the Contractor shall submit to the Design Team, for approval, all designs pertaining to the systems.
2. All equipment submittals shall include:
 - a. Manufacturer and Model Number.
 - b. Space where used.
 - c. Specification sub-section and/or item number in Equipment Schedule. This shall be in table form in the submittal binder.
3. Drawing submittals shall be on reproducible media and CD-ROM. These designs include, but are not limited to, the following:
 - a. Shop drawings shall be submitted on a consistent media size commensurate with standard architectural practices and with the project.
 - b. Assorted drawings on letter or ledger size media will not be deemed acceptable.
 - c. Complete system construction and point to point wiring schematic drawings, including all component values, and showing complete letter and number identification of all wire and cable as well as jacks, terminals and connectors. All connections are to be shown; a detail sheet with "typical" connection diagrams is not acceptable.
 - d. All control system pages, both touch panel based and control computer based.
 - i. All control system layouts shall be consistent with the existing systems.
 - ii. All submittals shall be transmitted to the Design Team independently.
 - iii. Explicit approval by the Owner is required for any systems and/or points of connectivity that connect with the Owner's network, and/or are carried on the network infrastructure.

- e. If requested by Owner, the configuration files for all DSP-based audio systems shall be forwarded to the manufacturer for their comments.
 - f. All panels, plates, and designation strips, including details relating to terminology, engraving finish and color.
 - g. All custom designed consoles, tables, carts, support bases, and shelves.
 - h. Schematic drawings of all custom components, assemblies and circuitry, including wall and/or floor plates.
 - i. All equipment modifications.
 - j. Run sheets or field wiring details.
 - k. Patch panel assignment layout drawings.
 - l. Front mechanical drawings of each equipment rack.
 - m. All items of equipment, whether a stock manufactured item or custom-built item, shall be supported by complete and detailed schematic drawings and replacement parts lists. No "black boxes" or unidentified components shall be acceptable under this specification.
 - n. Verification of the focal lengths of projection lenses to achieve the specified image sizes.
 - o. Shop Drawings shall also be submitted electronically.
 - i. Drawings shall be submitted in CAD.
 - ii. All external references, fonts and image shall be included.
 - iii. Portable Document Format (PDF) files may also be submitted as sheet sets.
4. At the completion of the installation, the Contractor shall provide two (2) copies each of the following:
- a. Test results, in "spreadsheet" format, of electrical audio and/or video performance testing for all systems end-to-end in every room and/or between rooms as applicable. These test results must include a gain structure chart showing measured levels at each and every gain point through the system. This will be submitted as the reference setup for the system.
 - b. Note that until these test results are provided, no other testing (functional or otherwise) shall be performed. If any anomalies in system performance are detected, the Contractor shall correct these before performing any other tests.
 - c. Equipment manufacturer's operation manuals for each piece of equipment.
 - d. "As-built" drawings for every item indicated in Contractor's Documentation. A final, approved copy shall be placed in a metal pocket mounted on the inside of the rear door of the rack.
 - e. System functional block drawing with all input and output circuit cable and terminal block numbers as well as all jack field circuit I.D. designations. A copy of this drawing shall be framed in protective plastic and mounted near the equipment racks.

Note: All drawing submittals must be in CAD format.

J. Operation and Maintenance Manuals

- 1. Prior to the final acceptance of the Work, submit two draft sets of the Manuals and all related project documentation to the Owner.

- a. Operation and Maintenance Manuals shall apply to all audiovisually related devices, equipment and software modules.
 - b. Operation and Maintenance Manuals shall be formatted as follows:
 - c. Bind each manual in a hard-back loose-leaf binder.
 - d. Identify each manual's contents on the cover.
 - e. Provide a table of contents and tabulated sheets for each manual. Place tab sheets at the beginning of each chapter or section and at the beginning of each appendix if applicable.
 - f. Any hardware manual demonstrating more than one model number of device on any one page shall be clearly marked as to delineate which model has been implemented in the Work.
2. Operation and Maintenance Manuals shall include, at a minimum, the following:
 - a. Operational description of each subsystem
 - b. Detailed programming descriptions for each subsystem
 - c. Explanations of subsystem interrelationships
 - d. Electrical schematics for each piece of equipment specified
 - e. Power-up and power-down procedures for each subsystem
 - f. Description of all diagnostic procedures
 - g. A menu tree for each subsystem
 - h. Setup procedures for each component of the subsystems
 - i. A list of manufacturers, their local representatives, and subcontractors that have performed Work on the Project
 - j. Installation and service manuals for each piece of equipment
 - k. Maintenance schedules for all installed components
 3. The Contractor shall provide a single page of basic operating instructions (Quick Start Guide) for each audio-visually equipped space.
 4. Operation and Maintenance Manuals shall include a separate section for each software program incorporated into the Project. The software section shall include, at a minimum, the following information:
 - a. Definitions of all software related terms and functions.
 - b. Description of required sequences.
 - c. Directory of all disk files.
 - d. Description of all communications protocols, including data formats, command characters, and a sample of each type of data transfer.
 - e. Instructions for manufacturer supplied report generation.
 - f. Instructions for custom report generation.
 - g. Database format and data entry requirements.

5. Software Documentation and Obligations
 - a. Title to, and exclusive ownership of, any software commissioned under this contract shall at all times remain with the Owner. All source code becomes the exclusive property of the Owner.
 - b. At the time of submitting the System to the Acceptance Tests, the Contractor will furnish media which will contain:
 - i. All source code pertaining to the System, where there is custom code.
 - ii. Instructions and full description of equipment required which will enable the Owner to create executable programs from source code.
 - iii. All executable programs.
 - iv. Instructions and full description of equipment required which will enable the Owner to prepare operating systems and other third party Software as licensed hereunder for use.
 - v. All source files for Web pages.
 - vi. Graphic files for all interface screens, if any.
 - vii. For any Software as purchased hereunder not developed by the Contractor all information, data, codes and documentation distributed to the Contractor and otherwise available to the Contractor.
 - a. When a third party software developer has been employed and sub-contracted by the Contractor, the Contractor must demonstrate best effort in fulfilling these requirements.
 - b. This best effort will be demonstrated to the Design Team by copies of correspondence between the Contractor and the third party stating the Contractor's request and giving the third party statement of compliance or otherwise.
 - viii. One copy of the above documentation will be retained by the Design Team.
 - c. An acceptance test will be performed for a ten (10) day period, during which this changed or additional code must perform accurately and error free. During this acceptance test, if the Owner discovers an error in the coding or the logic of the software as supplied under the terms of this Agreement to the Owner, which prevents the system from performing in accordance with the performance requirements of this Specification, the Owner shall notify the Contractor of the error and upon request the Contractor will deliver to the Owner its analysis thereof accompanied by complete program, module, data listings and sample runs exhibiting and rectifying the error.
 - d. The Owner shall assist the Contractor in its performance under the terms of this Specification by allowing the Contractor to use the Owner's System, data listings and sample runs to reproduce and/or correct the reported error and to install and check updated versions of the delivered Software licensed hereunder.
 - e. The Contractor represents and warrants that it is the owner or Licensee of the supplied Software as licensed hereunder and has the right to permit the Owner to use the same. The Owner shall not be liable for any incidental or consequential damages, whether foreseeable or not, even if the Owner has been advised of the possibility of such damages, resulting from or in any way connected with the use of the supplied Software as licensed hereunder.

- f. Subsequent to system acceptance, source code changes and/or additional programming, whether requested by the client or performed by the vendor, will be warranted by the vendor for a period of one (1) year, with the vendor responsible for the diagnosis and repair. The vendor shall ensure that the current program is saved to a floppy diskette, and stored as outlined.
- g. The Contractor shall defend any suit or proceeding brought against the Owner, and shall pay any adverse judgment entered therein, so far as such suit or proceeding is based upon a claim that the use of the Software as provided hereunder and furnished by the Contractor under this Agreement constitutes infringement of any copyright or patent, provided the Owner is promptly notified in writing and given authority, information and assistance (at the Contractor's expense) for the defense of same. The Contractor shall, at its own expense and at its option, procure for the Owner the right to continue to use the said Software as licensed hereunder, or to replace the same with a non-infringing release. The foregoing shall not be construed to include any agreement by the Owner to accept any liability whatsoever in respect to copyrights or patents for inventions including more than the Software as purchased and furnished hereunder, or in respect of copyrights or patents for methods and processes to be carried out with the aid of said Software as licensed hereunder, except those which are inherent in said System as furnished.
- h. The foregoing states the entire liability of the Contractor with regard to copyright and patent infringement as related to the delivered Software as licensed hereunder.
- i. Provided that the Owner has obtained, under the terms of this Specification or subsequent agreements, all items, such as but not limited to source code and compilers, required to modify the Software, the Contractor hereby grants the Owner the right to modify and to enhance the Software as supplied and licensed under the terms of this Agreement at its own risks and expense and further agrees such modifications and enhancements developed by the Owner to be the property of the Owner without prejudice to the rights of the Contractor to the basic Software. The Owner furthermore is under no obligation to notify the Contractor of any such modifications and enhancements.
- j. Any new version of Software as provided hereunder and delivered to the Owner by the Contractor during the warranty period, under the terms of this Specification which is deemed, and advised so by the Contractor, to rectify a failure which occurred during the operations of an event, will cause the warranty period for the Software as provided hereunder to restart.
- k. The Contractor warrants that all contracts, contacts and arrangements between the Contractor and all third party Software suppliers providing Software as licensed hereunder will transfer to the Owner with the successful completion of the Final Acceptance. The Owner will inform the Contractor of all its dealings with third party Software suppliers supplying software as licensed hereunder for the duration of the warranty period.
- l. The Contractor warrants that at no charge to the Owner it will reply to verbal queries from the Owner provided that:
 - i. The queries relate to the System provided by the Contractor pursuant to this Specification.
 - ii. The query is raised by Owner's staff or an authorized agent of the Owner.

- iii. The query is during the Contractor's normal business hours.
- iv. The Owner's representative or employee has attended training in the use of the System as provided by the Contractor, or is otherwise qualified.
- m. The Contractor shall also offer an annual "Software Maintenance" contract. This shall cover all software provided as part of this system and/or written for this system, and shall include both routine upgrades to applications and operating systems, as well as any modifications to software that may be required by the Owner. The Software Maintenance contract shall commence immediately after expiration of the warranty period, and continue for three (3) years.

K. Sub-Contract

- 1. No sub-contract will be permitted for the Contractor's responsibilities, as herein defined, unless specifically identified in the bid submission and approved by the Design Team.
- 2. The Contractor shall have sole responsibility for the satisfactory implementation of each system, even though the Contractor may have sub-contracted a portion of the installation or had certain manufacturers install their own equipment.

L. Cooperation with Other Trades

- 1. It shall be the responsibility of the Contractor to cooperate at all times, and to the fullest extent, with all trades doing work in the building, to the end that lost time, work stoppages, interference, and inefficiencies do not occur.
- 2. It shall also be the responsibility of the Contractor to participate in the preparation of coordination drawings and attend coordination meetings, before and during construction, at the request of the Construction Manager. It is not anticipated that these meetings will be held more than once a week.

M. Equipment Delivery and Storage

All equipment delivered prior to installation shall be stored by the Contractor at his place of business. Costs of all shipping, and of all unusual storage requirements, shall be borne by the Contractor. The Contractor shall inform the CM seven (7) days in advance of delivery to the site. It shall be the responsibility of the Contractor to make appropriate arrangements, and to coordinate with authorized personnel at the site, for the acceptance, handling, protection, and storage of equipment so delivered.

N. Cleanup and Repair

Upon completion of the work, the Contractor shall remove all his refuse and rubbish from and about the premises, and shall leave the relevant areas and equipment clean and in an operational state. The Contractor shall be responsible for repairing any damage caused to the premises by the Contractor's installation activities, at no cost to the Owner.

O. Owner Training

- 1. The Contractor shall provide on-the-job training by a suitably qualified instructor, to personnel designated by the Owner, to instruct them in the operation and maintenance of the systems.

- a. All training personnel shall be full-time employees of the Subcontractor.
 - i. In the event the Contractor does not have qualified instructors on staff for certain sophisticated equipment, a manufacturer's representative for such instruction will be provided by the Contractor, at no additional cost to the Owner.
 - ii. This representative must be a manufacturer's technical representative; training by a local sales representative is not acceptable.
 - b. All training shall take place after the systems are operational, but before the acceptance tests.
 - c. All training personnel should have been part of the installation team, where feasible.
 - i. A trainer will be available for a full day during normal operating hours.
 - ii. A trainer will be available by appointment for non-operating hours.
 - iii. A dedicated trainer shall provide administrative training to Owner personnel separately from the end- user training period.
2. The cost to train owner's personnel to service the equipment shall be listed separately by item of equipment.
 3. Follow-up training within ninety (90) days, at the request of the owner, shall also be provided at no additional charge.
 4. The Subcontractor shall include pricing to have a continuous on-site presence during the first week of operation. This presence shall include all operating hours of the facility.
 - a. All on-site personnel shall be full-time employees of the Subcontractor.
 - b. All on-site personnel shall hold certificates from either ICIA or another recognized organization or institution, providing formal training in audiovisual engineering or installation.
 - c. All on-site personnel should have been part of the installation team, where feasible.
 - d. Where possible, the on-site personnel shall have attended, or conducted, the training sessions as outlined above.
 - e. Additional on-site support shall be provided for the first two major events held at the facility, whether or not these events occur during normal hours of operation.

P. Publication

No information relative to this job may be released for publication without prior written approval from the Owner.

Q. Insurance

Before commencing work, the Contractor shall procure and maintain, during the life of the contract, such comprehensive liability and property damage insurance as shall protect him and the Owner from claims for bodily injury, including death, and claims for property damage which may arise from the operations under this contract.

R. Installation Practices

1. General

- a. Installation shall include the delivery to the installation site, unloading, setting in place, fastening to walls, floors, ceilings, counters, or other structures where required, interconnecting wiring of the system components, equipment alignment and adjustment, and all other work whether or not expressly required herein which is necessary to result in complete and fully operational systems.
- b. Prior to ordering equipment, the Contractor shall coordinate the frequencies of all wireless devices to prevent unwanted interaction between devices and rooms. This includes, but is not limited to, wireless microphones, assisted listening system devices, wireless control panels, etc.
- c. All accessories, including rack mounting hardware, power supplies, etc., shall be obtained from the original equipment manufacturer. Unless otherwise noted or specified, third party accessories shall not be used.
- d. All audiovisual equipment racks shall be wired at the Contractor's facility, and fully tested. The tests shall be documented as outlined in Section III.J.3.a (Contractor's Documentation).
- e. All installation practices 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, State, City, County, Municipal, and other authorities having jurisdiction.
- f. If, in the opinion of the Contractor, an installation practice is desired or required, which is contrary to these specifications or drawings, a written request for modification shall be made to the Design Team. Modifications shall not commence without written approval from the Design Team.
- g. During the installation, and up to the date of final acceptance, the Contractor shall be under obligation to protect his finished and unfinished work against damage and loss. In the event of such damage or loss, he shall replace or repair such work at no cost to the Owner.

2. Physical Installation

- a. All equipment shall be firmly secured in place unless requirements of portability dictate otherwise.
- b. All equipment shall have an engraved plaque permanently affixed, denoting its function.
- c. Fastenings and supports shall be adequate to support their loads with a safety factor of at least five. All boxes, equipment, etc., shall be secured plumb and square.
- d. In the installation of equipment and cable, consideration shall be given not only to operational efficiency, but also to overall aesthetic factors.

3. Trim and Escutcheon Components

- a. To insure a proper finished appearance, the Contractor shall furnish and install trim/escutcheon components at all conditions where audiovisual components penetrate a finished surface. This would include but not be limited to video projector supports, television monitor/receiver supports and any other component which is not

specifically supplied with integral flanges/trim components; i.e. speaker mounts, assistive listening devices, etc.

- b. The visible component of any trim should be minimum in size, preferably no wider than 1/2". All trim components at the ceiling plane shall be finished to match the approved ceiling system and grid system components. The Contractor should obtain a sample from the General Contractor, including any custom color information, or standard color numbers. All trim components shall be submitted to the Architect for review and approval prior to fabrication.
4. Cable Installation
- a. All wire bundles are to be neat and combed free of cable crossovers.
 - b. All cables, regardless of length, shall be marked with a permanent, self-laminating wrap-around number or letter cable marker at both ends, similar to the Panduit "Pan-Code" system. Labels must be computer-generated for legibility. Wire labels done by hand in the field must be replaced with computer generated labels. 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 or run sheets.
 - c. All cables shall be grouped according to the signals being carried. In order to reduce signal contamination, separate groups shall be formed for the following cable families:
 - i. Power cables – 120VAC or greater.
 - ii. Control cables.
 - iii. Video cables.
 - iv. Audio cables carrying signals less than – 20 dBm.
 - v. Audio cables carrying signals between – 20 dBm and +20 dBm.
 - vi. Audio cables carrying signals above +20 dBm.
 - d. 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.
 - e. Cables ties shall be placed at appropriate intervals of no greater than six inches for vertical bundles, two inches for horizontal bundles.
 - f. All vertical cable bundles shall be attached to the rack frame.
 - g. All cables shall be continuous lengths without splices. All system wire, after being cut and stripped, shall have the wire strands twisted back to their original lay and be terminated by approved soldered or mechanical means. Except where noted otherwise in the specifications, no bare wire terminations will be accepted. Heat-shrink tubing shall be used to insulate the ground or drain wire. Unused wires at the end of a cable shall remain unstripped and shall be laid back and held in place with wire ties.
 - h. All solder connections shall be made with rosin-core solder using temperature-controlled solder stations. Care shall be taken to avoid cold or cracked solder joints. Any connections that do not appear to be clean and shiny, or which show signs of cracking, shall be resoldered by the Contractor before final acceptance of the system.

- i. Mechanical connections using insulated, crimp-type connectors shall be bonded to the connector by soldering the wire to the metal part of the connector.
 - j. Connections made with screw actuated pressure type terminal strips shall be made by stripping approximately 1/4 inch of insulation from the stranded conductor. Then the un-tinned wire shall be inserted into the terminal and the screw tightened using a secure fitting precision screwdriver.
 - k. Terminal blocks, boards, strips or connectors shall be furnished for all cables that interface with racks, cabinets, consoles, or equipment modules.
 - i. No audio or control cables shall run directly to permanently rack-mounted equipment.
 - ii. All unused audio inputs and outputs will terminate at the terminal blocks.
 - iii. All audio patch panels and patch bays shall be furnished with a dedicated audio terminal block. All audio cables to and from the audio patch panels shall terminate on this block.
 - l. All wire markers shall face a common direction.
 - m. All cables shall have proper connector housing.
 - n. Cables shall not protrude from the back of racks.
 - o. All cable entry shall be through the tops of racks or through entrance holes in the base of the rack. No cable shall enter racks through front, rear or side panel openings.
 - p. Unless otherwise noted, all video and computer video cables are to be terminated using seventy-five ohm (75Ω) connectors, with a captive center pin.
 - q. Cables running in plenum areas without conduit shall be plenum rated cable, and match the specified cable; see Section III.S (Cable Types). It is the responsibility of the Bidder to inspect the Electrical Engineer's drawings, and verify in what spaces plenum cable shall be used.
 - r. Note: No claims for additional monies, based on the use of plenum cable, will be allowed.
 - s. All cables (except video and pulse cables, which must be cut to an electrical length) shall be cut to the length dictated by the run. No splices shall be permitted in any pull boxes without prior permission of the Design Team. For equipment mounted in drawers or on slides, the interconnecting cables shall be provided with a service loop of appropriate length.
 - t. No cable shall be installed with a bend radius less than that recommended by the cable manufacturer.
 - u. Where cables are installed in architectural niches, ensure that the cables are black, unless otherwise directed, to reduce visibility from the audience.
5. Connection Plate Receptacles
- a. Provide plate and connectivity panels as follows:
 - i. Audio (microphone or line level) – XLR type.
 - ii. Audio (loudspeaker level) – Neutrik “Speak-On” Type.
 - iii. Intercom – ¼ inch diameter tip/ring/sleeve type, or as required by the intercom system. Jack shall be insulated from panel type.

- iv. Video – BNC type.
 - v. VGA – DE-15HD jack, isolated from panel type, with hex nuts.
 - vi. RF – “F” type. Receptacles shall be insulated from panel type.
- b. When connectivity panels include voice/data connectivity, panel approval, including layout and connector type, shall be coordinated with the Owner.
6. Patch Panel Assignments
- All patch panels shall be wired so that signal “sources” (outputs from) appear on the upper row of a row pair; and all “loads” (inputs to) appear on the lower row of a row pair.
7. Patch Panel Designation Strips
- a. All audio and video patch panel designation strips shall utilize alphanumeric identifications and descriptive information.
 - b. The jack position in each horizontal row shall be numbered sequentially from left to right. The horizontal jack rows shall be lettered sequentially from top to bottom.
 - c. The alphanumeric identification of each jack shall be included on the functional block drawings, as well as on reproductions of these drawings, which shall be mounted in an appropriate location near the patch bays.
8. Grounding Procedures
- a. In order to minimize problems resulting from improper grounding, and to achieve maximum signal-to-noise ratios, the following grounding procedures shall be adhered to:
 - i. System Ground
 - a. A single primary “system ground” shall be established for the systems in each particular area. All grounding conductors in that area shall connect to this primary system ground.
 - b. The system ground shall be provided in the audio equipment rack for the area, and shall consist of a copper bar of sufficient size to accommodate all secondary ground conductors. A copper conductor having a maximum of 0.1 Ohms total resistance shall connect the primary system ground bar to the nearest approved electrical ground. The Contractor shall be responsible for determining if the metallic conduit is properly electrically bonded to the building ground system.
 - c. Secondary system grounding conductors shall be provided from all racks, audio consoles, and grounding point for the area. Each of these grounding conductors shall have a maximum of 0.1 Ohms total resistance.
 - d. Under no conditions shall the AC neutral conductor, either in the power panel or in a receptacle outlet, be used for a system ground.
 - e. Under no conditions shall the technical ground be connected to non-technical ground conductors.
 - ii. Audio Cable Shields
 - a. All audio cable shields shall be grounded at one point only. There are no exceptions. For inter and intra-rack wiring, this requires that the shield be connected at one end only. For ungrounded portable equipment, such as microphones, the shield shall be connected at both ends but grounded at only one end.

- b. The Contractor shall submit for approval a detail showing standard wiring procedures indicating the following:
 - i. Audio connection methodology for balanced to balanced line level interfaces.
 - ii. Audio connection methodology for balanced to unbalanced line level interfaces.
 - iii. Audio connection methodology for unbalanced to balanced line level interfaces.
- b. Video Receptacles

All video receptacles that are provided and installed by the Contractor shall be insulated from the mounting panel, outlet box, or wire way. Unless otherwise detailed herein, this shall be accomplished by using insulated-from-panel type receptacles.
- c. Audio Receptacles

All audio receptacles that are provided and installed by the Contractor shall be insulated from the mounting panel, outlet box, or wire way. Unless otherwise detailed herein, this shall be accomplished by using insulated-from-panel type receptacles.
- d. General

Because of the great number of possible variations in grounding systems, it shall be the responsibility of the Contractor to follow good engineering practice, as outlined above, and to deviate from these practices only when necessary to minimize crosstalk and to maximize signal-to-noise ratios in the audio, video, and control systems.

S. Cable Types

Unless otherwise called for in these specifications and drawings, the following cables, or their approved equals, shall be used in these systems:

- 1. Audio Applications
 - a. Microphone/Line Level; fixed installation BELDEN 8451 – or approved equal

Miniature PVC insulated, AWG 22 stranded copper wire twisted pair with 100% foil shield and drain wire, in PVC jacket, 3.51 mm nominal overall diameter.

Plenum Equivalent: Belden 88761
 - b. Speaker Level; Fixed Installation, 70 Volt Distribution

Only BELDEN 5300UP – or approved equal

PVC insulated AWG 18 high strand count copper twisted pair, individually PVC insulated with Black & White jackets, in an overall PVC insulated Jacket, 4.67 mm nominal overall diameter.

Plenum Equivalent: Belden 82740
 - c. Speaker Level; Fixed Installation, <50'

BELDEN 5200UP – or approved equal

 - i. PVC insulated AWG 16 high strand count copper twisted pair, individually PVC insulated with Black & White jackets, in an overall PVC insulated Jacket, 5.28 mm nominal overall diameter.
 - ii. Plenum Equivalent: Belden 6200UE – or approved equal

- d. Speaker Level; Fixed Installation, <100'
 BELDEN 5100UP – or approved equal
 - i. PVC insulated AWG 14 high strand count copper twisted pair, individually PVC insulated with Black & White jackets, in an overall PVC insulated Jacket, 6.6 mm nominal overall diameter.
 - ii. Plenum Equivalent: Belden 6100UE – or approved equal
 - e. Speaker Level; Fixed Installation, <150'
 BELDEN 5000UP – or approved equal
 - i. PVC insulated AWG 12 high strand count copper twisted pair, individually PVC insulated with Black & White jackets, in an overall PVC insulated Jacket, 7.67 mm nominal overall diameter.
 - ii. Plenum Equivalent: Belden 6000UE – or approved equal
 - f. Speaker Level; Fixed Installation, <200'
 BELDEN 5T00UP – or approved equal
 - i. PVC insulated AWG 10 high strand count copper twisted pair, individually PVC insulated with Black & White jackets, in an overall PVC insulated Jacket, 9.04 mm nominal overall diameter.
 - ii. Plenum Equivalent: Belden 6T00UP – or approved equal
 - g. Antenna Cable-Wireless Microphone, <100'
 BELDEN 9913F7 – or approved equal
 - i. PVC insulated coaxial cable, RG-8U, 50 Ohm, maximum VSWR 1.43:1 from 5MHz to 2,250MHz., with braided shield for minimum 95% coverage and foil shielding for minimum 100% coverage, in an overall PVC insulated jacket, 11 mm nominal overall diameter.
 - ii. Plenum Equivalent: Belden 89913 – or approved equal
 - h. Antenna Cable; Wireless Microphone/Assistive Listening Emitter, >100' BELDEN 8267 – or approved equal.
 - i. Coaxial cable, RG-213U, 50 Ohm.; equal to or better in high frequency attenuation performance at 1,000 MHz (-8.0dB, 100') as specified, with braided shield for minimum 95% coverage and foil shielding for minimum 100% coverage, in an overall PVC insulated jacket, 11 mm nominal overall diameter.
 - ii. Plenum Equivalent: Belden 89913 – or approved equal
2. Video Applications
- a. Base-band Analog Video BELDEN 8281 – or approved equal
 - i. Coaxial video cable, RG-59U, 75 Ohm, equal to or better in high frequency attenuation performance at 100 MHz (-9dB, 100m) as specified, with double braided shield for minimum 98% coverage, in an overall PVC insulated jacket, 8 mm nominal overall diameter.
 - ii. Plenum Equivalent: Belden 88281 – or approved equal

b. Serial Digital Video

BELDEN 1505A – or approved equal

- i. Coaxial video cable, RG-59U, 75 Ohm, equal to or better in high frequency attenuation performance at 100 MHz (-7.6dB, 100m) as specified, with braided shield for minimum 95% coverage and foil shielding for minimum 100% coverage, in an overall PVC insulated jacket, 6 mm nominal overall diameter.
- ii. Plenum Equivalent: Belden 1506A – or approved equal

c. Computer Video Cable

WEST PENN-CDT WP8195 – or approved equal

- i. Five (5) conductor bundled coaxial video cable, RG-59U, 75 Ohm, equal to or better in high frequency attenuation performance at 135 MHz (-8.3dB, 100m) as specified. Each sub-unit with double braided shield and individual jackets in Red, Green, Blue, White and Yellow jacket colors, in overall PVC jacket, 19.69 mm overall diameter
- ii. Plenum Equivalent: West Penn-CDT WP825195 – or approved equal

d. Camera Video Cable; Triaxial BELDEN 8233 – or approved equal

- i. 75 Ohm RG-11, bare copper braid, 96% coverage. Inner jacket of polyethylene between braids; 12.07 mm nominal overall diameter. Bare copper braid, 95% coverage.
- ii. Sweep Tested: 5 MHz - 3 GHz.

e. Camera Video Cable; Triaxial BELDEN 1858A – or approved equal

- i. 75 Ohm RG-11, bare copper braid, 95% coverage. Inner jacket of polyethylene between braids; 13.02 mm nominal overall diameter. Bare copper braid, 95% coverage.
- ii. Sweep Tested: 5 MHz - 850 MHz.
- iii. Plenum Equivalent: Belden 1859A – or approved equal

3. RF/CATV Applications

a. Horizontal Distribution, <150' only.

BELDEN 9118 – or approved equal

- i. RF Broadband Cable - 75 Ohm Broadband Coaxial Video cable, RG-6, with braided shield for minimum 60% coverage and triple foil shielding for minimum 100% coverage.
- ii. Sweep Tested: 5 MHz - 1 GHz, Structural Return Loss 20 db minimum.
- iii. High Frequency Attenuation performance equal to or better than at 1000 MHz (-21.5dB, 100m), as specified Type, in an overall PVC insulated jacket, 6.99 mm overall diameter.
- iv. Plenum Equivalent: Belden 1152A – or approved equal

b. Horizontal Distribution, <250' only.

BELDEN 9064 – or approved equal

- i. RF Broadband Cable - 75 Ohm Broadband Coaxial Video cable, RG-11, with braided shield for minimum 77% coverage and triple foil shielding for minimum 100% coverage.
 - ii. Sweep Tested: 5 MHz - 1 GHz, Structural Return Loss 20 db minimum.
 - iii. High Frequency Attenuation performance equal to or better than at 1000 MHz (-13.9dB, 100m), as specified Type, in an overall PVC insulated jacket, 10.16 mm overall diameter.
 - iv. Plenum Equivalent: Belden 1153A – or approved equal
 - c. Primary Riser; Horizontal Distribution, > 250'.
COMM-SCOPE P3 500 JCAR – or approved equal
 - i. RF Broadband Riser Cable - 75 Ohm Broadband Riser cable; meets NEC Article 820 Riser Rating.
 - ii. High Frequency Attenuation performance equal to or better than at 1000 MHz (-7.91 dB, 100m), as specified; 14.22 mm overall diameter.
- 4. Remote Control System Applications
 - a. Device Interconnection; Relay Systems BELDEN 9744 – or approved equal
 - i. Two twisted pair stranded AWG 22 copper wire, individually jacketed, in an overall PVC jacket, 6.20 mm nominal overall diameter.
 - ii. Plenum Equivalent: Belden 88741 – or approved equal
 - b. Device Interconnection; RS-232/RS-422/RS-485 BELDEN 8723 – or approved equal
 - i. Two twisted pair stranded AWG 22 copper wire, individually jacketed with individual shielding of pairs, in an overall PVC jacket, 4.39 mm nominal overall diameter.
 - ii. Plenum Equivalent: Belden 88723 – or approved equal
 - c. Device Interconnection; with Power BELDEN 1502R – or approved equal
 - i. One twisted pair stranded AWG 22 copper wire with shield; one AWG 18 TC unshielded power pair in an overall PVC jacket, 6.35 mm nominal overall diameter.
 - ii. Plenum Equivalent: Belden 1502P – or approved equal
- 5. Substitutions
 - a. These cable types are cited to illustrate the type and quality of cable required. Unless otherwise noted, cables from other manufacturers, i.e. West Penn, Comm-Scope, Liberty Cable, etc. will be considered acceptable if data sheets are submitted prior to installation.
 - b. The Contractor shall only use plugs and jacks specifically manufactured and designed for the cable used. Unless otherwise noted, third-party connectors from other manufacturers, i.e. Kings, Switchcraft, AMP, Amphenol, Lemo, etc. will be considered acceptable if data sheets are submitted prior to installation.
 - c. It is the responsibility of the Contractor to verify, furnish and install the correct CATV cable type, as per the local CATV provider.

T. Shop Staging and Inspection

After shop fabrication is complete, and prior to shipping completed equipment racks to the job site, the Design Team may elect to review the completed racks at the Contractor's facility.

1. The following are requirements for the Design Team's inspection:
 - a. All racks being reviewed should be in an isolated area of the shop, and arranged in a manner to expedite testing and review. A work table and chairs shall be provided for use of the design team.
 - b. All racks shall have temporary labels, indicating building, floor and room where the rack shall be installed. Alternatively, the temporary labeling should indicate system type.
 - c. Racks shall be clean, and free of all debris (cut cable ties, insulation from stripped wires, etc.) and dust.
 - d. Full-size approved shop drawings and preliminary as-built drawings.
 - e. All equipment shall be installed in the racks, with peripheral and ancillary equipment installed and ready to test.
 - f. Blank panels, vent panels and engravings may be omitted at this point, but should be on-hand for final assembly prior to shipping to the field.
2. The Design Team will review the following:
 - a. Equipment inventory, referenced to the Equipment Schedule and all change orders to-date.
 - b. Review of Contractors in-house testing.
 - c. Review of conformance with the specifications.
 - d. Review of internal cabling.
 - i. Cabling shall be as stated above.
 - ii. All internal cabling shall be neatly dressed, with all wire markers clearly visible.
 - iii. Tension of wire ties on bundled cable shall not bulge the cable.
 - iv. Review of terminal-block assemblies; Section III.R.4.j.
 - e. Review of control system panels and operation.
 - f. Review of heat path through the rack.
 - g. Review of overall build quality.
 - h. Review of general shop conditions.

U. Performance Standards

Unless restricted by the published specifications of a particular piece of equipment, or unless otherwise required under the Detailed Specifications, the following performance standards shall be met by each system:

1. Audio – General Conditions

All performance standards, unless otherwise noted, should be verified under the following conditions:

- a. Frequency bandwidth measured should be 20 Hz to 20 kHz.
 - b. All levels should be referenced to +4 dBu.
 - c. Gain settings should be “Unity Gain” for line level signals and maximum for microphone preamplifiers.
2. Audio – Electrical
- a. S/N (including crosstalk and hum): 75dB minimum (ref. 0dBu)
 - b. Total Harmonic Distortion: 0.1% maximum (30Hz to 15kHz)
 - c. Frequency Response: +/-1.0 dB (20Hz to 20kHz)
3. Audio – Acoustical
- a. S/N (including crosstalk and hum): 65dB minimum
 - b. Frequency Response: +/-3.0 dB (80Hz to 15kHz, loudspeaker direct field as measured via time-based analyzer, displayed with moderate smoothing.)
4. Video (signal)
- a. Frequency Response Within plus or minus 0.5dB, DC to 4.2 MHz.
 - b. Signal to Noise Ratio 55 dB minimum (peak to RMS) unweighted, DC to 4.2 MHz
 - c. Crosstalk 45 dB minimum unweighted DC to 4.2 MHz
 - d. Line and Field Tilt: 2% maximum.
 - e. Differential Gain: 3% maximum.
 - f. Differential Gain: 2 degrees maximum.
5. Performance Test Signal Paths
- The signal paths for the above Performance Standards shall be as follows:
- a. Audio From all source inputs (for microphones, audio tape units, video tape units, etc.) through all mixers, switchers, etc., to all signal destinations.
 - b. Video Signals From all sources of the above signal paths. This shall not exempt the Contractor from the responsibility of checking all paths and outlets for appropriate compliance with the Performance Standards; see section below for detailed requirements.
6. Display Systems
- All display systems shall meet the following performance standards:
- a. All displays shall be solidly mounted and braced, so that there will be no observable movement in the image induced by motor vibration or other mechanical operations.
 - b. All displays shall be calibrated to a common standard; there shall be no observable chrominance (saturation and tint) or luminance (black and white levels) differences between displays.
 - c. The total averaged light output from a projector, in lumens, shall be within plus-or-minus 15% of that specified by the projector manufacturer.
 - d. The light fall-off from the center of the projected image to all four corners, as measured at the projected image plane, shall not exceed 35% for slide projector images. The light intensity shall be measured at all five positions of the projected image after the projector has been adjusted to provide the light output as specified above.

- e. The “corner” location shall be defined as the four points determined by intersecting lines drawn 5% of the distance in from the focused edges of the image.
 - f. The light meter used for the above measurements shall be a properly calibrated foot-candle (or lux) meter and shall be cosine-corrected.
 - g. Projectors, lenses, and mirrors shall be solidly mounted and braced, so that there will be no observable movement in the image induced by motor vibration or other mechanical operations.
7. Control System User Interface

Control system user interfaces pages shall be designed for this project exclusively. While there are a great number of design approaches to designing the user interface, the following guidelines shall be adhered to:

- a. All panels are to have the time and date as icons, in the same position on every page.
- b. All panels are to have a title, indicating the piece of equipment and/or functionality being controlled.
- c. No individual component shall be programmed to function atypically.
- d. Devices similar in nature shall be programmed to operate with a common format.
- e. Pages for source equipment shall conform to the following guidelines:
 - i. Transport controls should be on the main device page.
 - ii. The primary transport controls, <Play>, <Stop> and <Pause> should be larger than the other transport controls.
 - iii. Buttons shall include both graphic images and text.
 - iv. A button shall be included for a pathway to device specific controls, including menus and advanced device functions.
- f. Final programming shall include capability to remotely control all functions of the audiovisual system. Individual device controls shall provide full manufacturer’s functionality.
- g. Provide control capability for every function available on every piece of equipment being controlled by the system. Define and provide “macro” commands for the most used functions.
- h. Provide control panel layouts that are consistent from page to page.
- i. Functions used during a general presentation shall be accessible with a minimal amount of button presses/page flips.
- j. All power functions, or other destructive commands, activated by the users through the user interface shall be intercepted in the programming. The user shall be provided with the opportunity to cancel out the command prior to any actions being initiated and without disturbing the current operating model.
- k. Where feasible, multi-level access to controls should be implemented. All software shall provide multiple levels of password protection. Initially three levels of security will be established and specific rights to program areas shall be assigned by user:
 - i. Level 1 shall allow user to operate the system, without a password. Control shall be limited to basic functionality directly affecting the space in which the control is located.

- ii. Level 2 shall be password protected, and allow administrators and support personnel to modify system parameters and features listed in level 1.
- 8. During performance testing, all equipment shall be operated under standard conditions as recommended by the manufacturer.

V. Contractor System Testing

1. Before Acceptance Tests are scheduled, the Contractor shall perform his own system tests. He shall furnish all required test equipment and shall perform all work necessary to determine and/or modify performance of the system to meet the requirements of this specification. This work shall include the following:
 - a. Provide documentation that all matrix switching cross-points have been tested and verified.
 - b. Test all audio and video systems for compliance with the Performance Standards.
2. Video Systems
 - a. Video Test Equipment:
 - i. Multi-Format Video signal generator, Quantum Data 802 series, with HDMI and DVI support.
 - ii. Calibrated content for all media players that are part of the system.
 - iii. Blank media for all media recorders that are part of the system.
 - iv. All miscellaneous equipment, cables and terminations necessary for testing.
 - b. Signal Paths; Video
 - i. Connect the output of the video signal generator to each source input point (floor box/table/rack panel, etc.) and select the "Full Field Color Bar" signal.
 - ii. Ensure that the test signal is routed to the selected output.
 - iii. Check that the image is filling the screen and is properly centered at all resolutions and timings that are industry standard and in use by the Owner.
 - iv. Change test pattern to Pluge pattern and ensure that there is no ringing in the image.
 - v. Change test pattern to a full-field cross-hatch pattern and ensure consistent focus throughout the image.
3. Audio Systems
 - a. Audio Test Equipment:
 - i. Signal generator, Leader LAG-120B – or approved equal
 - ii. Time-based acoustic analyzer, Goldline TEF, SIA Smaart, Meyer SIM System II or approved equivalent, with all required accessories.
 - iii. AC millivoltmeter, Leader LMZ-181A.
 - iv. Audio test set, Audio Precision P1PLUS.
 - v. Pink noise generator IVIE IE-20B.
 - vi. Spectrum analyzer IVIE-IE30A.
 - vii. Harmonic and intermodulation distortion analyzer Leader LDM-171.

- viii. Loudspeaker and Microphone polarity checker,
 - ix. Calibrated content for all media players that are part of the system.
 - x. Blank media for all media recorders that are part of the system.
 - xi. All miscellaneous equipment, microphones, cables and terminations necessary for testing.
- b. Gain Setting
- i. Adjust all components (starting at source equipment and ending at the power amplifiers or active loudspeaker inputs), for maximum signal-to-noise ratio per conventions outlined in Sound System Engineering, Second Edition (Don and Carolyn Davis, Howard W. Sams & Co. 1987).
 - ii. Provide a Gain Structure chart showing measured levels at each and every gain point through the system. This will be submitted as the reference setup for the system.
 - iii. At the conclusion of audio system gain structure setting no hiss or noise should be audible through any loudspeaker, and ample electronic headroom should be available throughout the signal chain.
 - iv. At the conclusion of the tests, return all equipment settings to previously calibrated positions. All component settings are to be label d, identified and documented.
 - v. Provide written records of all test results in spreadsheet form.
- c. Signal Paths; Audio
- i. Measure and record the impedance of each active device operating as a source to any passive device or series of passive devices. Record the dc resistance of any build-out resistors used.
 - ii. Measure and record the input impedance of any active device used to terminate passive devices, and record the total impedance of all such devices. Record the dc resistance of any terminating resistor used.
 - iii. Measure the absolute polarity of all devices, including all loudspeakers in the signal path, correct and record any reversals.
 - iv. Adjust the gain of all devices in the signal path for optimum signal-to-noise ratio and maximum crest factor.
 - v. Without changing gain, terminate microphone and line-level inputs, with shielded resistors of 150 and 600 ohms respectively.
 - vi. Measure and record the overall hum and noise level at each power amplifier output. Level shall be at least 75 dB below rated power output of amplifier over a bandwidth of 40-16,000 Hz.
 - vii. Measure and record the impedance of each loudspeaker line at 250, 1000, and 4000 Hz before connecting it to the output of its respective amplifier.
 - viii. Load power amplifiers with resistors matching nominal impedance of output terminals used in system in place of actual loudspeaker loads.
 - ix. Adjust gain of system as for hum and noise level tests above.

- x. Apply a 1,000 Hz. sine-wave signal to each microphone and line-level input at level required to produce measured full amplifier output.
 - xi. THD shall measure less than 1.0%.
 - xii. Set up system for each specified mode of operation.
 - xiii. Use wide-bandwidth oscilloscope and loudspeaker monitoring.
 - xiv. Check to ensure that system is free of spurious oscillation and RF pickup in the absence of any input signal and also with the system momentarily driven to full output at 400 Hz.
 - xv. Feed full/wide-dynamic range music to the system. Adjust the system for frequent peaks at its specified maximum sound pressure level.
 - xvi. Listen carefully for noise, rattle, or other extraneous sounds, and objectionable distortion.
 - xvii. Correct all causes of such defects. If cause is outside system, promptly notify the Construction Manager, and the Owner, indicating cause and suggested corrective procedures.
 - xviii. Measure and record the acoustic distribution of the loudspeakers of this system at locations as designated, one (1) in every zone. Record the location of all position where any 1/3 octave band, deviates more than +/-3 dB from 500 Hz to 4 kHz, weighted by -5 at 8,00 Hz re: 2500 Hz.
- d. General
- i. Check all control functions, from all controlling devices to all controlled devices, for proper operations.
 - ii. Adjust, balance, and align all equipment for optimum quality and to meet the manufacturer's published specifications. Establish and mark normal settings for all level controls, and record these settings in the "System Operation and Maintenance Manual".
 - iii. Check all optical projection images for average light level, light fall-off, and image alignment and size to comply with the Performance Standards and specifications drawings. Check to determine that all projectors, projector bases, carts, tables, and mirrors are rigid and vibration-less in operation.
 - iv. Maintain documentation of all performance tests for reference by the Design Team during the System Acceptance Tests.

W. Acceptance Testing

System Acceptance Tests will not be performed until the Contractor's System Checkout has been completed and the test results have been reviewed. The System Acceptance Tests will consist of the following:

1. A physical inventory will be taken of all equipment on site and will be compared to equipment lists in the contract documents.
2. The operation of all system equipment shall be demonstrated by the Contractor.
3. Both subjective and objective tests will be required by the Owner to determine compliance with the specifications. The Contractor shall be responsible for providing test equipment

for these tests.

4. All final, "as-built" drawings, run sheets, manuals, and other required documents shall be on hand. Two complete sets of these documents shall be delivered to the Owner at this time.
5. In the event further adjustment is required, or defective equipment must be repaired or replaced, tests may be suspended or continued at the option of the Owner.

X. Post Completion Documentation

During usage and maintenance of the system, the Owner may request changes and modifications to the system configuration. In order to maintain current and accurate system documentation, the following guidelines shall be followed:

1. All system changes shall be redlined on the existing documentation. This documentation shall be copied and returned to the Contractor's office for modification in CAD.
2. All system changes shall be "bubbled" with a revision number attached. This revision number shall also be in the revision block of the drawing, with the date and reason for the revision.
3. This finished documentation shall be burned onto a CD, or other approved media, and sent to the Owner.

The following pages constitute the Bill of Materials assembled for bidding purposes. The Bill of Materials has been developed by to provide a fully functional system based on drawings and client specifications. However, Contractor is solely responsible for the completeness and accuracy of take-offs and bids. Contractors are cautioned that the list may not be complete, may have discrepancies against the drawings, and may not indicate all pertinent information required to prepare an accurate bid. Determination of final quantities to meet the function of the design shall be the sole responsibility of the Contractor.

ATTACHMENT A1 – BILL OF MATERIALS

The following pages constitute the Bill of Materials assembled for bidding purposes. The Bill of Materials has been developed by to provide a fully functional system based on drawings and client specifications. However, Contractor is solely responsible for the completeness and accuracy of take-offs and bids. Contractors are cautioned that the list may not be complete, may have discrepancies against the drawings, and may not indicate all pertinent information required to prepare an accurate bid. Determination of final quantities to meet the function of the design shall be the sole responsibility of the Contractor.

Waiting Area			
QTY	MFG	MODEL	DESCRIPTION
DISPLAY DEVICES (OR APPROVED EQUAL)			
7	OFE	OFE	CLIENT PROVIDED 70" SHARP DISPLAYS
7	CHIEF	XSM1U	MOUNT, FUSION MICRO-ADJ FIXED WALL MOUNT, EXTRA LARGE
7	CHIEF	PAC526FWP6	ENCLOSURE, IN-WALL, LARGE WHITE W/SURGEX 3 OUTLET
DISPLAY SOURCE			
7	OFE	OFE	Qmatic player (one per display)
7	OFE	OFE	CATV receiver (one per display)
7	LIBERTY	E2HDSEMM02	CABLE, 6' HDMI WITH ETHERNET
QMATIC HEAD-END			
1	OFE	OFE	QMATIC HUB W/ AUDIO MODULE
AUDIO DISTRIBUTION SYSTEM (OR APPROVED EQUAL)			
8	JBL	C26CTLS	SPEAKER, 6.5" CEILING W/X FRMER (ORDER IN PAIRS)
1	JBL	CSA2300Z	AMPLIFIER, DUAL CHANNEL 300W
CONTROL SYSTEM			
TBD	OFE	OFE	HANDHELD REMOTE CONTROL

Main Lobby & Hallways			
QTY	MFG	MODEL	DESCRIPTION
DISPLAY DEVICES			
2	OFE	OFE	CLIENT PROVIDED 70" SHARP DISPLAYS
2	OFE	OFE	CLIENT PROVIDED WALL MOUNTS FOR DISPLAYS

Main Lobby & Hallways			
DISPLAY SOURCE			
2	OFE	OFE	Qmatic player (one per display)
2	OFE	OFE	CATV receiver (one per display)
2	LIBERTY	E2HDSEMM02	CABLE, 6' HDMI WITH ETHERNET
OMATIC HEAD-END			
1	OFE	OFE	OMATIC HUB W/ AUDIO MODULE
AUDIO DISTRIBUTION SYSTEM (OR APPROVED EQUAL)			
5	JBL	C67PTWH	SPEAKER, EXTENDED BASS PENDANT-WHT (PRICED AS EA/SOLD IN PAIRS)
10	JBL	C24CTXK	CEILING SPEAKER, 4" 2-WAY VENTED W/TRNS- (ORDER IN PAIRS)
1	EXTRON	6069220	AMPLIFIER, SIX OUTPUT STEREO AUDIO DISTRIBUTION
1	JBL	CSA2300Z	AMPLIFIER, DUAL CHANNEL 300W
CONTROL SYSTEM			
TBD	OFE	OFE	TV'S CONTROLLED BY HANDHELD REMOTE CONTROL

Multi Purpose Room			
QTY	MFG	MODEL	DESCRIPTION
DISPLAY SYSTEM - PROJECTION (OR APPROVED EQUAL)			
2	NEC	NPPX602ULW35	PROJECTOR, WUXGA 6000 LUMEN DLP 10000:1 LASER W/LENS (WHITE)
2	CHIEF	SYSAUW	MOUNT SYSTEM, SUSPENDED CEILING FOR PROJECTOR 0-12", WHITE
2	CRESTRON	DMRMC4KSCALE RC	4K DigitalMedia 8G+ RECEIVER & ROOM CONTROLLER W/SCALER ----
2	CRESTRON	CBLHD6	CABLE, 6 FT HDMI INTERFACE CABLE
2	DA-LITE	70136LS	SCREEN, 72.5" X 116" ADVANTAGE ELECROL, MATT WHITE, LVC & SM
SOURCE EQUIPMENT - WEST (OR APPROVED EQUAL)			
1	OFE	OFE	LAPTOP 1 (HDMI & VGA)
1	CRESTRON	CBLHD12	CABLE, 12 FT HDMI INTERFACE CABLE
1	CRESTRON	CBLVGA12	CABLE, 12 FT COMPUTER VGA INTERFACE CABLE
1	CRESTRON	DMTX200C2GW T	WALLPLATE, DIGITALMEDIA 8G+ TRANSMITTER 200 (MATTE WHITE)

Multi Purpose Room			
1	OFE	OFE	DEDICATED PC 1(HDMI)
2	CRESTRON	CBLHD6	CABLE, 6 FT HDMI INTERFACE CABLE
1	CRESTRON	HDEXT3CWSYSTEM	EXTENDER, HDMI OVER HDBaseT W/IR & RS-232 (WHITE)
SOURCE EQUIPMENT - EAST (OR APPROVED EQUAL)			
1	OFE	OFE	LAPTOP 2 (HDMI)
1	CRESTRON	CBLHD12	CABLE. 12 FT HDMI INTERFACE CABLE
1	CRESTRON	CBLVGA12	CABLE. 12 FT COMPUTER VGA INTERFACE CABLE
1	CRESTRON	DMTX200C2GW T	WALLPLATE, DIGITALMEDIA 8G+ TRANSMITTER 200 (MATTE WHITE)
1	OFE	OFE	DEDICATED PC 2(HDMI)
2	CRESTRON	CBLHD3	CABLE. 3 FT HDMI INTERFACE CABLE
1	CRESTRON	HDEXT3CWSYSTEM	EXTENDER, HDMI OVER HDBaseT W/IR & RS-232 (WHITE)
AUDIO EQUIPMENT (OR APPROVED EQUAL)			
4	SHURE	QLXD12485G50	BODYPACK AND VOVAL COMBO SYSTEM W/ WL 185 AND SM58
1	SHURE	UA844SWB	ANTENNA & POWER DISTRIBUTION SYSTEM
2	SHURE	UA221	SPLITTER. PASSIVE ANTENNA/COMBINER KIT
4	SHURE	UA864US	ANTENNA, WALL/CEILING MOUNTABLE & PAINTABLE (470-698 MHZ)
2	BIAMP SYSTEMS	TESIRAFORTEDAN VI	TESIRA FORTE DSP FIXED I/O SERVER W/ 12 IN, 8 OUT, DANTE
1	QSC	SPA4100	AMPLIFIER, 4 CHANNEL, 100 WATTS, 1/2 RU
16	JBL	C26CTLS	SPEAKER, 6.5" CEILING W/X FRMER (ORDER IN PAIRS)
SWITCHING & CONTROL EQUIPMENT (OR APPROVED EQUAL)			
2	CRESTRON	TSW760NCWS	TOUCH SCREEN, 7" WITHOUT CAMERA OR MIC - WHITE SMOOTH
1	CRESTRON	DMPS34K300C	PRESENTATION SYSTEM, 3-SERIES 4K DIGITAL MEDIA 300
1	CRESTRON	PW4830DUS	POWER PACK, 150W PoDM FOR DM 8G+ I/O BLADES
1	CRESTRON	GLSPARTCN	CRESNET PARTITION SENSOR
1	PAKEDGE	SX8P	SWITCH, 8 PORT MANAGED SWITCH, 8 PORTS POE+/POE
1	MIDDLE ATLANTIC	U1V	RACKSHELF FOR AV NETWORK SWITCH, 1 SPACE (1 3/4")
SUPPORT EQUIPMENT (OR APPROVED EQUAL)			
1	MIDDLE ATLANTIC	ERK4425AV	RACK, STAND ALONE 44 SPACE
1	MIDDLE ATLANTIC	PD915R	POWER STRIP, 9 OUTLET, SINGLE 15 AMP CIRCUIT
1	MIDDLE ATLANTIC	PDT1015CMNS	POWER STRIP, 10 OUTLET SINGLE 15A, THIN FOR RACKS W/9'CORD

ATTACHMENT F
INTENTIONALLY LEFT BLANK

ATTACHMENT G

CONTRACT AGREEMENT

CONTRACT AGREEMENT

CONSTRUCTION CONTRACT

This contract is made and entered into between THE CITY OF SAN DIEGO, a municipal corporation, herein called "City", and West Coast General Corporation, herein called "Contractor" for construction of **101 Ash St Tenant Improvements**; Bid No. **K-18-1586-DBB-3-A**; in the amount of **Seventeen Million Eighty Thousand Two Hundred Sixty One Dollars and Zero Cents (\$17,080,261.00)**, which is comprised of the Base Bid plus Additive Alternate A.

IN CONSIDERATION of the payments to be made hereunder and the mutual undertakings of the parties hereto, City and Contractor 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 Instruction to Bidders and the Supplementary Special Provisions (SSP).
 - (d) That certain documents entitled **101 Ash St Tenant Improvements**, on file in the office of the Public Works Department as Document No. **S-17009**, 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 **101 Ash St Tenant Improvements**, Bid Number **K-18-1586-DBB-3-A**, San Diego, California.
3. For such performances, the City 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 City 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 Mayor or designee signs the agreement.

CONTRACT AGREEMENT (continued)

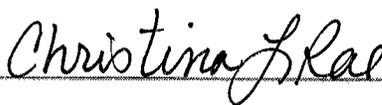
IN WITNESS WHEREOF, this Agreement is signed by the City of San Diego, acting by and through its Mayor or designee, pursuant to Municipal Code §22.3102 authorizing such execution.

THE CITY OF SAN DIEGO

APPROVED AS TO FORM

Mara W. Elliott, City Attorney

By 

By 

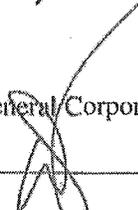
Print Name: James Nagelvoort
Director
Public Works Department

Print Name: Christina L. Rae
Deputy City Attorney

Date: 8/16/18

Date: 8/21/18

CONTRACTOR
West Coast General Corporation

By 

Print Name: David E. Davey

Title: President

Date: 8/1/18

City of San Diego License No.: B1992002309

State Contractor's License No.: 479019

DEPARTMENT OF INDUSTRIAL RELATIONS (DIR) REGISTRATION NUMBER: 1000002666

CERTIFICATIONS AND FORMS

The Bidder / Proposer, by submitting its electronic bid or proposal, agrees to and certifies under penalty of perjury under the laws of the State of California, that the certifications, forms and affidavits submitted as part of this bid are true and correct.

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.

**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

County of San Diego

The bidder, being first duly sworn, deposes and says that he or she is authorized by 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.

CONTRACTOR CERTIFICATION

DRUG-FREE WORKPLACE

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;

This company 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.

CONTRACTOR CERTIFICATION

AMERICANS WITH DISABILITIES ACT (ADA) COMPLIANCE CERTIFICATION

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

This company has in place 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.

CONTRACTOR CERTIFICATION

CONTRACTOR STANDARDS – PLEDGE OF COMPLIANCE

I declare under penalty of perjury that I am authorized to make this certification on behalf of the company submitting this bid/proposal, that as Contractor, I am familiar with the requirements of City of San Diego Municipal Code § 22.3004 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 has completed a Pledge of Compliance attesting under penalty of perjury of having complied with City of San Diego Municipal Code § 22.3004.

CONTRACTOR CERTIFICATION

EQUAL BENEFITS ORDINANCE CERTIFICATION

I declare under penalty of perjury that I am familiar with the requirements of and in compliance with the City of San Diego Municipal Code § 22.4300 regarding Equal Benefits Ordinance.

CONTRACTOR CERTIFICATION

EQUAL PAY ORDINANCE CERTIFICATION

Contractor shall comply with the Equal Pay Ordinance (EPO) codified in the San Diego Municipal Code (SDMC) at section 22.4801 through 22.4809, unless compliance is not required based on an exception listed in SDMC section 22.4804.

Contractor shall require all of its subcontractors to certify compliance with the EPO in their written subcontracts.

Contractor must post a notice informing its employees of their rights under the EPO in the workplace or job site.

By signing this Contract with the City of San Diego, Contractor acknowledges the EPO requirements and pledges ongoing compliance with the requirements of SDMC Division 48, section 22.4801 et seq., throughout the duration of this Contract.

AFFIDAVIT OF DISPOSAL

(To be submitted upon completion of Construction pursuant to the contracts Certificate of Completion)

WHEREAS, on the _____ DAY OF _____, 2_____
the undersigned entered into and executed a contract with the City of San Diego, a municipal corporation, for:

101 Ash St Tenant Improvements

(Project Title or Task)

as particularly described in said contract and identified as Bid No. **K-18-1586-DBB-3-A**; SAP No. (WBS/IO/CC) **S-17009**; 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 City of San Diego 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 _____, _____.

By: _____

Contractor

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

LIST OF SUBCONTRACTORS

***** PROVIDED FOR ILLUSTRATIVE PURPOSES ONLY *** TO BE SUBMITTED IN ELECTRONIC FORMAT ONLY *** SEE INSTRUCTIONS TO BIDDERS, FOR FURTHER INFORMATION**

In accordance with the requirements of the "Subletting and Subcontracting Fair Practices Act", Section 4100, of the California Public Contract Code (PCC), the Bidder is to list below the name, address and license number of each Subcontractor who will perform work, labor, render services or specially fabricate and install a portion [type] of the work or improvement, in an amount of or in excess of 0.5% of the Contractor's total Bid. Failure to comply with this requirement may result in the Bid being rejected as non-responsive. The Contractor is to list only one Subcontractor for each portion of the Work. The Bidder's attention is directed to the Special Provisions - General; Paragraph 2-3 Subcontracts, which stipulates the percentage of the Work to be performed with the Bidder's own forces. The Bidder is to also list all SLBE, ELBE, DBE, DVBE, MBE, WBE, OBE, SDB, WoSB, HUBZone, and SDVOSB Subcontractors for which the Bidders are seeking recognition towards achieving any mandatory, voluntary, or both subcontracting participation percentages.

NAME, ADDRESS AND TELEPHONE NUMBER OF SUBCONTRACTOR	CONSTRUCTOR OR DESIGNER	DIR Registration Number	SUBCONTRACTOR LICENSE NUMBER	TYPE OF WORK	DOLLAR VALUE OF SUBCONTRACT	MBE, WBE, DBE, DVBE, OBE, ELBE, SLBE, SDB, WoSB, HUBZone, OR SDVOSB [ⓐ]	WHERE CERTIFIED [ⓑ]	CHECK IF JOINT VENTURE PARTNERSHIP
Name: _____ Address: _____ City: _____ State: _____ Zip: _____ Phone: _____ Email: _____								
Name: _____ Address: _____ City: _____ State: _____ Zip: _____ Phone: _____ Email: _____								

- ⓐ 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 | | |

- ⓑ 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 | | |
| State of California's Department of General Services | CADoGS | City of Los Angeles | LA |
| State of California | CA | U.S. Small Business Administration | SBA |

The Bidder will not receive any subcontracting participation percentages if the Bidder fails to submit the required proof of certification.

NAMED EQUIPMENT/MATERIAL SUPPLIER LIST

***** PROVIDED FOR ILLUSTRATIVE PURPOSES ONLY *** TO BE SUBMITTED IN ELECTRONIC FORMAT ONLY *** SEE INSTRUCTIONS TO BIDDERS FOR FURTHER INFORMATION**

NAME, ADDRESS AND TELEPHONE NUMBER OF VENDOR/SUPPLIER	DIR Registration Number	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 SDVOSB ^①	WHERE CERTIFIED ^②
Name: _____ Address: _____ City: _____ State: _____ Zip: _____ Phone: _____ Email: _____							
Name: _____ Address: _____ City: _____ State: _____ Zip: _____ Phone: _____ Email: _____							

① As appropriate, Bidder shall identify Vendor/Supplier 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 Vendor/Supplier is certified by:

City of San Diego	CITY	State of California Department of Transportation	CALTRANS
California Public Utilities Commission	CPUC		
State of California's Department of General Services	CADoGS	City of Los Angeles	LA
State of California	CA	U.S. Small Business Administration	SBA

The Bidder will not receive any subcontracting participation percentages if the Bidder fails to submit the required proof of certification.

SUBCONTRACTORS ADDITIVE/DEDUCTIVE ALTERNATE (USE ONLY WHEN ADDITIVE ALTERNATES ARE REQUIRED)

ALTERNATE A

ADDITIVE/DEDUCTIVE ALTERNATE	NAME, ADDRESS AND TELEPHONE NUMBER OF SUBCONTRACTOR	CONSTRUCTOR OR DESIGNER	DIR Registration Number	SUBCONTRACTOR LICENSE NUMBER	TYPE OF WORK	DOLLAR VALUE OF SUBCONTRACT	MBE, WBE, DBE, DVBE, OBE, ELBE, SLBE, SDB, WoSB, HUBZone, OR SDVOSB ①	WHERE CERTIFIED ②	CHECK IF JOINT VENTURE PARTNERSHIP
A-ITEMS 16-24	Name: <u>KNIGHT MECHANICAL DBA AIRMETRIX</u> Address: <u>20619 EVANT DR</u> City: <u>WALNUT</u> State: <u>CA</u> Zip: <u>91789</u> Phone: <u>909-444-9235</u> Email: <u>AIRMETRIX@YAHOO.COM</u>	CONSTRUCTOR	1000020232	746204	PORTION OF HVAC	DD \$257,929.99 \$227,782			
DD	Name: <u>TITAN FIRE PROTECTION</u> Address: <u>280 SCOTT ST, STE 105</u> City: <u>VISTA</u> State: <u>CA</u> Zip: <u>92081</u> Phone: <u>760-295-3476</u> Email: <u>TSCIVEN@TITANFIREINC.COM</u>	CONSTRUCTOR	1000016631	989280	PORTION OF FIRE SPRINKLER	\$83004			

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	State of California's Department of General Services	CADoGS
City of Los Angeles	LA	State of California	CA
U.S. Small Business Administration	SBA		

The Bidder will not receive any subcontracting participation percentages if the Bidder fails to submit the required proof of certification.

SUBCONTRACTORS ADDITIVE/DEDUCTIVE ALTERNATE (USE ONLY WHEN ADDITIVE ALTERNATES ARE REQUIRED)

ALTERNATE A

ADDITIVE/DEDUCTIVE ALTERNATE	NAME, ADDRESS AND TELEPHONE NUMBER OF SUBCONTRACTOR	CONSTRUCTOR OR DESIGNER	DIR Registration Number	SUBCONTRACTOR LICENSE NUMBER	TYPE OF WORK	DOLLAR VALUE OF SUBCONTRACT	MBE, WBE, DBE, DVBE, OBE, ELBE, SLBE, SDB, WoSB, HUBZone, OR SDVOSB ①	WHERE CERTIFIED ②	CHECK IF JOINT VENTURE PARTNERSHIP
A- ITEMS 17-29	Name: <u>GLS SPRAY SERVICES</u> Address: <u>12527 KIRKHAM CT, STE B</u> City: <u>POWAY</u> State: <u>CA</u> Zip: <u>92064</u> Phone: <u>858-668-3334</u> Email: _____	CONSTRUCTOR	100008739	535326	PORTION OF FIRE-PROOFING	\$74,900			
A- ITEMS 16-29	Name: <u>JW CONTRACT BLINDS</u> Address: <u>4655 30TH ST.</u> City: <u>SAN DIEGO</u> State: <u>CA</u> Zip: <u>92116</u> Phone: <u>619-325-1877</u> Email: <u>JW@JWBLINDS.COM</u>	CONSTRUCTOR	100013459	612678	PORTION OF WINDOW COVERINGS	\$44,800			

- 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 | State of California's Department of General Services | CADoGS |
| City of Los Angeles | LA | State of California | CA |
| U.S. Small Business Administration | SBA | | |

The Bidder will not receive any subcontracting participation percentages if the Bidder fails to submit the required proof of certification.

SUBCONTRACTORS ADDITIVE/DEDUCTIVE ALTERNATE (USE ONLY WHEN ADDITIVE ALTERNATES ARE REQUIRED)

ALTERNATE A

ADDITIVE/DEDUCTIVE ALTERNATE	NAME, ADDRESS AND TELEPHONE NUMBER OF SUBCONTRACTOR	CONSTRUCTOR OR DESIGNER	DIR Registration Number	SUBCONTRACTOR LICENSE NUMBER	TYPE OF WORK	DOLLAR VALUE OF SUBCONTRACT	MBE, WBE, DBE, DVBE, OBE, ELBE, SLBE, SDB, WoSB, HUBZone, OR SDVOSB ①	WHERE CERTIFIED ②	CHECK IF JOINT VENTURE PARTNERSHIP
A-ITEMS 16-29	Name: <u>GCP MECHANICAL SYSTEMS</u> Address: <u>40283 ODESSA DR</u> City: <u>TEMECULA</u> State: <u>CA</u> Zip: <u>92591</u> Phone: <u>951-501-6395</u> Email: <u>GCOOPER@GCPMECHANICAL.COM</u>	CONSTRUCTOR	1000046572	433642	PORTION OF PLUMBING	\$185,257			
A-ITEMS 16-29	Name: <u>WORKPLACE SERVICES, INC</u> Address: <u>610 ALPINE WAY</u> City: <u>ESCONDIDO</u> State: <u>CA</u> Zip: <u>92029</u> Phone: <u>760-745-6889</u> Email: <u>JBOYCE@WORKPLACE-SERVICES.COM</u>	CONSTRUCTOR	100006879	793563	PORTION OF FLOORING	\$179,433.49			

- 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 | 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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SUBCONTRACTORS ADDITIVE/DEDUCTIVE ALTERNATE (USE ONLY WHEN ADDITIVE ALTERNATES ARE REQUIRED)

ALTERNATE A

ADDITIVE/DEDUCTIVE ALTERNATE	NAME, ADDRESS AND TELEPHONE NUMBER OF SUBCONTRACTOR	CONSTRUCTOR OR DESIGNER	DIR Registration Number	SUBCONTRACTOR LICENSE NUMBER	TYPE OF WORK	DOLLAR VALUE OF SUBCONTRACT	MBE, WBE, DBE, DVBE, OBE, ELBE, SLBE, SDB, WoSB, HUBZone, OR SDVOSB ①	WHERE CERTIFIED ②	CHECK IF JOINT VENTURE PARTNERSHIP
A-ITEMS 16-29	Name: <u>BRISTOL OMEGA</u> Address: <u>9441 N. OPAL AVE</u> City: <u>MENTONE</u> State: <u>CA</u> Zip: <u>92359</u> Phone: <u>909-794-6862</u> Email: <u>ACCOUNTING@BRISTOLOMEGA.COM</u>	CONSTRUCTOR	1000012779	667339	PORTION OF MILLWORK	\$134,300			
A-ITEMS 16-29, 31	Name: <u>ARGUS CONTRACTING</u> Address: <u>11807 E. SMITH AVE</u> City: <u>SANTA FE SPRINGS</u> State: <u>CA</u> Zip: <u>90670</u> Phone: <u>562-422-7370</u> Email: <u>DAVIDSON@ARGUSCONTRACTING.COM</u>	CONSTRUCTOR	1000018624	934189	PORTION OF REPAIRMENT AND DEMOLITION	\$1,200,000			

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	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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ALTERNATE A

ADDITIVE/DEDUCTIVE ALTERNATE	NAME, ADDRESS AND TELEPHONE NUMBER OF SUBCONTRACTOR	CONSTRUCTOR OR DESIGNER	DIR Registration Number	SUBCONTRACTOR LICENSE NUMBER	TYPE OF WORK	DOLLAR VALUE OF SUBCONTRACT	MBE, WBE, DBE, DVBE, OBE, ELBE, SLBE, SDB, WoSB, HUBZone, OR SDVOSB	WHERE CERTIFIED	CHECK IF JOINT VENTURE PARTNERSHIP
DD A-ITEMS 16-29	Name: <u>DAVIS MECHANICAL SYSTEMS</u> Address: <u>1316 N. MELROSE DR., STE E</u> City: <u>VISTA</u> State: <u>CA</u> Zip: <u>92083</u> Phone: <u>760-724-3990</u> Email: <u>NOELLE@DAVISMECH.COM</u>	CONSTRUCTOR	1000006274	584824	PORTION OF PLUMBING	\$252,300			
A-ITEMS 16-29, 32	Name: <u>MORROW-MEADOWS CORP</u> Address: <u>231 BENTON CT</u> City: <u>CITY OF INDUSTRY</u> State: <u>CA</u> Zip: <u>91789</u> Phone: <u>858-974-3650</u> Email: <u>MSPIMEA@MORROW-MEADOWS.COM</u>	CONSTRUCTOR	100000078	230813	PORTION OF ELECTRICAL AND FIRE ALARM	\$1,089,000			

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	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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ALTERNATE A

ADDITIVE/DEDUCTIVE ALTERNATE	NAME, ADDRESS AND TELEPHONE NUMBER OF SUBCONTRACTOR	CONSTRUCTOR OR DESIGNER	DIR Registration Number	SUBCONTRACTOR LICENSE NUMBER	TYPE OF WORK	DOLLAR VALUE OF SUBCONTRACT	MBE, WBE, DBE, DVBE, OBE, ELBE, SLBE, SDB, WoSB, HUBZone, OR SDVOSB ^①	WHERE CERTIFIED ^②	CHECK IF JOINT VENTURE PARTNERSHIP
A-ITEMS 30	Name: <u>ITI CABLING</u> Address: <u>PO BOX 721025</u> City: <u>SAN DIEGO</u> State: <u>CA</u> Zip: <u>92179</u> Phone: <u>858-240-6670</u> Email: <u>TESSA@ITI-CABLING.COM</u>	CONSTRUCTOR	100001685	849343	PORTION OF INFORMATION TECH	\$605,005	SLBE	CITY	
A-ITEMS 16-29	Name: <u>RBE</u> Address: <u>10765 WOODSIDE AVE, STE E</u> City: <u>SANTEE</u> State: <u>CA</u> Zip: <u>92071</u> Phone: <u>619-440-5758</u> Email: <u>ACCOUNTING@RBE-PAINTING.COM</u>	CONSTRUCTOR	1000030366	591196	PORTION OF PAINTING	\$157,835			

- 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 | State of California's Department of General Services | CADoGS |
| City of Los Angeles | LA | State of California | CA |
| U.S. Small Business Administration | SBA | | |

The Bidder will not receive any subcontracting participation percentages if the Bidder fails to submit the required proof of certification.

SUBCONTRACTORS ADDITIVE/DEDUCTIVE ALTERNATE (USE ONLY WHEN ADDITIVE ALTERNATES ARE REQUIRED)

ALTERNATE A

ADDITIVE/DEDUCTIVE ALTERNATE	NAME, ADDRESS AND TELEPHONE NUMBER OF SUBCONTRACTOR	CONSTRUCTOR OR DESIGNER	DIR Registration Number	SUBCONTRACTOR LICENSE NUMBER	TYPE OF WORK	DOLLAR VALUE OF SUBCONTRACT	MBE, WBE, DBE, DVBE, OBE, ELBE, SLBE, SDB, WoSB, HUBZone, OR SDVOSB ①	WHERE CERTIFIED ②	CHECK IF JOINT VENTURE PARTNERSHIP
A- ITEMS 16-29	Name: <u>A1 FIRE PROTECTION</u> Address: <u>8655 MIRAMAR PL</u> City: <u>SAN DIEGO</u> State: <u>CA</u> Zip: <u>92121</u> Phone: <u>858-623-2738</u> Email: <u>JILL@A1FPI.COM</u>	CONSTRUCTOR	1000002910	388358	PORTION OF FIRE SPRINKLER	\$81,000	ELBE	CITY	
A- ITEMS 16-29	Name: <u>BRADY SOCIAL INC</u> Address: <u>8100 CENTER ST</u> City: <u>LA MESA</u> State: <u>CA</u> Zip: <u>91944</u> Phone: <u>619-462-2600</u> Email: <u>DURSINO@BRADY.COM</u>	CONSTRUCTOR	1000007655	980003	PORTION OF DOORS, FRAMING, ACCESSORIES, CEILING	\$984,413			

- 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 | State of California's Department of General Services | CADoGS |
| City of Los Angeles | LA | State of California | CA |
| U.S. Small Business Administration | SBA | | |

The Bidder will not receive any subcontracting participation percentages if the Bidder fails to submit the required proof of certification.

SUBCONTRACTORS ADDITIVE/DEDUCTIVE ALTERNATE (USE ONLY WHEN ADDITIVE ALTERNATES ARE REQUIRED)

* ALTERNATE A

ADDITIVE/DEDUCTIVE ALTERNATE	NAME, ADDRESS AND TELEPHONE NUMBER OF SUBCONTRACTOR	CONSTRUCTOR OR DESIGNER	DIR Registration Number	SUBCONTRACTOR LICENSE NUMBER	TYPE OF WORK	DOLLAR VALUE OF SUBCONTRACT	MBE, WBE, DBE, DVBE, OBE, ELBE, SLBE, SDB, WoSB, HUBZone, OR SDVOSB	WHERE CERTIFIED	CHECK IF JOINT VENTURE PARTNERSHIP
A-Items 110-29	Name: <u>Alders Engineering</u> Address: <u>1111 6th Ave</u> City: <u>San Diego</u> State: <u>CA</u> Zip: <u>92101</u> Phone: <u>619.836.0088</u> Email: <u>nicholas@aldersengineering.com</u>	CONSULTANT	1000020006	n/a	portion of Commissionary	32,700 14,385	ELBE	CITY	
A-Items 110-29	Name: <u>DLG Contractors</u> Address: <u>PO Box 23601</u> City: <u>Alpine</u> State: <u>CA</u> Zip: <u>91901</u> Phone: <u>619.456.2992</u> Email: <u>desiree.dlgcontractors@gmail.com</u>	CONSTRUCTOR	100009891	988588	portion of bathroom specialties	49,368	ELBE	CITY	

- 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 | State of California's Department of General Services | CADoGS |
| City of Los Angeles | LA | State of California | CA |
| U.S. Small Business Administration | SBA | | |

The Bidder will not receive any subcontracting participation percentages if the Bidder fails to submit the required proof of certification.

ELECTRONICALLY SUBMITTED FORMS

THE FOLLOWING FORMS MUST BE SUBMITTED IN PDF FORMAT WITH BID SUBMISSION

The following forms are to be completed by the bidder and submitted (uploaded) electronically with the bid in PlanetBids.

- A. BID BOND – See Instructions to Bidders, Bidders Guarantee of Good Faith (Bid Security) for further instructions**
- B. CONTRACTOR’S CERTIFICATION OF PENDING ACTIONS**
- C. MANDATORY DISCLOSURE OF BUSINESS INTERESTS FORM**

Bids will not be accepted until ALL the above named forms are submitted as part of the bid submittal

BID BOND

**See Instructions to Bidders, Bidder Guarantee of Good Faith
(Bid Security)**

KNOW ALL MEN BY THESE PRESENTS,

That West Coast General Corporation as Principal, and
Fidelity and Deposit Company of Maryland as Surety, are

held and firmly bound unto The City of San Diego 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.

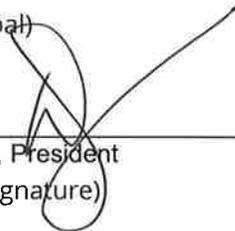
WHEREAS, said Principal has submitted a Bid to said OWNER to perform the WORK required under the bidding schedule(s) of the OWNER's Contract Documents entitled

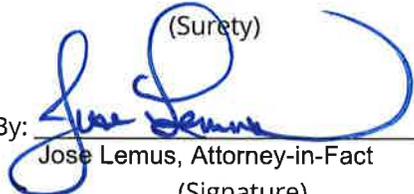
101 Ash St Tenant Improvements, Bid No.: K-18-1586-DBB-3-A

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 5th day of July, 2018

West Coast General Corporation (SEAL) Fidelity and Deposit Company of Maryland (SEAL)

(Principal)
By: 
David E. Davey, President
(Signature)

(Surety)
By: 
Jose Lemus, Attorney-in-Fact
(Signature)

(SEAL AND NOTARIAL ACKNOWLEDGEMENT OF SURETY)

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

STATE OF CALIFORNIA

County of San Diego }

On JUL 05 2018 before me, M. Collett, Notary Public,
Date Insert Name of Notary exactly as it appears on the official seal

personally appeared Jose Lemus

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.



Place Notary Seal Above

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 M. Collett
Signature of Notary Public M. Collett

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: _____

RIGHT THUMBPRINT
OF SIGNER

Top of thumb here

Signer is Representing: _____

Signer's Name: _____

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

RIGHT THUMBPRINT
OF SIGNER

Top of thumb here

Signer is Representing: _____

**ZURICH AMERICAN INSURANCE COMPANY
COLONIAL AMERICAN CASUALTY AND SURETY COMPANY
FIDELITY AND DEPOSIT COMPANY OF MARYLAND
POWER OF ATTORNEY**

KNOW ALL MEN BY THESE PRESENTS: That the ZURICH AMERICAN INSURANCE COMPANY, a corporation of the State of New York, the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY, a corporation of the State of Maryland, and the FIDELITY AND DEPOSIT COMPANY OF MARYLAND a corporation of the State of Maryland (herein collectively called the "Companies"), by **DAVID MCVICKER, Vice President**, in pursuance of authority granted by Article V, Section 8, of the By-Laws of said Companies, which are set forth on the reverse side hereof and are hereby certified to be in full force and effect on the date hereof, do hereby nominate, constitute, and appoint **Richard HALLETT, Aidan SMOCK, Tim MCCLELLAN, Marta COLLETT and Jose LEMUS, all of San Diego, California, EACH** its true and lawful agent and Attorney-in-Fact, to make, execute, seal and deliver, for, and on its behalf as surety, and as its act and deed: **any and all bonds and undertakings**, and the execution of such bonds or undertakings in pursuance of these presents, shall be as binding upon said Companies, as fully and amply, to all intents and purposes, as if they had been duly executed and acknowledged by the regularly elected officers of the ZURICH AMERICAN INSURANCE COMPANY at its office in New York, New York., the regularly elected officers of the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY at its office in Owings Mills, Maryland., and the regularly elected officers of the FIDELITY AND DEPOSIT COMPANY OF MARYLAND at its office in Owings Mills, Maryland., in their own proper persons.

The said Vice President does hereby certify that the extract set forth on the reverse side hereof is a true copy of Article V, Section 8, of the By-Laws of said Companies, and is now in force.

IN WITNESS WHEREOF, the said Vice-President has hereunto subscribed his/her names and affixed the Corporate Seals of the said **ZURICH AMERICAN INSURANCE COMPANY, COLONIAL AMERICAN CASUALTY AND SURETY COMPANY, and FIDELITY AND DEPOSIT COMPANY OF MARYLAND**, this 3rd day of August, A.D. 2017.

ATTEST:

**ZURICH AMERICAN INSURANCE COMPANY
COLONIAL AMERICAN CASUALTY AND SURETY COMPANY
FIDELITY AND DEPOSIT COMPANY OF MARYLAND**



By: 

*Assistant Secretary
Joshua Lecker*



*Vice President
David McVicker*

State of Maryland
County of Baltimore

On this 3rd day of August, A.D. 2017, before the subscriber, a Notary Public of the State of Maryland, duly commissioned and qualified, **DAVID MCVICKER, Vice President, and JOSHUA LECKER, Assistant Secretary**, of the Companies, to me personally known to be the individuals and officers described in and who executed the preceding instrument, and acknowledged the execution of same, and being by me duly sworn, depose and saith, that he/she is the said officer of the Company aforesaid, and that the seals affixed to the preceding instrument are the Corporate Seals of said Companies, and that the said Corporate Seals and the signature as such officer were duly affixed and subscribed to the said instrument by the authority and direction of the said Corporations.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed my Official Seal the day and year first above written.





Constance A. Dunn, Notary Public
My Commission Expires: July 9, 2019

EXTRACT FROM BY-LAWS OF THE COMPANIES

"Article V, Section 8, Attorneys-in-Fact. The Chief Executive Officer, the President, or any Executive Vice President or Vice President may, by written instrument under the attested corporate seal, appoint attorneys-in-fact with authority to execute bonds, policies, recognizances, stipulations, undertakings, or other like instruments on behalf of the Company, and may authorize any officer or any such attorney-in-fact to affix the corporate seal thereto; and may with or without cause modify or revoke any such appointment or authority at any time."

CERTIFICATE

I, the undersigned, Vice President of the ZURICH AMERICAN INSURANCE COMPANY, the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY, and the FIDELITY AND DEPOSIT COMPANY OF MARYLAND, do hereby certify that the foregoing Power of Attorney is still in full force and effect on the date of this certificate; and I do further certify that Article V, Section 8, of the By-Laws of the Companies is still in force.

This Power of Attorney and Certificate may be signed by facsimile under and by authority of the following resolution of the Board of Directors of the ZURICH AMERICAN INSURANCE COMPANY at a meeting duly called and held on the 15th day of December 1998.

RESOLVED: "That the signature of the President or a Vice President and the attesting signature of a Secretary or an Assistant Secretary and the Seal of the Company may be affixed by facsimile on any Power of Attorney...Any such Power or any certificate thereof bearing such facsimile signature and seal shall be valid and binding on the Company."

This Power of Attorney and Certificate may be signed by facsimile under and by authority of the following resolution of the Board of Directors of the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY at a meeting duly called and held on the 5th day of May, 1994, and the following resolution of the Board of Directors of the FIDELITY AND DEPOSIT COMPANY OF MARYLAND at a meeting duly called and held on the 10th day of May, 1990.

RESOLVED: "That the facsimile or mechanically reproduced seal of the company and facsimile or mechanically reproduced signature of any Vice-President, Secretary, or Assistant Secretary of the Company, whether made heretofore or hereafter, wherever appearing upon a certified copy of any power of attorney issued by the Company, shall be valid and binding upon the Company with the same force and effect as though manually affixed.

IN TESTIMONY WHEREOF, I have hereunto subscribed my name and affixed the corporate seals of the said Companies, this ____ day of _____ 20____.

JUL 05 2010



Michael Bond, Vice President

TO REPORT A CLAIM WITH REGARD TO A SURETY BOND, PLEASE SUBMIT ALL REQUIRED INFORMATION TO:

Zurich American Insurance Co.
Attn: Surety Claims
1299 Zurich Way
Schaumburg, IL 60196-1056

CONTRACTOR'S CERTIFICATION OF PENDING ACTIONS

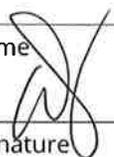
As part of its bid or proposal (Non-Price Proposal in the case of Design-Build contracts), the Bidder shall provide to the City a list of all instances within the past 10 years where a complaint was filed or pending against the Bidder in a legal or administrative proceeding alleging that Bidder discriminated 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: West Coast General Corporation

Certified By David E. Davey Title President
Name

Signature Date 7/9/18

USE ADDITIONAL FORMS AS NECESSARY

MANDATORY DISCLOSURE OF BUSINESS INTERESTS FORM

BIDDER/PROPOSER INFORMATION

Legal Name West Coast General Corporation	DBA		
Street Address 13700 Stowe Drive, Suite 100	City Poway	State CA	Zip 92064
Contact Person, Title David E. Davey, President	Phone (619) 561-4200 ext. 114	Fax (619) 561-4205	

Provide the name, identity, and precise nature of the interest* of all persons who are directly or indirectly involved** in this proposed transaction (SDMC § 21.0103).

* The precise nature of the interest includes:

- the percentage ownership interest in a party to the transaction,
- the percentage ownership interest in any firm, corporation, or partnership that will receive funds from the transaction,
- the value of any financial interest in the transaction,
- any contingent interest in the transaction and the value of such interest should the contingency be satisfied, and
- any philanthropic, scientific, artistic, or property interest in the transaction.

** Directly or indirectly involved means pursuing the transaction by:

- communicating or negotiating with City officers or employees,
- submitting or preparing applications, bids, proposals or other documents for purposes of contracting with the City, or
- directing or supervising the actions of persons engaged in the above activity.

Name David E. Davey	Title/Position President
City and State of Residence Poway, CA	Employer (if different than Bidder/Proposer) Same as noted above
Interest in the transaction	

Name Nicholas W. Walters	Title/Position Vice President/Secretary-Treasurer
City and State of Residence El Cajon, CA	Employer (if different than Bidder/Proposer) Same as noted above
Interest in the transaction	

*** Use Additional Pages if Necessary ***

Under penalty of perjury under the laws of the State of California, I certify that I am responsible for the completeness and accuracy of the responses contained herein, and that all information provided is true, full and complete to the best of my knowledge and belief. I agree to provide written notice to the Mayor or Designee within five (5) business days if, at any time, I learn that any portion of this Mandatory Disclosure of Business Interests Form requires an updated response. Failure to timely provide the Purchasing Agent with written notice is grounds for Contract termination.

David E. Davey, President		7/10/18
Print Name, Title	Signature	Date

Failure to sign and submit this form with the bid/proposal shall make the bid/proposal non-responsive. In the case of an informal solicitation, the contract will not be awarded unless a signed and completed Mandatory Disclosure of Business Interests Form is submitted.

: LIST OF TIERED SUBCONTRACTORS

Pursuant to California Senate Bill 96 and in accordance with the requirements of Labor Code sections 1771.1 and 1725.5, by submitting a bid or proposal to the City, Contractor is certifying that he or she has verified that all subcontractors used on this public work project are registered with the California Department of Industrial Relations (DIR). **The Bidder is to list below the name, address, license number, DIR registration number of any Subcontractor - regardless of tier - who will perform work, labor, render services or specially fabricate and install a portion [type] of the work or improvement pursuant to the contract.**

NAME, ADDRESS AND TELEPHONE NUMBER OF SUBCONTRACTOR	CONSTRUCTOR OR DESIGNER	DIR REGISTRATION NUMBER	SUBCONTRACTOR LICENSE NUMBER	TYPE OF WORK
Name: <u>Red Hawk Fire & Security</u> Address: <u>970 South Andreasen Dr.</u> City: <u>Escondido, CA 92029</u> State: <u>CA</u> Zip: <u>92029</u> Phone: <u>760.233.9787</u> Email: <u>gary.krauss@redhawkus.com</u>	CONSTRUCTOR	1000006967	713099	portion of fire alarm
Name: _____ Address: _____ City: _____ State: _____ Zip: _____ Phone: _____ Email: _____				
Name: _____ Address: _____ City: _____ State: _____ Zip: _____ Phone: _____ Email: _____				
Name: _____ Address: _____ City: _____ State: _____ Zip: _____ Phone: _____ Email: _____				

**** USE ADDITIONAL FORMS AS NECESSARY ****

City of San Diego

CITY CONTACT: Angelica Gil, Contract Specialist, Email: AGil@sandiego.gov
Phone No. (619) 533-3622

ADDENDUM C



FOR

101 ASH ST TENANT IMPROVEMENTS

BID NO.: K-18-1586-DBB-3-A
SAP NO. (WBS/IO/CC): S-17009
CLIENT DEPARTMENT: 1613
COUNCIL DISTRICT: 3
PROJECT TYPE: BS

BID DUE DATE:

**2:00 PM
JULY 12, 2018
CITY OF SAN DIEGO
PUBLIC WORKS CONTRACTS
525 B STREET, SUITE 750, MS 908A
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.

B. BIDDER'S QUESTIONS

- Q1. The Builder's Risk Insurance requirements only require coverage for the "work". The scope of the "work" does not include any portion or possibly very limited portions of the structure. Please confirm bidders have no requirement to cover any portion of the building other than the interior improvement ("the work"). Please also confirm coverage for those other portions of the building not included in "the work" is being supplied by another responsible party other than the bidders. If the City indicates the bidders must also include replacement costs for those portions of the building not a part of "the work" in their Builders Risk coverage, then the value of that additional replacement cost must be provided to the bidders – there is no credible way to determine the value of that portion of the building not covered under "the work".
- A1. The project's Scope Of Work require work outside the building, therefore, Builder's Risk Insurance requirements apply. Other vendors accessing the building during construction will carry its own insurances. General Contractor is only responsible to insure the portion of work they are responsible for.

James Nagelvoort, Director
Public Works Department

Dated: *July 3, 2018*
San Diego, California

JN/RWB/egz

ENGINEER OF WORK

The engineering Specifications and Special Provisions contained herein have been prepared by or under the direction of the following Registered Architect:

Thomas P. Heffernan

June 25, 2018

Seal:



1) Registered Architect

Date

Jason D. Grani

6/27/18

Seal



2) For City Engineer

Date

Nikki Damian Lewis

6/27/18

Seal



3) For City Engineer

Date

(for Right-of Way Improvements Only)

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. BIDDER'S QUESTIONS

Q1. What levels of the building have been completely abated for asbestos and other hazardous materials? What is necessary?

A1. There is no records of areas been completely abated for asbestos or hazardous materials. See Appendix F - Section 1.1 for required abatement.

Q2. Is complete asbestos abatement necessary on all floors? To what extent?

A2. No. See Appendix F - Section 1.1 for required abatement.

Q3. In the interstitial space above the ceilings, in some cases, being used as return air plenum, has the asbestos been encapsulated? On all floors?

A3. There are no records indicating if and where fireproof has been encapsulated.

Q4. Is encapsulation required over the exposed sprayed fireproofing that is not being disturbed within the containments?

A4. No.

Q5. Sheet A01.004 (and others), General note D states Plan shows portions of ceiling scope. There are gray and white areas. Do either of these areas represent ceiling demo?

A5. Ceiling demolition scope identified on sheets A00.601A-A00.619. Not in contract hatch is the same between demo plans and RCP demo plans. That is just a coordinating note.

Q6. Have preliminary air clearance tests been performed throughout this building to ensure there are no current hazardous elements that will affect workers outside of the containments?

A6. No.

- Q7. Please provide Chain Link Fencing spec.
- A7. Per City Standard Drawings SDM-112, SDM-114 and M-20.
- Q8. Please provide interior and exterior signage specs.
- A8. Signage by others.
- Q9. Please provide parking striping spec.
- A9. Per City Standard Drawings SDM-117.
- Q10. 92/A02.201B: Please provide details and spec for seismic joint replacement.
- A10. Seismic joint cover only will be replaced to match existing in existing location. Height not to exceed ¼" per note #92, sheet A02.201B.
- Q11. 80/A02.202A: What is the existing construction of the ramp to be modified and please provide details? Not shown on the General sheets as stated.
- A11. Ramp will be replaced per details provided 6, 7, 8 & 9 per Addendum B. Existing raised flooring system landing will remain per Addendum B details.
- Q12. Please provide FRP spec. Lorraine and Aaron – Confirm that this information is no longer required as the entire ramp on 2nd floor will have to be reconstructed.
- A12. FRP specification provided detail 11/A07.100. Marlite Standard-pebble surface.
- Q13. Please provide Fire Sprinkler and Fire Alarm specs.
- A13. Existing Fire Sprinkler and Fire Alarm systems' As-built information can be found at: <https://filecloud.sandiego.gov/ui/core/index.html?mode=public#expl-tabl./SHARED/rtobchi/HleZhktGahvFcKph/As-Builts-Fire%20Alarm%20System>

Q14. Appendix B submittal check list requires states that, at the time of bid, the Abatement Contractor shall submit the following:

With bid documents. ABATEMENT CONTRACTOR shall submit:

- Two projects within the past five (5) years that are similar to scope of this project
 - Project name
 - Address
 - Contact person name and phone #
 - Scope of work
 - Dates of projects
 - Name of monitoring company, contact, and phone #

- Signed & notarized statement disclosing all OSHA and EPA citations, violations and/or criminal or civil convictions in the past (3) years

Please clarify if this is required at the time of bid, or after award.

A14. Documents are due at the time of bid.

Q15. Reference Supplementary Special Provisions 2-3-2. Please confirm that RESEVED means that all self-performance requirements have been waived on this project.

A15. Confirmed. Since this project requires a B license, the self-performance has been waived.

Q16. What was the original year(s) of construction for this building?

A16. 1967.

Q17. Are there any move out / move in and/or storage requirements that are the responsibility of the Contractor?

A17. Furniture vendor will disassemble and move out existing furniture and moveable partitions. Contractor is responsible to coordinate with furniture vendor and to provide on-site storage for furniture.

Q18. Is temporary construction fencing required on this project?

A18. Temporary construction fencing shall be part of contractor's means and methods.

Q19. Will a secure space for the contractor's construction office be provided within the building in an area of no work?

A19. Any area within the area of work.

Q20. The bid is broken up into thirty (30) separate line items to provide pricing for. This is much too cumbersome and convoluted for the short amount of time there is on the bid day, and invites errors. Since the award will be made on the Base Bid and Alternate A (as a whole), and not based on the pricing of each line item of Alternate A, a more practical approach is to have the Contractor provide a lump sum for Alternate A, and have the breakdown by line item due within twenty four (24) hours of the bid time. Please advise.

A20. Bids are to be submitted per bidding instructions.

Q21. Notice Inviting Bids, 10.4 and 10.5 states that, 10.4-the low bid will be determined by the Base Bid plus all Alternates, and 10.5, Once the low bid has been determined, the City may, at its sole discretion, award the contract for the base bid alone: or for the base bid plus one or more of the alternates.

If the alternate is awarded in its entirety, or is the City going to pick and choose between the alternate's line items and only award a portion of them if the bids exceed the City's budget for the entire alternate?

A21. City may, at its sole discretion, award the contract for the Base bid alone; or for the Base Bid plus the Additive Alternate A.

Q22. The handrails in the stairwells are not in compliance with current codes. How is the City viewing this issue as part of the TI?

A22. Only items identified in the Solicitation documents are to be demolished, constructed, and/or modified.

Q23. Is moving and storage of all of the FF&E, along with the demountable partitions, the responsibility of the City's furniture vendor?

A23. Yes, contractor responsible to coordinate the logistics and on-site storage of these items.

Q24. A02.702B shows (2) Carpet schedule reference numbers side by side. Will CP-3 or CP-4 be used in this section? Please Clarify.

A24. Use CP-4 throughout the floor.

- Q25. Please Confirm that the Entire 17th, 18th, & 19th is to be re-carpeted per the plans.
- A25. Confirmed.
- Q26. Sheet G00.001, Scope of work states that there is no work on the 3rd Floor, however per the plans it seems that there is major changes to the 3rd floor. Please clarify?
- A26. Refer to Architectural, Structural, Mechanical, Electrical, and Plumbing sheets for 3rd floor scope of work. Disregard information pertaining the 3rd floor's scope of work in sheet G00.001.
- Q27. Sheet A02.603, Reflected Ceiling Plans shows new ceiling grid to be placed but with no Type mark or description per the finish schedule. Please provide the Type Mark required per this sheet. Same Note is on Both Plan Sets.
- A27. Use ACT-6 at finish schedule, 2x4 format.
- Q28. What do the white versus gray areas represent on the plans. For Example see sheet, A02.614. We are assuming that the Grey areas are out of contract and all the white areas are in contract. If this is accurate, what scope of work is in these white areas if nothing is shown, please clarify?
- A28. White = architectural scope of work, Grey = architectural NIC – reference all sheets to see where work occurs (demolition, power, etc.). Reference MEP and Structural for scope related to their plans, the shading applies to Architectural sheets only.
- Q29. PT-01 by definition states, Two (2) Coats of Eggshell Latex Paint over one (1) coat of Latex Primer. Flat Finish at Gypsum Ceilings, Semi-Gloss Finish at Doors, Door Frames and Wood Base per plan. When PT-01 is being called out throughout a floor U.N.O. (See Sheet A02.703), is the contractor required to paint all the existing ceiling, walls, doors, frames, and wood wall base on the entire floor? Please clarify?
- A29. Yes, Reference keynote 10 /12 on finish plans, and door schedule for further clarification of new paint locations.

- Q30. Sheet A02.701A Enlarged Breakroom 116 and Plan view of breakroom 116 show conflicting painting type marks, please clarify which is accurate per this sheet?
- A30. Paint should be PT-04 at 116.
- Q31. It is clear that the reflective ceiling demolition plan does NOT call out all the ceiling demolition and or remove and replacement of ceiling tiles required for the asbestos abatement scope of work. Please provide plan sheets that show all areas of ceiling to be removed and replaced for all scopes of work up to and including Framing, Electrical, Plumbing, HVAC, where asbestos abatement is required. The reflective ceiling plan shows little to no reflective ceiling demolition throughout floors 4 – 16 and it is clear per the Asbestos Abatement report that all work that takes place above the ceiling grid or gypsum walls will require abatement.
- A31. Any demolition required for asbestos abatement is not reflected in Construction Drawings, and it is to be allocated to the abatement scope of work.
- Q32. On the reflected ceiling plan there is a note I, that states “all existing damaged grilles shall be replaced with new”. Please identify the quantity or percentage of what the City believes are damaged.
- A32. Omit note I.
- Q33. Detail 1/S800 shows doweling into an existing elevated slab that is 5-1/2” thick. Is this slab a post tension slab?
- A33. Not post-tensioned.
- Q34. Is the existing Sidewalk to be removed on sheet D-1, poured monolithically with the existing curb and gutter, please clarify?
- A34. See City of San Diego Standard Drawing SDG-155, SDG-156, SDG-159, SDG-162.
- Q35. Please provide Details and Manufacturer to provide the Tree Grates on Sheet C-1?
- A35. See City of San Diego Standard Drawing SDL-104.

- Q36. Please provide what type of 24" Box tree is to be placed per Sheet C-1?
- A36. Podocarpus gracilior
- Q37. Will the City consider adding a mobilization bid item? Otherwise we will have to split these costs across multiple bid items and floors.
- A37. Mobilization and Demobilization costs can be reflected in the Schedule of Value per Whitebook Section 9-2.1 Schedule of Values (SOV).
- Q38. Please advise if the City will require a 28 day review period for all submittals or if since the project is a short duration if it will reduce its review period for submittals.
- A38. The City will require the standard review period as indicated in contract documents. Contractor may provide the submittals to the City upon issuance of the Limited Notice To Proceed (LNTP).
- Q39. In Addendum A dated June 26, 2018 page 7 of 41 Relocate IDF's (Additive Alternate). Please clarify which rooms these IDF's are going and whether we can re-use the existing racks, cable management and Category 6 patch panels.
- A39. IDF rooms are not relocated but reconfigured base architectural drawings. Existing infrastructure may be re-used.
- Q40. In Addendum A dated June 26, 2018 page 7 of 41 Install new OS2 single mode fiber to each IDF from the 4th floor MDF. Please clarify how many strands of fiber we are to install.
- A40. 12-strands of fiber from 4th floor IDF to each floor.
- Q41. In Addendum A dated June 26, 2018 page 10 of 41 8th floor (Additive Alternate) states for electrical circuits within 3 feet of the network racks and cabinets (this is mentioned in multiple places). Please clarify if we are installing cabinets in the IDF's.
- A41. No cabinets will be installed, there are existing racks that can be re-used. There is existing power infrastructure that can be reused.

- Q42. In Addendum A dated June 26, 2018 page 13 of 41 18th Floor (Base Bid) states contractor will need to identify where the fibers from the 18th floor IDF go to the 4th Floor MDF (same with 19th Floor). Please clarify as stated earlier on page 7 of 41 that we are to install new OS2 SM fiber to each IDF from the 4th Floor MDF as compared to identifying the existing fiber.
- A42. - 18th Floor, Fiber is fed from the electrical room to the 4th Floor MDF. Install new OS2 SM (12) strands from the 18th floor to the 4th Floor MDF.
- 19th Floor, Fiber is fed from the electrical room to the 4th Floor MDF. Install new OS2 SM (12) strands from the 19th floor to the 4th Floor MDF.
- Q43. In Addendum A dated June 26, 2018 page 16 of 41 4-post Cabinet Rack. Please clarify if we are to install 4-post Cabinet Racks in any of the IDF's, MDF or Data Center.
- A43. There should be no 4-post cabinets installed in the IDF's, MDF's, or Data Center. Existing racks and infrastructure should be used.
- Q44. In Addendum A dated June 26, 2018 page 17 of 41 Cabling Standards list 1. 1-Gigabit Ethernet over Copper Category 6 Cabling and 2. 10-Gigabit Ethernet over copper Category 6A. Please clarify if we are to use Category 6 or 6A for this install.
- A44. Use Category 6A
- Q45. In Addendum A dated June 26, 2018 page 19 of 41 Products 2.1 Fiber Optic Cable. The fiber cable that is listed is a outdoor rated fiber. Please clarify if we can use a 12-strand OS2 single mode plenum interlocking armor fiber optic cable from the MDF to the IDF's.
- A45. Yes, it may be used.
- Q46. Please clarify if we are to provide copper and fiber patch cords. If so, can we please get the quantities?
- A46. Yes. One-hundred fourteen (114), LC to LC SMF, 5 meters, One-hundred fourteen (114), SC to LC SMF, 5 meters.
- Q47. In Addendum A dated June 26, 2018 page 36 of 41 Chatsworth ladder rack. Please clarify if we are to use ladder rack or cable tray pages 37

thru 41 for the IDF build-out and whether cable tray is required in the open office area.

- A47. Cable tray is not required in the open office area. If additional cable tray is necessary, please use that is listed on pages 37 through 41 to maintain compatibility with existing ladder rack/cable tray infrastructure.

C. INSTRUCTIONS TO BIDDERS

1. To Section 14, Subcontractor Information, Subsection 14.1., Listing of Subcontractors, **ADD** the following:

Additionally, pursuant to California Senate Bill 96 and in accordance with the requirements of Labor Code sections 1771.1 and 1725.5, by submitting a bid or proposal to the City, Contractor is certifying that he or she has verified that all subcontractors used on this public work project are registered with the California Department of Industrial Relations (DIR). **The Bidder shall provide the name, address, license number, DIR registration number of any Subcontractor - regardless of tier** - who will perform work, labor, render services or specially fabricate and install a portion [type] of the work or improvement pursuant to the contract.

D. ATTACHMENTS

1. To Attachment D, Prevailing Wages, Section 1., Prevailing Wage Rates, Subsection 1.11., List of all Subcontractors, **DELETE** in its entirety and **SUBSTITUTE** with the following:

1.11. List of all Subcontractors: The Contractor shall provide the list of subcontractors (regardless of tier), along with their DIR registration numbers, utilized on this Contract prior to any work being performed; and the Contractor shall provide a complete list of all subcontractors with each invoice. Additionally, Contractor shall provide the City with a complete list of all subcontractors (regardless of tier) utilized on this contract within ten working days of the completion of the contract, along with their DIR registration numbers. The City shall withhold final payment to Construction

Management Professional until at least thirty (30) days after this information is provided to the City

E. SUPPLEMENTARY SPECIAL PROVISIONS

1. To Attachment E, Technicals, Section 09 61 13 Vapor Control Flooring Treatment, page 302 through page 308, **DELETE** in its entirety.
2. To Attachment E, Technicals, Sections: 01 01 10 Table of Contents, pages 52 to 55; Section 01 10 00 Summary, pages 56 to 57; Section 03 30 00 Cast-In-Place Concrete, pages 361 to 382; Section 09 91 23 Interior Painting, pages 333 to 344; Section 22 11 16 Domestic Water Piping, pages 415 to 421; Section 23 07 13 Duct Installation, pages 473 to 490; Section 26 05 33 Raceways and Boxes for Electrical Systems, pages 552 to 558; Section 26 09 23 Lighting Control Devices, pages 566 to 573; and, Section 26 09 26 Lighting Control Panelboards, pages 574 to 582; **DELETE** in their entirety and **SUBSTITUTE** with pages 15 through 102 of this Addendum.
3. To Attachment E, Technical Specifications, **ADD Sections:** Section 05 52 13 Pipe and Tube Railings, Section 07 01 50.71 Built-Up Roofing Repair, Section 10 44 00 Fire Protection Specialties, pages 103 through 117 of this Addendum.

E. CERTIFICATIONS AND FORMS

1. To Electronically Submitted Forms, **ADD** List of Tiered Subcontractors, page 118 of this addendum.

F. ADDITIONAL CHANGES

1. The following are additional changes to the Line Items in the PlanetBids Tab:

For clarity where applicable, **ADDITIONS**, if any, have been **Underlined** and **DELETIONS**, if any, have been **Stricken out**.

Section	Item Code	Description	UoM	Quantity	Payment Reference	Extension
						Only for AL

G. PLANS

1. To Drawings numbered 40154-03-D, 40154-06-D through 40154-27-D, 40154-32-D, 40154-35-D, 40154-57-D, 40154-64-D, 40154-69-D through 40154-71-D, 40154-80-D, 40154-82-D, 40154-122-D through 40154-142-D, 40154-144-D, 40154-145-D, 40154-164-D, 40154-167-D, 40154-170-D, through 40154-172-D, 40154-175-D, 40154-186-D, 40154-200-D, 40154-201-D, 40154-203-D through 40154-206-D, 40154-211-D, 40154-218-D through 40154-221-D, 40154-223-D through 40154-226-D, 40154-231-D, 40154-232-D, 40154-239-D, 40154-240-D, 40154-244-D, 40154-248-D, 40154-266-D, 40154-267-D, 40154-269-D, 40154-279-D, 40154-280-D, 40154-281-D, 40154-282-D, 40154-320-D, 40154-325-D, 40154-329-D, 40154-331-D, 40154-334-D, 40154-337-D, 40154-340-D, 40154-343-D, 40154-345-D, 40154-347-D, 40154-350-D, 40154-353-D, 40154-356-D, 40154-359-D, 40154-362-D, 40154-365-D, 40154-368-D, 40154-370-D, 40154-372-D, 40154-377-D, **DELETE** in their entirety and **REPLACE** with pages 119 through 222 of this Addendum.

James Nagelvoort, Director
Public Works Department

Dated: *June 29, 2018*
San Diego, California

JN/AJ/egz

LIST OF TIERED SUBCONTRACTORS

Pursuant to California Senate Bill 96 and in accordance with the requirements of Labor Code sections 1771.1 and 1725.5, by submitting a bid or proposal to the City, Contractor is certifying that he or she has verified that all subcontractors used on this public work project are registered with the California Department of Industrial Relations (DIR). **The Bidder is to list below the name, address, license number, DIR registration number of any Subcontractor – regardless of tier - who will perform work, labor, render services or specially fabricate and install a portion [type] of the work or improvement pursuant to the contract.**

NAME, ADDRESS AND TELEPHONE NUMBER OF SUBCONTRACTOR	CONSTRUCTOR OR DESIGNER	DIR REGISTRATION NUMBER	SUBCONTRACTOR LICENSE NUMBER	TYPE OF WORK
Name: _____ Address: _____ City: _____ State: _____ Zip: _____ Phone: _____ Email: _____				
Name: _____ Address: _____ City: _____ State: _____ Zip: _____ Phone: _____ Email: _____				
Name: _____ Address: _____ City: _____ State: _____ Zip: _____ Phone: _____ Email: _____				
Name: _____ Address: _____ City: _____ State: _____ Zip: _____ Phone: _____ Email: _____				

**** USE ADDITIONAL FORMS AS NECESSARY ****

Addendum 'B' June 25, 2018

TABLE OF CONTENTS	
<i>ITEMS DATED IN BOLD ON TABLE OF CONTENTS ARE NEW OR REVISED IN THIS ISSUE</i>	
<i>Document Issue Description</i>	<i>Issue Date</i>
In progress	In Progress
100% Construction Documents for bid / permit	09/07/17
ADDENDUM 'B'	06/25/18

PROCUREMENT AND CONTRACTING REQUIREMENTS GROUP

DIVISION 00 - PROCUREMENT AND CONTRACTING REQUIREMENTS

INTRODUCTORY INFORMATION

<i>Date</i>	<i>Document No.</i>	<i>Title</i>
	00 01 03	Consultants Directory
	00 01 10	Table of Contents

SPECIFICATIONS GROUP

GENERAL REQUIREMENTS SUBGROUP

DIVISION 01 - GENERAL REQUIREMENTS

<i>Date</i>	<i>Section No.</i>	<i>Title</i>
	01 10 00	Summary
	01 14 00	Work Restrictions
	01 23 00	Alternates
	01 25 00	Substitution Procedures – REFERENCE GREENBOOK AND WHITEBOOK SECTION 4-1.6
	01 26 00	Contract Modification Procedures – REFERENCE GREENBOOK AND WHITEBOOK SECTION 3
	01 26 13	Requests for Information (RFI)
	01 29 00	Payment Procedures – REFERENCE WHITEBOOK SECTION 9
	01 31 00	Project Management and Coordination
	01 32 00	Construction Progress Documentation
	01 32 33	Photographic Documentation
	01 33 00	Submittal Procedures
	01 40 00	Quality Requirements
	01 42 00	References
	01 46 00	Seismic Design Requirements for Nonstructural Systems
	01 50 00	Temporary Facilities and Controls
	01 60 00	Product Requirements
	01 73 00	Execution
	01 73 40	Renovation Design Guidelines
	01 74 19	Construction Waste Management and Disposal

01 77 00	Closeout Procedures – REFERENCE GREENBOOK AND WHITEBOOK SECTIONS 6-7 AND 6-8.
01 81 23	Cal Green Requirements
01 91 13	General Commissioning Requirements

FACILITY CONSTRUCTION SUBGROUP

DIVISION 02 - EXISTING CONDITIONS

<i>Date</i>	<i>Section No.</i>	<i>Title</i>
	02 41 19	Selective Demolition

DIVISION 03 – CONCRETE

<i>Date</i>	<i>Section No.</i>	<i>Title</i>
	03 30 00	Cast-In-Place Concrete (REVISED)

DIVISION 04 – MASONRY - Not used

DIVISION 05 – METALS

<i>Date</i>	<i>Section No.</i>	<i>Title</i>
	05 50 00	Metal Fabrications
	05 52 13	Pipe and Tube Railings (NEW)

DIVISION 06 - WOOD, PLASTICS, AND COMPOSITES

<i>Date</i>	<i>Section No.</i>	<i>Title</i>
	06 10 53	Miscellaneous Rough Carpentry
	06 40 23	Interior Architectural Woodwork

DIVISION 07 - THERMAL AND MOISTURE PROTECTION

<i>Date</i>	<i>Section No.</i>	<i>Title</i>
	07 01 50.71	Built-up Roofing Repair (NEW)
	07 84 13	Penetration Firestopping
	07 84 43	Joint Firestopping
	07 92 00	Joint Sealants

DIVISION 08 - OPENINGS

<i>Date</i>	<i>Section No.</i>	<i>Title</i>
	08 12 13	Hollow Metal Doors and Frames
	08 14 16	Flush Wood Doors
	08 31 13	Access Doors and Frames
	08 71 00	Door Hardware
	08 80 00	Glazing

DIVISION 09 - FINISHES

<i>Date</i>	<i>Section No.</i>	<i>Title</i>
	09 22 16	Non-Structural Metal Framing
	09 29 00	Gypsum Board

09 30 00	Tiling
09 30 33	Stone Tiling
09 51 13	Acoustical Panel Ceilings
09 61 43	Vapor Control Flooring Treatment (DELETED)
09 65 13	Resilient Base and Accessories
09 68 13	Tile Carpeting
09 72 00	Wall Coverings
<u>09 91 23</u>	<u>Interior Painting</u> (REVISED)

DIVISION 10 - SPECIALTIES

<i>Date</i>	<i>Section No.</i>	<i>Title</i>
	10 21 13	Toilet Compartments
	10 26 00	Wall and Door Protection

10 44 00 **Fire-Protection Specialties** (NEW)

DIVISION 11 - EQUIPMENT - Not Used

DIVISION 12 - FURNISHINGS

<i>Date</i>	<i>Section No.</i>	<i>Title</i>
	12 24 13	Roller Window Shades
	12 48 53	Area Rugs
	12 64 13	Banquette Seating

DIVISION 13 - SPECIAL CONSTRUCTION - Not Used

DIVISION 14 - CONVEYING EQUIPMENT - Not Used

DIVISIONS 15 through 19 - Reserved

DIVISION 20 - Reserved

DIVISION 21 - FIRE SUPPRESSION - Not Used

DIVISION 22 - PLUMBING

<i>Date</i>	<i>Section No.</i>	<i>Title</i>
	22 05 17	Sleeves and Sleeve Seals for Plumbing Piping
	22 05 18	Escutcheons for Plumbing Piping
	22 05 23.12	Ball Valves for Plumbing Piping
	22 05 29	Hangers and Supports for Plumbing Piping and Equipment
	22 05 53	Identification for Plumbing Piping and Equipment
	22 07 19	Plumbing Piping Insulation

22 11 16 **Domestic Water Piping** (REVISED)

22 13 16	Sanitary Waste and Vent Piping
22 13 19	Sanitary Waste Piping Specialties
22 33 00	Electric, Domestic – Water Heaters
22 42 16.16	Commercial Sinks

**DIVISION 23 - HEATING, VENTILATING AND AIR
CONDITIONING**

Date	Section No.	Title
	23 05 53	Identification for HVAC piping and equipment
	23 05 93	Testing, adjusting and balancing for HVAC
	<u>23 07 13</u>	<u>Duct Insulation</u> (REVISED)
	23 31 13	Metal Ducts
	23 33 00	Air duct accessories
	23 33 46	Flexible Ducts
	23 37 13.13	Air diffusers
	23 37 13.23	Registers and grilles
	23 37 23	HVAC Gravity Ventilators

DIVISION 24 - Reserved

DIVISION 25 - INTEGRATED AUTOMATION - Not Used

DIVISION 26 - ELECTRICAL

<i>Date</i>	<i>Section No.</i>	<i>Title</i>
	26 05 19	Low-voltage electrical power conductors and cables
	26 05 26	Grounding and bonding for electrical systems
	26 05 29	Hangers and supports for electrical systems
	<u>26 05 33</u>	<u>Raceways and boxes for electrical systems</u> (REVISED)
	26 05 53	Identification for electrical systems
	<u>26 09 23</u>	<u>Lighting control devices</u> (REVISED)
	<u>26 09 26</u>	<u>Lighting control Panelboards</u> (REVISED)
	26 24 16	Panelboards
	26 27 26	Wiring devices
	26 28 16	Enclosed switches and circuit breakers
	26 51 19	LED interior lighting
	26 52 13	Emergency and exit lighting

Addendum 'B' June 25, 2018

SECTION 01 10 00 - SUMMARY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Work covered by Contract Documents.
2. Work under separate contracts.
3. Miscellaneous provisions.
4. Owner's '**WHITEBOOK**' is incorporated by reference to the project manual.

- B. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to all Sections. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all. See **WHITEBOOK 2-5.2, pages 15-16.**

1.2 WORK COVERED BY CONTRACT DOCUMENTS

A. The Work of Project is defined by the Contract Documents and consists of the following:

1. Selective demolition of existing construction as indicated on Drawings.
2. Construction of interior tenant facilities within an existing building.

- B. Type of Contract: Project will be constructed under a single prime contract with the addition of separate specialty contracts described below.

1.3 WORK UNDER SEPARATE CONTRACTS See WHITEBOOK 2-14

A. General: Owner will award separate contracts for performance of certain construction activities at the Project site. The activities may occur prior to commencement of Work under this Contract, concurrent with the Work under this Contract, or as future work.

1. Cooperate fully with separate contractors so work on those contracts may be carried out smoothly, without interfering with or delaying work under this Contract or other contracts.
2. Coordinate the Work of this Contract with work performed under separate contracts, including furniture vendor GMBI

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 10 00

Addendum 'B' June 25, 2018

SECTION 03 30 00 - CAST-IN-PLACE CONCRETE

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: cast-in place concrete, including formwork, reinforcement, concrete materials, mix design, placement procedures, and finishes for the Mesa College Student Services Building Only.

1.3 DEFINITIONS

- A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash and other pozzolans, ground granulated blast-furnace slag, and silica fume; subject to compliance with requirements.

1.4 SUBMITTALS

- A. Product Data: For each type of manufactured material and product indicated.

CAST-IN-PLACE CONCRETE

B. Design Mixes: For each concrete mix. Submit alternate mix designs when characteristics of materials, project conditions, weather, test results, or other circumstances warrant adjustments.

1. Indicate amounts of mixing water to be withheld for later addition at Project site
2. Submit shrinkage test results with mix design for approval.

C. Steel Reinforcement Shop Drawings: Details of fabrication, bending, and placement, prepared according to ACI 315, "Details and Detailing of Concrete Reinforcement." Include material, grade, bar schedules, stirrup spacing, bent bar diagrams, arrangement, and supports of concrete reinforcement. Include special reinforcement required for openings through concrete structures.

D. Formwork Shop Drawings: Prepared by or under the supervision of a qualified professional engineer detailing fabrication, assembly, and support of formwork. Design and engineering of formwork are Contractor's responsibility.

1. Shoring and Reshoring: Indicate proposed schedule and sequence of stripping formwork, shoring removal, and installing and removing reshoring.

E. Welding Certificates: Copies of certificates for welding procedures and personnel.

F. Samples: For waterstops, vapor retarder.

G. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated, based on comprehensive testing of current materials:

H. Material Certificates: Signed by manufacturers certifying that each of the following items complies with requirements:

1. Cementitious materials and aggregates.
2. Form materials and form-release agents.
3. Steel reinforcement and reinforcement accessories.
4. Fiber reinforcement.
5. Admixtures.
6. Waterstops.
7. Curing materials.
8. Floor and slab treatments.
9. Bonding agents.
10. Adhesives.
11. Vapor retarders.
12. Epoxy joint filler.
13. Joint-filler strips.
14. Repair materials.

I. Minutes of preinstallation conference.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has completed concrete Work 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. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for formwork and shoring and reshoring installations that are similar to those indicated for this Project in material, design, and extent.
- C. 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.
 - 1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."
- D. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated, as documented according to ASTM E 548.
 - 1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-01 or an equivalent certification program.
 - 2. Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician - Grade I. Testing Agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician - Grade II.
- E. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, each aggregate from one source, and each admixture from the same manufacturer.
- F. Welding: Qualify procedures and personnel according to AWS D1.4, "Structural Welding Code--Reinforcing Steel."
- G. ACI Publications: Comply with the following, unless more stringent provisions are indicated:
 - 1. ACI 301, "Specification for Structural Concrete."
 - 2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."
- H. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."
 - 1. Before submitting design mixtures, review concrete design mixture and examine procedures for ensuring quality of concrete materials. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:
 - a. Contractor's superintendent.

- b. Independent testing agency responsible for concrete design mixtures.
 - c. Ready-mix concrete manufacturer.
 - d. Concrete subcontractor.
2. Review special inspection and testing and inspecting agency procedures for field quality control, concrete finishes and finishing, cold- and hot-weather concreting procedures, curing procedures, construction contraction and isolation joints, and joint-filler strips, semirigid joint fillers, forms and form removal limitations, shoring and reshoring procedures, vapor-retarder installation, anchor rod and anchorage device installation tolerances, steel reinforcement installation, floor and slab flatness and levelness measurement, concrete repair procedures, and concrete protection.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle steel reinforcement to prevent bending and damage.
 1. Avoid damaging coatings on steel reinforcement.
 2. Repair damaged epoxy coatings on steel reinforcement according to ASTM D 3963/D 3963M.
- B. Waterstops: Store waterstops under cover to protect from moisture, sunlight, dirt, oil, and other contaminants.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products specified.
 2. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.

2.2 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.
 1. Plywood, metal, or other approved panel materials.
 2. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:
 - a. High-density overlay, Class 1, or better.

- b. Medium-density overlay, Class 1, or better, mill-release agent treated and edge sealed.
 - c. Structural 1, B-B, or better, mill oiled and edge sealed.
 - d. B-B (Concrete Form), Class 1, or better, mill oiled and edge sealed.
- B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.
- C. Forms for Cylindrical Columns, Pedestals, and Supports: Metal, glass-fiber-reinforced plastic, paper, or fiber tubes that will produce surfaces with gradual or abrupt irregularities not exceeding specified formwork surface class. Provide units with sufficient wall thickness to resist plastic concrete loads without detrimental deformation.
- D. Void Forms: Biodegradable paper surface, treated for moisture resistance, structurally sufficient to support weight of plastic concrete and other superimposed loads.
- E. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch, minimum.
- F. 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.
- 1. Formulate form-release agent with rust inhibitor for steel form-facing materials.
- G. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
- 1. Furnish units that will leave no corrodible metal closer than 1 inch to the plane of the exposed concrete surface.
 - 2. Furnish ties that, when removed, will leave holes not larger than 1 inch in diameter in concrete surface.

2.3 STEEL REINFORCEMENT

- A. Recycled Content of Steel Products: Provide products with an average recycled content of steel products so postconsumer recycled content plus one-half of preconsumer recycled content is not less than 25 percent.
- B. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.
- C. Low-Alloy-Steel Reinforcing Bars: ASTM A 706/A 706M, deformed.
- D. Galvanized Reinforcing Bars: ASTM A 767, hot-dip galvanized after fabrication and bending, of reinforcement type and zinc coating as follows:
- 1. Steel Reinforcement: ASTM A 615, Grade 60, deformed.
 - 2. Steel Reinforcement: ASTM A 706, deformed.
- E. Galvanized Plain-Steel Welded Wire Fabric: ASTM A 185, fabricated from galvanized steel wire into flat sheets.

2.4 REINFORCEMENT ACCESSORIES

- A. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire fabric in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete or fiber-reinforced concrete of greater compressive strength than concrete, and as follows:
 - 1. For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected or CRSI Class 2 stainless-steel bar supports.
- B. Joint Dowel Bars: Plain-steel bars, ASTM A 615/A 615M, Grade 60. Cut bars true to length with ends square and free of burrs.
- C. Zinc Repair Material: ASTM A 780, zinc-based solder, paint containing zinc dust, or sprayed zinc.

2.5 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. Silica Fume: ASTM C 1240, amorphous silica.
- C. Normal-Weight Aggregate: ASTM C 33, uniformly graded, and as follows:
 - 1. Class: Moderate weathering region, but not less than 3M.
 - 2. Nominal Maximum Aggregate Size: 1 inch.
 - 3. Combined Aggregate Gradation: Well graded from coarsest to finest with not more than 18 percent and not less than 8 percent retained on an individual sieve, except that less than 8 percent may be retained on coarsest sieve and on No. 50 sieve, and less than 8 percent may be retained on sieves finer than No. 50.
- D. Lightweight Aggregate: ASTM C 330.
 - 1. Nominal Maximum Aggregate Size: 3/4 inch.
- E. Water: Potable and complying with ASTM C 94.

2.6 ADMIXTURES

- A. General: Admixtures certified by manufacturer to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material and to be compatible with other admixtures and cementitious materials. Do not use admixtures containing calcium chloride.
- B. Air-Entraining Admixture: ASTM C 260.

- C. 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, Type A.
 2. Retarding Admixture: ASTM C 494, Type B.
 3. Water-Reducing and Retarding Admixture: ASTM C 494, Type D.
 4. High-Range, Water-Reducing Admixture: ASTM C 494, Type F.
 5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494, Type G.
 6. Plasticizing and Retarding Admixture: ASTM C 1017, Type II.

2.7 FIBER REINFORCEMENT

- A. Synthetic Fiber: Fibrillated or monofilament polypropylene fibers engineered and designed for use in concrete, complying with ASTM C 1116, Type III, 1/2 to 1-1/2 inches long.
- B. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
- C. Products: Subject to compliance with requirements, provide one of the following:
1. Fibrillated Fibers:
 - a. Fibrasol F; Axim Concrete Technologies.
 - b. Fibermesh; Fibermesh, Div. of Synthetic Industries.
 - c. Forta; Forta Corporation.
 - d. Grace Fibers; W. R. Grace & Co., Construction Products Div.
 - e. Or approved equal
 2. Monofilament Fibers:
 - a. Fibrasol IIP; Axim Concrete Technologies.
 - b. Fiberstrand 100; Euclid Chemical Co.
 - c. Fibermix Stealth; Fibermesh, Div. of Synthetic Industries.
 - d. Forta Mono; Forta Corporation.
 - e. Grace MicroFiber; W. R. Grace & Co., Construction Products Div.
 - f. Hi-Tech PPM Fiber; Hi-Tech Fibers, Div. of Martin Color-Fi, Inc.
 - g. Or approved equal

2.8 WATERSTOPS

- A. Flexible Rubber Waterstops: CE CRD-C 572, for embedding in concrete to prevent passage of fluids through joints. Factory fabricate corners, intersections, and directional changes.
1. Profile: Ribbed without center bulb.
- B. 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. PVC Waterstops:
 - a. Greenstreak.
 - b. Meadows: W. R. Meadows, Inc.
 - c. Murphy: Paul Murphy Plastics Co.
 - d. Progress Unlimited Inc.
 - e. Sternson Group.
 - f. Tamms Industries Co.; Div. of LaPorte Construction Chemicals North America, Inc.
 - g. Vinylex Corporation.
 - h. Westec Barrier Technologies; Div. of Western Textile Products, Inc.
 - i. Or approved equal

- C. Self-Expanding Strip Waterstops: Manufactured rectangular or trapezoidal strip, sodium bentonite or other hydrophylic material for adhesive bonding to concrete.
 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Volclay Waterstop-RX; Colloid Environmental Technologies Co.
 - b. Conseal CS-231; Concrete Sealants Inc.
 - c. Swellseal Joint; De Neef Construction Chemicals (U.S.) Inc.
 - d. Hydrotite; Greenstreak.
 - e. Mirastop; Mirafi Moisture Protection, Div. of Royal Ten Cate (USA), Inc.
 - f. Adeka Ultra Seal; Mitsubishi International Corporation.
 - g. Superstop; Progress Unlimited Inc.
 - h. Or approved equal

2.9 FLOOR AND SLAB TREATMENTS

- A. Penetrating Liquid Floor Treatment (Sealer/Hardener): Chemically reactive, waterborne solution of inorganic silicate or silicate materials and proprietary components; odorless; colorless; that penetrates, hardens, and densifies concrete surfaces.
- B. Products: Subject to compliance with requirements, provide one of the following:
 1. Penetrating Liquid Floor Treatment:
 - a. Titan Hard; Burke Group, LLC (The).
 - b. Chemisil Plus; ChemMasters.
 - c. Intraseal; Conspec Marketing & Manufacturing Co., Inc.
 - d. Ashford Formula; Curecrete Chemical Co., Inc.
 - e. Day-Chem Sure Hard; Dayton Superior Corporation.
 - f. Euco Diamond Hard; Euclid Chemical Co.
 - g. Seal Hard; L&M Construction Chemicals, Inc.
 - h. Vexcon Starseal PS; Vexcon Chemicals, Inc.
 - i. Or approved equal

2.10 CURING MATERIALS

- A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
1. Products:
- a. Axim Concrete Technologies; Cimfilm.
 - b. Burke by Edoco; BurkeFilm.
 - c. ChemMasters; Spray-Film.
 - d. Conspec Marketing & Manufacturing Co., Inc., a Dayton Superior Company; Aquafilm.
 - e. Dayton Superior Corporation; Sure Film.
 - f. Euclid Chemical Company (The); Eucobar.
 - g. Kaufman Products, Inc.; Vapor Aid.
 - h. Lambert Corporation; Lambco Skin.
 - i. L&M Construction Chemicals, Inc.; E-Con.
 - j. MBT Protection and Repair, Div. of ChemRex; Confilm.
 - k. Meadows, W. R., Inc.; Sealtight Evapre.
 - l. Metalcrete Industries; Waterhold.
 - m. Nox-Crete Products Group, Kinsman Corporation; Monofilm.
 - n. Sika Corporation, Inc.; SikaFilm.
 - o. Symons Corporation, a Dayton Superior Company; Finishing Aid.
 - p. Unitex; Pro-Film.
 - q. US Mix Products Company; US Spec Monofilm ER.
 - r. Vexcon Chemicals, Inc.; Certi-Vex EnvioAssist.
 - s. Or approved equal
- 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.
1. Products:
- a. Anti-Hydro International, Inc.; AH Curing Compound #2 DR WB.
 - b. Burke by Edoco; Aqua Resin Cure.
 - c. ChemMasters; Safe-Cure Clear.
 - d. Conspec Marketing & Manufacturing Co., Inc., a Dayton Superior Company; W.B. Resin Cure.
 - e. Dayton Superior Corporation; Day Chem Rez Cure (J-11-W).
 - f. Euclid Chemical Company (The); Kurez DR VOX.
 - g. Kaufman Products, Inc.; Thinfilm 420.
 - h. Lambert Corporation; Aqua Kure-Clear.
 - i. L&M Construction Chemicals, Inc.; L&M Cure R.
 - j. Meadows, W. R., Inc.; 1100 Clear.
 - k. Nox-Crete Products Group, Kinsman Corporation; Resin Cure E.

- l. Symons Corporation, a Dayton Superior Company; Resi-Chem Clear Cure.
- m. Tamms Industries, Inc.; Horncure WB 30.
- n. Unitex; Hydro Cure 309.
- o. US Mix Products Company; US Spec Maxcure Resin Clear.
- p. Vexcon Chemicals, Inc.; Certi-Vex Enviocure 100.
- q. Or approved equal

2.11 RELATED MATERIALS

- A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber.
- B. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.
- C. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements, and as follows:
 1. Types I and II, non-load bearing, IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.
- D. Reglets: Fabricate reglets of not less than 0.0217-inch-thick galvanized steel sheet. Temporarily fill or cover face opening of reglet to prevent intrusion of concrete or debris.
- E. Dovetail Anchor Slots: Hot-dip galvanized steel sheet, not less than 0.0336 inch thick, with bent tab anchors. Temporarily fill or cover face opening of slots to prevent intrusion of concrete or debris.

2.12 REPAIR MATERIALS

- A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.
 1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
 2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
 3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by underlayment manufacturer.
 4. Compressive Strength: Not less than 4100 psi at 28 days when tested according to ASTM C 109/C 109M.
- B. Repair Topping: Traffic-bearing, cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/4 inch.
 1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.

2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by topping manufacturer.
4. Compressive Strength: Not less than 5700 psi at 28 days when tested according to ASTM C 109/C 109M.

2.13 CONCRETE MIXTURES, GENERAL

- 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.
 1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.
- B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
 1. Fly Ash: 25 percent.
 2. Combined Fly Ash and Pozzolan: 25 percent.
 3. Silica Fume: 10 percent.
- C. Limit water-soluble, chloride-ion content in hardened concrete to 0.06 percent by weight of cement.
- D. Admixtures: Use admixtures according to manufacturer's written instructions.
 1. Use 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 for heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a water-cementitious materials ratio below 0.50.
 4. Use corrosion-inhibiting admixture in concrete mixtures where indicated.

2.14 CONCRETE MIXTURES FOR BUILDING ELEMENTS

- A. Slabs/Ramp: Proportion normal-weight concrete mixture as follows:
 1. Minimum Compressive Strength: See Structural Drawings.
 2. Slump Limit: 4 inches, plus or minus 1 inch.
 3. Air Content: 5-1/2 percent, plus or minus 1.5 percent at point of delivery for 1-1/2-inch nominal maximum aggregate size.
 4. Air Content: Do not allow air content of troweled finished floors to exceed 3 percent.

2.15 FABRICATING REINFORCEMENT

- A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.16 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94 and ASTM C 1116, 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.

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 concrete 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. Limit concrete surface irregularities, designated by ACI 347R as abrupt or gradual, as follows:
 - 1. Class A, 1/8 inch for smooth-formed finished surfaces.
 - 2. Class B, 1/4 inch Class C, 1/2 inch Class D, 1 inch for rough-formed finished surfaces.
- D. Construct forms tight enough to prevent loss of concrete mortar.
- E. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical. Kerf wood inserts for forming keyways, reglets, recesses, and the like, for easy removal.
 - 1. Do not use rust-stained steel form-facing material.
- F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.
- G. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.
- H. Chamfer exterior corners and edges of permanently exposed concrete.
- I. Do not chamfer corners or edges of concrete.
- J. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.

- K. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
- L. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
- M. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

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.
 - 1. Install anchor bolts, accurately located, to elevations required.
 - 2. Install reglets to receive top edge of foundation sheet waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.
 - 3. Install dovetail anchor slots in concrete structures as indicated.

3.3 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.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that would reduce bond to concrete.
- C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.
 - 1. Weld reinforcing bars according to AWS D1.4, where indicated.
- D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
- E. Install welded wire reinforcement in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.
- F. At shear walls, use A706 reinforcement.

3.4 JOINTS

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

- B. Contraction Joints in Slabs/Ramps: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness, as follows:
1. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.

3.5 WATERSTOPS

- A. Flexible Waterstops: Install in construction joints as indicated to form a continuous diaphragm. Install in longest lengths practicable. Support and protect exposed waterstops during progress of Work. Field-fabricate joints in waterstops according to manufacturer's written instructions.
- B. Self-Expanding Strip Waterstops: Install in construction joints and at other locations indicated, according to manufacturer's written instructions, bonding or mechanically fastening and firmly pressing into place. Install in longest lengths practicable.

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. Do not add water to concrete during delivery, at Project site, or during placement, unless approved by Architect.
- C. Before placing concrete, water may be added at Project site, subject to limitations of ACI 301.
1. Do not add water to concrete after adding high-range water-reducing admixtures to mix.
- D. Deposit concrete continuously or in 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 specified. Deposit concrete to avoid segregation.
- E. 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. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.
 2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
 3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time

necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.

- F. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
 2. Maintain reinforcement in position on chairs during concrete placement.
 3. Screed slab surfaces with a straightedge and strike off to correct elevations.
 4. Slope surfaces uniformly to drains where required.
 5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.
- G. Cold-Weather Placement: Comply with ACI 306.1 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 average high and low temperature is expected to fall below 40 deg F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
 2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
 3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.
- H. Hot-Weather Placement: Comply with ACI 301 and as follows:
1. Maintain concrete temperature below 90 deg F 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. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

3.7 FINISHING FORMED SURFACES

- A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defective areas repaired and patched. Remove fins and other projections exceeding ACI 347R limits for class of surface specified.
- 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 defective areas. Remove fins and other projections exceeding 1/8 inch in height.
1. Apply to concrete surfaces exposed to public view or to be covered with a coating or covering material applied directly to concrete, such as waterproofing, dampproofing, veneer plaster, or painting.
 2. Do not apply rubbed finish to smooth-formed finish.

- C. Rubbed Finish: Apply the following to smooth-formed finished concrete:
1. Smooth-Rubbed Finish: Not later than one day after form removal, moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.
 2. Grout-Cleaned Finish: Wet concrete surfaces and apply grout of a consistency of thick paint to coat surfaces and fill small holes. Mix one part portland cement to one and one-half parts fine sand with a 1:1 mixture of bonding admixture and water. Add white portland cement in amounts determined by trial patches so color of dry grout will match adjacent surfaces. Scrub grout into voids and remove excess grout. When grout whitens, rub surface with clean burlap and keep surface damp by fog spray for at least 36 hours.
 3. Cork-Floated Finish: Wet concrete surfaces and apply a stiff grout. Mix one part portland cement and one part fine sand with a 1:1 mixture of bonding agent and water. Add white portland cement in amounts determined by trial patches so color of dry grout will match adjacent surfaces. Compress grout into voids by grinding surface. In a swirling motion, finish surface with a cork float.
- D. 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.

3.8 FINISHING FLOORS AND SLABS

- A. General: Comply with recommendations in ACI 302.1R 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.
1. Apply scratch finish to surfaces indicated and to surfaces to receive concrete floor topping or mortar setting beds for ceramic or quarry tile, portland cement terrazzo, and other bonded cementitious floor finishes.
- 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.
1. Apply float finish to surfaces indicated, to surfaces to receive trowel finish, and to floor and slab surfaces to be covered with fluid-applied or sheet waterproofing, built-up or membrane roofing, or sand-bed terrazzo.
- D. Trowel Finish: After applying float finish, apply first trowel finish 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. Apply a trowel finish to surfaces indicated and to floor and slab surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin film-finish coating system
 2. Finish surfaces to the following tolerances, measured within 24 hours according to ASTM E 1155/E 1155M for a randomly trafficked floor surface:
 - a. Specified overall values of flatness, F(F) 35; and levelness, F(L) 25; with minimum local values of flatness, F(F) 24; and levelness, F(L) 17; for slabs-on-grade.
 - b. Specified overall values of flatness, F(F) 30; and of levelness, F(L) 20; with minimum local values of flatness, F(F) 24; and of levelness, F(L) 15; for suspended slabs.
- E. Trowel and Fine-Broom Finish: Apply a partial trowel finish, stopping after second troweling, to surfaces indicated and to surfaces where ceramic or quarry tile is to be installed by either thickset or thin-set method. Immediately after second troweling, and when concrete is still plastic, slightly scarify surface with a fine broom.
- F. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, and ramps, and elsewhere as indicated.
1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

3.9 MISCELLANEOUS CONCRETE ITEMS

- A. Filling In: Fill in holes and openings left in concrete structures, unless otherwise indicated, after work of other trades is in place. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete Work.
- B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.
- C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on Drawings. Set anchor bolts for machines and equipment at correct elevations, complying with diagrams or templates of manufacturer furnishing machines and equipment.
- D. Steel Pan Stairs: Provide concrete fill for steel pan stair treads, landings, and associated items. Cast-in inserts and accessories as shown on Drawings. Screed, tamp, and trowel-finish concrete surfaces.

3.10 CONCRETE PROTECTION 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 with recommendations in ACI 305R 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. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing by one or a combination of the following methods:
- D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.
- E. 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 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. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
 - a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.
 - b. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.
 - c. Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer certifies will not interfere with bonding of floor covering used on Project.
 - 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.
 - a. After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer.

3.11 LIQUID FLOOR TREATMENTS

- A. Penetrating Liquid Floor Treatment: Prepare, apply, and finish penetrating liquid floor treatment according to manufacturer's written instructions.

1. Remove curing compounds, sealers, oil, dirt, laitance, and other contaminants and complete surface repairs.
 2. Do not apply to concrete that is less than seven days old.
 3. Apply liquid until surface is saturated, scrubbing into surface until a gel forms; rewet; and repeat brooming or scrubbing. Rinse with water; remove excess material until surface is dry. Apply a second coat in a similar manner if surface is rough or porous.
- B. Sealing Coat: Uniformly apply a continuous sealing coat of curing and sealing compound to hardened concrete by power spray or roller according to manufacturer's written instructions.

3.12 JOINT FILLING

- A. Prepare, clean, and install joint filler according to manufacturer's written instructions.
1. Defer joint filling until concrete has aged at least six months. Do not fill joints until construction traffic has permanently ceased.
- B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.
- C. Install semirigid joint filler full depth in saw-cut joints and at least 2 inches deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

3.13 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.
- B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part portland cement to two and one-half parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.
- C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension in solid concrete but not less than 1 inch in depth. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
 2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
 3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.

- D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
 2. After concrete has cured at least 14 days, correct high areas by grinding.
 3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
 4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.
 5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
 6. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least 3/4 inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mix as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
 7. Repair random cracks and single holes 1 inch or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.
- E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.
- F. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.14 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Owner will engage a special inspector and qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Inspections:
1. See Structural Drawings for primary list of Special Inspections.
 2. Steel reinforcement placement.
 3. Steel reinforcement welding.

4. Headed bolts and studs.
 5. Verification of use of required design mixture.
 6. Concrete placement, including conveying and depositing.
 7. Curing procedures and maintenance of curing temperature.
 8. Verification of concrete strength before removal of shores and forms from beams and slabs.
- C. Concrete Tests: 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 one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd., but less than 25 cu. yd., plus one set for each additional 50 cu. yd. or fraction thereof.
 2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
 3. Air Content: ASTM C 231, pressure method, for normal-weight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
 4. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F and below and when 80 deg F and above, and one test for each composite sample.
 5. Compression Test Specimens: ASTM C 31.
 - a. Cast and field cure three sets of two standard cylinder specimens for each composite sample.
 6. Compressive-Strength Tests: ASTM C 39; test one set of two laboratory-cured specimens at 7 days and one set of two specimens at 28 days.
 - a. Test one set of two field-cured specimens at 7 days and one set of two specimens at 28 days.
 - b. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.
 7. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
 8. Strength of each concrete mixture will be satisfactory if every average of any three 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.
 9. Test results shall be reported in writing to Architect, 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- and 28-day tests.
 10. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.

11. 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 Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods as directed by Architect.
 12. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
 13. Correct deficiencies in the Work that test reports and inspections indicate dos not comply with the Contract Documents.
- D. Measure floor and slab flatness and levelness according to ASTM E 1155 within 48 hours of finishing.

END OF SECTION 03300

Addendum 'B' June 25, 2018

SECTION 09 91 23 - INTERIOR PAINTING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes surface preparation and field application of paint systems on the following interior substrates:
1. Gypsum board.
 2. Steel.
 3. Aluminum (not anodized or otherwise coated).
 4. Aluminum (anodized).
 5. Wood.
 6. Rubber.

1.2 DEFINITIONS

- A. General: The following terms apply to this Section. Gloss level shall be determined according to ASTM D 523.
1. Gloss Level 1(Flat, or Matte): Not more than 5 units at 60 degrees and 10 units at 85 degrees.
 2. Gloss Level 3 (Eggshell): 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees.
 3. Gloss Level 4 (Satin or Low Luster): 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees.
 4. Gloss Level 5 (Semigloss): 35 to 70 units at 60 degrees.
 5. Gloss Level 6 (Gloss): 70 to 85 units at 60-degrees.
 6. Gloss Level 7 (High Gloss): More than 85 units at 60 degrees.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
- B. Not used.
- C. CALgreen Submittals:

1. Product Data for Section 5.504.4.3: For architectural paints and coatings, provide documentation including printed statement of VOC content showing compliance with Table 1 of the ARB, Architectural Coatings Suggested Control Measure, unless more stringent local limits apply.
 2. Product Data for Section 5.504.4.3.1: Aerosol paints and coatings, provide documentation that products meet the PWMIR Limits for ROC in Section 94522 (a)(3) and other requirements, including prohibitions on use of certain toxic compounds and ozone depleting substances, in Section 94522(c)(2 and (d)(2) of CCR Title 17.
- D. Samples for Verification: For each type of paint system and in each color and gloss of topcoat, with texture to simulate actual conditions.
1. Provide stepped Samples, defining each separate coat, including primers. Use representative colors when preparing Samples for review. Resubmit until required gloss, color, and texture are achieved.
 2. Provide a list of materials and applications for each coat of each Sample. Label each Sample for location and application.
 3. Submit paint samples on hardboard, 12 inches square, of each color and texture required.
- E. 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. VOC content.

1.4 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: 1 gal. of each material and color applied.

1.5 QUALITY ASSURANCE

- A. Applicator Qualifications: Engage an experienced applicator who has completed painting system applications similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance.

1.6 FIELD CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.
- B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Benjamin Moore Family of Products (Benjamin Moore, Coronado, Corotech, Insl-x, LenMar)
 2. PPG Paints (PPG)
 3. Sherwin-Williams Co. (SW)
 4. Vista Paint Corporation (Vista)
 5. or approved equal
- B. Products: Subject to compliance with requirements, provide one of the products listed in other Part 2 articles for the paint category indicated.
1. Proprietary Names: Use of manufacturer's proprietary product names to designate colors or materials is not intended to imply that products named are required to be used to the exclusion of equivalent products of other manufacturers.

2.2 PAINT, GENERAL

- A. Material Compatibility: Provide materials for use within each paint system that are compatible with one another and with the substrates indicated, under conditions of service and application, as demonstrated by manufacturer based on testing and field experience. 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.
- B. VOC Content: Products shall comply with the more stringent requirements of EPA 63 FR 176: 48848 and the following:
1. Southwest Air Pollution Control Authority (SWAPCA), SWAPCA 493 "VOC Area Source Rules," latest adopted requirements.
 2. California Air Resources Board (CARB), San Diego County APCD, R67-0, latest adopted requirements.
- C. Architectural Paints and coatings shall comply with VOC content as shown in Section 01 81 23 "CALgreen Requirements."
- D. Material Quality: Provide manufacturer's best-quality paint material of the various coating types specified that are factory formulated and recommended by manufacturer for application indicated. Paint-material containers not displaying manufacturer's product identification will not be acceptable.

- E. Colors and Gloss: As indicated in Finish Schedule on Drawings. Reference to a particular manufacturer's number or color name is used only as a convenience for the Architect in order to establish the Project color and gloss requirements. These references are not intended to describe the required generic paint systems. For generic paint system requirements, refer to the "Interior Paint Schedule" at the end of Part 3, as applicable to the respective conditions of use.
1. The selection of paint colors and gloss are indicated by manufacturer and color type; designated as "PT##."
 2. Furnish the same lots, batches, etc. within the same contiguous areas of the building (i.e., corridors on the same floors, common rooms which adjoin each other, etc.).

2.3 PREPARATORY COATS

- A. Primer Sealer, Latex, Interior:
1. Benjamin Moore; Ultra Spec 500 Interior Latex Primer (N534).
 2. PPG; Speedhide Zero Interior Latex Sealer Quick-Drying (6-4900).
 3. SW; ProMar 200 Zero VOC Interior Latex Primer (B28W02600).
 4. or approved equal
- B. Primer, Alkali Resistant, Water Based:
1. Benjamin Moore; Super Spec Masonry Int/Ext Acrylic High Build Primer (N068).
 2. PPG; Perma-Crete Interior/Exterior Alkali-Resistant Primer (4-603).
 3. SW; Loxon Concrete & Masonry Primer Interior/Exterior Latex (A24W8300) or approved equal
- C. Primer, Latex, for Interior Wood:
1. Benjamin Moore; Ultra Spec 500 Interior Latex Primer (N534).
 2. PPG; SEAL GRIP Interior Primer/Finish (17-951).
 3. SW; Premium Wall & Wood Interior Latex Primer (B28W08111)
 4. or approved equal.
- D. Primer, Bonding, Water Based:
1. Benjamin Moore; Insl-x Stix Bonding Primer (SXA-110).
 2. PPG; SEAL GRIP Interior/Exterior Acrylic Universal Primer/Sealer (17-921).
 3. SW; Adhesion Primer Interior/Exterior Latex (B51W8050).
 4. or approved equal
- E. Primer, Acrylic:
1. Benjamin Moore; Super Spec HP Acrylic Metal Primer (P04).
 2. or approved equal
 3. PPG; Pitt Tech Interior/Exterior Primer/Finish DTM Industrial Primer (90-712).
 4. SW; Pro Industrial Pro-Cryl Universal Primer (B66-310 Series).
 5. or approved equal

- F. Where manufacturer does not recommend a separate primer formulation on substrate indicated, use paint specified for finish coat.

2.4 WATER-BASED PAINTS

- A. Latex, Interior, Gloss Level 1 (Flat):
1. Benjamin Moore; Ultra Spec 500 Interior Flat (N536).
 2. PPG; SPEEDHIDE zero Interior Zero-VOC Latex Flat (6-4110XI).
 3. SW; ProMar 200 Zero VOC Interior Latex Flat (B30-2600 Series).
 4. or approved equal
- B. Latex, Interior, Gloss Level 3 (Eggshell).
1. Benjamin Moore; Ultra Spec 500 Interior Eggshell (N538).
 2. PPG; SPEEDHIDE zero Interior Zero-VOC Latex Eggshell (6-4310XI).
 3. SW; ProMar 200 Zero Interior VOC Latex Eg-Shel (B20-2600 Series).
 4. or approved equal
- C. Latex, Interior, Gloss Level 5 (Semigloss):
1. Benjamin Moore; Ultra Spec 500 Interior Semi-Gloss (N539).
 2. PPG; SPEEDHIDE zero Interior Zero-VOC Latex Semi-Gloss (6-4510XI).
 3. SW; ProMar 200 Zero VOC Latex Semi-Gloss (B31-2600 Series).
 4. or approved equal
- D. Latex, Interior, High Performance Architectural, Gloss Level 3 (Eggshell):
1. Benjamin Moore; Corotech PreCatalyzed Waterborne Epoxy Eggshell V342.
 2. PPG; Pitt-Glaze WB1 Interior Eggshell Pre-Catalyzed Water-Borne Acrylic Epoxy (16-310).
 3. SW; Pro Industrial Pre-Catalyzed Waterbased Epoxy Eg-Shel (K45-150 Series).
 4. or approved equal
- E. Latex, Interior, High Performance Architectural, Gloss Level 5 (Semigloss):
1. Benjamin Moore; Corotech PreCatalyzed Waterborne Epoxy SG (V341).
 2. PPG; Pitt-Glaze WB1 Interior Semi-Gloss Pre-Catalyzed Water-Borne Acrylic Epoxy (16-510).
 3. SW; Pro Industrial Pre-Catalyzed Waterbased Epoxy Semi-Gloss (K46-150 Series).
 4. or approved equal

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Applicator present, for compliance with manufacturer's requirements for paint application. Comply with procedures specified in PDCA P4.
 - 1. Proceed with paint application only after unsatisfactory conditions have been corrected and surfaces receiving paint are thoroughly dry.

3.2 PREPARATION

- A. Remove hardware and hardware accessories, cover plates, machined surfaces, lighting fixtures, and similar items already installed that are not to be painted. If removal is impractical or impossible, provide surface-applied protection before surface preparation and painting.
- B. Before applying paint or other surface treatments, clean substrates of substances that could impair bond of paints. Remove oil and grease before cleaning.
 - 1. Schedule cleaning and painting so dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.
- C. Clean and prepare surfaces to be painted according to manufacturer's written instructions for each particular substrate condition and as specified. Provide barrier coats over incompatible primers or remove and reprime.
 - 1. Gypsum Wallboard: Repair all surfaces in gypsum wallboard with wallboard joint finishing compound or spackling compound, filled out flush and sanded smooth. Clean all surfaces and taped joints of dust, dirt and other contaminants and be sure they are thoroughly dry before applying paint.
 - 2. Steel Substrates: Remove rust, loose mill scale, and shop primer, if any. Clean using methods recommended in writing by paint manufacturer.
 - 3. 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.
 - 4. 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.
 - 5. Aluminum Substrates: Remove loose surface oxidation.
 - 6. Anodized Aluminum Substrates: Remove dust, dirt, and other foreign material that might impair bond of paints to substrates. Abrade surface to promote adhesion of subsequently applied paints.
 - 7. Powder-Coated Aluminum Substrates: Remove dust, dirt, and other foreign material that might impair bond of paints to substrates. Abrade surface to promote adhesion of subsequently applied paints.
 - 8. Wood: Clean surfaces of dirt, oil, and other foreign substances with scrapers, mineral spirits, and sandpaper, as required. Sand surfaces exposed to view smooth and dust off.

- a. Scrape and clean small, dry, seasoned knots, and apply a thin coat of white shellac or other recommended knot sealer before applying primer. After priming, fill holes and imperfections in finish surfaces with putty or plastic wood filler. Sand smooth when dried.
 - b. Seal tops, bottoms, and cutouts of unprimed wood doors with a heavy coat of varnish or sealer immediately on delivery.
9. Rubber: Remove dust, dirt, and other foreign material that might impair bond of paints to substrates. Abrade surface to promote adhesion of subsequently applied paints, if necessary.
- D. Mix and prepare paint materials according to manufacturer's written instructions.
1. Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.
 2. Stir material before application to produce a mixture of uniform density. Stir as required during application. Do not stir surface film into material. If necessary, remove surface film and strain material before using.
 3. Use only thinners approved by paint manufacturer and only within recommended limits.
- E. Tint each undercoat a lighter shade to facilitate identification of each coat when multiple coats of same material are applied. Tint undercoats to match the color of the topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.

3.3 APPLICATION

- A. Apply paint according to manufacturer's written instructions. Use applicators and techniques best suited for substrate and type of material being applied.
1. Paint colors, surface treatments, and finishes are indicated in Finish Schedule on Drawings.
 2. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film.
 3. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
 4. Extend coatings in exposed surfaces, as required, to maintain system integrity and provide desired protection.
 - a. The term "exposed surfaces" includes areas visible when permanent or built-in fixtures, grilles, convactor covers, covers for finned-tube radiation, and similar components are in place.
 5. Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces. Before final installation of equipment, paint surfaces behind permanently fixed equipment or furniture with prime coat only.

6. Paint front and back sides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces. Paint access panels, electrical panels, air diffusing outlets, supply and exhaust grilles, louvers, exposed conduit, primed hardware items, primed outlet covers, primed wall and ceiling cover plates and other items in painted areas to match the areas in which they occur unless otherwise directed by the Architect.
- B. Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.
1. The number of coats and film thickness required are the same regardless of application method. Do not apply succeeding coats until previous coat has cured as recommended by manufacturer. If sanding is required to produce a smooth, even surface according to manufacturer's written instructions, sand between applications.
 - a. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn-through or other defects due to insufficient sealing.
 - b. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.
 - c. If undercoats, stains, or other conditions show through final coat of paint, apply additional coats until paint film is of uniform finish, color, and appearance. Give special attention to ensure that edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.
 2. Allow sufficient time between successive coats to permit proper drying. Do not recoat surfaces until paint has dried to where it feels firm, and does not deform or feel sticky under moderate thumb pressure, and until application of another coat of paint does not cause undercoat to lift or lose adhesion.
- C. Apply paints and coatings by brush, roller, spray, or other applicators according to manufacturer's written instructions.
1. Brushes: Use brushes best suited for type of material applied. Use brush of appropriate size for surface or item being painted.
 2. Rollers: Use rollers of carpet, velvet-back, or high-pile sheep's wool as recommended by manufacturer for material and texture required.
 3. Spray Equipment: Use airless spray equipment with orifice size as recommended by manufacturer for material and texture required.
- 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. Apply paint materials no thinner than manufacturer's recommended spreading rate to achieve dry film thickness indicated. Provide total dry film thickness of the entire system as recommended by manufacturer.
- F. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:

1. ~~Paint the following work where exposed in equipment rooms:~~
 - a. ~~_____.~~
 2. Paint the following work where exposed in occupied spaces:
 - 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.
 - i. ~~_____.~~
 3. Paint portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets that are visible from occupied spaces.
 - a. Color: Flat (gloss level 1), nonspecular, black.
- G. Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not complying with requirements.

3.4 MARKING AND IDENTIFICATION

- A. Mark fire-rated and smoke-rated partitions required to have protective openings or penetrations.
 1. Locate markings in accessible concealed floor, floor-ceiling, or attic spaces.
 2. Provide markings within 15 feet of the end of each wall and at intervals not exceeding 30 feet measured horizontally along the partition.
 3. Marking shall include stenciled lettering not less than 3 inches in height with a minimum 3/8 inch stroke.
 4. Apply markings in a contrasting color with the suggested wording "FIRE AND/OR SMOKE BARRIER---PROTECT ALL OPENINGS", or other wording as approved by the Authority Having Jurisdiction.

3.5 CLEANING

- A. At the end of each workday, remove empty cans, rags, rubbish, and other discarded paint materials from Project site.
- B. After completing painting, clean glass and paint-spattered surfaces. Remove spattered paint by washing and scraping without scratching or damaging adjacent finished surfaces.
- C. After completing painting operations in each space or area, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection, if any.

3.6 PROTECTION

- A. Protect work of other trades, whether being painted or not, against damage from paint application. Correct damage to work of other trades by cleaning, repairing or replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- B. Provide "Wet Paint" signs to protect newly painted finishes. After completing painting operations, remove temporary protective wrappings provided by others to protect their work. After work of other trades is complete, touch up and restore damaged or defaced painted surfaces. Comply with procedures specified in PDCA P1.

3.7 INTERIOR PAINTING SCHEDULE

- A. Gypsum Board Substrates:
 - 1. Latex System:
 - a. Primer: Sealer, latex, interior.
 - b. Intermediate Coat: Latex, interior, matching topcoat.
 - c. Topcoat: Latex, interior (gloss as indicated in Finish Schedule).
 - 2. High-Performance Architectural Latex System:
 - a. Primer: Sealer, latex, interior.
 - b. Intermediate Coat: Latex, interior, high performance architectural, matching topcoat.
 - c. Topcoat: Latex, interior, high performance architectural (gloss as indicated in Finish Schedule).
- B. Steel Substrates:
 - 1. High-Performance Architectural Latex System:
 - a. Primer: Acrylic.
 - b. Intermediate Coat: Latex, interior, high performance architectural; matching topcoat.
 - c. Topcoat: Latex, interior, high performance architectural (gloss as indicated in Finish Schedule).
- C. Steel (Factory-Primed) Substrates:
 - 1. High-Performance Architectural Latex System:
 - a. Primer: Acrylic (applied over factory primer).
 - b. Intermediate Coat: Latex, interior, high performance architectural; matching topcoat.
 - c. Topcoat: Latex, interior, high performance architectural (gloss as indicated in Finish Schedule).

- D. Galvanized Metal Substrates:
 - 1. High-Performance Architectural Latex System:
 - a. Primer: Acrylic.
 - b. Intermediate Coat: Latex, interior, high performance architectural; matching topcoat.
 - c. Topcoat: Latex, interior, high performance architectural (gloss as indicated in Finish Schedule).

- E. Aluminum Substrates: Not anodized or otherwise coated.
 - 1. High-Performance Architectural Latex System:
 - a. Primer: Acrylic.
 - b. Intermediate Coat: Latex, interior, high performance architectural; matching topcoat.
 - c. Topcoat: Latex, interior, high performance architectural (gloss as indicated in Finish Schedule).

- F. Aluminum (Anodized) Substrates:
 - 1. High-Performance Architectural Latex System:
 - a. Primer: Acrylic.
 - b. Intermediate Coat: Latex, interior, high performance architectural; matching topcoat.
 - c. Topcoat: Latex, interior, high performance architectural (gloss as indicated in Finish Schedule).

- G. Aluminum (Powder-Coated) Substrates:
 - 1. High-Performance Architectural Latex System:
 - a. Primer: Acrylic.
 - b. Intermediate Coat: Latex, interior, high performance architectural; matching topcoat.
 - c. Topcoat: Latex, interior, high performance architectural (gloss as indicated in Finish Schedule).

- H. Wood[and Hardboard] Substrates:
 - 1. High-Performance Architectural Latex System:
 - a. Primer: Acrylic.
 - b. Intermediate Coat: Latex, interior, high performance architectural; matching topcoat.
 - c. Topcoat: Latex, interior, high performance architectural (gloss as indicated in Finish Schedule).

I. Rubber Substrates:

1. Latex System:

- a. Primer: Acrylic bonding primer or universal acrylic primer.
- b. Intermediate Coat: Latex, interior, matching topcoat.
- c. Topcoat: Latex, interior (gloss as indicated in Finish Schedule).

2. High-Performance Architectural Latex System:

- a. Primer: Acrylic bonding primer or universal acrylic primer.
- b. Intermediate Coat: Latex, interior, high performance architectural, matching topcoat.
- c. Topcoat: Latex, interior, high performance architectural (gloss as indicated in Finish Schedule).

END OF SECTION 09 91 23

SECTION 22 11 16 - DOMESTIC WATER PIPING

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. Copper tube and fittings.
 - 2. Piping joining materials.

1.3 ACTION SUBMITTALS

- A. Product Data: For transition fittings and dielectric fittings.

1.4 INFORMATIONAL SUBMITTALS

- A. System purging and disinfecting activities report.
- B. Field quality-control reports.

1.5 FIELD CONDITIONS

- A. Interruption of Existing Water Service: Do not interrupt water service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary water service according to requirements indicated:
 - 1. Notify Architect no fewer than two days in advance of proposed interruption of water service.
 - 2. Do not interrupt water service without Architect's written permission.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

- A. Comply with requirements in "Piping Schedule" Article (Section 22 11 16, 3.10) for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.
- B. Potable-water piping and components shall comply with NSF 14 and NSF 61 Annex G.
- C. Comply with NSF 372 for low lead.

2.2 COPPER TUBE AND FITTINGS

- A. Hard Copper Tube: ASTM B 88, Type L water tube, drawn temper.
- B. Cast-Copper, Solder-Joint Fittings: ASME B16.18, pressure fittings.
- C. Wrought-Copper, Solder-Joint Fittings: ASME B16.22, wrought-copper pressure fittings.
- D. Bronze Flanges: ASME B16.24, Class 150, with solder-joint ends.
- E. Copper Unions:
 - 1. MSS SP-123.
 - 2. Cast-copper-alloy, hexagonal-stock body.
 - 3. Ball-and-socket, metal-to-metal seating surfaces.
 - 4. Solder-joint or threaded ends.

PART 3 - EXECUTION

3.1 PIPING INSTALLATION

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of domestic water piping. Indicated locations and arrangements are used to size pipe and calculate friction loss, expansion, and other design considerations. Install piping as indicated unless deviations to layout are approved on coordination drawings.
- B. Install shutoff valve, hose-end drain valve, strainer, pressure gage, and test tee with valve inside the building at each domestic water-service entrance.
- C. Install shutoff valve immediately upstream of each dielectric fitting.
- D. Install domestic water piping level without pitch and plumb.

- E. Install piping concealed from view and protected from physical contact by building occupants unless otherwise indicated and except in equipment rooms and service areas.
- F. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal, and coordinate with other services occupying that space.
- G. Install piping to permit valve servicing.
- H. Install piping free of sags and bends.
- I. Install fittings for changes in direction and branch connections.
- J. Install unions in copper tubing at final connection to each piece of equipment, machine, and specialty.
- K. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Section 22 05 17 "Sleeves and Sleeve Seals for Plumbing Piping."
- L. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified in Section 22 05 17 "Sleeves and Sleeve Seals for Plumbing Piping."
- M. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Section 22 05 18 "Escutcheons for Plumbing Piping."

3.2 JOINT CONSTRUCTION

- A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- B. Remove scale, slag, dirt, and debris from inside and outside of pipes, tubes, and fittings before assembly.
- C. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
 - 1. Apply appropriate tape or thread compound to external pipe threads.
 - 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged.
- D. Soldered Joints for Copper Tubing: Apply ASTM B 813, water-flushable flux to end of tube. Join copper tube and fittings according to ASTM B 828 or CDA's "Copper Tube Handbook."

3.3 HANGER AND SUPPORT INSTALLATION

- A. Comply with requirements for pipe hanger, support products, and installation in Section 22 05 29 "Hangers and Supports for Plumbing Piping and Equipment."

1. Vertical Piping: MSS Type 8 or 42, clamps.
 2. Individual, Straight, Horizontal Piping Runs:
 - a. 100 Feet and Less: MSS Type 1, adjustable, steel clevis hangers.
 - b. Longer Than 100 Feet: MSS Type 43, adjustable roller hangers.
 - c. Longer Than 100 Feet if Indicated: MSS Type 49, spring cushion rolls.
 3. Multiple, Straight, Horizontal Piping Runs 100 Feet or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
 4. Base of Vertical Piping: MSS Type 52, spring hangers.
- B. Support vertical piping and tubing at base and at each floor.
- C. Rod diameter may be reduced one size for double-rod hangers, to a minimum of 3/8 inch.
- D. Install hangers for copper tubing with the following maximum horizontal spacing and minimum rod diameters:
1. NPS 3/4 and Smaller: 60 inches with 3/8-inch rod.
 2. NPS 1 and NPS 1-1/4: 72 inches with 3/8-inch rod.
 3. NPS 1-1/2 and NPS 2: 96 inches with 3/8-inch rod.
 4. NPS 2-1/2: 108 inches with 1/2-inch rod.
 5. NPS 3 to NPS 5: 10 feet with 1/2-inch rod.
 6. NPS 6: 10 feet with 5/8-inch rod.
 7. NPS 8: 10 feet with 3/4-inch rod.

3.4 CONNECTIONS

- A. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. When installing piping adjacent to equipment and machines, allow space for service and maintenance.
- C. Connect domestic water piping to water-service piping with shutoff valve; extend and connect to the following:
1. Water Heaters: Cold-water inlet and hot-water outlet piping in sizes indicated, but not smaller than sizes of water heater connections.
 2. Plumbing Fixtures: Cold- and hot-water-supply piping in sizes indicated, but not smaller than that required by plumbing code.
 3. Equipment: Cold- and hot-water-supply piping as indicated, but not smaller than equipment connections. Provide shutoff valve and union for each connection. Use flanges instead of unions for NPS 2-1/2 and larger.

3.5 IDENTIFICATION

- A. Identify system components. Comply with requirements for identification materials and installation in Section 22 05 53 "Identification for Plumbing Piping and Equipment."

- B. Label pressure piping with system operating pressure.

3.6 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:

- 1. Piping Inspections:

- a. Do not enclose, cover, or put piping into operation until it has been inspected and approved by authorities having jurisdiction.
- b. During installation, notify authorities having jurisdiction at least one day before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction:
 - 1) Roughing-in Inspection: Arrange for inspection of piping before concealing or closing in after roughing in and before setting fixtures.
 - 2) Final Inspection: Arrange for authorities having jurisdiction to observe tests specified in "Piping Tests" Subparagraph below and to ensure compliance with requirements.
- c. Reinspection: If authorities having jurisdiction find that piping will not pass tests or inspections, make required corrections and arrange for reinspection.
- d. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.

- 2. Piping Tests:

- a. Fill domestic water piping. Check components to determine that they are not air bound and that piping is full of water.
- b. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit a separate report for each test, complete with diagram of portion of piping tested.
- c. Leave new, altered, extended, or replaced domestic water piping uncovered and unconcealed until it has been tested and approved. Expose work that was covered or concealed before it was tested.
- d. Cap and subject piping to static water pressure of 50 psig above operating pressure, without exceeding pressure rating of piping system materials. Isolate test source and allow it to stand for four hours. Leaks and loss in test pressure constitute defects that must be repaired.
- e. Repair leaks and defects with new materials, and retest piping or portion thereof until satisfactory results are obtained.
- f. Prepare reports for tests and for corrective action required.

- B. Domestic water piping will be considered defective if it does not pass tests and inspections.

- C. Prepare test and inspection reports.

3.7 ADJUSTING

- A. Perform the following adjustments before operation:
 - 1. Open shutoff valves to fully open position.
 - 2. Remove plugs used during testing of piping and for temporary sealing of piping during installation.
 - 3. Remove and clean strainer screens. Close drain valves and replace drain plugs.
 - 4. Remove filter cartridges from housings and verify that cartridges are as specified for application where used and are clean and ready for use.
 - 5. Check plumbing specialties and verify proper settings, adjustments, and operation.

3.8 CLEANING

- A. Clean and disinfect potable domestic water piping as follows:
 - 1. Purge new piping and parts of existing piping that have been altered, extended, or repaired before using.
 - 2. Use purging and disinfecting procedures prescribed by authorities having jurisdiction; if methods are not prescribed, use procedures described in either AWWA C651 or AWWA C652 or follow procedures described below:
 - a. Flush piping system with clean, potable water until dirty water does not appear at outlets.
 - b. Fill and isolate system according to either of the following:
 - 1) Fill system or part thereof with water/chlorine solution with at least 50 ppm of chlorine. Isolate with valves and allow to stand for 24 hours.
 - c. Flush system with clean, potable water until no chlorine is in water coming from system after the standing time.
 - d. Repeat procedures if biological examination shows contamination.
 - e. Submit water samples in sterile bottles to authorities having jurisdiction.

3.9 PIPING SCHEDULE

- A. Transition and special fittings with pressure ratings at least equal to piping rating may be used in applications below unless otherwise indicated.
- B. Flanges and unions may be used for aboveground piping joints unless otherwise indicated.
- C. Fitting Option: Extruded-tee connections and brazed joints may be used on aboveground copper tubing.
- D. Aboveground domestic water piping, NPS 2 and smaller, shall be the following:
 - 1. Hard copper tube, ASTM B 88, Type L; solder-joint fittings; and soldered joints.

END OF SECTION 22 11 16

SECTION 23 07 13 - DUCT 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 insulating the following duct services:
 - 1. Indoor, concealed supply return, and outdoor air ducts and plenums.
- B. Related Sections:
 - 1. Section 23 31 13 "Metal Ducts" for duct liners.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include thermal conductivity, water-vapor permeance thickness, and jackets (both factory- and field-applied if any).
- B. Sustainable Design Submittals:
 - 1. Product Data: For adhesives, indicating VOC content.
 - 2. Laboratory Test Reports: For adhesives, indicating compliance with requirements for low-emitting materials.
 - 3. Product Data: For coatings, indicating VOC content.
 - 4. Laboratory Test Reports: For coatings, indicating compliance with requirements for low-emitting materials.
 - 5. Product Data: For sealants, indicating VOC content.
 - 6. Laboratory Test Reports: For sealants, indicating compliance with requirements for low-emitting materials.
- C. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
 - 1. Detail application of protective shields, saddles, and inserts at hangers for each type of insulation and hanger.
 - 2. Detail insulation application at elbows, fittings, dampers, specialties and flanges for each type of insulation.
 - 3. Detail application of field-applied jackets.
 - 4. Detail application at linkages of control devices.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified Installer.
- B. Material Test Reports: From a qualified testing agency acceptable to authorities having jurisdiction indicating, interpreting, and certifying test results for compliance of insulation materials, sealers, attachments, cements, and jackets, with requirements indicated. Include dates of tests and test methods employed.
- C. Field quality-control reports.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Skilled mechanics who have successfully completed an apprenticeship program or another craft training program certified by the Department of Labor, Bureau of Apprenticeship and Training.
- B. Surface-Burning Characteristics: For insulation and related materials, as determined by testing identical products according to ASTM E 84, by a testing agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing agency.
 - 1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Packaging: Insulation material containers shall be marked by manufacturer with appropriate ASTM standard designation, type and grade, and maximum use temperature.

1.7 COORDINATION

- A. Coordinate clearance requirements with duct Installer for duct insulation application. Before preparing ductwork Shop Drawings, establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.
- B. Coordinate installation and testing of heat tracing.

1.8 SCHEDULING

- A. Schedule insulation application after pressure testing systems and, where required, after installing and testing heat tracing. Insulation application may begin on segments that have satisfactory test results.

- B. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

PART 2 - PRODUCTS

2.1 INSULATION MATERIALS

- A. Comply with requirements in "Duct Insulation Schedule, General" (Section 23 07 13, 3.9), "Indoor Duct and Plenum Insulation Schedule" (Section 23 07 13, 3.10), and "Aboveground, Outdoor Duct and Plenum Insulation Schedule" articles for where insulating materials shall be applied.
- B. Products shall not contain asbestos, lead, mercury, or mercury compounds.
- C. Products that come in contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C 871.
- D. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable according to ASTM C 795.
- E. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.
- F. Mineral-Fiber Blanket Insulation: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 553, Type II and ASTM C 1290, Type III with factory-applied FSK jacket. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. CertainTeed Corporation.
 - b. Johns Manville; a Berkshire Hathaway company.
 - c. Knauf Insulation.
 - d. Manson Insulation Inc.
 - e. Owens Corning.
 - f. or approved equal.

2.2 ADHESIVES

- A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated unless otherwise indicated.
- B. Mineral-Fiber Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- a. Childers Brand; H. B. Fuller Construction Products.
 - b. Eagle Bridges - Marathon Industries.
 - c. Foster Brand; H. B. Fuller Construction Products.
 - d. Mon-Eco Industries, Inc.
 - e. or approved equal.
2. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- C. ASJ Adhesive, and FSK Jacket Adhesive: Comply with MIL-A-3316C, Class 2, Grade A for bonding insulation jacket lap seams and joints.
- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Childers Brand; H. B. Fuller Construction Products.
 - b. Eagle Bridges - Marathon Industries.
 - c. Foster Brand; H. B. Fuller Construction Products.
 - d. Mon-Eco Industries, Inc.
 - e. or approved equal.
 - 2. Adhesive shall have a VOC content of 80 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 - 3. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

2.3 MASTICS

- A. Materials shall be compatible with insulation materials, jackets, and substrates; comply with MIL-PRF-19565C, Type II.
- 1. VOC Content: 300 g/L or less.
 - 2. Low-Emitting Materials: Mastic coatings shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- B. Vapor-Barrier Mastic: Water based; suitable for indoor use on below ambient services.
- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Childers Brand; H. B. Fuller Construction Products.
 - b. Foster Brand; H. B. Fuller Construction Products.
 - c. Knauf Insulation.

- d. Vimasco Corporation.
 - e. or approved equal.
2. Water-Vapor Permeance: ASTM E 96/E 96M, Procedure B, 0.013 perm at 43-mil dry film thickness.
 3. Service Temperature Range: Minus 20 to plus 180 deg F.
 4. Solids Content: ASTM D 1644, 58 percent by volume and 70 percent by weight.
 5. Color: White.
- C. Breather Mastic: Water based; suitable for indoor and outdoor use on above ambient services.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Childers Brand; H. B. Fuller Construction Products.
 - b. Eagle Bridges - Marathon Industries.
 - c. Foster Brand; H. B. Fuller Construction Products.
 - d. Knauf Insulation.
 - e. Mon-Eco Industries, Inc.
 - f. Vimasco Corporation.
 - g. or approved equal.
 2. Water-Vapor Permeance: ASTM F 1249, 1.8 perms at 0.0625-inch dry film thickness.
 3. Service Temperature Range: Minus 20 to plus 180 deg F.
 4. Solids Content: 60 percent by volume and 66 percent by weight.
 5. Color: White.

2.4 LAGGING ADHESIVES

- A. Description: Comply with MIL-A-3316C, Class I, Grade A and shall be compatible with insulation materials, jackets, and substrates.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Childers Brand; H. B. Fuller Construction Products.
 - b. Foster Brand; H. B. Fuller Construction Products.
 - c. Vimasco Corporation.
 - d. or approved equal.
 2. Adhesives shall have a VOC content of 50 g/L or less.
 3. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

4. Fire-resistant, water-based lagging adhesive and coating for use indoors to adhere fire-resistant lagging cloths over duct insulation.
5. Service Temperature Range: 0 to plus 180 deg F.
6. Color: White.

2.5 SEALANTS

A. FSK Sealants:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Childers Brand; H. B. Fuller Construction Products.
 - b. Eagle Bridges - Marathon Industries.
 - c. Foster Brand; H. B. Fuller Construction Products.
 - d. Mon-Eco Industries, Inc.
 - e. or approved equal.
2. Materials shall be compatible with insulation materials, jackets, and substrates.
3. Fire- and water-resistant, flexible, elastomeric sealant.
4. Service Temperature Range: Minus 40 to plus 250 deg F.
5. Color: Aluminum.
6. Sealant shall have a VOC content of 420 g/L or less.
7. Sealant shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

B. ASJ Flashing Sealants:

1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. Childers Brand; H. B. Fuller Construction Products.
 - b. or approved equal.
2. Materials shall be compatible with insulation materials, jackets, and substrates.
3. Fire- and water-resistant, flexible, elastomeric sealant.
4. Service Temperature Range: Minus 40 to plus 250 deg F.
5. Color: White.
6. Sealant shall have a VOC content of 420 g/L or less.
7. Sealant shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

2.6 FACTORY-APPLIED JACKETS

- A. Insulation system schedules indicate factory-applied jackets on various applications. 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.
 2. ASJ-SSL: ASJ with self-sealing, pressure-sensitive, acrylic-based adhesive covered by a removable protective strip; complying with ASTM C 1136, Type I.
 3. FSK Jacket: Aluminum-foil, fiberglass-reinforced scrim with kraft-paper backing; complying with ASTM C 1136, Type II.
 4. FSP Jacket: Aluminum-foil, fiberglass-reinforced scrim with polyethylene backing; complying with ASTM C 1136, Type II.

2.7 FIELD-APPLIED FABRIC-REINFORCING MESH

- A. Woven Glass-Fiber Fabric: Approximately 6 oz./sq. yd. with a thread count of 5 strands by 5 strands/sq. in. for covering ducts.
1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. Childers Brand; H. B. Fuller Construction Products.
 - b. or approved equal.
- B. Woven Polyester Fabric: Approximately 1 oz./sq. yd. with a thread count of 10 strands by 10 strands/sq. in., in a Leno weave, for ducts.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Foster Brand; H. B. Fuller Construction Products.
 - b. Vimasco Corporation.
 - c. or approved equal.

2.8 FIELD-APPLIED CLOTHS

- A. Woven Glass-Fiber Fabric: Comply with MIL-C-20079H, Type I, plain weave, and presized a minimum of 8 oz./sq. yd..
1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. Alpha Associates, Inc.
 - b. or approved equal.

2.9 TAPES

- A. ASJ Tape: White vapor-retarder tape matching factory-applied jacket with acrylic adhesive, complying with ASTM C 1136.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Avery Dennison Corporation, Specialty Tapes Division.
 - b. Compac Corporation.
 - c. Ideal Tape Co., Inc., an American Biltrite Company.
 - d. Knauf Insulation.
 - e. Venture Tape.
 - f. or approved equal.
 2. Width: 3 inches.
 3. Thickness: 11.5 mils.
 4. Adhesion: 90 ounces force/inch in width.
 5. Elongation: 2 percent.
 6. Tensile Strength: 40 lbf/inch in width.
 7. ASJ Tape Disks and Squares: Precut disks or squares of ASJ tape.
- B. FSK Tape: Foil-face, vapor-retarder tape matching factory-applied jacket with acrylic adhesive; complying with ASTM C 1136.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Avery Dennison Corporation, Specialty Tapes Division.
 - b. Compac Corporation.
 - c. Ideal Tape Co., Inc., an American Biltrite Company.
 - d. Knauf Insulation.
 - e. Venture Tape.
 - f. or approved equal.
 2. Width: 3 inches.
 3. Thickness: 6.5 mils.
 4. Adhesion: 90 ounces force/inch in width.
 5. Elongation: 2 percent.
 6. Tensile Strength: 40 lbf/inch in width.
 7. FSK Tape Disks and Squares: Precut disks or squares of FSK tape.
- C. Aluminum-Foil Tape: Vapor-retarder tape with acrylic adhesive.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- a. Avery Dennison Corporation, Specialty Tapes Division.
 - b. Compac Corporation.
 - c. Ideal Tape Co., Inc., an American Biltrite Company.
 - d. Knauf Insulation.
 - e. Venture Tape.
 - f. or approved equal.
2. Width: 2 inches.
 3. Thickness: 3.7 mils.
 4. Adhesion: 100 ounces force/inch in width.
 5. Elongation: 5 percent.
 6. Tensile Strength: 34 lbf/inch in width.

2.10 SECUREMENTS

A. Bands:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. ITW Insulation Systems; Illinois Tool Works, Inc.
 - b. RPR Products, Inc.
 - c. or approved equal.
2. Stainless Steel: ASTM A 167 or ASTM A 240/A 240M, Type 316; 0.015 inch thick, 3/4 inch wide with wing seal.
3. Springs: Twin spring set constructed of stainless steel with ends flat and slotted to accept metal bands. Spring size determined by manufacturer for application.

B. Insulation Pins and Hangers:

1. Capacitor-Discharge-Weld Pins: Copper- or zinc-coated steel pin, fully annealed for capacitor-discharge welding, 0.135-inch- diameter shank, length to suit depth of insulation indicated.
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) AGM Industries, Inc.
 - 2) Gemco.
 - 3) Hardcast, Inc.
 - 4) Midwest Fasteners, Inc.
 - 5) Nelson Stud Welding.
 - 6) or approved equal.
2. Metal, Adhesively Attached, Perforated-Base Insulation Hangers: Baseplate welded to projecting spindle that is capable of holding insulation, of thickness indicated, securely in

position indicated when self-locking washer is in place. Comply with the following requirements:

- a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) AGM Industries, Inc.
 - 2) Gemco.
 - 3) Midwest Fasteners, Inc.
 - 4) or approved equal.
 - b. Baseplate: Perforated, galvanized carbon-steel sheet, 0.030 inch thick by 2 inches square.
 - c. Spindle: Stainless steel, fully annealed, 0.106-inch-diameter shank, length to suit depth of insulation indicated.
 - d. Adhesive: Recommended by hanger manufacturer. Product with demonstrated capability to bond insulation hanger securely to substrates indicated without damaging insulation, hangers, and substrates.
3. Nonmetal, Adhesively Attached, Perforated-Base Insulation Hangers: Baseplate fastened to projecting spindle that is capable of holding insulation, of thickness indicated, securely in position indicated when self-locking washer is in place. Comply with the following requirements:
- a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) Gemco.
 - 2) Midwest Fasteners, Inc.
 - 3) or approved equal.
 - b. Baseplate: Perforated, nylon sheet, 0.030 inch thick by 1-1/2 inches in diameter.
 - c. Spindle: Nylon, 0.106-inch-diameter shank, length to suit depth of insulation indicated, up to 2-1/2 inches.
 - d. Adhesive: Recommended by hanger manufacturer. Product with demonstrated capability to bond insulation hanger securely to substrates indicated without damaging insulation, hangers, and substrates.
4. Self-Sticking-Base Insulation Hangers: Baseplate welded to projecting spindle that is capable of holding insulation, of thickness indicated, securely in position indicated when self-locking washer is in place. Comply with the following requirements:
- a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) AGM Industries, Inc.
 - 2) Gemco.

- 3) Hardcast, Inc.
 - 4) Midwest Fasteners, Inc.
 - 5) or approved equal.
- b. Baseplate: Galvanized carbon-steel sheet, 0.030 inch thick by 2 inches square.
 - c. Spindle: Stainless steel, fully annealed, 0.106-inch-diameter shank, length to suit depth of insulation indicated.
 - d. Adhesive-backed base with a peel-off protective cover.
5. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch-thick, stainless-steel sheet, with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches in diameter.
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) AGM Industries, Inc.
 - 2) Gemco.
 - 3) Hardcast, Inc.
 - 4) Midwest Fasteners, Inc.
 - 5) Nelson Stud Welding.
 - 6) or approved equal.
 - b. Protect ends with capped self-locking washers incorporating a spring steel insert to ensure permanent retention of cap in exposed locations.
 6. Nonmetal Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch-thick nylon sheet, with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches in diameter.
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) Gemco.
 - 2) Midwest Fasteners, Inc.
 - 3) or approved equal.
- C. Staples: Outward-clinching insulation staples, nominal 3/4-inch-wide, stainless steel or Monel.
 - D. Wire: 0.062-inch soft-annealed, stainless steel.
 1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. C & F Wire.
 - b. or approved equal.

2.11 CORNER ANGLES

- A. Aluminum Corner Angles: 0.040 inch thick, minimum 1 by 1 inch, aluminum according to ASTM B 209, Alloy 3003, 3005, 3105, or 5005; Temper H-14.
- B. Stainless-Steel Corner Angles: 0.024 inch thick, minimum 1 by 1 inch, stainless steel according to ASTM A 167 or ASTM A 240/A 240M, Type 316.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of insulation application.
 - 1. Verify that systems to be insulated have been tested and are free of defects.
 - 2. Verify that surfaces to be insulated are clean and dry.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.

3.3 GENERAL INSTALLATION REQUIREMENTS

- A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of ducts and fittings.
- B. Install insulation materials, vapor barriers or retarders, jackets, and thicknesses required for each item of duct system as specified in insulation system schedules.
- C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.
- D. Install insulation with longitudinal seams at top and bottom of horizontal runs.
- E. Install multiple layers of insulation with longitudinal and end seams staggered.
- F. Keep insulation materials dry during application and finishing.
- G. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.

- H. Install insulation with least number of joints practical.
- I. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.
 - 1. Install insulation continuously through hangers and around anchor attachments.
 - 2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.
 - 3. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.
- J. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.
- K. Install insulation with factory-applied jackets as follows:
 - 1. Draw jacket tight and smooth.
 - 2. Cover circumferential joints with 3-inch-wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip, spaced 4 inches o.c.
 - 3. Overlap jacket longitudinal seams at least 1-1/2 inches. Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at 4 inches o.c.
 - a. For below ambient services, apply vapor-barrier mastic over staples.
 - 4. Cover joints and seams with tape, according to insulation material manufacturer's written instructions, to maintain vapor seal.
 - 5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to duct flanges and fittings.
- L. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.
- M. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.
- N. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.

3.4 PENETRATIONS

- A. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.

- B. Insulation Installation at Fire-Rated Wall and Partition Penetrations: Terminate insulation at fire damper sleeves for fire-rated wall and partition penetrations. Externally insulate damper sleeves to match adjacent insulation and overlap duct insulation at least 2 inches.
 - 1. Comply with requirements in Section 07 84 13 "Penetration Firestopping."
- C. Insulation Installation at Floor Penetrations:
 - 1. Duct: For penetrations through fire-rated assemblies, terminate insulation at fire damper sleeves and externally insulate damper sleeve beyond floor to match adjacent duct insulation. Overlap damper sleeve and duct insulation at least 2 inches.
 - 2. Seal penetrations through fire-rated assemblies. Comply with requirements in Section 07 84 13 "Penetration Firestopping."

3.5 INSTALLATION OF MINERAL-FIBER INSULATION

- A. Blanket Insulation Installation on Ducts and Plenums: Secure with adhesive and insulation pins.
 - 1. Apply adhesives according to manufacturer's recommended coverage rates per unit area, for 50 percent coverage of duct and plenum surfaces.
 - 2. Apply adhesive to entire circumference of ducts and to all surfaces of fittings and transitions.
 - 3. Install either capacitor-discharge-weld pins and speed washers or cupped-head, capacitor-discharge-weld pins on sides and bottom of horizontal ducts and sides of vertical ducts as follows:
 - a. On duct sides with dimensions 18 inches and smaller, place pins along longitudinal centerline of duct. Space 3 inches maximum from insulation end joints, and 16 inches o.c.
 - b. On duct sides with dimensions larger than 18 inches, place pins 16 inches o.c. each way, and 3 inches maximum from insulation joints. Install additional pins to hold insulation tightly against surface at cross bracing.
 - c. Pins may be omitted from top surface of horizontal, rectangular ducts and plenums.
 - d. Do not overcompress insulation during installation.
 - e. Impale insulation over pins and attach speed washers.
 - f. Cut excess portion of pins extending beyond speed washers or bend parallel with insulation surface. Cover exposed pins and washers with tape matching insulation facing.
 - 4. For ducts and plenums with surface temperatures below ambient, install a continuous unbroken vapor barrier. Create a facing lap for longitudinal seams and end joints with insulation by removing 2 inches from one edge and one end of insulation segment. Secure laps to adjacent insulation section with 1/2-inch outward-clinching staples, 1 inch o.c. Install vapor barrier consisting of factory- or field-applied jacket, adhesive, vapor-barrier mastic, and sealant at joints, seams, and protrusions.
 - a. Repair punctures, tears, and penetrations with tape or mastic to maintain vapor-barrier seal.

- b. Install vapor stops for ductwork and plenums operating below 50 deg F at 18-foot intervals. Vapor stops shall consist of vapor-barrier mastic applied in a Z-shaped pattern over insulation face, along butt end of insulation, and over the surface. Cover insulation face and surface to be insulated a width equal to two times the insulation thickness, but not less than 3 inches.
 - 5. Overlap unfaced blankets a minimum of 2 inches on longitudinal seams and end joints. At end joints, secure with steel bands spaced a maximum of 18 inches o.c.
 - 6. Install insulation on rectangular duct elbows and transitions with a full insulation section for each surface. Install insulation on round and flat-oval duct elbows with individually mitered gores cut to fit the elbow.
 - 7. Insulate duct stiffeners, hangers, and flanges that protrude beyond insulation surface with 6-inch-wide strips of same material used to insulate duct. Secure on alternating sides of stiffener, hanger, and flange with pins spaced 6 inches o.c.
- B. Board Insulation Installation on Ducts and Plenums: Secure with adhesive and insulation pins.
- 1. Apply adhesives according to manufacturer's recommended coverage rates per unit area, for 50 percent coverage of duct and plenum surfaces.
 - 2. Apply adhesive to entire circumference of ducts and to all surfaces of fittings and transitions.
 - 3. Install either capacitor-discharge-weld pins and speed washers or cupped-head, capacitor-discharge-weld pins on sides and bottom of horizontal ducts and sides of vertical ducts as follows:
 - a. On duct sides with dimensions 18 inches and smaller, place pins along longitudinal centerline of duct. Space 3 inches maximum from insulation end joints, and 16 inches o.c.
 - b. On duct sides with dimensions larger than 18 inches, space pins 16 inches o.c. each way, and 3 inches maximum from insulation joints. Install additional pins to hold insulation tightly against surface at cross bracing.
 - c. Pins may be omitted from top surface of horizontal, rectangular ducts and plenums.
 - d. Do not overcompress insulation during installation.
 - e. Cut excess portion of pins extending beyond speed washers or bend parallel with insulation surface. Cover exposed pins and washers with tape matching insulation facing.
 - 4. For ducts and plenums with surface temperatures below ambient, install a continuous unbroken vapor barrier. Create a facing lap for longitudinal seams and end joints with insulation by removing 2 inches from one edge and one end of insulation segment. Secure laps to adjacent insulation section with 1/2-inch outward-clinching staples, 1 inch o.c. Install vapor barrier consisting of factory- or field-applied jacket, adhesive, vapor-barrier mastic, and sealant at joints, seams, and protrusions.
 - a. Repair punctures, tears, and penetrations with tape or mastic to maintain vapor-barrier seal.
 - b. Install vapor stops for ductwork and plenums operating below 50 deg F at 18-foot intervals. Vapor stops shall consist of vapor-barrier mastic applied in a Z-shaped pattern over insulation face, along butt end of insulation, and over the surface.

Cover insulation face and surface to be insulated a width equal to two times the insulation thickness, but not less than 3 inches.

5. Install insulation on rectangular duct elbows and transitions with a full insulation section for each surface. Groove and score insulation to fit as closely as possible to outside and inside radius of elbows. Install insulation on round and flat-oval duct elbows with individually mitered gores cut to fit the elbow.
6. Insulate duct stiffeners, hangers, and flanges that protrude beyond insulation surface with 6-inch-wide strips of same material used to insulate duct. Secure on alternating sides of stiffener, hanger, and flange with pins spaced 6 inches o.c.

3.6 FIELD-APPLIED JACKET INSTALLATION

- A. Where glass-cloth jackets are indicated, install directly over bare insulation or insulation with factory-applied jackets.
 1. Draw jacket smooth and tight to surface with 2-inch overlap at seams and joints.
 2. Embed glass cloth between two 0.062-inch-thick coats of lagging adhesive.
 3. Completely encapsulate insulation with coating, leaving no exposed insulation.
- B. Where FSK jackets are indicated, install as follows:
 1. Draw jacket material smooth and tight.
 2. Install lap or joint strips with same material as jacket.
 3. Secure jacket to insulation with manufacturer's recommended adhesive.
 4. Install jacket with 1-1/2-inch laps at longitudinal seams and 3-inch-wide joint strips at end joints.
 5. Seal openings, punctures, and breaks in vapor-retarder jackets and exposed insulation with vapor-barrier mastic.

3.7 FIRE-RATED INSULATION SYSTEM INSTALLATION

- A. Where fire-rated insulation system is indicated, secure system to ducts and duct hangers and supports to maintain a continuous fire rating.
- B. Insulate duct access panels and doors to achieve same fire rating as duct.
- C. Install firestopping at penetrations through fire-rated assemblies.

3.8 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- B. Perform tests and inspections.
- C. Tests and Inspections:

1. Inspect ductwork, randomly selected by Architect, by removing field-applied jacket and insulation in layers in reverse order of their installation. Extent of inspection shall be limited to two location(s) for each duct system defined in the "Duct Insulation Schedule, General" Article.
- D. All insulation applications will be considered defective Work if sample inspection reveals noncompliance with requirements.

3.9 DUCT INSULATION SCHEDULE, GENERAL

- A. Plenums and Ducts Requiring Insulation:
1. Indoor, concealed supply return, and outdoor air ducts and plenums.
 2. Indoor, exposed supply and outdoor air (SCE 23 31 13 – metal ducts).
- B. Items Not Insulated:
1. Fibrous-glass ducts.
 2. Metal ducts with duct liner of sufficient thickness to comply with energy code and ASHRAE/IESNA 90.1.
 3. Factory-insulated flexible ducts.
 4. Factory-insulated plenums and casings.
 5. Flexible connectors.
 6. Vibration-control devices.
 7. Factory-insulated access panels and doors.

3.10 INDOOR DUCT AND PLENUM INSULATION SCHEDULE

- A. Concealed, rectangular, round or flat-oval, supply-air duct return and plenum insulation shall be:
1. Mineral-Fiber Blanket: 1-1/2 inches thick and 0.75-lb/cu. ft. nominal density.
- B. All exposed ductwork (not including mechanical equipment spaces) shall use internal lining. See Section 23 31 13 – Metal Ducts.

END OF SECTION 23 07 13

SECTION 26 05 33 - RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Metal conduits and fittings.
 - 2. Boxes, enclosures, and cabinets.

1.3 DEFINITIONS

- A. GRC: Galvanized rigid steel conduit.
- B. IMC: Intermediate metal conduit.

1.4 ACTION SUBMITTALS

- A. Product Data: For surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.
- B. Shop Drawings: For custom enclosures and cabinets. Include plans, elevations, sections, and attachment details.

1.5 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Conduit routing plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of items involved:
 - 1. Structural members in paths of conduit groups with common supports.
 - 2. HVAC and plumbing items and architectural features in paths of conduit groups with common supports.
- B. Source quality-control reports.

PART 2 - PRODUCTS

2.1 METAL CONDUITS AND FITTINGS

A. Metal Conduit:

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. AFC Cable Systems; a part of Atkore International.
 - b. Allied Tube & Conduit; a part of Atkore International.
 - c. Anamet Electrical, Inc.
 - d. O-Z/Gedney; a brand of Emerson Industrial Automation.
 - e. Western Tube and Conduit Corporation.
 - f. Or approved equal.
2. Listing and Labeling: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
3. GRC: Comply with ANSI C80.1 and UL 6.
4. IMC: Comply with ANSI C80.6 and UL 1242.
5. EMT: Comply with ANSI C80.3 and UL 797.
6. FMC: Comply with UL 1; zinc-coated steel.
7. LFMC: Flexible steel conduit with PVC jacket and complying with UL 360.

B. Metal Fittings:

1. Comply with NEMA FB 1 and UL 514B.
2. Listing and Labeling: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
3. Fittings, General: Listed and labeled for type of conduit, location, and use.
4. Fittings for EMT:
 - a. Material: Steel.
 - b. Type: compression.
5. Expansion Fittings: PVC or steel to match conduit type, complying with UL 651, rated for environmental conditions where installed, and including flexible external bonding jumper.

- C. Joint Compound for IMC or GRC: Approved, as defined in NFPA 70, by authorities having jurisdiction for use in conduit assemblies, and compounded for use to lubricate and protect threaded conduit joints from corrosion and to enhance their conductivity.

2.2 BOXES, ENCLOSURES, AND CABINETS

- 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. Crouse-Hinds, an Eaton business.
 2. EGS/Appleton Electric.
 3. Erickson Electrical Equipment Company.
 4. Hoffman; a brand of Pentair Equipment Protection.
 5. Hubbell Incorporated; Wiring Device-Kellems.
 6. Thomas & Betts Corporation; A Member of the ABB Group.
 7. Wiremold / Legrand.
 8. Or approved equal.
- B. General Requirements for Boxes, Enclosures, and Cabinets: Boxes, enclosures, and cabinets installed in wet locations shall be listed for use in wet locations.
- C. Sheet Metal Outlet and Device Boxes: Comply with NEMA OS 1 and UL 514A.
- D. Metal Floor Boxes:
1. Material: Cast metal.
 2. Type: Semi-adjustable.
 3. Shape: Round.
 4. Listing and Labeling: Metal floor boxes shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- E. Luminaire Outlet Boxes: Nonadjustable, designed for attachment of luminaire weighing 50 lb. Outlet boxes designed for attachment of luminaires weighing more than 50 lb shall be listed and marked for the maximum allowable weight.
- F. Paddle Fan Outlet Boxes: Nonadjustable, designed for attachment of paddle fan weighing 70 lb.
1. Listing and Labeling: Paddle fan outlet boxes shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- G. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.
- H. Device Box Dimensions: 4 inches square by 2-1/8 inches deep.
- I. Hinged-Cover Enclosures: Comply with UL 50 and NEMA 250, Type 1 with continuous-hinge cover with flush latch unless otherwise indicated.
1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.
- J. Cabinets:

1. NEMA 250, Type 1 galvanized-steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel.
2. Hinged door in front cover with flush latch and concealed hinge.
3. Key latch to match panelboards.
4. Metal barriers to separate wiring of different systems and voltage.
5. Accessory feet where required for freestanding equipment.

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

- A. Indoors: Apply raceway products as specified below unless otherwise indicated:
1. Exposed, Not Subject to Physical Damage: EMT.
 2. Exposed and Subject to Severe Physical Damage: GRC. Raceway locations include the following:
 - a. Loading dock.
 - b. Corridors used for traffic of mechanized carts, forklifts, and pallet-handling units.
 - c. Mechanical rooms.
 3. Concealed in Ceilings and Interior Walls and Partitions: EMT.
 4. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.
 5. Damp or Wet Locations: GRC.
 6. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 4 stainless steel in institutional and commercial kitchens and damp or wet locations.
- B. Minimum Raceway Size: 3/4-inch trade size.
- C. Raceway Fittings: Compatible with raceways and suitable for use and location.
1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings unless otherwise indicated. Comply with NEMA FB 2.10.
 2. EMT: Use compression, steel fittings. Comply with NEMA FB 2.10.
 3. Flexible Conduit: Use only fittings listed for use with flexible conduit. Comply with NEMA FB 2.20.
- D. Do not install aluminum conduits, boxes, or fittings in contact with concrete or earth.

3.2 INSTALLATION

- A. Comply with requirements in Section 26 05 29 "Hangers and Supports for Electrical Systems" for hangers and supports.

- B. Comply with NECA 1 and NECA 101 for installation requirements except where requirements on Drawings or in this article are stricter. Comply with NECA 102 for aluminum conduits. Comply with NFPA 70 limitations for types of raceways allowed in specific occupancies and number of floors.
- C. Do not fasten conduits onto the bottom side of a metal deck roof.
- D. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.
- E. Complete raceway installation before starting conductor installation.
- F. Arrange stub-ups so curved portions of bends are not visible above finished slab.
- G. Install no more than the equivalent of three 90-degree bends in any conduit run except for control wiring conduits, for which fewer bends are allowed. Support within 12 inches of changes in direction.
- H. Make bends in raceway using large-radius preformed ells. Field bending shall be according to NFPA 70 minimum radii requirements. Use only equipment specifically designed for material and size involved.
- I. Conceal conduit within finished walls, ceilings, and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines.
- J. Support conduit within 12 inches of enclosures to which attached.
- K. Stub-Ups to Above Recessed Ceilings:
 - 1. Use EMT or RMC for raceways.
 - 2. Use a conduit bushing or insulated fitting to terminate stub-ups not terminated in hubs or in an enclosure.
- L. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.
- M. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors including conductors smaller than No. 4 AWG.
- N. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install bushings on conduits up to 1-1/4-inch trade size and insulated throat metal bushings on 1-1/2-inch trade size and larger conduits terminated with locknuts. Install insulated throat metal grounding bushings on service conduits.
- O. Install raceways square to the enclosure and terminate at enclosures with locknuts. Install locknuts hand tight plus 1/4 turn more.

- P. Do not rely on locknuts to penetrate nonconductive coatings on enclosures. Remove coatings in the locknut area prior to assembling conduit to enclosure to assure a continuous ground path.
- Q. Cut conduit perpendicular to the length. For conduits 2-inch trade size and larger, use roll cutter or a guide to make cut straight and perpendicular to the length.
- R. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire. Cap underground raceways designated as spare above grade alongside raceways in use.
- S. Install raceway sealing fittings at accessible locations according to NFPA 70 and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings according to NFPA 70.
- T. Install devices to seal raceway interiors at accessible locations. Locate seals so no fittings or boxes are between the seal and the following changes of environments. Seal the interior of all raceways at the following points:
 1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
 2. Where otherwise required by NFPA 70.
- U. Comply with manufacturer's written instructions for solvent welding RNC and fittings.
- V. Expansion-Joint Fittings:
 1. Install fitting(s) that provide expansion and contraction for at least 0.00041 inch per foot of length of straight run per deg F of temperature change for PVC conduits. Install fitting(s) that provide expansion and contraction for at least 0.000078 inch per foot of length of straight run per deg F of temperature change for metal conduits.
 2. Install expansion fittings at all locations where conduits cross building or structure expansion joints.
 3. Install each expansion-joint fitting with position, mounting, and piston setting selected according to manufacturer's written instructions for conditions at specific location at time of installation. Install conduit supports to allow for expansion movement.
- W. Flexible Conduit Connections: Comply with NEMA RV 3. Use a maximum of 72 inches of flexible conduit for recessed and semirecessed luminaires, equipment subject to vibration, noise transmission, or movement; and for transformers and motors.
 1. Use LFMC in damp or wet locations subject to severe physical damage.
- X. Mount boxes at heights indicated on Drawings. If mounting heights of boxes are not individually indicated, give priority to ADA requirements. Install boxes with height measured to bottom of box unless otherwise indicated.
- Y. Horizontally separate boxes mounted on opposite sides of walls so they are not in the same vertical channel.

- Z. Locate boxes so that cover or plate will not span different building finishes.
- AA. Support boxes of three gangs or more from more than one side by spanning two framing members or mounting on brackets specifically designed for the purpose.
- BB. Fasten junction and pull boxes to or support from building structure. Do not support boxes by conduits.
- CC. Set metal floor boxes level and flush with finished floor surface.

3.3 FIRESTOPPING

- A. Install firestopping at penetrations of fire-rated floor and wall assemblies.

3.4 PROTECTION

- A. Protect coatings, finishes, and cabinets from damage and deterioration.
 - 1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.

END OF SECTION 26 05 33

SECTION 26 09 23 - LIGHTING CONTROL DEVICES

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. Standalone daylight-harvesting switching and dimming controls.
 - 2. Indoor occupancy and vacancy sensors.
 - 3. Switchbox-mounted occupancy sensors.
 - 4. Emergency shunt relays.
- B. Related Requirements:
 - 1. Section 26 27 26 "Wiring Devices" for wall-box dimmers, non-networkable wall-switch occupancy sensors, and manual light switches.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings:
 - 1. Show installation details for the following:
 - a. Vacancy sensors.
 - 2. Interconnection diagrams showing field-installed wiring.
 - 3. Include diagrams for power, signal, and control wiring.

1.4 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Reflected ceiling plan(s) and elevations, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
 - 1. Suspended ceiling components.
 - 2. Structural members to which equipment will be attached.
 - 3. Items penetrating finished ceiling, including the following:

- a. Luminaires.
 - b. Air outlets and inlets.
 - c. Speakers.
 - d. Sprinklers.
 - e. Access panels.
 - f. Control modules.
- B. Field quality-control reports.
 - C. Sample Warranty: For manufacturer's warranties.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For each type of lighting control device to include in operation and maintenance manuals.
- B. Software and Firmware Operational Documentation:
 - 1. Software operating and upgrade manuals.
 - 2. Program Software Backup: On manufacturer's website. Provide names, versions, and website addresses for locations of installed software.
 - 3. Device address list.
 - 4. Printout of software application and graphic screens.

1.6 WARRANTY

- A. Manufacturer's Warranty: Manufacturer and Installer agree to repair or replace lighting control devices that fail(s) in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Faulty operation of lighting control software.
 - b. Faulty operation of lighting control devices.
 - 2. Warranty Period: [Two] year(s) from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 DAYLIGHT-HARVESTING DIMMING CONTROLS

- 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. Hubbell Building Automation, Inc.
 - 2. Leviton Manufacturing Co., Inc.
 - 3. Lithonia Lighting; Acuity Brands Lighting, Inc.

4. Or approved equal.
- B. System Description: Sensing daylight and electrical lighting levels, the system adjusts the indoor electrical lighting levels. As daylight increases, the lights are dimmed.
1. Lighting control set point is based on two lighting conditions:
 - a. When no daylight is present (target level).
 - b. When significant daylight is present.
 2. System programming is done with two hand-held, remote-control tools.
 - a. Initial setup tool.
 - b. Tool for occupants to adjust the target levels by increasing the set point up to 25 percent, or by minimizing the electric lighting level.
- C. Ceiling-Mounted Dimming Controls: Solid-state, light-level sensor unit, with integrated power pack mounted on luminaire, to detect changes in indoor lighting levels that are perceived by the eye.
- D. Electrical Components, Devices, and Accessories:
1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
 2. Sensor Output: 0- to 10-V dc to operate luminaires. Sensor is powered by controller unit.
 3. Light-Level Sensor Set-Point Adjustment Range: 20 to 60 fc.
- E. Power Pack: Digital controller capable of accepting 4 RJ45 inputs with two outputs rated for 20-A incandescent LED load at 120- and 277-V ac, for 16-A LED at 120- and 277-V ac, and for 1 hp at 120-V ac. Sensor has 24-V dc Class 2 power source, as defined by NFPA 70.

2.2 INDOOR OCCUPANCY AND VACANCY SENSORS

- 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. Cooper Industries, Inc.
 2. Hubbell Building Automation, Inc.
 3. Intermatic, Inc.
 4. Leviton Manufacturing Co., Inc.
 5. Lithonia Lighting; Acuity Brands Lighting, Inc.
 6. Philips Lighting Controls.
 7. Sensor Switch, Inc.
 8. Or approved equal.
- B. General Requirements for Sensors:
1. Ceiling-mounted, solid-state indoor vacancy sensors.

2. Dual technology.
 3. Integrated power pack.
 4. Hardwired connection to switch; and BAS and lighting control system.
 5. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
 6. Operation:
 - a. Vacancy Sensor: Unless otherwise indicated, lights are manually turned on and sensor turns lights off when the room is unoccupied; with a time delay for turning lights off, adjustable over a minimum range of 1 to 15 minutes.
 7. Sensor Output: Contacts rated to operate the connected relay, complying with UL 773A.
 8. Power: Line voltage.
 9. Power Pack: Dry contacts rated for 20-A LED load at 120- and 277-V ac, for 13-A tungsten at 120-V ac, and for 1 hp at 120-V ac. Sensor has 24-V dc, 150-mA, Class 2 power source, as defined by NFPA 70.
 10. Mounting:
 - a. Sensor: Suitable for mounting in any position on a standard outlet box.
 - b. Relay: Externally mounted through a 1/2-inch knockout in a standard electrical enclosure.
 - c. Time-Delay and Sensitivity Adjustments: Recessed and concealed behind hinged door.
 11. Indicator: Digital display, to show when motion is detected during testing and normal operation of sensor.
 12. Bypass Switch: Override the "on" function in case of sensor failure.
 13. Automatic Light-Level Sensor: Adjustable from 2 to 200 fc; turn lights off when selected lighting level is present.
- C. Dual-Technology Type: Ceiling mounted; detect occupants in coverage area using PIR and ultrasonic detection methods. The particular technology or combination of technologies that control on-off functions is selectable in the field by operating controls on unit.
1. Sensitivity Adjustment: Separate for each sensing technology.
 2. Detector Sensitivity: Detect occurrences of 6-inch-minimum movement of any portion of a human body that presents a target of not less than 36 sq. in., and detect a person of average size and weight moving not less than 12 inches in either a horizontal or a vertical manner at an approximate speed of 12 inches/s.
 3. Detection Coverage (Standard Room): Detect occupancy anywhere within a circular area of 1000 sq. ft. when mounted on a 96-inch-high ceiling.

2.3 SWITCHBOX-MOUNTED OCCUPANCY SENSORS

- 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. Cooper Industries, Inc.
 2. Hubbell Building Automation, Inc.

3. Leviton Manufacturing Co., Inc.
 4. Lithonia Lighting; Acuity Brands Lighting, Inc.
 5. Lutron Electronics Co., Inc.
 6. Sensor Switch, Inc.
 7. Or approved equal.
- B. General Requirements for Sensors: Automatic-wall-switch occupancy sensor with manual on-off switch, suitable for mounting in a single gang switchbox, with provisions for connection to BAS.
1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application, and shall comply with California Title 24.
 2. Occupancy Sensor Operation: Unless otherwise indicated, turn lights on when coverage area is occupied, and turn lights off when unoccupied; with a time delay for turning lights off, adjustable over a minimum range of 1 to 15 minutes.
 3. Operating Ambient Conditions: Dry interior conditions, 32 to 120 deg F.
 4. Switch Rating: Not less than 800-VA ballast or LED load at 120 V, 1200-VA ballast or LED load at 277 V, and 800-W incandescent.
- C. Wall-Switch Sensor Tag WS2:
1. Standard Range: 210-degree field of view, with a minimum coverage area of 900 sq. ft..
 2. Sensing Technology: PIR.
 3. Switch Type: SP, manual "on," automatic "off."
 4. Capable of controlling load in three-way application.
 5. Voltage: Dual voltage, 120 and 277 V.
 6. Ambient-Light Override: Concealed, field-adjustable, light-level sensor from 10 to 150 fc. The switch prevents the lights from turning on when the light level is higher than the set point of the sensor.
 7. Concealed, "off" time-delay selector at 30 seconds and 5, 10, and 20 minutes.
 8. Color: White.
 9. Faceplate: Color matched to switch.

2.4 EMERGENCY SHUNT RELAY

- A. Description: NC, electrically held relay, arranged for wiring in parallel with manual or automatic switching contacts; complying with UL 924.

2.5 CONDUCTORS AND CABLES

- A. Power Wiring to Supply Side of Remote-Control Power Sources: Not smaller than No. 12 AWG. Comply with requirements in Section 26 05 19 "Low-Voltage Electrical Power Conductors and Cables."
- B. Classes 2 and 3 Control Cable: Multiconductor cable with stranded-copper conductors not smaller than No. 18 AWG. Comply with requirements in Section 26 05 19 "Low-Voltage Electrical Power Conductors and Cables."

- C. Class 1 Control Cable: Multiconductor cable with stranded-copper conductors not smaller than No. 14 AWG. Comply with requirements in Section 26 05 19 "Low-Voltage Electrical Power Conductors and Cables."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine lighting control devices before installation. Reject lighting control devices that are wet, moisture damaged, or mold damaged.
- B. Examine walls and ceilings for suitable conditions where lighting control devices will be installed.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 SENSOR INSTALLATION

- A. Comply with NECA 1.
- B. Coordinate layout and installation of ceiling-mounted devices with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, smoke detectors, fire-suppression systems, and partition assemblies.
- C. Install and aim sensors in locations to achieve not less than 90-percent coverage of areas indicated. Do not exceed coverage limits specified in manufacturer's written instructions.

3.3 WIRING INSTALLATION

- A. Comply with NECA 1.
- B. Wiring Method: Comply with Section 26 05 19 "Low-Voltage Electrical Power Conductors and Cables." Minimum conduit size is 1/2 inch.
- C. Wiring within Enclosures: Comply with NECA 1. Separate power-limited and nonpower-limited conductors according to conductor manufacturer's written instructions.
- D. Size conductors according to lighting control device manufacturer's written instructions unless otherwise indicated.
- E. Splices, Taps, and Terminations: Make connections only on numbered terminal strips in junction, pull, and outlet boxes; terminal cabinets; and equipment enclosures.

3.4 IDENTIFICATION

- A. Identify components and power and control wiring according to Section 26 05 53 "Identification for Electrical Systems."
 - 1. Identify controlled circuits in lighting contactors.
 - 2. Identify circuits or luminaires controlled by photoelectric and occupancy sensors at each sensor.
- B. Label time switches and contactors with a unique designation.

3.5 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to evaluate lighting control devices and perform tests and inspections.
- B. Perform the following tests and inspections:
 - 1. Operational Test: After installing time switches and sensors, and after electrical circuitry has been energized, start units to confirm proper unit operation.
 - 2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- C. Lighting control devices will be considered defective if they do not pass tests and inspections.
- D. Prepare test and inspection reports.

3.6 ADJUSTING

- A. Occupancy Adjustments: When requested within 12 months from date of Substantial Completion, provide on-site assistance in adjusting lighting control devices to suit actual occupied conditions. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose.
 - 1. For occupancy and motion sensors, verify operation at outer limits of detector range. Set time delay to suit Owner's operations.
 - 2. For daylighting controls, adjust set points and deadband controls to suit Owner's operations.
 - 3. Align high-bay occupancy sensors using manufacturer's laser aiming tool.

3.7 SOFTWARE SERVICE AGREEMENT

- A. Technical Support: Beginning at Substantial Completion, service agreement shall include software support for two years.

- B. Upgrade Service: At Substantial Completion, update software to latest version. Install and program software upgrades that become available within two years from date of Substantial Completion. Upgrading software shall include operating system and new or revised licenses for using software.
 - 1. Upgrade Notice: At least 30 days to allow Owner to schedule and access the system and to upgrade computer equipment if necessary.

3.8 DEMONSTRATION

- A. Coordinate demonstration of products specified in this Section with demonstration requirements for low-voltage, programmable lighting control systems.
- B. Train Owner's maintenance personnel to adjust, operate, and maintain lighting control devices.

END OF SECTION 26 09 23

SECTION 26 09 26 - LIGHTING CONTROL PANELBOARDS

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: Lighting controls using electrically operated circuit breakers.
- B. Related Requirements:
 - 1. Section 260923 "Lighting Control Devices" for time switches, photoelectric switches, occupancy sensors and vacancy sensors connected to building automation or lighting control systems, multipole contactors, and emergency shunt relays.

1.3 DEFINITIONS

- A. DDC: Direct digital control.
- B. IP: Internet protocol.
- C. Low Voltage: As defined in NFPA 70 for circuits and equipment operating at less than 50 V or for remote-control, signaling power-limited circuits.
- D. Monitoring: Acquisition, processing, communication, and display of equipment status data, metered electrical parameter values, power quality evaluation data, event and alarm signals, tabulated reports, and event logs.
- E. PC: Personal computer; sometimes plural as "PCs."
- F. RS-485: A serial network protocol, similar to RS-232, complying with TIA-485-A.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for control modules, power distribution components, manual switches and plates, and conductors and cables.

2. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.
- B. Shop Drawings: For each lighting control panelboard and related equipment.
1. Include dimensioned plans, elevations, sections, and details. Show tabulations of installed devices, equipment features, and ratings.
 2. Detail enclosure types and details for types other than NEMA 250, Type 1.
 3. Detail bus configuration and current and voltage ratings.
 4. Short-circuit current rating of panelboards and overcurrent protective devices.
 5. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.
 6. Include diagrams for power, signal, and control wiring.
 7. Block Diagram: Show interconnections between new and existing components specified in this Section and devices furnished with power distribution system components. Indicate data communication paths and identify networks, data buses, data gateways, concentrators, and other devices to be used. Describe characteristics of network and other data communication lines.

1.5 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Submit evidence that lighting controls are compatible with connected monitoring and control devices and systems specified in other Sections.
1. Show interconnecting signal and control wiring and interfacing devices that prove compatibility of inputs and outputs.
 2. For networked controls, list network protocols and provide statements from manufacturers that input and output devices comply with interoperability requirements of the network protocol.
- B. Qualification Data: For testing agency.
- C. Seismic Qualification Data: Certificates, for panelboards, accessories, and components, from manufacturer.
1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
 2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
 3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
- D. Field quality-control reports.

1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For lighting controls to include in emergency, operation, and maintenance manuals.
- B. Software and Firmware Operational Documentation:
 - 1. Software operating and upgrade manuals.
 - 2. Program Software Backup: On manufacturer's website. Provide names, versions, and website addresses for locations of installed software.
 - 3. Printout of software application and graphic screens.
 - 4. Device address list.

1.7 QUALITY ASSURANCE

- A. Testing Agency Qualifications:
 - 1. Member company of NETA.
 - a. Testing Agency's Field Supervisor: Certified by NETA to supervise on-site testing.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Handle and prepare panelboards for installation according to NECA 407.

1.9 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of lighting control panelboards that fail in materials or workmanship within specified warranty period.
 - 1. 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. Eaton.
 - 2. General Electric Company; GE Energy Management - Electrical Distribution.
 - 3. Lithonia Lighting; Acuity Brands Lighting, Inc.
 - 4. NexLight.
 - 5. Or approved equal.

- B. Source Limitations: Obtain lighting controls and power distribution components from single manufacturer.

2.2 SYSTEM DESCRIPTION

- A. Input signal from field-mounted or onboard signal source shall open or close one or more electrically operated circuit breakers in the lighting control panelboards. Any combination of inputs shall be programmable to any combination outputs.
- B. 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.
- C. Comply with 47 CFR, Subpart A and Subpart B, for Class A digital devices.

2.3 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Panelboards shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
 - 1. The term "withstand" means "the unit will remain in place without separation of any parts when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."
- B. Expansion Requirements: Capacity for future expansion of number of control functions by 25 percent of current capacity; to include equipment ratings, housing capacities, spare spaces for circuit breakers, terminals, number of conductors in control cables, and control software.
- C. Source Limitations: Obtain the following from a single manufacturer:
 - 1. Panelboards.
 - 2. Circuit breakers.
 - 3. Controllers.
 - 4. Slave panel controllers.

2.4 CONTROLLERS

- A. Description: Controllers shall contain the power supply and electronic control for operating and monitoring remotely operated branch circuit breakers.
 - 1. Comply with UL 916; with a microprocessor-based, solid-state, 365-day timing and control unit.
 - 2. Power Supply: Powered from the panelboard, sized to provide control power for the operation of the remotely operated circuit breakers, controller, bus system, low-voltage inputs, field-installed occupancy sensors, and low-voltage photo sensors.
 - 3. Integral keypad and digital-display front panel for local setup, including the following:

- a. Blink notice, time adjustable from software.
 - b. Ability to log and display remotely operated breaker-on-time.
 - c. Upgradeable firmware, so that the latest production features may be added in the future without replacing the module.
4. Nonvolatile memory shall retain all setup configurations. After a power failure, the controller shall automatically reboot and return to normal system operation.
 5. Ethernet Communications: Comply with ASHRAE 135 protocols.
 - a. Each input connected to the controller shall control any remotely operated breaker in any other networked lighting control panel.
 - b. A schedule programmed at one controller shall be able to control any remotely operated breaker in any other networked lighting control panel.
 6. Time Synchronization: The timing unit shall be updated not less than every 24 hour(s) with the network time server.
 7. Web Server: Display information listed below over a standard Web-enabled server for displaying information over a standard Web browser.
 - a. A secure, password-protected login screen for modifying operational parameters, accessible to authorized users via webpage interface.
 - b. Separate webpage, showing status of each main and slave lighting control panel, with the arrangement of breakers on the page matching the physical appearance of the panel. Status shall include breaker nametags, pole configuration, location in panel, actual contact state (on-off/tripped/manual), and breaker-on-time and blink information in real time.
 - c. Panel summary showing the master and slave panels connected to the controller.
 - d. Controller diagnostic information.
 - e. Show front panel mimic screens for setting up controller parameters, input types, zones, and operating schedules. These mimic screens shall also allow direct breaker control and zone overrides.
 8. Alarm and E-mail Notification: Automatically initiate alarms based on preconfigured conditions listed below and routing alarm alerts as set at the control panel.
 - a. General Alarms: Power loss, nonresponding breakers, loss and restoration of sub-net communications, loss and restoration of serial port communications, and loss and restoration of DDC system for HVAC commands.
 - b. Specific Alarms: Input status, zone status, breaker-on-time status (0 to 99999 hours).
 - c. E-mail Notification: Automatically route e-mail messages to five individual e-mail addresses. Within the body text of the e-mail, include a link that automatically redirects the user to the associated panels' status webpage.

2.5 CONTROL NETWORK

- A. Panel Controllers: Networked with other lighting control panel controllers in a peer-to-peer configuration using Ethernet 10Base-T network or two wire system.

- B. Compliance with ASHRAE 135: Controllers shall support serial MS/TP and Ethernet IP communications, and shall be able to communicate directly via DDC system for HVAC RS-485 serial networks and Ethernet 10Base-T networks as a native device.

2.6 MANUAL SWITCHES AND PLATES

- A. Keypads: Programmable and designed to control lighting applications and functions associated with the equipment of this Section. The units shall be able to control any system output device, including remotely operated circuit breakers, relays, dimmers, and analog outputs.
- B. Push-Button Switches: Modular, momentary-contact, low-voltage type.
 - 1. Match color specified in Section 262726 "Wiring Devices."
- C. Wall Plates: Single- and multigang plates as specified in Section 262726 "Wiring Devices."
- D. Legend: Engraved or permanently silk-screened on wall plate where indicated. Use designations indicated on Drawings.

2.7 CONDUCTORS AND CABLES

- A. Power Wiring to Supply Side of Class 2 Power Source: Not smaller than No. 12 AWG. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables."
- B. Class 2 and Class 3 Control Cables: Multiconductor cable with copper conductors not smaller than No. 18 AWG. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables."
- C. Class 1 Control Cables: Multiconductor cable with copper conductors not smaller than No. 14 AWG. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables."
- D. Network Cabling: Unshielded, twisted-pair cable with copper conductors, Category 5e.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Receive, inspect, handle, and store panelboards according to NECA 407.
- B. Examine panelboards before installation. Reject panelboards that are, damaged, rusted, or water saturated.
- C. Examine elements and surfaces to receive panelboards for compliance with installation tolerances and other conditions affecting performance of the Work.

- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 WIRING INSTALLATION

- A. Comply with NECA 1.
- B. Wiring Method: Install cables in raceways and cable trays, except within consoles, cabinets, desks, and counters and except in accessible ceiling spaces and in gypsum board partitions where unenclosed wiring method may be used. Conceal raceways and cables, except in unfinished spaces.
 - 1. Comply with requirements for raceways and boxes specified in Section 260533 "Raceways and Boxes for Electrical Systems."
- C. Wiring Method: Conceal conductors and cables in accessible ceilings, walls, and floors where possible.
- D. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points with no excess and without exceeding manufacturer's limitations on bending radii. Install lacing bars and distribution spools.

3.3 PANELBOARD INSTALLATION

- A. Comply with NECA 1.
- B. Install panelboards and accessories according to NECA 407.
- C. Mounting Height: 90 inches to top of trim above finished floor unless otherwise indicated.
- D. Mount panelboard cabinet plumb and rigid without distortion of box. Mount recessed panelboards with fronts uniformly flush with wall finish and mating with back box.
- E. Install filler plates in unused spaces.

3.4 IDENTIFICATION

- A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."
- B. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs complying with Section 260553 "Identification for Electrical Systems."
- C. Create a directory to indicate loads served by each circuit; incorporate Owner's final room designations. Obtain approval before installing. Use a computer or typewriter to create directory; handwritten directories are unacceptable.
- D. Panelboard Nameplates: Label each panelboard with a nameplate complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

3.5 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.
- C. Perform the following tests and inspections:
 - 1. Visual and Mechanical Inspection:
 - a. Verify equipment nameplate.
 - b. Inspect physical and mechanical conditions.
 - c. Inspect anchorage, alignment, and grounding.
 - d. Verify that unit is clean.
 - e. Operate circuit breaker to ensure smooth operation.
 - f. Inspect bolted electrical connections for high resistance, using one or more of the following methods:
 - 1) Using a low-resistance ohmmeter.
 - 2) Verify bolted connections, using a calibrated torque wrench method according to manufacturer's published data.
 - g. Inspect operating mechanism, contacts, and arc chutes in unsealed units.
 - h. Perform adjustments for final protective device settings according to coordination study.
 - 2. Electrical Tests:
 - a. Measure resistance through bolted connections with low-resistance ohmmeter.
 - b. Contact/pole resistance test.
 - c. Insulation resistance tests on all control wiring with respect to ground. Applied potential shall be 500 V dc for 300-V rated cable and 1000 V dc for 600-V rated cable. Test duration shall be one minute. Follow manufacturer's recommendations for solid-state units.
 - d. Verify correct operation of auxiliary features.
- D. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
- E. Perform the following infrared scan tests and inspections, and prepare reports.
- F. Acceptance Testing Preparation:
 - 1. Test insulation resistance for each panelboard bus, component, connecting supply, feeder, and control circuit.
 - 2. Test continuity of each circuit.
- G. Panelboard will be considered defective if it does not pass tests and inspections.

- H. Prepare test and inspection reports, including a certified report that identifies panelboards included and describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations made after remedial action.

3.6 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.
 - 2. Confirm correct communication wiring, initiate communications between panels, and program the lighting control system according to approved zone configuration schedules, time-of-day schedules, and input override assignments.

3.7 ADJUSTING

- A. Occupancy Adjustments: When requested within 12 months from date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose.

3.8 SOFTWARE SERVICE AGREEMENT

- A. Technical Support: Beginning at Substantial Completion, service agreement shall include software support for two years.
- B. Upgrade Service: At Substantial Completion, update software to latest version. Install and program software upgrades that become available within two years from date of Substantial Completion. Upgrading software shall include operating system and new or revised licenses for using software.
 - 1. Upgrade Notice: At least 30 days to allow Owner to schedule and access the system and to upgrade computer equipment if necessary.

3.9 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain control modules.

END OF SECTION 26 09 26

Addendum 'B' June 25, 2018

SECTION 05 52 13 - PIPE AND TUBE RAILINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Steel pipe and tube railings.

B. Related Requirements:

1. Section 09 22 16 "Non-Structural Metal Framing" for metal backing for anchoring railings.

1.2 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.

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. CALgreen Submittals:

1. Product Data for Section 5.504.4.1.1: Provide documentation for adhesives, adhesive bonding primers, adhesive primers, sealants, sealant primers and caulks, including printed statement of VOC content showing compliance with local or regional air pollution control or air quality management district rules where applicable, or SCAQMD Rule 1168 VOC limits as shown in CALgreen Tables 5.504.4.1 and 5.504.4.2.

2. Product Data for Section 5.504.4.1.2: Provide documentation for aerosol adhesives, and smaller unit sizes of adhesives, sealant, and caulking compounds (in units of product, less packaging, which do not weigh more than one (1) pound and do not consist of more than sixteen (16) fluid ounces) comply with statewide VOC standards and prohibitions on use of certain toxic compounds, of CCR Title 17, commencing with Section 94507.
 3. Product Data for Section 5.504.4.3: For architectural paints and coatings, provide documentation including printed statement of VOC content showing compliance with Table 1 of the ARB, Architectural Coatings Suggested Control Measure, unless more stringent local limits apply.
 4. Product Data for Section 5.504.4.3.1: Aerosol paints and coatings, provide documentation that products meet the PWMIR Limits for ROC in Section 94522 (a)(3) and other requirements, including prohibitions on use of certain toxic compounds and ozone depleting substances, in Section 94522(c)(2 and (d)(2) of CCR Title 17.
- 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. Welding certificates.
- B. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers certifying that shop primers are compatible with topcoats.

1.5 QUALITY ASSURANCE

- A. Fabricator/Installer Qualifications: A firm experienced in producing handrails and railings similar to those indicated for this Project, with a record of successful in-service performance, with sufficient production capacity to produce required units without causing delay in the work.
- B. Source Limitations: Obtain each type of railing from single source from single manufacturer.
- C. Welding Qualifications: Qualify procedures and personnel according to the following as applicable:
 1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."

1.6 FIELD CONDITIONS

- A. Field Measurements: Verify actual locations of walls and other construction contiguous with pipe and tube 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 construction to ensure that actual dimensions correspond to established dimensions.

PART 2 - PRODUCTS

2.1 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, including attachment to building construction, 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. Regulatory Requirements: Comply with the requirements of Part 1910 of the Occupational Safety and Health Standards (OSHA), the American Disabilities Act (ADA), and local regulatory requirements as applicable to stairs, handrails and the protection of openings; where regulatory requirements conflict the more stringent shall apply.

2.2 METALS, GENERAL

- A. Metal Surfaces, General: Provide materials with smooth surfaces, without pitting, seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes 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 STEEL AND IRON

- A. General: Provide steel and iron (ferrous metal) in the form indicated, complying with the following requirements.
- B. Pipe: ASTM A 53/A 53M, Type S – Ó Seamless, Grade A, suitable for close coiling or cold bending, Standard Weight (Schedule 40) minimum, unless another grade and weight are required to suit performance requirements.
 - 1. Black finish, unless otherwise indicated.
- C. Tubing: ASTM A 500 (cold formed) Grade A or ASTM A 513, unless otherwise indicated or required to satisfy the performance requirements.
- D. Plates, Shapes, and Bars: ASTM A 36/A 36M.
 - 1. Welded Headed Studs: AWS D1.1 (Type A or B as selected by fabricator), ASTM A 108 Grades 1010 through 1020 inclusive and bearing the minimum mechanical properties for studs as selected by fabricator to suit performance requirements.
- E. Cold Finished Steel Bars: ASTM A 108, grade as selected by fabricator.

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 complying with the performance requirements.
- C. Post-Installed Anchors: Torque-controlled expansion 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. Shop Primers: Provide primers that comply with Section 09 91 23 "Interior Painting."

- C. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior 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 comply with the performance requirements.
- 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. Shear, 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. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items.
- F. Connections: Fabricate railings with welded connections unless otherwise indicated.
- G. 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. Weld connections 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 flux immediately.
 - 4. Finish welds to comply with NOMMA's "Voluntary Joint Finish Standards" for Type 2 welds: completely sanded joint, some undercutting and pinholes okay.
- H. 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.
- I. Close exposed ends of railing members with prefabricated end fittings.
- J. Provide wall returns at ends of wall-mounted handrails unless otherwise indicated. Close ends of returns.
- K. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, end closures, 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.
- L. 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.
- M. Toe Boards: Where indicated, provide toe boards at railings around openings and at edge of open-sided floors and platforms. Fabricate to dimensions and details indicated.

2.7 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

2.8 STEEL AND IRON FINISHES

- A. For nongalvanized steel railings, provide nongalvanized ferrous-metal fittings, brackets, fasteners, and sleeves.
- B. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces by removing oil, grease, and similar contaminants in accordance with SSPC -SP 1 "Solvent Cleaning," followed with SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning." Surface preparation shall be done after fabrication and immediately prior to shop painting. Apply shop coat of paint within 4 hours after cleaning and before rust bloom occurs.
- C. Primer Application: Apply shop primer to prepared surfaces of railings, except those to be field welded, 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. Stripe paint edges, corners, crevices, bolts, and welds.
 2. Dry Film Thickness of Primer: 2.5 to 3.0 mils, dry film thickness. Apply paint thoroughly and evenly to dry surfaces, free from holidays and pinholes, in accordance with manufacturers directions
- D. Do not deliver primed railing work until primer has dried.

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. Space posts at spacing indicated or, if not indicated, as required to meet or exceed the performance requirements.
- 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. 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.

3.4 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 or, if not indicated, at spacing required to meet or exceed the performance requirements.
 - 1. Use type of bracket with flange tapped for concealed anchorage to threaded hanger bolt.

3.5 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 same material.
- B. Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in Section 09 91 23 "Interior Painting."

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 52 13

Addendum 'B' June 25, 2018

SECTION 07 01 50.71 - BUILT-UP ROOFING REPAIR

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Selective demolition of existing roofing, and repairs to existing roofing system to accommodate new work. Extent of existing roofing demolition and repair is indicated on Drawings.

1.2 DEFINITIONS

- A. Roofing Terminology: Definitions in ASTM D 1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual" apply to work of this Section.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Include plans, sections, and details.

1.4 INFORMATIONAL SUBMITTALS

- A. Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including exterior and interior finish surfaces, that might be misconstrued as having been damaged by reroofing operations. Submit before Work begins.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Approved by manufacturer of existing roofing system to work on existing roofing.
- B. Regulatory Requirements: Comply with governing EPA notification regulations before beginning roofing removal. Comply with hauling and disposal regulations of authorities having jurisdiction.

1.6 FIELD CONDITIONS

- A. Existing Roofing System: Built-up asphalt roofing.

- B. Owner will not occupy portions of building immediately below roof repair areas when work is in progress.
- C. Protect adjacent roofing and flashings, walkways, site improvements, exterior plantings, and landscaping from damage or soiling from reroofing operations.
- D. Conditions existing at time of inspection for bidding are maintained by Owner as far as practical.
- E. Weather Limitations: Proceed with reroofing preparation only when existing and forecasted weather conditions permit Work to proceed without water entering existing roofing system or building.
 - 1. Remove only as much roofing in one day as can be made watertight in the same day.
- F. Hazardous Materials: It is not expected that hazardous materials, such as asbestos-containing materials, will be encountered in the Work.
 - 1. Hazardous materials will be removed by Owner before start of the Work. Existing roof will be left no less watertight than before removal.
 - 2. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.

PART 2 - PRODUCTS

2.1 TEMPORARY PROTECTION MATERIALS

- A. Expanded Polystyrene (EPS) Insulation: ASTM C 578.
- B. Plywood: DOC PS1, Grade CD Exposure 1.

2.2 INFILL AND REPLACEMENT MATERIALS

- A. Use infill materials matching existing roofing system materials unless otherwise indicated.
 - 1. To the best of the Architect's knowledge and belief, the existing roofing system is a 4 ply built-up membrane manufactured by Johns Manville (JM), installed over rigid insulation. The system is not currently under warranty.
- B. Verify attachment methods for roof membrane and rigid insulation. Provide adhesives, fasteners, and related accessories compatible with existing roofing system.
- C. Provide rigid insulation and roof board to match existing materials.

2.3 AUXILIARY REROOFING MATERIALS

- A. General: Use auxiliary reroofing preparation materials recommended by roofing system manufacturer for intended use and compatible with components of existing and new roofing system.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect existing roofing system that is not to be repaired.
 - 1. Loosely lay 1-inch- minimum thick, expanded polystyrene (EPS) insulation over existing roofing in areas adjacent to repair work. Loosely lay 15/32-inch plywood or OSB panels over EPS. Extend EPS past edges of plywood or OSB panels a minimum of 1 inch.
 - 2. Limit traffic and material storage to areas of existing roofing that have been protected.
 - 3. Maintain temporary protection and leave in place until roofing repair has been completed. Remove temporary protection on completion of repair.

3.2 SELECTIVE DEMOLITION

- A. Selective Demolition: Where indicated, remove existing roofing and immediately check for presence of moisture by visually observing substrate that is to remain.
 - 1. Remove wet or damp materials below existing roofing and above deck. Notify Owner and Architect of any wet or damp materials discovered during selective demolition of roofing.
 - 2. Inspect wood blocking, curbs, and nailers for deterioration and damage. If wood blocking, curbs, or nailers have deteriorated, immediately notify Architect.

3.3 INFILL MATERIALS INSTALLATION

- A. Immediately after roof selective demolition, and installation of new work, repair demolished roofing areas to match existing roofing system construction.
 - 1. Install rigid insulation, roof boards, membrane and flashings, and related accessories as detailed on Drawings, and in compliance with JM "Commercial Roofing Application Guide: Book 1".

3.4 DISPOSAL

- A. Collect demolished materials and place in containers. Promptly dispose of demolished materials. Do not allow demolished materials to accumulate on-site.
 - 1. Storage or sale of demolished items or materials on-site is not permitted.

- B. Transport and legally dispose of demolished materials off Owner's property.

END OF SECTION 07 01 50.71

Addendum 'B' June 25, 2018

SECTION 10 44 00 - FIRE-PROTECTION SPECIALTIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section fire protection specialties includes fire extinguishers and fire extinguisher cabinets.

1.2 COORDINATION

- A. Coordinate size of fire-extinguisher cabinets to ensure that type and capacity of fire extinguishers indicated are accommodated.

1.3 ACTION SUBMITTALS

- A. Product Data: Submit product data including construction details, material descriptions, dimensions of individual components and profiles, and finishes for fire-protection specialties.
 - 1. Fire Extinguishers: Include rating and classification.
- B. CALgreen Submittals:
 - 1. Product Data for Section 5.508.1: Provided documentation showing that proposed HVAC, refrigeration and fire suppression equipment contains no Chlorofluorocarbons (CFCs) or Halons, as required in CALgreen Section 5.508.1.1 and Section 5.508.1.2.

1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain fire extinguishers and fire-protection cabinets through one source from a single manufacturer.
- B. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Standard for Portable Fire Extinguishers."
- C. Listing: Fire extinguishers shall be UL listed with UL Listing Mark for type, rating, and classification of extinguisher.

1.5 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of portable fire extinguishers that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:

- a. Failure of hydrostatic test according to NFPA 10.
 - b. Faulty operation of valves or release levers.
2. Warranty Period: Six years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 FIRE EXTINGUISHERS

- A. General: Provide fire extinguishers for each fire extinguisher cabinet and at other locations indicated.
- B. Multipurpose Dry-Chemical Type: UL-rated 4-A:60-B:C, 10-lb. nominal capacity, in enameled-steel container.
- C. Located on Drawings by Designation: FEC.
- D. HVAC, refrigeration, and fire suppression equipment and systems, shall contain no CFCs or halons.

2.2 FIRE-EXTINGUISHER CABINETS

- A. General: Provide fire extinguisher cabinets of suitable size for housing fire extinguishers of types and capacities specified.
- B. Cabinet Construction: Provide manufacturer's standard box (tub), with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated. Weld joints and grind smooth. Miter and weld perimeter door frames.
 1. Cabinet Mounting: Semi Recessed unless otherwise indicated.
 2. Cabinet Trim Material: Manufacturer's standard steel sheet.
 3. Door Material: Manufacturer's standard #4 stainless steel sheet.
 4. Door Glazing: Manufacturer's standard, as follows:
 - a. Tempered Float Glass: ASTM C 1048, Kind FT, Condition A, Type I, Quality q3, Class 1 (clear).
 5. Door Style: Vertical duo panel with frame.
 6. Door Style: Manufacturer's standard design vertical duo panel with frame with 1/4 inch thick glass.
 7. Door Construction: Fabricate doors according to manufacturer's standards, of materials indicated, and coordinated with cabinet types and trim styles selected.
 8. Door Hardware: Provide manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated. Provide exposed door pull and friction latch. Provide concealed or continuous-type hinge permitting door to open 180 degrees.

- C. Products and Manufacturers: One of the following:
1. Larsens Manufacturing Company; Occult Series Fire Extinguisher Cabinets.
 2. Potter Roemer; Dana Series Fire Extinguisher Cabinets.
 3. JL Industries, Inc.; Embassy Series Fire Extinguisher Cabinets.
 4. Or Equal
- D. Located on Drawings by designation: FEC.

2.3 FINISHES

- A. General: Apply finishes in factory after products are assembled. Protect cabinets with plastic or paper covering, prior to shipment.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Prepare recesses for recessed fire-protection cabinets as required by type and size of cabinet and trim style.

3.2 INSTALLATION

- A. General: Follow manufacturer's printed instructions for installation.
- B. Install fire-protection specialties in locations and at mounting heights indicated or, if not indicated, at heights acceptable to authorities having jurisdiction.
1. Fasten cabinets to structure, square and plumb.

3.3 ADJUSTING AND CLEANING

- A. Adjust cabinet doors to operate freely without binding. Examine fire extinguishers for proper charging and tagging.
1. Remove and replace damaged, defective, or undercharged units.
- B. On completion of fire-protection cabinet installation, clean interior and exterior surfaces as recommended by manufacturer.

END OF SECTION 10 44 00

ACCESSIBILITY REQUIREMENTS

ACCESSIBILITY REQUIREMENTS FOR EXISTING BUILDINGS / PORTIONS. 1.1 AM THE DESIGNER/OWNER IN RESPONSIBLE CHARGE OF THIS TENANT IMPROVEMENT PROJECT, I HAVE INSPECTED THE SITE/PREMISES AND DETERMINED THAT EXISTING CONDITIONS... 1.2 AM THE DESIGNER/OWNER IN RESPONSIBLE CHARGE OF THIS TENANT IMPROVEMENT PROJECT, I HAVE INSPECTED THE TOILET AND BATHING FACILITIES FOR MEN AND WOMEN...

GENERAL NOTES

- 1 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR. THE CONTRACTOR SHALL CAREFULLY STUDY AND COMPARE THE CONTRACT DOCUMENTS WITH EACH OTHER AND WITH AS-BUILT DRAWINGS PROVIDED BY THE OWNER AND SHALL AT ONCE REPORT TO THE ARCHITECT... 2 INTENT OF CONTRACT DOCUMENTS. THE INTENT OF THE CONTRACT DOCUMENTS IS TO ALLOW FOR THE PERFORMANCE OF THE WORK... 3 DEFECTIVE WORK. NO WORK DEFECTIVE IN WORKMANSHIP OR QUALITY OR DEFICIENT IN ANY REQUIREMENTS OF THE CONTRACT DOCUMENTS WILL BE ACCEPTABLE... 4 FIREPROOFING. PATCH AND REPAIR ALL FIREPROOFING DAMAGE INCURRED DURING DEMOLITION AND/OR CONSTRUCTION... 5 AS-BUILT DRAWINGS. DURING THE COURSE OF CONSTRUCTION, ACTUAL LOCATIONS OF CONSTRUCTION ITEMS DENOTED IN THE CONSTRUCTION DOCUMENTS SHALL BE INDICATED TO SCALE IN CONTRASTING INK ON THE DRAWINGS... 6 CONTRACTOR RESPONSIBILITY. IT IS INTENDED THAT THE CONTRACTOR PROVIDE A COMPLETE JOB AND ANY OMISSIONS IN THESE NOTES OR IN THE OUTLINE OF WORK SHALL NOT BE CONSIDERED AS RELIEVING THE CONTRACTOR OF SUCH RESPONSIBILITIES... 7 UNENFORCEABLE WORK. SHOULD ANY PORTION OF THE CONTRACT DOCUMENTS PROVE TO BE, FOR WHATEVER REASONS, UNENFORCEABLE, SUCH UNENFORCEABILITY SHALL NOT EXTEND TO THE REMAINDER OF THE CONTRACT... 8 LIENS. THROUGHOUT THE DURATION OF THE PROJECT, THE CONTRACTOR SHALL REFRAIN FROM ACTIONS THAT COULD LEAD TO THE FILING OF CLAIMS OF LIEN BY SUBCONTRACTORS, SUPPLIERS OF MATERIALS, LABOR, SERVICE, EQUIPMENT, OR ANY OTHER INDIVIDUAL OR COMPANY SO ENTITLED UNDER GOVERNING LAWS AND REGULATIONS... 9 COORDINATION OF THE WORK. THE CONTRACTOR IS RESPONSIBLE FOR REVIEW AND VERIFICATION OF CONTRACT DOCUMENTS, FIELD CONDITIONS, AND DIMENSIONS FOR ACCURACY AND CONFIRMING THAT WORK IS BUILDABLE AS SHOWN BEFORE PROCEEDING WITH CONSTRUCTION... 10 WORK SHOULD COMPLY WITH APPLICABLE CODES. EXECUTE WORK IN ACCORDANCE WITH ANY AND ALL APPLICABLE LOCAL, STATE, AND FEDERAL CODES... 11 DIMENSIONS. DO NOT SCALE DRAWINGS. DIMENSIONS SHALL GOVERN. DETAILS SHALL GOVERN OVER PLANS AND ELEVATIONS... 12 CLARIFICATIONS. CLARIFY ALL DISCREPANCIES RELATIVE TO CONSTRUCTION DOCUMENTS, SPECIFICATIONS, AND FIELD CONDITIONS PRIOR TO SUBMITTING BIDS AND COMMENCING WORK... 13 SUBSTITUTIONS. THERE SHALL BE NO SUBSTITUTION OF MATERIALS WHERE A MANUFACTURER IS SPECIFIED... 14 DRAWING DISTRIBUTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DISTRIBUTION OF DRAWINGS TO ALL TRADES UNDER THEIR JURISDICTION... 15 CHANGES IN THE WORK. DO NOT PROCEED WITH ANY WORK REQUIRING ADDITIONAL COMPENSATION BEYOND THE CONTRACT AMOUNT WITHOUT WRITTEN AUTHORIZATION FROM THE OWNER... 16 EXISTING WORK. ALL INSTALLED PLUMBING, MECHANICAL, AND ELECTRICAL EQUIPMENT SHALL OPERATE QUIETLY AND FREE OF VIBRATION... 17 PUNCH LIST. UPON COMPLETION OF THE WORK BY THE CONTRACTOR, THE CONTRACTOR SHALL NOTIFY THE ARCHITECT IN WRITING OF SUCH COMPLETION... 18 MATERIALS. ALL MATERIALS SHALL BE NEW, UNUSED, AND OF THE HIGHEST QUALITY IN EVERY RESPECT... 19 INSURANCE. THE CONTRACTOR AND SUBCONTRACTORS SHALL PURCHASE AND MAINTAIN CERTIFICATIONS OF INSURANCE WITH RESPECT TO WORKERS COMPENSATION, PUBLIC LIABILITY, AND PROPERTY DAMAGE... 20 EXISTING TENANTS. COORDINATE ALL WORK WITH BUILDING OWNER SO AS NOT TO DISTURB OR CAUSE DAMAGE TO ANY TENANT... 21 COORDINATION. VERIFY IN THE FIELD THAT NO CONFLICTS EXIST WHICH WOULD PROHIBIT THE LOCATION OF ANY AND ALL MECHANICAL, TELEPHONE, ELECTRICAL, LIGHTING, PLUMBING, AND SPRINKLER EQUIPMENT... 22 PROTECTION OF EXISTING WORK. PROVIDE PROTECTION TO ALL EXISTING FINISHES IN ALL SPACES WITHIN OR ADJACENT TO THE SCOPE OF WORK... 23 EXISTING DEFECTS. CORRECT ANY DEFECTS FOUND IN EXISTING BUILDING CONSTRUCTION WHICH AFFECTS THE SCOPE OF WORK... 24 TERMINOLOGY. TYPICAL OR TYP MEANS IDENTICAL FOR ALL SIMILAR CONDITIONS, UNLESS NOTED OTHERWISE... 25 FURNITURE. FURNITURE SHOWN IS FOR REFERENCE ONLY AND INSTALLED BY OTHERS... 26 FILE CABINETS. FILE CABINETS, AS SHOWN ON DRAWINGS, ARE SUPPLIED BY OTHERS... 27 CLEANING. PROVIDE STRICT CONTROL OF JOB CLEANING AND PREVENT DUST AND DEBRIS FROM MIGRATING FROM CONSTRUCTION AREA... 28 ADJACENT SPACES. CONTRACTOR SHALL BE RESPONSIBLE FOR SCHEDULING OF ACCESS INTO ADJACENT TENANT SPACES... 29 EXISTING CONDITIONS. CONTRACTOR SHALL THOROUGHLY EXAMINE THE PREMISES AND SHALL BASE HIS BID ON THE EXISTING CONDITIONS... 30 CONTRACT DOCUMENTS. ALL CONTRACT DOCUMENTS ARE COMPLEMENTARY AND WHAT IS CALLED FOR BY ANY WILL BE AS BINDING AS IF CALLED FOR BY ALL... 31 CONTRACTOR RESPONSIBILITY TO NOTIFY ARCHITECT. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO NOTIFY THE ARCHITECT OF ANY CONFLICTS HEREIN... 32 DUPLICATION OF DOCUMENTS. ALL DRAWINGS AND WRITTEN MATERIAL HEREIN CONSTITUTE THE ORIGINAL AND UNPUBLISHED WORK OF THE ARCHITECT/OWNER... 33 DETAIL REFERENCE. REFER TO DETAIL SHEETS SERIES FOR DETAILS NOT CROSS REFERENCED FOR ALL THE CONDITIONS OF PENETRATION THROUGH FIRE RATED ASSEMBLIES AND ACOUSTICAL PARTITIONS... 34 EXISTING PENETRATIONS. ALL PENETRATIONS TO THE FLOOR/CEILING ASSEMBLY SHALL BE GROUTED SOLID WITH A QUICK-SET CONCRETE FILLER... 35 SHOP DRAWINGS AND SUBMITTALS. THE CONTRACTOR SHALL CAREFULLY STUDY AND COMPARE THE CONTRACT DOCUMENTS WITH EACH OTHER AND WITH AS-BUILT DRAWINGS PROVIDED BY THE OWNER AND SHALL AT ONCE REPORT TO THE ARCHITECT... 36 IF ANY WORK IS PERFORMED PRIOR TO PROPER CLARIFICATION, CONTRACTOR SHALL CORRECT CONFLICTING WORK AT CONTRACTORS EXPENSE AT NO ADDITIONAL COST TO THE OWNER... 37 WHEN 'PROVIDE' IS USED IN SHEET AND GENERAL NOTES, THIS MEANS GENERAL CONTRACTOR IS TO PROVIDE AND INSTALL ITEM IDENTIFIED.

HAZARDOUS MATERIALS NOTES

- 1 OWNER ACKNOWLEDGES THAT ARCHITECT SHALL HAVE NO RESPONSIBILITY FOR THE DISCOVERY, PRESENCE, HANDLING, REMOVAL, DISPOSAL, OR EXPOSURE OF PERSONS TO HAZARDOUS SUBSTANCES, MATERIALS, AND WASTES IN ANY FORM AT THE PROJECT SITE, INCLUDING BUT NOT LIMITED TO: ASBESTOS, ASBESTOS PRODUCTS, PCB MOLD, OR OTHER TOXIC SUBSTANCES... 2 THE OWNER ACKNOWLEDGES THAT IT ACCEPTS RESPONSIBILITY FOR NOTIFYING THE APPROPRIATE FEDERAL, STATE, AND AUTHORITIES HAVING JURISDICTION FOR ANY DEMOLITION, CONSTRUCTION, OR REPAIR WORK... 3 ANY QUESTIONS THAT ARISE RELATED TO ASBESTOS SHALL BE REFERRED TO THE OWNER FOR RESOLUTION... 4 THE OWNER SHALL RETAIN AN INDEPENDENT CONSULTANT WHO IS TRAINED AND EXPERIENCED IN IDENTIFICATION AND SURVEY OF EXISTING SITES PRIOR TO START OF DEMOLITION CONSTRUCTION... 5 ALL CONTRACTORS AND SUBCONTRACTORS SHALL REPORT THE PRESENCE OF ANY MATERIAL OR ASSEMBLY SUSPECTED TO CONTAIN ASBESTOS UPON DISCOVERY... 6 PER THE CONSULTANTS RECOMMENDATIONS.

FIRE DEPT SUBMITTALS & PERMITS

- SUBMITTAL DOCUMENTS FOR FIRE DEPARTMENT ITEMS SHALL BE SUBMITTED TO THE ARCHITECT OR ENGINEER OF RECORD WHO SHALL REVIEW THEM AND FORWARD TO THE BUILDING OFFICIAL WITH A NOTATION INDICATING THAT THE FIRE DEPARTMENT SUBMITTALS HAVE BEEN REVIEWED AND THAT THEY HAVE BEEN FOUND TO BE IN GENERAL CONFORMANCE WITH THE DESIGN OF THE BUILDING... 1 FIRE SPRINKLER SYSTEMS AND CALCULATIONS... 2 FIRE ALARM SYSTEMS

DEFERRED SUBMITTALS & NOTES

- DEFERRED SUBMITTALS: -FIRE SPRINKLERS AND ALARMS -HANDRAIL GUARDRAIL & CABLE GUARDRAIL PER SHEET S-100... 1 IT IS UNDERSTOOD THAT PLANS FOR THE PROJECT HAVE, AT THIS TIME, BEEN REVIEWED FOR COMPLIANCE WITH ALL APPLICABLE STATE AND CITY REGULATIONS... 2 IWE UNDERSTAND THAT IWE WILL NOT BE AUTHORIZED ANY INSPECTION OF THE DEFERRED ITEMS PROPOSED PRIOR TO THE SUBMITTAL AND APPROVAL OF PLANS AND/OR CALCULATIONS FOR THOSE DEFERRED ITEMS... 3 COMPLETE PLANS AND SPECIFICATIONS FOR ALL FIRE EXTINGUISHING SYSTEMS, INCLUDING AUTOMATIC SPRINKLER AND STANDPIPE SYSTEMS AND OTHER SPECIAL FIRE EXTINGUISHING SYSTEMS AND RELATED APPURTENANCES SHALL BE SUBMITTED TO THE CITY OF SAN DIEGO FOR REVIEW AND APPROVAL PRIOR TO INSTALLATION... 4 COMPLETE PLANS AND SPECIFICATIONS FOR ALL FIRE ALARM SYSTEMS SHALL BE SUBMITTED TO THE CITY OF SAN DIEGO DEVELOPMENT SERVICES FOR REVIEW AND APPROVAL PRIOR TO INSTALLATION... 5 PLANS FOR THE DEFERRED SUBMITTAL ITEMS SHALL BE SUBMITTED IN A TIMELY MANNER BUT NOT LESS THAN 30 BUSINESS DAYS PRIOR TO INSTALLATION... 6 ADDRESS TO THE SATISFACTION OF THE PLAN CHECK DIVISION PRIOR TO APPROVAL OF THE SUBMITTAL ITEMS.

SCOPE OF WORK

THE PROJECT INCLUDES TENANT IMPROVEMENTS TO PARTIAL & FULL FLOORS, COMMON AREA IMPROVEMENTS AND PARKING LEVEL 'A'. SCOPE OF WORK IS AS FOLLOWS PER FULL:

- PARKING LEVEL 'A': - NEW PEDESTRIAN RAMP - PARKING RE-STRIPING... PARKING LEVEL 'B': - NO NEW PROJECT SCOPE THIS FLOOR... 1ST FLOOR: - DEMOLITION OF SELECTIVE NON-BEARING WALLS, CEILING AND CAFETERIA - NEW INTERIOR NON-LOAD BEARING PARTITIONS - NEW CEILING AND LIGHTING - MECHANICAL DUCT AND REGISTER RE-WORK - NEW ELECTRICAL - NEW FINISHES - NEW PLUMBING... 3RD FLOOR: - NO PROJECT SCOPE THIS FLOOR... 2ND, 4-16TH FLOORS: - DEMOLITION OF SELECTIVE NON-BEARING WALLS, MODULAR WALL & DOOR SYSTEMS, CEILING - NEW COMMON CORRIDOR FLOORS 4, 5, 6, 7 & 9 - NEW INTERIOR NON-LOAD BEARING PARTITIONS AND RELOCATED MODULAR WALL AND DOOR SYSTEMS - NEW AND RELOCATED LIGHTING WITH MODIFIED SWITCHING - NEW CEILING AT DEFINED AREAS - MECHANICAL DUCT AND REGISTER RE-WORK - NEW ELECTRICAL - NEW FINISHES - NEW PLUMBING FLOORS 3, 5, 6, 7, 9... 17TH - 19TH FLOORS: - DEMOLITION OF SELECTIVE NON-BEARING WALLS, CEILING - NEW COMMON CORRIDOR FLOOR 17 - NEW INTERIOR NON-LOAD BEARING PARTITIONS - NEW LIGHTING AND RELOCATED LIGHTING WITH MODIFIED SWITCHING - NEW CEILING AT DEFINED AREAS - MECHANICAL DUCT AND REGISTER RE-WORK - NEW ELECTRICAL - NEW FINISHES - NEW PLUMBING FLOORS 17, 18, 19

LOCATION MAP



PROJECT TEAM

Table listing project team members: TENANT (CITY OF SAN DIEGO), TELEPHONE/FAX: CONTACT: KAREN JOHNSON, PROPERTY MANAGER (CBRE), TELEPHONE/FAX: CONTACT: MARY BLAGG, CONSTRUCTION MANAGER (CITY OF SD PUBLIWORKS), TELEPHONE/FAX: CONTACT: JORGE ACEVEDO, ARCHITECT (GENSLER), TELEPHONE/FAX: CONTACT: AARON KROLL, GENERAL CONTRACTOR (TBD), TELEPHONE/FAX: CONTACT: BSE ENGINEERING, MECHANICAL ENGINEER (BSE ENGINEERING), TELEPHONE/FAX: CONTACT: DAN CRANE, ELECTRICAL ENGINEER (BSE ENGINEERING), TELEPHONE/FAX: CONTACT: GERRY SANNER, PLUMBING ENGINEER (BSE ENGINEERING), TELEPHONE/FAX: CONTACT: TAMARA BADKERHANIAN-GANEV, STRUCTURAL ENGINEER (KPFF), TELEPHONE/FAX: CONTACT: AARON PEBLEY, FIRE/LIFE SAFETY ENGINEER (DESIGN BUILD), TELEPHONE/FAX: CONTACT: DESIGN BUILD, FIRE SPRINKLER CONTRACTOR (DESIGN BUILD), TELEPHONE/FAX: CONTACT:

PROJECT INFORMATION

Table with project details: ADDRESS: 101 W. ASH STREET, SAN DIEGO, CA 92101, PROJECT SQ. FT.: 1,365 SF, CONSTRUCTION TYPE: TYPE I, FULLY SPRINKLERED, NUMBER OF STORIES: 19, OCCUPANCY: EXISTING B, PROPOSED B (NO CHANGE IN USE), ZONE: (NO CHANGE IN USE), ASSESSOR'S PARCEL NUMBER: 533-424-11-00 & 533-424-14-00, LEGAL DESCRIPTION: PROPERTY LEGAL DESCRIPTION, CODES / REGULATIONS: CBC 2016, CM 2016, CA ENERGY CODE, CEC 2016, CPC 2016, CA TITLE 24 ACCESSIBILITY, FEDERAL ADAAG 2010, CFC 2016, CALGREEN 2016

CITY OF SAN DIEGO 101 W. ASH 101 W. ASH STREET SAN DIEGO, CA 92101

GenSler 225 Broadway Suite 100 San Diego, CA 92101 United States Tel 619.557.2500 Fax 619.557.2520

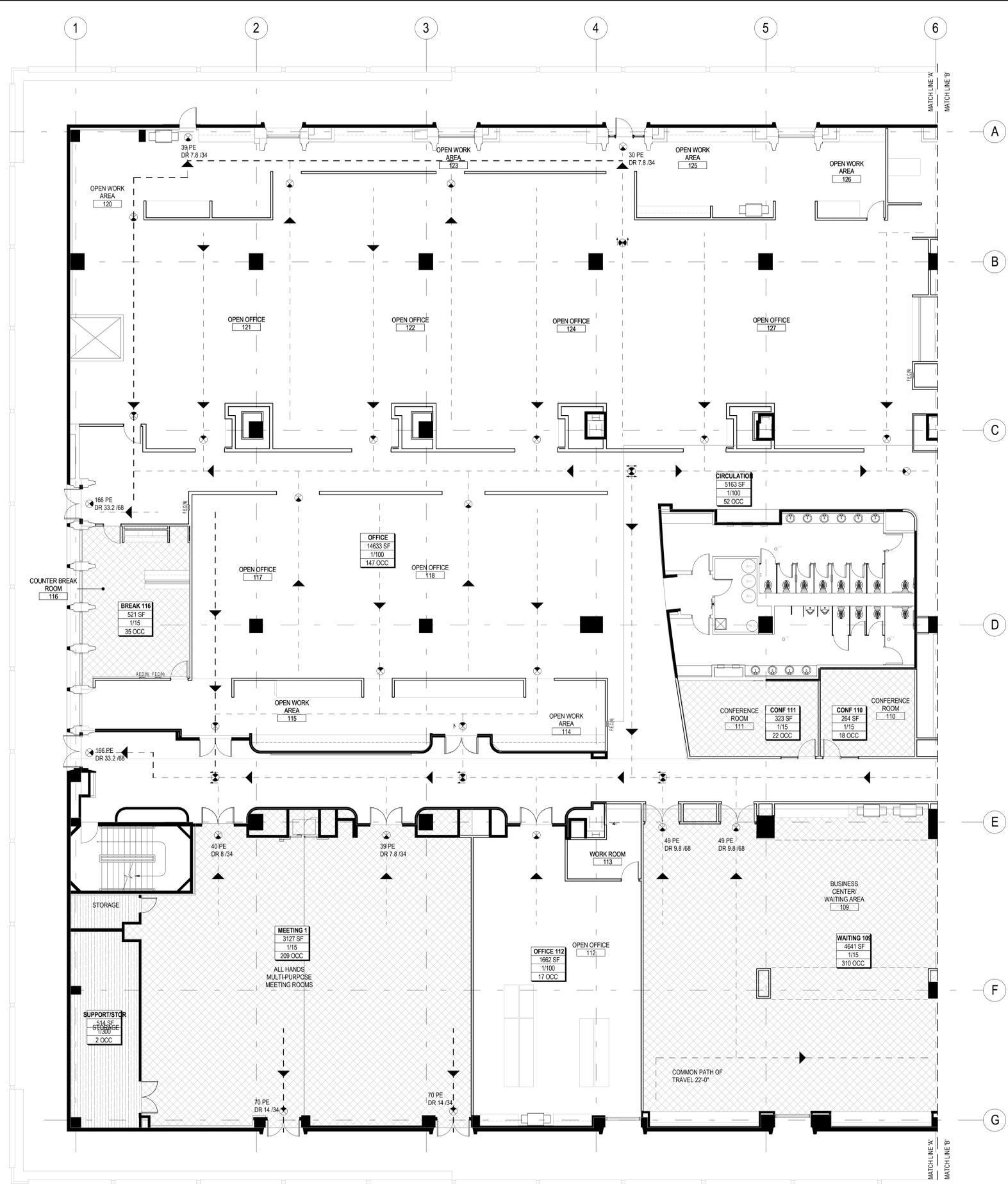
Table with columns: Date, Description. Entries include: 07.28.2017 ISSUE PERMIT AK/SS, 09.08.2017 ISSUE FOR BID AK/SS, 09.19.2017 PLAN CHECK RESPONSES/ PLAN CHANGES AK, 05.07.2018 ISSUE FOR BID AK/SS, 05.25.2018 ADDENDUM 'B' AK/ML



The City of SAN DIEGO Public Works G00.001

CITY OF SAN DIEGO GENERAL PROJECT INFORMATION SHEET 03 OF 402 SHEETS. APPROVED: JASON GRANI, DATE: 5/31/2018, SUBMITTED BY: JORGE ACEVEDO, PROJECT MANAGER, CHECKED BY: MARLON PEREZ, PROJECT ENGINEER, DESCRIPTION: ADDENDUM B, DATE: 6/25/2018, APPROVED: [Signature], DATE FILMED: 6/25/2018, CONTRACTOR INSPECTOR: [Signature], DATE STARTED: [Blank], DATE COMPLETED: [Blank], 40154 - 03 - D

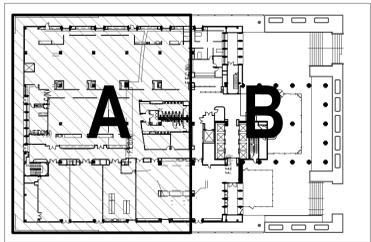
CONSTRUCTION CHANGE / ADDENDUM table with columns: CHANGE, DATE, AFFECTED OR ADDED SHEET NUMBERS, APPROVAL NO. Rows include changes B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z.



OCCUPANCY TABULATION - LEVEL 01 S

ROOM/AREA NAME	OCCUPANCY DESIGNATION	AREA (SQ FT)	LOAD FACTOR (SQ FT)	OCCUPANT LOAD
CONF 110	Assembly without fixed seats - Unconcentrated (tables and chairs)	264 SF	15	18
CONF 111	Assembly without fixed seats - Unconcentrated (tables and chairs)	323 SF	15	22
MEETING 1	Assembly without fixed seats - Unconcentrated (tables and chairs)	3,127 SF	15	209
WAITING 101	Assembly without fixed seats - Unconcentrated (tables and chairs)	1,772 SF	15	119
WAITING 109	Assembly without fixed seats - Unconcentrated (tables and chairs)	4,641 SF	15	310
CIRCULATION	Business areas	5,163 SF	100	52
OFFICE	Business areas	14,633 SF	100	147
OFFICE 112	Business areas	1,662 SF	100	17
SEC 103	Business areas	750 SF	100	8
SUPPORT/STOR	Accessory storage areas, mechanical equipment room	514 SF	300	2
UNOCCUPIED AREA (WALLS, CASEWORK, ETC.)		0 SF	0	0
TOTAL SUITE AREA:		32,849 SF		904
TOTAL EXITS PROVIDED:				9

OCCUPANCY TABULATION



SHEET NOTES

GENERAL NOTES

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- F REFER TO DETAIL 06/A00.301 FOR SIGNAGE AND TACTILE REQUIREMENTS AT STAIR/EXIT/EGRESS

LEGEND

- A REFER TO SHEET A00.100 FOR SYMBOLS AND ABBREVIATIONS.
- OCCUPANCY DESIGNATION**
- Accessory storage areas, mechanical equipment room
 - Assembly without fixed seats - Unconcentrated (tables and chairs)
 - Business areas

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05.07.2018	ISSUE FOR BID	AKISS
8.06.25.2018	ADDENDUM 'B'	AKLM



Project Number
55.7291.013

The City of
SAN DIEGO
Public Works

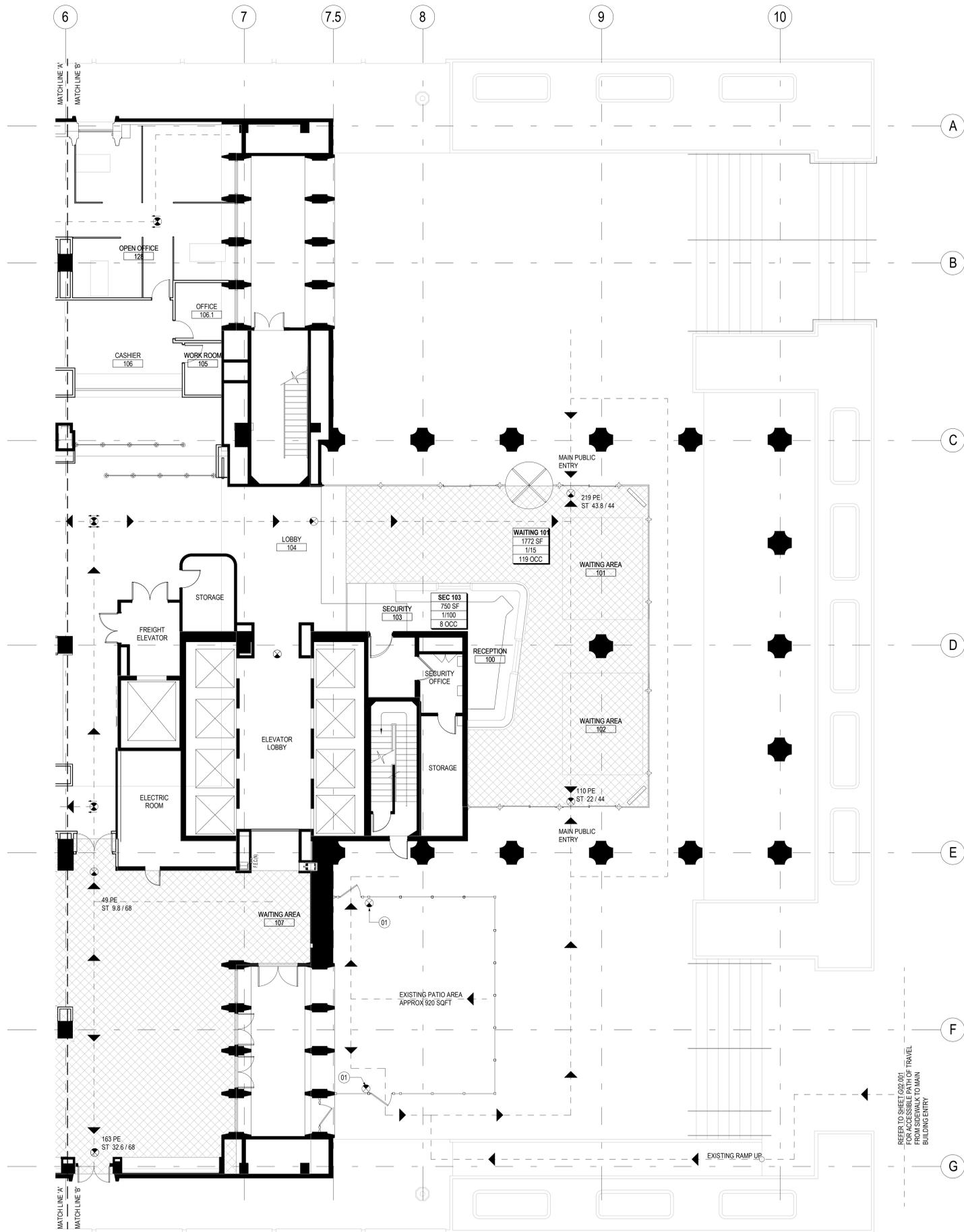
G03.001A

CITY OF SAN DIEGO
LIFE SAFETY PLAN - LEVEL 01 SOUTH

CITY OF SAN DIEGO, CALIFORNIA PUBLIC WORKS DEPARTMENT SHEET 06 OF 402 SHEETS		WBS S-17009
APPROVED FOR CITY ENGINEER JASON GRANI PRINT DGE NAME	DATE 5/31/2018 7/20/18	SUBMITTED BY JORGE ACEVEDO PROJECT MANAGER
DESCRIPTION	BY	APPROVED
ORIGINAL		DATE FILMED 5/31/2018
ADDENDUM B		DATE COMPLETED 6/25/2018
CONTRACTOR INSPECTOR	DATE STARTED	DATE COMPLETED
		40154 - 06 - D

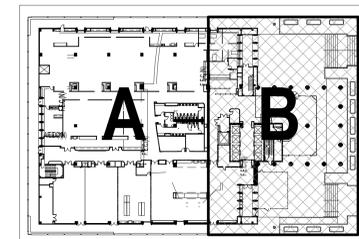
A LIFE SAFETY PLAN - LEVEL 01 SOUTH
SCALE: 1/8" = 1'-0"

02 LEVEL 01 - KEY PLAN
SCALE: 1/64" = 1'-0"



REFER TO G03.001A

OCCUPANCY TABULATION



REFER TO SHEET G02.001 FOR ACCESSIBLE PATH OF TRAVEL FROM MAIN BUILDING ENTRY TO MAIN BUILDING ENTRY

SHEET NOTES

GENERAL NOTES

- A ACCESSORY USE AREAS THAT ORDINARILY ARE USED ONLY BY PERSONS WHO OCCUPY THE MAIN AREAS OF AN OCCUPANCY SHALL BE PROVIDED WITH MEANS OF EGRESS AS THOUGH THEY ARE COMPLETELY OCCUPIED, BUT THEIR OCCUPANT LOAD NEED NOT BE INCLUDED WHEN COMPUTING THE TOTAL OCCUPANT LOAD OF THE BUILDING.
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LEGEND

A REFER TO SHEET A00.100 FOR SYMBOLS AND ABBREVIATIONS

OCCUPANCY DESIGNATION

- Assembly without fixed seats - Unconcentrated (tables and chairs)
- Business areas

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Project Number

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The City of
SAN DIEGO
Public Works

G03.001B

CITY OF SAN DIEGO

LIFE SAFETY PLAN - LEVEL 01 NORTH

CITY OF SAN DIEGO, CALIFORNIA PUBLIC WORKS DEPARTMENT SHEET 07 OF 402 SHEETS		WBS S-17009
APPROVED FOR CITY ENGINEER JASON GRANI PRINT DCE NAME	DATE 5/31/2018 77208	SUBMITTED BY JORGE ACEVEDO PROJECT MANAGER CHECKED BY MARLON PEREZ PROJECT ENGINEER
DESCRIPTION	BY	APPROVED
ORIGINAL		5/31/2018
ADDENDUM B		6/25/2018
CONTRACTOR	DATE STARTED	40154 - 07 - D
INSPECTOR	DATE COMPLETED	

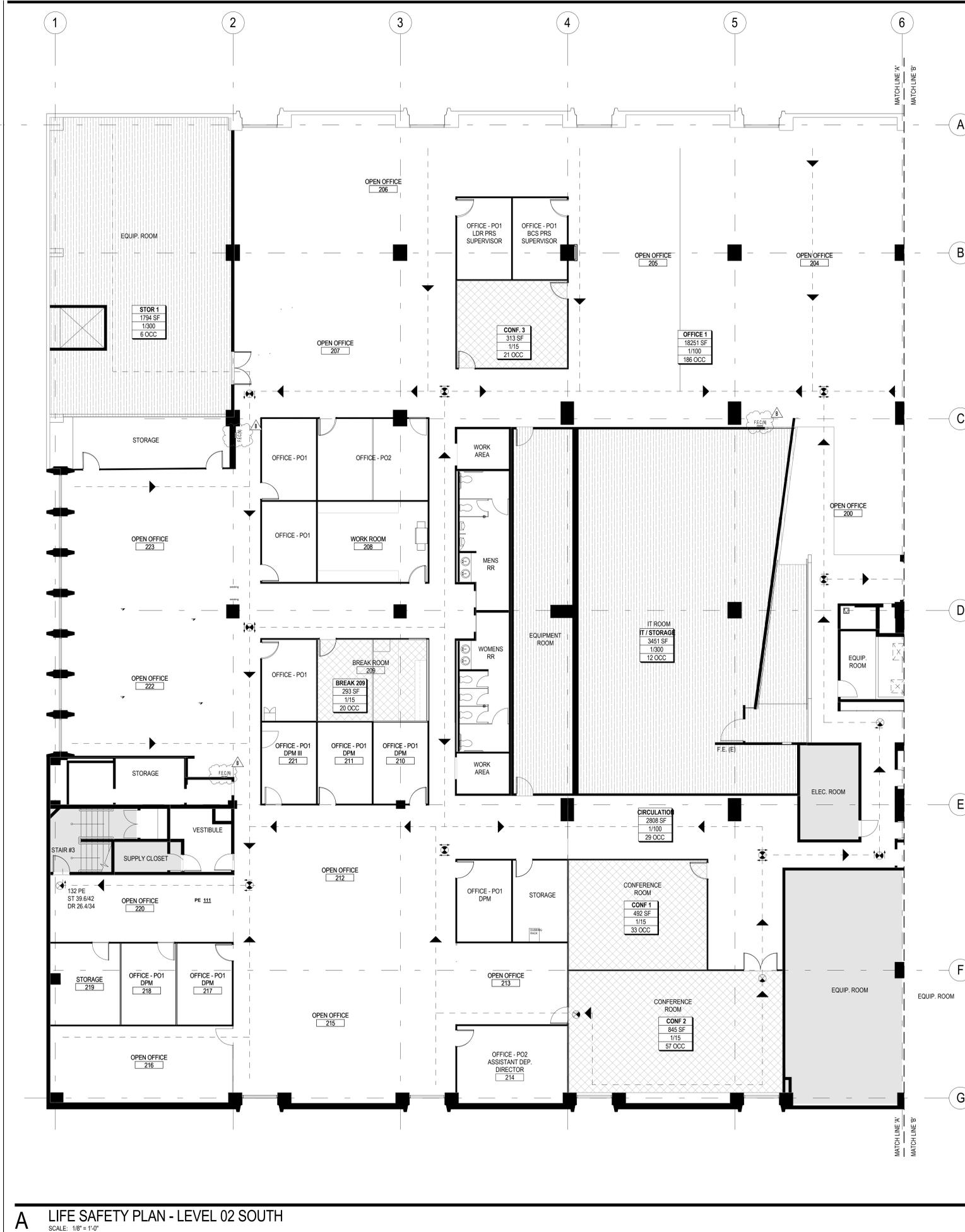
02 LEVEL 01 - KEY PLAN

SCALE: 1/64" = 1'-0"



Added Occupancy designation legend

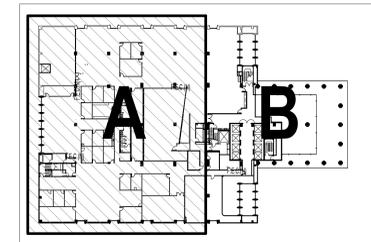
ADDENDUM B



OCCUPANCY TABULATION - LEVEL 02 S

ROOM/AREA NAME	OCCUPANCY DESIGNATION	AREA (SQ FT)	LOAD FACTOR (SQ FT)	OCCUPANT LOAD
BREAK 209	Assembly without fixed seats - Unconcentrated (tables and chairs)	293 SF	15	20
CONF 1	Assembly without fixed seats - Unconcentrated (tables and chairs)	492 SF	15	33
CONF 2	Assembly without fixed seats - Unconcentrated (tables and chairs)	845 SF	15	57
CONF 3	Assembly without fixed seats - Unconcentrated (tables and chairs)	313 SF	15	21
CIRCULATION	Business areas	2,808 SF	100	29
OFFICE 1	Business areas	18,251 SF	100	183
IT / STORAGE	Accessory storage areas, mechanical equipment room	3,451 SF	300	12
STOR 1	Accessory storage areas, mechanical equipment room	1,794 SF	300	6
		OCCUPIED AREA:	28,246 SF	362
UNOCCUPIED AREA (WALLS, CASEWORK, ETC.)		0 SF	0	0
		TOTAL SUITE AREA:	28,246 SF	362
NUMBER OF EXITS		TOTAL EXITS REQUIRED:		2
		TOTAL EXITS PROVIDED:		3

OCCUPANCY TABULATION



SHEET NOTES

GENERAL NOTES

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- D WHEN 2 EXITS ARE REQUIRED, THE MEANS OF EGRESS ILLUMINATION LEVEL SHALL NOT BE LESS THAN 1 FOOT-CANDLE (11 LUX) AT THE WALKING SURFACE LEVEL. THE MEANS OF EGRESS SHALL BE ILLUMINATED AT ALL TIMES IN ACCORDANCE WITH CBC SECTION 1006.1; 1006.2 AND 1006.3.
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- F REFER TO DETAIL 06/A00.301 FOR SIGNAGE AND TACTILE REQUIREMENTS AT STAIR/EXIT/EGRESS

LEGEND

- A REFER TO SHEET A00.100 FOR SYMBOLS AND ABBREVIATIONS
- OCCUPANCY DESIGNATION**
- Accessory storage areas, mechanical equipment room
- Assembly without fixed seats - Unconcentrated (tables and chairs)
- Business areas

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05.07.2018	ISSUE FOR BID	AKISS
06.25.2018	ADDENDUM 'B'	AKJLM



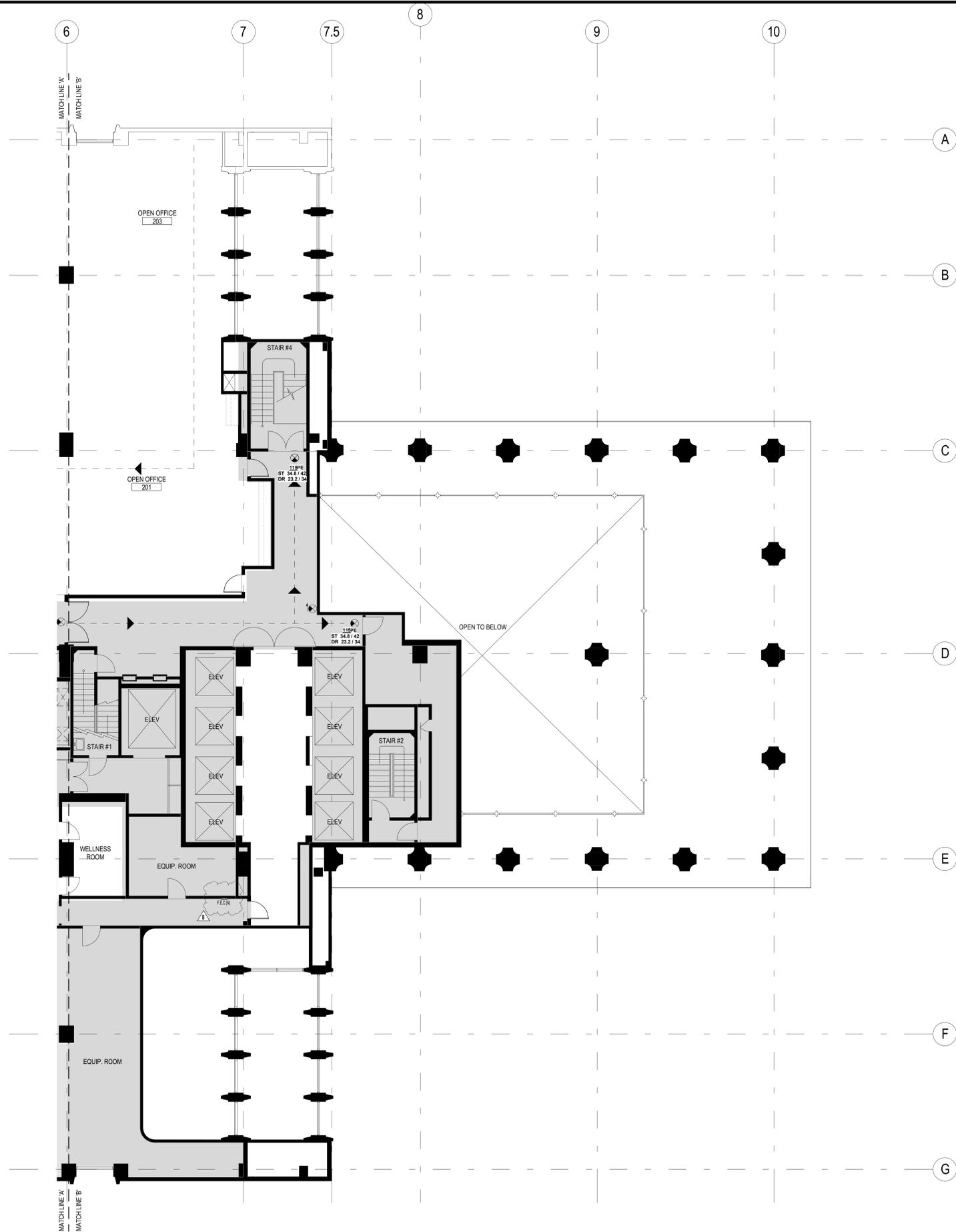
Project Number
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The City of
SAN DIEGO
Public Works
G03.002A

CITY OF SAN DIEGO
LIFE SAFETY PLAN - LEVEL 02 SOUTH

CITY OF SAN DIEGO, CALIFORNIA PUBLIC WORKS DEPARTMENT SHEET 08 OF 402 SHEETS		WBS S-17009
APPROVED FOR CITY ENGINEER JASON GRANI PRINT DCE NAME	DATE 5/31/2018 77208	SUBMITTED BY JORGE ACEVEDO PROJECT MANAGER CHECKED BY MARLON PEREZ PROJECT ENGINEER
DESCRIPTION	BY	APPROVED
ORIGINAL		DATE FILMED 5/31/2018
ADDENDUM B		DATE COMPLETED 6/25/2018
CONTRACTOR INSPECTOR		DATE STARTED DATE COMPLETED
CCS27 COORDINATE		CCS83 COORDINATE
40154 - 08 - D		

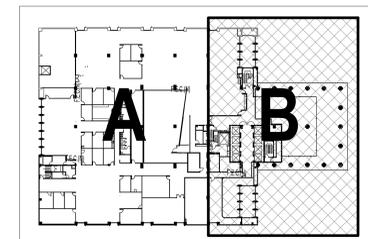
A LIFE SAFETY PLAN - LEVEL 02 SOUTH
SCALE: 1/8" = 1'-0"

02 LEVEL 02 - KEY PLAN
SCALE: 1/64" = 1'-0"



REFER TO SHEET G03.002A

OCCUPANCY TABULATION



SHEET NOTES

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LEGEND

- A REFER TO SHEET A00.100 FOR SYMBOLS AND ABBREVIATIONS

OCCUPANCY DESIGNATION

- Business areas

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The City of
SAN DIEGO
Public Works

G03.002B

CITY OF SAN DIEGO

LIFE SAFETY PLAN - LEVEL 02 NORTH

CITY OF SAN DIEGO, CALIFORNIA
PUBLIC WORKS DEPARTMENT
SHEET 09 OF 402 SHEETS

WBS S-17009

APPROVED FOR CITY ENGINEER	DATE	5/31/2018	SUBMITTED BY	JORGE ACEVEDO
JASON GRANI	7/20/18		PROJECT MANAGER	
PRINT DCE NAME	RCEP		CHECKED BY	MARLON PEREZ
			PROJECT ENGINEER	
DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL			5/31/2018	
ADDENDUM B			6/25/2018	
				CCS27 COORDINATE
				CCS83 COORDINATE
CONTRACTOR	DATE STARTED			
INSPECTOR	DATE COMPLETED			40154 - 09 - D



02 LEVEL 02 - KEY PLAN
SCALE: 1/64" = 1'-0"

Added Occupancy designation legend

ADDENDUM B



SHEET NOTES

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LEGEND

- A REFER TO SHEET A00.100 FOR SYMBOLS AND ABBREVIATIONS
- OCCUPANCY DESIGNATION**
- Accessory storage areas, mechanical equipment room
 - Assembly without fixed seats - Unconcentrated (tables and chairs)
 - Business areas

CITY OF SAN DIEGO
 101 W. ASH
 101 W. ASH STREET
 SAN DIEGO, CA 92101

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 Tel 619.557.2500 Fax 619.557.2520

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07.28.2017	ISSUE PERMIT	AK/SS
09.08.2017	ISSUE FOR BID	AK/SS
05.07.2018	ISSUE FOR BID	AK/SS
06.25.2018	ADDENDUM 'B'	AK/SS



Project Number
 55.7291.013

The City of
SAN DIEGO
 Public Works

G03.003

OCCUPANCY TABULATION - SUITE 300

ROOM AREA NAME	OCCUPANCY DESIGNATION	AREA (SQ FT)	LOAD FACTOR (SQ FT)	OCCUPANT LOAD
COFFEE/BREAK 324	Assembly without fixed seats - Unconcentrated (tables and chairs)	168 SF	15	12
CONF 312	Assembly without fixed seats - Unconcentrated (tables and chairs)	189 SF	15	13
CONF 314	Assembly without fixed seats - Unconcentrated (tables and chairs)	502 SF	15	34
CONF 316	Assembly without fixed seats - Unconcentrated (tables and chairs)	165 SF	15	12
GALLERY/BREAK 302	Assembly without fixed seats - Unconcentrated (tables and chairs)	160 SF	15	11
STE 300 OFF	Business areas	9,621 SF	100	97
ELECTRICAL ROOM 1	Accessory storage areas, mechanical equipment room	226 SF	300	1
OCCUPIED AREA:		11,032 SF		179
UNOCCUPIED AREA (WALLS, CASEWORK, ETC.):		0 SF	0	0
TOTAL SUITE AREA:		11,032 SF		179

NUMBER OF EXITS

TOTAL EXITS REQUIRED:	2
TOTAL EXITS PROVIDED:	2

01 LIFE SAFETY PLAN - LEVEL 03
 SCALE: 1/8" = 1'-0"

OCCUPANCY TABULATION

CITY OF SAN DIEGO
 LIFE SAFETY PLAN - LEVEL 03

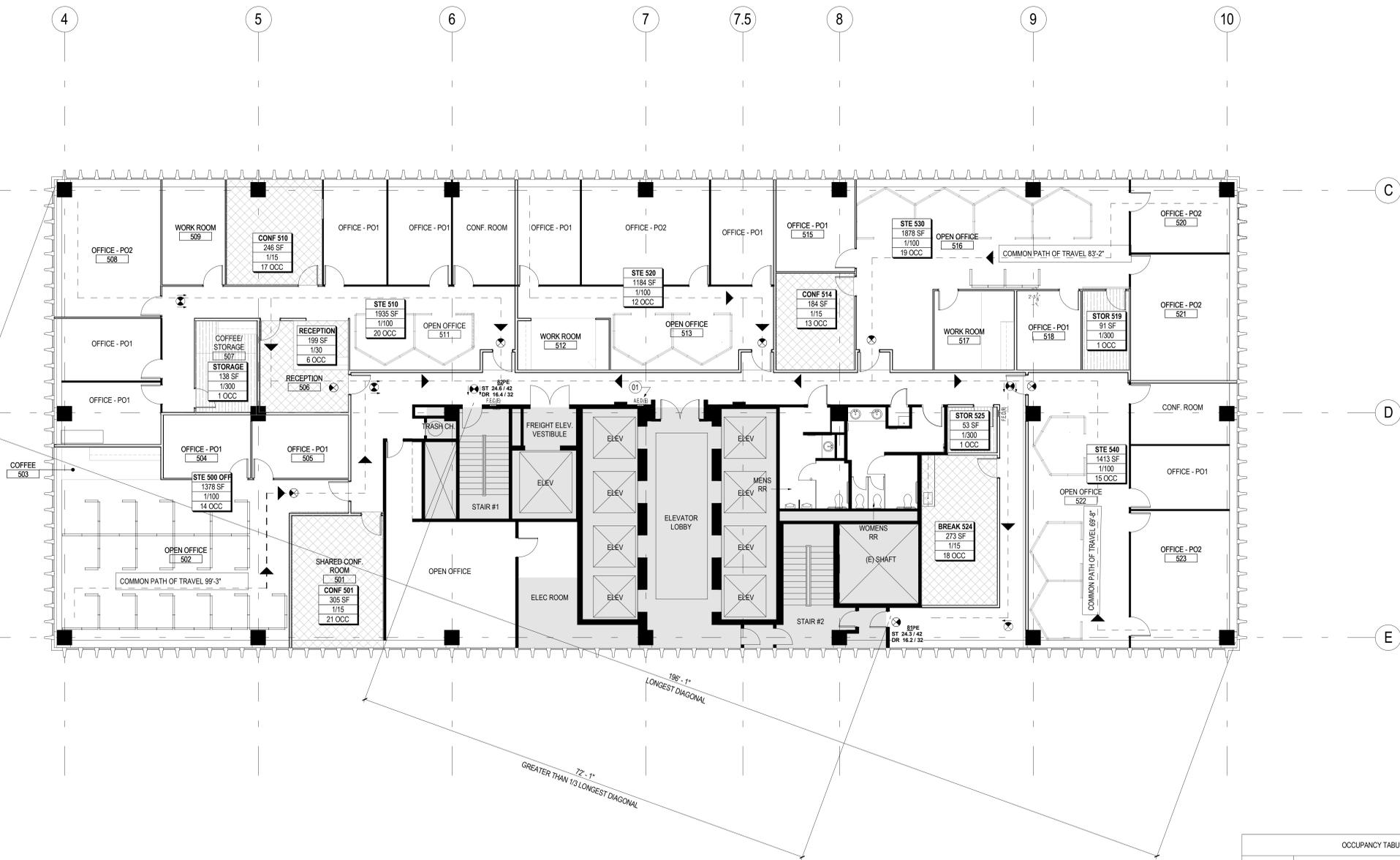
CITY OF SAN DIEGO, CALIFORNIA
 PUBLIC WORKS DEPARTMENT
 SHEET 10 OF 402 SHEETS

WBS S-17009

APPROVED FOR CITY ENGINEER	DATE	SUBMITTED BY
JASON GRANI	5/31/2018	JORGE ACEVEDO
PROJECT MANAGER	DATE	PROJECT MANAGER
MARLON PEREZ	7/20/18	MARLON PEREZ
PROJECT ENGINEER	DATE	PROJECT ENGINEER

CONTRACTOR INSPECTOR DATE STARTED DATE COMPLETED

40154 - 10 - D



196'-1" LONGEST DIAGONAL
 GREATER THAN 1/3 LONGEST DIAGONAL
 72'-1"

SHEET NOTES

01 REFER TO SHEET A00.100 FOR SYMBOLS AND ABBREVIATIONS.

GENERAL NOTES

- A ACCESSORY USE AREAS THAT ORDINARILY ARE USED ONLY BY PERSONS WHO OCCUPY THE MAIN AREAS OF AN OCCUPANCY SHALL BE PROVIDED WITH MEANS OF EGRESS AS THOUGH THEY ARE COMPLETELY OCCUPIED, BUT THEIR OCCUPANT LOAD NEED NOT BE INCLUDED WHEN COMPUTING THE TOTAL OCCUPANT LOAD OF THE BUILDING.
- B PROVIDE MEANS OF EGRESS IDENTIFICATION USING EXIT SIGNS THAT ARE INTERNALLY OR EXTERNALLY ILLUMINATED ALONG THE PATH OF EXIT TRAVEL WITHIN THE MEANS OF EGRESS SYSTEM. THE EXIT SIGNS SHALL MEET THE FOLLOWING MINIMUM REQUIREMENTS WHICH ARE EXIT SIGNS SHALL BE VISIBLE FROM ANY DIRECTION OF APPROACH AND EXIT SIGNS SHALL BE LOCATED TO CLEARLY INDICATE THE DIRECTION OF EGRESS TRAVEL AND SUCH THAT NO POINT SHALL BE MORE THAN 100 FEET FROM THE NEAREST VISIBLE SIGN.
- C EXIT SIGNS SHALL BE CONNECTED TO AN EMERGENCY ELECTRICAL POWER SYSTEM (STORAGE BATTERIES, UNIT EQUIPMENT, OR AN ON SITE GENERATOR SET) OR AN APPROVED SELF LUMINOUS SYSTEM THAT PROVIDES CONTINUOUS ILLUMINATION INDEPENDENT OF THE EXTERNAL POWER SOURCE TO ENSURE THAT THE EXIT SIGNS ARE ILLUMINATED AT ALL TIMES. MINIMUM 90 MIN BATTERY BACKUP REQUIRED CBC 1011.5.3
- D WHEN 2 EXITS ARE REQUIRED, THE MEANS OF EGRESS ILLUMINATION LEVEL SHALL NOT BE LESS THAN 1 FOOT-CANDLE (11 LUX) AT THE WALKING SURFACE LEVEL. THE MEANS OF EGRESS SHALL BE ILLUMINATED AT ALL TIMES IN ACCORDANCE WITH CBC SECTION 1006.1; 1006.2 AND 1006.3.
- E THE POWER SUPPLY FOR MEANS OF EGRESS ILLUMINATION SHALL NORMALLY BE PROVIDED BY THE PREMISES' ELECTRICAL SUPPLY. IN THE EVENT OF POWER SUPPLY FAILURE, AN EMERGENCY ELECTRICAL SYSTEM SHALL AUTOMATICALLY ILLUMINATE THE EGRESS SYSTEM.
- F REFER TO DETAIL 06/A00.301 FOR SIGNAGE AND TACTILE REQUIREMENTS AT STAIR/EXIT/EGRESS

CITY OF SAN DIEGO
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06.25.2018	ADDENDUM 'B'	AKLM



Project Number
 55.7291.013

The City of
SAN DIEGO
 Public Works

G03.005

LEGEND

- A REFER TO SHEET A00.100 FOR SYMBOLS AND ABBREVIATIONS.
- OCCUPANCY DESIGNATION
- Accessory storage areas, mechanical equipment room
- Assembly without fixed seats - Unconcentrated (tables and chairs)
- Business areas

OCCUPANCY TABULATION - SUITE 520

ROOM/AREA NAME	OCCUPANCY DESIGNATION	AREA (SQ FT)	LOAD FACTOR (SQ FT)	OCCUPANT LOAD
BREAK 524	Assembly without fixed seats - Unconcentrated (tables and chairs)	273 SF	15	19
CONF 501	Assembly without fixed seats - Unconcentrated (tables and chairs)	305 SF	15	21
OCCUPIED AREA:		578 SF		40
UNOCCUPIED AREA (WALLS, CASEWORK, ETC.)		0 SF	0	0
TOTAL SUITE AREA:		578 SF		40

NUMBER OF EXITS
 TOTAL EXITS REQUIRED: 1
 TOTAL EXITS PROVIDED: 1

OCCUPANCY TABULATION - SUITE 530

ROOM/AREA NAME	OCCUPANCY DESIGNATION	AREA (SQ FT)	LOAD FACTOR (SQ FT)	OCCUPANT LOAD
CONF 514	Assembly without fixed seats - Unconcentrated (tables and chairs)	184 SF	15	13
STE 530	Business areas	1,878 SF	100	19
STOR 519	Accessory storage areas, mechanical equipment room	91 SF	300	1
OCCUPIED AREA:		2,153 SF		33
UNOCCUPIED AREA (WALLS, CASEWORK, ETC.)		0 SF	0	0
TOTAL SUITE AREA:		2,153 SF		33

NUMBER OF EXITS
 TOTAL EXITS REQUIRED: 1
 TOTAL EXITS PROVIDED: 1

OCCUPANCY TABULATION - SUITE 540

ROOM/AREA NAME	OCCUPANCY DESIGNATION	AREA (SQ FT)	LOAD FACTOR (SQ FT)	OCCUPANT LOAD
STE 540	Business areas	1,413 SF	100	15
OCCUPIED AREA:		1,413 SF		15
UNOCCUPIED AREA (WALLS, CASEWORK, ETC.)		0 SF	0	0
TOTAL SUITE AREA:		1,413 SF		15

NUMBER OF EXITS
 TOTAL EXITS REQUIRED: 1
 TOTAL EXITS PROVIDED: 1

OCCUPANCY TABULATION - LEVEL 05

ROOM/AREA NAME	OCCUPANCY DESIGNATION	AREA (SQ FT)	LOAD FACTOR (SQ FT)	OCCUPANT LOAD
BREAK 524	Assembly without fixed seats - Unconcentrated (tables and chairs)	273 SF	15	19
CONF 501	Assembly without fixed seats - Unconcentrated (tables and chairs)	305 SF	15	21
OCCUPIED AREA:		578 SF		40
UNOCCUPIED AREA (WALLS, CASEWORK, ETC.)		0 SF	0	0
TOTAL SUITE AREA:		578 SF		40

NUMBER OF EXITS
 TOTAL EXITS REQUIRED: 2
 TOTAL EXITS PROVIDED: 2

OCCUPANCY TABULATION - SUITE 500

ROOM/AREA NAME	OCCUPANCY DESIGNATION	AREA (SQ FT)	LOAD FACTOR (SQ FT)	OCCUPANT LOAD
STE 500 OFF	Business areas	1,378 SF	100	14
OCCUPIED AREA:		1,378 SF		14
UNOCCUPIED AREA (WALLS, CASEWORK, ETC.)		0 SF	0	0
TOTAL SUITE AREA:		1,386 SF		14

NUMBER OF EXITS
 TOTAL EXITS REQUIRED: 1
 TOTAL EXITS PROVIDED: 1

OCCUPANCY TABULATION - SUITE 510

ROOM/AREA NAME	OCCUPANCY DESIGNATION	AREA (SQ FT)	LOAD FACTOR (SQ FT)	OCCUPANT LOAD
CONF 510	Assembly without fixed seats - Unconcentrated (tables and chairs)	246 SF	15	17
RECEPTION	Assembly without fixed seats - Unconcentrated (tables and chairs)	199 SF	15	14
STE 510	Business areas	1,935 SF	100	20
STORAGE	Accessory storage areas, mechanical equipment room	138 SF	300	1
OCCUPIED AREA:		2,518 SF		51
UNOCCUPIED AREA (WALLS, CASEWORK, ETC.)		0 SF	0	0
TOTAL SUITE AREA:		2,493 SF		50

NUMBER OF EXITS
 TOTAL EXITS REQUIRED: 2
 TOTAL EXITS PROVIDED: 2

OCCUPANCY TABULATION

01 LIFE SAFETY PLAN - LEVEL 05
 SCALE: 1/8" = 1'-0"

CITY OF SAN DIEGO
 LIFE SAFETY PLAN - LEVEL 05

CITY OF SAN DIEGO, CALIFORNIA
 PUBLIC WORKS DEPARTMENT
 SHEET 12 OF 402 SHEETS

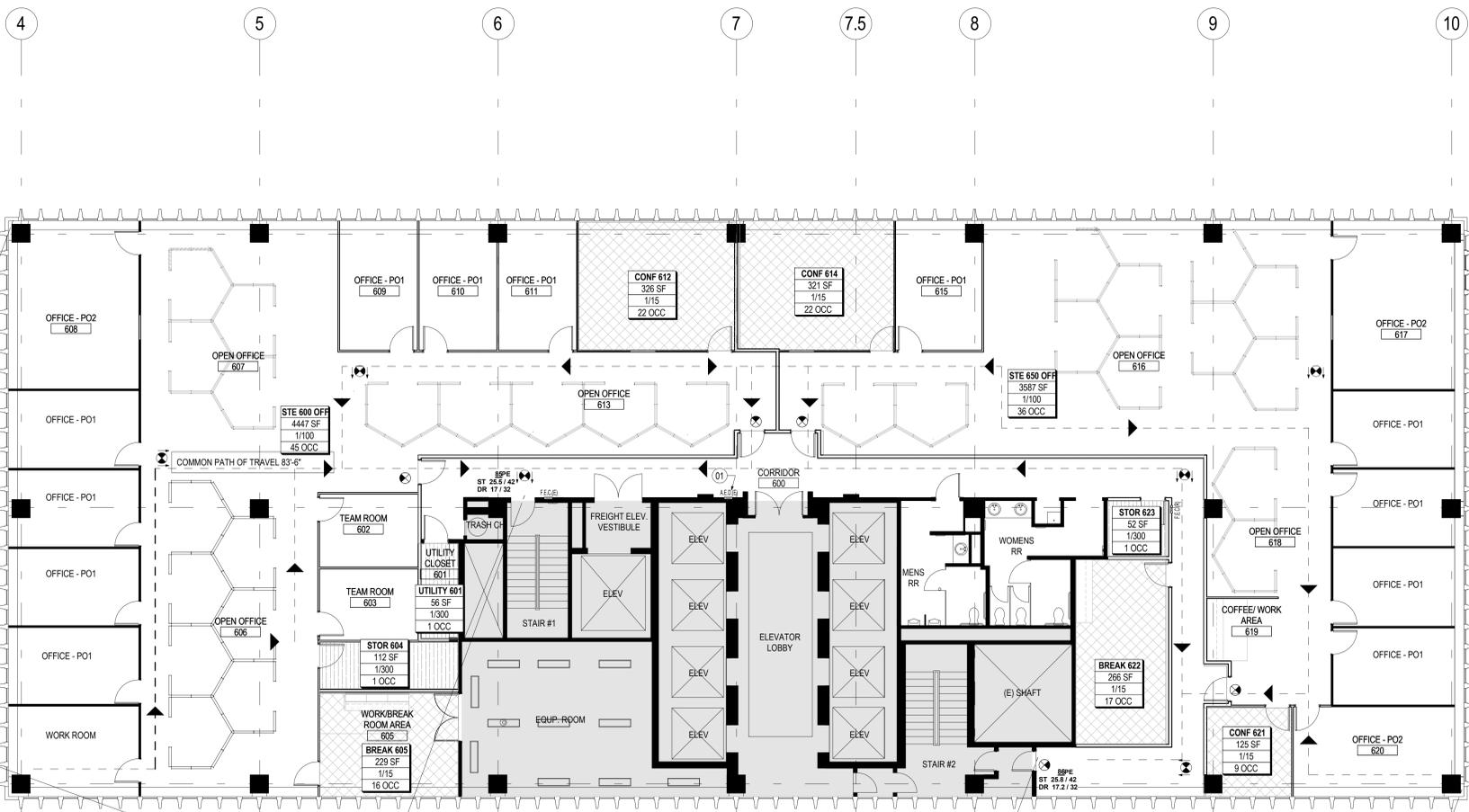
WBS S-17009

APPROVED: [Signature] 5/31/2018
 FOR CITY ENGINEER DATE
 JASON GRANI PROJECT MANAGER
 PRINT DCE NAME RECD
 MARLON PEREZ PROJECT ENGINEER

DESCRIPTION BY APPROVED DATE FILMED
 ORIGINAL 5/31/2018
 ADDENDUM B 6/25/2018

CONTRACTOR DATE STARTED
 INSPECTOR DATE COMPLETED

CCS27 COORDINATE
 CCS83 COORDINATE
 40154 - 12 - D



72'-1" LONGEST DIAGONAL
196'-1" LONGEST DIAGONAL
GREATER THAN 1/3 LONGEST DIAGONAL

SHEET NOTES

01 REFER TO SHEET A00-100 FOR SYMBOLS AND ABBREVIATIONS.

GENERAL NOTES

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06.25.2018	ADDENDUM 'B'	AK/LM

OCCUPANCY TABULATION - LEVEL 06

ROOM/AREA NAME	OCCUPANCY DESIGNATION	AREA (SQ FT)	LOAD FACTOR (SQ FT)	OCCUPANT LOAD
BREAK 622	Assembly without fixed seats - Unconcentrated (tables and chairs)	266 SF	15	18
STOR 623	Accessory storage areas, mechanical equipment room	52 SF	300	1
UTILITY 601	Accessory storage areas, mechanical equipment room	56 SF	300	1
OCCUPIED AREA:		374 SF		20
UNOCCUPIED AREA (WALLS, CASEWORK, ETC.):		0 SF	0	0
TOTAL SUITE AREA:		374 SF		20

NUMBER OF EXITS: TOTAL EXITS REQUIRED: 1, TOTAL EXITS PROVIDED: 3

OCCUPANCY TABULATION - SUITE 600

ROOM/AREA NAME	OCCUPANCY DESIGNATION	AREA (SQ FT)	LOAD FACTOR (SQ FT)	OCCUPANT LOAD
BREAK 605	Assembly without fixed seats - Unconcentrated (tables and chairs)	229 SF	15	16
CONF 612	Assembly without fixed seats - Unconcentrated (tables and chairs)	326 SF	15	22
STE 600 OFF	Business areas	4,447 SF	100	45
STOR 604	Accessory storage areas, mechanical equipment room	112 SF	300	1
OCCUPIED AREA:		5,114 SF		84
UNOCCUPIED AREA (WALLS, CASEWORK, ETC.):		0 SF	0	0
TOTAL SUITE AREA:		5,114 SF		84

NUMBER OF EXITS: TOTAL EXITS REQUIRED: 2, TOTAL EXITS PROVIDED: 2

OCCUPANCY TABULATION - SUITE 650

ROOM/AREA NAME	OCCUPANCY DESIGNATION	AREA (SQ FT)	LOAD FACTOR (SQ FT)	OCCUPANT LOAD
CONF 614	Assembly without fixed seats - Unconcentrated (tables and chairs)	321 SF	15	22
CONF 621	Assembly without fixed seats - Unconcentrated (tables and chairs)	125 SF	15	9
STE 650 OFF	Business areas	4,033 SF	100	36
OCCUPIED AREA:		4,033 SF		67
UNOCCUPIED AREA (WALLS, CASEWORK, ETC.):		0 SF	0	0
TOTAL SUITE AREA:		4,033 SF		67

NUMBER OF EXITS: TOTAL EXITS REQUIRED: 2, TOTAL EXITS PROVIDED: 2

LEGEND

- A REFER TO SHEET A00-100 FOR SYMBOLS AND ABBREVIATIONS.
- OCCUPANCY DESIGNATION**
- Accessory storage areas, mechanical equipment room
 - Assembly without fixed seats - Unconcentrated (tables and chairs)
 - Business areas



Project Number: 55.7291.013

The City of **SAN DIEGO** Public Works

G03.006

CITY OF SAN DIEGO
LIFE SAFETY PLAN - LEVEL 06

CITY OF SAN DIEGO, CALIFORNIA
PUBLIC WORKS DEPARTMENT
SHEET 13 OF 402 SHEETS

WBS S-17009

APPROVED: FOR CITY ENGINEER DATE: 5/31/2018
PROJECT MANAGER: JASON GRANI DATE: 7/20/18
PROJECT ENGINEER: MARLON PEREZ

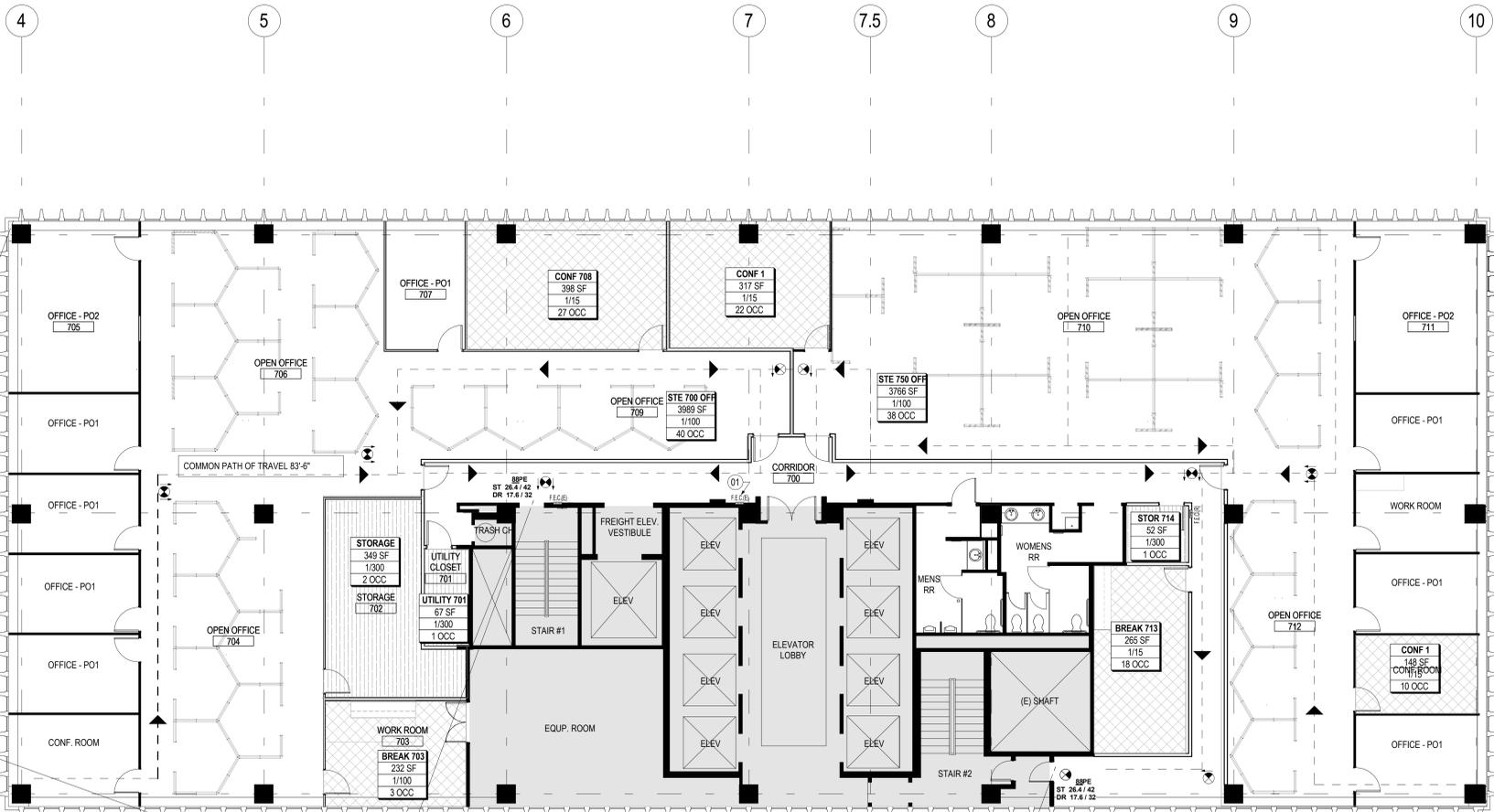
DESCRIPTION: ORIGINAL DATE FILMED: 5/31/2018
ADDENDUM B DATE FILMED: 6/25/2018

CONTRACTOR: DATE STARTED: 40154 - 13 - D
INSPECTOR: DATE COMPLETED:

Added Occupancy designation legend

OCCUPANCY TABULATION

01 LIFE SAFETY PLAN - LEVEL 06
SCALE: 1/8" = 1'-0"



GREATER THAN 72'-1"
LONGEST DIAGONAL

SHEET NOTES

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GENERAL NOTES

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- F REFER TO DETAIL 06/A00.301 FOR SIGNAGE AND TACTILE REQUIREMENTS AT STAIR/EXIT/EGRESS

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8.06.2018	ADDENDUM 'B'	AK/LM

OCCUPANCY TABULATION - LEVEL 07

ROOM/ AREA NAME	OCCUPANCY DESIGNATION	AREA (SQ FT)	LOAD FACTOR (SQ FT)	OCCUPANT LOAD
BREAK 713	Assembly without fixed seats - Unconcentrated (tables and chairs)	265 SF	15	18
STOR 714	Accessory storage areas, mechanical equipment room	52 SF	300	1
UTILITY 701	Accessory storage areas, mechanical equipment room	67 SF	300	1
OCCUPIED AREA:		385 SF		20
UNOCCUPIED AREA (WALLS, CASEWORK, ETC.):		0 SF	0	0
TOTAL SUITE AREA:		385 SF		20

NUMBER OF EXITS: 1
TOTAL EXITS REQUIRED: 3
TOTAL EXITS PROVIDED: 3

OCCUPANCY TABULATION - SUITE 700

ROOM/ AREA NAME	OCCUPANCY DESIGNATION	AREA (SQ FT)	LOAD FACTOR (SQ FT)	OCCUPANT LOAD
BREAK 703	Assembly without fixed seats - Unconcentrated (tables and chairs)	232 SF	15	16
CONF 708	Assembly without fixed seats - Unconcentrated (tables and chairs)	398 SF	15	27
STE 700 OFF	Business areas	3,989 SF	100	40
STORAGE	Accessory storage areas, mechanical equipment room	349 SF	300	2
OCCUPIED AREA:		4,969 SF		85
UNOCCUPIED AREA (WALLS, CASEWORK, ETC.):		0 SF	0	0
TOTAL SUITE AREA:		4,969 SF		85

NUMBER OF EXITS: 2
TOTAL EXITS REQUIRED: 2
TOTAL EXITS PROVIDED: 2

OCCUPANCY TABULATION - SUITE 750

ROOM/ AREA NAME	OCCUPANCY DESIGNATION	AREA (SQ FT)	LOAD FACTOR (SQ FT)	OCCUPANT LOAD
CONF 1	Assembly without fixed seats - Unconcentrated (tables and chairs)	317 SF	15	22
CONF 1	Assembly without fixed seats - Unconcentrated (tables and chairs)	148 SF	15	10
STE 750 OFF	Business areas	3,766 SF	100	38
OCCUPIED AREA:		4,232 SF		70
UNOCCUPIED AREA (WALLS, CASEWORK, ETC.):		0 SF	0	0
TOTAL SUITE AREA:		4,232 SF		70

NUMBER OF EXITS: 2
TOTAL EXITS REQUIRED: 2
TOTAL EXITS PROVIDED: 2

LEGEND

- A REFER TO SHEET A00.100 FOR SYMBOLS AND ABBREVIATIONS
- OCCUPANCY DESIGNATION
 - Accessory storage areas, mechanical equipment room
 - Assembly without fixed seats - Unconcentrated (tables and chairs)
 - Business areas



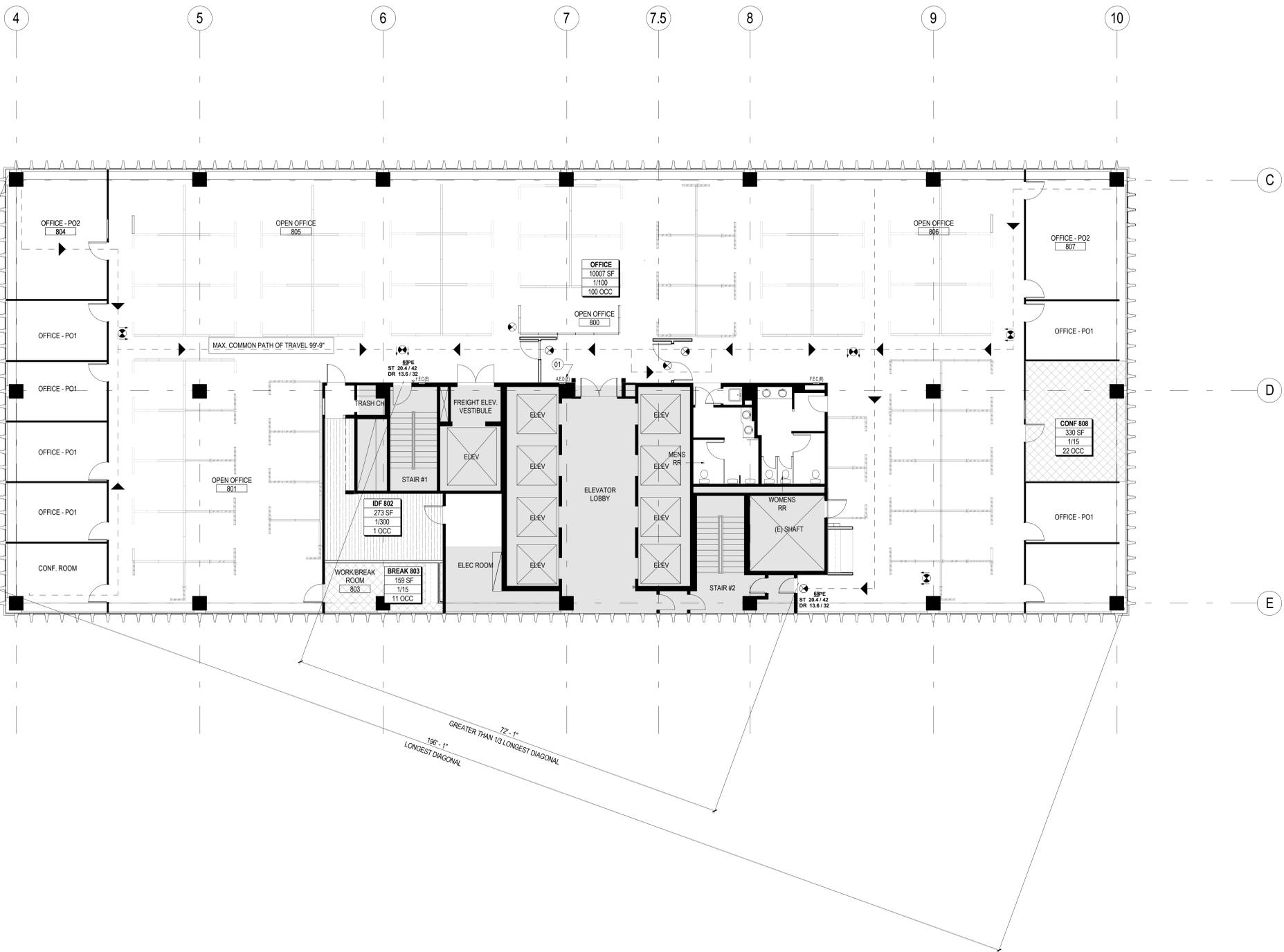
Project Number
55.7291.013
The City of
SAN DIEGO
Public Works
G03.007

CITY OF SAN DIEGO
LIFE SAFETY PLAN - LEVEL 07

CITY OF SAN DIEGO, CALIFORNIA PUBLIC WORKS DEPARTMENT SHEET 14 OF 402 SHEETS		WBS S-17009
APPROVED: JASON GRANI FOR CITY ENGINEER PRINT DCE NAME	DATE: 5/31/2018 77208	SUBMITTED BY: JORGE ACEVEDO PROJECT MANAGER CHECKED BY: MARLON PEREZ PROJECT ENGINEER
DESCRIPTION: ORIGINAL	BY: [Signature]	DATE: 5/31/2018
DESCRIPTION: ADDENDUM B	BY: [Signature]	DATE: 6/25/2018
CONTRACTOR INSPECTOR	DATE STARTED	DATE COMPLETED
		40154 - 14 - D

01 LIFE SAFETY PLAN - LEVEL 07
SCALE: 1/8" = 1'-0"

OCCUPANCY TABULATION



SHEET NOTES

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GENERAL NOTES

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- C EXIT SIGNS SHALL BE CONNECTED TO AN EMERGENCY ELECTRICAL POWER SYSTEM (STORAGE BATTERIES, UNIT EQUIPMENT, OR AN ON SITE GENERATOR SET) OR AN APPROVED SELF LUMINOUS SYSTEM THAT PROVIDES CONTINUOUS ILLUMINATION INDEPENDENT OF THE EXTERNAL POWER SOURCE TO ENSURE THAT THE EXIT SIGNS ARE ILLUMINATED AT ALL TIMES. MINIMUM 90 MIN BATTERY BACKUP REQUIRED CBC 1011.5.3
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LEGEND

- A REFER TO SHEET A00.100 FOR SYMBOLS AND ABBREVIATIONS.
- OCCUPANCY DESIGNATION**
- Accessory storage areas, mechanical equipment room
- Assembly without fixed seats - Unconcentrated (tables and chairs)
- Business areas

CITY OF SAN DIEGO
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Project Number
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The City of
SAN DIEGO
 Public Works

G03.008

ROOM AREA NAME	OCCUPANCY DESIGNATION	AREA (SQ FT)	LOAD FACTOR (SQ FT)	OCCUPANT LOAD
BREAK 803	Assembly without fixed seats - Unconcentrated (tables and chairs)	159 SF	15	11
CONF 808	Assembly without fixed seats - Unconcentrated (tables and chairs)	330 SF	15	22
OFFICE	Business areas	10,007 SF	100	101
IDF 802	Accessory storage areas, mechanical equipment room	273 SF	300	1
OCCUPIED AREA:		10,768 SF		136
UNOCCUPIED AREA (WALLS, CASEWORK, ETC.):		0 SF	0	0
TOTAL SUITE AREA:		10768 SF		136

NUMBER OF EXITS	TOTAL EXITS REQUIRED:	TOTAL EXITS PROVIDED:
2	2	2

CITY OF SAN DIEGO
 LIFE SAFETY PLAN - LEVEL 08

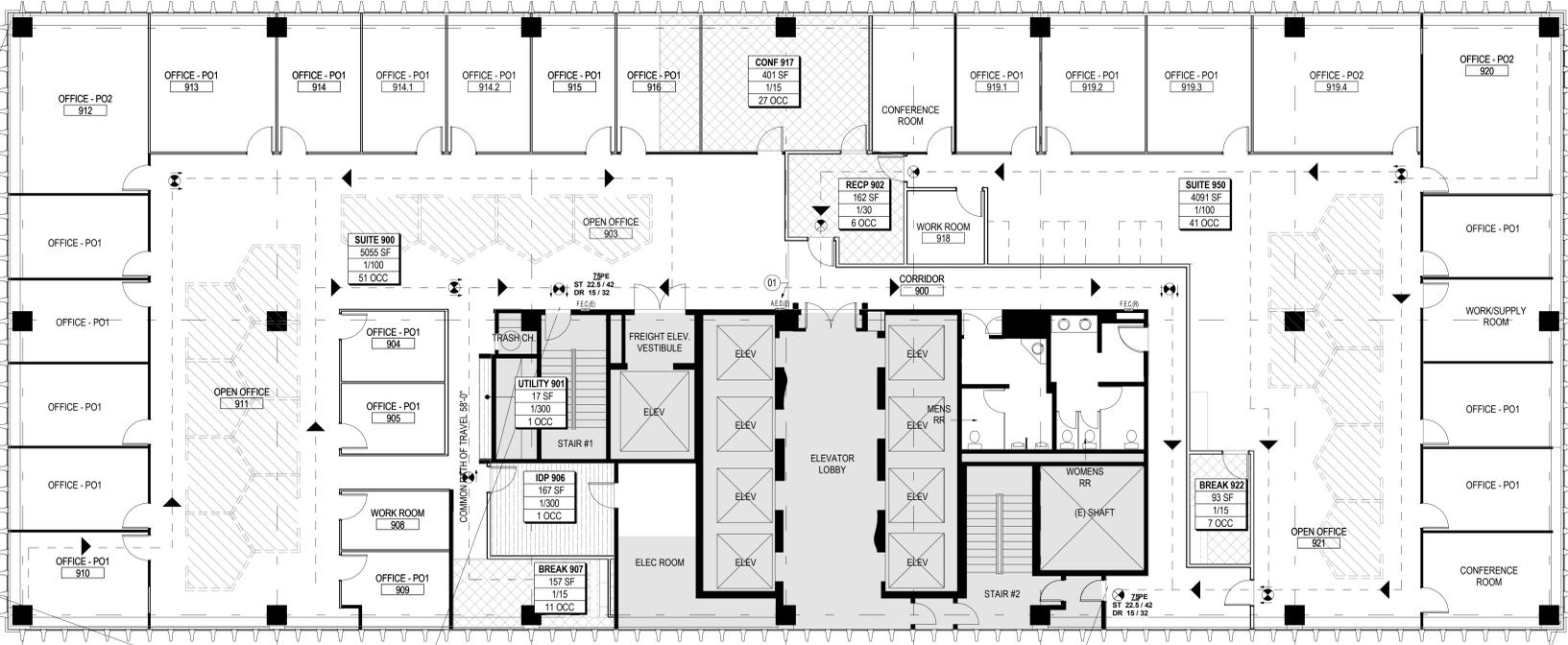
CITY OF SAN DIEGO, CALIFORNIA PUBLIC WORKS DEPARTMENT SHEET 15 OF 402 SHEETS		WBS S-17009
APPROVED: FOR CITY ENGINEER JASON GRANI PRINT DCE NAME	DATE 5/31/2018 77208	SUBMITTED BY JORGE ACEVEDO PROJECT MANAGER CHECKED BY MARLON PEREZ PROJECT ENGINEER
DESCRIPTION	BY	APPROVED
ORIGINAL		5/31/2018
ADDENDUM B		6/25/2018
CONTRACTOR INSPECTOR	DATE STARTED	DATE COMPLETED
		40154 - 15 - D

01 LIFE SAFETY PLAN - LEVEL 08
 SCALE: 1/8" = 1'-0"

OCCUPANCY TABULATION

4 5 6 7 7.5 8 9 10

C
D
E



72'-1"
196'-1"
GREATER THAN 1/3 LONGEST DIAGONAL

SHEET NOTES

01 REFER TO SHEET A00.100 FOR SYMBOLS AND ABBREVIATIONS.

GENERAL NOTES

- A ACCESSORY USE AREAS THAT ORDINARILY ARE USED ONLY BY PERSONS WHO OCCUPY THE MAIN AREAS OF AN OCCUPANCY SHALL BE PROVIDED WITH MEANS OF EGRESS AS THOUGH THEY ARE COMPLETELY OCCUPIED, BUT THEIR OCCUPANT LOAD NEED NOT BE INCLUDED WHEN COMPUTING THE TOTAL OCCUPANT LOAD OF THE BUILDING.
- B PROVIDE MEANS OF EGRESS IDENTIFICATION USING EXIT SIGNS THAT ARE INTERNALLY OR EXTERNALLY ILLUMINATED ALONG THE PATH OF EXIT TRAVEL WITHIN THE MEANS OF EGRESS SYSTEM. THE EXIT SIGNS SHALL MEET THE FOLLOWING MINIMUM REQUIREMENTS WHICH ARE EXIT SIGNS SHALL BE VISIBLE FROM ANY DIRECTION OF APPROACH AND EXIT SIGNS SHALL BE LOCATED TO CLEARLY INDICATE THE DIRECTION OF EGRESS TRAVEL AND SUCH THAT NO POINT SHALL BE MORE THAN 100 FEET FROM THE NEAREST VISIBLE SIGN.
- C EXIT SIGNS SHALL BE CONNECTED TO AN EMERGENCY ELECTRICAL POWER SYSTEM (STORAGE BATTERIES, UNIT EQUIPMENT, OR AN ON SITE GENERATOR SET) OR AN APPROVED SELF LUMINOUS SYSTEM THAT PROVIDES CONTINUOUS ILLUMINATION INDEPENDENT OF THE EXTERNAL POWER SOURCE TO ENSURE THAT THE EXIT SIGNS ARE ILLUMINATED AT ALL TIMES. MINIMUM 90 MIN BATTERY BACKUP REQUIRED CBC 1011.5.3
- D WHEN 2 EXITS ARE REQUIRED, THE MEANS OF EGRESS ILLUMINATION LEVEL SHALL NOT BE LESS THAN 1 FOOT-CANDLE (11 LUX) AT THE WALKING SURFACE LEVEL. THE MEANS OF EGRESS SHALL BE ILLUMINATED AT ALL TIMES IN ACCORDANCE WITH CBC SECTION 1006.1; 1006.2 AND 1006.3.
- E THE POWER SUPPLY FOR MEANS OF EGRESS ILLUMINATION SHALL NORMALLY BE PROVIDED BY THE PREMISES' ELECTRICAL SUPPLY. IN THE EVENT OF POWER SUPPLY FAILURE, AN EMERGENCY ELECTRICAL SYSTEM SHALL AUTOMATICALLY ILLUMINATE THE EGRESS SYSTEM.
- F REFER TO DETAIL 06/A00.301 FOR SIGNAGE AND TACTILE REQUIREMENTS AT STAIR/EXIT/EGRESS

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Date	Description	AK/SS
07.28.2017	ISSUE PERMIT	AK/SS
09.08.2017	ISSUE FOR BID	AK/SS
05.07.2018	ISSUE FOR BID	AK/SS
06.25.2018	ADDENDUM 'B'	AK/LM

LEGEND

- A REFER TO SHEET A00.100 FOR SYMBOLS AND ABBREVIATIONS.
- OCCUPANCY DESIGNATION**
- Accessory storage areas, mechanical equipment room
 - Assembly without fixed seats - Unconcentrated (tables and chairs)
 - Business areas

OCCUPANCY TABULATION - SUITE 900

ROOM/ AREA NAME	OCCUPANCY DESIGNATION	AREA (SQ FT)	LOAD FACTOR (SQ FT)	OCCUPANT LOAD
BREAK 907	Assembly without fixed seats - Unconcentrated (tables and chairs)	157 SF	15	11
CONF 917	Assembly without fixed seats - Unconcentrated (tables and chairs)	401 SF	15	27
SUITE 900	Business areas	5,055 SF	100	51
IDP 906	Accessory storage areas, mechanical equipment room	167 SF		300
UTILITY 901	Accessory storage areas, mechanical equipment room	17 SF	300	1
		OCCUPIED AREA:	5,796 SF	91
UNOCCUPIED AREA (WALLS, CASEWORK, ETC.)			0 SF	0
		TOTAL SUITE AREA:	5796 SF	91

NUMBER OF EXITS TOTAL EXITS REQUIRED: 2
TOTAL EXITS PROVIDED: 2

OCCUPANCY TABULATION - SUITE 950

ROOM/ AREA NAME	OCCUPANCY DESIGNATION	AREA (SQ FT)	LOAD FACTOR (SQ FT)	OCCUPANT LOAD
BREAK 922	Assembly without fixed seats - Unconcentrated (tables and chairs)	93 SF	15	7
RECP 902	Assembly without fixed seats - Unconcentrated (tables and chairs)	162 SF	15	11
SUITE 950	Business areas	4,091 SF	100	41
		OCCUPIED AREA:	4,346 SF	59
UNOCCUPIED AREA (WALLS, CASEWORK, ETC.)			0 SF	0
		TOTAL SUITE AREA:	4346 SF	59

NUMBER OF EXITS TOTAL EXITS REQUIRED: 2
TOTAL EXITS PROVIDED: 2



Project Number
55.7291.013

The City of
SAN DIEGO
Public Works

G03.009

CITY OF SAN DIEGO
LIFE SAFETY PLAN - LEVEL 09

CITY OF SAN DIEGO, CALIFORNIA
PUBLIC WORKS DEPARTMENT
SHEET 16 OF 402 SHEETS

WBS S-17009

APPROVED: 5/31/2018
FOR CITY ENGINEER: JASON GRANI
DATE: 7/20/2018
PROJECT MANAGER: JORGE ACEVEDO
PROJECT ENGINEER: MARLON PEREZ

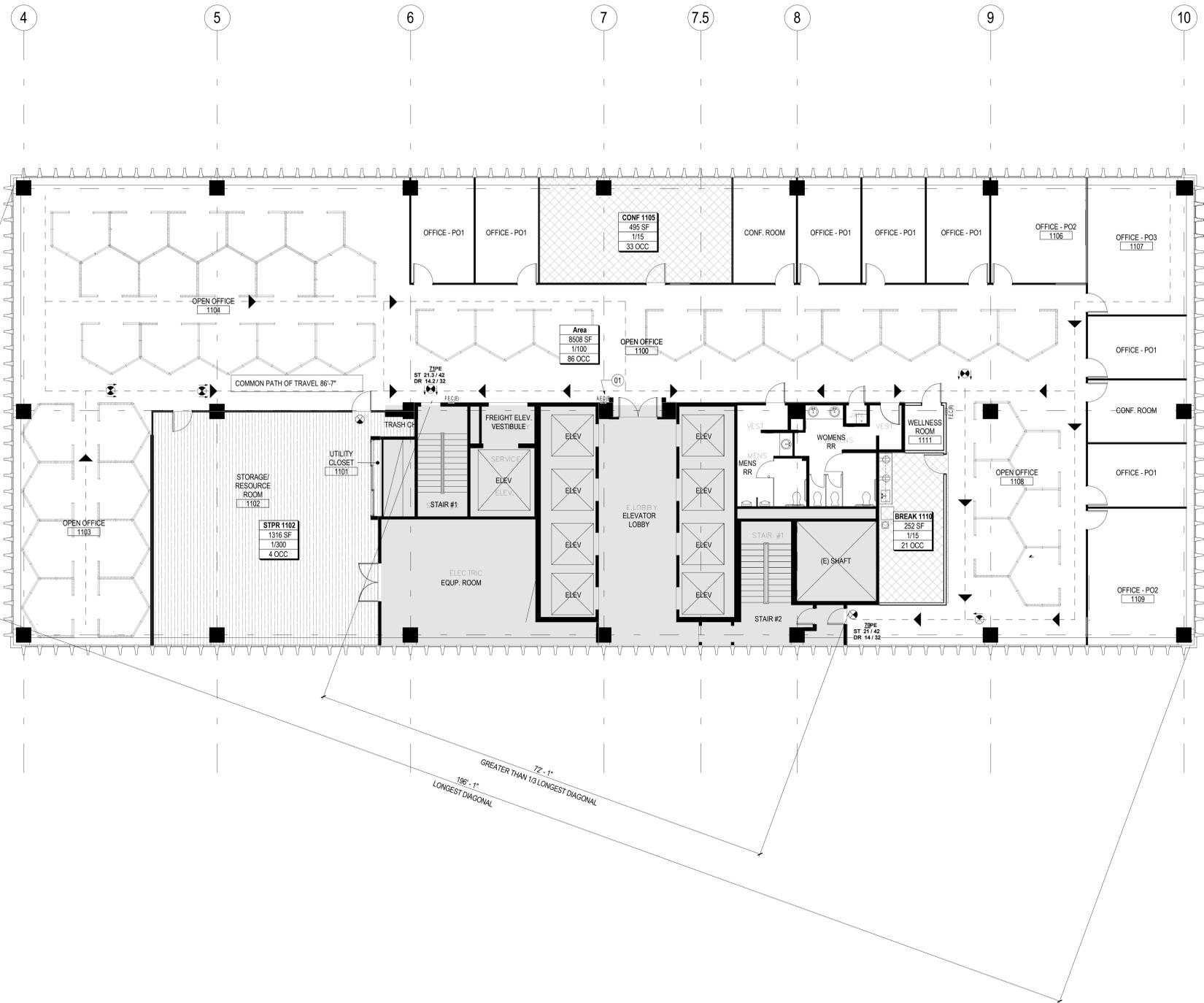
DESCRIPTION: ORIGINAL
BY: [Signature]
APPROVED: [Signature]
DATE FILMED: 5/31/2018
DATE COMPLETED: 6/25/2018

CONTRACTOR: [Blank]
INSPECTOR: [Blank]
DATE STARTED: [Blank]
DATE COMPLETED: [Blank]

CCS27 COORDINATE
CCS83 COORDINATE
40154 - 16 - D

01 LIFE SAFETY PLAN - LEVEL 09
SCALE: 1/8" = 1'-0"

OCCUPANCY TABULATION



SHEET NOTES

01 REFER TO SHEET A00.100 FOR SYMBOLS AND ABBREVIATIONS.

GENERAL NOTES

- A ACCESSORY USE AREAS THAT ORDINARILY ARE USED ONLY BY PERSONS WHO OCCUPY THE MAIN AREAS OF AN OCCUPANCY SHALL BE PROVIDED WITH MEANS OF EGRESS AS THOUGH THEY ARE COMPLETELY OCCUPIED, BUT THEIR OCCUPANT LOAD NEED NOT BE INCLUDED WHEN COMPUTING THE TOTAL OCCUPANT LOAD OF THE BUILDING.
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LEGEND

- A REFER TO SHEET A00.100 FOR SYMBOLS AND ABBREVIATIONS
- OCCUPANCY DESIGNATION**
- Accessory storage areas, mechanical equipment room
 - Assembly without fixed seats - Unconcentrated (tables and chairs)
 - Business areas

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Project Number
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The City of
SAN DIEGO
Public Works

G03.011

CITY OF SAN DIEGO

LIFE SAFETY PLAN - LEVEL 11

CITY OF SAN DIEGO, CALIFORNIA
PUBLIC WORKS DEPARTMENT
SHEET 18 OF 402 SHEETS

WBS S-17009

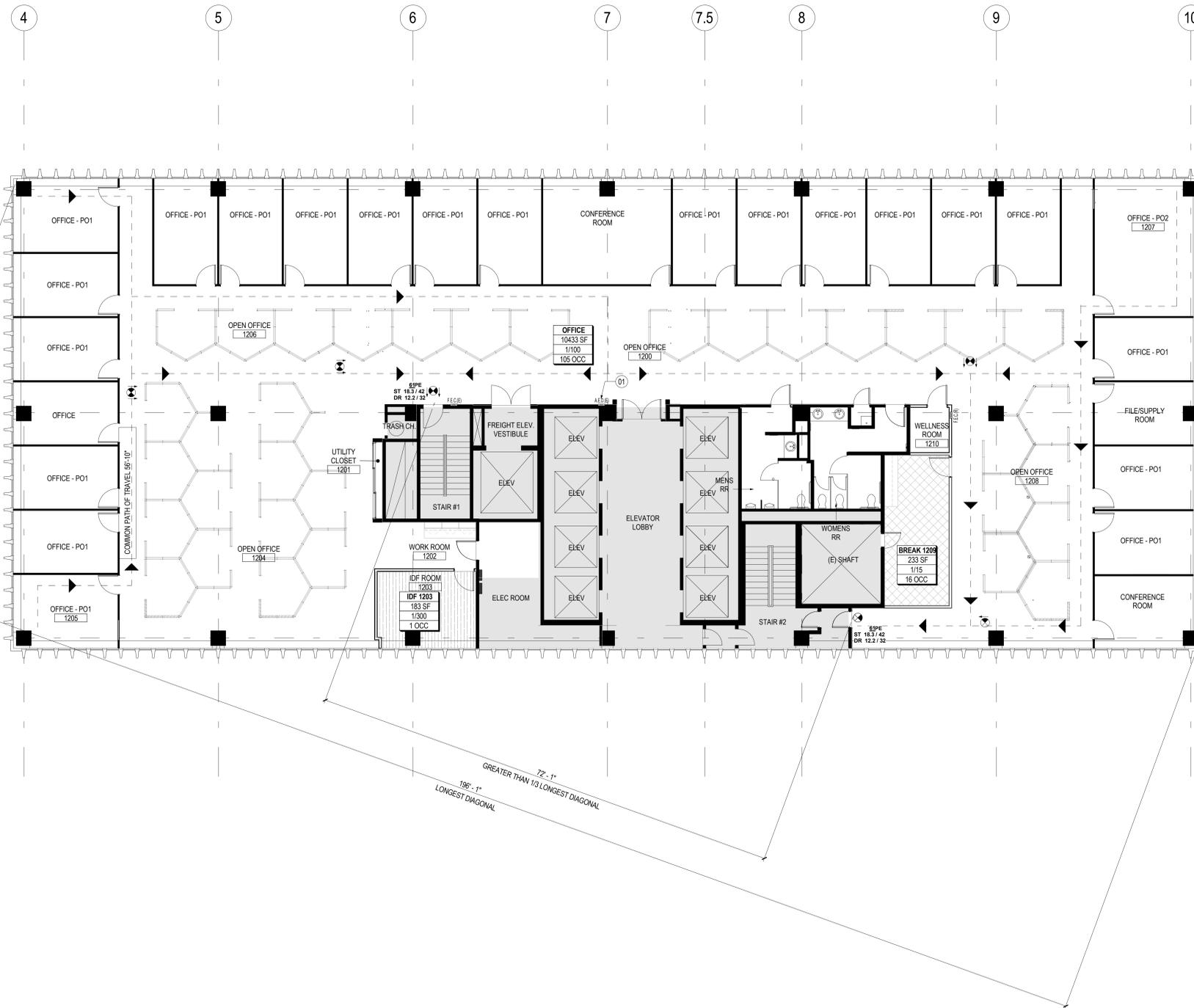
APPROVED:	DATE	5/31/2018	SUBMITTED BY:	JORGE ACEVEDO
FOR CITY ENGINEER	DATE	7/20/18	PROJECT MANAGER	MARLON PEREZ
JASON GRANI	DATE		PROJECT ENGINEER	
PRINT DCE NAME	DATE			
DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL			5/31/2018	
ADDENDUM B			6/25/2018	
				CCS27 COORDINATE
				CCS83 COORDINATE
CONTRACTOR	DATE STARTED			
INSPECTOR	DATE COMPLETED			40154 - 18 - D

ROOM/ AREA NAME	OCCUPANCY DESIGNATION	AREA (SQ FT)	LOAD FACTOR (SQ FT)	OCCUPANT LOAD
BREAK 1110	Assembly without fixed seats - Unconcentrated (tables and chairs)	252 SF	15	17
CONF 1105	Assembly without fixed seats - Unconcentrated (tables and chairs)	495 SF	15	34
Area	Business areas	8,508 SF	100	86
STPR 1102	Accessory storage areas, mechanical equipment room	1,316 SF	300	5
OCCUPIED AREA:		10,571 SF		141
UNOCCUPIED AREA (WALLS, CASEWORK, ETC.):		0 SF	0	0
TOTAL SUITE AREA:		10571 SF		141

NUMBER OF EXITS	TOTAL EXITS REQUIRED:	2
	TOTAL EXITS PROVIDED:	2

OCCUPANCY TABULATION

01 LIFE SAFETY PLAN - LEVEL 11
SCALE: 1/8" = 1'-0"



72'-1" LONGEST DIAGONAL
196'-1" LONGEST DIAGONAL
GREATER THAN 1/3 LONGEST DIAGONAL

SHEET NOTES

01 REFER TO SHEET A00.100 FOR SYMBOLS AND ABBREVIATIONS.

GENERAL NOTES

- A ACCESSORY USE AREAS THAT ORDINARILY ARE USED ONLY BY PERSONS WHO OCCUPY THE MAIN AREAS OF AN OCCUPANCY SHALL BE PROVIDED WITH MEANS OF EGRESS AS THOUGH THEY ARE COMPLETELY OCCUPIED, BUT THEIR OCCUPANT LOAD NEED NOT BE INCLUDED WHEN COMPUTING THE TOTAL OCCUPANT LOAD OF THE BUILDING.
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- D WHEN 2 EXITS ARE REQUIRED, THE MEANS OF EGRESS ILLUMINATION LEVEL SHALL NOT BE LESS THAN 1 FOOT-CANDLE (11 LUX) AT THE WALKING SURFACE LEVEL. THE MEANS OF EGRESS SHALL BE ILLUMINATED AT ALL TIMES IN ACCORDANCE WITH CBC SECTION 1006.1; 1006.2 AND 1006.3.
- E THE POWER SUPPLY FOR MEANS OF EGRESS ILLUMINATION SHALL NORMALLY BE PROVIDED BY THE PREMISES' ELECTRICAL SUPPLY. IN THE EVENT OF POWER SUPPLY FAILURE, AN EMERGENCY ELECTRICAL SYSTEM SHALL AUTOMATICALLY ILLUMINATE THE EGRESS SYSTEM.
- F REFER TO DETAIL 06/A00.301 FOR SIGNAGE AND TACTILE REQUIREMENTS AT STAIR/EXIT/EGRESS

LEGEND

A REFER TO SHEET A00.100 FOR SYMBOLS AND ABBREVIATIONS

- OCCUPANCY DESIGNATION**
- Accessory storage areas, mechanical equipment room
 - Assembly without fixed seats - Unconcentrated (tables and chairs)
 - Business areas

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Date	Description	AK/SS
07.28.2017	ISSUE PERMIT	AK/SS
09.08.2017	ISSUE FOR BID	AK/SS
05.07.2018	ISSUE FOR BID	AK/SS
8.06.25.2018	ADDENDUM 'B'	AK/LM



Project Number
55.7291.013

The City of
SAN DIEGO
Public Works

G03.012

CITY OF SAN DIEGO
LIFE SAFETY PLAN - LEVEL 12

CITY OF SAN DIEGO, CALIFORNIA
PUBLIC WORKS DEPARTMENT
SHEET 19 OF 402 SHEETS
WBS S-17009

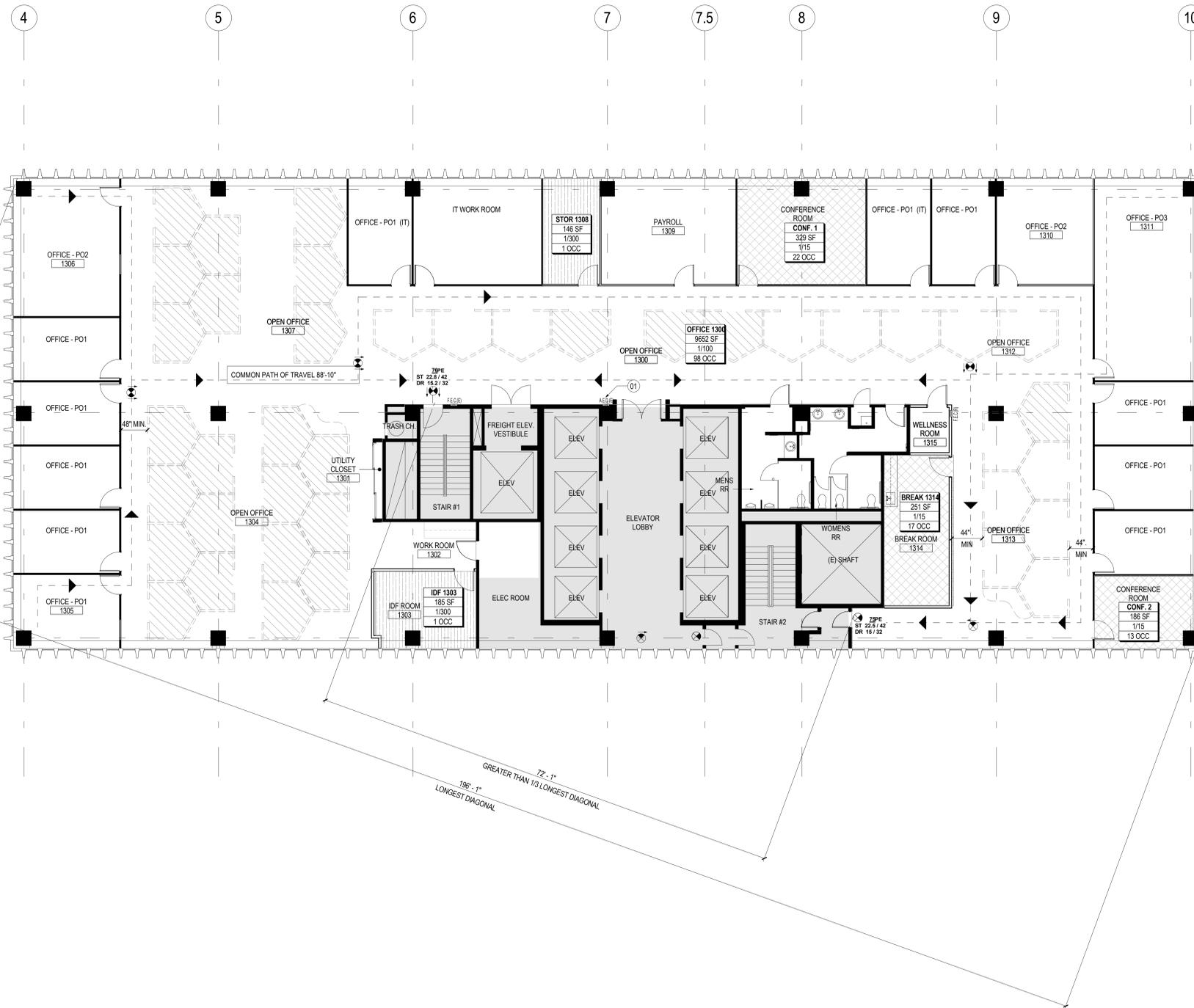
ROOM/ AREA NAME	OCCUPANCY DESIGNATION	AREA (SQ FT)	LOAD FACTOR (SQ FT)	OCCUPANT LOAD
BREAK 1209	Assembly without fixed seats - Unconcentrated (tables and chairs)	233 SF	15	16
OFFICE	Business areas	10,433 SF	100	105
IDF 1203	Accessory storage areas, mechanical equipment room	183 SF	300	1
OCCUPIED AREA:		10,848 SF		122
UNOCCUPIED AREA (WALLS, CASEWORK, ETC.):		0 SF	0	0
TOTAL SUITE AREA:		10848 SF		122

NUMBER OF EXITS
TOTAL EXITS REQUIRED: 2
TOTAL EXITS PROVIDED: 2

OCCUPANCY TABULATION

01 LIFE SAFETY PLAN - LEVEL 12
SCALE: 1/8" = 1'-0"

APPROVED FOR CITY ENGINEER	DATE	5/31/2018	SUBMITTED BY	JORGE ACEVEDO
JASON GRANI	7/20/18		PROJECT MANAGER	
PRINT DCE NAME	RCEP		CHECKED BY	MARLON PEREZ
			PROJECT ENGINEER	
DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL			5/31/2018	
ADDENDUM B			6/25/2018	
				CCS27 COORDINATE
				CCS83 COORDINATE
CONTRACTOR INSPECTOR	DATE STARTED	DATE COMPLETED		40154 - 19 - D



ROOM/ AREA NAME	OCCUPANCY DESIGNATION	AREA (SQ FT)	LOAD FACTOR (SQ FT)	OCCUPANT LOAD
BREAK 1314	Assembly without fixed seats - Unconcentrated (tables and chairs)	251 SF	15	17
CONF. 1	Assembly without fixed seats - Unconcentrated (tables and chairs)	329 SF	15	22
CONF. 2	Assembly without fixed seats - Unconcentrated (tables and chairs)	186 SF	15	13
OFFICE 1300	Business areas	9,652 SF	100	97
IDF 1303	Accessory storage areas, mechanical equipment room	185 SF	300	1
OCCUPIED AREA:		10,603 SF		151
UNOCCUPIED AREA (WALLS, CASEWORK, ETC.):		0 SF	0	0
TOTAL SUITE AREA:		10603 SF		151

NUMBER OF EXITS	TOTAL EXITS REQUIRED:	2
	TOTAL EXITS PROVIDED:	2

SHEET NOTES

01 REFER TO SHEET A00.100 FOR SYMBOLS AND ABBREVIATIONS.

GENERAL NOTES

- A ACCESSORY USE AREAS THAT ORDINARILY ARE USED ONLY BY PERSONS WHO OCCUPY THE MAIN AREAS OF AN OCCUPANCY SHALL BE PROVIDED WITH MEANS OF EGRESS AS THOUGH THEY ARE COMPLETELY OCCUPIED, BUT THEIR OCCUPANT LOAD NEED NOT BE INCLUDED WHEN COMPUTING THE TOTAL OCCUPANT LOAD OF THE BUILDING.
- B PROVIDE MEANS OF EGRESS IDENTIFICATION USING EXIT SIGNS THAT ARE INTERNALLY OR EXTERNALLY ILLUMINATED ALONG THE PATH OF EXIT TRAVEL WITHIN THE MEANS OF EGRESS SYSTEM. THE EXIT SIGNS SHALL MEET THE FOLLOWING MINIMUM REQUIREMENTS WHICH ARE EXIT SIGNS SHALL BE VISIBLE FROM ANY DIRECTION OF APPROACH AND EXIT SIGNS SHALL BE LOCATED TO CLEARLY INDICATE THE DIRECTION OF EGRESS TRAVEL AND SUCH THAT NO POINT SHALL BE MORE THAN 100 FEET FROM THE NEAREST VISIBLE SIGN.
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- D WHEN 2 EXITS ARE REQUIRED, THE MEANS OF EGRESS ILLUMINATION LEVEL SHALL NOT BE LESS THAN 1 FOOT-CANDLE (11 LUX) AT THE WALKING SURFACE LEVEL. THE MEANS OF EGRESS SHALL BE ILLUMINATED AT ALL TIMES IN ACCORDANCE WITH CBC SECTION 1006.1; 1006.2 AND 1006.3.
- E THE POWER SUPPLY FOR MEANS OF EGRESS ILLUMINATION SHALL NORMALLY BE PROVIDED BY THE PREMISES' ELECTRICAL SUPPLY. IN THE EVENT OF POWER SUPPLY FAILURE, AN EMERGENCY ELECTRICAL SYSTEM SHALL AUTOMATICALLY ILLUMINATE THE EGRESS SYSTEM.
- F REFER TO DETAIL 06/A00.301 FOR SIGNAGE AND TACTILE REQUIREMENTS AT STAIR/EXIT/EGRESS

LEGEND

- A REFER TO SHEET A00.100 FOR SYMBOLS AND ABBREVIATIONS
- OCCUPANCY DESIGNATION**
- Accessory storage areas, mechanical equipment room
- Assembly without fixed seats - Unconcentrated (tables and chairs)
- Business areas

CITY OF SAN DIEGO
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Date	Description	AK/SS
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05.07.2018	ISSUE FOR BID	AK/SS
06.25.2018	ADDENDUM 'B'	AK/LM



Project Number
 55.7291.013

The City of
SAN DIEGO
 Public Works

G03.013

CITY OF SAN DIEGO
 LIFE SAFETY PLAN - LEVEL 13

CITY OF SAN DIEGO, CALIFORNIA
 PUBLIC WORKS DEPARTMENT
 SHEET 20 OF 402 SHEETS

APPROVED:	DATE:	5/31/2018	SUBMITTED BY:	JORGE ACEVEDO
FOR CITY ENGINEER	DATE:	7/20/18	PROJECT MANAGER	
JASON GRANI	DATE:		PROJECT ENGINEER	MARLON PEREZ
PRINT DCE NAME	DATE:		PROJECT ENGINEER	
DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL			5/31/2018	
ADDENDUM B			6/25/2018	
				CCS27 COORDINATE
				CCS83 COORDINATE
CONTRACTOR	DATE STARTED			
INSPECTOR	DATE COMPLETED			40154 - 20 - D

OCCUPANCY TABULATION

01 LIFE SAFETY PLAN - LEVEL 13
 SCALE: 1/8" = 1'-0"



SHEET NOTES

01 EXISTING DEFIBRILLATOR UNIT. UNIT TO BE REPLACED WITH CURRENT CODE COMPLIANT SYSTEM AS REQUIRED.

GENERAL NOTES

- A ACCESSORY USE AREAS THAT ORDINARILY ARE USED ONLY BY PERSONS WHO OCCUPY THE MAIN AREAS OF AN OCCUPANCY SHALL BE PROVIDED WITH MEANS OF EGRESS AS THOUGH THEY ARE COMPLETELY OCCUPIED, BUT THEIR OCCUPANT LOAD NEED NOT BE INCLUDED WHEN COMPUTING THE TOTAL OCCUPANT LOAD OF THE BUILDING.
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- C EXIT SIGNS SHALL BE CONNECTED TO AN EMERGENCY ELECTRICAL POWER SYSTEM (STORAGE BATTERIES, UNIT EQUIPMENT, OR AN ON SITE GENERATOR SET) OR AN APPROVED SELF LUMINOUS SYSTEM THAT PROVIDES CONTINUOUS ILLUMINATION INDEPENDENT OF THE EXTERNAL POWER SOURCE TO ENSURE THAT THE EXIT SIGNS ARE ILLUMINATED AT ALL TIMES. MINIMUM 90 MIN BATTERY BACKUP REQUIRED CBC 1011.5.3
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LEGEND

A REFER TO SHEET A00.100 FOR SYMBOLS AND ABBREVIATIONS

OCCUPANCY DESIGNATION

- Assembly without fixed seats - Unconcentrated (tables and chairs)
- Business areas

CITY OF SAN DIEGO

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The City of
SAN DIEGO
Public Works

G03.014

CITY OF SAN DIEGO
LIFE SAFETY PLAN - LEVEL 14

CITY OF SAN DIEGO, CALIFORNIA
PUBLIC WORKS DEPARTMENT
SHEET 21 OF 402 SHEETS
WBS S-17009

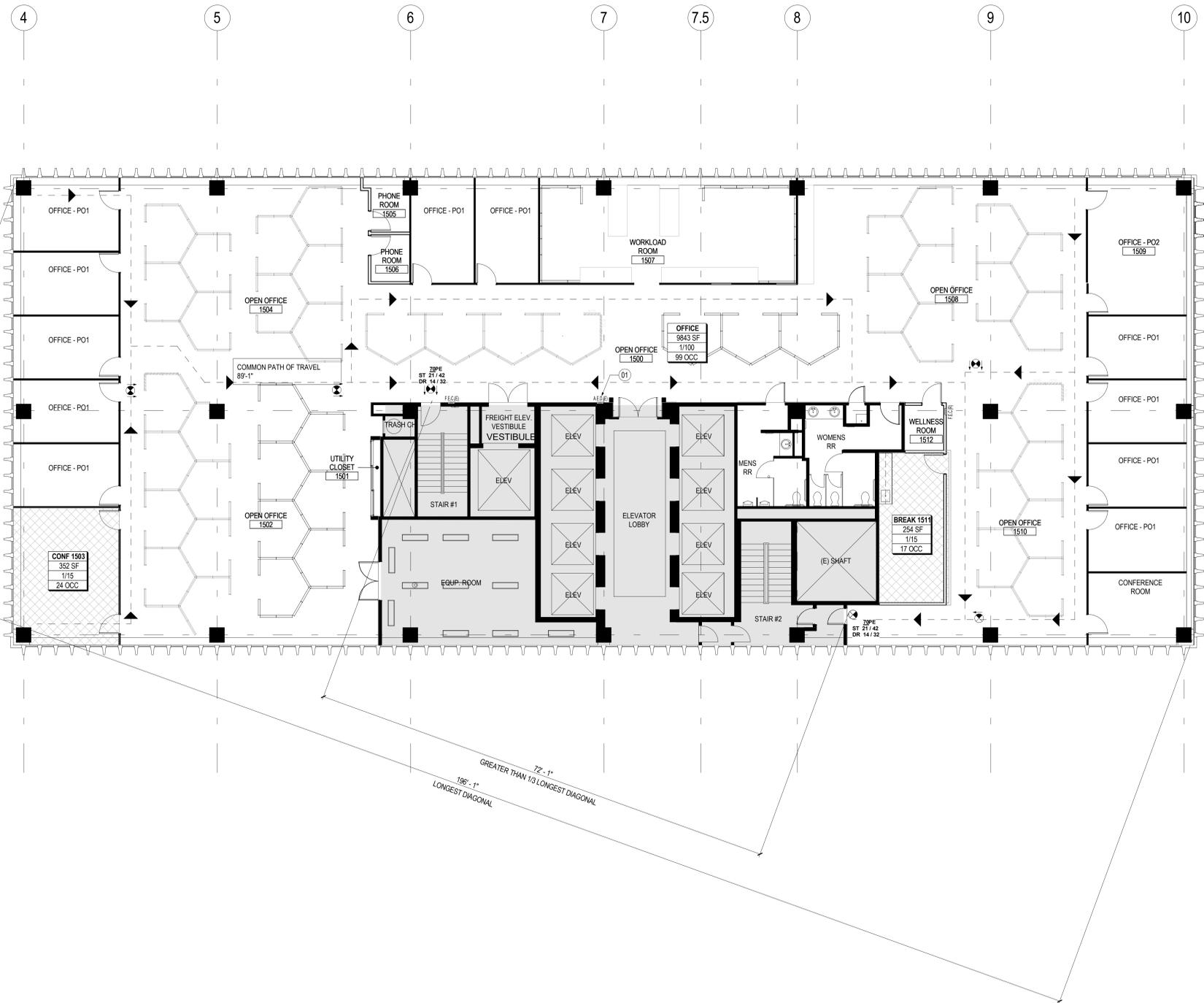
APPROVED:	DATE: 5/31/2018	SUBMITTED BY: JORGE ACEVEDO
FOR CITY ENGINEER:	DATE: 7/20/18	PROJECT MANAGER
PRINT DCE NAME:		PROJECT ENGINEER
DESCRIPTION:	BY:	APPROVED:
ORIGINAL		DATE FILMED: 5/31/2018
ADDENDUM B		DATE FILMED: 6/25/2018
		CCS27 COORDINATE
		CCS83 COORDINATE
CONTRACTOR:	DATE STARTED:	40154 - 21 - D
INSPECTOR:	DATE COMPLETED:	

OCCUPANCY TABULATION - LEVEL 14				
ROOM/ AREA NAME	OCCUPANCY DESIGNATION	AREA (SQ FT)	LOAD FACTOR (SQ FT)	OCCUPANT LOAD
BREAK 1410	Assembly without fixed seats - Unconcentrated (tables and chairs)	234 SF	15	16
OFFICE	Business areas	10,217 SF	100	103
		0 SF	0	0
UNOCCUPIED AREA (WALLS, CASEWORK, ETC.)		0 SF	0	0
TOTAL SUITE AREA:		10451 SF		119

NUMBER OF EXITS: 2
TOTAL EXITS REQUIRED: 2
TOTAL EXITS PROVIDED: 2

01 LIFE SAFETY PLAN - LEVEL 14
SCALE: 1/8" = 1'-0"

OCCUPANCY TABULATION



72'-1" LONGEST DIAGONAL
196'-1" LONGEST DIAGONAL
GREATER THAN 1/3 LONGEST DIAGONAL

SHEET NOTES

- 01 EXISTING DEFIBRILLATOR UNIT. UNIT TO BE REPLACED WITH CURRENT CODE COMPLIANT SYSTEM AS REQUIRED.

GENERAL NOTES

- A ACCESSORY USE AREAS THAT ORDINARILY ARE USED ONLY BY PERSONS WHO OCCUPY THE MAIN AREAS OF AN OCCUPANCY SHALL BE PROVIDED WITH MEANS OF EGRESS AS THOUGH THEY ARE COMPLETELY OCCUPIED, BUT THEIR OCCUPANT LOAD NEED NOT BE INCLUDED WHEN COMPUTING THE TOTAL OCCUPANT LOAD OF THE BUILDING.
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- F REFER TO DETAIL 06/A00.301 FOR SIGNAGE AND TACTILE REQUIREMENTS AT STAIR/EXIT/EGRESS

LEGEND

- A REFER TO SHEET A00-100 FOR SYMBOLS AND ABBREVIATIONS
- OCCUPANCY DESIGNATION**
- Assembly without fixed seats - Unconcentrated (tables and chairs)
- Business areas

CITY OF SAN DIEGO

101 W. ASH
101 W. ASH STREET
SAN DIEGO, CA 92101

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Fax 619.557.2520

Date	Description	AK/SS
07.28.2017	ISSUE PERMIT	AK/SS
09.08.2017	ISSUE FOR BID	AK/SS
05.07.2018	ISSUE FOR BID	AK/SS
06.25.2018	ADDENDUM 'B'	AK/SS



Project Number
55.7291.013
The City of
SAN DIEGO
Public Works
G03.015

ROOM/ AREA NAME	OCCUPANCY DESIGNATION	AREA (SQ FT)	LOAD FACTOR (SQ FT)	OCCUPANT LOAD
BREAK 1511	Assembly without fixed seats - Unconcentrated (tables and chairs)	254 SF	15	17
CONF 1503	Assembly without fixed seats - Unconcentrated (tables and chairs)	352 SF	15	24
OFFICE	Business areas	9,843 SF	100	99
UNOCCUPIED AREA (WALLS, CASEWORK, ETC.)		10,449 SF	0	0
TOTAL SUITE AREA:		10,449 SF		140

NUMBER OF EXITS	TOTAL EXITS REQUIRED:	TOTAL EXITS PROVIDED:
2	2	2

CITY OF SAN DIEGO
LIFE SAFETY PLAN - LEVEL 15

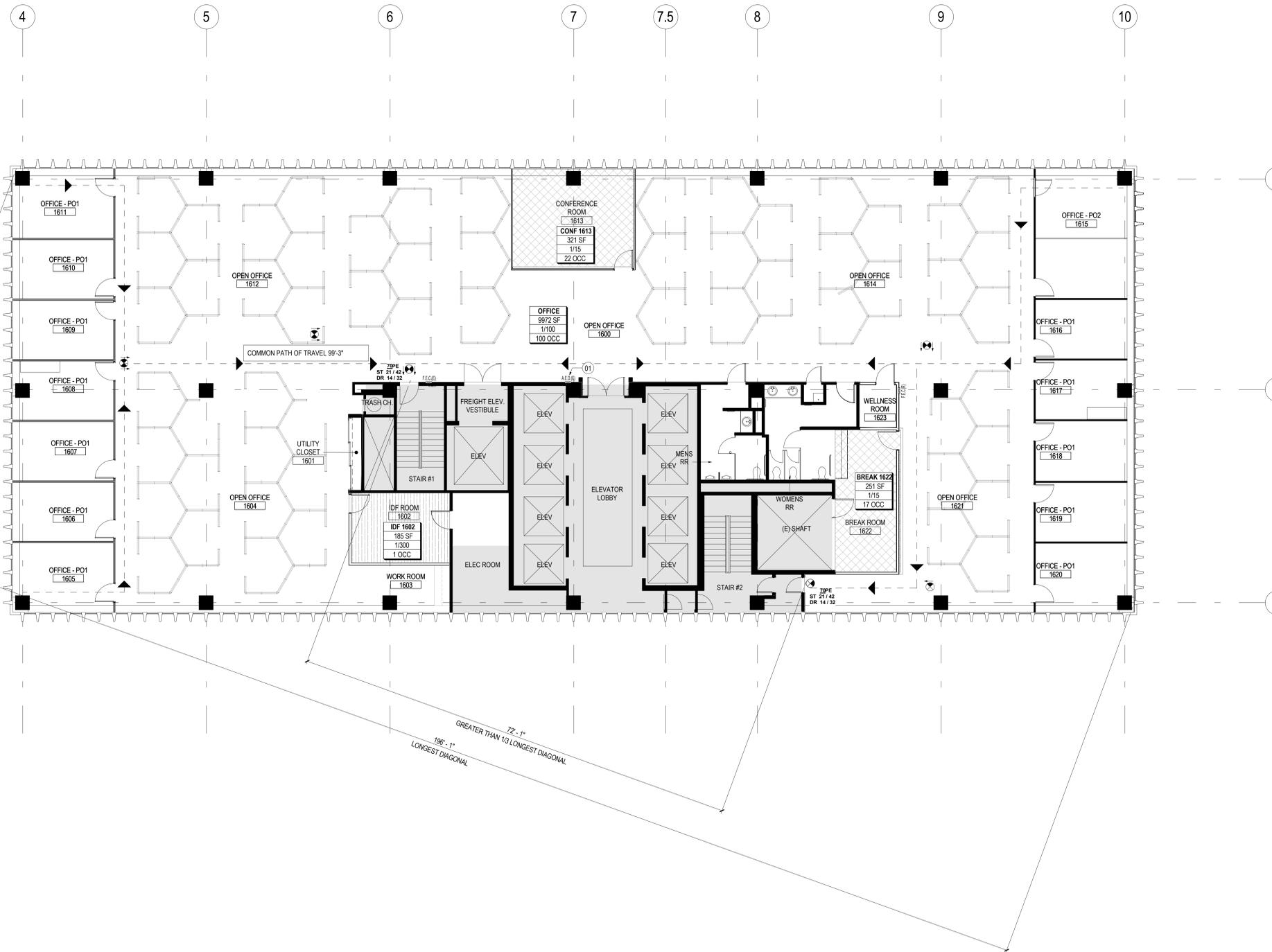
CITY OF SAN DIEGO, CALIFORNIA PUBLIC WORKS DEPARTMENT SHEET 22 OF 402 SHEETS		WBS S-17009
APPROVED FOR CITY ENGINEER JASON GRANI PRINT DCE NAME	DATE 5/31/2018 77208	SUBMITTED BY JORGE ACEVEDO PROJECT MANAGER CHECKED BY MARLON PEREZ PROJECT ENGINEER
DESCRIPTION	BY	APPROVED
ORIGINAL		
ADDENDUM B		
CONTRACTOR INSPECTOR	DATE STARTED	DATE COMPLETED
		40154 - 22 - D

01 LIFE SAFETY PLAN - LEVEL 15
SCALE: 1/8" = 1'-0"

OCCUPANCY TABULATION

Added Occupancy designation legend

ADDENDUM B



SHEET NOTES

01 EXISTING DEFIBRILLATOR UNIT. UNIT TO BE REPLACED WITH CURRENT CODE COMPLIANT SYSTEM AS REQUIRED.

GENERAL NOTES

- A ACCESSORY USE AREAS THAT ORDINARILY ARE USED ONLY BY PERSONS WHO OCCUPY THE MAIN AREAS OF AN OCCUPANCY SHALL BE PROVIDED WITH MEANS OF EGRESS AS THOUGH THEY ARE COMPLETELY OCCUPIED, BUT THEIR OCCUPANT LOAD NEED NOT BE INCLUDED WHEN COMPUTING THE TOTAL OCCUPANT LOAD OF THE BUILDING.
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- F REFER TO DETAIL 06/A00.301 FOR SIGNAGE AND TACTILE REQUIREMENTS AT STAIR/EXIT/EGRESS

LEGEND

- A REFER TO SHEET A00.100 FOR SYMBOLS AND ABBREVIATIONS.
- OCCUPANCY DESIGNATION**
- Accessory storage areas, mechanical equipment room
- Assembly without fixed seats - Unconcentrated (tables and chairs)
- Business areas

CITY OF SAN DIEGO
 101 W. ASH
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 Fax 619.557.2520

Date	Description	AKISS
07.28.2017	ISSUE PERMIT	AKISS
09.08.2017	ISSUE FOR BID	AKISS
09.19.2017	PLAN CHECK RESPONSES/ PLAN CHANGES	AK
05.07.2018	ISSUE FOR BID	AKISS
B 06.25.2018	ADDENDUM 'B'	AKJLM



Project Number
 55.7291.013

The City of
SAN DIEGO
 Public Works

G03.016

OCCUPANCY TABULATION - LEVEL 16				
ROOM/ AREA NAME	OCCUPANCY DESIGNATION	AREA (SQ FT)	LOAD FACTOR (SQ FT)	OCCUPANT LOAD
BREAK 1622	Assembly without fixed seats - Unconcentrated (tables and chairs)	251 SF	15	17
CONF 1613	Assembly without fixed seats - Unconcentrated (tables and chairs)	321 SF	15	22
OFFICE	Business areas	9,972 SF	100	100
IDF 1602	Accessory storage areas, mechanical equipment room	185 SF	300	1
		OCCUPIED AREA:	10,728 SF	140
UNOCCUPIED AREA (WALLS, CASEWORK, ETC.)		0 SF	0	0
		TOTAL SUITE AREA:	10,728 SF	140

NUMBER OF EXITS: 2
 TOTAL EXITS REQUIRED: 2
 TOTAL EXITS PROVIDED: 2

OCCUPANCY TABULATION

01 LIFE SAFETY PLAN - LEVEL 16
 SCALE: 1/8" = 1'-0"

CITY OF SAN DIEGO
 LIFE SAFETY PLAN - LEVEL 16

CITY OF SAN DIEGO, CALIFORNIA
 PUBLIC WORKS DEPARTMENT
 SHEET 23 OF 402 SHEETS

WBS S-17009

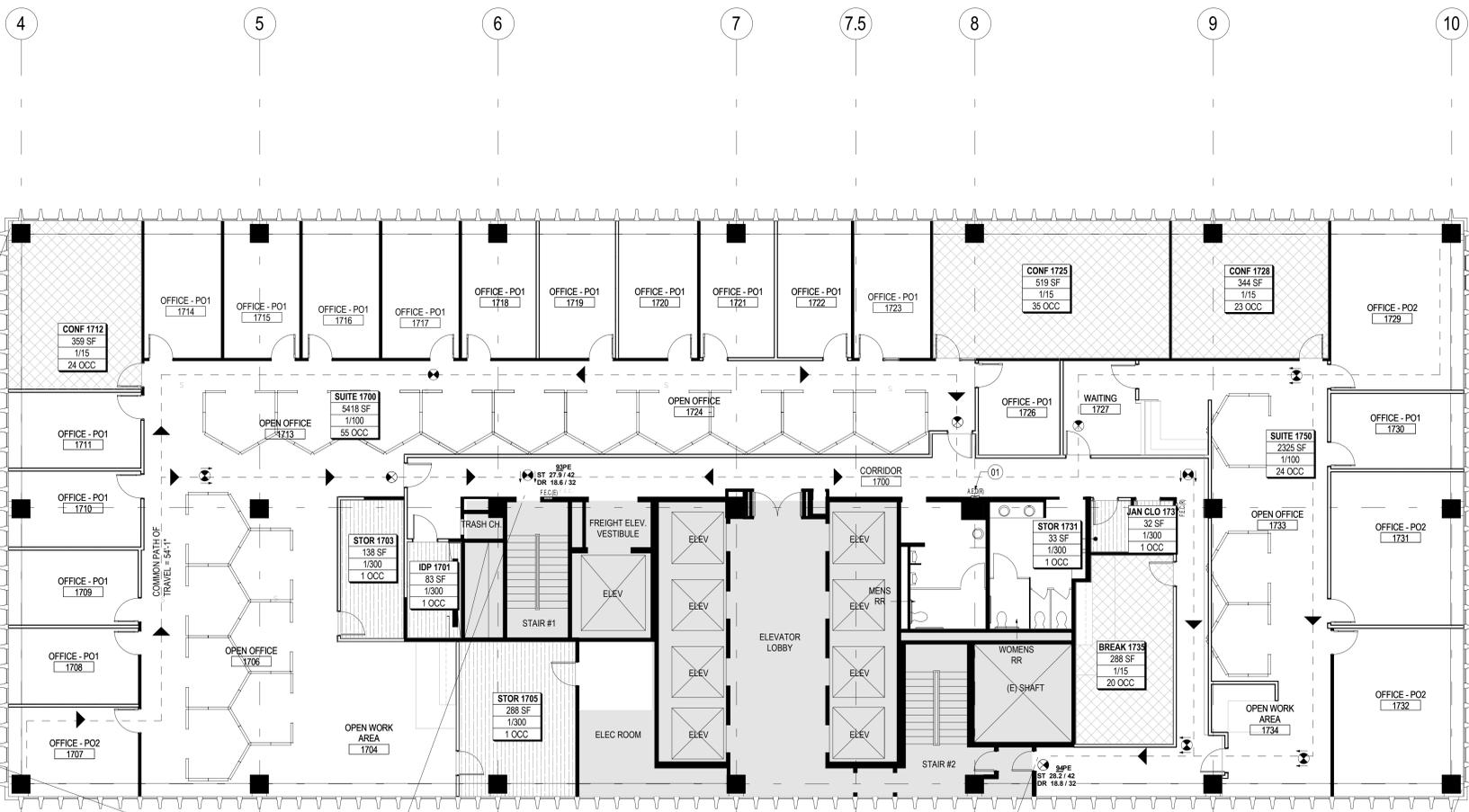
APPROVED: 5/31/2018
 FOR CITY ENGINEER DATE
 JASON GRANI 77208
 PRINT DCE NAME RCEP

SUBMITTED BY: JORGE ACEVEDO
 PROJECT MANAGER
 CHECKED BY: MARLON PEREZ
 PROJECT ENGINEER

DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL			5/31/2018	
ADDENDUM B			6/25/2018	

CONTRACTOR: _____ DATE STARTED: _____
 INSPECTOR: _____ DATE COMPLETED: _____

CCS27 COORDINATE
 CCS83 COORDINATE
 40154 - 23 - D



72'-1" > 196'-1" LONGEST DIAGONAL

SHEET NOTES

- 01 EXISTING DEFIBRILLATOR UNIT. UNIT TO BE REPLACED WITH CURRENT CODE COMPLIANT SYSTEM AS REQUIRED.

GENERAL NOTES

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05.07.2018	ISSUE FOR BID	AK/SS
06.25.2018	ADDENDUM 'B'	AK/LM

OCCUPANCY TABULATION - SUITE 1700

ROOM/ AREA NAME	OCCUPANCY DESIGNATION	AREA (SQ FT)	LOAD FACTOR (SQ FT)	OCCUPANT LOAD
CONF 1712	Assembly without fixed seats - Unconcentrated (tables and chairs)	359 SF	15	24
CONF 1725	Assembly without fixed seats - Unconcentrated (tables and chairs)	519 SF	15	35
SUITE 1700	Business areas	5,418 SF	100	55
STOR 1703	Accessory storage areas, mechanical equipment room	138 SF	300	1
STOR 1705	Accessory storage areas, mechanical equipment room	288 SF	300	1
OCCUPIED AREA:		6,723 SF		117
UNOCCUPIED AREA (WALLS, CASEWORK, ETC.)		0 SF	0	0
TOTAL SUITE AREA:		6,723 SF		117

NUMBER OF EXITS: TOTAL EXITS REQUIRED: 2, TOTAL EXITS PROVIDED: 2

OCCUPANCY TABULATION - SUITE 1750

ROOM/ AREA NAME	OCCUPANCY DESIGNATION	AREA (SQ FT)	LOAD FACTOR (SQ FT)	OCCUPANT LOAD
CONF 1728	Assembly without fixed seats - Unconcentrated (tables and chairs)	344 SF	15	23
SUITE 1750	Business areas	2,325 SF	100	24
OCCUPIED AREA:		2,669 SF		47
UNOCCUPIED AREA (WALLS, CASEWORK, ETC.)		0 SF	0	0
TOTAL SUITE AREA:		2,325 SF		47

NUMBER OF EXITS: TOTAL EXITS REQUIRED: 1, TOTAL EXITS PROVIDED: 2

OCCUPANCY TABULATION - LEVEL 17

ROOM/ AREA NAME	OCCUPANCY DESIGNATION	AREA (SQ FT)	LOAD FACTOR (SQ FT)	OCCUPANT LOAD
BREAK 1735	Assembly without fixed seats - Unconcentrated (tables and chairs)	288 SF	15	20
IDP 1701	Accessory storage areas, mechanical equipment room	83 SF	300	1
JAN CLO 1737	Accessory storage areas, mechanical equipment room	32 SF	300	1
STOR 1731	Accessory storage areas, mechanical equipment room	33 SF	300	1
OCCUPIED AREA:		436 SF		22
UNOCCUPIED AREA (WALLS, CASEWORK, ETC.)		0 SF	0	0
TOTAL SUITE AREA:		436 SF		23

NUMBER OF EXITS: TOTAL EXITS REQUIRED: 1, TOTAL EXITS PROVIDED: 2

LEGEND

- A REFER TO SHEET A00.100 FOR SYMBOLS AND ABBREVIATIONS
- OCCUPANCY DESIGNATION
 - Accessory storage areas, mechanical equipment room
 - Assembly without fixed seats - Unconcentrated (tables and chairs)
 - Business areas



Project Number
 55.7291.013

The City of
SAN DIEGO
 Public Works

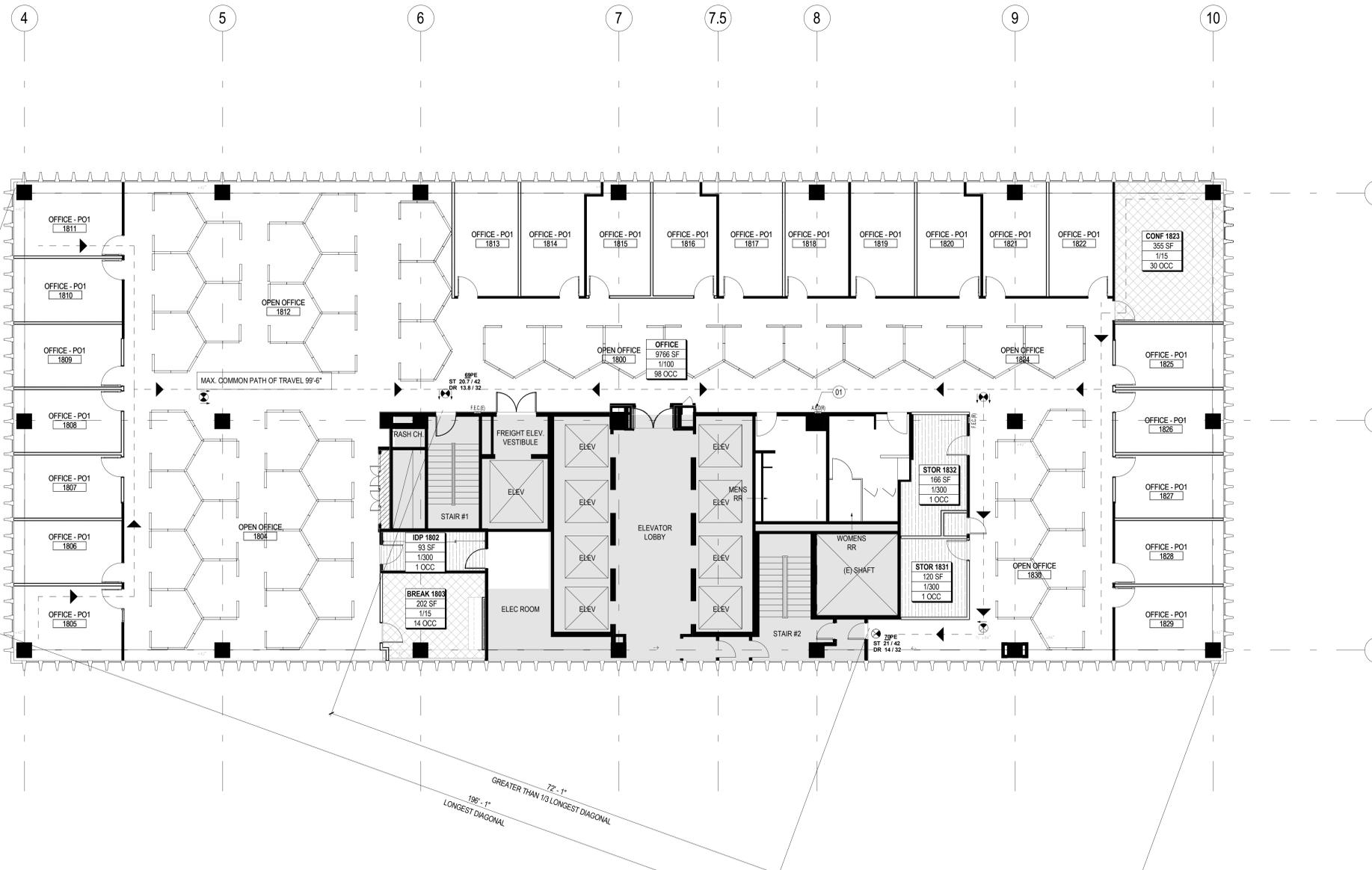
G03.017

CITY OF SAN DIEGO
 LIFE SAFETY PLAN - LEVEL 17

CITY OF SAN DIEGO, CALIFORNIA PUBLIC WORKS DEPARTMENT SHEET 24 OF 402 SHEETS		WBS S-17009
APPROVED FOR CITY ENGINEER JASON GRANI PRINT DCE NAME	DATE 5/31/2018 77208	SUBMITTED BY JORGE ACEVEDO PROJECT MANAGER CHECKED BY MARLON PEREZ PROJECT ENGINEER
DESCRIPTION	BY	APPROVED
ORIGINAL		5/31/2018
ADDENDUM B		6/25/2018
CONTRACTOR INSPECTOR	DATE STARTED	DATE COMPLETED
		40154 - 24 - D

01 LIFE SAFETY PLAN - LEVEL 17
 SCALE: 1/8" = 1'-0"

OCCUPANCY TABULATION



SHEET NOTES

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GENERAL NOTES

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LEGEND

- A REFER TO SHEET A00.100 FOR SYMBOLS AND ABBREVIATIONS
- OCCUPANCY DESIGNATION**
- Accessory storage areas, mechanical equipment room
- Assembly without fixed seats - Unconcentrated (tables and chairs)
- Business areas
- Exit Enclosure

OCCUPANCY TABULATION - LEVEL 18				
ROOM/ AREA NAME	OCCUPANCY DESIGNATION	AREA (SQ FT)	LOAD FACTOR (SQ FT)	OCCUPANT LOAD
BREAK 1803	Assembly without fixed seats - Unconcentrated (tables and chairs)	202 SF	15	14
CONF 1823	Assembly without fixed seats - Unconcentrated (tables and chairs)	355 SF	15	24
OFFICE	Business areas	9,766 SF	100	98
IDP 1802	Accessory storage areas, mechanical equipment room	93 SF	300	1
STOR 1831	Accessory storage areas, mechanical equipment room	120 SF	300	1
STOR 1832	Accessory storage areas, mechanical equipment room	166 SF	300	1
OCCUPIED AREA:		10,702 SF		139
UNOCCUPIED AREA (WALLS, CASEWORK, ETC.):		0 SF	0	0
TOTAL SUITE AREA:		10702 SF		139

NUMBER OF EXITS	TOTAL EXITS REQUIRED:	2
	TOTAL EXITS PROVIDED:	2

01 LIFE SAFETY PLAN - LEVEL 18
SCALE: 1/8" = 1'-0"

OCCUPANCY TABULATION

CITY OF SAN DIEGO
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SAN DIEGO, CA 92101

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06.25.2018	ADDENDUM 'B'	AK/LM



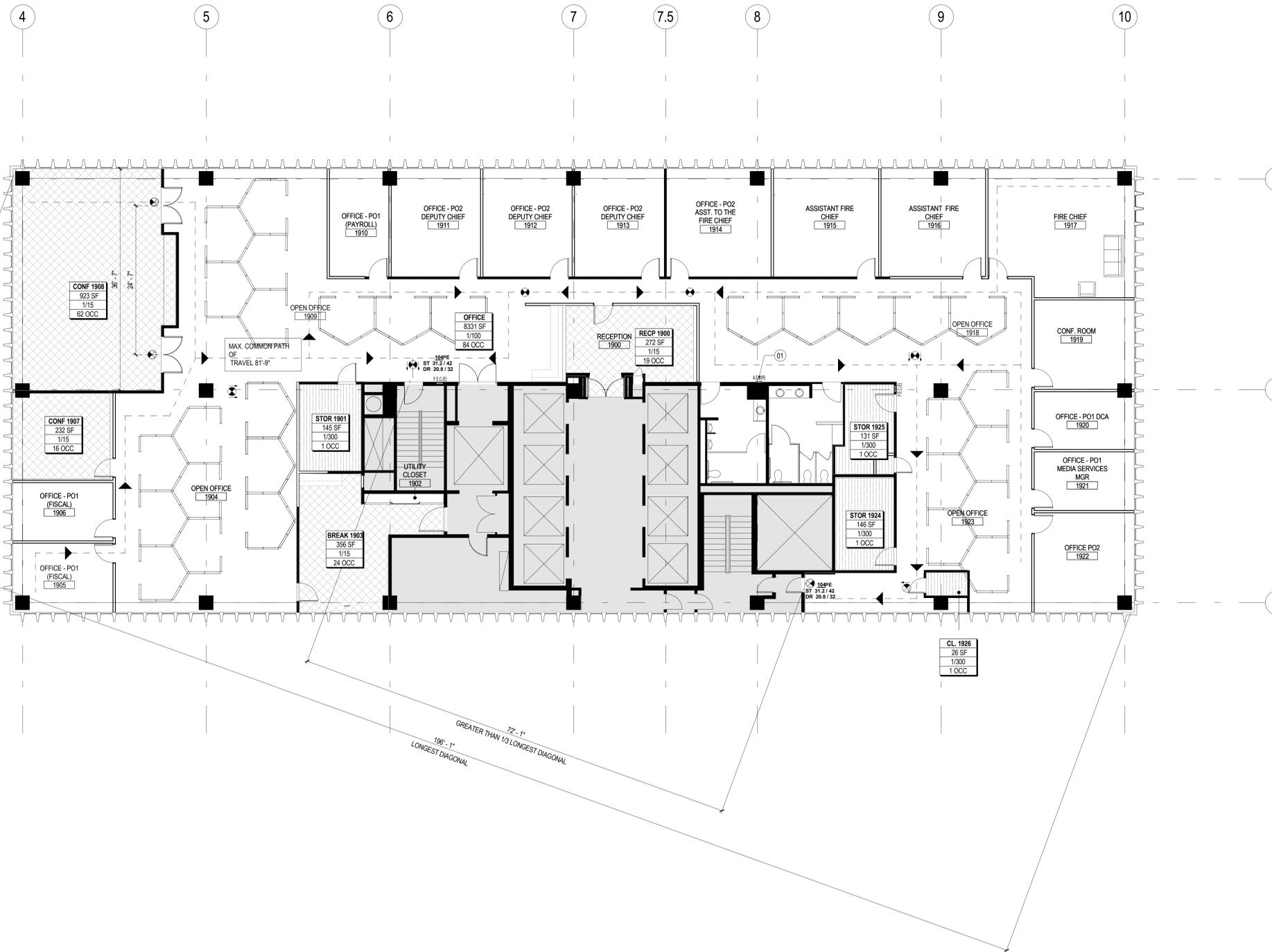
Project Number
55.7291.013

The City of
SAN DIEGO
Public Works

G03.018

CITY OF SAN DIEGO
LIFE SAFETY PLAN - LEVEL 18

CITY OF SAN DIEGO, CALIFORNIA PUBLIC WORKS DEPARTMENT SHEET 25 OF 402 SHEETS		WBS S-17009
APPROVED:	DATE: 5/31/2018	SUBMITTED BY: JORGE ACEVEDO
FOR CITY ENGINEER:	DATE: 7/20/18	PROJECT MANAGER:
JASON GRANI		MARLON PEREZ
PRINT DCE NAME:	RCEP	PROJECT ENGINEER:
DESCRIPTION	BY	APPROVED
ORIGINAL		5/31/2018
ADDENDUM B		6/25/2018
CONTRACTOR INSPECTOR	DATE STARTED	40154 - 25 - D
	DATE COMPLETED	



SHEET NOTES

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LEGEND

- A REFER TO SHEET A00.100 FOR SYMBOLS AND ABBREVIATIONS.

OCCUPANCY DESIGNATION

- Accessory storage areas, mechanical equipment room
- Assembly without fixed seats - Unconcentrated (tables and chairs)
- Business areas

OCCUPANCY TABULATION - LEVEL 19					
LEVEL	ROOM/ AREA NAME	OCCUPANCY DESIGNATION	AREA (SQ FT)	LOAD FACTOR (SQ FT)	OCCUPANT LOAD
Level 19	BREAK 1903	Assembly without fixed seats - Unconcentrated (tables and chairs)	356 SF	15	24
Level 19	CONF 1907	Assembly without fixed seats - Unconcentrated (tables and chairs)	232 SF	15	16
Level 19	CONF 1908	Assembly without fixed seats - Unconcentrated (tables and chairs)	923 SF	15	62
Level 19	RECP 1900	Assembly without fixed seats - Unconcentrated (tables and chairs)	272 SF	15	19
Level 19	OFFICE	Business areas	8,331 SF	100	84
Level 19	CL 1926	Accessory storage areas, mechanical equipment room	26 SF	300	1
Level 19	STOR 1901	Accessory storage areas, mechanical equipment room	145 SF	300	1
Level 19	STOR 1924	Accessory storage areas, mechanical equipment room	146 SF	300	1
Level 19	STOR 1925	Accessory storage areas, mechanical equipment room	131 SF	300	1
			OCCUPIED AREA:	10,561 SF	208
UNOCCUPIED AREA (WALLS, CASEWORK, ETC.)			0 SF	0	0
			TOTAL SUITE AREA:	10561 SF	208

NUMBER OF EXITS: 2
 TOTAL EXITS REQUIRED: 2
 TOTAL EXITS PROVIDED: 2

OCCUPANCY TABULATION

CITY OF SAN DIEGO

101 W. ASH
 101 W. ASH STREET
 SAN DIEGO, CA 92101

Gensler

225 Broadway
 Suite 100
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Date	Description	AKISS
07.28.2017	ISSUE PERMIT	AKISS
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09.18.2017	PLAN CHECK RESPONSES/ PLAN CHANGES	AK
05.07.2018	ISSUE FOR BID	AKISS
06.25.2018	ADDENDUM 'B'	AKJLM



Project Number
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The City of
SAN DIEGO
 Public Works

G03.019

CITY OF SAN DIEGO

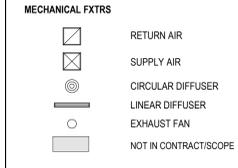
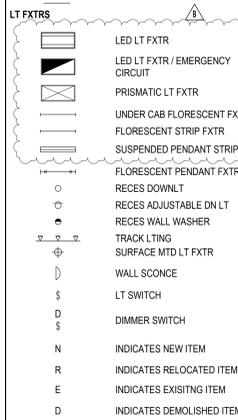
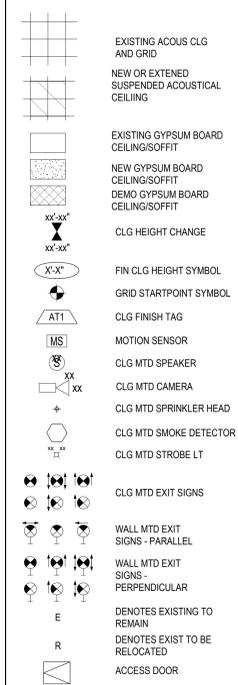
LIFE SAFETY PLAN - LEVEL 19

CITY OF SAN DIEGO, CALIFORNIA PUBLIC WORKS DEPARTMENT SHEET 26 OF 402 SHEETS		WBS S-17009
APPROVED FOR ENGINEER: JASON GRANI PRINT DCE NAME: RCEP	DATE: 5/31/2018 77208	SUBMITTED BY: JORGE ACEVEDO PROJECT MANAGER: MARLON PEREZ PROJECT ENGINEER:
DESCRIPTION: ORIGINAL	BY: [Signature]	DATE: 5/31/2018
DESCRIPTION: ADDENDUM B	BY: [Signature]	DATE: 6/25/2018
CONTRACTOR INSPECTOR:	DATE STARTED:	DATE COMPLETED:

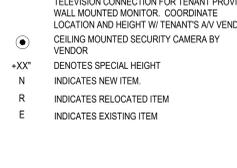
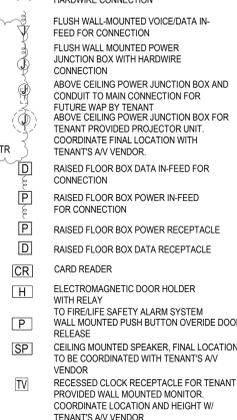
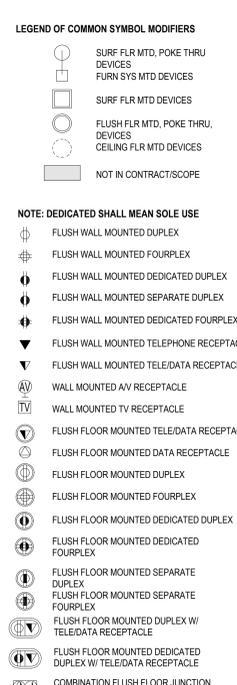
01 LIFE SAFETY PLAN - LEVEL 19
 SCALE: 1/8" = 1'-0"

GRAPHIC SYMBOLS

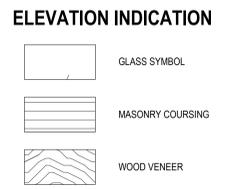
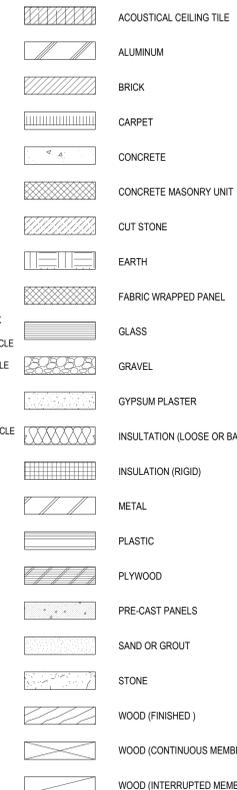
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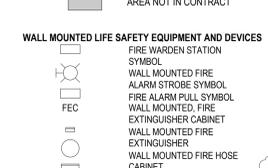
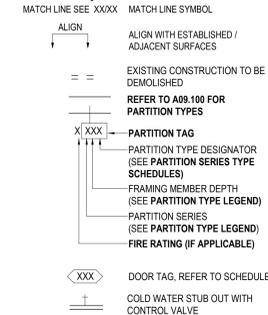
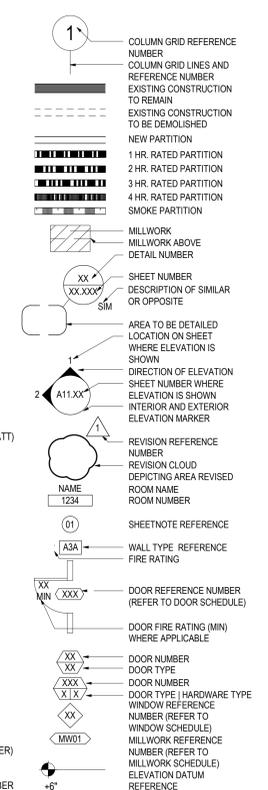
POWER & COMM.



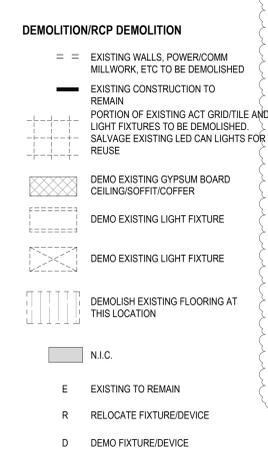
SECTION INDICATIONS



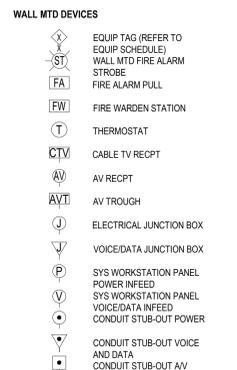
CONSTRUCTION



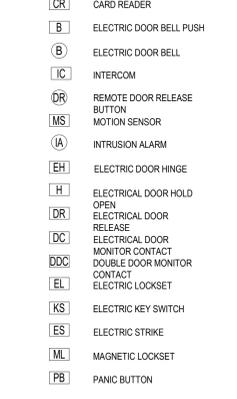
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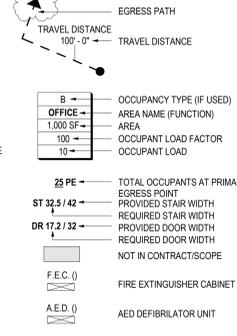
WALL MTD DEVICES



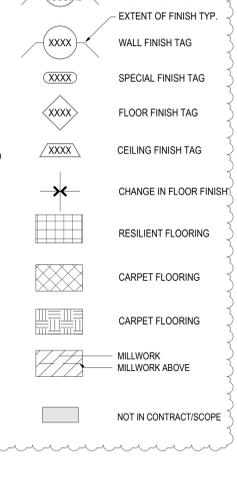
SECURITY DEVICES



LIFE-SAFETY/ EGRESS



FINISH



ABBREVIATIONS

Table of abbreviations and their corresponding full names, organized in columns. Includes terms like AND, EXISTING, NEW, RELOCATED, and various material and equipment abbreviations.

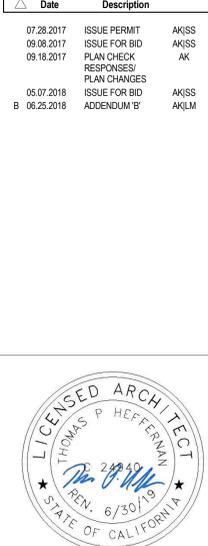
CITY OF SAN DIEGO

101 W. ASH
101 W. ASH STREET
SAN DIEGO, CA 92101

Gensler

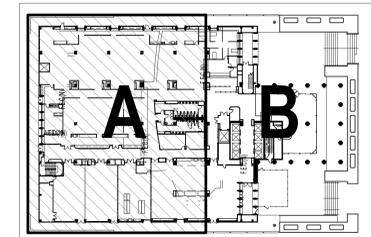
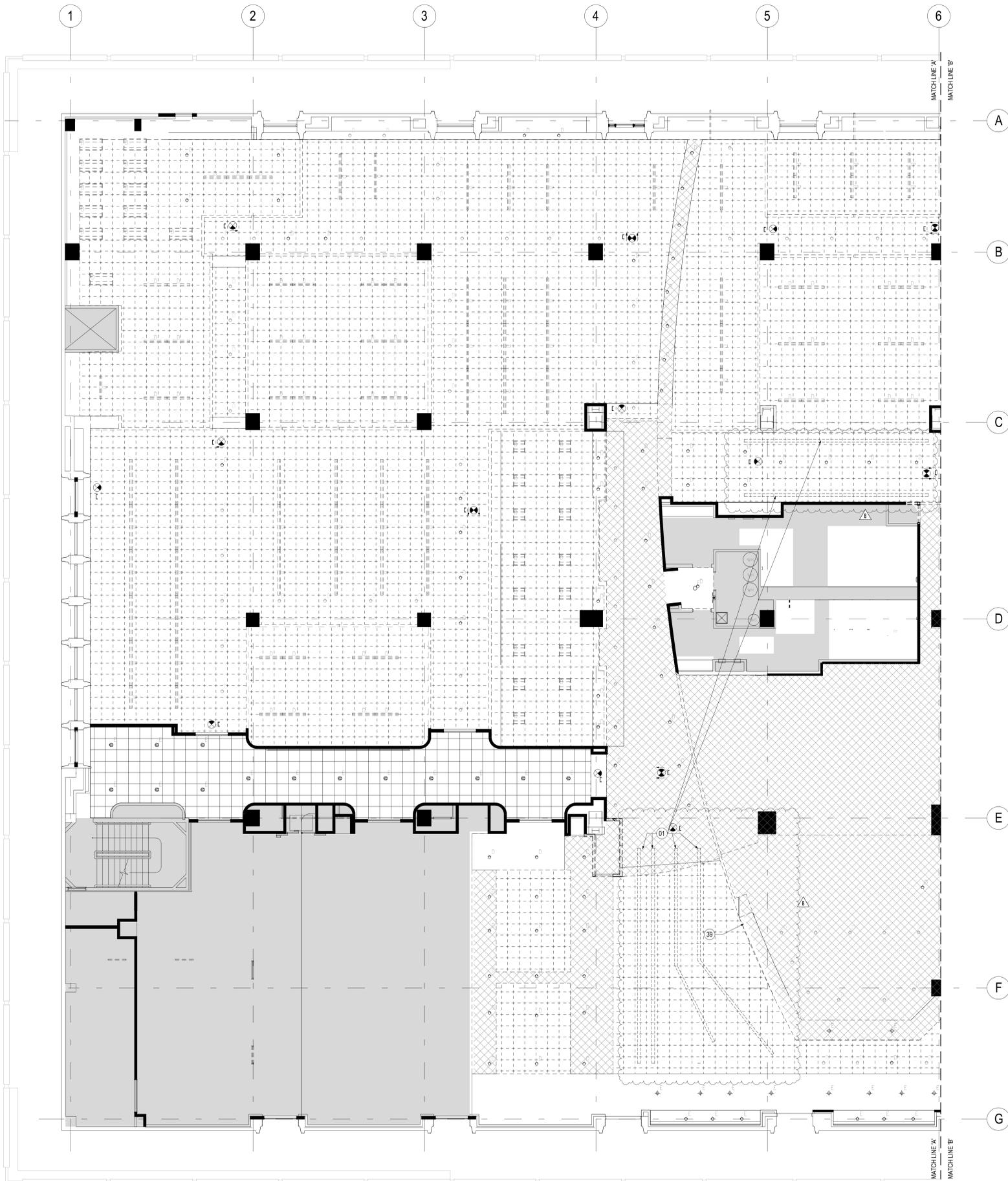
225 Broadway
Suite 100
San Diego, CA 92101
United States

Table with columns for Date and Description, listing project milestones and dates.



Project Number
55.7291.013
The City of
SAN DIEGO
Public Works
A00.100

Table for City of San Diego Symbols & Abbreviations, including project information, approval dates, and sheet details.



SHEET NOTES

- 01 DEMOLISH EXISTING TRACK LIGHTING
- 39 DEMOLISH EXISTING SECURITY GATE AND SALVAGE FOR REUSE

GENERAL NOTES

- 1 REFER TO A00 SERIES SHEETS FOR GENERAL NOTES, ABBREVIATIONS, SYMBOLS, ETC.
- 2 ALL EXISTING CONSTRUCTION AND FINISHES TO REMAIN, UNLESS NOTED OTHERWISE
- 3 VERIFY WITH BUILDING OWNER OR BUILDING MANAGER OF ALL RE-USABLE DEMOLISHED MATERIALS AND EQUIPMENT PRIOR TO START OF WORK
- 4 DEMOLISHED LIGHT FIXTURES AND EXIT SIGNS TO BE SALVAGED FOR REUSE. REFER TO REFLECTED CEILING PLANS.

CITY OF SAN DIEGO

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Date	Description	AK/SS
07.28.2017	ISSUE PERMIT	AK/SS
09.08.2017	ISSUE FOR BID	AK/SS
05.07.2018	ISSUE FOR BID	AK/SS
06.25.2018	ADDENDUM 'B'	AK/LM

LEGEND

- A REFER TO SHEET A00-100 FOR SYMBOLS AND ABBREVIATIONS



Project Number
55.7291.013

The City of
SAN DIEGO
Public Works

A00.601A

CITY OF SAN DIEGO

REFLECTED CEILING PLAN (DEMOLITION) - LEVEL 01 SOUTH

CITY OF SAN DIEGO, CALIFORNIA
PUBLIC WORKS DEPARTMENT
SHEET 32 OF 402 SHEETS

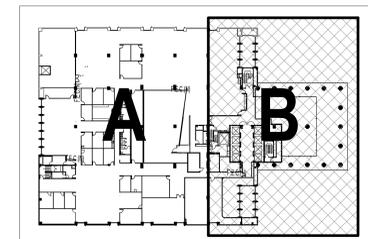
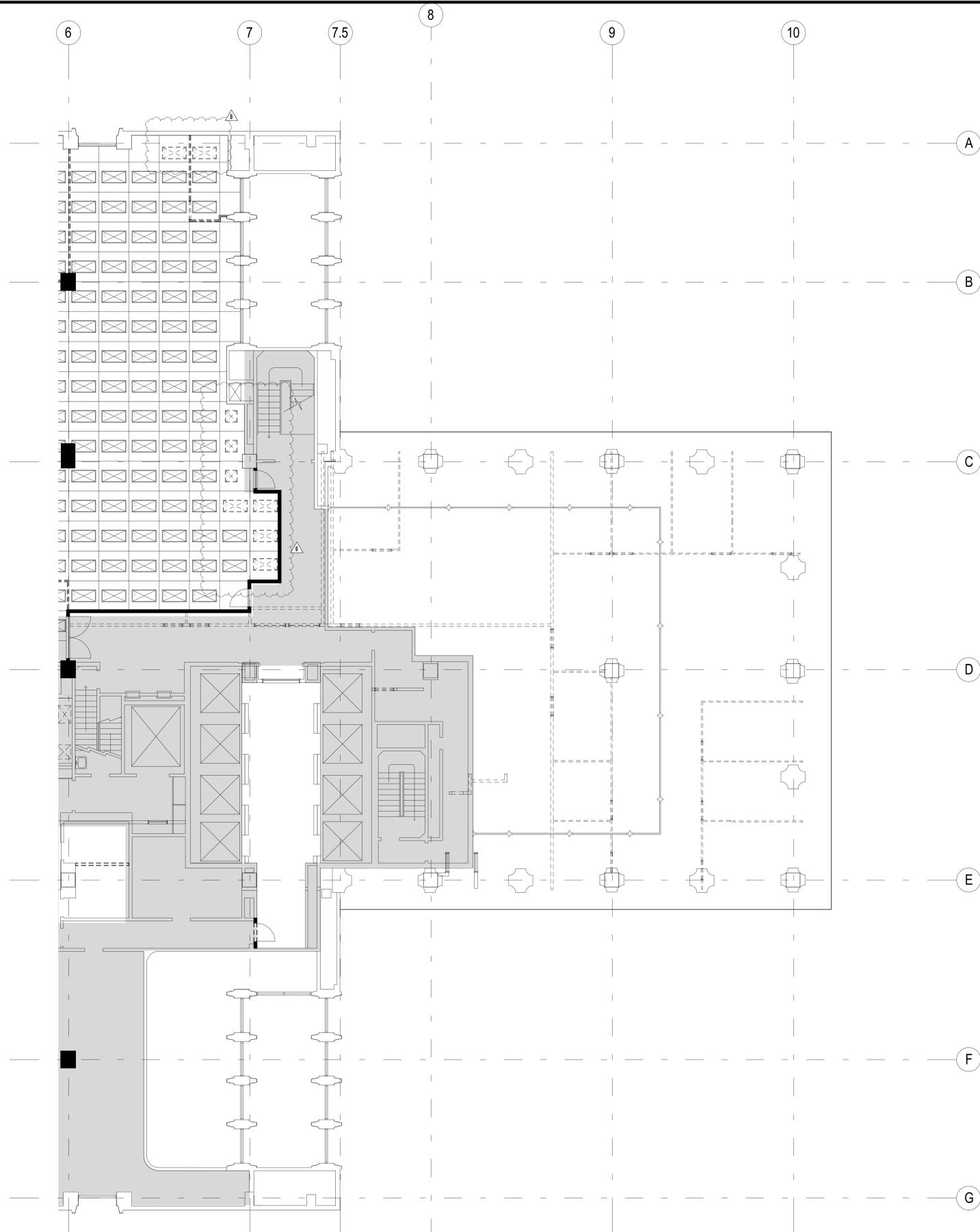
WBS S-17009

APPROVED FOR CITY ENGINEER JASON GRANI PRINT DGE NAME	DATE 5/31/2018 77208	DATE FILMED 5/31/2018 6/25/2018	DATE COMPLETED
APPROVED RCEP	DATE	DATE	DATE
ORIGINAL	5/31/2018	5/31/2018	
ADDENDUM B		6/25/2018	
			CCS27 COORDINATE
			CCS83 COORDINATE
CONTRACTOR INSPECTOR	DATE STARTED	DATE COMPLETED	40154 - 32 - D

A REFLECTED CEILING PLAN (DEMOLITION) - LEVEL 01 SOUTH
SCALE: 1/8" = 1'-0"

02 LEVEL 01 - KEY PLAN
SCALE: 1/64" = 1'-0"





SHEET NOTES

GENERAL NOTES

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CITY OF SAN DIEGO

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Date	Description	
07.28.2017	ISSUE PERMIT	AK/SS
09.08.2017	ISSUE FOR BID	AK/SS
05.07.2018	ISSUE FOR BID	AK/SS
06.25.2018	ADDENDUM 'B'	AK/LM

LEGEND

A REFER TO SHEET A00-100 FOR SYMBOLS AND ABBREVIATIONS



Project Number

55.7291.013

The City of
SAN DIEGO
Public Works

A00.602.B

CITY OF SAN DIEGO

REFLECTED CEILING PLAN (DEMOLITION) - LEVEL 02 NORTH

CITY OF SAN DIEGO, CALIFORNIA
PUBLIC WORKS DEPARTMENT
SHEET 35 OF 402 SHEETS

WBS S-17009

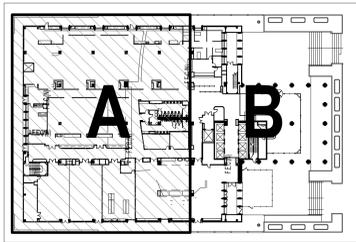
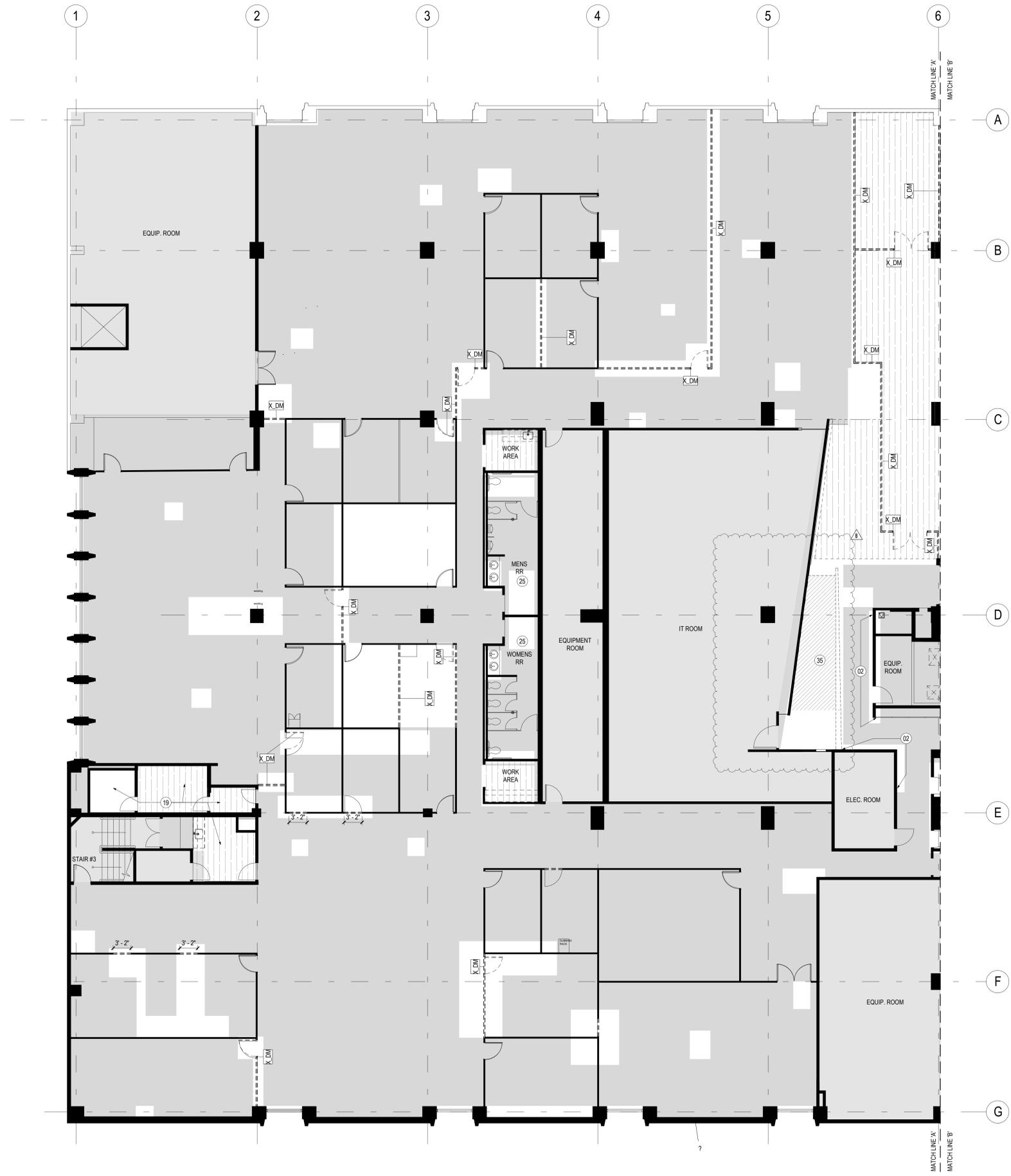
APPROVED FOR CITY ENGINEER	DATE	5/31/2018	SUBMITTED BY	JORGE ACEVEDO
JASON GRANI	DATE	7/20/18	PROJECT MANAGER	JORGE ACEVEDO
PRINT DCE NAME	RCEP		CHIEF ENGINEER	MARLON PEREZ
DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL			5/31/2018	
ADDENDUM B			6/25/2018	
				CCS83 COORDINATE
				CCS83 COORDINATE
CONTRACTOR	DATE STARTED			40154 - 35 - D
INSPECTOR	DATE COMPLETED			

B REFLECTED CEILING PLAN (DEMOLITION) - LEVEL 02 NORTH
SCALE: 1/8" = 1'-0"

02 LEVEL 02 - KEY PLAN
SCALE: 1/64" = 1'-0"

Updated plan to show light fixtures to be demoed

ADDENDUM B



SHEET NOTES

- 02 DEMOLISH EXISTING CORNER GUARD. PATCH REPAIR EXISTING WALL AS REQUIRED.
- 19 DEMO ALL FLOOR/WALL TILE, COUNTERTOPS, RESTROOM STALL PARTITIONS, PLUMBING FIXTURES AND ASSOCIATED PLUMBING BACK TO SOURCE. PREP FOR NEW FINISHES (FLOOR/WALL).
- 25 DEMOLISH EXISTING COAT HOOK(S). PATCH/REPAIR AFFECTED SURFACES, TO BE IN "LIKE NEW" CONDITION.
- 35 DEMO HATCHED PORTION OF EXISTING RAISED FLOORING RAMP SYSTEM AND HAND RAILS. REFER TO CONSTRUCTION PLAN FOR NEW LAYOUT.

GENERAL NOTES

- A REFER TO A00 SERIES SHEETS FOR GENERAL NOTES, ABBREVIATIONS, SYMBOLS, ETC.
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- F WHERE MOVEABLE WALLS ARE REMOVED/RELOCATED, PROVIDE ALLOWANCE TO PATCH CARPET AT ANY WALL DAMAGE THAT MAY OCCUR.
- G WHERE RAISED POWER/DATA BOXES ARE REMOVED, CORE TO REMAIN, PROVIDE FLUSH MOUNTED COVER PLATE, COLOR TO MATCH CARPET.
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- J ALL DEMOLISHED MOVEABLE PARTITIONS, DOORS, PARTS, CONNECTIONS, HARDWARE TO BE SALVAGED AND STORED ON SITE FOR REUSE, COORDINATE WITH BUILDING ENGINEER AND FURNITURE VENDOR.

LEGEND

- A REFER TO SHEET A00-100 FOR SYMBOLS AND ABBREVIATIONS

CITY OF SAN DIEGO
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Date	Description	
07.28.2017	ISSUE PERMIT	AK/SS
09.08.2017	ISSUE FOR BID	AK/SS
09.19.2017	PLAN CHECK RESPONSES/ PLAN CHANGES	AK
05.07.2018	ISSUE FOR BID	AK/SS
06.25.2018	ADDENDUM 'B'	AK/ML



Project Number
55.7291.013

The City of
SAN DIEGO
Public Works

A01.002A

CITY OF SAN DIEGO
DEMOLITION PLAN - LEVEL 02 SOUTH

CITY OF SAN DIEGO, CALIFORNIA PUBLIC WORKS DEPARTMENT SHEET 57 OF 402 SHEETS		WBS S-17009
APPROVED FOR CITY ENGINEER JASON GRANI PRINT DCE NAME	DATE 5/31/2018 77208	SUBMITTED BY JORGE ACEVEDO PROJECT MANAGER
DESCRIPTION	BY	APPROVED
ORIGINAL		DATE FILMED 5/31/2018
ADDENDUM B		DATE FILMED 6/25/2018
CONTRACTOR		DATE STARTED
INSPECTOR		DATE COMPLETED

A DEMOLITION PLAN - LEVEL 02 SOUTH
SCALE: 1/8" = 1'-0"

2 LEVEL 02 - KEY PLAN
SCALE: 1/64" = 1'-0"



SHEET NOTES

- 15 DEMOLISH FURR WALL AT EXISTING EXTERIOR WINDOWS
- 31 DEMO COUNTERTOP, SINK, AND PLUMBING. SAFE OFF AT SOURCE.
- 32 DEMO WALL, REFER TO CONSTRUCTION PLAN FOR DIMS.

GENERAL NOTES

- A REFER TO A00 SERIES SHEETS FOR GENERAL NOTES, ABBREVIATIONS, SYMBOLS, ETC.
- B ALL EXISTING CONSTRUCTION AND FINISHES TO REMAIN, UNLESS NOTED OTHERWISE
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- E EXISTING PERIMETER WINDOW COVERINGS ARE TO BE RETAINED, BAGGED AND PROTECTED AS REQUIRED. WINDOW COVERINGS TO BE FUNCTIONAL, V.I.F. AND REPAIR AS REQUIRED.
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- G WHERE RAISED POWER/DATA BOXES ARE REMOVED, CORE TO REMAIN, PROVIDE FLUSH MOUNTED COVER PLATE, COLOR TO MATCH CARPET
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- J ALL DEMOLISHED MOVEABLE PARTITIONS, DOORS, PARTS, CONNECTIONS, HARDWARE TO BE SALVAGED AND STORED ON SITE FOR REUSE. COORDINATE WITH BUILDING ENGINEER AND FURNITURE VENDOR

CITY OF SAN DIEGO

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Date	Description	AKISS
07.28.2017	ISSUE PERMIT	AKISS
09.08.2017	ISSUE FOR BID	AKISS
09.18.2017	PLAN CHECK RESPONSES/ PLAN CHANGES	AK
05.07.2018	ISSUE FOR BID	AKISS
B 05.25.2018	ADDENDUM 'B'	AKJLM

LEGEND

- A REFER TO SHEET A00-100 FOR SYMBOLS AND ABBREVIATIONS



Project Number
55.7291.013

The City of
SAN DIEGO
Public Works

A01.008

CITY OF SAN DIEGO

DEMOLITION PLAN - LEVEL 08

CITY OF SAN DIEGO, CALIFORNIA
PUBLIC WORKS DEPARTMENT
SHEET 64 OF 402 SHEETS

WBS S-17009

APPROVED:	FOR CITY ENGINEER	DATE	5/31/2018	SUBMITTED BY:	JORGE ACEVEDO
	JASON GRANI	DATE	7/208	PROJECT MANAGER	
	PRINT DCE NAME	RCEP		CHECKED BY:	MARLON PEREZ
				PROJECT ENGINEER	
DESCRIPTION	BY	APPROVED	DATE	FILMED	
ORIGINAL			5/31/2018		
ADDENDUM B			6/25/2018		CCS27 COORDINATE
					CCS83 COORDINATE
CONTRACTOR	DATE STARTED	INSPECTOR	DATE COMPLETED		40154 - 64 - D

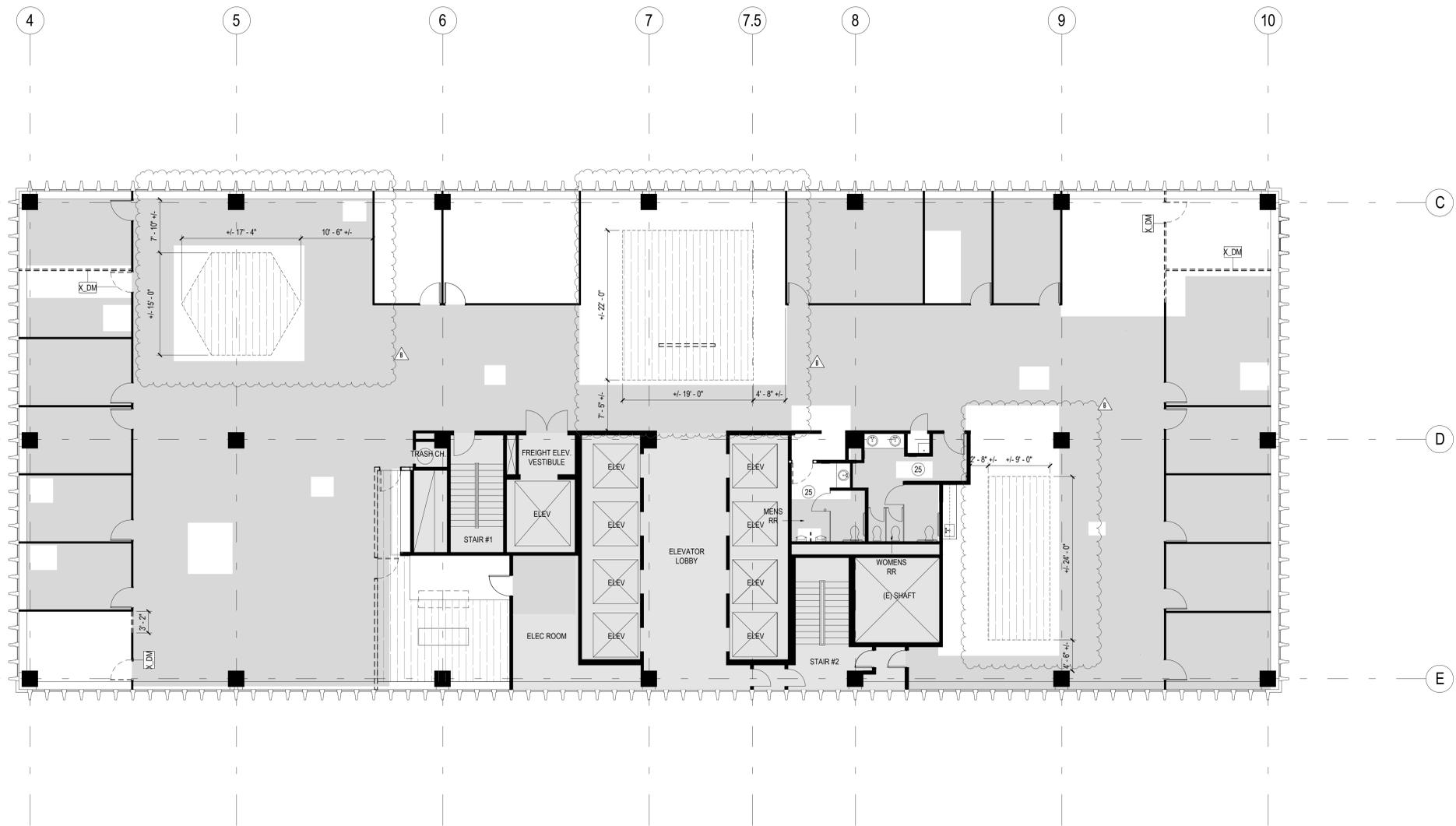


Updated plan to identify location of demoed carpet

ADDENDUM B

01 DEMOLITION PLAN - LEVEL 08

SCALE: 1/8" = 1'-0"



SHEET NOTES

25 DEMOLISH EXISTING COAT HOOK(S)
PATCH/REPAIR AFFECTED SURFACES TO BE IN
LIKE NEW CONDITION.

GENERAL NOTES

- A REFER TO A00 SERIES SHEETS FOR GENERAL NOTES, ABBREVIATIONS, SYMBOLS, ETC.
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CITY OF SAN DIEGO

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Date	Description	
07.28.2017	ISSUE PERMIT	AK/SS
09.08.2017	ISSUE FOR BID	AK/SS
09.18.2017	PLAN CHECK RESPONSES/ PLAN CHANGES	AK
05.07.2018	ISSUE FOR BID	AK/SS
06.25.2018	ADDENDUM 'B'	AK/ML

LEGEND

A REFER TO SHEET A00-100 FOR SYMBOLS AND ABBREVIATIONS



Project Number
55.7291.013

The City of
SAN DIEGO
Public Works

A01.013

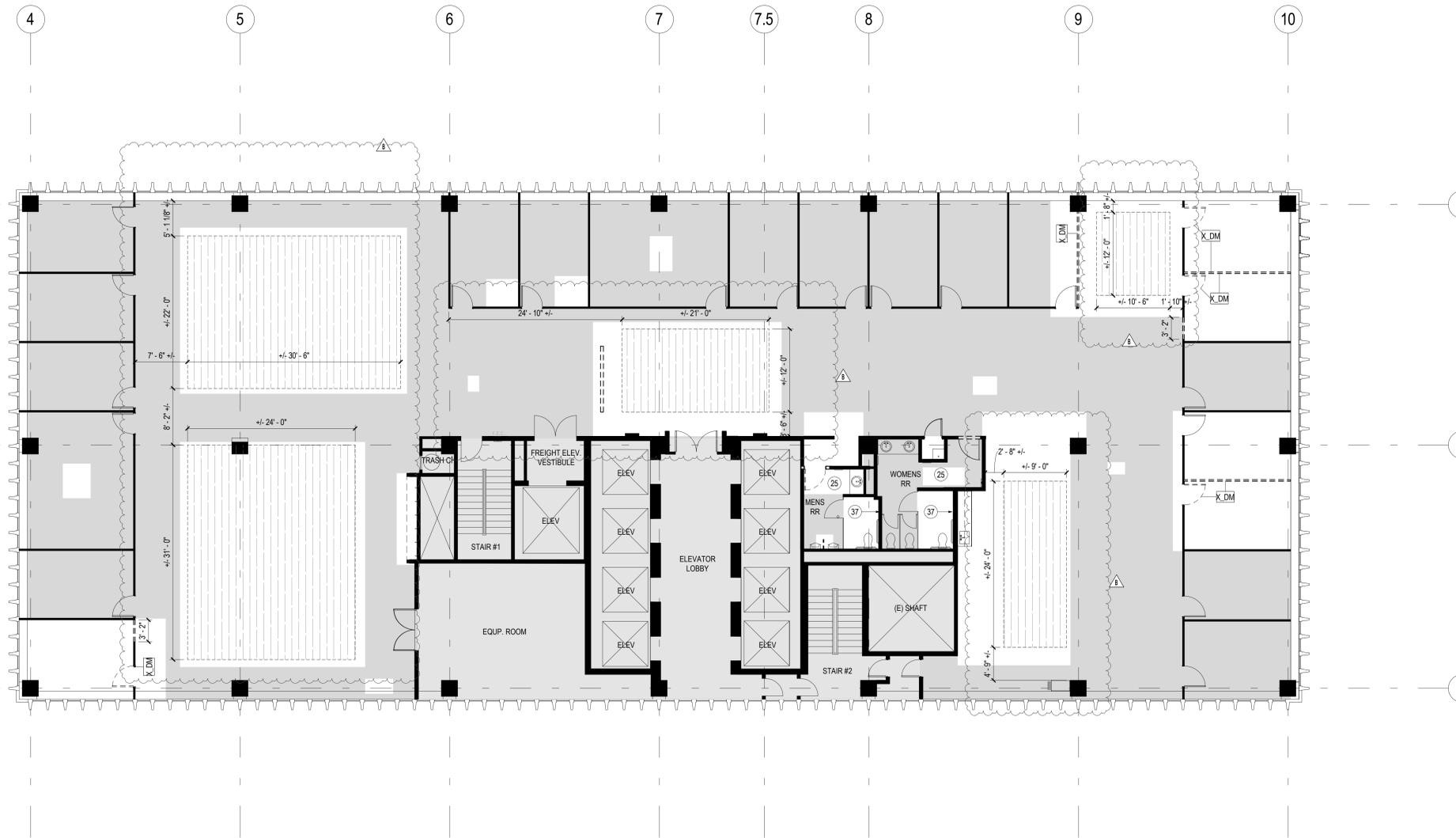
CITY OF SAN DIEGO
DEMOLITION PLAN - LEVEL 13

CITY OF SAN DIEGO, CALIFORNIA PUBLIC WORKS DEPARTMENT SHEET 89 OF 402 SHEETS		WBS S-17009
APPROVED FOR CITY ENGINEER JASON GRANI PRINT DCE NAME	DATE 5/31/2018 77208	SUBMITTED BY JORGE ACEVEDO PROJECT MANAGER
DESCRIPTION	BY	APPROVED
ORIGINAL		DATE FILMED 5/31/2018
ADDENDUM B		DATE FILMED 6/25/2018
CONTRACTOR	DATE STARTED	CCS83 COORDINATE
INSPECTOR	DATE COMPLETED	40154 - 69 - D

01 DEMOLITION PLAN - LEVEL 13
SCALE: 1/8" = 1'-0"

Updated plan to identify location of demoed carpet

ADDENDUM B



SHEET NOTES

- 25 DEMOLISH EXISTING COAT HOOK(S) PATCH/REPAIR AFFECTED SURFACES TO BE IN "LIKE NEW" CONDITION.
- 37 DEMO PORTION OF EXISTING WALL TO EXISTING STUDS PER ELEVATION 10/A07.100 AND PREP WALL FOR NEW FURRING AND FRP

GENERAL NOTES

- A REFER TO A00 SERIES SHEETS FOR GENERAL NOTES, ABBREVIATIONS, SYMBOLS, ETC.
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CITY OF SAN DIEGO

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07.28.2017	ISSUE PERMIT	AKISS
09.08.2017	ISSUE FOR BID	AKISS
09.18.2017	PLAN CHECK RESPONSES/ PLAN CHANGES	AK
05.07.2018	ISSUE FOR BID	AKISS
05.25.2018	ADDENDUM 'B'	AKJLM

LEGEND

- A REFER TO SHEET A00.100 FOR SYMBOLS AND ABBREVIATIONS



Project Number
55.7291.013

The City of
SAN DIEGO
Public Works

A01.014

CITY OF SAN DIEGO

DEMOLITION PLAN - LEVEL 14

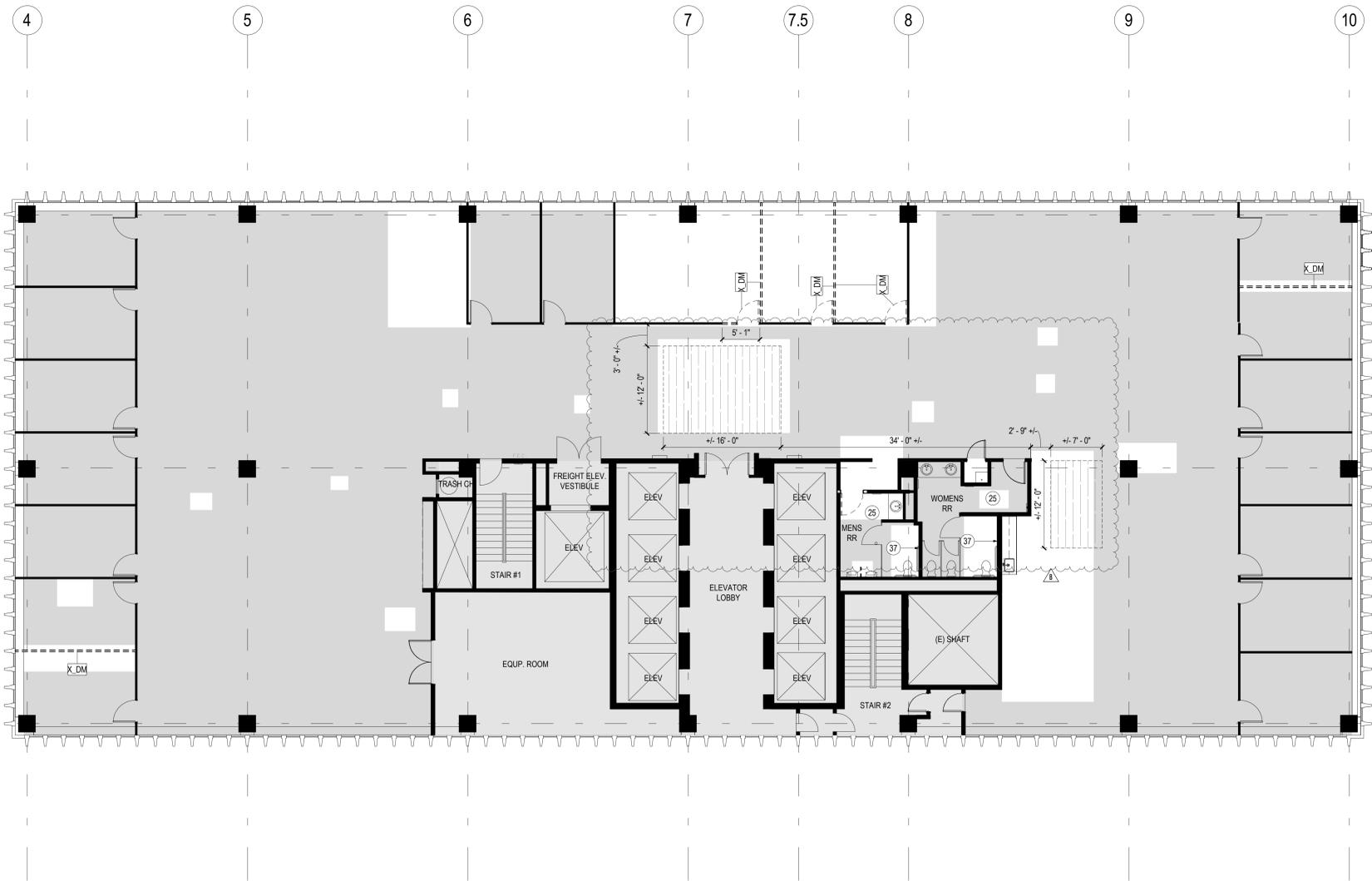
CITY OF SAN DIEGO, CALIFORNIA PUBLIC WORKS DEPARTMENT SHEET 70 OF 402 SHEETS		WBS S-17009
APPROVED FOR CITY ENGINEER JASON GRANI PRINT DGE NAME	DATE 5/31/2018 77208	SUBMITTED BY JORGE ACEVEDO PROJECT MANAGER
DESCRIPTION	BY	APPROVED
ORIGINAL		DATE FILMED 5/31/2018
ADDENDUM B		DATE FILMED 6/25/2018
CONTRACTOR		DATE STARTED
INSPECTOR		DATE COMPLETED
		40154 - 70 - D

01 DEMOLITION PLAN - LEVEL 14
SCALE: 1/8" = 1'-0"



Updated plan to identify location of demoed carpet

ADDENDUM B



SHEET NOTES

- 25 DEMOLISH EXISTING COAT HOOK(S)
PATCH/REPAIR AFFECTED SURFACES TO BE IN "LIKE NEW" CONDITION
- 37 DEMO PORTION OF EXISTING WALL TO EXISTING STUDS PER ELEVATION 10A07.100 AND PREP WALL FOR NEW FURRING AND FRP

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CITY OF SAN DIEGO

101 W. ASH
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Gensler

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Date	Description	AKISS
07.28.2017	ISSUE PERMIT	AKISS
09.08.2017	ISSUE FOR BID	AKISS
09.18.2017	PLAN CHECK RESPONSES/ PLAN CHANGES	AK
05.07.2018	ISSUE FOR BID	AKISS
05.25.2018	ADDENDUM 'B'	AKJLM

LEGEND

- A REFER TO SHEET A00.100 FOR SYMBOLS AND ABBREVIATIONS



Project Number
55.7291.013

The City of
SAN DIEGO
Public Works

A01.015

CITY OF SAN DIEGO

DEMOLITION PLAN - LEVEL 15

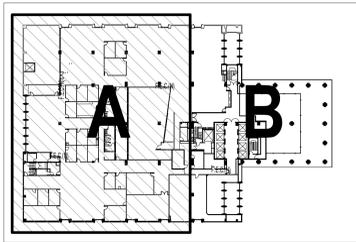
CITY OF SAN DIEGO, CALIFORNIA PUBLIC WORKS DEPARTMENT SHEET 71 OF 402 SHEETS		WBS S-17009
APPROVED FOR CITY ENGINEER JASON GRANI PRINT DCE NAME	DATE 5/31/2018 77208	SUBMITTED BY JORGE ACEVEDO PROJECT MANAGER
DESCRIPTION	BY	APPROVED
ORIGINAL		DATE FILMED 5/31/2018
ADDENDUM B		DATE FILMED 6/25/2018
CONTRACTOR		DATE STARTED
INSPECTOR		DATE COMPLETED
		40154 - 71 - D

01 DEMOLITION PLAN - LEVEL 15
SCALE: 1/8" = 1'-0"



Updated plan to identify location of demoed carpet

ADDENDUM B



SHEET NOTES

- 46 RELOCATED DEFIBRILLATOR CABINET.
- 84 RELOCATE EXISTING SEAT COVERTOILET PAPER ACCESSORY TO CODE COMPLIANT LOCATION HEIGHT. PATCH REPAIR AFFECTED SURFACES AND PREP FOR NEW FINISHES. REFER TO SHEET A00.301 FOR MOUNTING HEIGHT AND LOCATION REQUIREMENTS.
- 88 LOWER EXISTING MILLWORK TO BE ACCESSIBLE. CONTRACTOR TO LOWER COUNTERTOP AND FIXTURES TO MAKE FINISH HEIGHT OF COUNTERTOP 34" A.F.F. MAX. CONTRACTOR TO RE-WORK EXISTING PLUMBING AT SINK TO COORDINATE WITH ADJUSTMENT. PROVIDE ALLOWANCE TO REPLACE FAUCETS WITH MAC-F44-12 OR EQUAL. REFER TO DETAIL 12A07.100 FOR ELEVATION REFERENCE.
- 93 REFER TO DETAIL 13A08.S01 FOR POWER SUPPLY TO COUNTER AT OPEN BIN STORAGE MILLWORK.
- 94 REFER TO DETAIL 14A08.501 FOR POWER SUPPLY TO COUNTER WHERE INDICATED.

GENERAL NOTES

- A REFER TO A00 SERIES SHEETS FOR GENERAL NOTES, ABBREVIATIONS, SYMBOLS, ACCESSIBILITY REQUIREMENTS, CLEARANCES, MOUNTING HEIGHTS, ETC.
- B ALL PARTITIONS TO BE TYPE 'A', UNLESS NOTED OTHERWISE. REFER TO A09 SERIES SHEETS FOR PARTITION DETAILS.
- C PROVIDE LEVEL 4 FINISH AT ALL GYP BD SURFACES. LEVEL 5 AT SOFFITS, UNLESS NOTED OTHERWISE. PROVIDE LEVEL 5 FINISH AT ALL PARTITIONS TO RECEIVE WALL COVERING. REFER TO FINISH PLAN FOR LOCATIONS.
- D USE 5/8" TYPE 'X' GYP. BD. THROUGHOUT.
- F PROVIDE BLOCKING AS REQ. AT ALL LOCATIONS INCLUDING, BUT NOT LIMITED TO: GRAB BARS, OVERHEAD CABINETRY, SHELVING, SIGNAGE, TOILET ROOM ACCESSORIES, WALL MOUNTED EQUIPMENT, ETC.
- G U.N.O. EXISTING CONSTRUCTION AND FINISHES TO REMAIN AS IS.
- H PROVIDE SPOT STEAM CLEANING AT CARPET THROUGHOUT AS REQUIRED.
- K AT RELOCATED MOVEABLE WALLS TYPE X, B PROVIDE THE FOLLOWING COST PROVISIONS: 1.) PROVIDE SEISMIC BRACING TO DECK ABOVE. SEE STRUCTURAL DETAIL 16S201. GC TO COORDINATE STRUCTURAL SUPPORT CONSTRUCTION WITH FURNITURE VENDOR'S INSTALLATION OF MOVEABLE WALLS.
- M U.N.O. ALL NEW WALLS WHERE EXISTING FLOORING IS TO REMAIN TO BE CONSTRUCTED OVER EXISTING FLOORING.
- N ANY WALLS RECEIVING TILE WITHIN 6'-0" OF WATER SOURCE TO RECEIVE GLASS-MAT TILE BACKER BOARD, AND WALLS NOT RECEIVING TILE WITHIN 6'-0" OF WATER SOURCE TO RECEIVE WATER RESISTANT GYP BOARD.
- P ALL DIMENSIONS PROVIDED ARE TO FINISH FACE OF WALL OR FINISHED SURFACE.

LEGEND

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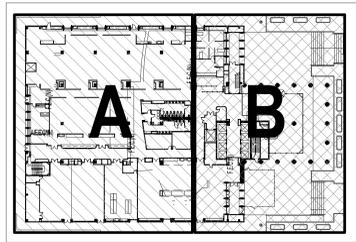
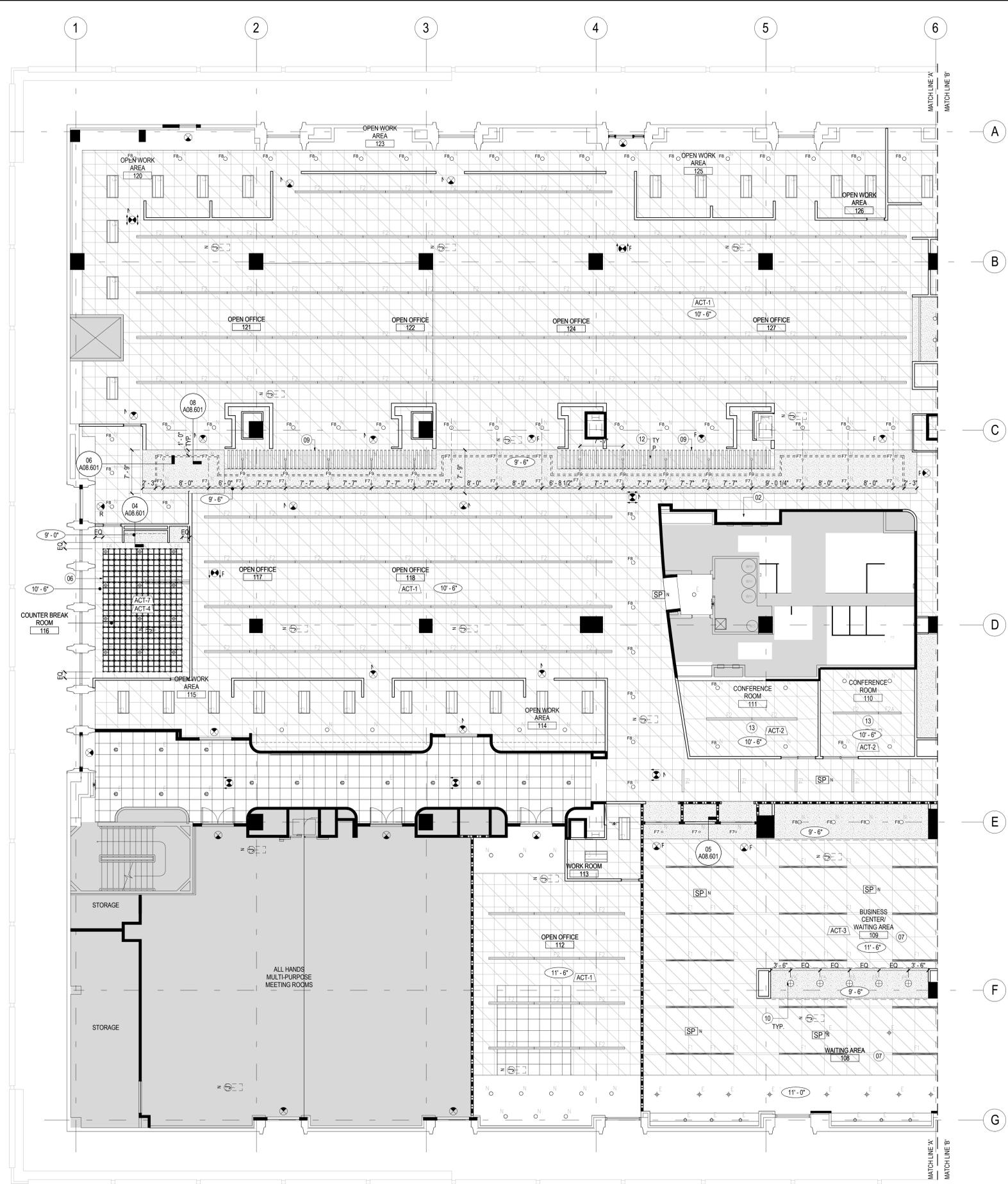
A02.202A

CITY OF SAN DIEGO
 CONSTRUCTION PLAN - LEVEL 02 SOUTH

CITY OF SAN DIEGO, CALIFORNIA PUBLIC WORKS DEPARTMENT SHEET 80 OF 402 SHEETS		WBS S-17009
APPROVED FOR CITY ENGINEER JASON GRANI PRINT DCE NAME	DATE 5/31/2018 77208	SUBMITTED BY JORGE ACEVEDO PROJECT MANAGER
DESCRIPTION	BY	APPROVED
ORIGINAL		DATE FILMED 5/31/2018
ADDENDUM B		DATE COMPLETED 6/25/2018
CONTRACTOR INSPECTOR		DATE STARTED
		DATE COMPLETED
		40154 - 80 - D

A CONSTRUCTION PLAN - LEVEL 02 SOUTH
 SCALE: 1/8" = 1'-0"

02 LEVEL 02 - KEY PLAN
 SCALE: 1/64" = 1'-0"



SHEET NOTES

- 02 PROVIDE RECESSED LIGHT COVER OVER BENCH ALCOVE.
- 06 PROVIDE SUSPENDED WOOD GRID CEILING SYSTEM BELOW ACOUSTICAL CEILING SYSTEM. MFR: ARMSTRONG. WOODWORKS OPEN CELL VECTOR 6622 FOUR SQUARE W/ 12" CELLS. COLOR: PAINTED FINISH. COLOR: TBD. PROVIDE ALL NECESSARY REQUIRED ATTACHMENTS TO ACT ABOVE. INSTALL SYSTEM 9'-3" A.F.F. TO THE BOTTOM OF THE GRID. CONTACT DAI-NEE TANG@ARMSTRONGCEILING.COM FOR ADDITIONAL INFORMATION.
- 07 ARMSTRONG INTEGRATED TECHZONE CEILING SYSTEM. SPRINKLER HEADS TO BE FULLY RECESSED WHITE. COORDINATE SPRINKLER HEAD LOCATIONS WITH ARCHITECT PRIOR TO ROUGH IN.
- 09 PROVIDE BAFFLE WHERE INDICATED ON PLAN. MFR: KIREI. H-BAFFLE. 40" LONG, WITH 1/4" -20 MALE THREAD ROD AND FEMALE MOUNTING HARDWARE. COLOR: TBD. PROVIDE ALL REQUIRED ATTACHMENTS FOR INSTALLATION. INSTALL BAFFLE 9'-6" A.F.F. TO BOTTOM OF BAFFLE. BAFFLE TO ALIGN WITH THE BOTTOM OF ADJACENT SOFFIT. V.I.F. REF. TO DET. 11/A08.601 FOR FURTHER DETAILS.
- 10 - FIXTURE FS TO BE FIELD CUT. CONTRACTOR TO COORDINATE WITH ARCHITECT PRIOR TO INSTALLATION.
- 12 INSTALL FS FIXTURE 9'-6" A.F.F. TO THE BOTTOM OF THE FIXTURE. FIXTURE SHOULD ALIGN WITH BOTTOM OF THE ADJACENT BAFFLE. V.I.F. REF. TO DET. 11/A08.600 FOR FURTHER DETAILS.
- 13 ARMSTRONG 48"x48" OPTIMA TEGULAR CEILING TILES. SPRINKLER HEADS TO BE FULLY RECESSED WHITE. COORDINATE SPRINKLER HEAD LOCATIONS WITH ARCHITECT PRIOR TO ROUGH IN.

GENERAL NOTES

- A SEE SPEC MANUAL FOR FIXTURE SPECS AND FURTHER INFORMATION.
- B EXIT ILLUMINATION LEVEL SHALL NOT BE LESS THAN 1 FC AT THE WALKING SURFACE LEVEL (CBC 1006.2). POWER FOR THE MEANS OF EGRESS ILLUMINATION SHALL BE PROVIDED BY THE BUILDING ELECTRICAL SUPPLY. IN THE EVENT OF POWER SUPPLY FAILURE, EMERGENCY POWER SYSTEM SHALL PROVIDE POWER FOR A DURATION NOT LESS THAN 90 MINUTES AND SHALL CONSIST OF STORAGE BATTERIES, UNIT EQUIPMENT OR AN ON-SITE GENERATOR (CBC 1006.1, 1006.2, 1006.3, 1006.4).
- C LOCATIONS OF CLG PENETRATIONS, SUCH AS DIFFUSERS, GRILLES, LIGHT FIXTURES, ETC., SHALL BE AS SHOWN ON THE ARCHITECTURAL REFLECTED CLG PLAN. WHERE DISCREPANCIES OCCUR, THE ARCHITECTURAL PLANS GOVERN.
- D ALL NEW GRILLES, PERF. FACE PLATES, ACCESS PANELS, AIR BARS AND TRIMS SHALL BE FACTORY FINISHED TO MATCH THE COLOR OF ADJACENT CEILING FINISH.
- E PROVIDE OVERRIDE SWITCHING AT CONFERENCE ROOMS. PROVIDE LIGHT SENSORS AT ALL SPACES WITH AN OVERRIDE SWITCH.
- G ALL REMOVED LIGHT FIXTURES SHALL BE RE-USED BEFORE INSTALLING NEW LIGHT FIXTURES. UNO. VERIFY RE-USE OF LIGHT FIXTURES W/ OWNER & ARCHITECT PRIOR TO INSTALLATION.
- H FIRE SPRINKLER LINES AND HEADS TO BE ADJUSTED AND/OR RELOCATED AS REQUIRED TO ACCOMMODATE NEW CONFIGURATION.
- I ALL EXISTING DAMAGED GRILLES SHALL BE REPLACED W/ NEW.
- J NOTIFY ARCHITECT WHEN A LIGHT FIXTURE CANNOT BE USED DUE TO EXISTING NON-REMOVABLE PLENUM OBSTRUCTION(S) AND ALTERNATE LOCATION DEVIATES FROM LAYOUT. LOW PROFILE LIGHT FIXTURE SHALL BE USED.
- K PROVIDE NEW LIGHT SWITCHING W/ SENSOR WHERE REQ BY CODE. PROVIDE NEW LIGHT SWITCHING CONTROLS FOR NEW SUITE LAYOUT AS REQ WHERE REQ.
- L AVG LEVEL OF ILLUMINATION THROUGHOUT AS REQ PER TITLE 24 IS DEFINED AS NOT TO EXCEED 1.5 WATTS/SF ON AVG.
- M REPAIR DAMAGED LIGHT FIXTURE COVERS AND BULBS THROUGH.
- N PROVIDE ALLOWANCE TO REPLACE DAMAGED/SUSTAINED TILE. PROVIDE ALLOWANCE TO REPLACE 100 CEILING TILES THROUGHOUT THE BUILDING.
- P PROVIDE LINE ITEM ALLOWANCE TO ADD COMPRESSION STRUTS AT EXISTING CEILING THROUGHOUT TO MEET CURRENT SEISMIC CODE REQUIREMENTS.

LEGEND

- A REFER TO SHEET A00.100 FOR SYMBOLS AND ABBREVIATIONS

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B 06.25.2018	ADDENDUM 'B'	AK/ISS



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The City of
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 Public Works

A02.601A

CITY OF SAN DIEGO
 REFLECTED CEILING PLAN - LEVEL 01 SOUTH

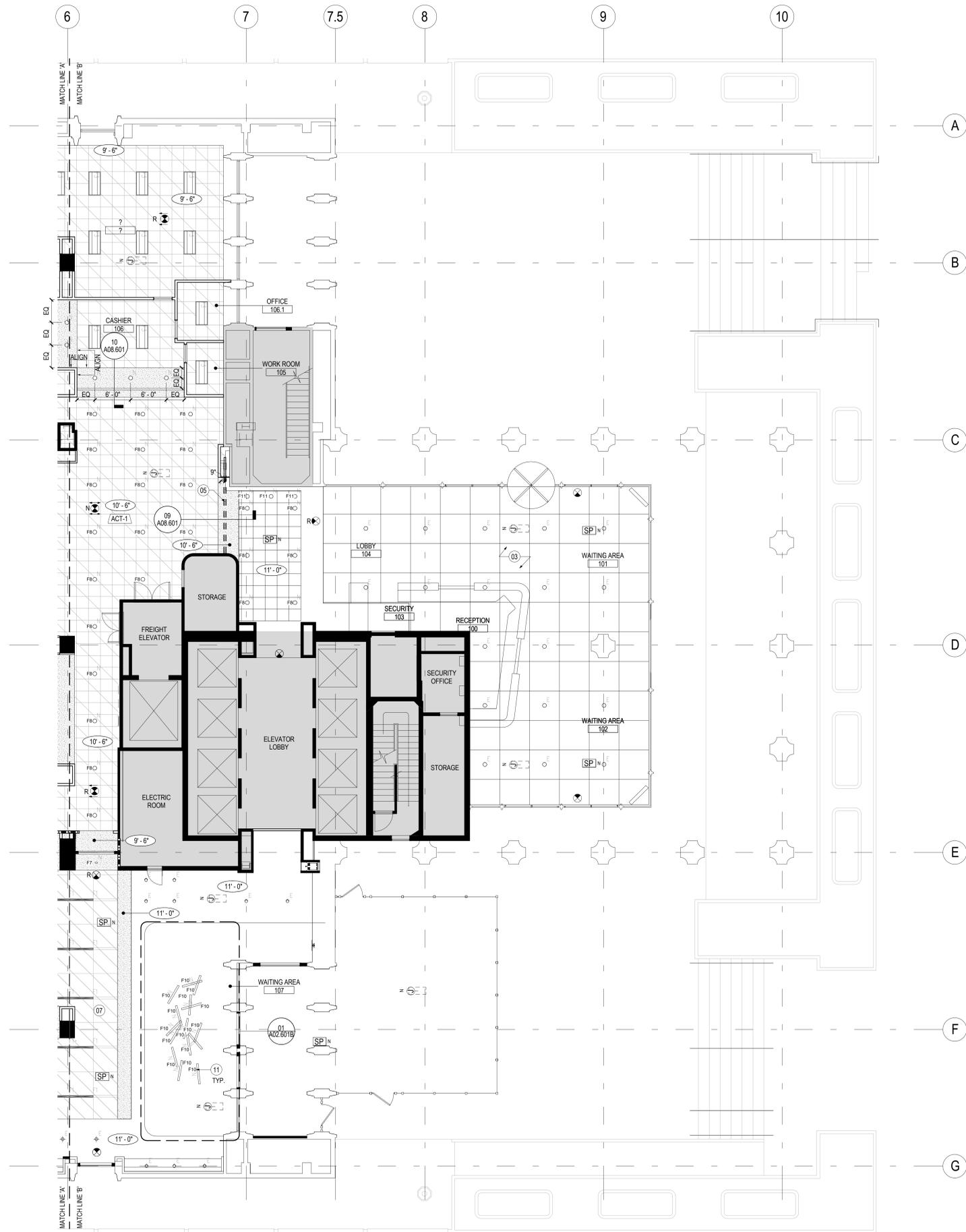
CITY OF SAN DIEGO, CALIFORNIA
 PUBLIC WORKS DEPARTMENT
 SHEET 122 OF 402 SHEETS

APPROVED FOR CITY ENGINEER	DATE	5/31/2018	DATE	7/20/18
JASON GRAN	DATE	7/20/18	DATE	7/20/18
PRINT DC# NAME	RECEIVED			
DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL			5/31/2018	
ADDENDUM B			6/25/2018	

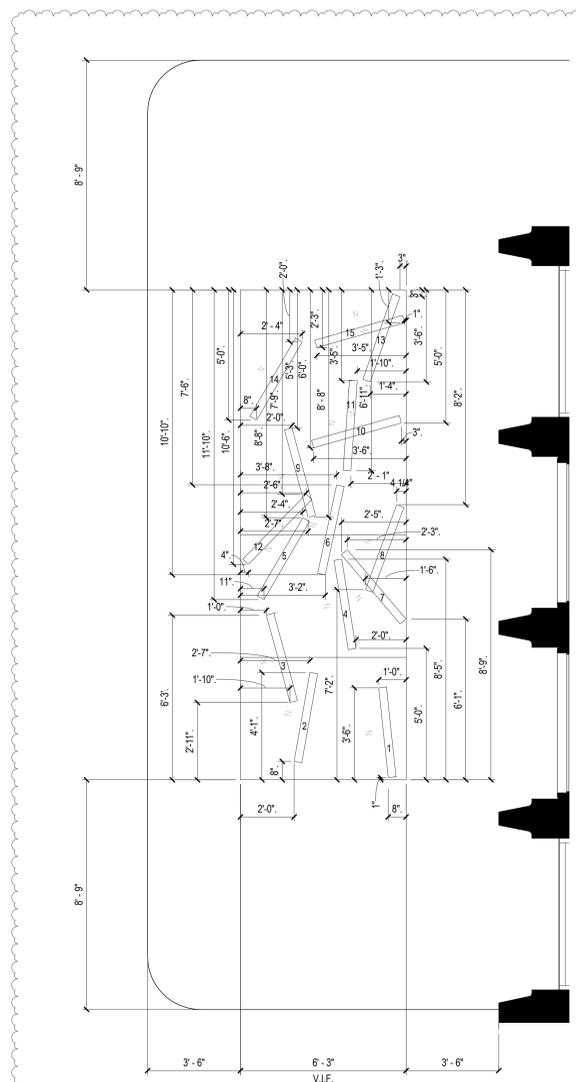
CONTRACTOR INSPECTOR DATE STARTED DATE COMPLETED
 Update to general notes

A REFLECTED CEILING PLAN - LEVEL 01 SOUTH
 SCALE: 1/8" = 1'-0"

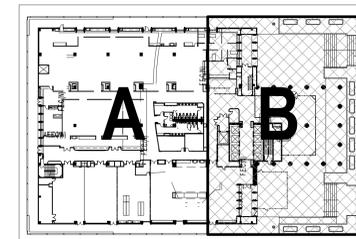
02 LEVEL 01 - KEY PLAN
 SCALE: 1/64" = 1'-0"



B REFLECTED CEILING PLAN - LEVEL 01 NORTH
SCALE: 1/8" = 1'-0"



01 WAITING 107 ENLARGED RCP
SCALE: 3/8" = 1'-0"



02 LEVEL 01 - KEY PLAN
SCALE: 1/64" = 1'-0"

SHEET NOTES

- 03 RELAMP ALL LAMPS AT RECEPTION LOBBY CYLINDER LIGHT FIXTURES TO BE 3500K TEMP LED.
- 05 PROVIDE TRACK FOR RELOCATED SECURITY GATE
- 07 ARMSTRONG INTEGRATED TECHZONE CEILING SYSTEM. SPRINKLER HEADS TO BE FULLY RECESSED WHITE. COORDINATE SPRINKLER HEAD LOCATIONS WITH ARCHITECT PRIOR TO ROUGH IN
- 11 G.G. TO INCLUDE CORD AND AIRCRAFT CABLE LENGTH FOR FIXTURE THAT ACCOMMODATE VARIED MOUNTING HEIGHTS AS SHOWN ON ELEVATION 04/A07.100.3. LIGHT FIXTURE TO BE PRICED AS ALTERNATE.

GENERAL NOTES

- A SEE SPEC MANUAL FOR FIXTURE SPECS AND FURTHER INFORMATION
- B EXIT ILLUMINATION LEVEL SHALL NOT BE LESS THAN 1 FC AT THE WALKING SURFACE LEVEL (CBC 1006.2). POWER FOR THE MEANS OF EGRESS ILLUMINATION SHALL BE PROVIDED BY THE BUILDING ELECTRICAL SUPPLY. IN THE EVENT OF POWER SUPPLY FAILURE, EMERGENCY POWER SYSTEM SHALL PROVIDE POWER FOR A DURATION NOT LESS THAN 90 MINUTES AND SHALL CONSIST OF STORAGE BATTERIES, UNIT EQUIPMENT OR AN ON-SITE GENERATOR (CBC 1006.1, 1006.2, 1006.3, 1006.4)
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- P PROVIDE LINE ITEM ALLOWANCE TO ADD COMPRESSION STRUTS AT EXISTING CEILING THROUGHOUT TO MEET CURRENT SEISMIC CODE REQUIREMENTS.

LEGEND

- A REFER TO SHEET A00.100 FOR SYMBOLS AND ABBREVIATIONS

APPROVED FOR CITY ENGINEER JASON GRANI PRINT DCE NAME	DATE 5/31/2018 77208	DATE FILMED 5/31/2018 6/25/2018	DATE STARTED DATE COMPLETED
PROJECT MANAGER MORLON PEREZ	PROJECT ENGINEER MORLON PEREZ	PROJECT MANAGER JORGE ACEVEDO	PROJECT ENGINEER MORLON PEREZ
ORIGINAL	ADDENDUM B	CS27 COORDINATE	CS83 COORDINATE

Update to general notes. Dimensions provided for pendant fixtures

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The City of
SAN DIEGO
Public Works

A02.601B

CITY OF SAN DIEGO
REFLECTED CEILING PLAN - LEVEL 01 NORTH

CITY OF SAN DIEGO, CALIFORNIA
PUBLIC WORKS DEPARTMENT
SHEET 123 OF 402 SHEETS
WBS S-17009

ADDENDUM B



A REFLECTED CEILING PLAN - LEVEL 02 SOUTH
SCALE: 1/8" = 1'-0"

02 LEVEL 02 - KEY PLAN
SCALE: 1/64" = 1'-0"

SHEET NOTES

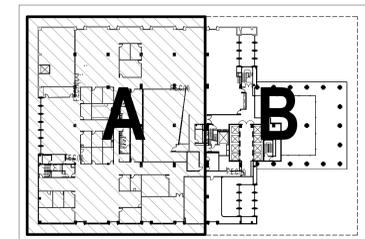
- 01 REPLACE DAMAGED/STAIN TILES THROUGHOUT FLOOR. PROVIDE ALLOWANCE FOR UP TO 20% REPLACEMENT OF EXISTING TILES.
- 08 PROVIDE NEW 2'X4' CEILING GRID, 2'X2' TILES AND LIGHT FIXTURES AS SHOWN. MATCH EXISTING CEILING HEIGHT.

GENERAL NOTES

- A SEE SPEC MANUAL FOR FIXTURE SPECS AND FURTHER INFORMATION
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LEGEND

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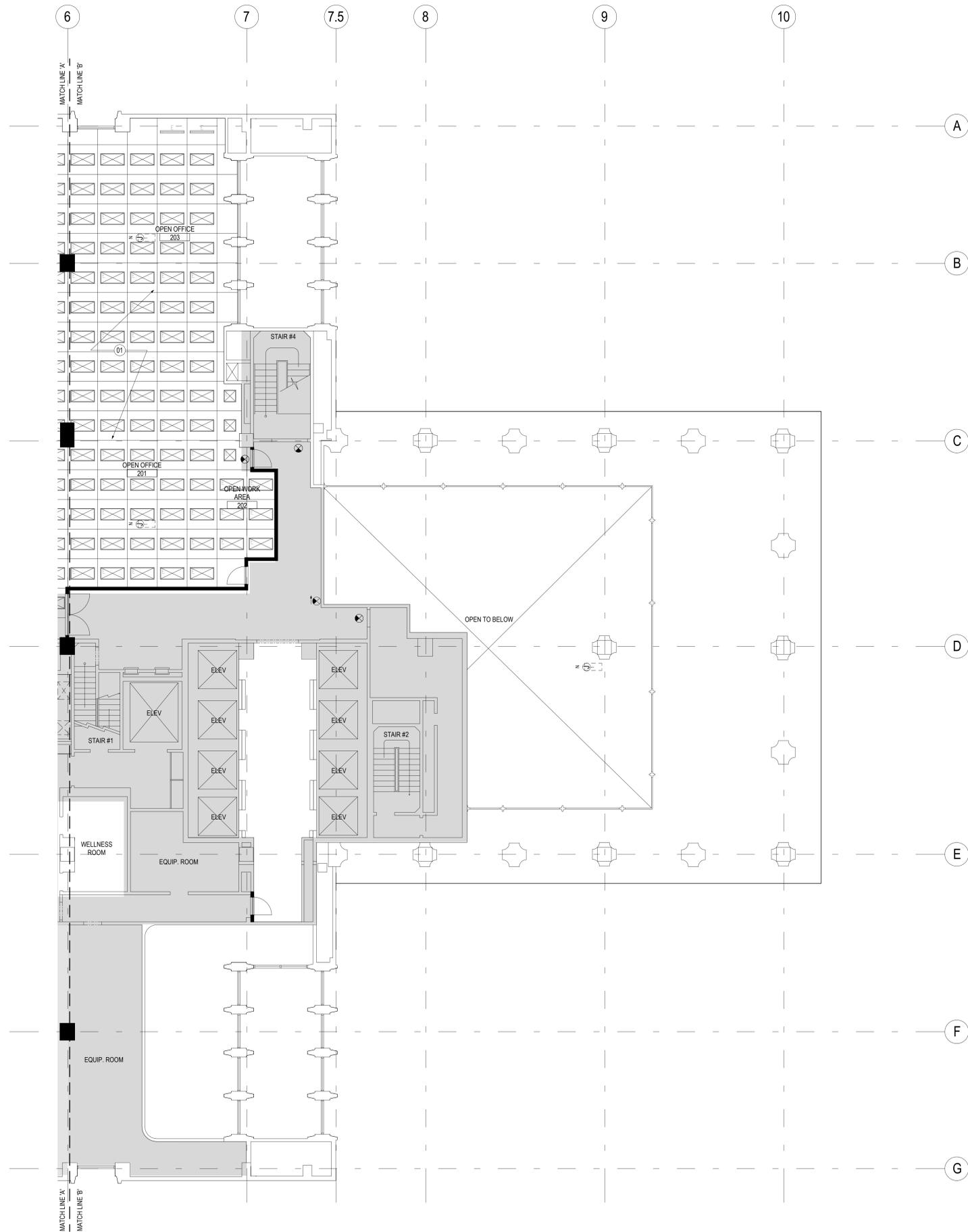
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Public Works

A02.602A

CITY OF SAN DIEGO
REFLECTED CEILING PLAN - LEVEL 02 SOUTH

CITY OF SAN DIEGO, CALIFORNIA PUBLIC WORKS DEPARTMENT SHEET 124 OF 402 SHEETS		WBS S-17009
APPROVED FOR CITY ENGINEER JASON GRANI PRINT DCE NAME	DATE 5/31/2018 77208	SUBMITTED BY JORGE ACEVEDO PROJECT MANAGER CHECKED BY MARLON PEREZ PROJECT ENGINEER
DESCRIPTION	BY	APPROVED
ORIGINAL		
ADDENDUM B		
DATE STARTED	DATE COMPLETED	CONTRACTOR INSPECTOR
		40154 - 124 - D



B REFLECTED CEILING PLAN - LEVEL 01 NORTH
SCALE: 1/8" = 1'-0"

SHEET NOTES

- 01 REPLACE DAMAGED/STAIN TILES THROUGHOUT FLOOR. PROVIDE ALLOWANCE FOR UP TO 20% REPLACEMENT OF EXISTING TILES.

GENERAL NOTES

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05.07.2018	ISSUE FOR BID	AK/SS
06.25.2018	ADDENDUM 'B'	AK/LM



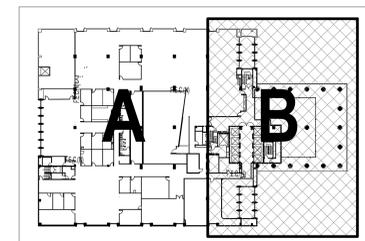
Project Number
55.7291.013

The City of
SAN DIEGO
Public Works

A02.602B

CITY OF SAN DIEGO
REFLECTED CEILING PLAN - LEVEL 02 NORTH

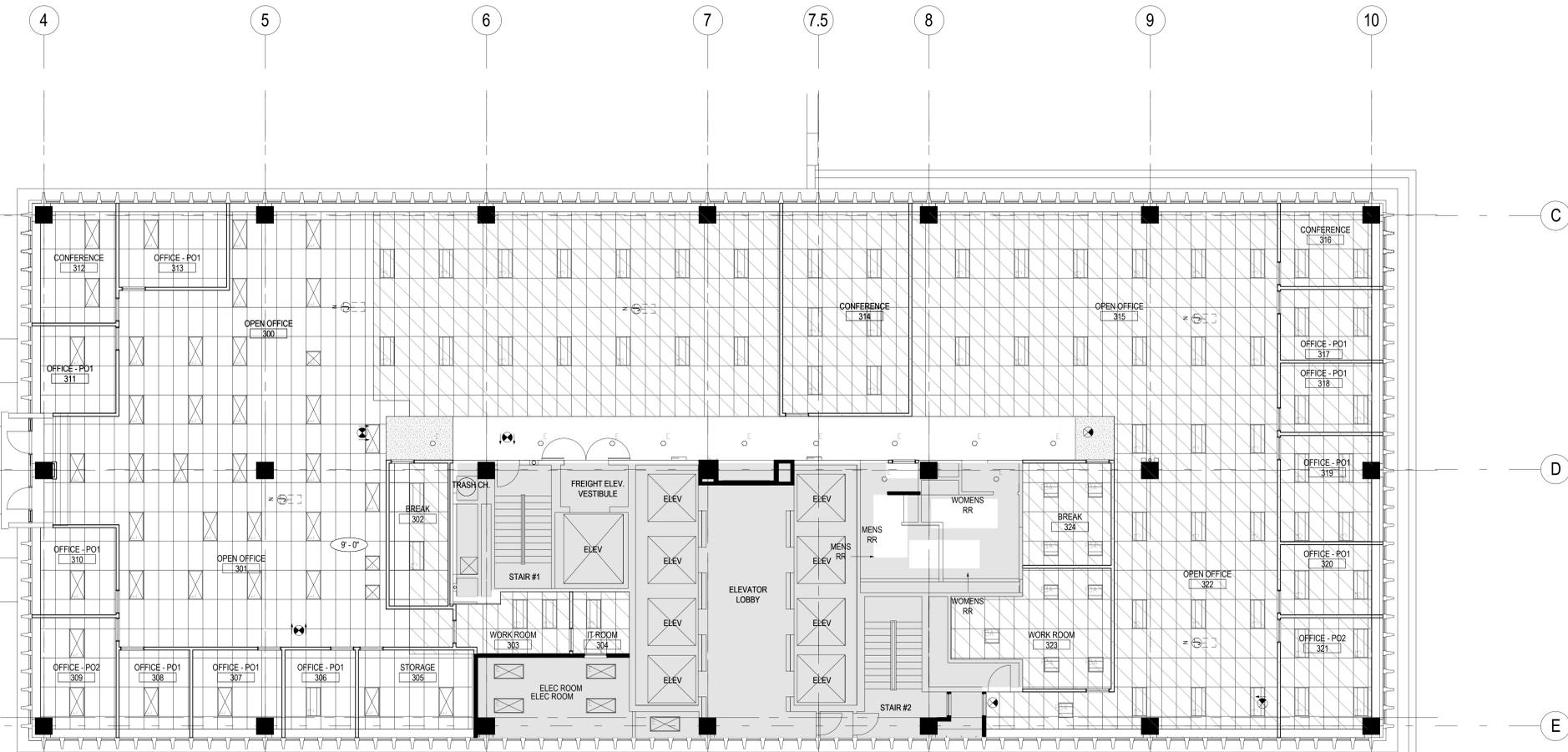
CITY OF SAN DIEGO, CALIFORNIA PUBLIC WORKS DEPARTMENT SHEET 125 OF 402 SHEETS		WBS S-17009
APPROVED: JASON GRANI FOR CITY ENGINEER PRINT DCE NAME	DATE: 5/31/2018 77208	SUBMITTED BY: JORGE ACEVEDO PROJECT MANAGER CHECKED BY: MARLON PEREZ PROJECT ENGINEER
DESCRIPTION	BY	APPROVED
ORIGINAL		5/31/2018
ADDENDUM B		6/25/2018
CONTRACTOR		DATE STARTED
INSPECTOR		DATE COMPLETED
		40154-125-D



02 LEVEL 02 - KEY PLAN
SCALE: 1/64" = 1'-0"

Update to general notes

ADDENDUM B



SHEET NOTES

GENERAL NOTES

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- B EXIT ILLUMINATION LEVEL SHALL NOT BE LESS THAN 1 FC AT THE WALKING SURFACE LEVEL (CBC 1006.2). POWER FOR THE MEANS OF EGRESS ILLUMINATION SHALL BE PROVIDED BY THE BUILDING ELECTRICAL SUPPLY. IN THE EVENT OF POWER SUPPLY FAILURE, EMERGENCY POWER SYSTEM SHALL PROVIDE POWER FOR A DURATION NOT LESS THAN 90 MINUTES AND SHALL CONSIST OF STORAGE BATTERIES, UNIT EQUIPMENT OR AN ON-SITE GENERATOR (CBC 1006.1, 1006.2, 1006.3, 1006.4)
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- P PROVIDE LINE ITEM ALLOWANCE TO ADD COMPRESSION STRUTS AT EXISTING CEILING THROUGHOUT TO MEET CURRENT SEISMIC CODE REQUIREMENTS.

LEGEND

- A REFER TO SHEET A00.100 FOR SYMBOLS AND ABBREVIATIONS

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07.28.2017	ISSUE PERMIT	AK/SS
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05.07.2018	ISSUE FOR BID	AK/SS
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Project Number
55.7291.013

The City of
SAN DIEGO
Public Works

A02.603

CITY OF SAN DIEGO

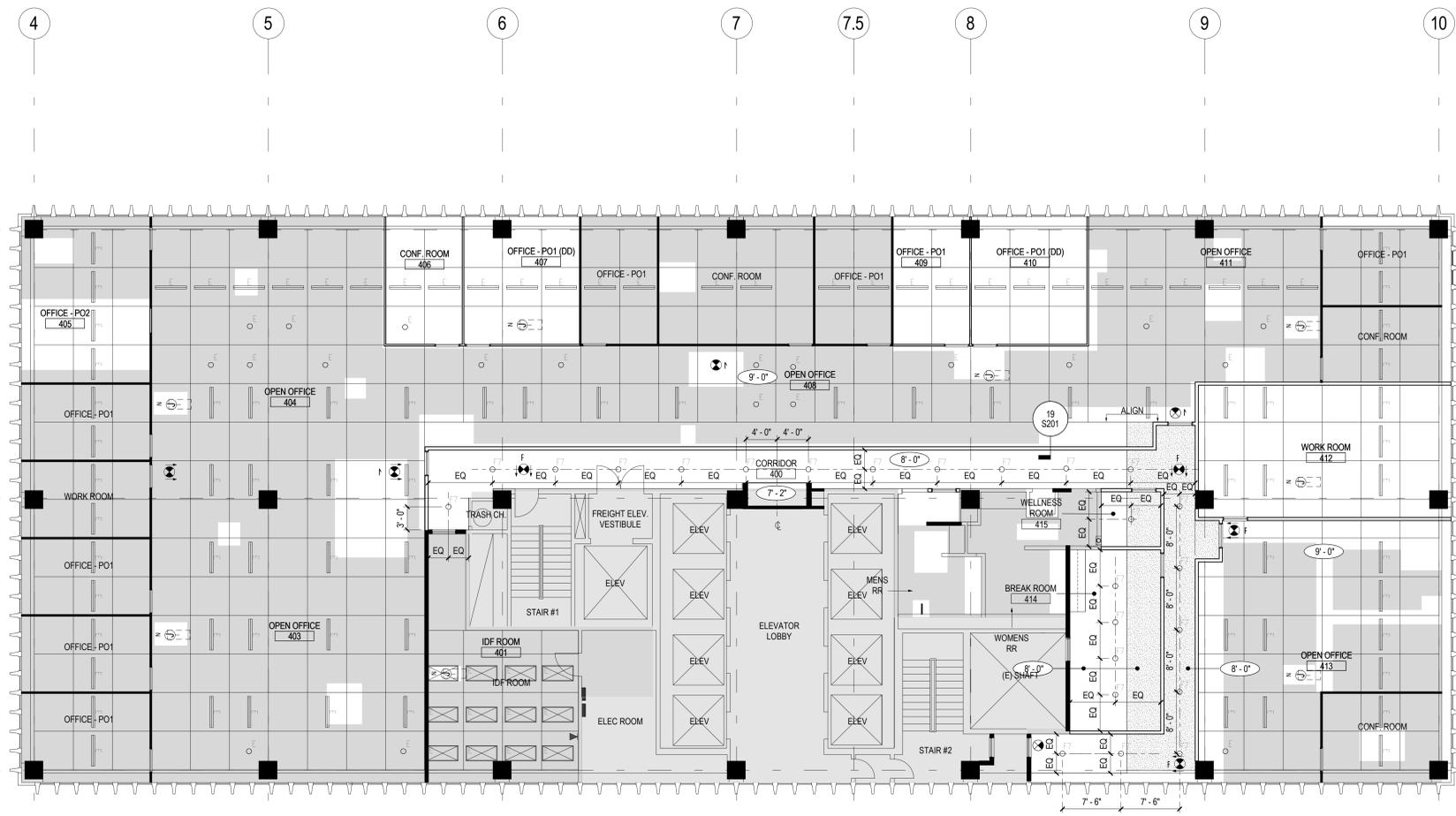
REFLECTED CEILING PLAN - LEVEL 03

CITY OF SAN DIEGO, CALIFORNIA PUBLIC WORKS DEPARTMENT SHEET 126 OF 402 SHEETS		WBS S-17009
APPROVED FOR CITY ENGINEER JASON GRANI PRINT DGE NAME	DATE 5/31/2018 77208	SUBMITTED BY JORGE ACEVEDO PROJECT MANAGER
DESCRIPTION	BY	APPROVED
ORIGINAL		5/31/2018
ADDENDUM B		6/25/2018
CONTRACTOR		DATE STARTED
INSPECTOR		DATE COMPLETED
		40154-126-D

01 REFLECTED CEILING PLAN - LEVEL 03
SCALE: 1/8" = 1'-0"

Update to general notes

ADDENDUM B



SHEET NOTES

GENERAL NOTES

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LEGEND

A REFER TO SHEET A00.100 FOR SYMBOLS AND ABBREVIATIONS

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05.07.2018	ISSUE FOR BID	AK/SS
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Project Number
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The City of
SAN DIEGO
Public Works

A02.604

LEGEND

A REFER TO SHEET A00.100 FOR SYMBOLS AND ABBREVIATIONS

CITY OF SAN DIEGO
REFLECTED CEILING PLAN - LEVEL 04

CITY OF SAN DIEGO, CALIFORNIA
PUBLIC WORKS DEPARTMENT
SHEET 127 OF 402 SHEETS

WBS S-17009

APPROVED: FOR CITY ENGINEER DATE 5/31/2018
PROJECT MANAGER
DATE 7/20/18

SUBMITTED BY: JORGE ACEVEDO
PROJECT ENGINEER
DATE 5/31/2018

CHIEF ENGINEER: MARLON PEREZ
PROJECT ENGINEER

DESCRIPTION BY APPROVED DATE FILMED

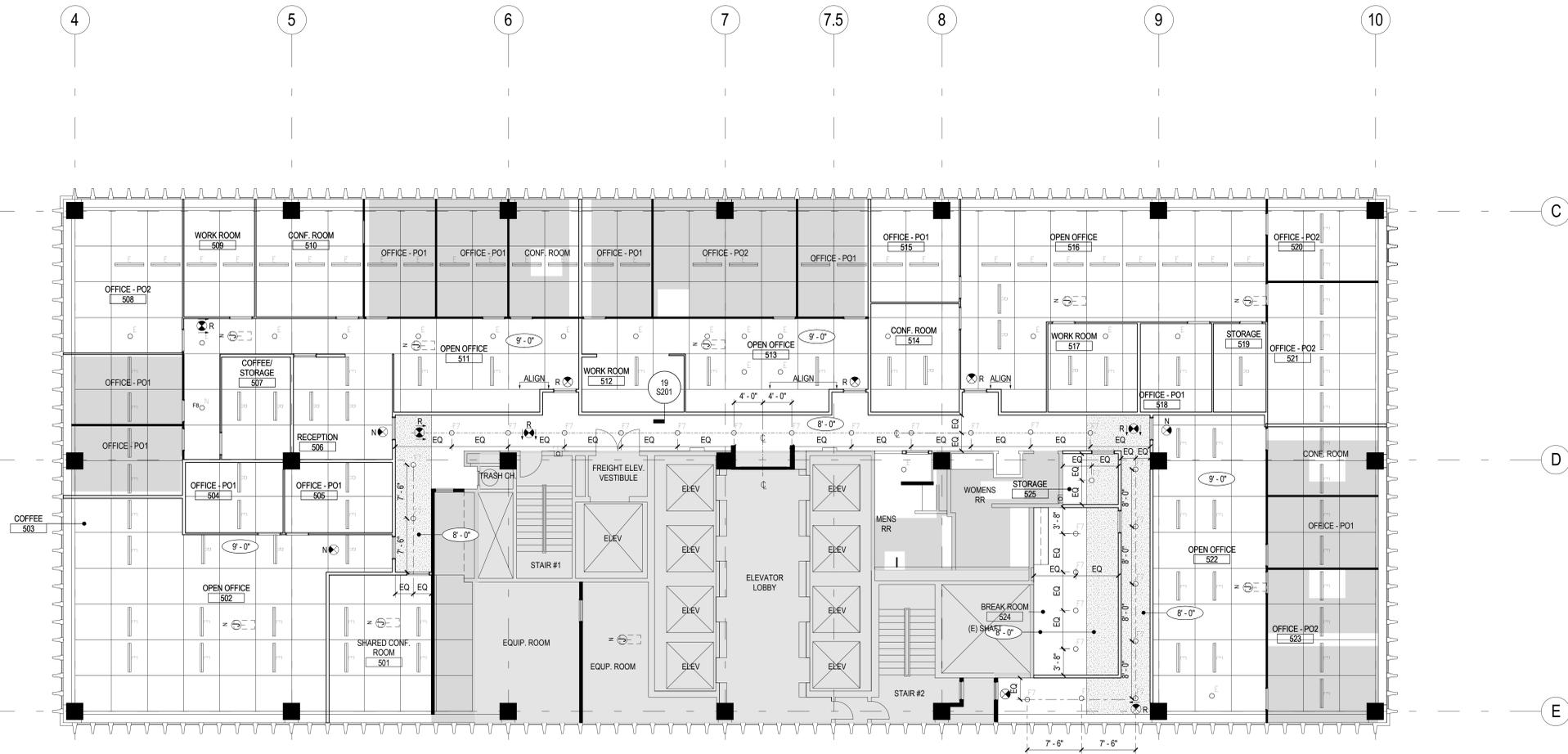
ORIGINAL

ADDENDUM B

CONTRACTOR INSPECTOR DATE STARTED DATE COMPLETED

40154-127-D

01 REFLECTED CEILING PLAN - LEVEL 04
SCALE: 1/8" = 1'-0"



SHEET NOTES

GENERAL NOTES

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The City of
SAN DIEGO
Public Works

A02.605

CITY OF SAN DIEGO

REFLECTED CEILING PLAN - LEVEL 05

CITY OF SAN DIEGO, CALIFORNIA
PUBLIC WORKS DEPARTMENT
SHEET 128 OF 402 SHEETS

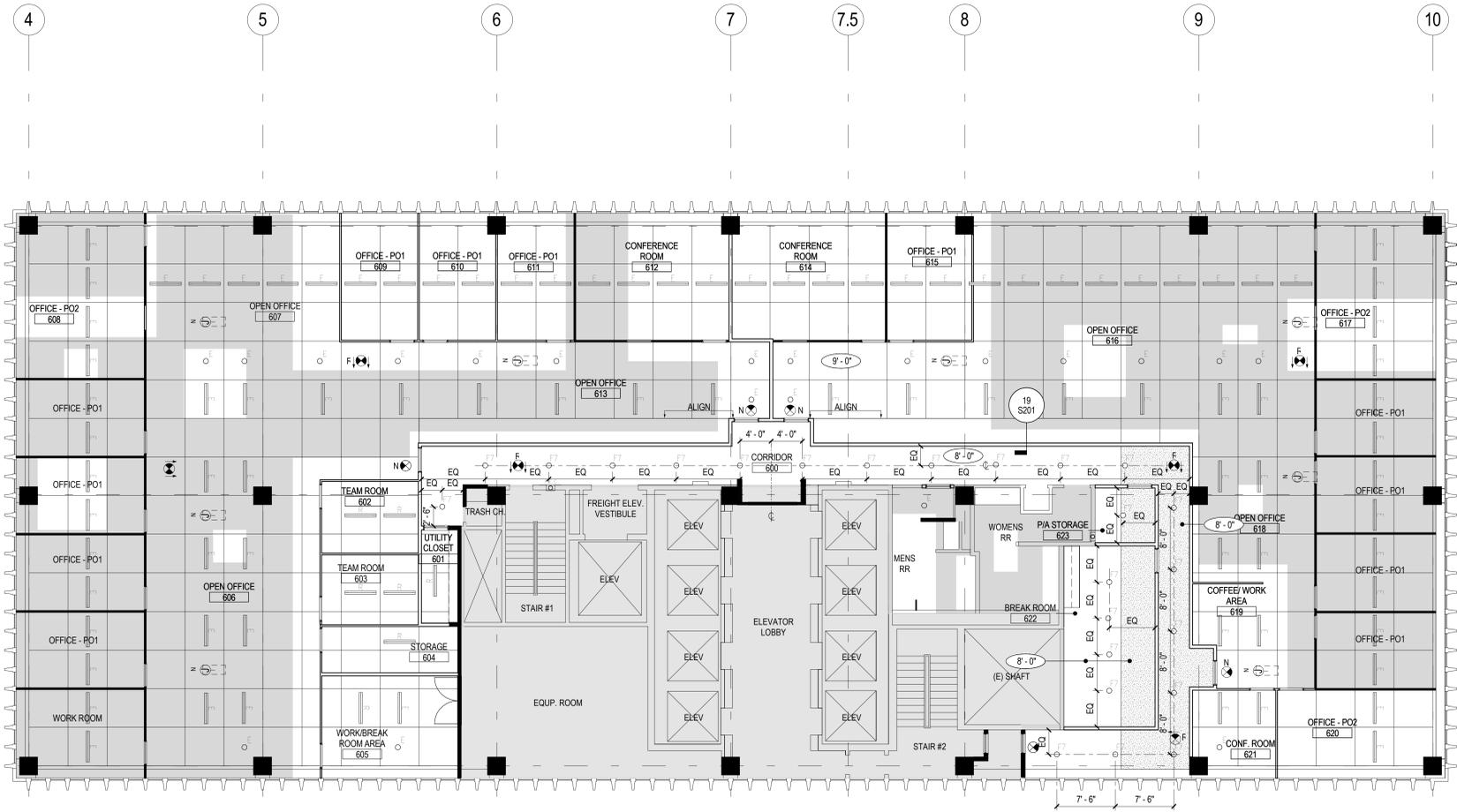
WBS S-17009

APPROVED:	DATE	5/31/2018	SUBMITTED BY:	JORGE ACEVEDO
FOR CITY ENGINEER	DATE	7/20/18	PROJECT MANAGER	
JASON GRANI	DATE		PROJECT ENGINEER	MARLON PEREZ
PRINT DCE NAME	DATE			
DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL			5/31/2018	
ADDENDUM B			6/25/2018	
CONTRACTOR	DATE STARTED		40154-128-D	
INSPECTOR	DATE COMPLETED			

01 REFLECTED CEILING PLAN - LEVEL 05
SCALE: 1/8" = 1'-0"

Update to general notes

ADDENDUM B



SHEET NOTES

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CITY OF SAN DIEGO

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The City of
SAN DIEGO
Public Works

A02.606

CITY OF SAN DIEGO

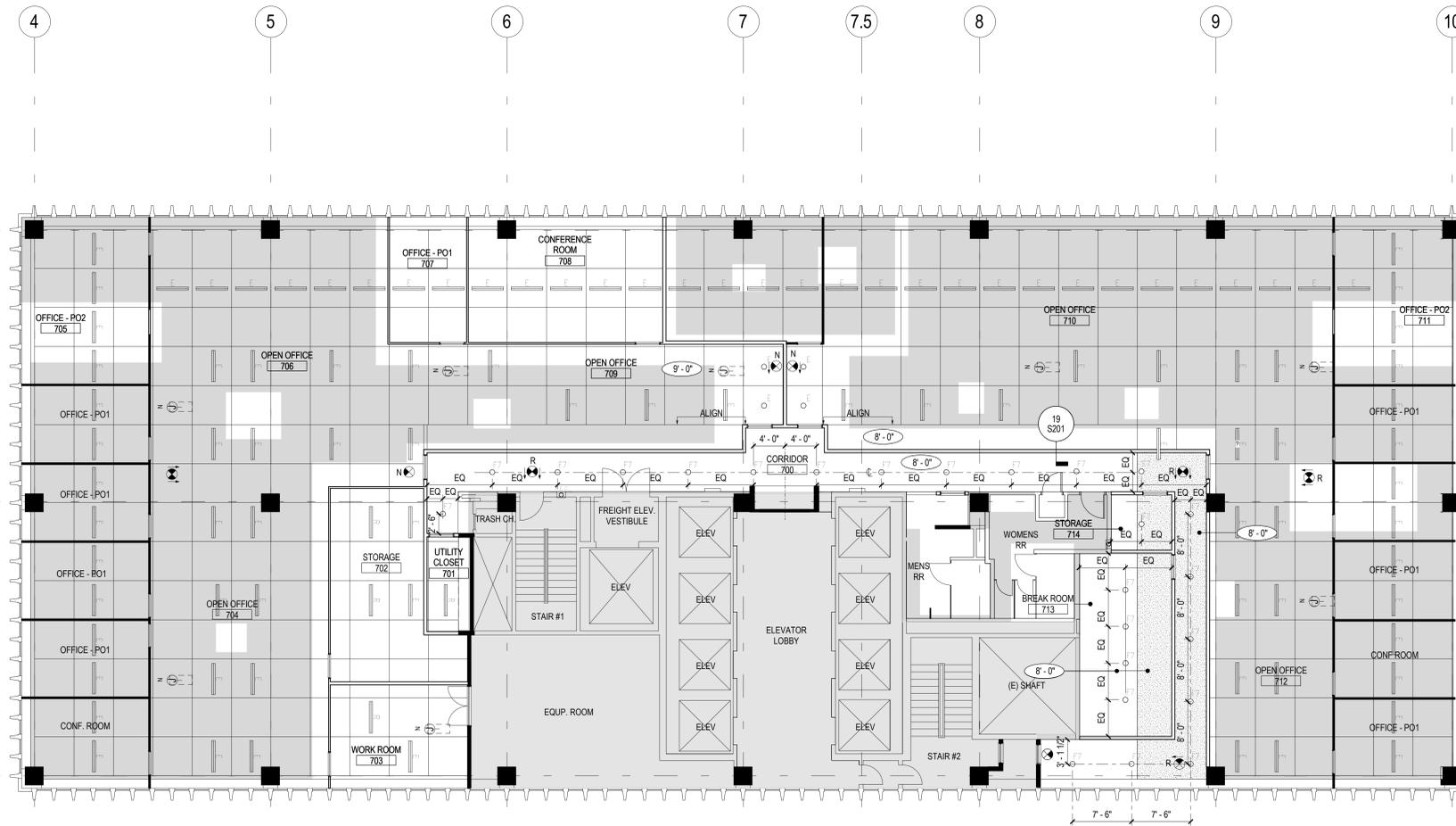
REFLECTED CEILING PLAN - LEVEL 06

CITY OF SAN DIEGO, CALIFORNIA
PUBLIC WORKS DEPARTMENT
SHEET 129 OF 402 SHEETS

WBS S-17009

APPROVED FOR CITY ENGINEER JASON GRANI PRINT DCE NAME	DATE 5/31/2018 77208	SUBMITTED BY JORGE ACEVEDO PROJECT MANAGER
DESCRIPTION	BY	APPROVED
ORIGINAL		5/31/2018
ADDENDUM B		6/25/2018
CONTRACTOR INSPECTOR	DATE STARTED	DATE COMPLETED
		40154-129-D

01 REFLECTED CEILING PLAN - LEVEL 06
SCALE: 1/8" = 1'-0"



SHEET NOTES

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Project Number
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The City of
SAN DIEGO
Public Works

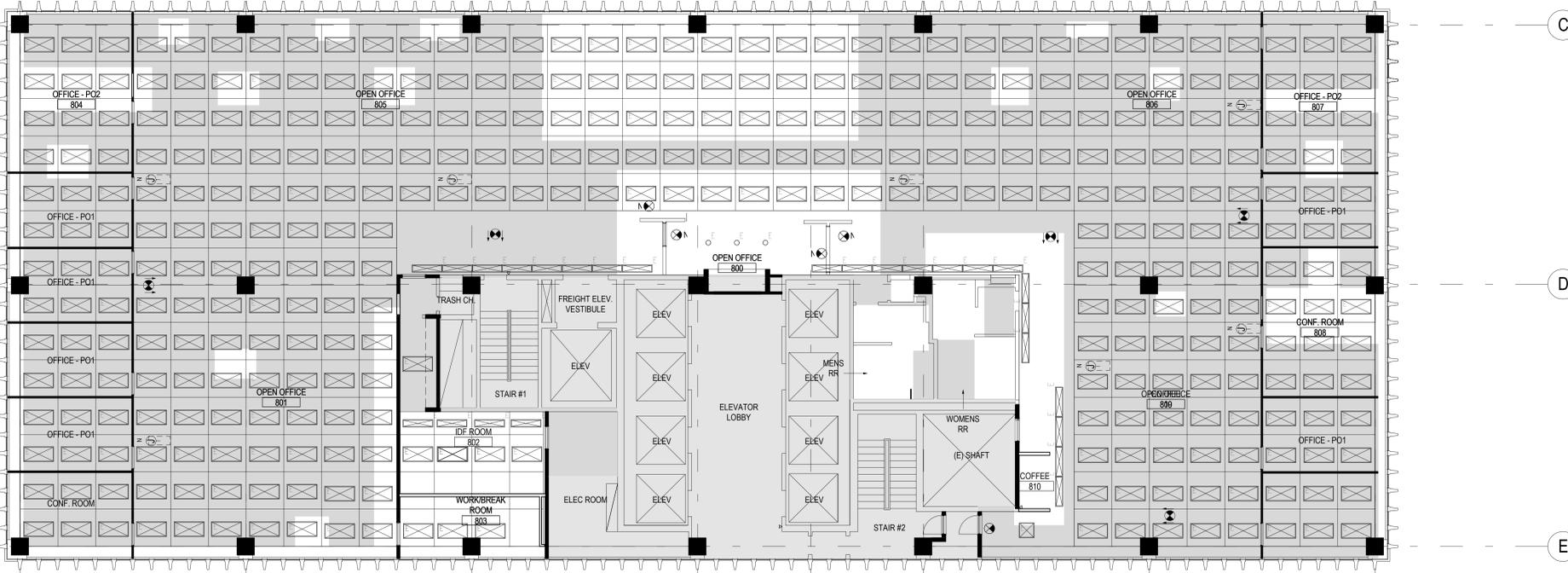
A02.607

CITY OF SAN DIEGO
REFLECTED CEILING PLAN - LEVEL 07

CITY OF SAN DIEGO, CALIFORNIA PUBLIC WORKS DEPARTMENT SHEET 130 OF 402 SHEETS		WBS S-17009
APPROVED: FOR CITY ENGINEER JASON GRANI PRINT DCE NAME	DATE 5/31/2018 77208	SUBMITTED BY JORGE ACEVEDO PROJECT MANAGER CHECKED BY MARLON PEREZ PROJECT ENGINEER
DESCRIPTION	BY	APPROVED
ORIGINAL		5/31/2018
ADDENDUM B		6/25/2018
CONTRACTOR	DATE STARTED	40154 - 130 - D
INSPECTOR	DATE COMPLETED	

01 REFLECTED CEILING PLAN - LEVEL 07
SCALE: 1/8" = 1'-0"

4 5 6 7 7.5 8 9 10



SHEET NOTES

GENERAL NOTES

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Project Number
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The City of
SAN DIEGO
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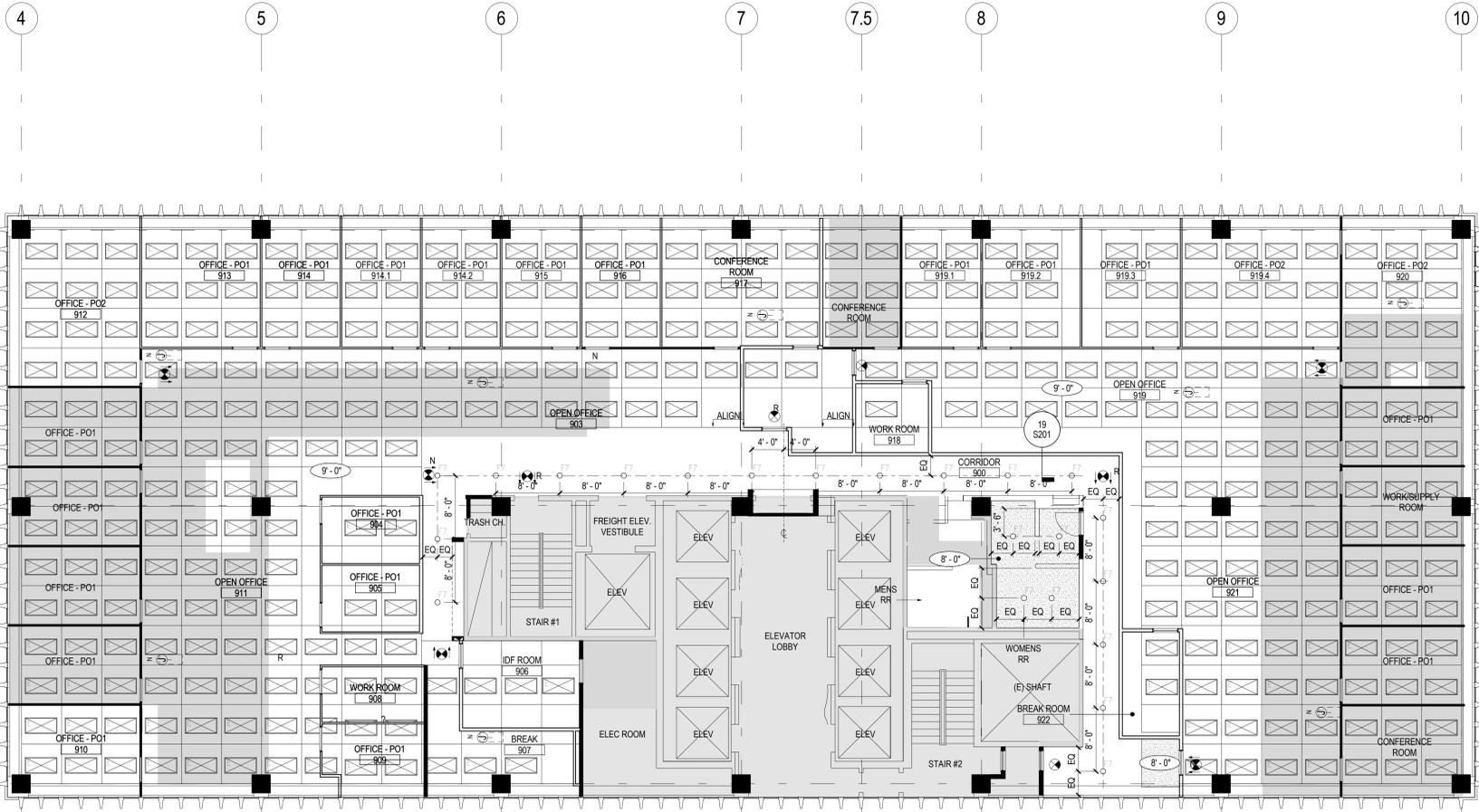
A02.608

CITY OF SAN DIEGO
REFLECTED CEILING PLAN - LEVEL 08

CITY OF SAN DIEGO, CALIFORNIA
PUBLIC WORKS DEPARTMENT
SHEET 131 OF 402 SHEETS
WBS S-17009

APPROVED:	DATE	5/31/2018	SUBMITTED BY:	JORGE ACEVEDO
FOR CITY ENGINEER	DATE	7/20/18	PROJECT MANAGER	
JASON GRANI	DATE		PROJECT ENGINEER	MARLON PEREZ
PRINT DCE NAME	RCEP		PROJECT ENGINEER	
DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL			5/31/2018	
ADDENDUM B			6/25/2018	
				CCS27 COORDINATE
				CCS83 COORDINATE
CONTRACTOR	DATE STARTED			40154 - 131 - D
INSPECTOR	DATE COMPLETED			

01 REFLECTED CEILING PLAN - LEVEL 08
SCALE: 1/8" = 1'-0"



SHEET NOTES

CITY OF SAN DIEGO

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Gensler

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Suite 100
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United States

Tel 619.557.2500
Fax 619.557.2520

GENERAL NOTES

- A SEE SPEC MANUAL FOR FIXTURE SPECS AND FURTHER INFORMATION
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- G ALL REMOVED LIGHT FIXTURES SHALL BE RE-USED BEFORE INSTALLING NEW LIGHT FIXTURES. UNO. VERIFY RE-USE OF LIGHT FIXTURES W/ OWNER & ARCHITECT PRIOR TO INSTALLATION.
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Date	Description	AKISS
07.28.2017	ISSUE PERMIT	AKISS
09.08.2017	ISSUE FOR BID	AKISS
05.07.2018	ISSUE FOR BID	AKISS
06.25.2018	ADDENDUM 'B'	AKLM



Project Number
55.7291.013

The City of
SAN DIEGO
Public Works

A02.609

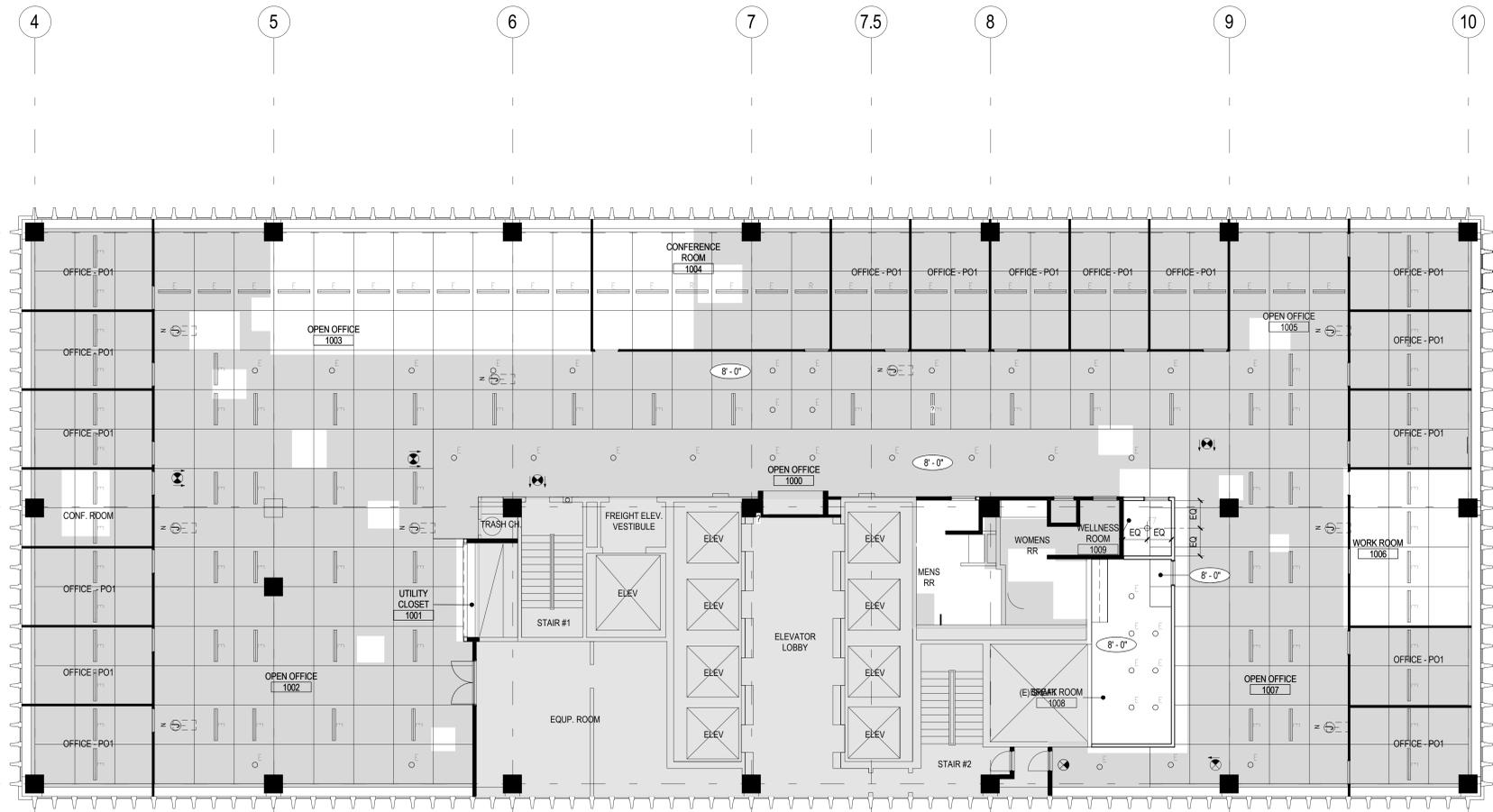
LEGEND

- A REFER TO SHEET A00.100 FOR SYMBOLS AND ABBREVIATIONS

CITY OF SAN DIEGO
REFLECTED CEILING PLAN - LEVEL 09

CITY OF SAN DIEGO, CALIFORNIA PUBLIC WORKS DEPARTMENT SHEET 132 OF 402 SHEETS		WBS S-17009
APPROVED:	DATE: 5/31/2018	SUBMITTED BY: JORGE ACEVEDO
FOR CITY ENGINEER	DATE: 7/20/18	PROJECT MANAGER
PRINT DCE NAME: JASON GRANI	RCEP	CHECKED BY: MARLON PEREZ
DESCRIPTION	BY	APPROVED
ORIGINAL		DATE FILMED: 5/31/2018
ADDENDUM B		DATE FILMED: 02/25/2018
CONTRACTOR		DATE STARTED
INSPECTOR		DATE COMPLETED
		40154 - 132 - D

01 REFLECTED CEILING PLAN - LEVEL 09
SCALE: 1/8" = 1'-0"



SHEET NOTES

GENERAL NOTES

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05.07.2018	ISSUE FOR BID	AK/SS
8.06.2018	ADDENDUM 'B'	AK/LM



Project Number
55.7291.013

The City of
SAN DIEGO
Public Works

A02.610

CITY OF SAN DIEGO

REFLECTED CEILING PLAN - LEVEL 10

CITY OF SAN DIEGO, CALIFORNIA
PUBLIC WORKS DEPARTMENT
SHEET 133 OF 402 SHEETS

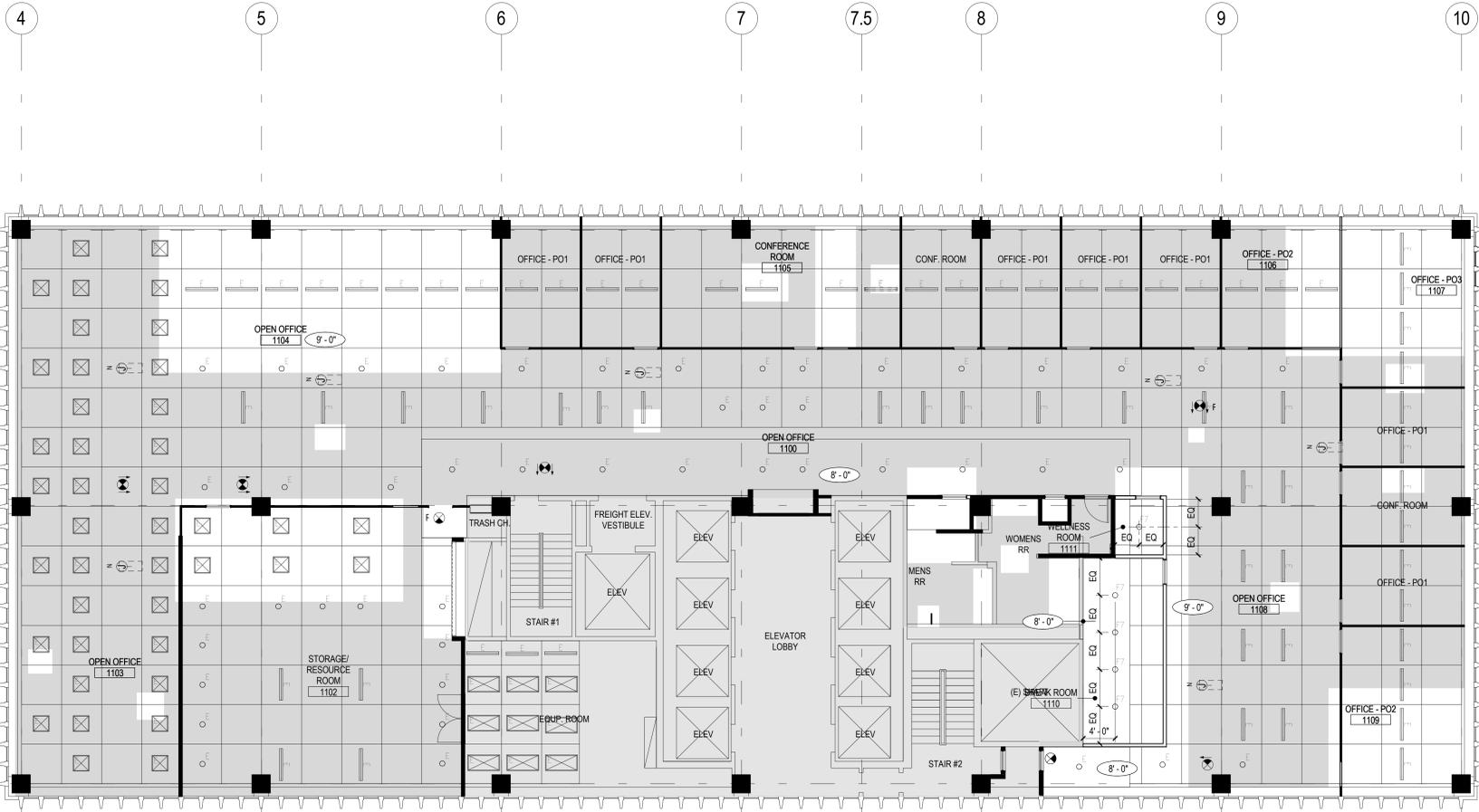
WBS S-17009

APPROVED:	DATE	5/31/2018	SUBMITTED BY:	JORGE ACEVEDO
FOR CITY ENGINEER	DATE	7/20/18	PROJECT MANAGER	
JASON GRANI	DATE		PROJECT ENGINEER	MARLON PEREZ
PRINT DCE NAME	RCEP			
DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL			5/31/2018	
ADDENDUM B			6/25/2018	
				CCS87 COORDINATE
				CCS83 COORDINATE
CONTRACTOR	DATE STARTED			40154-133-D
INSPECTOR	DATE COMPLETED			

01 REFLECTED CEILING PLAN - LEVEL 10
SCALE: 1/8" = 1'-0"

Update to general notes

ADDENDUM B



SHEET NOTES

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LEGEND

- A REFER TO SHEET A00.100 FOR SYMBOLS AND ABBREVIATIONS

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8.06.2018	ADDENDUM 'B'	AKLM



Project Number
 55.7291.013

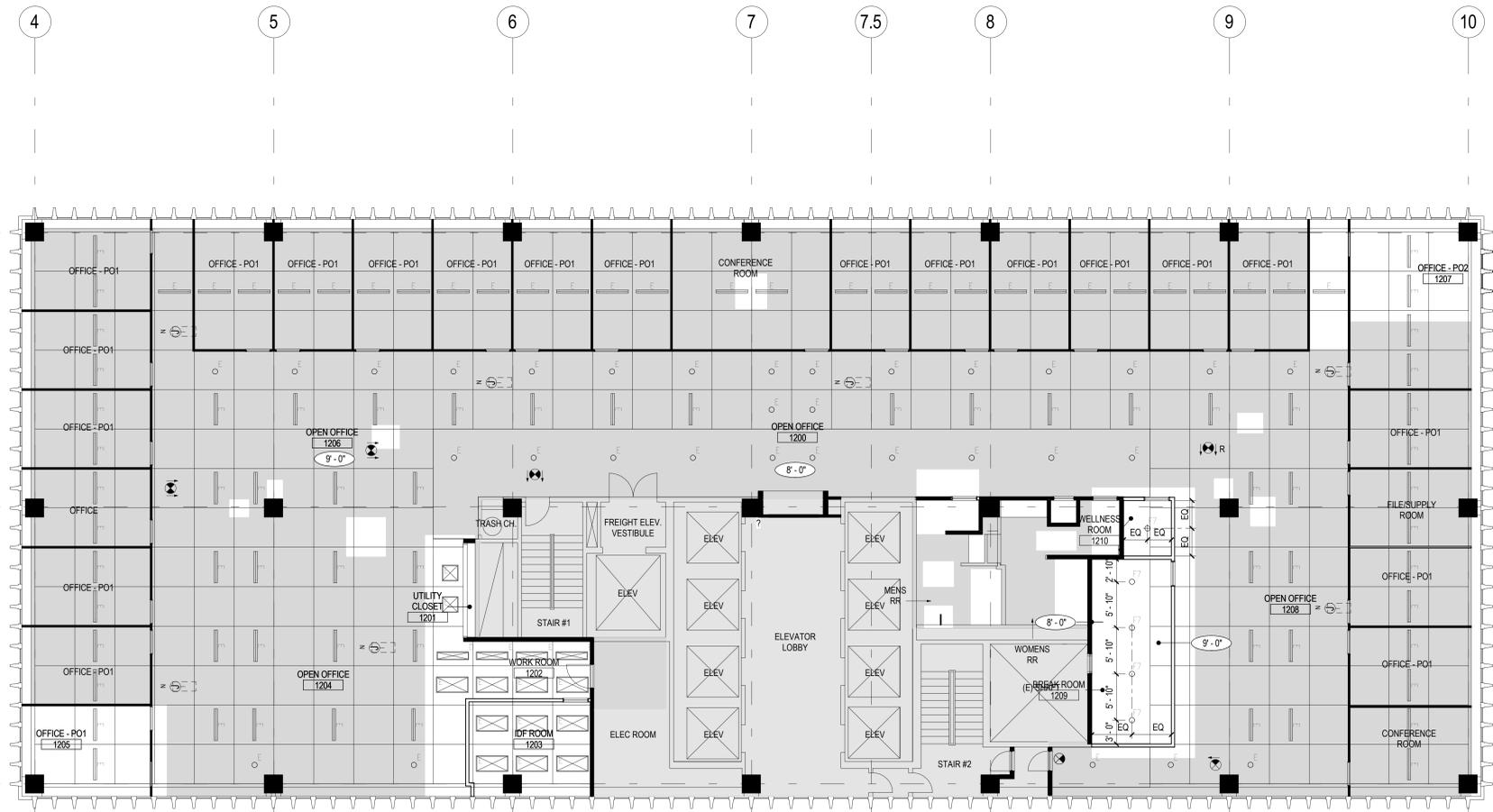
The City of
SAN DIEGO
 Public Works

A02.611

CITY OF SAN DIEGO
 REFLECTED CEILING PLAN - LEVEL 11

CITY OF SAN DIEGO, CALIFORNIA PUBLIC WORKS DEPARTMENT SHEET 134 OF 402 SHEETS		WBS S-17009
APPROVED BY: JASON GRANI FOR CITY ENGINEER DATE: 5/31/2018 PRINT DCE NAME: JASON GRANI	DATE: 5/31/2018 PROJECT MANAGER: JORGE ACEVEDO PROJECT ENGINEER: MARLON PEREZ	DATE STARTED: 5/31/2018 DATE COMPLETED: 6/25/2018
DESCRIPTION: ORIGINAL	BY: [Signature]	CCS27 COORDINATE
DESCRIPTION: ADDENDUM B	BY: [Signature]	CCS83 COORDINATE
CONTRACTOR: [Blank]	INSPECTOR: [Blank]	40154-134-D

01 REFLECTED CEILING PLAN - LEVEL 11
 SCALE: 1/8" = 1'-0"



SHEET NOTES

GENERAL NOTES

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LEGEND

- A REFER TO SHEET A00.100 FOR SYMBOLS AND ABBREVIATIONS

CITY OF SAN DIEGO

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Date	Description	AK/SS
07.28.2017	ISSUE PERMIT	AK/SS
09.08.2017	ISSUE FOR BID	AK/SS
05.07.2018	ISSUE FOR BID	AK/SS
8.06.25.2018	ADDENDUM 'B'	AK/LM



Project Number
55.7291.013

The City of
SAN DIEGO
Public Works

A02.612

CITY OF SAN DIEGO
REFLECTED CEILING PLAN - LEVEL 12

CITY OF SAN DIEGO, CALIFORNIA
PUBLIC WORKS DEPARTMENT
SHEET 135 OF 402 SHEETS

WBS S-17009

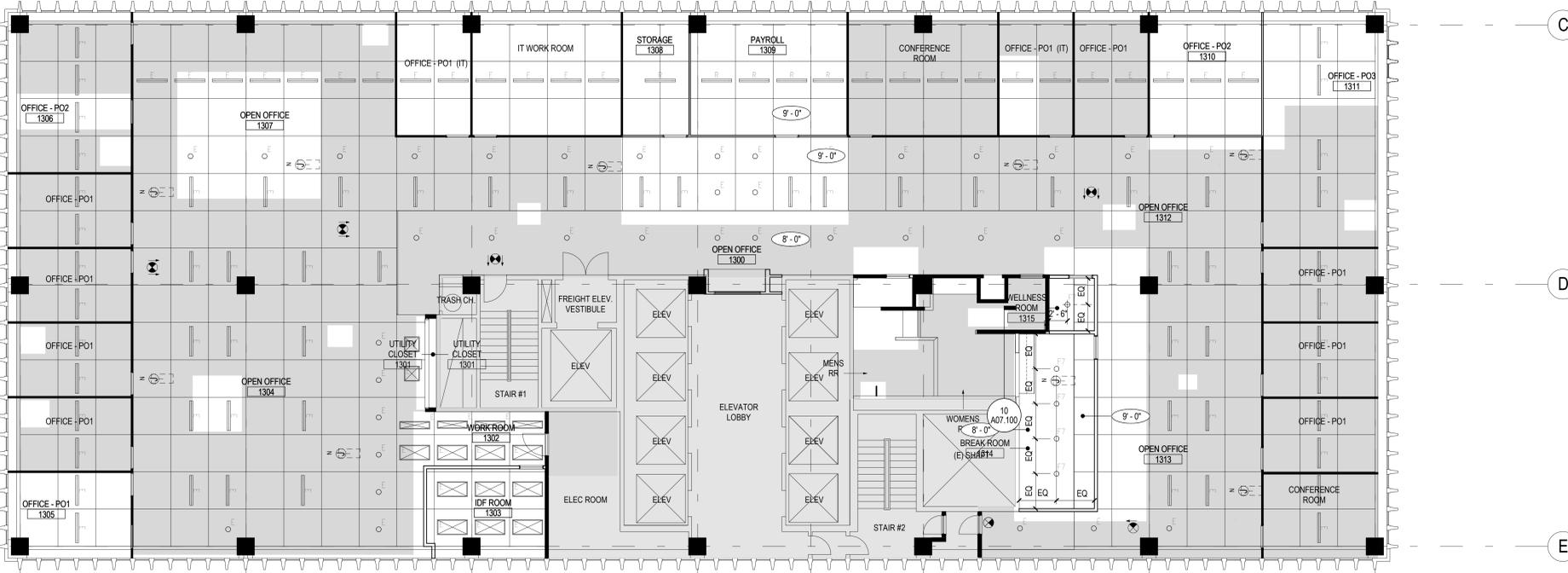
APPROVED:	DATE	5/31/2018	FOR CITY ENGINEER	DATE	7/20/18	PROJECT MANAGER
JASON GRANI			JASON GRANI			JORGE ACEVEDO
PRINT DCE NAME			PROJECT ENGINEER			MARLON PEREZ
DESCRIPTION	BY	APPROVED	DATE	FILMED		
ORIGINAL			5/31/2018			
ADDENDUM B			6/25/2018			CCS27 COORDINATE
						CCS83 COORDINATE
CONTRACTOR	DATE STARTED					40154 - 135 - D
INSPECTOR	DATE COMPLETED					

01 REFLECTED CEILING PLAN - LEVEL 12
SCALE: 1/8" = 1'-0"

Update to general notes

ADDENDUM B

4 5 6 7 7.5 8 9 10



SHEET NOTES

GENERAL NOTES

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6.05.2018	ADDENDUM 'B'	AKLM



Project Number
55.7291.013

The City of
SAN DIEGO
Public Works

A02.613

CITY OF SAN DIEGO

REFLECTED CEILING PLAN - LEVEL 13

CITY OF SAN DIEGO, CALIFORNIA
PUBLIC WORKS DEPARTMENT
SHEET 136 OF 402 SHEETS

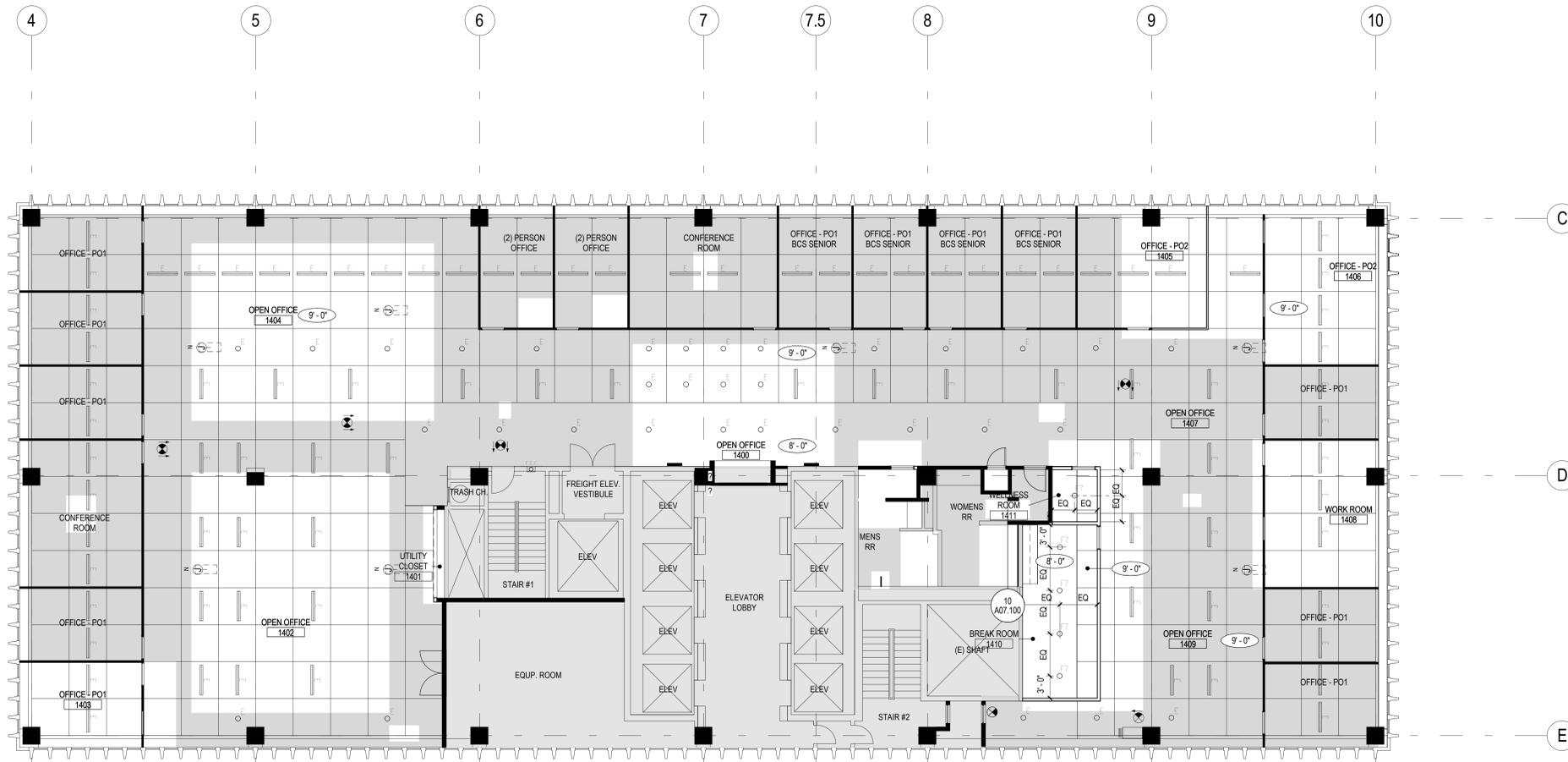
WBS S-17009

APPROVED:	DATE	5/31/2018	FOR CITY ENGINEER	DATE	7/20/18	PROJECT MANAGER
JASON GRANI			JASON GRANI			JORGE ACEVEDO
PRINT DCE NAME			RCEP			MARLON PEREZ
DESCRIPTION	BY	APPROVED	DATE	FILMED		
ORIGINAL			5/31/2018			
ADDENDUM B			6/25/2018			CCS27 COORDINATE
						CCS83 COORDINATE
CONTRACTOR	DATE STARTED					40154 - 136 - D
INSPECTOR	DATE COMPLETED					

01 REFLECTED CEILING PLAN - LEVEL 13
SCALE: 1/8" = 1'-0"

Update to general notes

ADDENDUM B



SHEET NOTES

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The City of
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Public Works

A02.614

CITY OF SAN DIEGO
REFLECTED CEILING PLAN - LEVEL 14

CITY OF SAN DIEGO, CALIFORNIA
PUBLIC WORKS DEPARTMENT
SHEET 137 OF 402 SHEETS

WBS S-17009

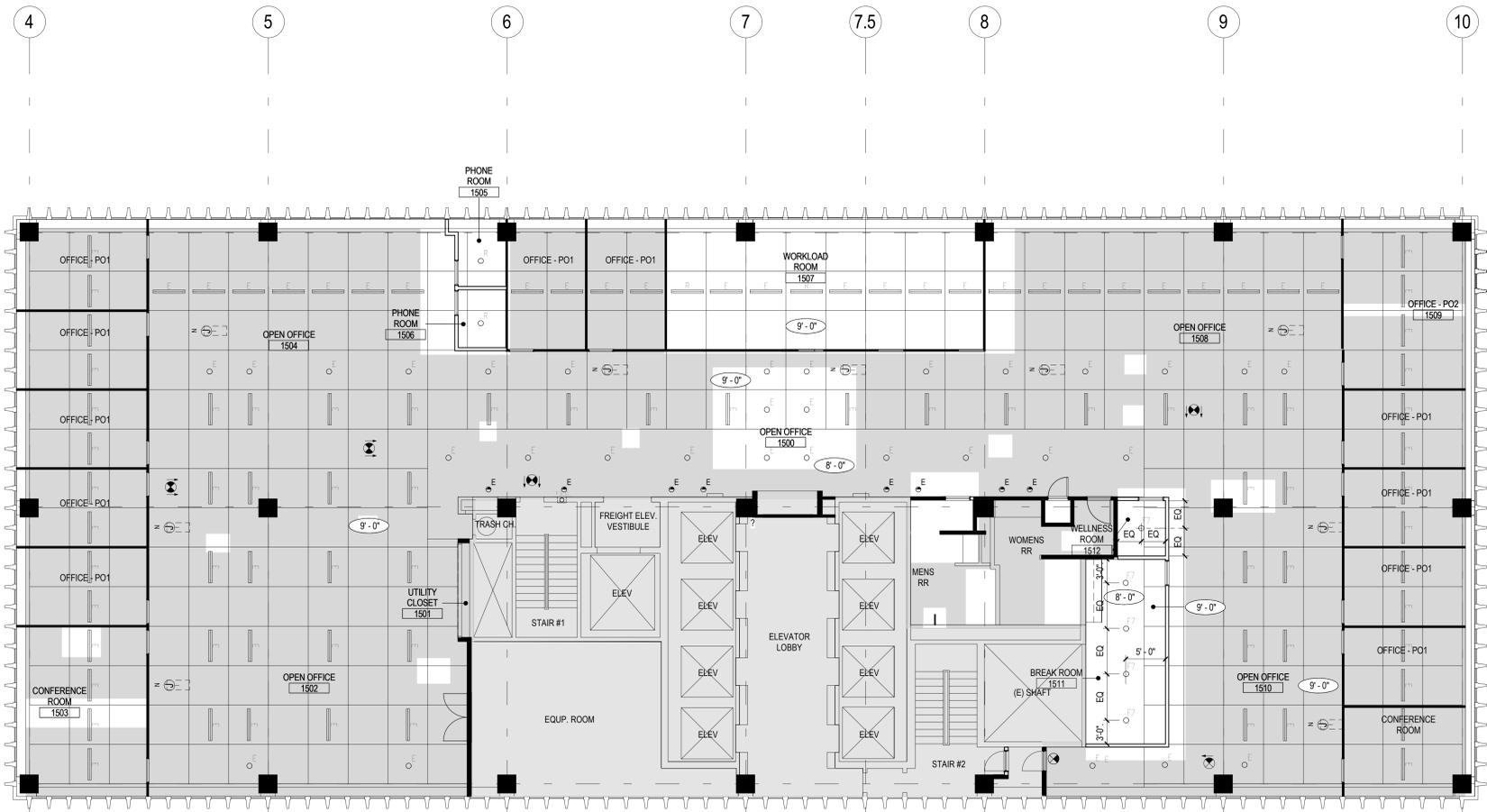
APPROVED:	FOR CITY ENGINEER	DATE	5/31/2018	SUBMITTED BY	JORGE ACEVEDO
	JASON GRANI	DATE	7/20/18	PROJECT MANAGER	
	PRINT DCE NAME	RCEP		CHIEF ENGINEER	MARLON PEREZ
DESCRIPTION	BY	APPROVED	DATE	FILMED	
ORIGINAL			5/31/2018		
ADDENDUM B			02/25/2018		CCS27 COORDINATE
					CCS83 COORDINATE
CONTRACTOR		DATE STARTED			40154-137-D
INSPECTOR		DATE COMPLETED			

Update to general notes

ADDENDUM B

REFLECTED CEILING PLAN - LEVEL 14

SCALE: 1/8" = 1'-0"



SHEET NOTES

CITY OF SAN DIEGO

101 W. ASH
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SAN DIEGO, CA 92101

Gensler

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San Diego, CA 92101
United States
Tel 619.557.2500
Fax 619.557.2520

GENERAL NOTES

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- D ALL NEW GRILLES, PERF. FACE PLATES, ACCESS PANELS, AIR BARS AND TRIMS SHALL BE FACTORY FINISHED TO MATCH THE COLOR OF ADJACENT CEILING FINISH.
- E PROVIDE OVERRIDE SWITCHING AT CONFERENCE ROOMS. PROVIDE LIGHT SENSORS AT ALL SPACES WITH AN OVERRIDE SWITCH.
- G ALL REMOVED LIGHT FIXTURES SHALL BE REUSED BEFORE INSTALLING NEW LIGHT FIXTURES. UNO. VERIFY RE-USE OF LIGHT FIXTURES W/ OWNER & ARCHITECT PRIOR TO INSTALLATION.
- H FIRE SPRINKLER LINES AND HEADS TO BE ADJUSTED AND/OR RELOCATED AS REQUIRED TO ACCOMMODATE NEW CONFIGURATION.
- I ALL EXISTING DAMAGED GRILLES SHALL BE REPLACED W/ NEW.
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Date	Description	
07.28.2017	ISSUE PERMIT	AK/SS
09.08.2017	ISSUE FOR BID	AK/SS
05.07.2018	ISSUE FOR BID	AK/SS
8.06.25.2018	ADDENDUM 'B'	AK/LM

LEGEND

- A REFER TO SHEET A00.100 FOR SYMBOLS AND ABBREVIATIONS



Project Number
55.7291.013

The City of
SAN DIEGO
Public Works

A02.615

CITY OF SAN DIEGO

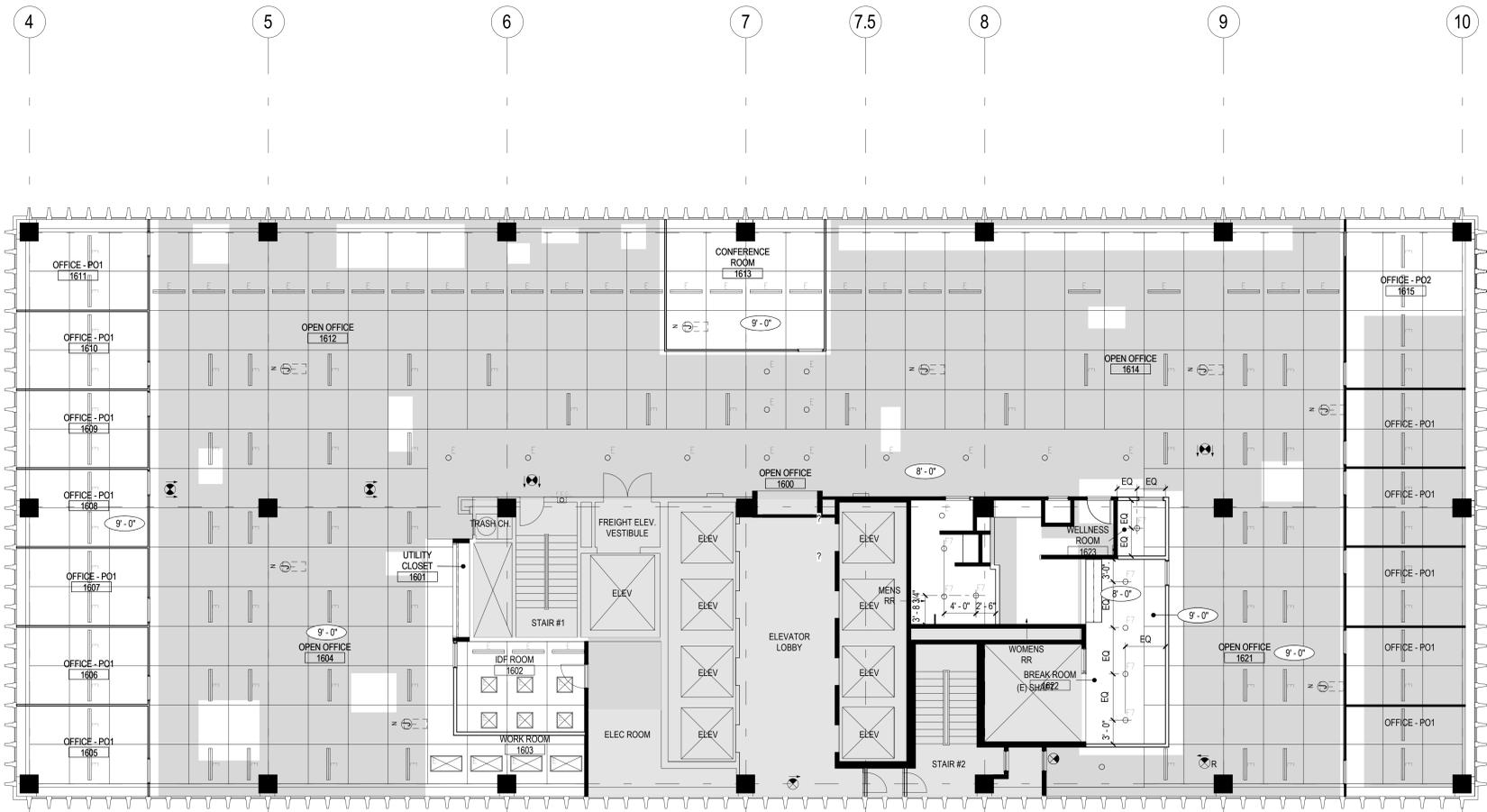
REFLECTED CEILING PLAN - LEVEL 15

CITY OF SAN DIEGO, CALIFORNIA
PUBLIC WORKS DEPARTMENT
SHEET 138 OF 402 SHEETS

WBS S-17009

APPROVED:	DATE	5/31/2018	FOR CITY ENGINEER	DATE	7/20/18	PROJECT MANAGER
JASON GRANI			JASON GRANI			JORGE ACEVEDO
PRINT DCE NAME			RCEP			MARLON PEREZ
DESCRIPTION	BY	APPROVED	DATE	FILMED		
ORIGINAL			5/31/2018			
ADDENDUM B			6/25/2018			CCS27 COORDINATE
						CCS83 COORDINATE
CONTRACTOR	DATE STARTED					40154-138-D
INSPECTOR	DATE COMPLETED					

01 REFLECTED CEILING PLAN - LEVEL 15
SCALE: 1/8" = 1'-0"



SHEET NOTES

GENERAL NOTES

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8.06.25.2018	ADDENDUM 'B'	AK/LM



Project Number
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The City of
SAN DIEGO
Public Works

A02.616

CITY OF SAN DIEGO
REFLECTED CEILING PLAN - LEVEL 16

CITY OF SAN DIEGO, CALIFORNIA
PUBLIC WORKS DEPARTMENT
SHEET 139 OF 402 SHEETS

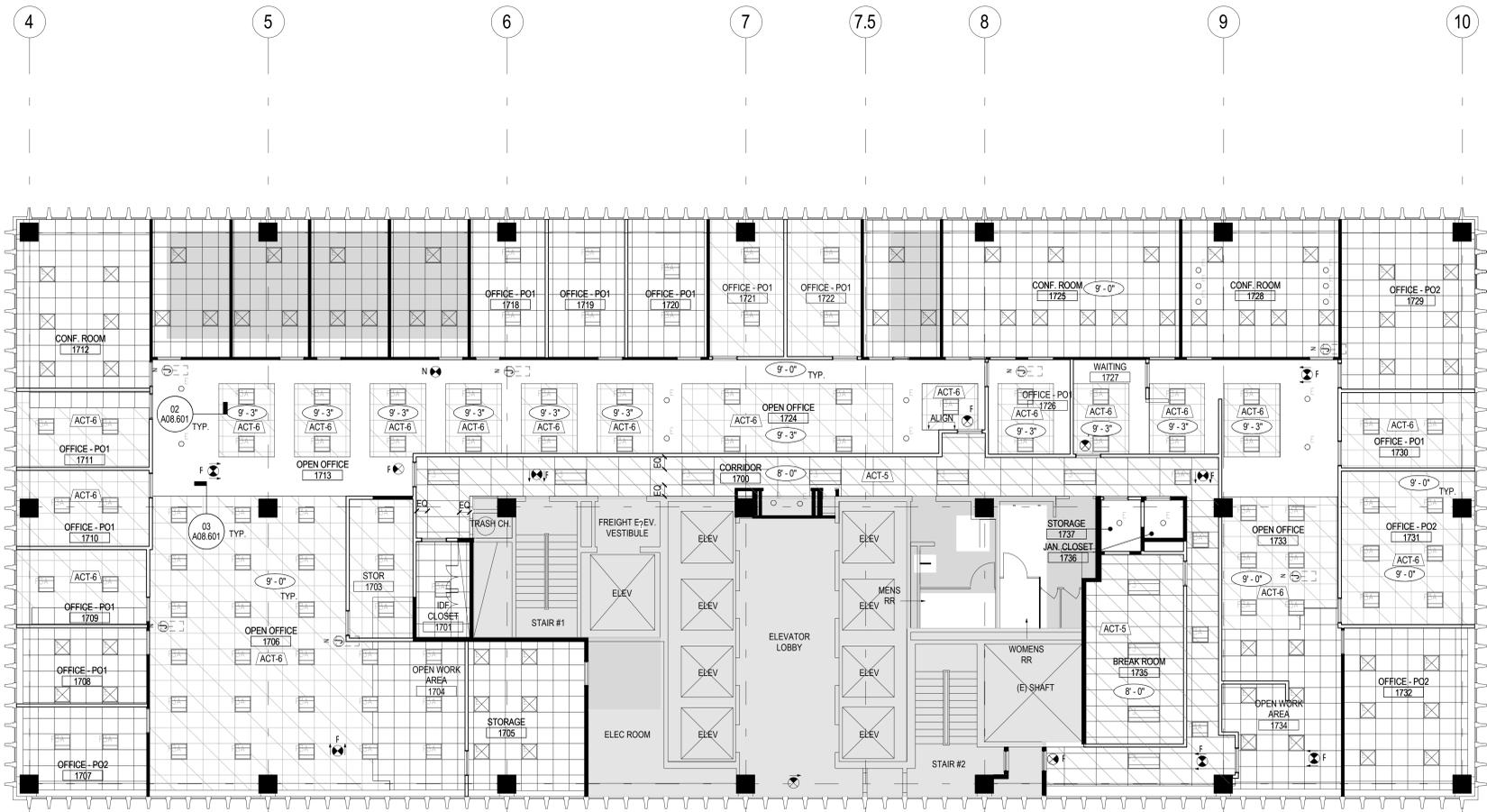
WBS S-17009

APPROVED:	DATE	5/31/2018	FOR CITY ENGINEER	DATE	7/20/18	PROJECT MANAGER
JASON GRANI						JORGE ACEVEDO
PRINT DCE NAME			RCEP			MARLON PEREZ
DESCRIPTION	BY	APPROVED	DATE	FILMED		
ORIGINAL			5/31/2018			
ADDENDUM B			6/25/2018			CCS27 COORDINATE
						CCS83 COORDINATE
CONTRACTOR	DATE STARTED					40154 - 139 - D
INSPECTOR	DATE COMPLETED					

01 REFLECTED CEILING PLAN - LEVEL 16
SCALE: 1/8" = 1'-0"

Update to general notes

ADDENDUM B



SHEET NOTES

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LEGEND

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Project Number
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The City of
SAN DIEGO
Public Works

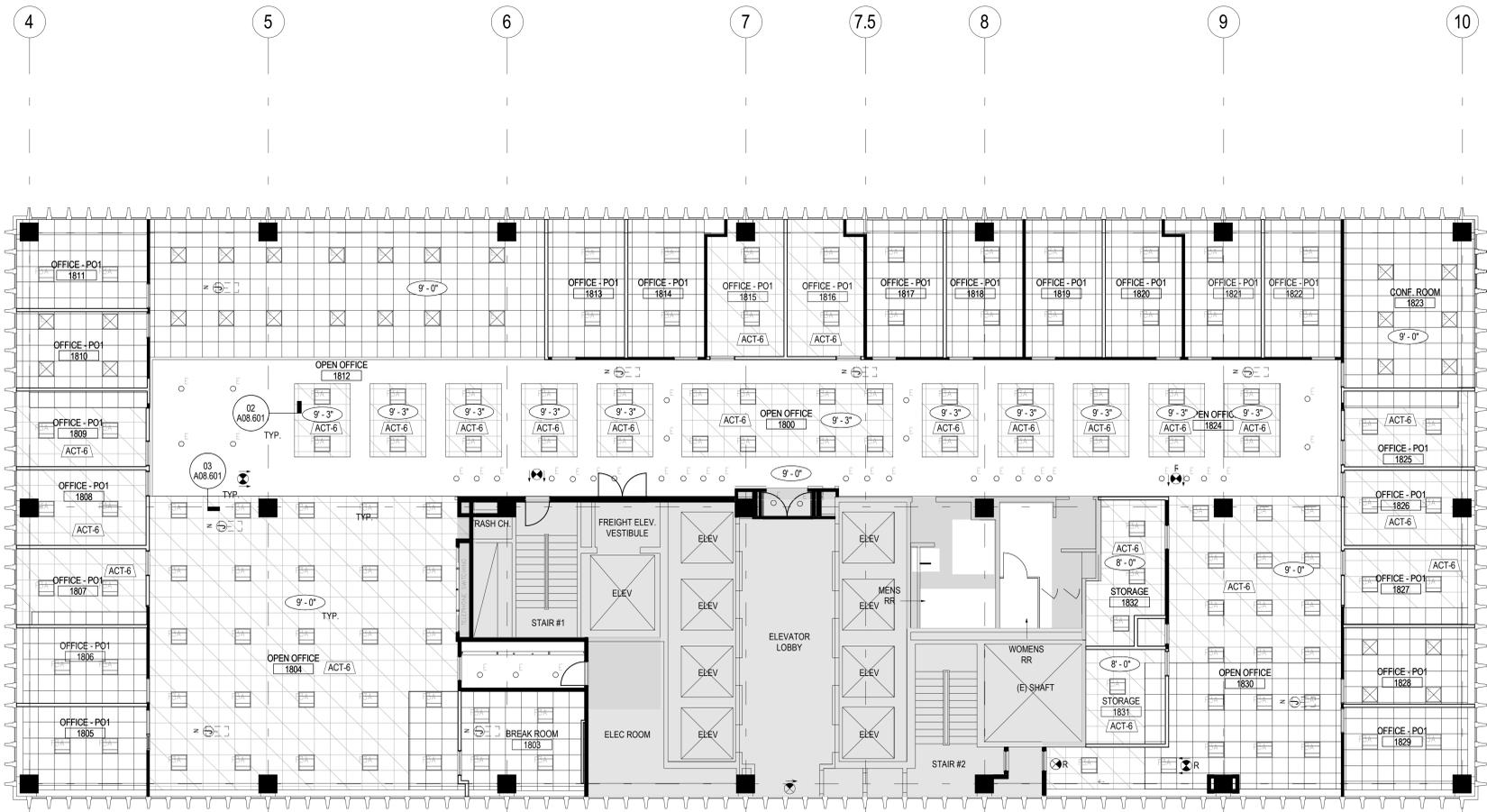
A02.617

CITY OF SAN DIEGO

REFLECTED CEILING PLAN - LEVEL 17

CITY OF SAN DIEGO, CALIFORNIA PUBLIC WORKS DEPARTMENT SHEET 140 OF 402 SHEETS		WBS S-17009
APPROVED BY: FOR CITY ENGINEER JASON GRANI PRINT DCE NAME	DATE 5/31/2018 77208	SUBMITTED BY: JORGE ACEVEDO PROJECT MANAGER CHECKED BY: MARLON PEREZ PROJECT ENGINEER
DESCRIPTION	BY	APPROVED
ORIGINAL		5/31/2018
ADDENDUM B		6/25/2018
CONTRACTOR	DATE STARTED	CCS83 COORDINATE
INSPECTOR	DATE COMPLETED	40154 - 140 - D

01 REFLECTED CEILING PLAN - LEVEL 17
SCALE: 1/8" = 1'-0"



SHEET NOTES

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LEGEND

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CITY OF SAN DIEGO

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06.25.2018	ADDENDUM 'B'	AK/LM



Project Number

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The City of
SAN DIEGO
Public Works

A02.618

CITY OF SAN DIEGO

REFLECTED CEILING PLAN - LEVEL 18

CITY OF SAN DIEGO, CALIFORNIA
PUBLIC WORKS DEPARTMENT
SHEET 141 OF 402 SHEETS

WBS S-17009

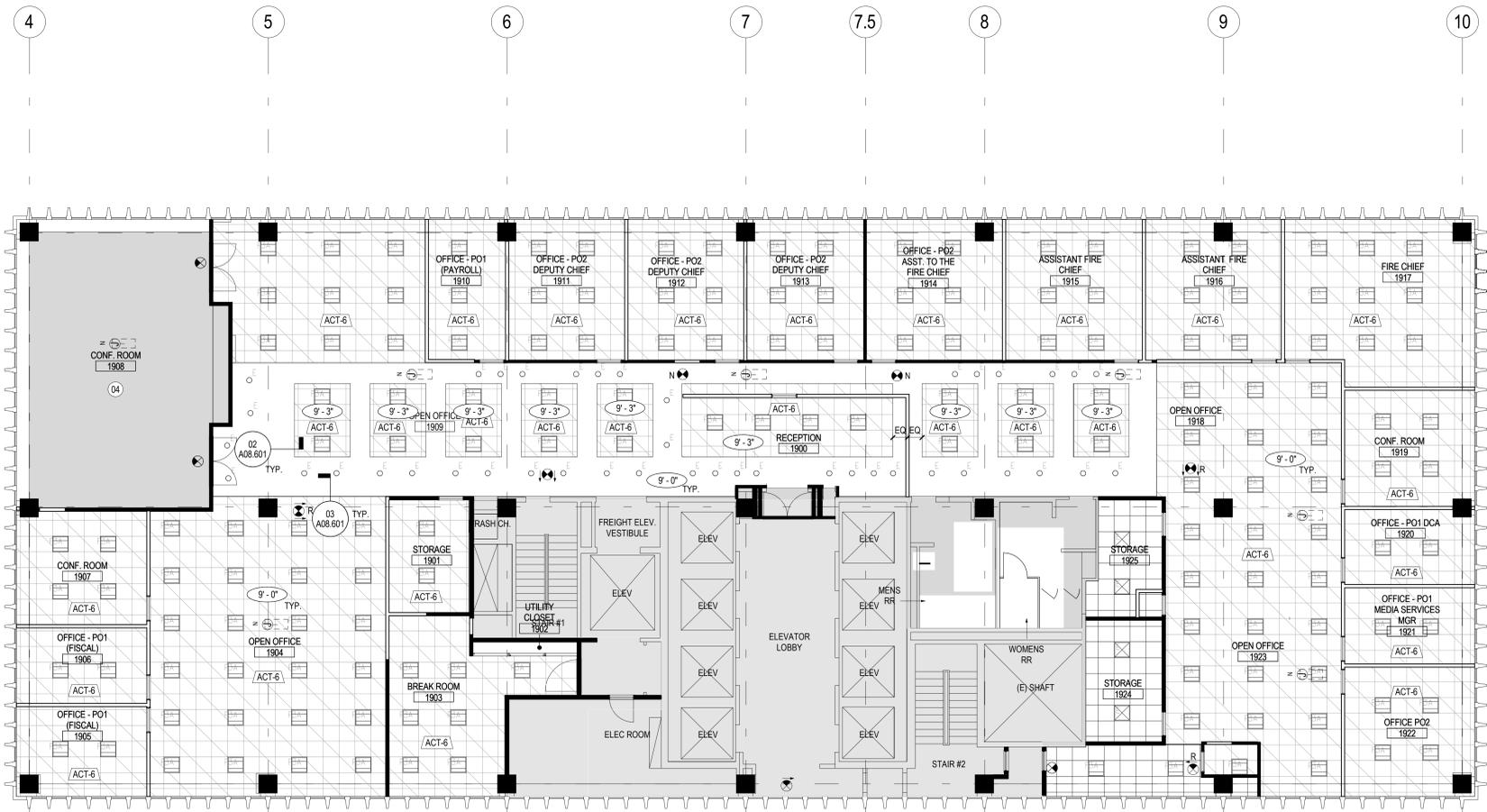
APPROVED:	DATE	5/31/2018	SUBMITTED BY:	JORGE ACEVEDO
FOR CITY ENGINEER	DATE	7/20/18	PROJECT MANAGER	
JASON GRANI	DATE		PROJECT ENGINEER	MARLON PEREZ
PRINT DCE NAME	DATE		PROJECT ENGINEER	
DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL			5/31/2018	
ADDENDUM B			02/25/2018	
CONTRACTOR	DATE STARTED		40154-141-D	
INSPECTOR	DATE COMPLETED			

01 REFLECTED CEILING PLAN - LEVEL 18

SCALE: 1/8" = 1'-0"

Update to general notes

ADDENDUM B



SHEET NOTES

04 RELAMP ALL COVE LIGHTING TO BE LED 3500K TEMP. AT THIS ROOM

GENERAL NOTES

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LEGEND

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Project Number
55.7291.013

The City of
SAN DIEGO
Public Works

A02.619

CITY OF SAN DIEGO

REFLECTED CEILING PLAN - LEVEL 19

CITY OF SAN DIEGO, CALIFORNIA
PUBLIC WORKS DEPARTMENT
SHEET 142 OF 402 SHEETS

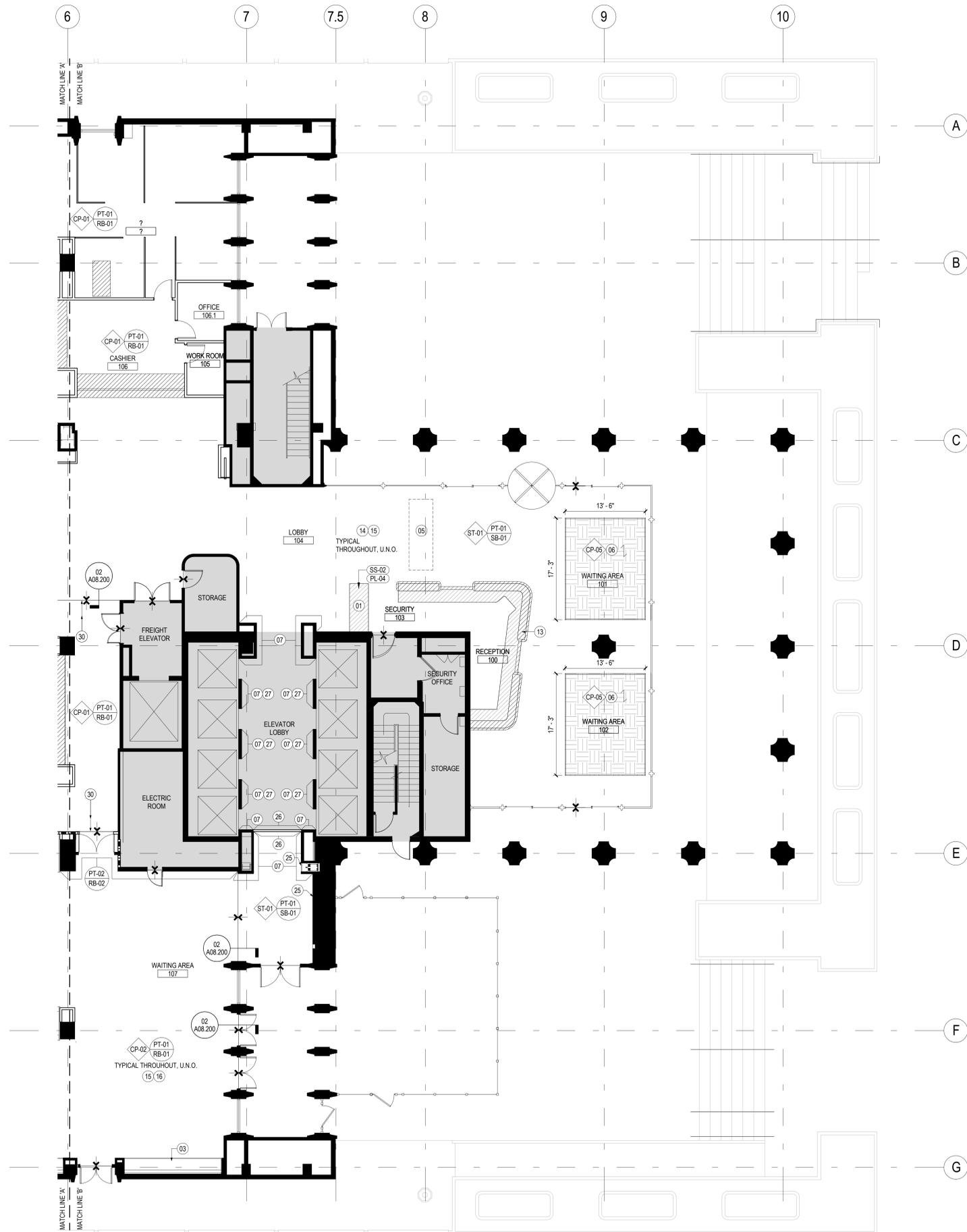
WBS S-17009

APPROVED FOR CITY ENGINEER	DATE	5/31/2018	DATE	7/20/18	DATE	5/31/2018	DATE	6/25/2018
JASON GRANI	RCEP							
DESCRIPTION	BY	APPROVED	DATE	FILMED				
ORIGINAL								
ADDENDUM B								CCS27 COORDINATE
								CCS83 COORDINATE
CONTRACTOR INSPECTOR		DATE STARTED		DATE COMPLETED				40154 - 142 - D

Update to general notes

ADDENDUM B

01 REFLECTED CEILING PLAN - LEVEL 19
SCALE: 1/8" = 1'-0"



SHEET NOTES

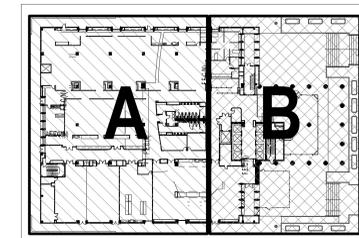
- 01 RELAMINATE EXISTING MILLWORK AND PROVIDE NEW SOLID SURFACE COUNTERTOP WHERE INDICATED ON PLAN. SALVAGE, STORE EXISTING HARDWARE FOR RE-USE.
- 03 EXISTING BANQUETTE TO BE REUPHOLSTERED. UP-01. MILLWORKER TO PROVIDE NEW TUCK AND ROLL UPHOLSTERED ATTACHED BACK. UP-02. REFER TO ELEVATION FOR FURTHER INFORMATION.
- 05 PATCH/REPLACE EXISTING STONE FLOORING TO MATCH EXISTING AS REQUIRED WHERE SECURITY TURNSTILES ARE REMOVED. CONTRACTOR TO SUBMIT SAMPLE OF STONE FOR ARCHITECT'S REVIEW.
- 06 PROVIDE NEW AREA RUG WITH 2" FABRIC TAPE TRIM EDGE WITH MITERED CORNERS. MRF. TANDUS. STYLE: PEBBLE MESH 60126. COLOR: WEATHERED EARTH 0209. SIZE: 13'-6" X 17'-3". TAPE TRIM EDGE TO MATCH COLOR OF RUG. CONTRACTOR TO PROVIDE SAMPLE OF TAPE TRIM PRIOR TO MANUFACTURING FOR ARCHITECT'S REVIEW.
- 07 REFRESH EXISTING WOOD PANELING/PILLASTER TO MATCH ARCHITECT'S CONTROL SAMPLE WHERE INDICATED ON PLAN.
- 13 PROVIDE NEW MOLDABLE SOLID SURFACE CLADDING OVER EXISTING RECEPTION DESK. CONTRACTOR TO DEMO EXISTING SOLID SURFACE TRANSACTION TOP (WORK SURFACE TO REMAIN) AND METAL CAP TRIM AT LOWER TRANSACTION SURFACE FOR ACCESSIBILITY. MILLWORKER TO BUILD OUT EXISTING DESK FRONT TO SUPPORT NEW CLADDING AS REQUIRED. NEW CLADDING IS TO HAVE CUSTOM FLUTED/PERFORATED TEXTURE. MILLWORKER TO CONFIRM AND COORDINATE WITH ARCHITECT DESK DESIGN PRIOR TO FABRICATION. REFER TO ELEVATIONS 01-03A/07.100.3 FOR DESIGN INTENT. CONTACT PREFERRED MANUFACTURER FOR FURTHER DETAILS. MARIO ROMANO. MARIO@MARIOROMANO.COM.
- 14 EXISTING STONE SLAB WALLS AND STONE BASE TO REMAIN THIS ROOM.
- 15 ALL EXISTING METAL WALL REVEALS AT EXISTING PARTITIONS THIS AREA TO REMAIN. U.N.O. DO NOT PAINT REVEALS.
- 16 ALL EXISTING CONCRETE EXTERIOR (PERIMETER) ARCHITECTURAL COLUMNS/MULLIONS AND CONCRETE BASE TO REMAIN AS IS. DO NOT PAINT. PAINT ONLY INTERIOR PARTITIONS. U.N.O.
- 25 PROVIDE NEW STONE BASE TO MATCH AND ALIGN WITH EXISTING ADJACENT STONE BASE WHERE INDICATED ON PLAN. CONTRACTOR TO SUBMIT STONE SAMPLE FOR ARCHITECT'S REVIEW.
- 26 PROVIDE NEW WOOD PANELING WITH REVEALS TO MATCH AND ALIGN WITH EXISTING ADJACENT PANELING. FINISH TO MATCH NEW REFINISHED PANELING. COORDINATE WITH ARCHITECT AND ARCHITECT'S CONTROL SAMPLE.
- 27 PROVIDE ALTERNATE COST FOR ACOUSTICAL WRAPPED PANELING WHERE INDICATED ON PLAN. PRICE SEPARATELY.
- 30 FEATHER NEW FLOORING SLOPE TO FLOORING TRANSITION FOR NO ELEVATION CHANGE AT TRANSITION. SLOPE NOT TO EXCEED 1/16" RISE TO 1'-0" RUN.

GENERAL NOTES

- A REFER TO ADD SERIES SHEETS FOR GENERAL NOTES, ABBREVIATIONS, SYMBOLS, ADA REQUIREMENTS, CLEARANCES, MOUNTING HEIGHTS, ETC.
- B ALL PAINT FINISH LOCATIONS TO BE THREE COAT SYSTEMS. (1) COAT PRIMER, (2) COATS FINISH.
- C FLOAT ALL AREAS WHERE FLOOR IS NOT LEVEL OR TRUE PRIOR TO FLOORING INSTALLATIONS. FLOAT WOOD AND RESILIENT FLOORS LEVEL TO WITHIN 1/4" IN 10'. PROVIDE SURVEY OF FLOOR ELEVATIONS TO ARCHITECT PRIOR TO COMMENCEMENT OF WORK.
- D WALL BASE TO BE 2-1/2" HIGH ROLLED GOODS IN MAXIMUM LENGTHS. PROVIDE STRAIGHT BASE AT CARPET COVER BASE AT VOT. BASE WRAP AROUND CORNERS. COORDINATE WITH ARCHITECT FOR CORRECT INSTALLATION METHOD.
- E WHERE FLOOR OUTLETS ARE SPEC'D IN CARPETED AREA. CUT CARPET IN AN "X" OVER THE HOLE AND CARPET ACROSS TO ALLOW CARPET PATCHING IF OUTLETS ARE LATER CAPPED. DO NOT TRIM CARPET.
- F SUBMIT THE FOLLOWING SAMPLES FOR ARCHITECT'S APPROVAL: (A) THREE 12"x12" SAMPLES OF ALL PAINT, VINYL AND FABRIC FINISHES AND COLORS APPLIED TO A SUBSTRATE WHICH IS REPRESENTATIVE OF THE SURFACE TO BE FINISHED. SUBMIT PAINT SAMPLES FROM THE PAINT LOT OR LOTS INTENDED FOR APPLICATION. (B) ONE 24"x24" MOCK-UP WITH SAMPLE SEAM (CENTERED) OF ALL FABRIC AND VINYL FINISHES AND COLOR. (C) THREE 12"x12" SAMPLE OF ALL FLOOR COVERINGS. (D) THREE SAMPLES OF ALL PLASTIC LAMINATE AND FINISH WOOD.
- G FLOOR COVERING IN CLOSETS SHALL BE THE SAME AS THAT OF THE SPACE ONTO WHICH THE CLOSET DOOR OPENS. U.N.O.
- H PRIOR TO SETTING TILE, CAULK AROUND ALL PIPES AND OTHER ELEMENTS PENETRATING SURFACE TO BE TILED USING SILICONE TYPE SEALANT. COMPLY WITH TCA INSTALLATION METHODS.
- I THE FLOOR SURFACE OF THE FINISHED INSTALLATION SHALL BE SLIP RESISTANT AS DEFINED BY REQUIRED BY THOSE AUTHORITIES HAVING JURISDICTION.
- J REPAIR OR REWORK BLDG. STD. WINDOW TREATMENT AT ALL PERIMETER GLASS AS REQUIRED DUE TO NEW CONSTRUCTION. PROVIDE NEW BLDG. STD. WINDOW TREATMENT WHERE REQUIRED BY NEW CONSTRUCTION AT WINDOWS WHERE FURRING HAS BEEN REMOVED.
- K REFER TO ELEVATIONS FOR FINISHES NOT NOTED ON FINISH PLAN.
- L PROVIDE FINISHES AS NOTED ON PLAN OR SCHEDULES) OR ARCHITECT APPROVED EQUAL.

LEGEND

- A REFER TO SHEET A00.100 FOR SYMBOLS AND ABBREVIATIONS



1 LEVEL 01 - KEY PLAN
SCALE: 1/64" = 1'-0"

CITY OF SAN DIEGO

101 W. ASH
101 W. ASH STREET
SAN DIEGO, CA 92101

Gensler

225 Broadway
Suite 100
San Diego, CA 92101
United States
Tel 619.557.2500
Fax 619.557.2520

Date	Description	AKISS
07.28.2017	ISSUE PERMIT	AKISS
09.08.2017	ISSUE FOR BID	AKISS
05.07.2018	ISSUE FOR BID	AKISS
06.25.2018	ADDENDUM 'B'	AKLJM



Project Number
55.7291.013

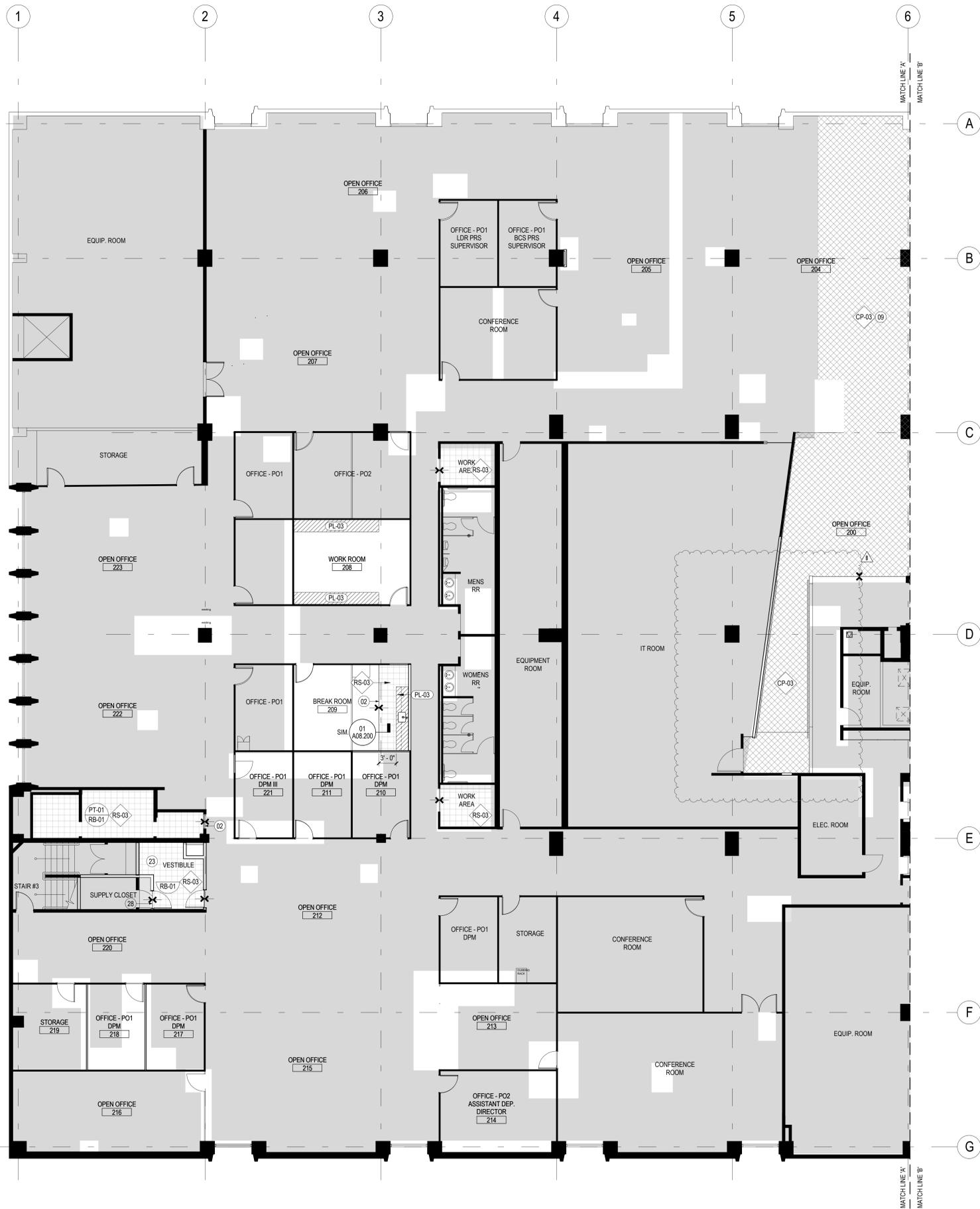
The City of
SAN DIEGO
Public Works

A02.701B

CITY OF SAN DIEGO
FINISH PLAN - LEVEL 01 NORTH

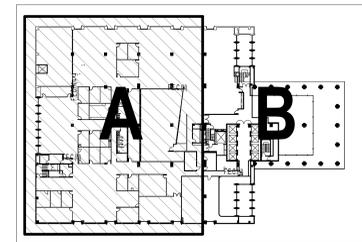
CITY OF SAN DIEGO, CALIFORNIA PUBLIC WORKS DEPARTMENT SHEET 144 OF 402 SHEETS		WBS S-17009
APPROVED:	DATE: 5/31/2018	SUBMITTED BY: JORGE ACEVEDO
FOR CITY ENGINEER	DATE: 7/20/08	PROJECT MANAGER
JASON GRANI		CHIEF: MARLON PEREZ
PRINT DGE NAME	RCER	PROJECT ENGINEER
DESCRIPTION	BY	APPROVED
ORIGINAL		DATE FILMED
ADDENDUM B		DATE FILMED
		CCS27 COORDINATE
		CCS83 COORDINATE
CONTRACTOR	DATE STARTED	40154-144-D
INSPECTOR	DATE COMPLETED	

Updated graphical conflict to general notes ADDENDUM B



A FINISH PLAN - LEVEL 02 SOUTH
SCALE: 1/8" = 1'-0"

2 LEVEL 02 - KEY PLAN
SCALE: 1/64" = 1'-0"



SHEET NOTES

- 02 PROVIDE TRANSITION STRIP WHERE INDICATED ON PLAN. MFR: FLEXCO, STYLE: 168, COLOR: 034 BARLEY.
- 09 PROVIDE NEW CARPET TILE WHERE INDICATED ON PLAN WITH HATCH TO MATCH EXISTING. CARPET TILES FROM BUILDING STOCK. CONFIRM W/ BUILDING ENGINEER. PROVIDE NEW CARPET TILES (CP-04) AS REQUIRED PER STOCK LIMITATION.
- 23 PATCH VCT THIS AREA AS REQUIRED BY NEW DEMOLITION OR CONSTRUCTION. CONTRACTOR TO MATCH EXISTING VCT.
- 28 PROVIDE TRANSITION STRIP WHERE INDICATED ON PLAN. MFR: BLANKE, STYLE: TRIANGLE ALUMINUM #380-40502-0825, COLOR: STAINLESS STEEL METALLIC.

GENERAL NOTES

- A REFER TO A00 SERIES SHEETS FOR GENERAL NOTES, ABBREVIATIONS, SYMBOLS, ADA REQUIREMENTS, CLEARANCES, MOUNTING HEIGHTS, ETC.
- B ALL PAINT FINISH LOCATIONS TO BE THREE COAT SYSTEMS. (1) COAT PRIMER, (2) COATS FINISH.
- C FLOAT ALL AREAS WHERE FLOOR IS NOT LEVEL OR TRUE PRIOR TO FLOORING INSTALLATIONS. FLOAT WOOD AND RESILIENT FLOORS LEVEL TO WITHIN 1/4" IN 10'. PROVIDE SURVEY OF FLOOR ELEVATIONS TO ARCHITECT PRIOR TO COMMENCEMENT OF WORK.
- D WALL BASE TO BE 2-1/2" HIGH ROLLED GOODS IN MAXIMUM LENGTHS. PROVIDE STRAIGHT BASE AT CARPET, COVE BASE AT VCT. BASE WRAP AROUND CORNERS. COORDINATE WITH ARCHITECT FOR CORRECT INSTALLATION METHOD.
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- K REFER TO ELEVATIONS FOR FINISHES NOT NOTED ON FINISH PLAN.
- L PROVIDE FINISHES AS NOTED ON PLAN (OR SCHEDULE) OR ARCHITECT APPROVED EQUAL.

LEGEND

- A REFER TO SHEET A00 100 FOR SYMBOLS AND ABBREVIATIONS

CITY OF SAN DIEGO

101 W. ASH
101 W. ASH STREET
SAN DIEGO, CA 92101

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United States

Date	Description	
07.28.2017	ISSUE PERMIT	AKSS
09.08.2017	ISSUE FOR BID	AKSS
05.07.2018	ISSUE FOR BID	AKSS
06.25.2018	ADDENDUM 'B'	AKLM



Project Number

55.7291.013

The City of
SAN DIEGO
Public Works

A02.702A

CITY OF SAN DIEGO

FINISH PLAN - LEVEL 02 SOUTH

CITY OF SAN DIEGO, CALIFORNIA
PUBLIC WORKS DEPARTMENT
SHEET 145 OF 402 SHEETS

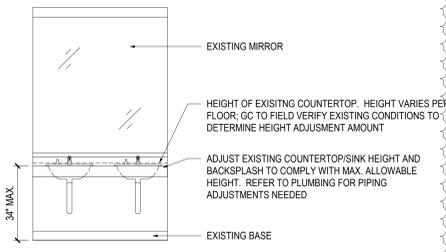
WBS S-17009

APPROVED:	DATE:	5/31/2018	SUBMITTED BY:	JORGE ACEVEDO
FOR CITY ENGINEER	DATE:	7/20/18	PROJECT MANAGER	
PRINT DCE NAME:	DATE:		PROJECT ENGINEER	MARLON PEREZ
DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL			5/31/2018	
ADDENDUM B			05/25/2018	
				CCS27 COORDINATE
				CCS83 COORDINATE
CONTRACTOR	DATE STARTED			40154 - 145 - D
INSPECTOR	DATE COMPLETED			

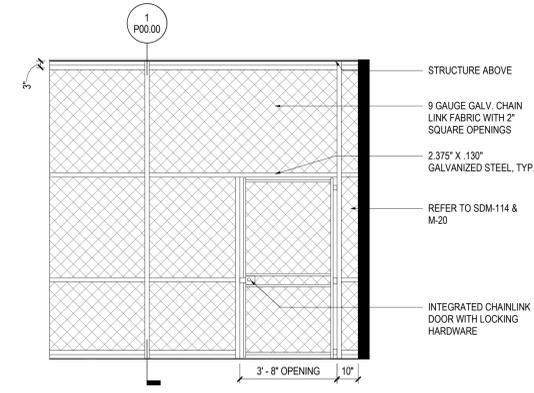
Updated finish plan at revised ramp layout

ADDENDUM B

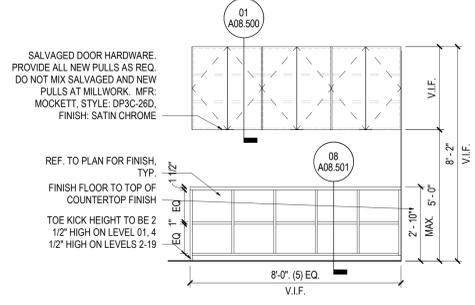
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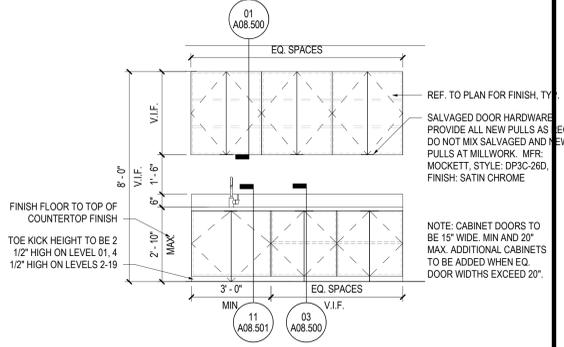
12 TYP. ELEVATION AT RESTROOM SINKS
SCALE: 3/8" = 1'-0"



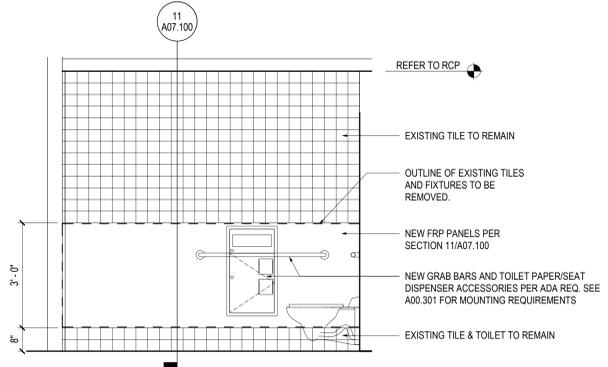
09 TYP. ELEVATION AT CHAINLINK ENCLOSURE
SCALE: 3/8" = 1'-0"



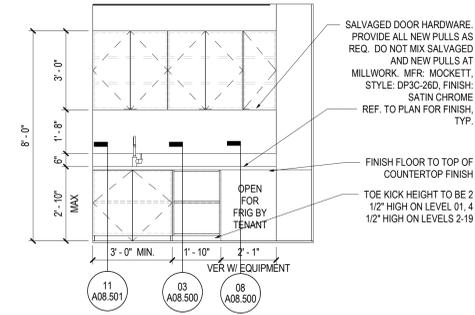
05 ELEV. @ UPPER & OPEN LOWER MILLWORK
SCALE: 3/8" = 1'-0"



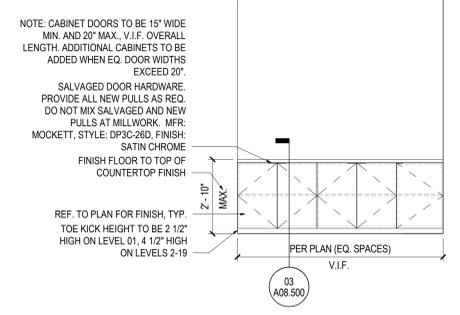
01 TYP. ELEVATION @ NEW BREAK MILLWORK
SCALE: 3/8" = 1'-0"



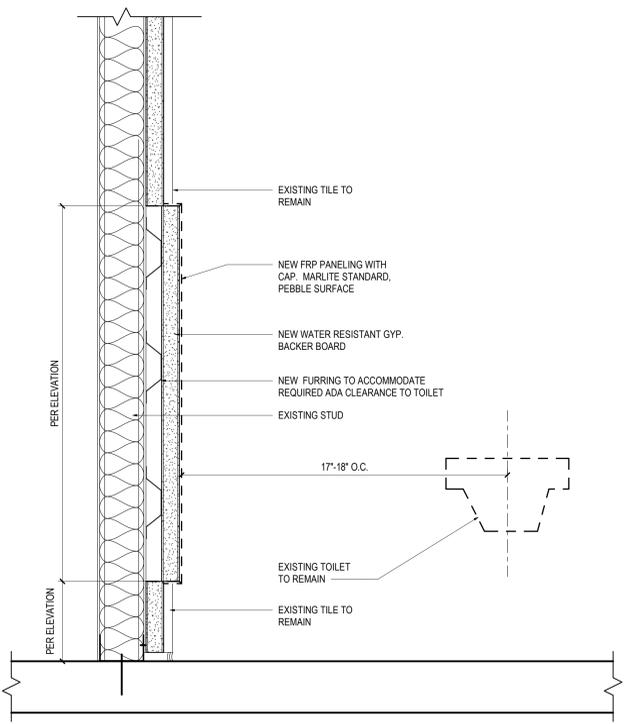
10 RESTROOM ELEVATION @ NEW TILE (TYP.)
SCALE: 1/2" = 1'-0"



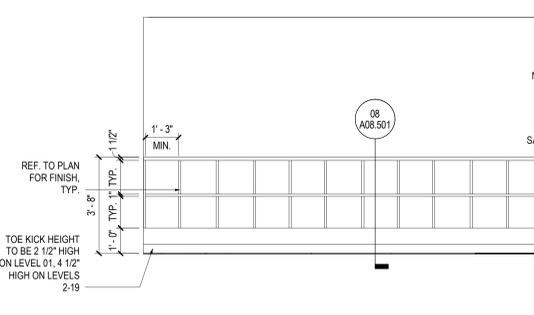
06 ELEVATION @ NEW MILLWORK
SCALE: 3/8" = 1'-0"



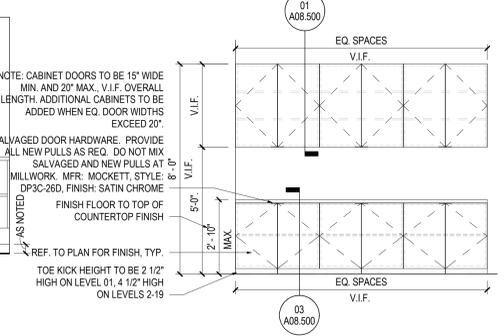
02 TYP. ELEVATION @ LOWER MILLWORK
SCALE: 3/8" = 1'-0"



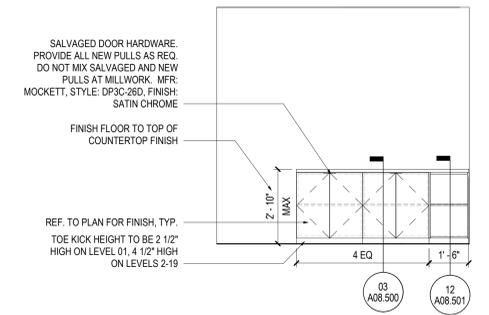
11 WALL SECTION AT RESTROOM
SCALE: 3" = 1'-0"



07 OPEN BIN MILLWORK
SCALE: 3/8" = 1'-0"



03 TYP. UPPER & LOWER MILLWORK
SCALE: 3/8" = 1'-0"



04 MILLWORK AT COLUMN
SCALE: 3/8" = 1'-0"

CITY OF SAN DIEGO
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SAN DIEGO, CA 92101

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07.28.2017	ISSUE PERMIT	AK/SS
09.08.2017	ISSUE FOR BID	AK/SS
03.07.2018	ISSUE FOR BID	AK/SS
06.25.2018	ADDENDUM 'B'	AK/LM



Project Number
55.7291.013

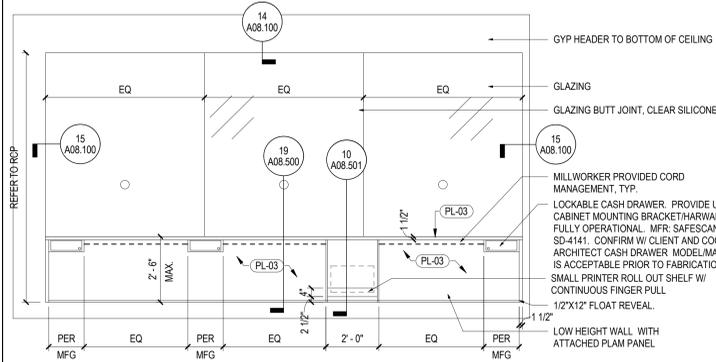
The City of
SAN DIEGO
Public Works

A07.100

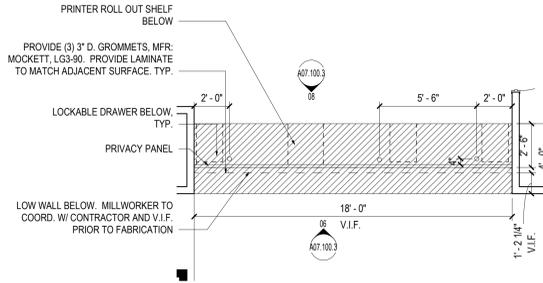
CITY OF SAN DIEGO
INTERIOR ELEVATIONS

CITY OF SAN DIEGO, CALIFORNIA PUBLIC WORKS DEPARTMENT SHEET 184 OF 402 SHEETS		WBS S-17009
APPROVED FOR CITY ENGINEER JASON GRANI PRINT DCE NAME	DATE 5/31/2018 77208	SUBMITTED BY JORGE ACEVEDO PROJECT MANAGER CHECKED BY MARLON PEREZ PROJECT ENGINEER
DESCRIPTION	BY	APPROVED
ORIGINAL		5/31/2018
ADDENDUM B		6/25/2018
CONTRACTOR INSPECTOR	DATE STARTED	DATE COMPLETED
		40154-164-D

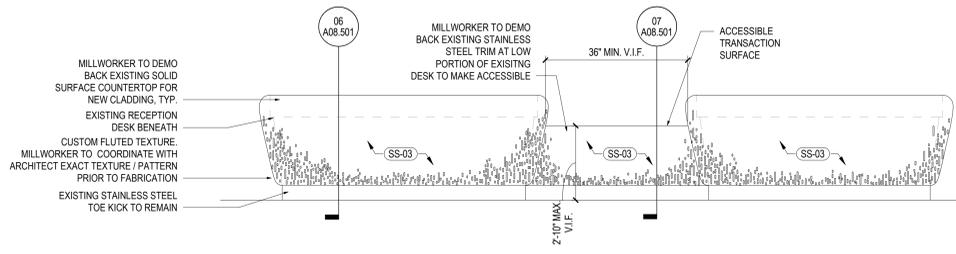
Provided detail 12. To be used as reference when countertop height adjustment is required.



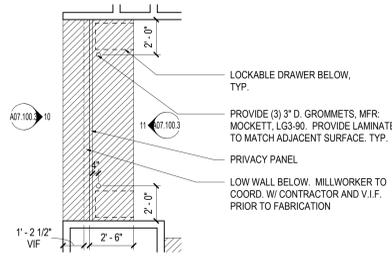
08 CASHIER 106 - WEST ELEVATION
SCALE: 3/8" = 1'-0"



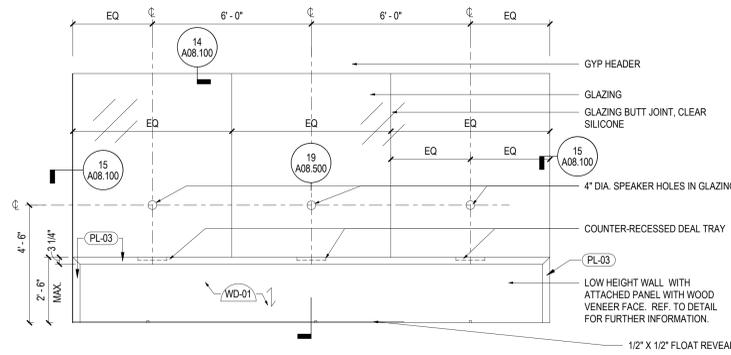
05 CASHIER 106 ENLARGED PLAN - W
SCALE: 1/4" = 1'-0"



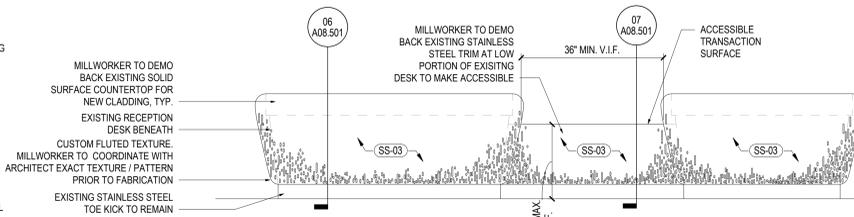
01 RECEPTION 100 DESK - NORTH
SCALE: 3/8" = 1'-0"



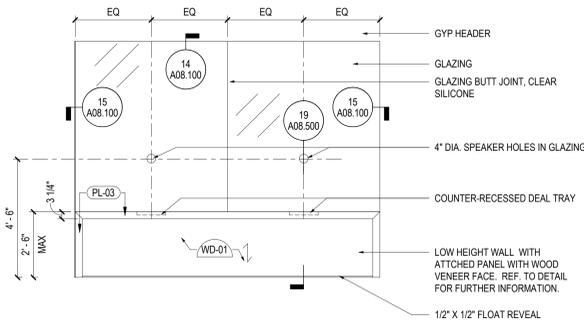
09 CASHIER 106 ENLARGED PLAN - S
SCALE: 1/4" = 1'-0"



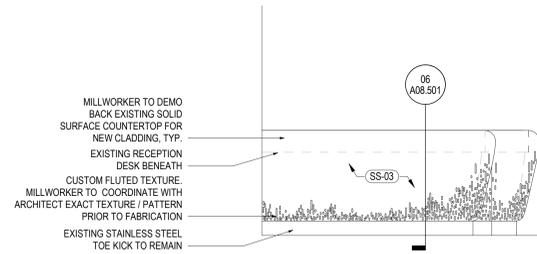
06 CASHIER 106 - EAST ELEVATION
SCALE: 3/8" = 1'-0"



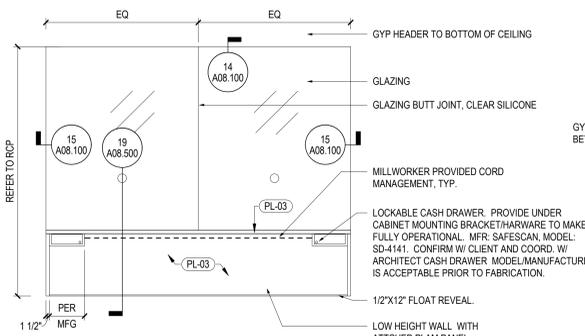
02 RECEPTION 100 DESK - WEST
SCALE: 3/8" = 1'-0"



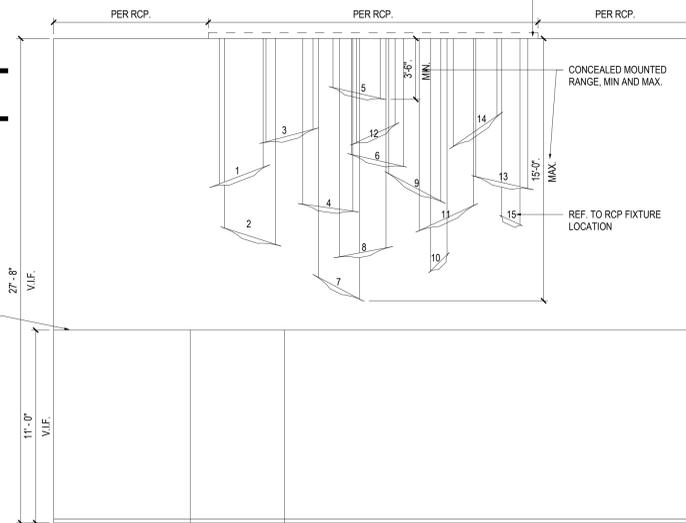
10 CASHIER ELEVATION - N
SCALE: 3/8" = 1'-0"



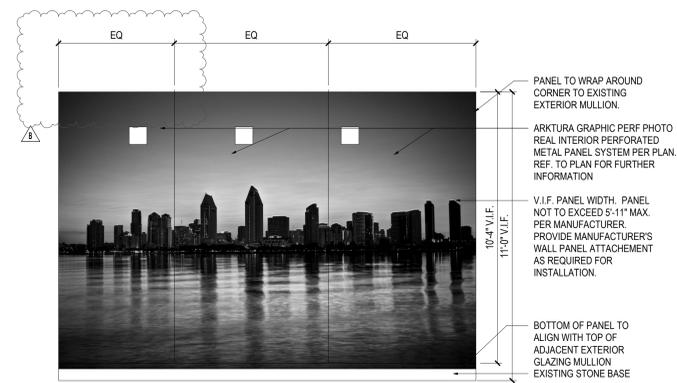
03 RECEPTION 100 DESK - EAST
SCALE: 3/8" = 1'-0"



11 CASHIER ELEVATION - S
SCALE: 3/8" = 1'-0"



07 WAITING 107 ELEVATION - CONCEPTUAL MOUNTING HEIGHTS
SCALE: 1/4" = 1'-0"



04 RECEPTION FEATURE WALL
SCALE: 3/8" = 1'-0"

Date	Description	AK/SS
07.28.2017	ISSUE PERMIT	AK/SS
09.08.2017	ISSUE FOR BID	AK/SS
05.07.2018	ISSUE FOR BID	AK/SS
06.25.2018	ADDENDUM 'B'	AK/LM



Project Number

55.7291.013

The City of
SAN DIEGO
Public Works

A07.100.3

CITY OF SAN DIEGO
INTERIOR ELEVATIONS & ENLARGED PLANS LEVEL 01

CITY OF SAN DIEGO, CALIFORNIA PUBLIC WORKS DEPARTMENT SHEET 187 OF 402 SHEETS		WBS S-17009
APPROVED: JASON GRANI FOR CITY ENGINEER PRINT DCE NAME	DATE: 5/31/2018 77208	SUBMITTED BY: JORGE ACEVEDO PROJECT MANAGER CHECKED BY: MARLON PEREZ PROJECT ENGINEER
DESCRIPTION: ORIGINAL	BY: [Signature]	DATE: 5/31/2018
ADDENDUM B	BY: [Signature]	DATE: 6/25/2018
CONTRACTOR INSPECTOR	DATE STARTED	DATE COMPLETED
		40154 - 167 - D

Dimension clarification at detail 04

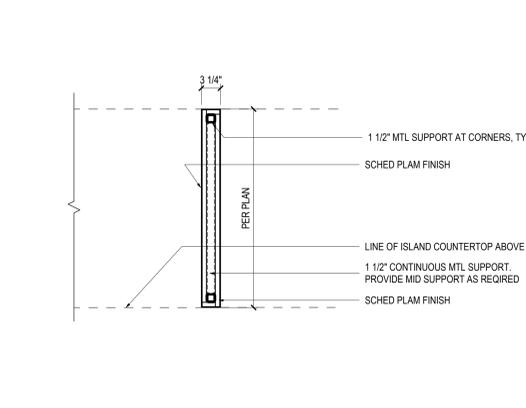
ADDENDUM B

Date	Description	AK/SS
07.28.2017	ISSUE PERMIT	AK/SS
09.08.2017	ISSUE FOR BID	AK/SS
05.07.2018	ISSUE FOR BID	AK/SS
06.25.2018	ADDENDUM 'B'	AK/LM

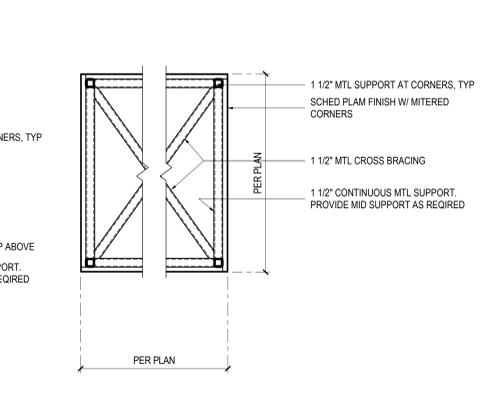


Project Number
55.7291.013
The City of
SAN DIEGO
Public Works
A08.500

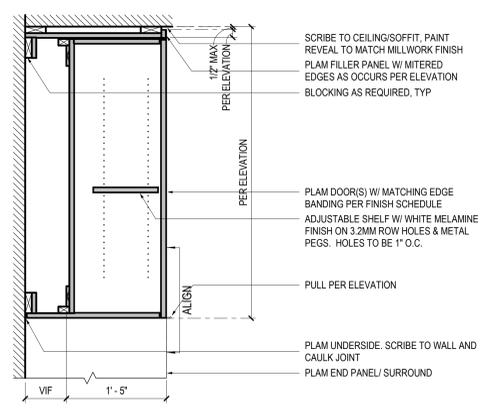
CITY OF SAN DIEGO DETAILS - MILLWORK		WBS S-17009	
CITY OF SAN DIEGO, CALIFORNIA PUBLIC WORKS DEPARTMENT SHEET 170 OF 402 SHEETS			
APPROVED:	DATE:	5/31/2018	WBS S-17009
FOR CITY ENGINEER	DATE:	7/20/08	
JASON GRANI	PROJECT MANAGER		
PRINT CODE NAME	RCEP		
DESCRIPTION	BY	APPROVED	DATE
ORIGINAL			5/31/2018
ADDENDUM B			6/25/2018
CHANGED BY: MARLON PEREZ			PROJECT ENGINEER
CONTRACTOR			DATE STARTED
INSPECTOR			DATE COMPLETED
Provided general note for backing detail at millwork			40154 - 170 - D



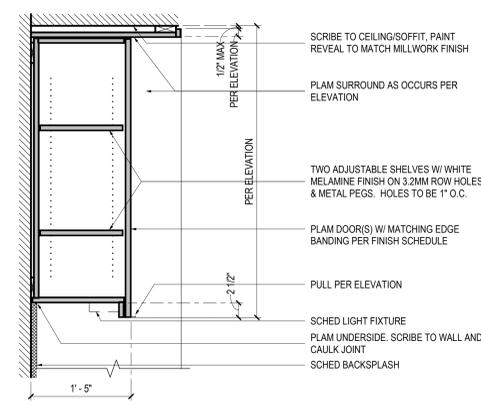
17 ISLAND SLAB SUPPORT
SCALE: 1" = 1'-0"



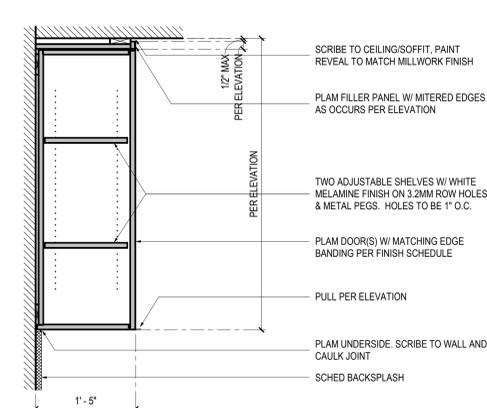
13 ISLAND SECTION THROUGH COUNTERTOP
SCALE: 1" = 1'-0"



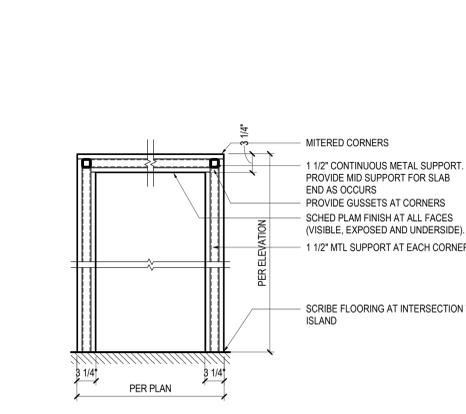
09 UPPER/ ABOVE REFRIGERATOR
SCALE: 1" = 1'-0"



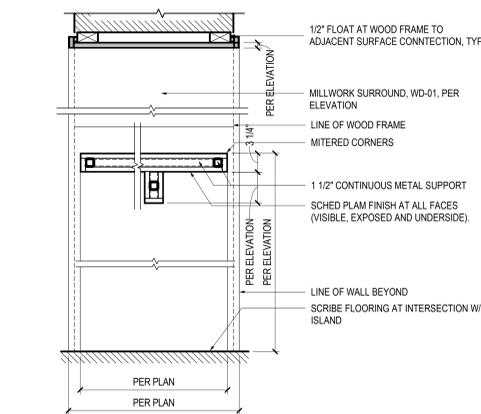
05 BREAK 116 UPPER/ UNDER LIGHT
SCALE: 1" = 1'-0"



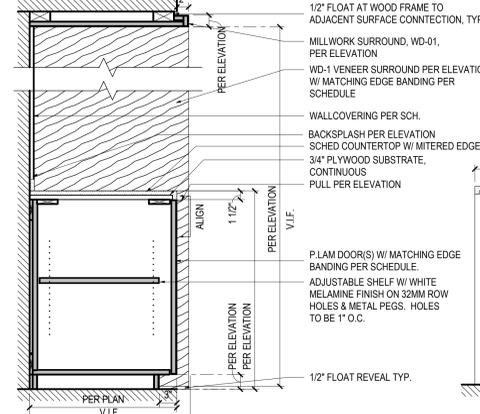
01 UPPER/ TYPICAL
SCALE: 1" = 1'-0"



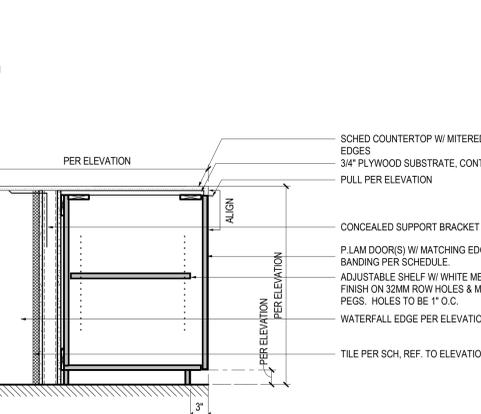
18 ISLAND SECTION THROUGH SUPPORT
SCALE: 1" = 1'-0"



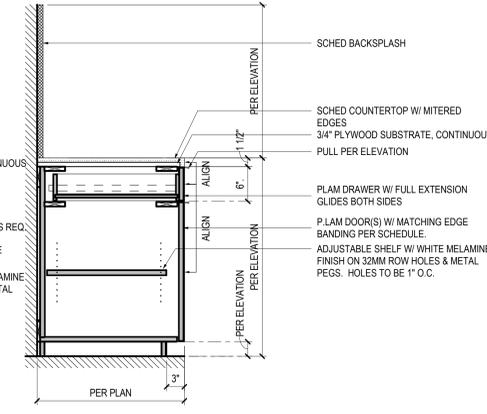
14 ISLAND SECTION
SCALE: 1" = 1'-0"



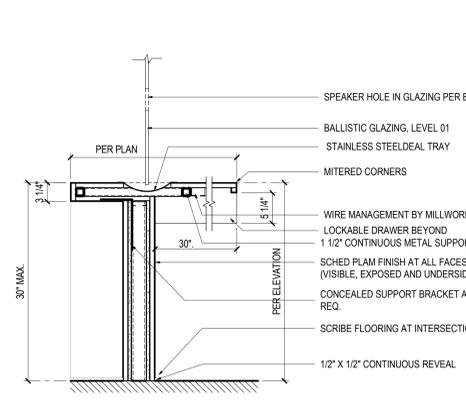
10 BASE/ DOOR BUSINESS CENTER 116
SCALE: 1" = 1'-0"



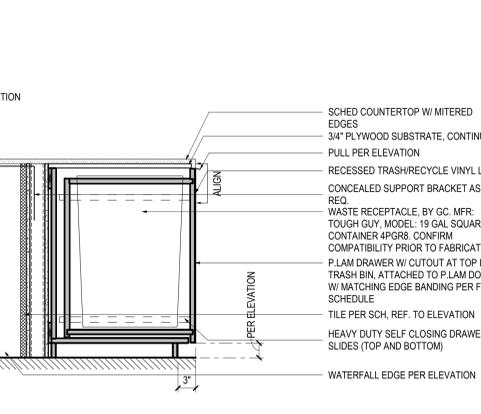
06 BASE/ DOOR @ COUNTER
SCALE: 1" = 1'-0"



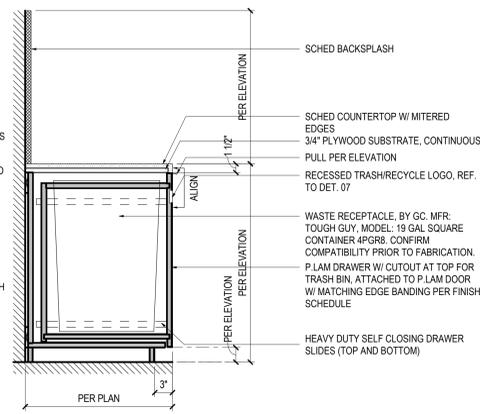
02 BASE/ DRAWER AND DOOR
SCALE: 1" = 1'-0"



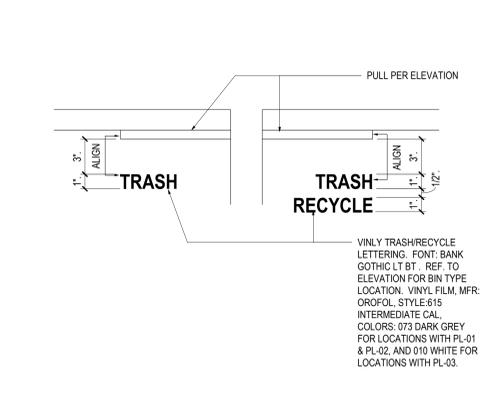
19 CASHIER 106 COUNTERTOP
SCALE: 1" = 1'-0"



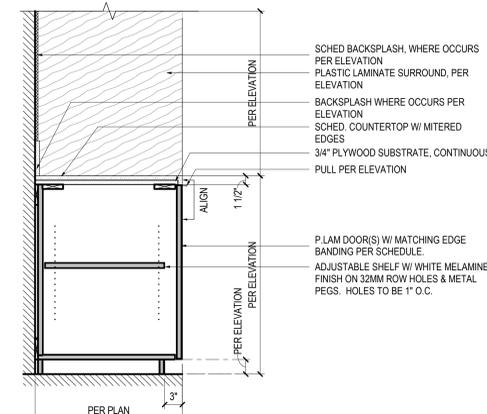
15 CABINET/FULL TRASH DRAWER @ COUNTER
SCALE: 1" = 1'-0"



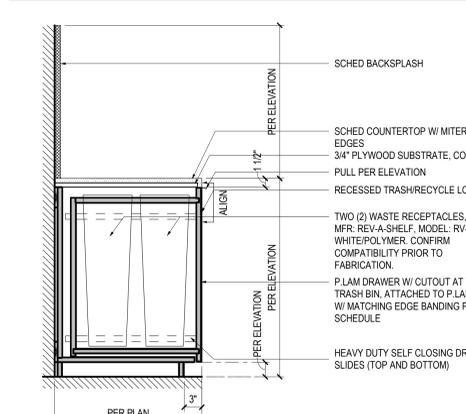
11 LOWER CABINET/FULL TRASH DRAWER
SCALE: 1" = 1'-0"



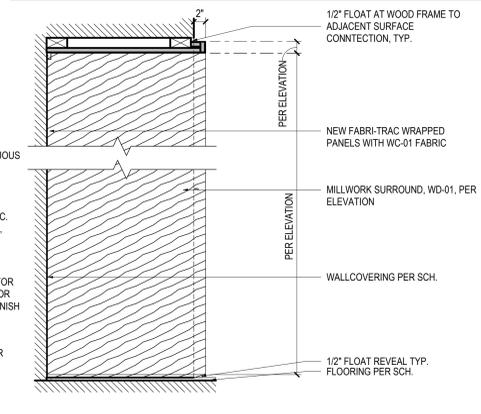
07 TRASH/RECYCLE SIGNAGE
SCALE: 1" = 1'-0"



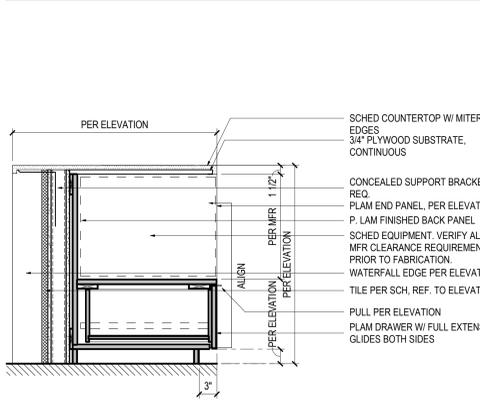
03 BASE/ DOOR
SCALE: 1" = 1'-0"



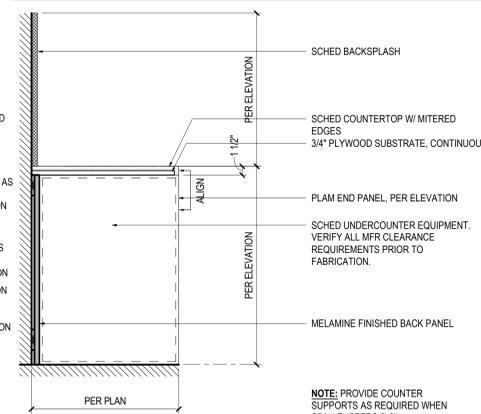
20 LOWER CABINET/COMBO TRASH DRAWER
SCALE: 1" = 1'-0"



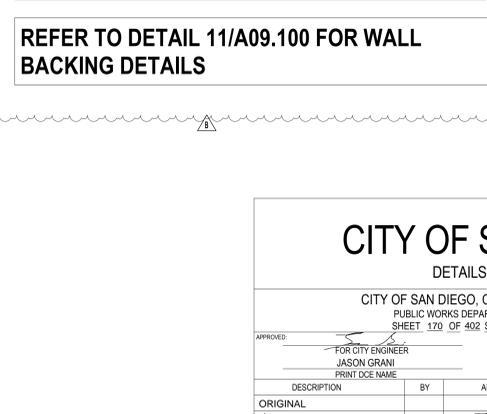
16 MILLWORK SURROUND BUS. CENTER 116
SCALE: 1" = 1'-0"



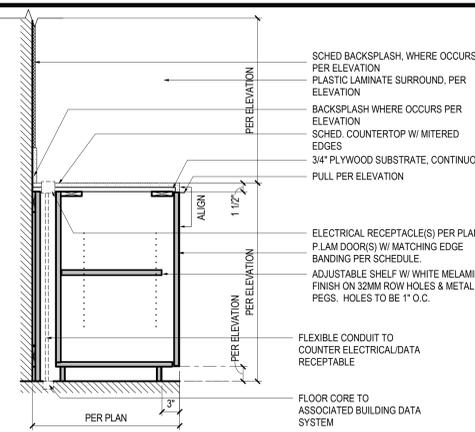
12 LOWER CABINET/APPLIANCE AND DRAWER
SCALE: 1" = 1'-0"



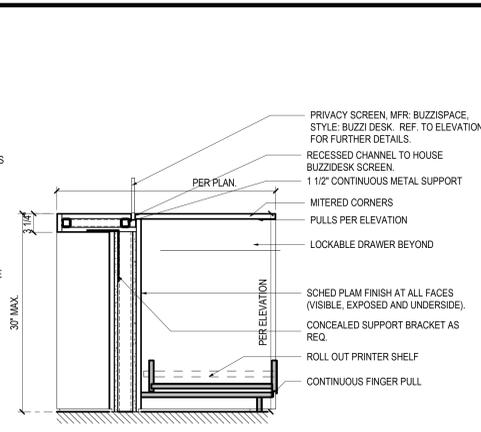
08 LOWER CABINET/APPLIANCE
SCALE: 1" = 1'-0"



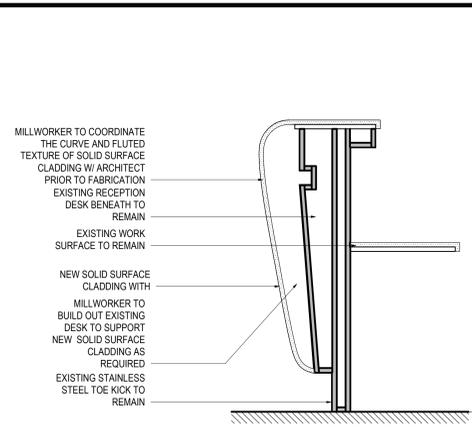
03 BASE/ DOOR
SCALE: 1" = 1'-0"



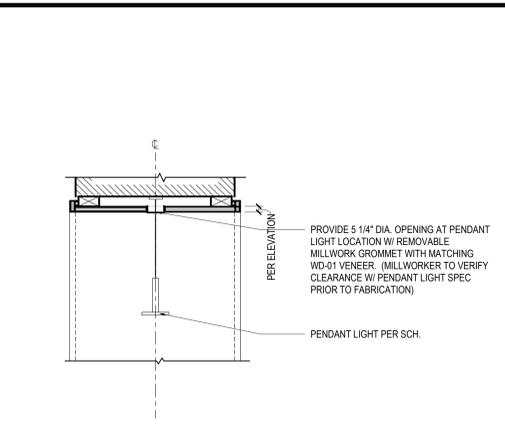
14 BASE/ DOOR W/ PWR
SCALE: 1" = 1'-0"



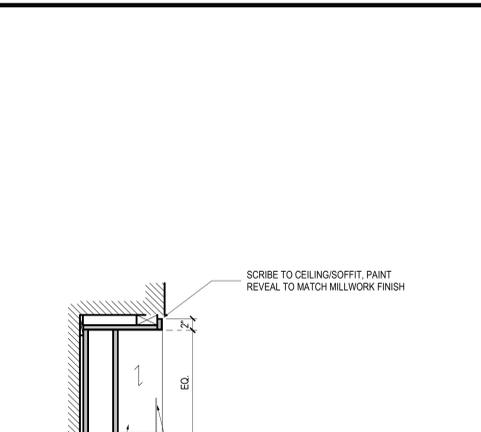
10 CASHIER 106 DRAWER
SCALE: 1" = 1'-0"



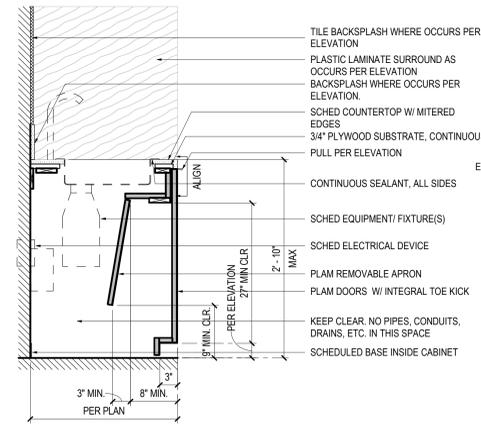
06 RECEPTION DESK HIGH
SCALE: 1" = 1'-0"



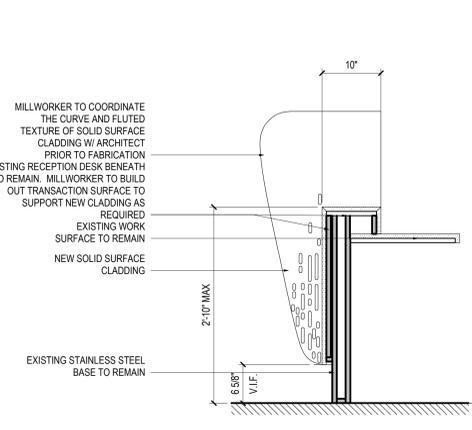
03 PENDANT HOUSING RECESS AT MILLWORK
SCALE: 1" = 1'-0"



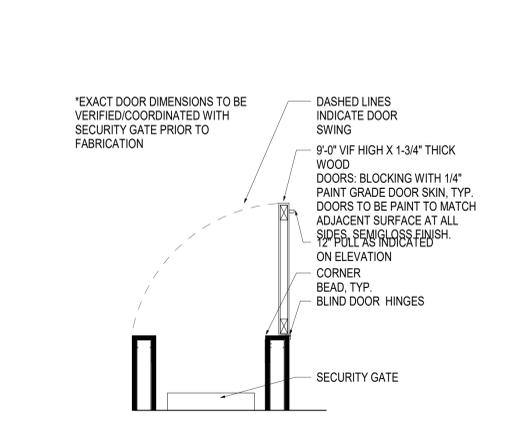
01 REVIEWER STATION CUBBY
SCALE: 1" = 1'-0"



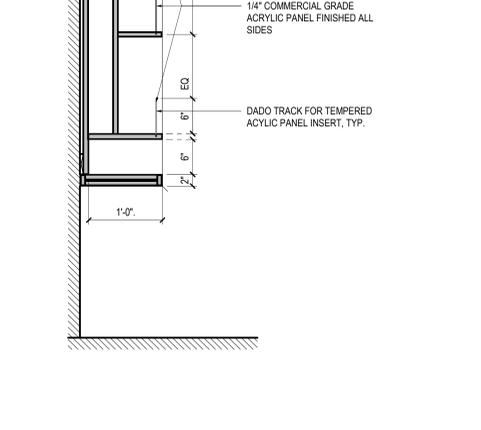
11 BASE/ SINK (ADA)
SCALE: 1" = 1'-0"



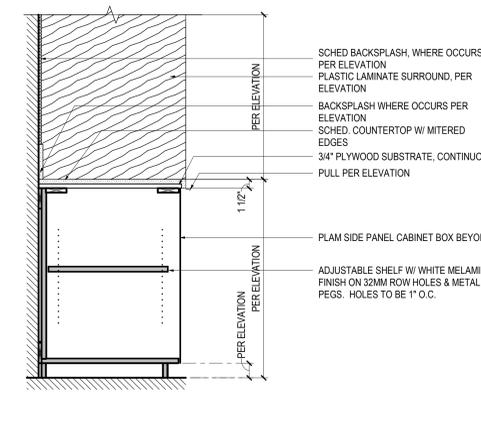
07 RECEPTION DESK TRANSACTION
SCALE: 1" = 1'-0"



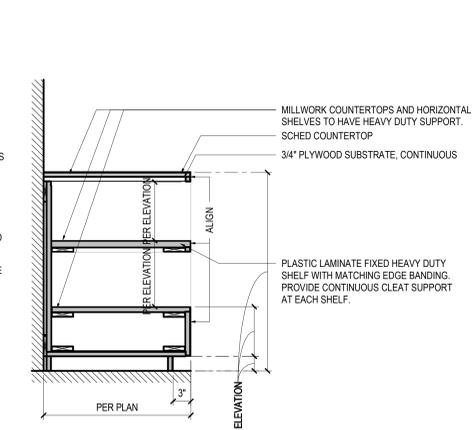
04 SECURITY MILLWORK DOOR
SCALE: 1" = 1'-0"



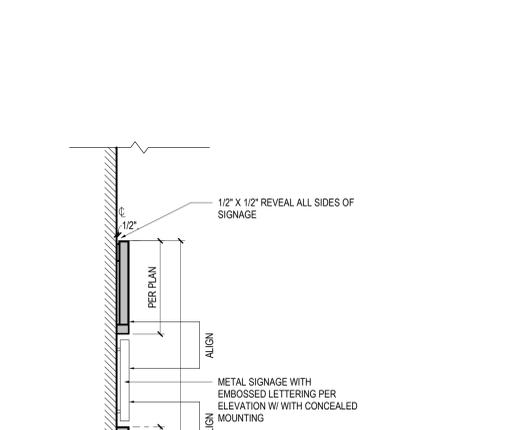
02 REVIEWER STATION MILLWORK
SCALE: 1" = 1'-0"



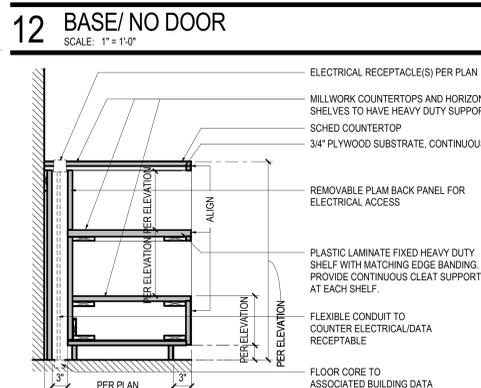
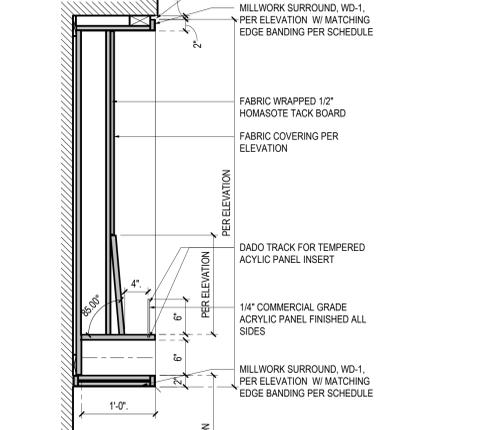
12 BASE/ NO DOOR
SCALE: 1" = 1'-0"



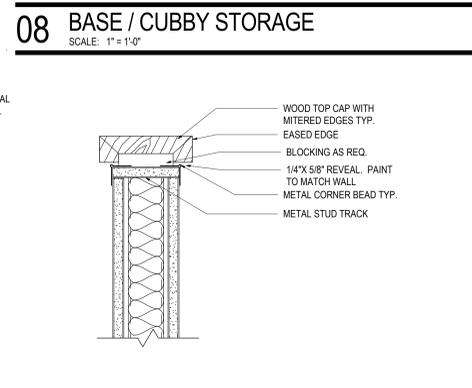
08 BASE / CUBBY STORAGE
SCALE: 1" = 1'-0"



05 WAITING WAYFINDING
SCALE: 1" = 1'-0"



13 BASE CUBBY WITH POWER
SCALE: 1" = 1'-0"



09 LOW WALL CAP
SCALE: 3" = 1'-0"

Date	Description	AK/SS
07.28.2017	ISSUE PERMIT	AK/SS
09.08.2017	ISSUE FOR BID	AK/SS
05.07.2018	ISSUE FOR BID	AK/SS
06.25.2018	ADDENDUM 'B'	AK/LM



Project Number
55.7291.013
The City of
SAN DIEGO
Public Works
A08.501

REFER TO DETAIL
11/A09.100 FOR WALL
BACKING DETAILS

CITY OF SAN DIEGO
DETAILS - MILLWORK

CITY OF SAN DIEGO, CALIFORNIA
PUBLIC WORKS DEPARTMENT
SHEET 171 OF 402 SHEETS

WBS S-17009

APPROVED: *[Signature]* DATE: 5/31/2018
FOR CITY ENGINEER: JASON GRANI
PRINT DCE NAME: JASON GRANI
RCEP: 77208

DATE: 5/31/2018
DATE: 6/25/2018

DESCRIPTION: ORIGINAL
ADDENDUM B

BY: *[Signature]*

APPROVED: *[Signature]*

DATE: 5/31/2018
DATE: 6/25/2018

CONTRACTOR: *[Signature]*
INSPECTOR: *[Signature]*

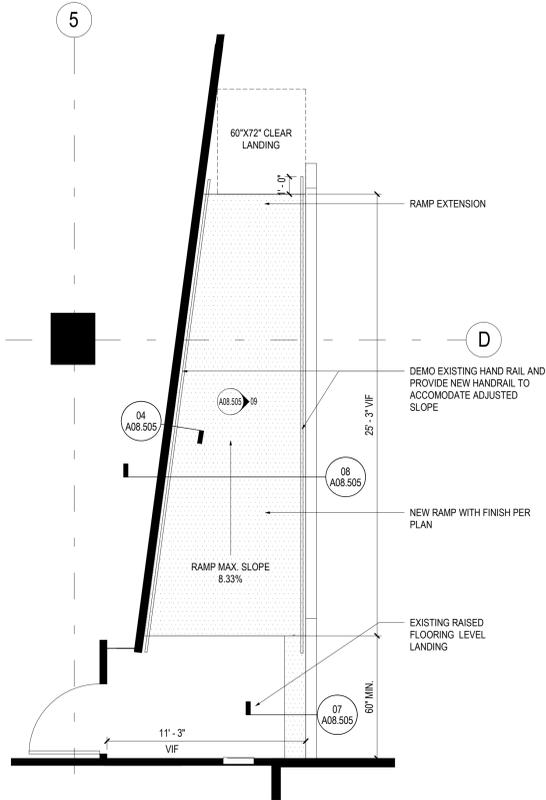
DATE STARTED: *[Signature]*
DATE COMPLETED: *[Signature]*

WBS S-17009
SUBMITTED BY: JORGE ACEVEDO
PROJECT MANAGER: MARLON PEREZ
PROJECT ENGINEER: MARLON PEREZ

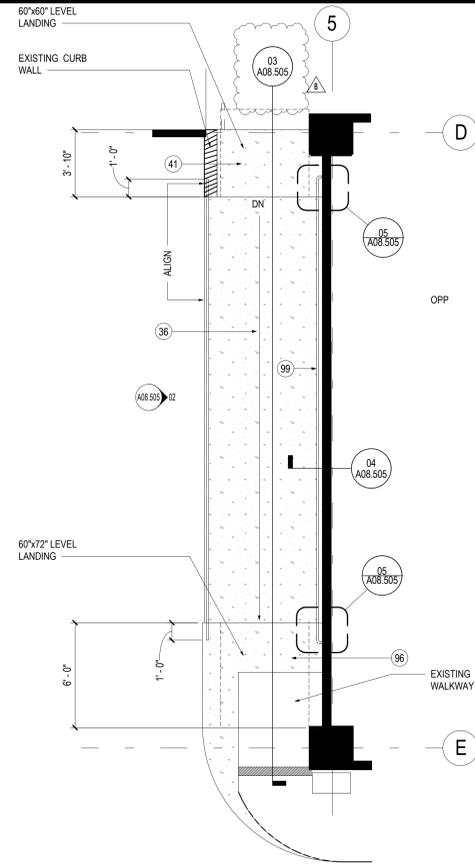
CCS27 COORDINATE
CCS83 COORDINATE
40154 - 171 - D

Provided general note for backing detail at millwork

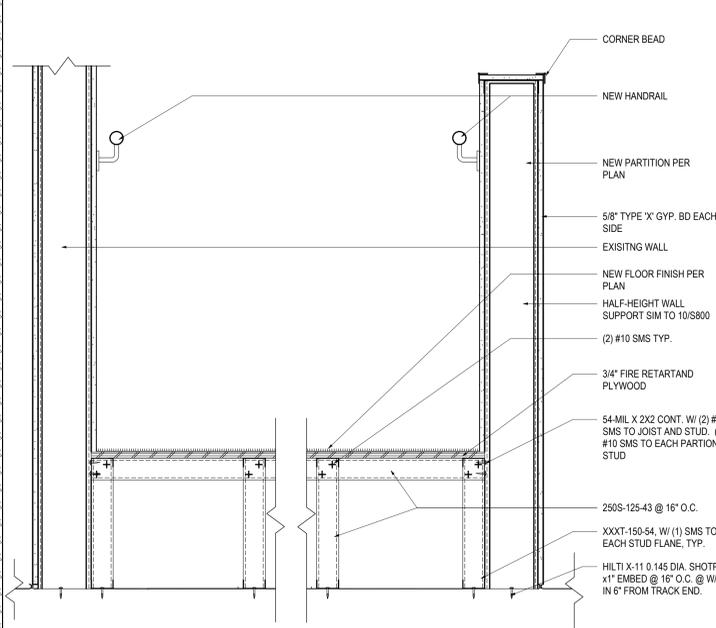
6/25/2018 10:33:39 AM



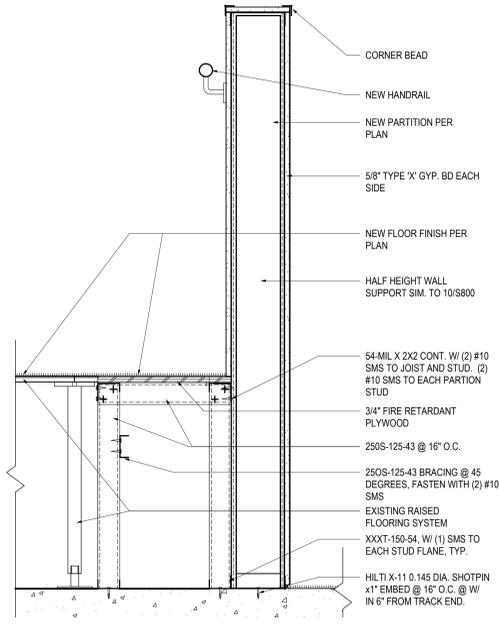
06 LEVEL 02 RAMP-ENLARGED PLAN
SCALE: 1/4" = 1'-0"



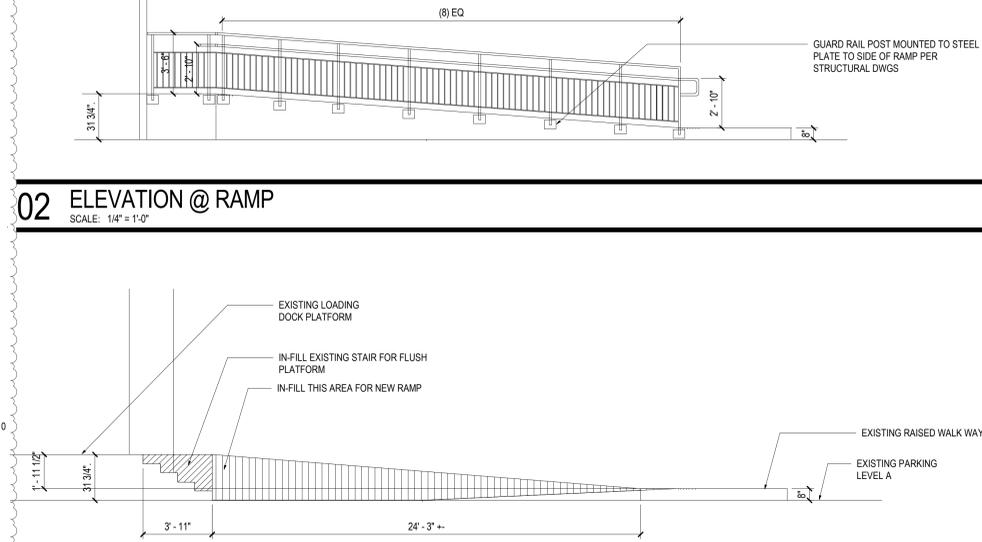
01 ENLARGED FLOOR PLAN RAMP - PARKING LEVEL A
SCALE: 1/4" = 1'-0"



08 SECTION AT RAMP SLOPE
SCALE: 1 1/2" = 1'-0"

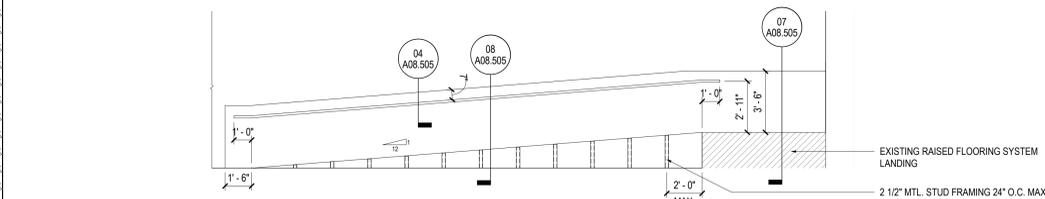


07 SECTION AT RAMP
SCALE: 1 1/2" = 1'-0"

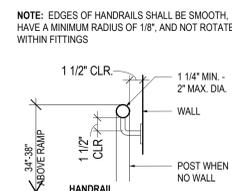


02 ELEVATION @ RAMP
SCALE: 1/4" = 1'-0"

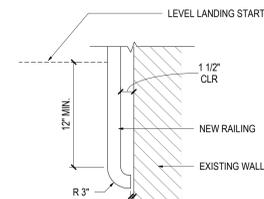
03 SECTION @ RAMP
SCALE: 1/4" = 1'-0"



09 ELEVATION AT 2ND FLOOR RAMP
SCALE: 1/4" = 1'-0"



04 HANDRAIL SECTION
SCALE: 1 1/2" = 1'-0"



05 ENLARGED PLAN AT HANDRAIL
SCALE: 1 1/2" = 1'-0"

SHEET NOTES

- 36 PROVIDE NEW RAMP WITH GUARD RAIL AND HAND RAIL CONNECTING TO EXISTING RAISED SIDEWALK. SLOPE NOT TO EXCEED 8.33% AND 2% CROSS SLOPE. REFER TO STRUCTURAL DWGS
- 41 IN-FILL EXISTING STAIRS TO CREATE LEVEL PLATFORM TO ALIGN WITH ADJACENT LOADING DOCK FLOORING. REFER TO STRUCTURAL DWGS.
- 96 IN-FILL AT EXISTING RAMP TO CREATE LEVEL LANDING AS SHOWN. LEVEL LANDING ELEVATION TO ALIGN WITH EXISTING WALKWAY.
- 99 NEW PIPE HANDRAIL ATTACHED TO WALL. REFER TO DETAILS SHEET A00.300 FOR MOUNTING HEIGHTS AND REQUIREMENTS

CITY OF SAN DIEGO

101 W. ASH
101 W. ASH STREET
SAN DIEGO, CA 92101

Gensler

225 Broadway
Suite 100
San Diego, CA 92101
United States
Tel 619.557.2500
Fax 619.557.2520

Date	Description	AK/SS
07.28.2017	ISSUE PERMIT	AK/SS
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Project Number

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The City of
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Public Works

A08.505

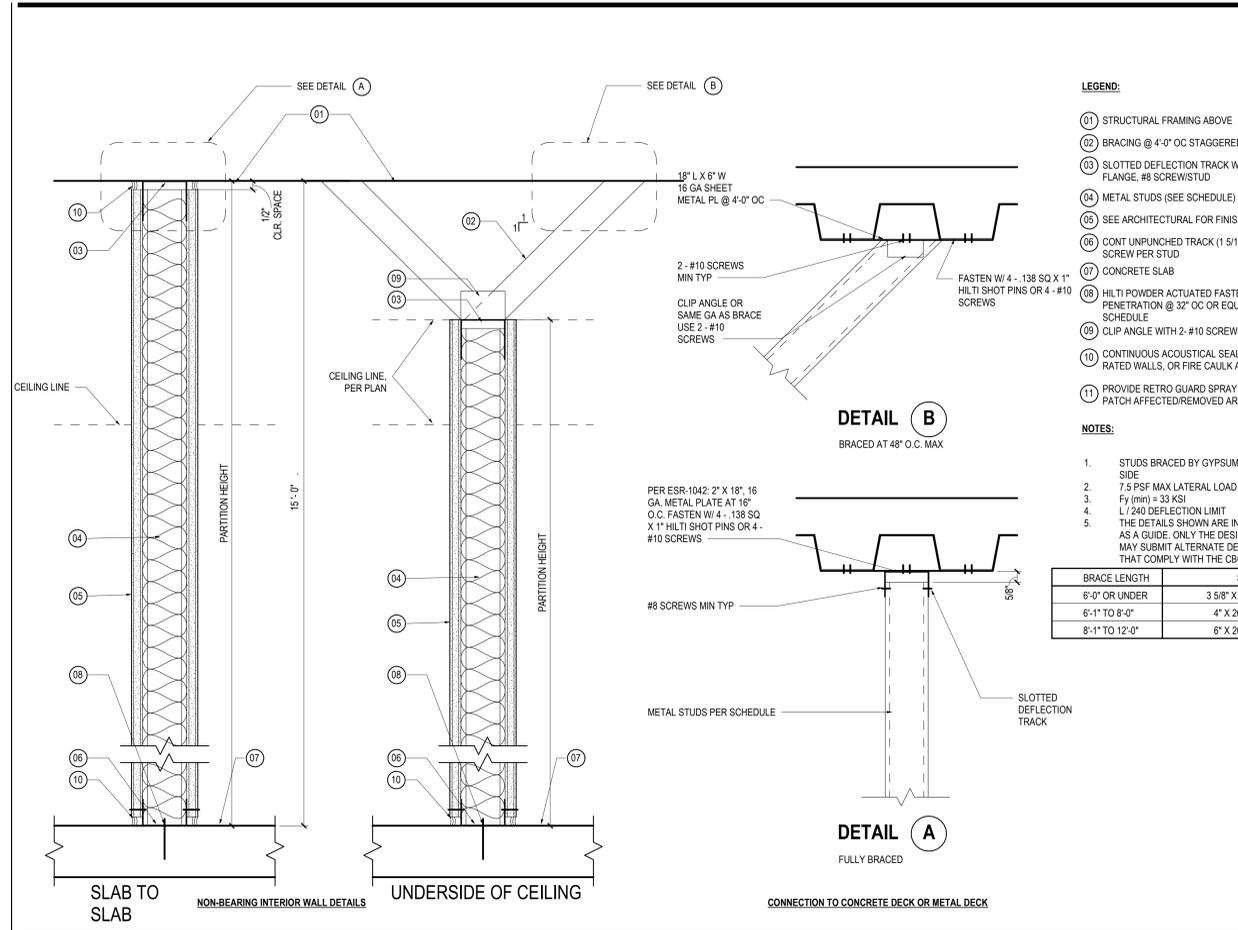
CITY OF SAN DIEGO
DETAILS - RAMP

CITY OF SAN DIEGO, CALIFORNIA PUBLIC WORKS DEPARTMENT SHEET 172 OF 402 SHEETS		WBS S-17009
APPROVED: JASON GRANI FOR CITY ENGINEER PRINT DCE NAME	DATE: 5/31/2018 77208	SUBMITTED BY: JORGE ACEVEDO PROJECT MANAGER CHECKED BY: MARLON PEREZ PROJECT ENGINEER
DESCRIPTION: ORIGINAL	BY: [Signature]	APPROVED: [Signature]
DATE STARTED: 5/31/2018	DATE COMPLETED: 6/25/2018	CONTRACTOR INSPECTOR: [Signature]
DATE STARTED: [Blank]	DATE COMPLETED: [Blank]	CONTRACTOR INSPECTOR: [Blank]
CONTRACTOR INSPECTOR: [Blank]		DATE STARTED: [Blank]
DATE COMPLETED: [Blank]		DATE COMPLETED: [Blank]

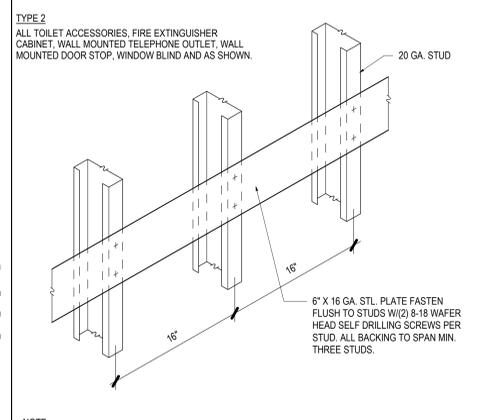
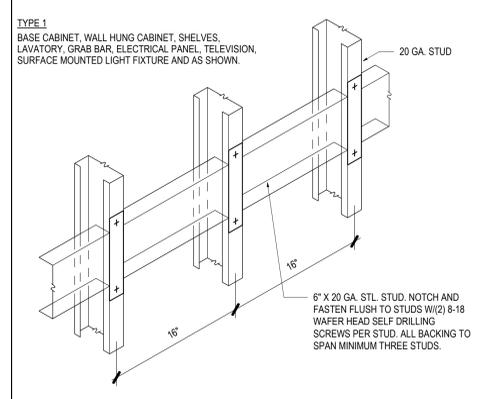
Added details for ramp adjustments, details 06, 07, 08 & 09

ADDENDUM B

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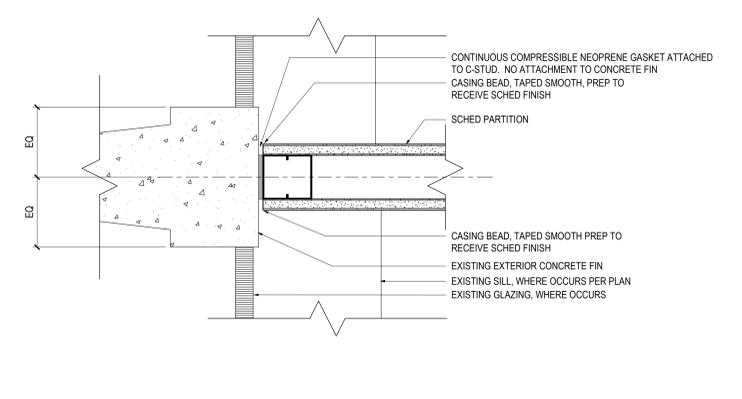


08 STANDARD CLVBD METAL STUD NON-BEARING PARTITION DETAIL
SCALE: 3" = 1'-0"

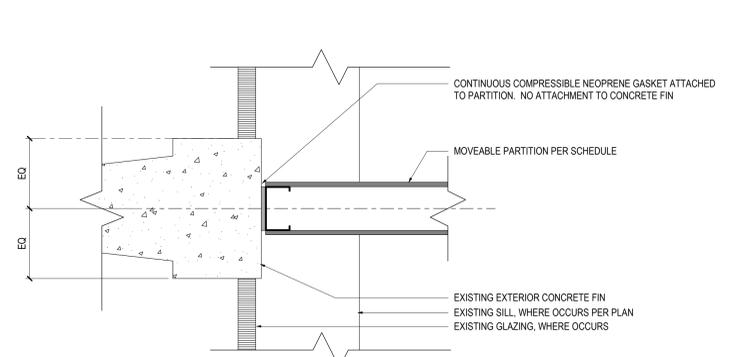


NOTE:
1. EXTEND BCK'G PLATES TO LAST STUD BEYOND FACE OF FIXTURE OR ACCESSORY TYP
2. PROVIDE METAL SLEEVES THROUGH WALL FINISH AT FIXTURE FASTENING, TYP.
3. ALL BACKING PLATES SHOWN OR NOT SHALL BE SCREWED TO STUDS, TYP.

11 BACKING PLATE
SCALE: 3" = 1'-0"



09 NEW PARTITION AT EXTERIOR VERTICAL CONCRETE FIN
SCALE: 3" = 1'-0"



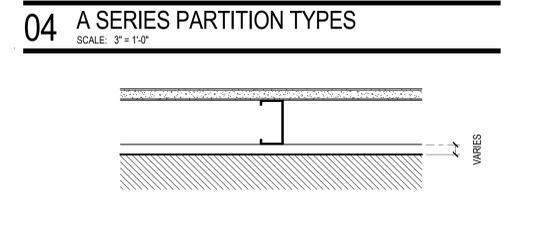
10 MOVEABLE PARTITION AT EXTERIOR VERTICAL CONCRETE FIN
SCALE: 3" = 1'-0"

- LEGEND:**
- 01 STRUCTURAL FRAMING ABOVE
 - 02 BRACING @ 4'-0" OC STAGGERED W/ 3 #10 EA END
 - 03 SLOTTED DEFLECTION TRACK W/ 2.5" FLANGE, #8 SCREW/STUD
 - 04 METAL STUDS (SEE SCHEDULE)
 - 05 SEE ARCHITECTURAL FOR FINISH
 - 06 CONT UNPUNCHED TRACK (1 5/16" FLANGE) W/ #8 SCREW PER STUD
 - 07 CONCRETE SLAB
 - 08 HILTI POWDER ACTUATED FASTENER, 145 SQ X 1 1/2" PENETRATION @ 32" OC OR EQUAL. REFER TO ICC SCHEDULE
 - 09 CLIP ANGLE WITH 2-#10 SCREWS PER FLANGE
 - 10 CONTINUOUS ACOUSTICAL SEALANT AT SOUND RATED WALLS, OR FIRE CAULK AT FIRE RATED WALLS
 - 11 PROVIDE RETRO GUARD SPRAY FIRE PROOFING TO PATCH AFFECTED/REMOVED AREAS. UL ER4339-02
- NOTES:**
1. STUDS BRACED BY GYPSUM WALL BOARD EA SIDE
 2. 7.5 PSF MAX LATERAL LOAD
 3. Fy (min) = 33 KSI
 4. L/240 DEFLECTION LIMIT
 5. THE DETAILS SHOWN ARE INTENDED TO SERVE AS A GUIDE. ONLY THE DESIGN PROFESSIONAL MAY SUBMIT ALTERNATE DESIGN AND DETAILS THAT COMPLY WITH THE CBC

BRACE LENGTH	SIZE
6'-0" OR UNDER	3/8" X 25 GA. MIN.
6'-1" TO 8'-0"	4" X 20 GA. MIN.
8'-1" TO 12'-0"	6" X 20 GA. MIN.

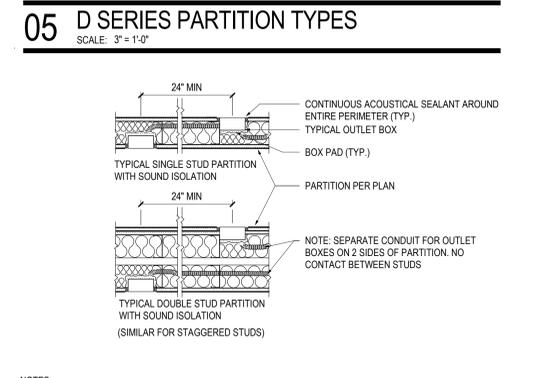
04 A SERIES PARTITION TYPES
SCALE: 3" = 1'-0"

TYPE MAR	K	TYPE DESCRIPTION	TYPE COMMENTS	FRAMING		DETAILS		ATTN THK	FIRE RTG	TESTED ASSEMBLY
				GA DEPTH	SPACIN G	TOP	BOT			
A2B		2 1/2" metal stud partition w/ 1 layer 5/8" gyp. ea. side	TO UNDERSIDE OF CEILING/ GRID.	20	2 1/2"	24" O.C.	08/A09 00	08/A09 100	3 5/8"	
A2K		2 1/2" metal stud partition w/ 1 layer 5/8" gyp. ea. side	LOW PARTITION. REFER TO ELEVATION.	20	2 1/2"	24" O.C.	08/A09 00	08/A09 100	3 5/8"	
A3A		3 5/8" metal stud partition w/ 1 layer 5/8" gyp. ea. side	SLAB TO SLAB.	20	3 5/8"	16" O.C.	08/A09 00	08/A09 100	3 5/8"	
1A3A		3 5/8" metal stud partition w/ 1 layer 5/8" gyp. ea. side	SLAB TO SLAB, RATED.	20	3 5/8"	16" O.C.	08/A09 00	08/A09 100	3 5/8"	1
A3B		3 5/8" metal stud partition w/ 1 layer 5/8" gyp. ea. side	TO UNDERSIDE OF CEILING/ GRID.	20	3 5/8"	24" O.C.	08/A09 00	08/A09 100	3 5/8"	
A3K		3 5/8" metal stud partition w/ 1 layer 5/8" gyp. ea. side	INTERIOR LOW PARTITION, 60" TALL.	20	3 5/8"	24" O.C.	08/A09 00	08/A09 100	3 5/8"	
A6K		6" metal stud partition w/ 1 layer 5/8" gyp. ea. side	INTERIOR LOW PARTITION.	20	6"	16" O.C.	07/A08 505			



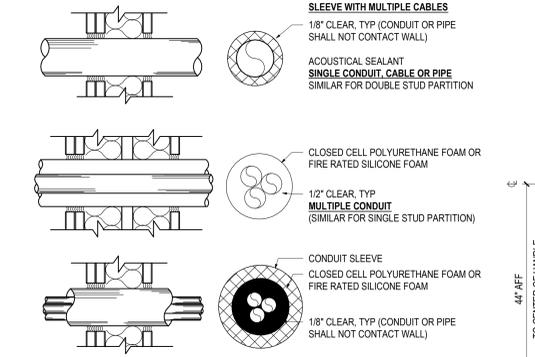
TYPE MAR	K	TYPE DESCRIPTION	TYPE COMMENTS	FRAMING		DETAILS		ATTN THK	FIRE RTG	TESTED ASSEMBLY
				GA DEPTH	SPACIN G	TOP	BOT			
D2B		2 1/2" metal stud partition w/ 1 layer 5/8" gyp. int.	TO UNDERSIDE OF CEILING/ GRID.	20	2 1/2"	24" O.C.	08/A09 100 SIM	08/A09 100 SIM		
D3B		3 5/8" metal stud partition w/ 1 layer 5/8" gyp. int.	TO UNDERSIDE OF CEILING/ GRID.	20	3 5/8"	24" O.C.	08/A09 100 SIM	08/A09 100 SIM		

05 D SERIES PARTITION TYPES
SCALE: 3" = 1'-0"



NOTES:
1. PLACE OUTLET BOXES IN SEPARATE STUD SPACES
2. BACK-TO-BACK OUTLETS NOT PERMITTED.
3. PLUG ALL UNUSED KNOCK-OUTS IN OUTLET BOXES WITH KNOCK-OUT CAPS.
4. PROVIDE BACKING EQUIVALENT TO HILTI CP617 (CA FIRE MARSHALL LISTING 4485-1200-0129)
5. DEPTH OF OUTLET BOX MUST BE COMPATIBLE WITH STUD SIZE IN ORDER TO ACCOMMODATE BOX PAD. 6. ACOUSTICAL BOX PAD REQUIREMENT APPLIES TO ALL PARTITIONS WITH ACOUSTICAL INSULATION. APPLIES TO POWER, PHONE, COMMUNICATIONS, ETC.

06 OUTLET BOX DETAILS
SCALE: 3" = 1'-0"



07 DT-PTN/PENETRATION(S)
SCALE: 1 1/2" = 1'-0"

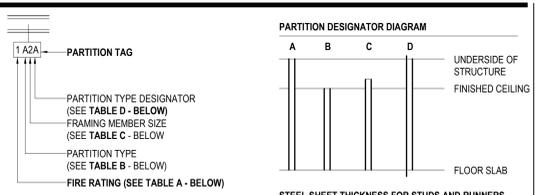


TABLE A- FIRE RATING - HOUR

1	1 HOUR
2	2 HOUR
3	3 HOUR

TABLE B- PARTITION TYPE ASSEMBLY

SERIES	SHEATHING	FRAMING MEMBERS	SHEATHING
A	1-LAYER	METAL C-STUD	1-LAYER
B	2-LAYERS	METAL C-STUD	2-LAYERS
C	1-LAYER	METAL C-STUD	2-LAYERS
D	1-LAYER	METAL C-STUD	NONE
E	2-LAYERS	METAL C-STUD	NONE
F	1-LAYER	MTL HAT CHANNEL	NONE
G	1-LAYER	NONE	NONE
H	1-LAYER	METAL C-H STUD	1-SHAFT LINER
J	2-LAYERS	METAL C-H STUD	1-SHAFT LINER
K	1-LAYER	(2) METAL C-STUDS	1-LAYER
L	2-LAYERS	(2) METAL C-STUDS	2-LAYERS
M	NONE	MASONRY	NONE
X	RELOCATED	DEMOUNTABLE PARTITION	

TABLE C- FRAMING MEMBER SIZE

TAG NUMBER	MTL C-STUD DEPTH	MTL C-H STUD DEPTH	CMU DEPTH
-	NO FRAMING		
0	7/8" FURRING CHANNEL	N/A	N/A
1	1 5/8"	N/A	N/A
2	2 1/2"	2 1/2"	N/A
3	3 5/8"	N/A	N/A
4	4"	4"	3 5/8"
6	6"	6"	5 5/8"
8	8"	N/A	7 5/8"
10	10"	N/A	9 5/8"
12	N/A	N/A	11 5/8"

TABLE D- PARTITION DESIGNATOR (HEAD & SILL CONDITION)

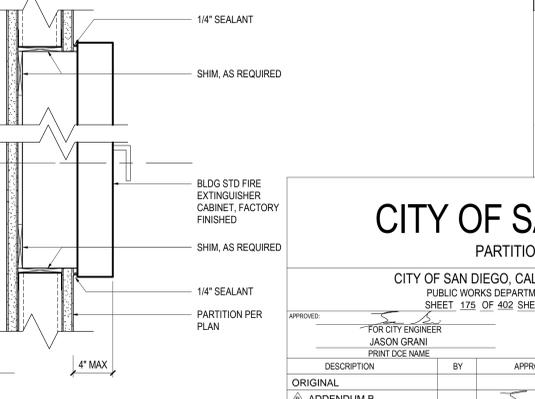
MODIFIER	STUD HEIGHT	SHEATHING HEIGHT
A	CONCRETE FLOOR SLAB TO UNDERSIDE OF STRUCTURE ABOVE	CONCRETE FLOOR SLAB TO UNDERSIDE OF STRUCTURE ABOVE
B	CONCRETE FLOOR SLAB TO UNDERSIDE OF FINISHED CEILING	CONCRETE FLOOR SLAB TO FINISHED CEILING
C	CONCRETE FLOOR SLAB TO UNDERSIDE OF STRUCTURE ABOVE	CONCRETE FLOOR SLAB TO 6" ABOVE FINISHED CEILING
D	CONCRETE FLOOR SLAB TO UNDERSIDE OF STRUCTURE ABOVE	CONCRETE FLOOR SLAB TO UNDERSIDE OF STRUCTURE ABOVE WITH 1 LAYER OF GYP BD EXTENDING BEYOND STRUCTURE

FASTENER SPACING FOR DRYWALL AND SHEATHING
8" O.C. AT PANEL EDGES
2" O.C. AT PANEL FIELD
TYPE 'S' SCREWS

01 SHEET LEGEND

TYPE MARK	TYPE DESCRIPTION	TYPE COMMENTS	DETAILS
X_B	Demountable Interior Partition	Relocated from stock. Provide seismic supports as required at top of wall to deck above. GC to coordinate install with furniture vendor.	16/S201
X_B2	Demountable Interior Partition w/ glass insert panels	Relocated from stock. Provide seismic supports as required at top of wall to deck above. GC to coordinate install with furniture vendor.	16/S201
X_DM	Demolished Demountable Interior Partition & Door System	PARTITIONS, DOORS, PARTS, CONNECTIONS, HARDWARE TO BE SALVAGED AND STORED ON SITE FOR REUSE. COORDINATE WITH BUILDING ENGINEER AND FURNITURE VENDOR.	

02 X SERIES PARTITION TYPES
SCALE: 3" = 1'-0"



03 FIRE EXT. CABINET

CITY OF SAN DIEGO
101 W. ASH
101 W. ASH STREET
SAN DIEGO, CA 92101

Gensler
225 Broadway
Suite 100
San Diego, CA 92101
United States
Tel 619.557.2500
Fax 619.557.2520

ICC SCHEDULE/REFERENCES

CONDITION	ICC REFERENCE
METAL STUD	ESR-3064P, ESR-2457
METAL SLIP TRACK	ESR-1042
S.M. SCREWS	ER-5202
P.A. FASTENER	ESR-1752

Date	Description	AKISS
07.28.2017	ISSUE PERMIT	AKISS
09.08.2017	ISSUE FOR BID	AKISS
09.19.2017	PLAN CHECK RESPONSES/ PLAN CHANGES	AK
05.07.2018	ISSUE FOR BID	AKISS
06.25.2018	ADDENDUM 'B'	AKJLM



Project Number
55.7291.013
The City of
SAN DIEGO
Public Works
A09.100

CITY OF SAN DIEGO
PARTITION TYPES
CITY OF SAN DIEGO, CALIFORNIA
PUBLIC WORKS DEPARTMENT
SHEET 175 OF 402 SHEETS

APPROVED:	DATE	RECEIVED:	DATE	FILED:
FOR CITY ENGINEER	5/31/2018		7/20/18	
PROJECT MANAGER				
PROJECT ENGINEER				

DESCRIPTION BY APPROVED DATE FILED
ORIGINAL 5/31/2018
ADDENDUM B 6/25/2018

CONTRACTOR INSPECTOR DATE STARTED DATE COMPLETED
40154-175-D

FILE NAME: C:\PROJECTS\GENSLER - 135\003\CITY OF SD - 101 ASH ST TENANT IMPROVEMENT\DRAWINGS\CAD\2013\MECH\135-003-M000.001.DWG PLOT DATE: 6/25/2018 3:50 PM PRINT BY: NICHOLAS CLEMENTS

MECHANICAL GENERAL NOTES

- CONTRACTOR SHALL CAREFULLY REVIEW THESE PLANS AND SPECIFICATIONS PRIOR TO BID. CONTRACTOR SHALL ALSO REVIEW PLANS AND SPECIFICATIONS OF ALL OTHER RELATED TRADES PRIOR TO BID TO ENSURE AN ACCURATE UNDERSTANDING OF EXACT SCOPE OF WORK. ANY ITEMS REQUIRING CLARIFICATION SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT IN SUFFICIENT TIME TO BE INCORPORATED INTO THE BID.
- CONTRACTOR SHALL VERIFY ALL EQUIPMENT MODEL NUMBERS, CAPACITIES, SIZES, VOLTAGES, AND ALL OTHER SCHEDULED INFORMATION WITH ALL OTHER APPLICABLE TRADES AND WITH THE MANUFACTURER PRIOR TO INSTALLATION.
- CONTRACTOR SHALL VERIFY ALL LOCATIONS, SIZES, P.O.C.'S, AND AVAILABILITY OF ALL EXISTING ITEMS (I.E.: OUTSIDE AIR, EXHAUST ETC.) PRIOR TO INSTALLATION OF ANY MATERIAL OR EQUIPMENT.
- THE CONTRACTOR SHALL VERIFY AND COORDINATE THE PATHWAY AND MEANS TO MOVE ALL HVAC EQUIPMENT WITH ASSOCIATED APPURTENANCES BEING BROUGHT INTO AND/OR REMOVED FROM THE AREA OF WORK, PRIOR TO PROJECT BIDDING.
- THESE DRAWINGS ARE ESSENTIALLY DIAGRAMMATIC AND ARE NOT INTENDED TO INDICATE ALL NECESSARY OFFSETS OF DUCTWORK AND PIPING. THE CONTRACTOR SHALL INSTALL MATERIAL AND EQUIPMENT IN A MANNER AS TO CONFORM TO STRUCTURE, AVOID OBSTRUCTIONS, PRESERVE HEADROOM, AND KEEP OPENINGS AND PASSAGEWAYS CLEAR. ALL INSTALLATIONS SHALL BE CONSISTENT WITH NORMALLY ACCEPTABLE INDUSTRY STANDARDS. THE CONTRACTOR SHALL NOTIFY THE ARCHITECT IN WRITING OF ANY DISCREPANCIES OR CONDITIONS THAT WOULD AFFECT THE SYSTEM PERFORMANCE OR WHICH WOULD INCUR ADDITIONAL COSTS. THIS NOTIFICATION SHALL BE MADE PRIOR TO THE INSTALLATION OF THE ITEMS CONCERNED.
- NEW AND/OR EXISTING EQUIPMENT INDICATED ON THESE DRAWINGS ARE SHOWN IN APPROXIMATE POSITIONS. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS INCLUDING EQUIPMENT LOCATIONS, P.O.C.'S AND STRUCTURAL MEMBERS PRIOR TO INSTALLATION. IN ALL CASES, ADEQUATE ACCESS (PER MANUFACTURER'S RECOMMENDATIONS AND CODE COMPLIANCE) FOR MAINTENANCE AND REPLACEMENT OF EQUIPMENT SHALL BE PROVIDED.
- ALL WORK SHALL BE DONE IN ACCORDANCE WITH ALL APPLICABLE CODES. NOTHING SHOWN IN THE PLANS OR STATED IN THE SPECIFICATIONS IS INTENDED TO INDICATE THAT THE INSTALLATION OF ANY ITEM OR DEVICE SHOULD BE DONE CONTRARY TO THE MANUFACTURER'S INSTRUCTIONS AND ALL APPLICABLE CODES AND REGULATIONS.
- ALL HVAC & PLUMBING EQUIPMENT, MATERIALS, AND ALL CONNECTIONS THERETO SHALL BE INSTALLED COMPLETE PER MANUFACTURER'S INSTRUCTIONS TO PROVIDE A COMPLETE AND FULLY OPERATIONAL SYSTEM.
- DUCT SIZES INDICATED ON DRAWINGS ARE INSIDE NET CLEARANCE DIMENSIONS.
- ALL DUCTWORK SHALL BE CONSTRUCTED, ERECTED AND TESTED IN ACCORDANCE WITH THE MOST RESTRICTIVE OF PROCEDURES SPECIFIED. DETAILED IN THE ASHRAE HANDBOOK OF FUNDAMENTALS AND THE APPLICABLE STANDARDS ADOPTED BY THE SHEET METAL AND AIR CONDITIONING CONTRACTORS NATIONAL ASSOCIATION (SMACNA), LATEST EDITION. A COPY OF THE SMACNA STANDARDS SHALL BE KEPT AT THE JOB FOR REFERENCE BY THOSE REVIEWING THE WORK.
- ALL DUCTS AND PIPES 6 SQ.FT. OR LESS SHALL BE SUPPORTED PER SMACNA USING THE LATEST STANDARD AVAILABLE.
- ALL NEW SUPPLY, RETURN, AND EXHAUST (AIR DISTRIBUTION) GRILLES, REGISTERS, AND DIFFUSERS SHALL HAVE A MAXIMUM NOISE "NC LEVEL" OF 25.
- ALL SUPPLY, RETURN, AND EXHAUST REGISTER CONNECTIONS TO DUCTWORK SHALL BE PROVIDED WITH ACCESSIBLE MANUAL VOLUME DAMPERS. ALTERNATIVELY, ACCESSIBLE MANUAL VOLUME DAMPERS MAY BE PROVIDED IN DUCTWORK FEEDER LINES SERVING INDIVIDUAL REGISTERS. PROVIDE ACCESS DOORS AND PANELS AS REQUIRED.
- SUBMITTALS: APPROVAL OF SUBMITTALS DOES NOT RELEASE THE CONTRACTOR FROM OBLIGATIONS TO COMPLY WITH ALL REQUIREMENTS OF THE CONSTRUCTION DOCUMENTS OR APPLICABLE CODE REGULATIONS.
- PROVIDE BALANCING DAMPERS ON ALL OUTSIDE AIR, EXHAUST AIR, SUPPLY AIR AND RETURN AIR SYSTEMS THROUGH OUT. ALL DAMPERS MAY NOT BE INDICATED ON PLANS BUT ARE REQUIRED AT ALL BRANCH TAKE-OFFS, SEE DETAILS.
- PROVIDE DOUBLE WALL TURNING VANES ON ALL NEW 90-DEGREE SUPPLY AIR SQUARE ELBOWS.
- PROVIDE FLEXIBLE DUCT CONNECTIONS WITH MINIMUM 2" GAP ON THE SUPPLY AND RETURN DUCT CONNECTIONS ON ALL FANS.
- DO NOT INSTALL FLEXIBLE DUCTS FOR EXPOSED CEILING INSTALLATIONS. PROVIDE HARD CONNECTED DUCTWORK USING LONG-RADIUS ELBOWS AT DIFFUSER AND GRILLE CONNECTIONS. PER 2016 CMC SECTION 603.4.1. FINAL CONNECTIONS TO DIFFUSERS USING FLEXIBLE DUCTWORK SHALL BE NO LONGER THAN 5- FEET IN LENGTH, AND SHALL NOT BE KINKED OR OTHERWISE OBSTRUCTED.
- PENETRATIONS OF FIRE-RESISTIVE WALLS, FLOORS, CEILINGS AND ROOF CEILINGS SHALL BE PROTECTED AS REQUIRED IN 2016 CBC SECTIONS 709, 710, 713, 714 AND 715.
- AIR-MOVING SYSTEMS SUPPLYING AIR IN EXCESS OF 2,000 CUBIC FEET PER MINUTE TO ENCLOSED SPACES WITHIN BUILDINGS SHALL BE EQUIPPED WITH AN AUTOMATIC SHUTOFF PER SECTION 608.1 OF THE 2016 CMC. AUTOMATIC SHUTOFF SHALL BE ACCOMPLISHED UPON DETECTION OF SMOKE IN THE MAIN SUPPLY-AIR DUCT SERVED BY SUCH EQUIPMENT. SMOKE DETECTORS SHALL BE TYPE APPROVED AND LISTED BY CALIFORNIA STATE FIRE MARSHAL AND COORDINATED WITH DIVISION 26, ELECTRICAL.
- PER NFPA 90A-6.4.2.1(2) PROVIDE A SMOKE DETECTOR AT EACH STORY PRIOR TO THE CONNECTION TO A COMMON RETURN AND PRIOR TO ANY RECIRCULATION OR FRESH AIR INLET CONNECTION IN AIR RETURN SYSTEMS HAVING A CAPACITY GREATER THAN 15,000-CFM AND SERVING MORE THAN ONE STORY.
- UNLESS SPECIFICALLY SHOWN ON THESE PLANS NO STRUCTURAL MEMBER SHALL BE CUT, DRILLED NOR NOTCHED WITHOUT PRIOR WRITTEN AUTHORIZATION FROM THE STRUCTURAL ENGINEER.
- CONTRACTOR SHALL VERIFY ALL LOCATIONS, SIZES, P.O.C.'S, INVERT ELEVATIONS, AND COORDINATION OF ALL UTILITIES PRIOR TO INSTALLATION OF ANY MATERIAL OR EQUIPMENT.
- IF THE CONTRACTOR'S USE OF SUBSTITUTE MATERIALS, EQUIPMENT APPROVED BY THE ENGINEER OR METHODS OF INSTALLATION REQUIRES ANY CHANGES IN OTHER TRADES WORK FROM THAT SHOWN ON THE DRAWINGS, THE EXTRA COST OF THE OTHER TRADES' WORK SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR INITIATING THE SUBSTITUTION.
- WHERE NONMETALLIC PIPING PENETRATES AN AREA SEPARATION, 1 HOUR, OR 2 HOUR WALLS, THE PIPE SECTION PASSING THROUGH THE WALLS AND EXTENDING A DISTANCE OF 5 FEET ON EITHER SIDE THEREOF SHALL BE OF METAL ONLY. WHERE NONMETALLIC PIPING PENETRATES AREA SEPARATION WALLS, THE PIPE SECTION PASSING THROUGH THE WALLS AND THE FIXTURE CONNECTIONS THERETO SHALL BE OF METAL ONLY.
- PROVIDE TESTING, ADJUSTING & BALANCING (TAB) OF ALL EXISTING SYSTEMS WITHIN THE AREA OF WORK. TAB TO BE PERFORMED PER SPECIFICATIONS.
- UNLESS SPECIFICALLY SHOWN ON THESE PLANS NO STRUCTURAL MEMBER SHALL BE CUT, DRILLED NOR NOTCHED WITHOUT PRIOR WRITTEN AUTHORIZATION FROM THE STRUCTURAL ENGINEER AND THE DISTRICT ENGINEER FROM THE DIVISION OF THE STATE ARCHITECT.
- PRIOR TO ANY WORK TAKING PLACE, SUBMIT 1/4" = 1'-0" SCALED DETAILED LAYOUTS OF ALL EXPOSED DUCTWORK AND FITTINGS INCLUDING, BUT NOT LIMITED TO, DUCT SIZES, PROPOSED SUPPORT SYSTEMS, LOCATIONS AND ELEVATIONS.
- OFFICE HVAC SYSTEMS DUCTWORK NOISE LEVELS SHALL NOT EXCEED NC-25 UNDER FULL LOAD CONDITIONS.
- NO RANGE HOODS, DRYER VENTS, COMBUSTION VENTS, OR HEATING DUCTS ARE PERMITTED IN AREA SEPARATION WALLS.
 - CONTRACTOR TO VERIFY LOCATION OF FIRE AND FIRE/SMOKE BARRIER WALLS WITH ARCHITECT PRIOR TO FIRE AND/OR SMOKE DAMPER, DETECTOR AND ACTUATOR INSTALLATION.
 - ALL CEILING FIRE DAMPERS TO BE ONE (1) HOUR U.L. AND C.S.F.M. APPROVED.
 - ALL ONE HOUR WALL SHALL BE APPROVED WITH ONE HOUR FIRE DAMPERS BOTH U.L. AND C.S.F.M. APPROVED.
 - ALL SMOKE BARRIER WALLS SHALL BE PROVIDED WITH U.L. AND C.S.F.M. APPROVED SMOKE/FIRE DAMPERS (EQUAL TO WALL RATING), MOTOR, ACTUATOR, AND SMOKE DETECTOR.
 - ALL PENETRATIONS OF ONE (1) HOUR CORRIDOR WALLS AND CEILINGS THAT WOULD REQUIRE THE INSTALLATION OF A FIRE DAMPER SHALL BE APPROVED WITH A U.L. AND C.S.F.M. APPROVED COMBINATION SMOKE/FIRE DAMPER, (EQUAL TO WALL RATING), MOTOR, ACTUATOR, AND SMOKE DETECTOR.
 - PROVIDE ALL FIRE & SMOKE DAMPERS WITH ACCESS DOORS AS NECESSARY.
- ALL EQUIPMENT, DUCTS, PIPING, AND OTHER DEVICES AND MATERIALS INSTALLED OUTSIDE OF THE BUILDING OR OTHERWISE EXPOSED TO THE WEATHER SHALL BE COMPLETELY WEATHERPROOFED.
- AIR FILTERS SHALL BE A STATE FIRE MARSHAL APPROVED AND LISTED TYPE. PREFORMED FILTERS HAVING COMBUSTIBLE FRAMING SHALL BE TESTED AS A COMPLETE ASSEMBLY. AIR FILTERS IN ALL OCCUPANCIES SHALL BE CLASS 2 OR BETTER (AS SHOWN IN THE STATE FIRE MARSHAL LISTING). AIR FILTERS SHALL BE ACCESSIBLE FOR CLEANING AND REPLACEMENT.
- ALL HVAC SYSTEMS SHALL MEET THE CONTROL REQUIREMENTS PER SECTION 110.2 AND 120.2 E.E.S.
- ALL HVAC EQUIPMENT AND APPLIANCES SHALL MEET THE REQUIREMENTS PER SECTION 110.1-110.3, 110.5, 120.1-120.4 TITLE 24 ENERGY STANDARDS.
- ALL PIPING AND DUCT WORK SHALL BE INSULATED CONSISTENT WITH THE REQUIREMENTS OF SECTIONS 120.3, 120.4 AND 120.7 TITLE 24 ENERGY STANDARDS AND CHAPTER 6 CMC.
- NEW INSTALLATION MATERIALS EXPOSED WITHIN A DUCT OR PLENUM SHALL COMPLY WITH SECTION 602.2 CMC.
- PROVIDE MEANS TO FURNISH AND INSTALL.

CALIFORNIA GREEN BUILDING CODE NOTES

- THE PERMANENT HVAC SYSTEM SHALL ONLY BE USED DURING CONSTRUCTION IF NECESSARY TO CONDITION THE BUILDING OR AREAS OF ADDITION OR ALTERATION WITHIN THE REQUIRED TEMPERATURE RANGE FOR MATERIAL AND EQUIPMENT INSTALLATION. IF THE HVAC SYSTEM IS USED DURING CONSTRUCTION, RETURN AIR FILTERS WITH A MINIMUM EFFICIENCY REPORTING VALUE (MERV) OF 8, BASED ON ASHRAE 52.2-1999, OR AN AVERAGE EFFICIENCY OF 30% BASED ON ASHRAE 52.1-1992 SHALL BE USED. ALL FILTERS SHALL BE REPLACED IMMEDIATELY PRIOR TO OCCUPANCY OR AT THE CONCLUSION OF CONSTRUCTION. (CAL GREEN SECTION: 5.504.1.3).
- AT THE TIME OF ROUGH INSTALLATION AND DURING STORAGE ON THE CONSTRUCTION SITE UNTIL FINAL STARTUP OF THE HEATING, COOLING AND VENTILATING EQUIPMENT, ALL DUCT AND OTHER RELATED AIR DISTRIBUTION COMPONENT OPENINGS SHALL BE COVERED WITH TAPE, PLASTIC, SHEETMETAL OR OTHER METHODS ACCEPTABLE TO THE ENFORCING AGENCY TO REDUCE THE AMOUNT OF DUST, WATER AND DEBRIS WHICH MAY ENTER THE SYSTEM. (CAL GREEN SECTION: 5.504.3).
- IN MECHANICALLY VENTILATED BUILDINGS, REGULARLY OCCUPIED AREAS OF THE BUILDING SHALL BE PROVIDED WITH AIR FILTRATION MEDIA FOR OUTSIDE AND RETURN AIR THAT PROVIDES AT LEAST A MINIMUM EFFICIENCY REPORTING VALUE (MERV) OF 8. MERV 8 FILTERS SHALL BE INSTALLED PRIOR TO OCCUPANCY, AND RECOMMENDATIONS FOR MAINTENANCE WITH FILTERS OF THE SAME VALUE SHALL BE INCLUDED IN THE OPERATION AND MAINTENANCE MANUAL. (CAL GREEN SECTION 5.504.5.3).

GENERAL SCOPE OF WORK

- THESE ENGINEERING DESIGN DRAWINGS WERE DEVELOPED USING THE AVAILABLE AS-BUILT DRAWINGS. CONTRACTOR WILL BE RESPONSIBLE FOR FIELD VERIFICATION OF THE AS-BUILT CONDITIONS AND FOR THE DEVELOPMENT OF WORKING SHOP DRAWINGS PRIOR TO THE COMMENCEMENT OF WORK.
- CONTRACTOR SHALL SUBMIT SCALED SHOP DRAWINGS, DEVELOPED BASED ON ACTUAL FIELD CONDITIONS, FOR REVIEW BY ENGINEER PRIOR TO ANY WORK TAKING PLACE.
- CONTRACTOR SHALL WIPE CLEAN ALL EXISTING GRILLES, DIFFUSERS AND VAV BOXES PRIOR TO RELOCATION.
- CONTRACTOR SHALL WIPE CLEAN ALL RETURN AIR GRILLES WITHIN THE EFFECTED AREAS OF WORK.
- CONTROLS CONTRACTOR TO VERIFY AND REPORT CONDITION OF EXISTING ACTUATORS AND CONTROLS FUNCTIONALITY PRIOR TO RELOCATION. REPORT FAULTY DEVICES TO THE BUILDING ENGINEER.
- CONTROLS CONTRACTOR SHALL DISCONNECT, CLEAN, AND RELOCATE EXISTING TEMPERATURE SENSORS AND THERMOSTATS INDICATED TO NEW LOCATIONS SHOWN.
- TEST AND BALANCE THE EXISTING MECHANICAL SYSTEMS TO MEET THE SPECIFIED AIRFLOW REQUIREMENTS. SCOPE OF WORK INCLUDES ALL EXISTING HVAC EQUIPMENT SERVING THE BUILDING.
- FLOORS 1 THROUGH 19 UTILIZE A RETURN AIR PLENUM ABOVE THE CEILING. FOR FLOORS 2 THROUGH 19, THE CONTRACTOR SHALL NOT OBSTRUCT ANY OF THE EXISTING RETURN AIR SLOTS IN THE EXISTING CEILING GRID.
- EXISTING CONTROLS HARDWARE MANUFACTURERS IN THE BUILDING ARE CSI AND TAC (CONTROLLERS, AND THERMOSTATS). THE FRONT END EMS COMPUTER LOCATED ON 20TH FLOOR.
- CONTROLS CONTRACTOR TO REVIEW DRAWINGS, WHICH INDICATE TERMINAL BOXES (ACTUATORS) AND THERMOSTATS TO BE RELOCATED. CONTROLS CONTRACTOR TO VERIFY AND REPORT CONDITION OF EXISTING ACTUATOR AND CONTROLS FUNCTIONALITY PRIOR TO RELOCATION/DEMOLITION. CONTROLS CONTRACTOR SHALL DISCONNECT, CLEAN AND RECONNECT INDICATED DEVICES IN NEW LOCATIONS SHOWN, AND VALIDATE CONTROLS ARE FUNCTIONING PROPERLY AFTER RELOCATION.
- CONTROLS CONTRACTOR TO WORK WITH MECHANICAL CONTRACTOR ON BALANCING HVAC EQUIPMENT TO MEET MAX/MIN AIRFLOW REQUIREMENTS INDICATED ON DRAWINGS. CONTROLS CONTRACTOR MUST TO WORK WITH MECHANICAL CONTRACTOR TO PROVIDE A FUNCTIONAL SYSTEM. CONTROLS CONTRACTOR TO IDENTIFY AND REPORT ANY NON-FUNCTIONING CONTROL DEVICES TO THE OWNER.

MECHANICAL SHEET LIST

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M00.002	MECHANICAL LEGEND & ABBREVIATIONS
M00.003	TITLE 24 CALCULATIONS
M00.004	TITLE 24 CALCULATIONS
M00.005	TITLE 24 CALCULATIONS
M00.006	TITLE 24 CALCULATIONS
M00.007	TITLE 24 CALCULATIONS
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M00.012	TITLE 24 CALCULATIONS
M00.013	TITLE 24 CALCULATIONS
M00.014	TITLE 24 CALCULATIONS
M01.201A	MECHANICAL DEMO LEVEL 01 SOUTH
M01.201B	MECHANICAL DEMO LEVEL 01 NORTH
M01.202A	MECHANICAL DEMO LEVEL 02 SOUTH
M01.203	MECHANICAL DEMO LEVEL 03
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M02.201A	MECHANICAL LEVEL 01 SOUTH
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M02.203	MECHANICAL LEVEL 03
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M05.001	MECHANICAL DETAILS
M05.002	MECHANICAL DETAILS
M06.001	MECHANICAL SCHEDULES
M06.002	MECHANICAL SCHEDULES
M06.003	MECHANICAL SCHEDULES

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Project Number

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The City of **SAN DIEGO** Public Works

M00.001

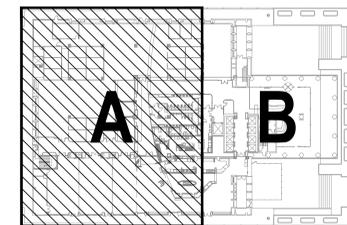
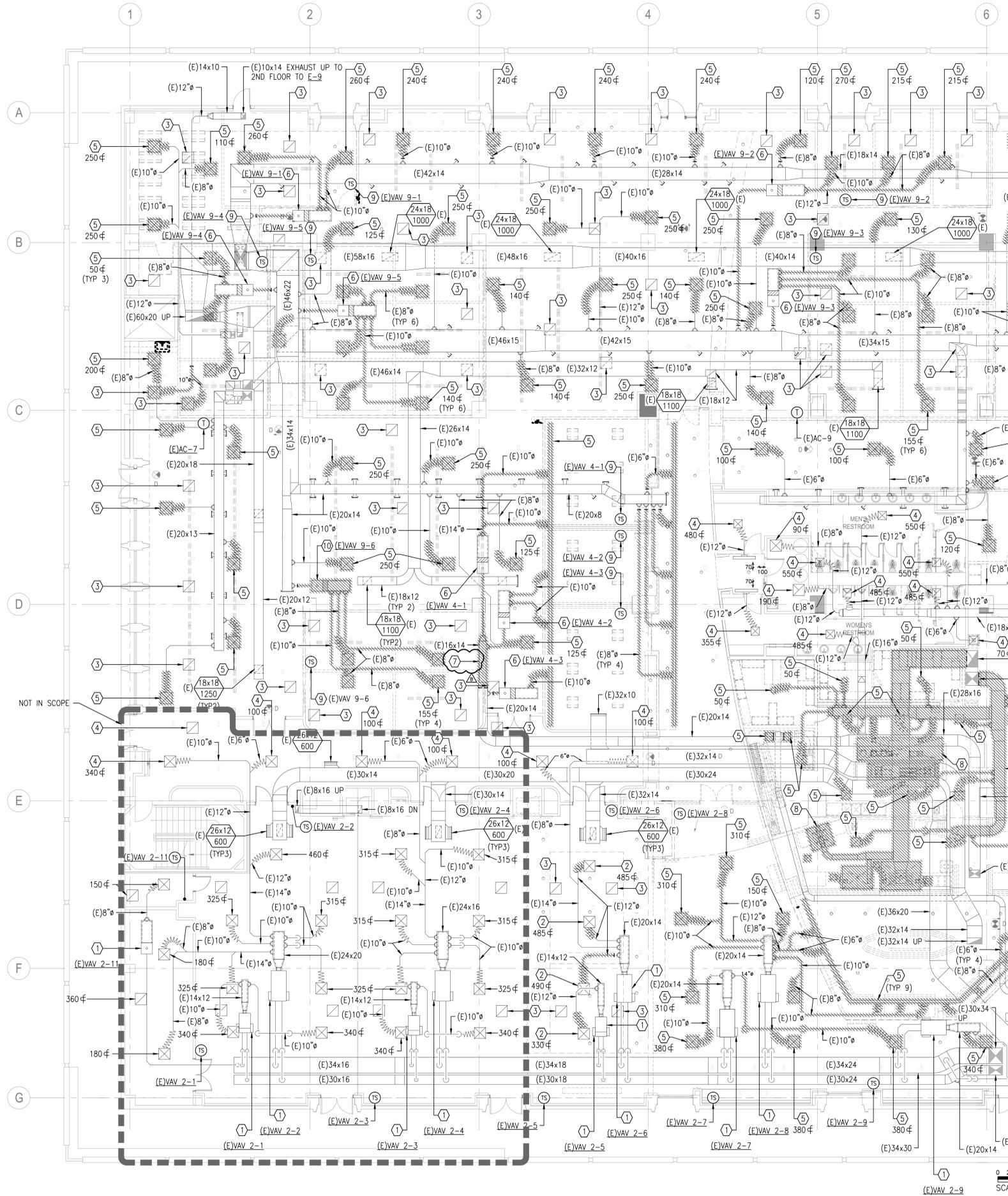
CITY OF SAN DIEGO

MECHANICAL GENERAL NOTES

CITY OF SAN DIEGO, CALIFORNIA PUBLIC WORKS DEPARTMENT SHEET 186 OF 402 SHEETS		WBS S-17009
APPROVED BY: FOR CITY ENGINEER JASON GRAN PRINT DATE NAME	DATE 5/31/2018 7/20/18	SUBMITTED BY: JORGE ACEVEDO PROJECT MANAGER CHECKED BY: MARLON PEREZ PROJECT ENGINEER
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ADDENDUM B		6/25/2018
		CS827 COORDINATE
		CS883 COORDINATE
CONTRACTOR INSPECTOR	DATE STARTED	40154 - 186 - D
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ADDED NOTE 9, 10, AND 11 TO GENERAL SCOPE OF WORK ADDENDUM B

FILE NAME: K:\PROJECTS\GENSLER - 135\003\CITY OF SD - 101 ASH ST TENANT IMPROVEMENT\DRAWINGS\CAD\2013\MECH\135-003-MA-M01.201A.DWG PLOT DATE: 6/25/2018 3:50 PM PRINT BY: NICHOLAS CLEMENTS



SHEET NOTES

- ALL REMAINING AREAS TO BE REBALANCED TO MATCH DESIGN AIRFLOW.

KEYNOTES

- EXISTING VAV BOX TO REMAIN.
- DISCONNECT AND REMOVE EXISTING DIFFUSER. DEMOLISH EXISTING FLEX DUCT, CLEAN AND RELOCATE DIFFUSER PER FIRST FLOOR NEW WORK DRAWINGS ON SHEET M01.201A.
- REMOVE EXISTING RETURN/EXHAUST GRILL, CLEAN AND RELOCATE PER FIRST FLOOR NEW WORK DRAWINGS.
- EXISTING DIFFUSER/REGISTER TO REMAIN.
- DEMOLISH EXISTING DIFFUSERS, REGISTERS, GRILLES, AND DUCTWORK SHOWN.
- EXISTING VAV BOX TO BE DISCONNECTED, CLEANED, AND RELOCATED PER FIRST FLOOR NEW WORK DRAWINGS.
- DEMOLISH DUCTWORK FOR AC-4 AS SHOWN.
- DEMOLISH DUCTWORK, GRILLES, AND HOODS FOR EF 3-1 AS SHOWN.
- DISCONNECT, CLEAN, AND RELOCATE EXISTING TEMPERATURE SENSOR PER FIRST FLOOR NEW WORK DRAWINGS ON SHEET M02.201A.
- DEMOLISH EXISTING VAV BOX.

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M01.201A

CITY OF SAN DIEGO
 MECHANICAL DEMO LEVEL 01 SOUTH

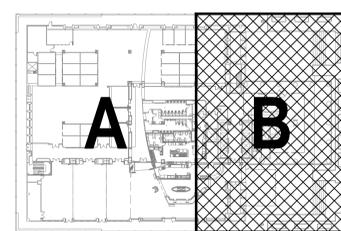
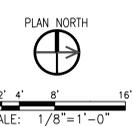
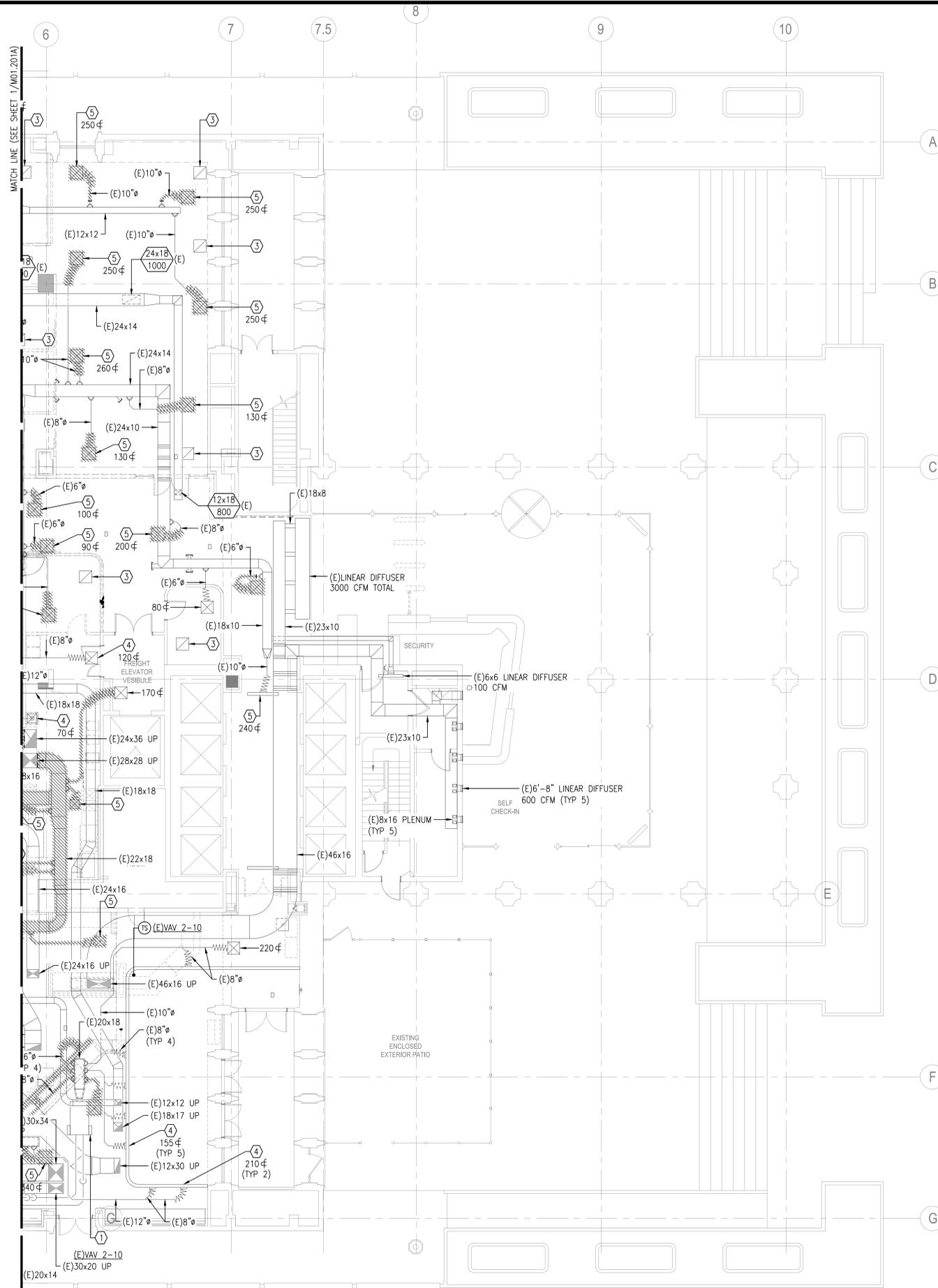
CITY OF SAN DIEGO, CALIFORNIA PUBLIC WORKS DEPARTMENT SHEET 200 OF 402 SHEETS		WBS S-17009
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ORIGINAL		
ADDENDUM B		
CONTRACTOR	DATE STARTED	DATE COMPLETED
INSPECTOR		
		40154 - 200 - D

01 MECHANICAL DEMO FLOOR PLAN - LEVEL 01 SOUTH
 SCALE: 1/8" = 1'-0"

02 LEVEL 01 - KEYPLAN
 SCALE: 1/64" = 1'-0"

ADDED KEYNOTE 7 TO THE FLOORPLAN
 ADDENDUM B
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KEYNOTES

- 1 EXISTING VAV BOX TO REMAIN.
- 2 NOT USED.
- 3 REMOVE EXISTING RETURN/EXHAUST GRILL, CLEAN AND RELOCATE PER FIRST FLOOR NEW WORK DRAWINGS.
- 4 EXISTING DIFFUSER/REGISTER TO REMAIN.
- 5 DEMOLISH EXISTING DIFFUSERS, REGISTERS, GRILLES, AND DUCTWORK SHOWN.

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M01.201B

CITY OF SAN DIEGO
 MECHANICAL DEMO LEVEL 01 NORTH

CITY OF SAN DIEGO, CALIFORNIA PUBLIC WORKS DEPARTMENT SHEET 201 OF 402 SHEETS		WBS S-17009
APPROVED FOR CITY ENGINEER JASON GRANU PRINT DGE NAME	DATE 5/31/2018 7/20/18	SUBMITTED BY JORGE ACEVEDO PROJECT MANAGER CHECKED BY MARLON PEREZ PROJECT ENGINEER
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		40154 - 201 - D

01 MECHANICAL DEMO FLOOR PLAN - LEVEL 01 NORTH
 SCALE: 1/8" = 1'-0"

02 LEVEL 01 - KEYPLAN
 SCALE: 1/8" = 1'-0"

SHEET NOTES

1. PROVIDE PRE-DEMOLITION AIR READINGS OF EACH DIFFUSER.

KEYNOTES

- ① DISCONNECT, CLEAN AND RELOCATE EXISTING LINEAR DIFFUSER TO LOCATION SHOWN ON SHEET M02.209. DEMOLISH EXISTING FLEX CONNECTION AND CAP AND SEAL DUCT AT BRANCH CONNECTION.
- ② DISCONNECT, CLEAN AND RETURN EXISTING LINEAR DIFFUSER TO OWNER. DEMOLISH EXISTING FLEX CONNECTION AND CAP AND SEAL DUCT AT BRANCH CONNECTION.
- ③ DISCONNECT, CLEAN AND RELOCATE EXISTING SUPPLY DIFFUSER TO LOCATION SHOWN ON SHEET M2.203. DEMOLISH EXISTING FLEX CONNECTION AND CAP AND SEAL DUCT AT BRANCH CONNECTION.
- ④ DISCONNECT, CLEAN, AND RELOCATE EXISTING THERMOSTAT TO NEW LOCATION ON SHEET M02.203.
- ⑤ DISCONNECT AND REMOVE EXISTING IT ROOM STAND ALONE UNIT AND ALL ASSOCIATED APPURTENANCES.

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Date	Description	AK/SS
07.28.2017	ISSUE PERMIT	AK/SS
09.08.2017	ISSUE FOR BID	AK/SS
05.07.2018	ISSUE FOR BID	AK/SS
06.25.2018	ADDENDUM 'B'	AK/LM



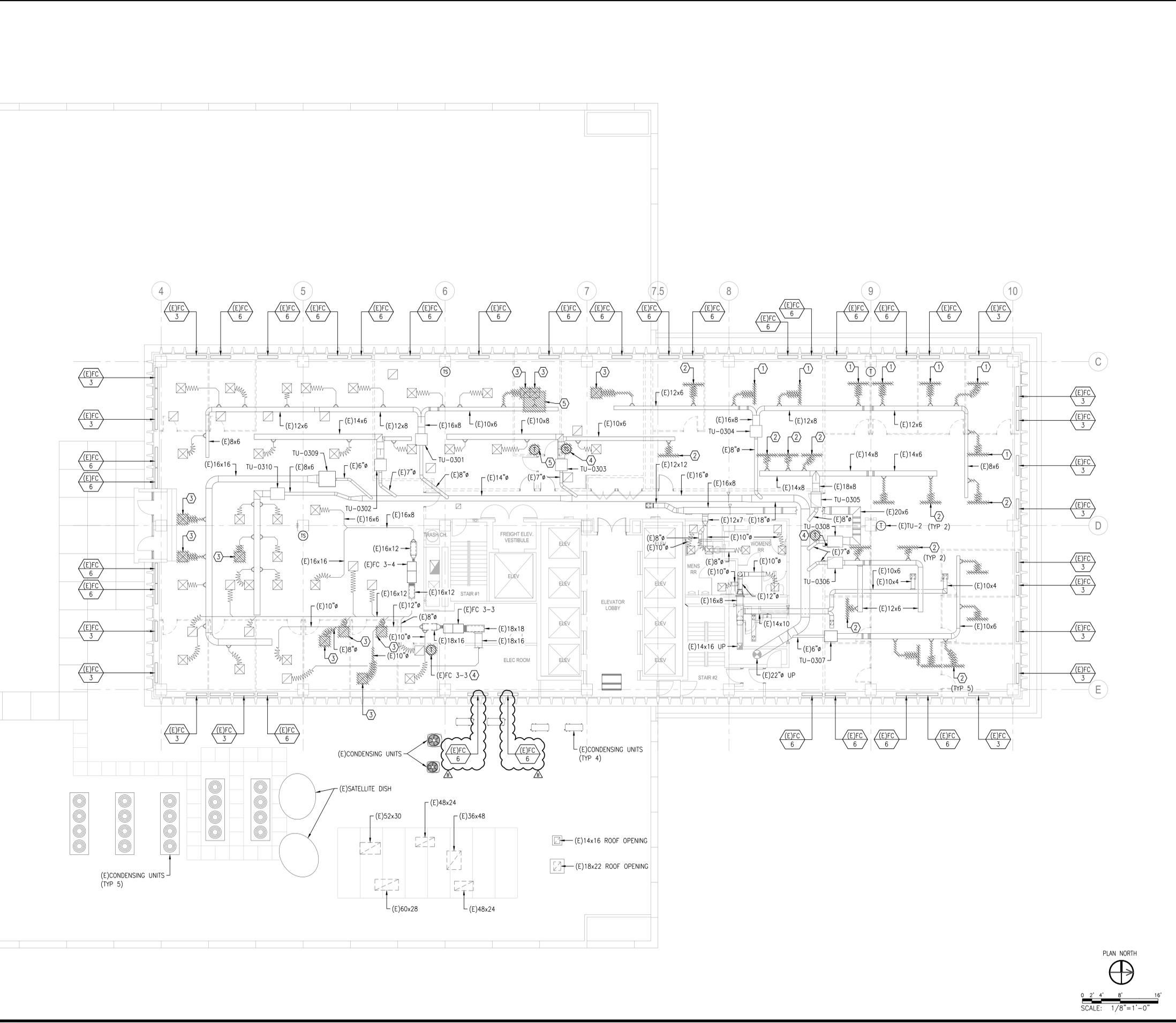
Project Number
 55.7291.013

The City of
SAN DIEGO
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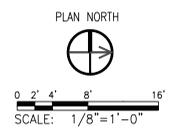
M01.203

CITY OF SAN DIEGO
 MECHANICAL DEMO LEVEL 03

CITY OF SAN DIEGO, CALIFORNIA PUBLIC WORKS DEPARTMENT SHEET 203 OF 402 SHEETS		WBS S-17009
APPROVED: [Signature] FOR CITY ENGINEER PRINT DCE NAME	DATE: 5/31/2018 7/20/18	SUBMITTED BY: JORGE ACEVEDO PROJECT MANAGER CHECKED BY: MARLON PEREZ PROJECT ENGINEER
DESCRIPTION	BY	APPROVED
ORIGINAL		5/31/2018
ADDENDUM B		05/25/2018
CONTRACTOR	DATE STARTED	CS287 COORDINATE
INSPECTOR	DATE COMPLETED	CS883 COORDINATE
		40154 - 203 - D

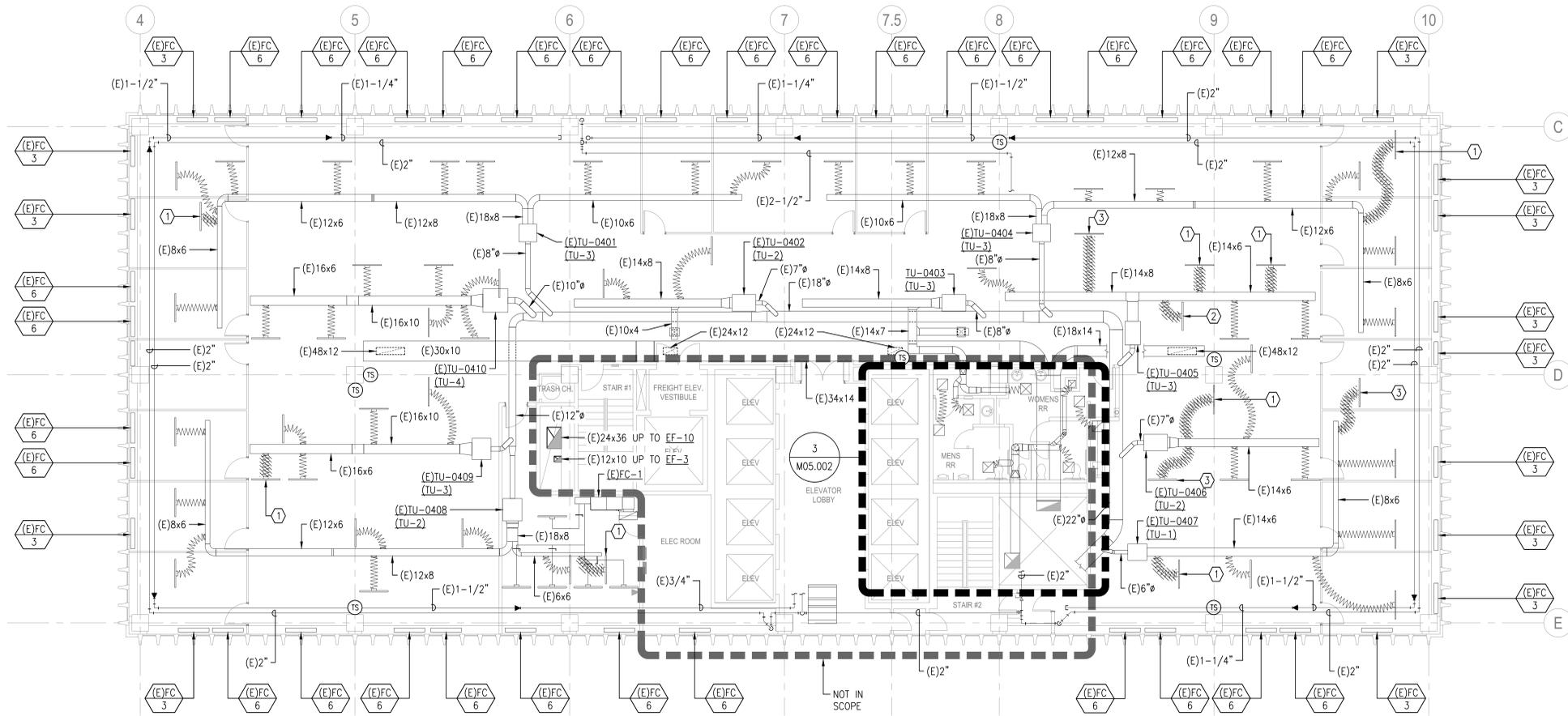


01 MECHANICAL DEMO FLOOR PLAN - LEVEL 03
 SCALE: 1/8" = 1'-0"



FILE NAME: K:\PROJECTS\GENSLER - 135\003\CITY OF SD - 101 ASH ST TENANT IMPROVEMENT\DRAWINGS\CAD\2013\MECH\135-003-M01.203.DWG PLOT DATE: 6/25/2018 3:50 PM PRINT BY: NICHOLAS CLEMENTS

FILE NAME: K:\PROJECTS\GENSLER - 135\003\CITY OF SD - 101 ASH ST TENANT IMPROVEMENT\DRAWINGS\CAD\2013\MECH\135-003-M01.204.DWG PLOT DATE: 6/25/2018 3:50 PM PRINT BY: NICHOLAS CLEMENTS



SHEET NOTES

1. PROVIDE PRE-DEMOLITION AIR READINGS OF EACH DIFFUSER.

KEYNOTES

- ① DISCONNECT, CLEAN AND RELOCATE EXISTING LINEAR DIFFUSER TO LOCATION SHOWN ON SHEET M02.204. DEMOLISH EXISTING FLEX CONNECTION AND CAP AND SEAL DUCT AT BRANCH CONNECTION.
- ② DISCONNECT, CLEAN AND RELOCATE EXISTING LINEAR DIFFUSER TO LOCATION SHOWN ON SHEET M2.202A. DEMOLISH EXISTING FLEX CONNECTION AND CAP AND SEAL DUCT AT BRANCH CONNECTION.
- ③ DISCONNECT, CLEAN AND RELOCATE EXISTING LINEAR DIFFUSER TO LOCATION SHOWN ON SHEET M02.204. DEMOLISH EXISTING FLEX CONNECTION.

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07.28.2017	ISSUE PERMIT	AK/SS
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05.07.2018	ISSUE FOR BID	AK/SS
06.25.2018	ADDENDUM 'B'	AK/ML



Project Number
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M01.204

CITY OF SAN DIEGO

MECHANICAL DEMO LEVEL 04

CITY OF SAN DIEGO, CALIFORNIA
PUBLIC WORKS DEPARTMENT
SHEET 204 OF 402 SHEETS

APPROVED:	FOR CITY ENGINEER	DATE	5/31/2018	77208	SUBMITTED BY	JORGE ACEVEDO
PROJECT MANAGER	DATE	5/31/2018	77208	PROJECT ENGINEER	DATE	5/31/2018
DESCRIPTION	BY	APPROVED	DATE	FILMED	PROJECT ENGINEER	
ORIGINAL			5/31/2018			
ADDENDUM B			6/25/2018			CS27 COORDINATE
						CS83 COORDINATE
CONTRACTOR	DATE STARTED	DATE COMPLETED				40154 - 204 - D
INSPECTOR						



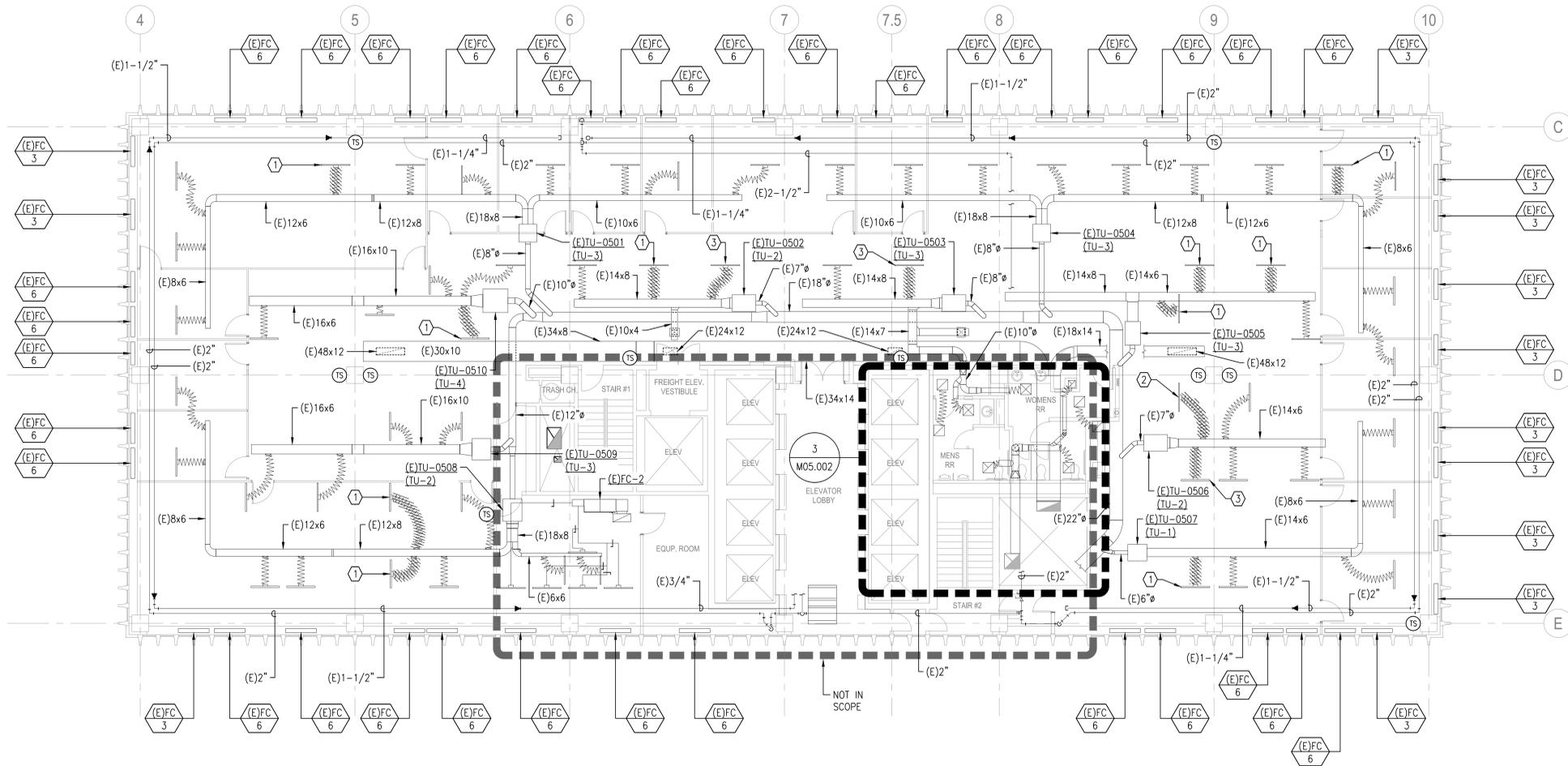
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SCALE: 1/8" = 1'-0"

01 MECHANICAL DEMO FLOOR PLAN - LEVEL 04
SCALE: 1/8" = 1'-0"

MODIFIED KEYNOTE 2

ADDENDUM B

FILE NAME: K:\PROJECTS\GENSLER - 135\003\CITY OF SD - 101 ASH ST TENANT IMPROVEMENT\DRAWINGS\CAD\2013\MECH\135-003-M01.205.DWG PLOT DATE: 6/25/2018 3:50 PM PRINT BY: NICHOLAS CLEMENTS



SHEET NOTES

1. PROVIDE PRE-DEMOLITION AIR READINGS OF EACH DIFFUSER.

KEYNOTES

- ① DISCONNECT, CLEAN AND RELOCATE EXISTING LINEAR DIFFUSER TO LOCATION SHOWN ON SHEET M02.205. DEMOLISH EXISTING FLEX CONNECTION AND CAP AND SEAL DUCT AT BRANCH CONNECTION.
- ② DISCONNECT, CLEAN AND RELOCATE EXISTING LINEAR DIFFUSER TO LOCATION SHOWN ON SHEET M2.202A. DEMOLISH EXISTING FLEX CONNECTION AND CAP AND SEAL DUCT AT BRANCH CONNECTION.
- ③ DISCONNECT, CLEAN AND RELOCATE EXISTING LINEAR DIFFUSER TO LOCATION SHOWN ON SHEET M02.205. DEMOLISH EXISTING FLEX CONNECTION.

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07.28.2017	ISSUE PERMIT	AKISS
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Project Number
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M01.205

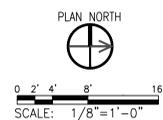
CITY OF SAN DIEGO
MECHANICAL DEMO LEVEL 05

CITY OF SAN DIEGO, CALIFORNIA
PUBLIC WORKS DEPARTMENT
SHEET 205 OF 402 SHEETS

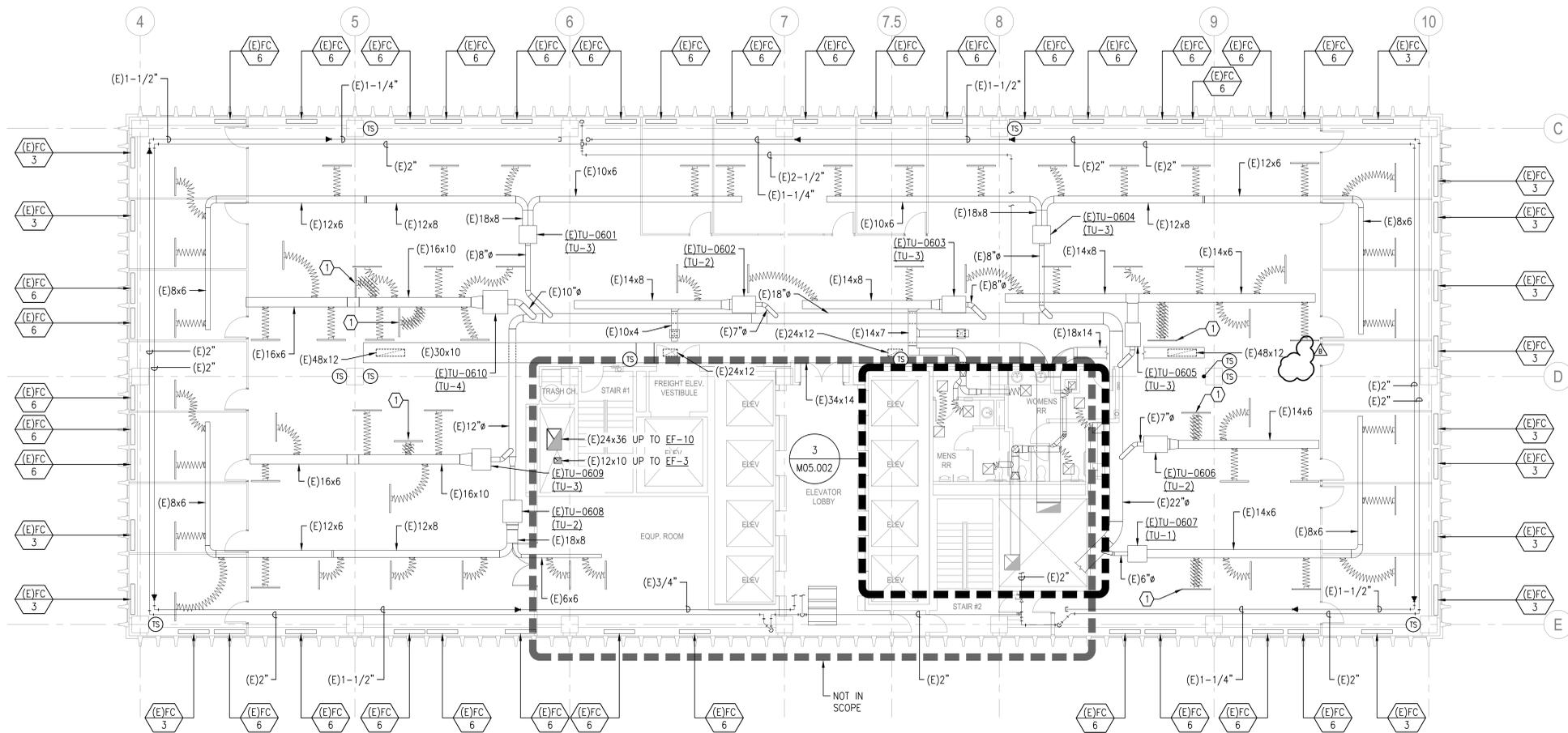
WBS S-17009

APPROVED: 	DATE: 5/31/2018	SUBMITTED BY: JORGE ACEVEDO		
FOR CITY ENGINEER: JASON GRAN	DATE: 7/20/18	PROJECT MANAGER		
PRINT DGE NAME: _____	RCER: _____	PROJECT ENGINEER: MARLON PEREZ		
DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL			5/31/2018	
ADDENDUM B			6/25/2018	
				CS27 COORDINATE
				CS83 COORDINATE
CONTRACTOR	DATE STARTED			40154 - 205 - D
INSPECTOR	DATE COMPLETED			

01 MECHANICAL DEMO FLOOR PLAN - LEVEL 05
SCALE: 1/8" = 1'-0"



FILE NAME: C:\PROJECTS\GENSLER - 135\003\CITY OF SD - 101 ASH ST TENANT IMPROVEMENT\DRAWINGS\CAD\2013\MECH\135-003-M01.206.DWG PLOT DATE: 6/25/2018 3:50 PM PRINT BY: NICHOLAS CLEMENTS



SHEET NOTES

1. PROVIDE PRE-DEMOLITION AIR READINGS OF EACH DIFFUSER.

KEYNOTES

① DISCONNECT, CLEAN AND RELOCATE EXISTING LINEAR DIFFUSER TO LOCATION SHOWN ON SHEET M02.206. DEMOLISH EXISTING FLEX CONNECTION AND CAP AND SEAL DUCT AT BRANCH CONNECTION.

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Date	Description	AK/SS
07.28.2017	ISSUE PERMIT	AK/SS
09.08.2017	ISSUE FOR BID	AK/SS
03.07.2018	ISSUE FOR BID	AK/SS
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Project Number
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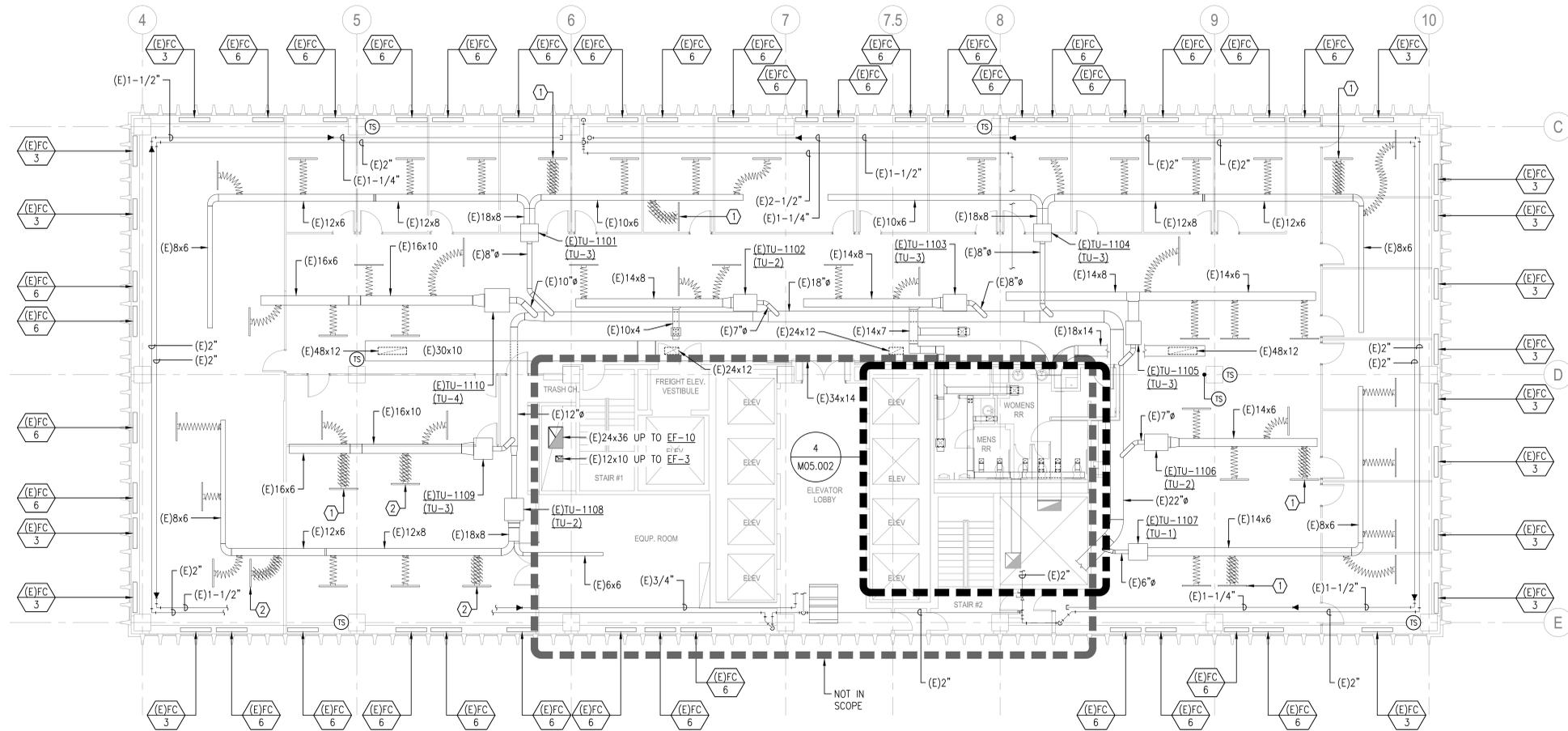
M01.206

CITY OF SAN DIEGO
MECHANICAL DEMO LEVEL 06

CITY OF SAN DIEGO, CALIFORNIA PUBLIC WORKS DEPARTMENT SHEET 206 OF 402 SHEETS		WBS S-17009
APPROVED: _____ FOR CITY ENGINEER JASON GRAN	DATE: 5/31/2018 7/20/18	SUBMITTED BY: JORGE ACEVEDO PROJECT MANAGER PROJECT ENGINEER: MARLON PEREZ
DESCRIPTION	BY	APPROVED
ORIGINAL		5/31/2018
ADDENDUM B		6/25/2018
CONTRACTOR INSPECTOR		DATE STARTED DATE COMPLETED
		40154 - 206 - D

01 MECHANICAL DEMO FLOOR PLAN - LEVEL 06
SCALE: 1/8" = 1'-0"

FILE NAME: K:\PROJECTS\GENSLER - 135\003\CITY OF SD - 101 ASH ST TENANT IMPROVEMENT\DRAWINGS\CAD\2013\MECH\135-003-M01.211.DWG PLOT DATE: 6/25/2018 3:50 PM PRINT BY: NICHOLAS CLEMENTS



SHEET NOTES

1. PROVIDE PRE-DEMOLITION AIR READINGS OF EACH DIFFUSER.

KEYNOTES

- ① DISCONNECT, CLEAN AND RELOCATE EXISTING LINEAR DIFFUSER TO LOCATION SHOWN ON SHEET M02.211. DEMOLISH EXISTING FLEX CONNECTION AND CAP AND SEAL DUCT AT BRANCH CONNECTION.
- ② DISCONNECT, CLEAN AND RELOCATE EXISTING LINEAR DIFFUSER TO LOCATION SHOWN ON SHEET M2.202A. DEMOLISH EXISTING FLEX CONNECTION AND CAP AND SEAL DUCT AT BRANCH CONNECTION.

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Project Number
55.7291.013

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Public Works

M01.211

CITY OF SAN DIEGO
MECHANICAL DEMO LEVEL 11

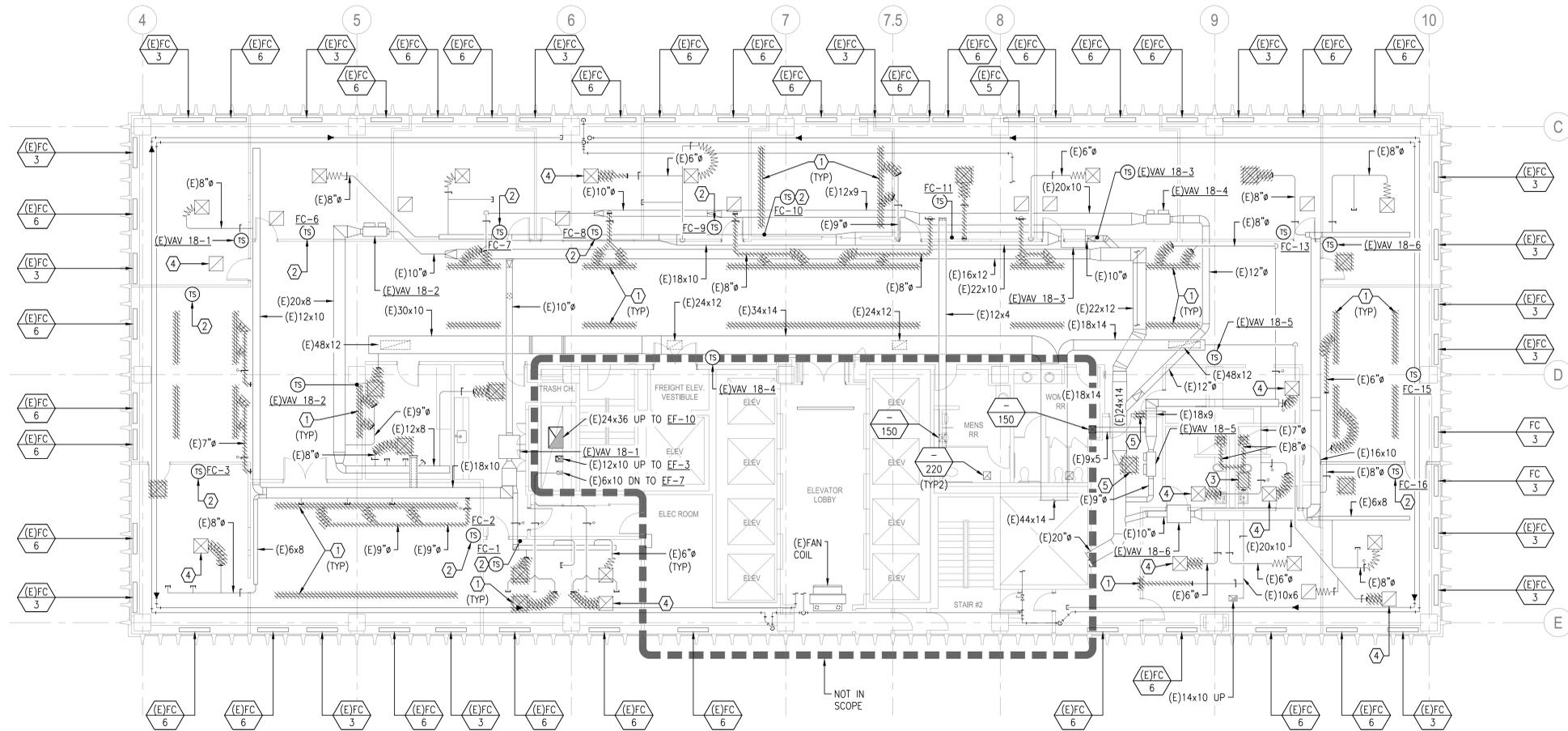
CITY OF SAN DIEGO, CALIFORNIA
PUBLIC WORKS DEPARTMENT
SHEET 211 OF 402 SHEETS

WBS S-17009

APPROVED	DATE	5/31/2018	SUBMITTED BY	JORGE ACEVEDO
FOR CITY ENGINEER	DATE	7/20/18	PROJECT MANAGER	JORGE ACEVEDO
PRINT DGE NAME	RCER		PROJECT ENGINEER	MARLON PEREZ
DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL			5/31/2018	
ADDENDUM B			6/25/2018	
				CS27 COORDINATE
				CS83 COORDINATE
CONTRACTOR	DATE STARTED			
INSPECTOR	DATE COMPLETED			40154 - 211 - D

01 MECHANICAL DEMO FLOOR PLAN - LEVEL 11
SCALE: 1/8" = 1'-0"

FILE NAME: K:\PROJECTS\GENSLER - 135\003\CITY OF SD - 101 ASH ST TENANT IMPROVEMENT\DRAWINGS\CAD\2013\MECH\135-003-M01.218.DWG PLOT DATE: 6/25/2018 9:51 PM PRINT BY: NICHOLAS CLEMENTS



KEYNOTES

- ① DEMOLISH EXISTING DIFFUSER AND RETURN/EXHAUST GRILLE AS SHOWN. DEMOLISH EXISTING FLEX DUCT.
- ② DISCONNECT, CLEAN AND RELOCATE EXISTING TEMPERATURE SENSOR PER FLOOR 18, NEW WORK ON SHEET M02.218.
- ③ DISCONNECT AND REMOVE EXISTING EXHAUST FAN AND ALL ASSOCIATED APPURTENANCES.
- ④ REMOVE DIFFUSER AND RETURN/EXHAUST GRILLE AS SHOWN, CLEAN AND RELOCATE PER SHEET M02.218.
- ⑤ DEMOLISH EXISTING RETURN GRILLE AS SHOWN.

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Date	Description	AKISS
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55.7291.013

The City of
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M01.218

CITY OF SAN DIEGO

MECHANICAL DEMO LEVEL 18

CITY OF SAN DIEGO, CALIFORNIA
PUBLIC WORKS DEPARTMENT
SHEET 218 OF 402 SHEETS

APPROVED:	DATE:	5/31/2018	SUBMITTED BY:	JORGE ACEVEDO
FOR CITY ENGINEER:	DATE:	7/20/18	PROJECT MANAGER:	JORGE ACEVEDO
PRINT DCE NAME:	DATE:		PROJECT ENGINEER:	MARLON PEREZ
DESCRIPTION:	BY:	APPROVED:	DATE:	FILMED:
ORIGINAL			5/31/2018	
ADDENDUM B			6/25/2018	
				CS837 COORDINATE
				CS837 COORDINATE
CONTRACTOR:	DATE STARTED:			
INSPECTOR:	DATE COMPLETED:			40154 - 218 - D



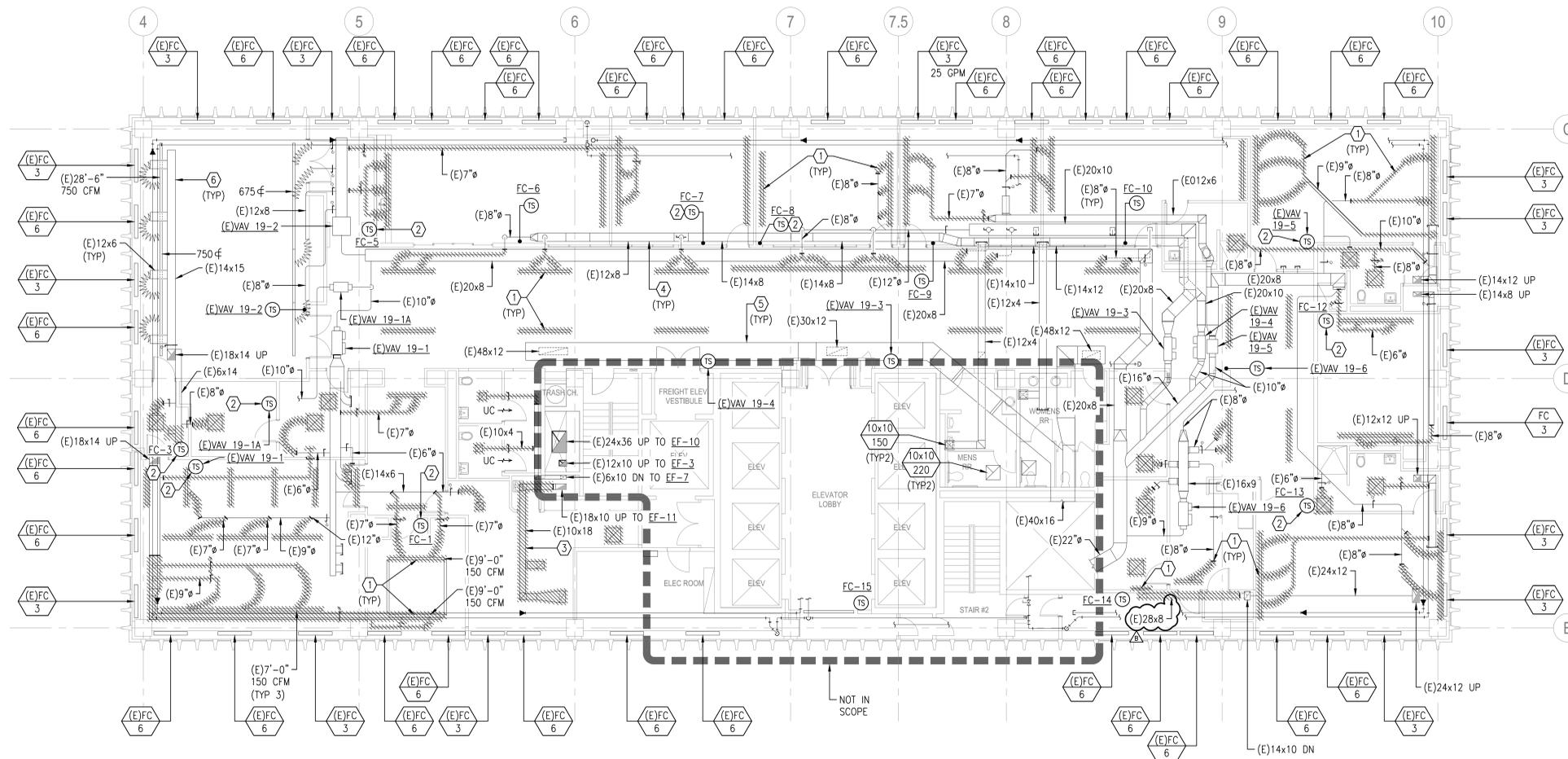
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SCALE: 1/8" = 1'-0"

01 MECHANICAL DEMO FLOOR PLAN - LEVEL 18
SCALE: 1/8" = 1'-0"

MODIFIED KEYNOTE 2 AND 4

ADDENDUM B

FILE NAME: K:\PROJECTS\GENSLER - 135\003\CITY OF SD - 101 ASH ST TENANT IMPROVEMENT\DRAWINGS\CAD\2013\MECH\135-003-M01.219.DWG PLOT DATE: 6/25/2018 9:51 PM PRINT BY: NICHOLAS CLEMENTS



KEYNOTES

- ① DEMOLISH EXISTING DIFFUSER/REGISTER AND ASSOCIATED FLEX DUCT AS SHOWN.
- ② DISCONNECT, CLEAN, AND RELOCATE EXISTING TEMPERATURE SENSOR PER LEVEL 19 NEW WORK ON SHEET M02.219.
- ③ DEMOLISH DUCTWORK, GRILLES, AND HOODS FOR EXISTING KITCHEN EXHAUST FAN AS SHOWN.
- ④ EXISTING SUPPLY DUCT TO REMAIN AND BE REUSED.
- ⑤ EXISTING RETURN DUCT TO REMAIN AND BE REUSED.
- ⑥ EXISTING EXHAUST DUCT TO REMAIN AND BE REUSED.

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05.07.2018	ISSUE FOR BID	AKISS
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Project Number
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The City of
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M01.219

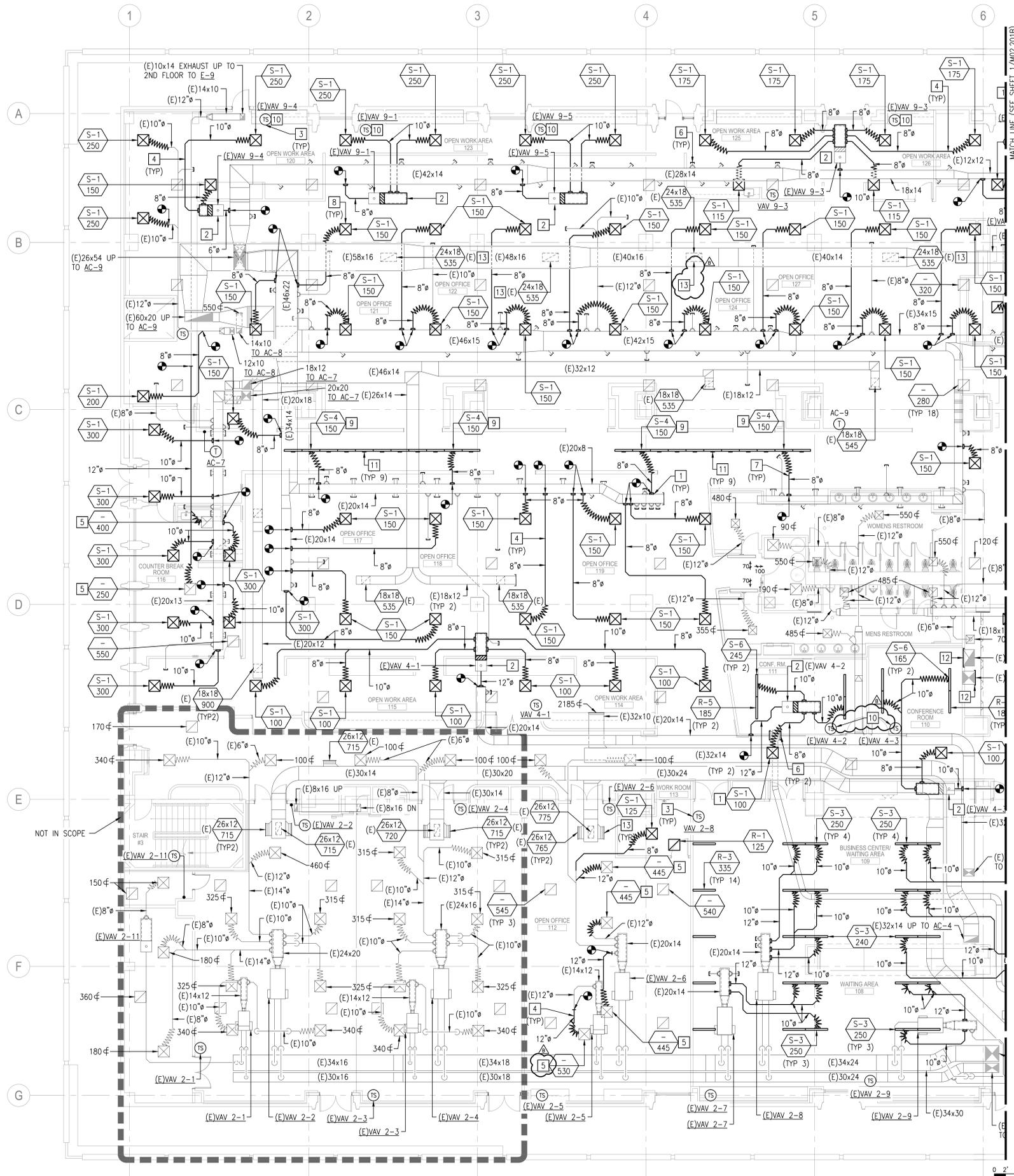
CITY OF SAN DIEGO
MECHANICAL DEMO LEVEL 19

CITY OF SAN DIEGO, CALIFORNIA PUBLIC WORKS DEPARTMENT SHEET 219 OF 402 SHEETS		WBS S-17009
APPROVED:	DATE: 5/31/2018	SUBMITTED BY: JORGE ACEVEDO
FOR CITY ENGINEER	DATE: 7/20/18	PROJECT MANAGER
PRINT DGE NAME: JASON GRANU	RCER	PROJECT ENGINEER
DESCRIPTION	BY	APPROVED
ORIGINAL		5/31/2018
ADDENDUM B		6/25/2018
		CS27 COORDINATE
		CS83 COORDINATE
CONTRACTOR	DATE STARTED	40154 - 219 - D
INSPECTOR	DATE COMPLETED	

01 MECHANICAL DEMO FLOOR PLAN - LEVEL 19
SCALE: 1/8" = 1'-0"

ADDED DIMENSION TO EXHAUST DUCTWORK BEING DEMO'D ADDENDUM B

FILE NAME: K:\PROJECTS\GENSLER - 135\003 CITY OF SD - 101 ASH ST TENANT IMPROVEMENT\DRAWINGS\CAD\2013\MECH\135-003-M02.201A.DWG PLOT DATE: 6/25/2018 3:51 PM PRINT BY: NICHOLAS CLEMENTS



VAV/TERMINAL UNIT ZONE SCHEDULE

TAG	SIZE	MAX / MIN
VAV 2-1	8	600 /
VAV 2-2	14	2540 /
VAV 2-3	8	680 /
VAV 2-4	14	2030 /
VAV 2-5	8	570 /
VAV 2-6	12	1660 /
VAV 2-7	10	750 /
VAV 2-8	12	1240 /
VAV 2-9	10	750 /
VAV 2-10	14	2235 /
VAV 2-11	6	150 /
VAV 4-1	8	600 /
VAV 4-2	8	590 /
VAV 4-3	6	430 /
VAV 9-1	8	500 /
VAV 9-2	8	665 /
VAV 9-3	10	930 /
VAV 9-4	8	400 /
VAV 9-5	8	500 /
VAV 9-6	8	DEMOLISHED

SHEET NOTES

- CAP EXISTING DUCTWORK AS SHOWN.
- SEE SHEET 2/M05.001 FOR BRANCH DUCTWORK CONNECTION DETAIL.
- INSTALL ASSOCIATED VAV THAT WAS PREVIOUSLY REMOVED ON SHEET M01.201A. PROVIDE INSULATED PLENUM BOX AS SHOWN. SEE SHEET 4/M05.001 FOR TERMINAL UNIT/VAV UNIT INSTALLATION DETAIL.
- SEE SHEET 7/M05.001 FOR THERMOSTAT/TEMP SENSOR MOUNTING DETAIL.
- PROVIDE NEW DUCT LAYOUT AND INSULATION AS SHOWN.
- PROVIDE RELOCATED SUPPLY DIFFUSER OR RETURN/EXHAUST GRILLE FROM DEMO WORK ON SHEET M01.201A. REBALANCE DIFFUSER/GRILLE TO CFM AS SHOWN.
- CAP AND SEAL DUCTWORK AIR TIGHT AT LOCATION SHOWN.
- SEE SHEET 1/M05.001 FOR DUCT INSTALLATION DETAIL.
- SEE SHEET 5/M05.001 FOR CEILING DIFFUSER DETAIL.
- SEE 6/M05.001 FOR LINEAR SLOT DIFFUSER WITH PLENUM DETAIL. PAINT FACE TO MATCH CEILING
- RELOCATED TEMP SENSOR/THERMOSTAT SEE M01.201A
- PROVIDE S-4 INACTIVE LINEAR SLOT DIFFUSERS WITH BLANK OFF PLATES. PAINT FACE TO MATCH CEILING.
- CAP DUCTWORK AS SHOWN.
- BALANCE EXISTING RETURN AIR DUCT TO MATCH DESIGN AIRFLOW SHOWN.

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Date	Description	By
07.28.2017	ISSUE PERMIT	AK/SS
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05.07.2018	ISSUE FOR BID	AK/SS
6.06.2018	ADDENDUM 'B'	AK/JLM



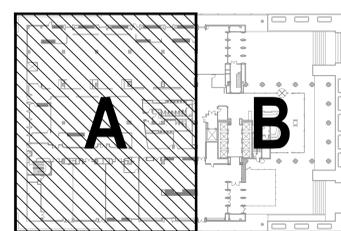
Project Number
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The City of
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 Public Works

M02.201A

CITY OF SAN DIEGO MECHANICAL LEVEL 01 SOUTH

CITY OF SAN DIEGO, CALIFORNIA PUBLIC WORKS DEPARTMENT SHEET 220 OF 402 SHEETS		WBS S-17009
APPROVED: FOR CITY ENGINEER JASON GRANU PRINT DATE NAME	DATE: 5/31/2018 7/20/18	DATE FILMED: 5/31/2018 6/25/2018
DESCRIPTION: ORIGINAL	BY: ADDENDUM B	FILED: CS27 COORDINATE
CONTRACTOR INSPECTOR	DATE STARTED: DATE COMPLETED:	FILED: CS27 COORDINATE 40154 - 220 - D

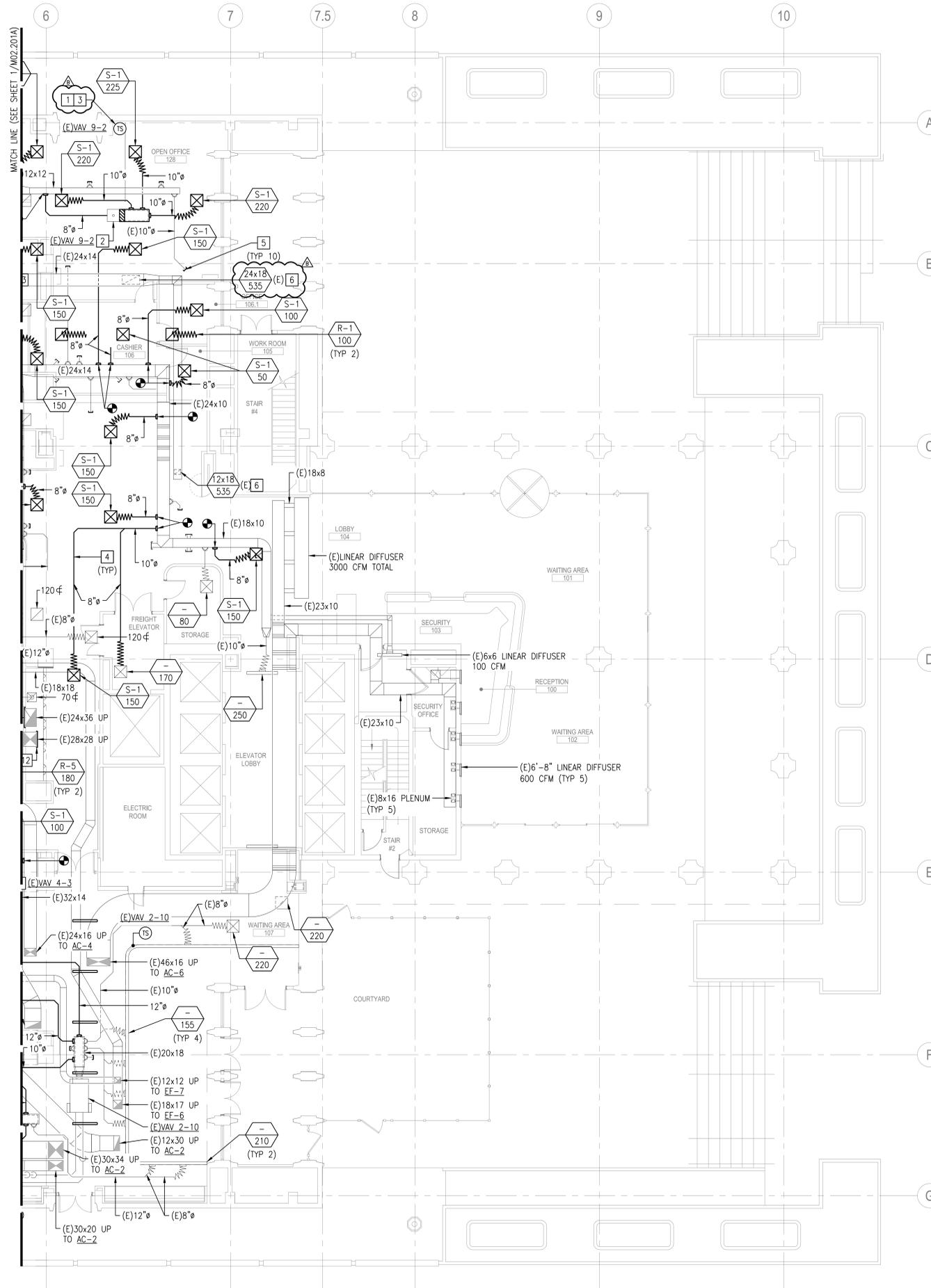


01 MECHANICAL FLOOR PLAN - LEVEL 01 SOUTH
 SCALE: 1/8" = 1'-0"

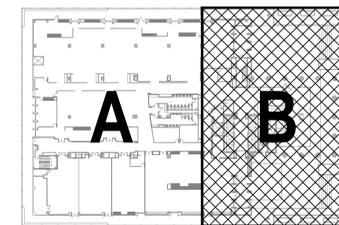
02 LEVEL 01 - KEYPLAN
 SCALE: 1/8" = 1'-0"

RELOCATED KEYNOTE 10 ON FLOORPLAN. RELOCATED NOTE 13 TO RETURN DUCT OFF AC-9. RELOCATED KEYNOTE 5 TO SUPPLY DIFFUSER OFF VAV 2-5. **ADDENDUM B**

FILE NAME: C:\PROJECTS\GENSLER - 135\003 CITY OF SD - 101 ASH ST TENANT IMPROVEMENT\DRAWINGS\CAD\2013\MECH\135-003-M02.201B.DWG PLOT DATE: 6/25/2018 3:51 PM PRINT BY: NICHOLAS CLEMENTS



SCALE: 1/8" = 1'-0"



SHEET NOTES

- ALL REMAINING AREAS TO BE REBALANCED TO MATCH DESIGN AIRFLOW.

KEYNOTES

- RELOCATE TEMPERATURE SENSOR/THERMOSTAT, SEE M01.201A.
- INSTALL ASSOCIATED VAV THAT WAS PREVIOUSLY REMOVED ON SHEET M01.201A. PROVIDE PLENUM BOX AS SHOWN.
- INSTALL ASSOCIATED TEMPERATURE SENSOR (TYP).
- PROVIDE NEW DUCT LAYOUT AND INSULATION AS SHOWN.
- CAP DUCTWORK AS SHOWN.
- BALANCE EXISTING RETURN AIR DUCT TO MATCH DESIGN AIRFLOW.

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6.06.25.2018	ADDENDUM 'B'	AK/LM



Project Number
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M02.201B

CITY OF SAN DIEGO
 MECHANICAL LEVEL 01 NORTH

CITY OF SAN DIEGO, CALIFORNIA PUBLIC WORKS DEPARTMENT SHEET 221 OF 402 SHEETS		WBS S-17009
APPROVED FOR CITY ENGINEER JASON GRANU PRINT DGE NAME	DATE 5/31/2018 7/20/18	SUBMITTED BY JORGE ACEVEDO PROJECT MANAGER CHECKED BY MARLON PEREZ PROJECT ENGINEER
DESCRIPTION	BY	APPROVED
ORIGINAL		5/31/2018
ADDENDUM B		6/25/2018
CONTRACTOR	DATE STARTED	DATE COMPLETED
INSPECTOR		
		40154 - 221 - D

CHANGED KEYNOTE 10 ON FLOORPLAN TO KEYNOTE 3. ADD KEYNOTE 6 TO RETURN REGISTER TAG. MODIFIED KEYNOTE 1.

01 MECHANICAL FLOOR PLAN - LEVEL 01 NORTH
 SCALE: 1/8" = 1'-0"

02 LEVEL 01 - KEYPLAN
 SCALE: 1/84" = 1'-0"

SHEET NOTES

1. BALANCE ALL EXISTING DIFFUSERS TO MATCH DESIGN AIRFLOW.
2. PROVIDE NEW DIFFUSER TO MEET DESIGN AIRFLOW.
3. SEE SHEET 2/M05.001 FOR BRANCH DUCTWORK CONNECTION DETAIL.
4. CAP EXISTING DUCTWORK AS SHOWN.
5. SEE SHEET 5/M05.001 FOR CEILING DIFFUSER DETAIL.
6. REBALANCE EXISTING DIFFUSER TO MEET DESIGN AIRFLOW.
7. SEE SHEET 8/M05.001 FOR DUCT THRU ROOF DETAIL.
8. SEE SHEET 1/M05.002 FOR GRAVITY VENTILATOR DETAIL.
9. RELOCATE EXISTING THERMOSTAT IN LOCATION SHOWN.
10. CONTRACTOR TO MODIFY SEQUENCE OF OPERATIONS OF FC 3-3 TO OPERATE CONTINUOUSLY 24HRS A DAY. DURING UNOCCUPIED HOURS OF BUILDING, FC 3-3 UNOCCUPIED SETPOINT SHALL BE 78°F. BALANCE FC 3-3 TO HAVE A MINIMUM OF 180 CFM OF OUTSIDE AIR.
11. BALANCE FC 3-4 TO HAVE A MINIMUM OF 125 CFM OF OUTSIDE AIR.
12. SEE 9/M05.001 FOR RETURN AIR WITH FLEX DUCT DETAIL.
13. UNABLE TO IDENTIFY LOCATION OF TEMP SENSOR, BUT EMS SHOWS TEMP READING. CONTRACTOR TO IDENTIFY LOCATION AND SHOW ON AS-BUILTS.

KEYNOTES

- 1
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- 11
- 12
- 13

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BSE PROJECT NO. 135-003
BSE ENGINEERING, INC.
 12480 Torrey Pines Dr., Suite 100
 San Diego, CA 92121
 TEL: 619.279.2500
 FAX: 619.279.2504

Date	Description	Author
07.28.2017	ISSUE PERMIT	AKISS
09.08.2017	ISSUE FOR BID	AKISS
05.07.2018	ISSUE FOR BID	AKISS
06.25.2018	ADDENDUM 'B'	AKJLM



Project Number
 55.7291.013

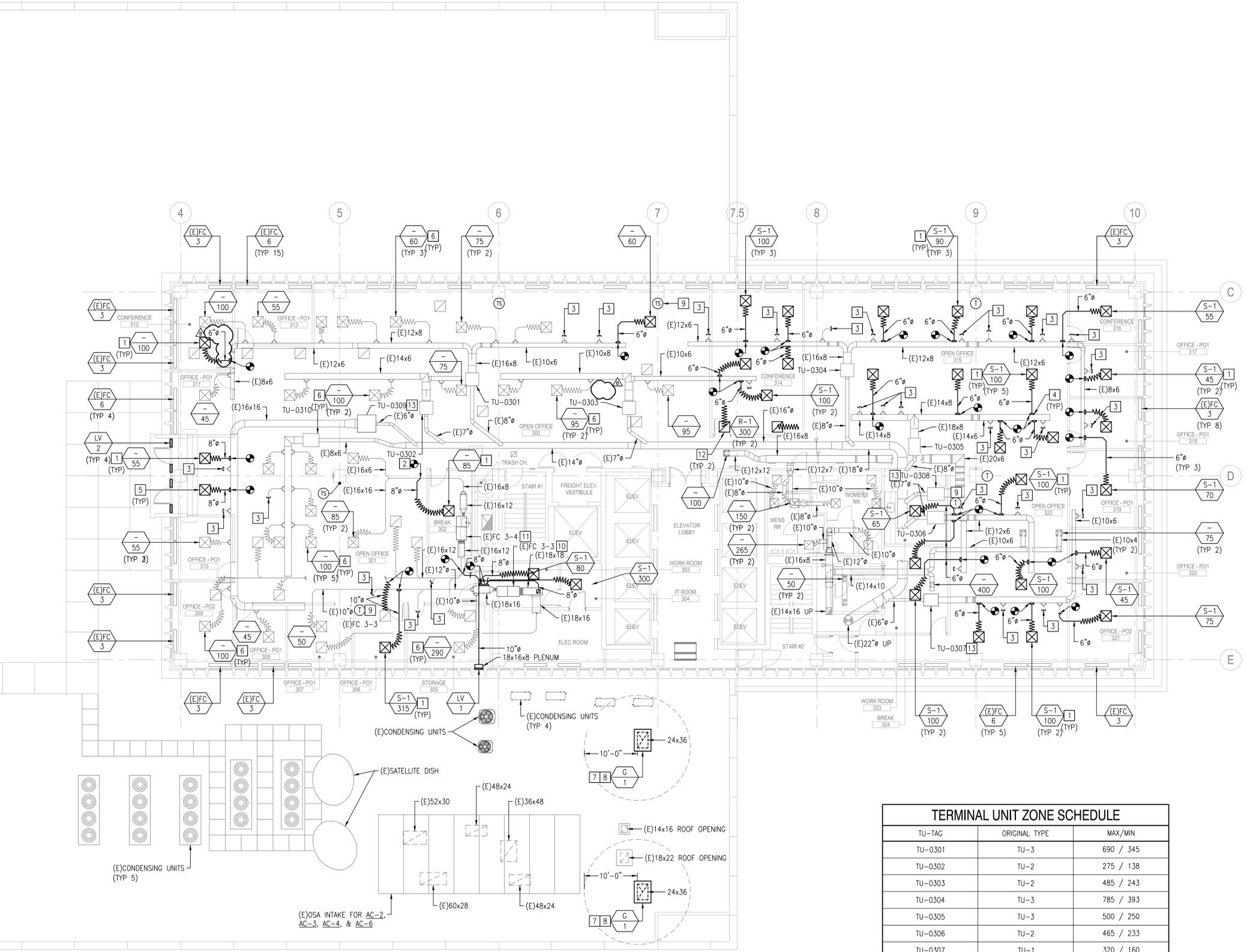
The City of
SAN DIEGO
 Public Works

M02.203

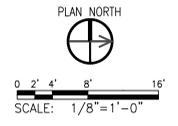
CITY OF SAN DIEGO
 MECHANICAL LEVEL 03

CITY OF SAN DIEGO, CALIFORNIA PUBLIC WORKS DEPARTMENT SHEET 223 OF 402 SHEETS		WBS S-17009
APPROVED: [Signature]	DATE: 5/31/2018	SUBMITTED BY: JORGE ACEVEDO
FOR CITY ENGINEER: JASON GRAN	DATE: 7/20/18	PROJECT MANAGER
PRINT DGE NAME: RCEB		PROJECT ENGINEER: MARLON PEREZ
DESCRIPTION	BY	APPROVED
ORIGINAL		5/31/2018
ADDENDUM B		6/25/2018
		CS27 COORDINATE
		CS27 COORDINATE
CONTRACTOR INSPECTOR	DATE STARTED	40154 - 223 - D
	DATE COMPLETED	

TU-TAG	ORIGINAL TYPE	MAX/MIN
TU-0301	TU-3	690 / 345
TU-0302	TU-2	275 / 138
TU-0303	TU-2	485 / 243
TU-0304	TU-3	785 / 393
TU-0305	TU-3	500 / 250
TU-0306	TU-2	465 / 233
TU-0307	TU-1	320 / 160
TU-0308	TU-2	400 / 200
TU-0309	TU-1	310 / 155
TU-0310	TU-3	500 / 250



01 MECHANICAL FLOOR PLAN - LEVEL 03
 SCALE: 1/8" = 1'-0"



ADDED SIZE TO FLEX DUCT. REMOVED THERMOSTAT ATTACHED IN DEMO

FILE NAME: K:\PROJECTS\GENSLER - 135\003\CITY OF SD - 101 ASH ST TENANT IMPROVEMENT\DRAWINGS\CAD\2013\MECH\135-003-M02.203.DWG PLOT DATE: 6/25/2018 9:51 PM PRINT BY: NICHOLAS CLEMENTS

FILE NAME: C:\PROJECTS\GENSLER - 135\003\CITY OF SD - 101 ASH ST TENANT IMPROVEMENT\DRAWINGS\CAD\2013\MECH\135-003-M02.204.DWG PLOT DATE: 6/25/2018 9:51 PM PRINT BY: NICHOLAS CLEMENTS

SHEET NOTES

1. BALANCE ALL EXISTING DIFFUSERS TO MATCH DESIGN AIRFLOW.

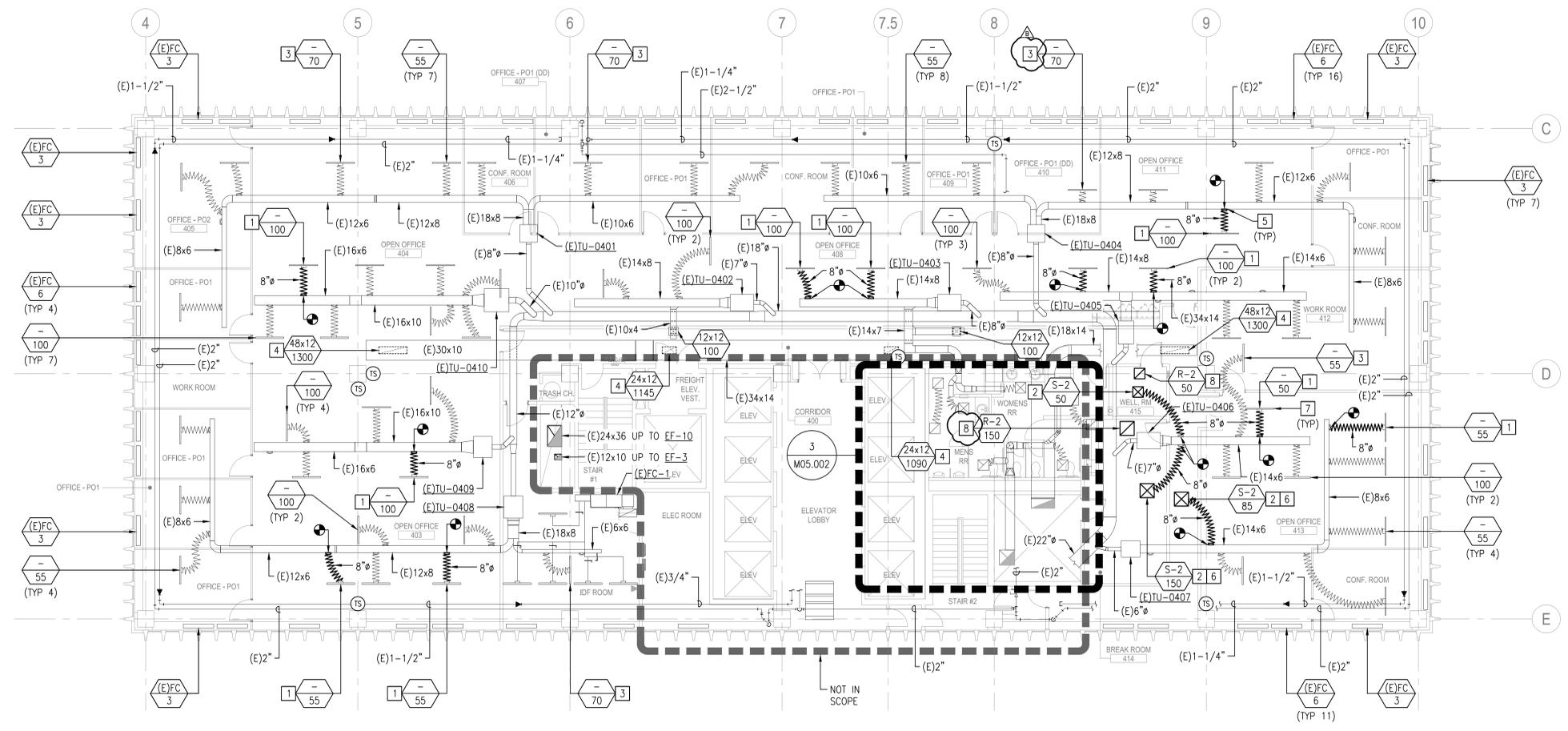
KEYNOTES

- 1 PROVIDE NEW FLEX DUCT AND MANUAL VOLUME DAMPER, RELOCATE DIFFUSER PER PLAN.
- 2 PROVIDE NEW DIFFUSER, FLEX DUCT AND MANUAL VOLUME DAMPER.
- 3 REBALANCE EXISTING DIFFUSER TO CFM SHOWN ON PLANS.
- 4 REBALANCE EXISTING RETURN AIR OPPOSED BLADE VOLUME CONTROL TO CFM SHOWN ON PLANS.
- 5 SEE 2/M05.001 FOR BRANCH DUCTWORK CONNECTIONS DETAIL.
- 6 SEE 5/M05.001 FOR CEILING DIFFUSER DETAIL.
- 7 SEE 6/M05.001 FOR LINEAR SLOT DIFFUSER WITH PLENUM DETAIL.
- 8 PROVIDE NEW RETURN REGISTER, BALANCE TO AIRFLOW SHOWN.

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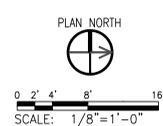
BSE PROJECT NO. 135-003
BSE ENGINEERING, INC.
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 FAX: 619.279.2204



Date	Description	AKSS
07.28.2017	ISSUE PERMIT	AKSS
09.08.2017	ISSUE FOR BID	AKSS
05.07.2018	ISSUE FOR BID	AKSS
06.25.2018	ADDENDUM 'B'	AKJM



TAG	ORIGINAL TYPE	MAX / MIN
TU-0401	TU-3	525 / 210
TU-0402	TU-2	300 / 120
TU-0403	TU-3	600 / 240
TU-0404	TU-3	610 / 245
TU-0405	TU-3	500 / 200
TU-0406	TU-2	500 / 185
TU-0407	TU-1	360 / 145
TU-0408	TU-2	600 / 240
TU-0409	TU-3	500 / 200
TU-0410	TU-4	800 / 320



01 MECHANICAL FLOOR PLAN - LEVEL 04
 SCALE: 1/8" = 1'-0"

CITY OF SAN DIEGO
 MECHANICAL LEVEL 04

CITY OF SAN DIEGO, CALIFORNIA
 PUBLIC WORKS DEPARTMENT
 SHEET 224 OF 402 SHEETS

APPROVED: *[Signature]* DATE: 5/31/2018
 FOR CITY ENGINEER: JASON GRANI DATE: 7/20/18
 PRINT DCA NAME: RCEB

WBS S-17009
 SUBMITTED BY: JORGE ACEVEDO
 PROJECT MANAGER
 CHECKED BY: MARLON PEREZ
 PROJECT ENGINEER

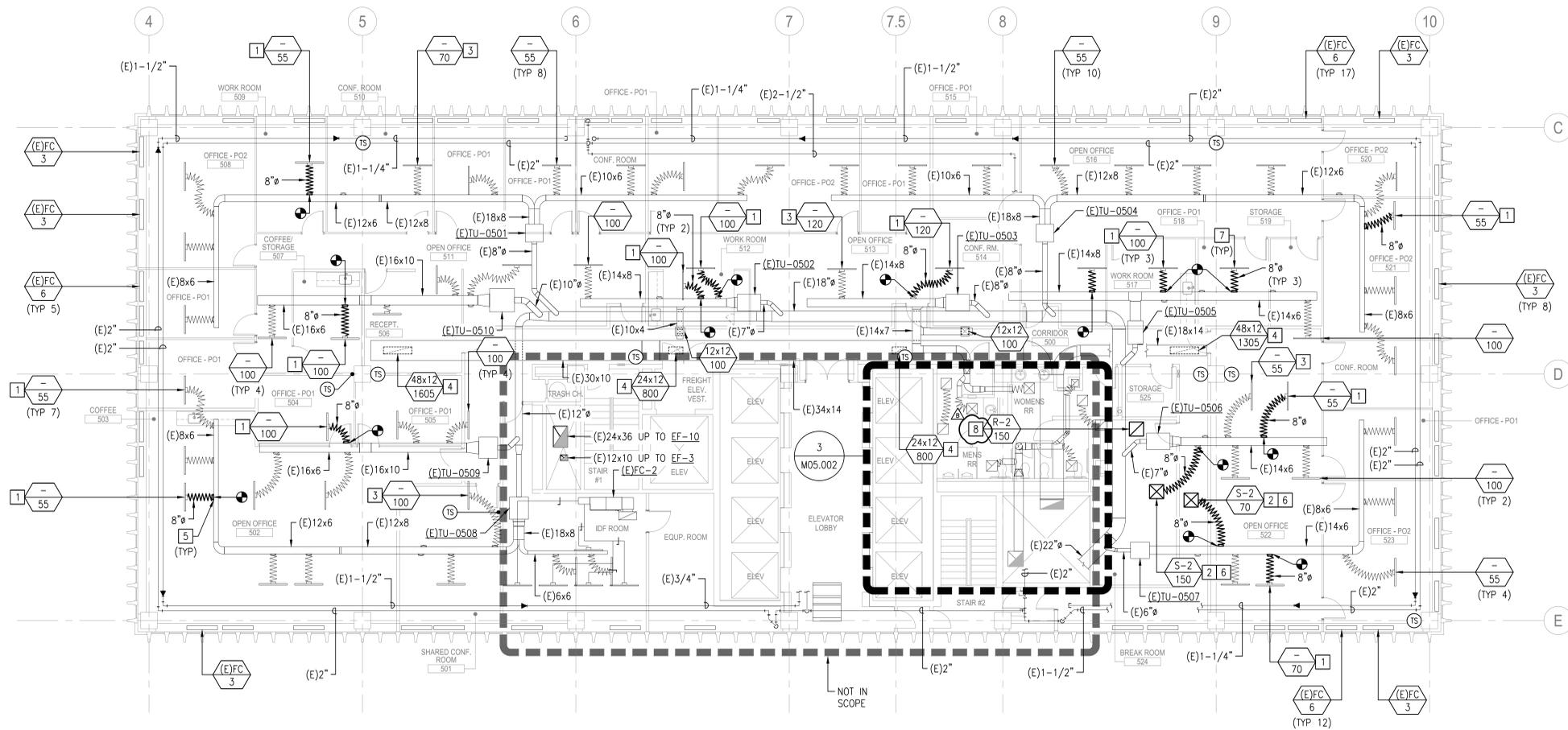
DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL			5/31/2018	
ADDENDUM B			6/25/2018	

CONTRACTOR: _____ DATE STARTED: _____
 INSPECTOR: _____ DATE COMPLETED: _____

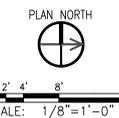
40154 - 224 - D

MODIFIED KEYNOTE 1, MODIFIED KEYNOTE ON DIFFUSER TO REFERENCE KEYNOTE 3, ADDED KEYNOTE 8 TO BATHROOM RETURN REGISTER ON FLOORPLAN
 ADDENDUM B
 Page 192 of 227

FILE NAME: K:\PROJECTS\GENSLER - 135\003\CITY OF SD - 101 ASH ST TENANT IMPROVEMENT\DRAWINGS\CAD\2013\MECH\135-003-M02.205.DWG PLOT DATE: 6/25/2018 9:51 PM PRINT BY: NICHOLAS CLEMENTS



TERMINAL UNIT ZONE SCHEDULE		
TAG	ORIGINAL TYPE	MAX / MIN
TU-0501	TU-3	565 / 230
TU-0502	TU-2	400 / 160
TU-0503	TU-3	640 / 260
TU-0504	TU-3	605 / 245
TU-0505	TU-3	400 / 160
TU-0506	TU-2	460 / 185
TU-0507	TU-1	360 / 145
TU-0508	TU-2	540 / 220
TU-0509	TU-3	500 / 200
TU-0510	TU-4	500 / 200



SHEET NOTES

1. BALANCE ALL EXISTING DIFFUSERS TO MATCH DESIGN AIRFLOW.
2. PROVIDE NEW FLEX DUCT AND MANUAL VOLUME DAMPER. LOCATE DIFFUSER PER PLAN.
3. PROVIDE NEW DIFFUSER, FLEX DUCT AND MANUAL VOLUME DAMPER.
4. REBALANCE EXISTING DIFFUSER TO CFM SHOWN ON PLANS.
5. REBALANCE EXISTING RETURN AIR OPPOSED BLADE VOLUME CONTROL TO CFM SHOWN ON PLANS.
6. SEE 2/M05.001 FOR BRANCH DUCTWORK CONNECTIONS DETAIL.
7. SEE 5/M05.001 FOR CEILING DIFFUSER DETAIL.
8. SEE 6/M05.001 FOR LINEAR SLOT DIFFUSER WITH PLENUM DETAIL.
9. PROVIDE NEW RETURN REGISTER. BALANCE TO AIRFLOW SHOWN.

KEYNOTES

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Date	Description	AKISS
07.28.2017	ISSUE PERMIT	AKISS
09.08.2017	ISSUE FOR BID	AKISS
05.07.2018	ISSUE FOR BID	AKISS
6.06.2018	ADDENDUM 'B'	AKJLM



Project Number
 55.7291.013

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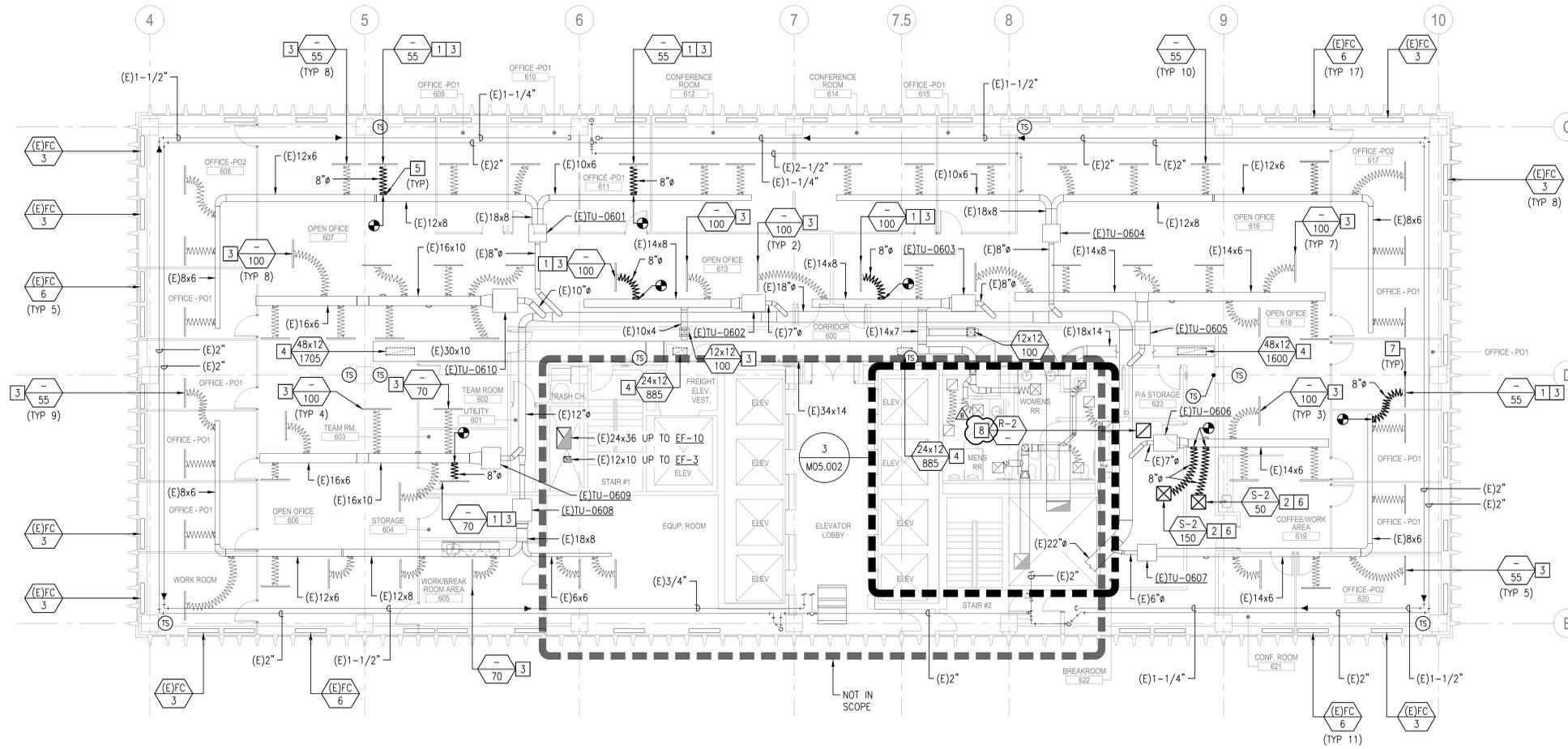
M02.205

CITY OF SAN DIEGO
 MECHANICAL LEVEL 05

CITY OF SAN DIEGO, CALIFORNIA PUBLIC WORKS DEPARTMENT SHEET 225 OF 402 SHEETS		WBS S-17009
APPROVED: [Signature]	DATE: 5/31/2018	SUBMITTED BY: JORGE ACEVEDO
FOR CITY ENGINEER: JASON GRANI	DATE: 7/20/18	PROJECT MANAGER
PRINT DGE NAME: [Signature]	DATE: [Blank]	PROJECT ENGINEER: MARLON PEREZ
DESCRIPTION: ADDENDUM B	BY: [Signature]	DATE: 5/31/2018
FILED: [Signature]	DATE: 6/25/2018	FILED: [Signature]
CONTRACTOR: [Blank]	DATE STARTED: [Blank]	DATE COMPLETED: [Blank]
INSPECTOR: [Blank]	DATE STARTED: [Blank]	DATE COMPLETED: [Blank]

01 MECHANICAL FLOOR PLAN - LEVEL 05
 SCALE: 1/8" = 1'-0"

FILE NAME: K:\PROJECTS\GENSLER - 135\003\CITY OF SD - 101 ASH ST TENANT IMPROVEMENT\DRAWINGS\CAD\2013\MECH\135-003-M02.206.DWG PLOT DATE: 6/25/2018 9:51 PM PRINT BY: NICHOLAS CLEMENTS



TERMINAL UNIT ZONE SCHEDULE		
TAG	ORIGINAL TYPE	MAX / MIN
TU-0601	TU-3	550 / 220
TU-0602	TU-2	300 / 120
TU-0603	TU-3	700 / 280
TU-0604	TU-3	550 / 220
TU-0605	TU-3	700 / 280
TU-0606	TU-2	500 / 200
TU-0607	TU-1	330 / 135
TU-0608	TU-2	565 / 225
TU-0609	TU-3	540 / 220
TU-0610	TU-4	800 / 320



SCALE: 1/8" = 1'-0"

SHEET NOTES

1. BALANCE ALL EXISTING DIFFUSERS TO MATCH DESIGN AIRFLOW.

KEYNOTES

- 1 PROVIDE NEW FLEX DUCT AND MANUAL VOLUME DAMPER. LOCATE DIFFUSER PER PLAN.
- 2 PROVIDE NEW DIFFUSER, FLEX DUCT AND MANUAL VOLUME DAMPER.
- 3 REBALANCE EXISTING DIFFUSER TO CFM SHOWN ON PLANS.
- 4 REBALANCE EXISTING RETURN AIR OPPOSED BLADE VOLUME CONTROL TO CFM SHOWN ON PLANS.
- 5 SEE 2/M05.001 FOR BRANCH DUCTWORK CONNECTIONS DETAIL.
- 6 SEE 5/M05.001 FOR CEILING DIFFUSER DETAIL.
- 7 SEE 6/M05.001 FOR LINEAR SLOT DIFFUSER WITH PLENUM DETAIL.
- 8 PROVIDE NEW RETURN REGISTER. BALANCE TO AIRFLOW SHOWN.

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Date	Description	AKISS
07.28.2017	ISSUE PERMIT	AKISS
09.08.2017	ISSUE FOR BID	AKISS
05.07.2018	ISSUE FOR BID	AKISS
6.06.2018	ADDENDUM 'B'	AKJLM



Project Number
 55.7291.013

The City of
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 Public Works

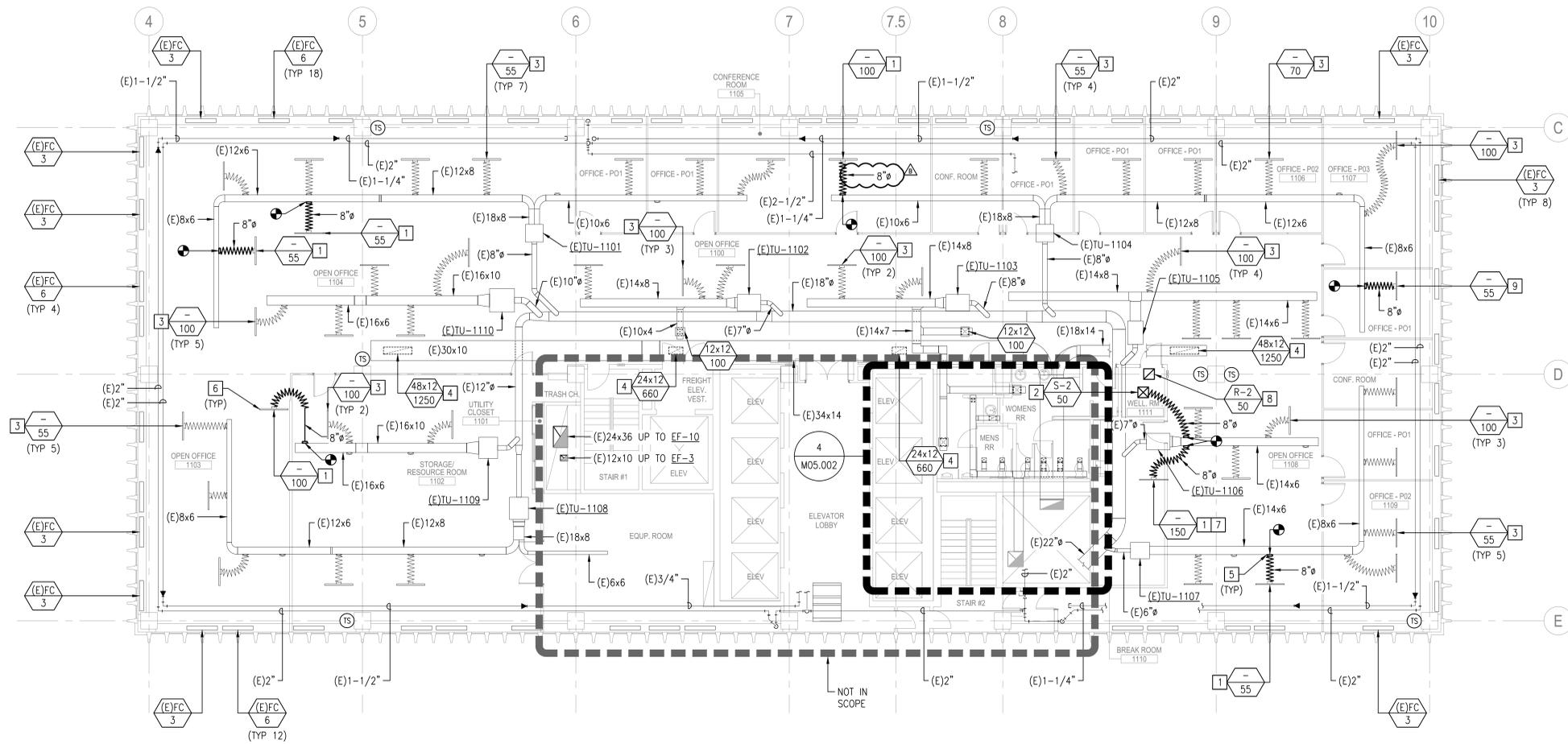
M02.206

CITY OF SAN DIEGO
 MECHANICAL LEVEL 06

CITY OF SAN DIEGO, CALIFORNIA PUBLIC WORKS DEPARTMENT SHEET 226 OF 402 SHEETS		WBS S-17009
APPROVED: JASON GRANU FOR CITY ENGINEER	DATE: 5/31/2018	SUBMITTED BY: JORGE ACEVEDO PROJECT MANAGER
DATE: 7/20/18	DATE: 7/20/18	PROJECT ENGINEER: MARLON PEREZ
DESCRIPTION: ADDENDUM B	BY: [Signature]	DATE: 5/31/2018
APPROVED: [Signature]	DATE: 6/25/2018	FILED: [Signature]
CONTRACTOR: [Blank]	DATE STARTED: [Blank]	DATE COMPLETED: [Blank]
INSPECTOR: [Blank]	DATE STARTED: [Blank]	DATE COMPLETED: [Blank]

01 MECHANICAL FLOOR PLAN - LEVEL 06
 SCALE: 1/8" = 1'-0"

FILE NAME: K:\PROJECTS\GENSLER - 135\003\CITY OF SD - 101 ASH ST TENANT IMPROVEMENT\DRAWINGS\CAD\2013\MECH\135-003-M02.211.DWG PLOT DATE: 6/25/2018 9:51 PM PRINT BY: NICHOLAS CLEMENTS



TERMINAL UNIT ZONE SCHEDULE		
TAG	ORIGINAL TYPE	MAX / MIN
TU-1101	TU-3	495 / 200
TU-1102	TU-2	400 / 160
TU-1103	TU-3	600 / 240
TU-1104	TU-3	530 / 215
TU-1105	TU-3	400 / 160
TU-1106	TU-2	500 / 200
TU-1107	TU-1	330 / 135
TU-1108	TU-2	275 / 110
TU-1109	TU-3	300 / 150
TU-1110	TU-4	500 / 250



SCALE: 1/8" = 1'-0"

SHEET NOTES

1. BALANCE ALL EXISTING DIFFUSERS TO MATCH DESIGN AIRFLOW.

KEYNOTES

- 1 PROVIDE NEW FLEX DUCT AND MANUAL VOLUME DAMPER. LOCATE DIFFUSER PER PLAN.
- 2 PROVIDE NEW DIFFUSER, FLEX DUCT AND MANUAL VOLUME DAMPER.
- 3 REBALANCE EXISTING DIFFUSER TO CFM SHOWN ON PLANS.
- 4 REBALANCE EXISTING RETURN AIR OPPOSED BLADE VOLUME CONTROL TO CFM SHOWN ON PLANS.
- 5 SEE 2/M05.001 FOR BRANCH DUCTWORK CONNECTIONS DETAIL.
- 6 SEE 6/M05.001 FOR LINEAR SLOT DIFFUSER WITH PLENUM DETAIL.
- 7 CONTRACTOR TO REMOVE SLOT FILL FROM 3 ADJACENT SLOTS IN BREAK ROOM CEILING GRID FOR RETURN AIR.
- 8 PROVIDE NEW RETURN AIR REGISTER. BALANCE TO AIR FLOW SHOWN.
- 9 PROVIDE FLEX DUCT AND MANUAL VOLUME DAMPER. LOCATE DIFFUSER PER PLAN FROM 16TH FLOOR SHEET M01.216.

CITY OF SAN DIEGO

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Date	Description	AKISS
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05.07.2018	ISSUE FOR BID	AKISS
6.25.2018	ADDENDUM 'B'	AKJM



Project Number
55.7291.013

The City of
SAN DIEGO
Public Works

M02.211

CITY OF SAN DIEGO

MECHANICAL LEVEL 11

CITY OF SAN DIEGO, CALIFORNIA
PUBLIC WORKS DEPARTMENT
SHEET 231 OF 402 SHEETS

APPROVED:	DATE:	5/31/2018	SUBMITTED BY:	JORGE ACEVEDO
FOR CITY ENGINEER:	DATE:	7/20/18	PROJECT MANAGER:	JASON GRANU
PRINT DGE NAME:	DATE:		PROJECT ENGINEER:	MARLON PEREZ
DESCRIPTION:	BY:	APPROVED:	DATE:	FILMED:
ORIGINAL:			5/31/2018	
ADDENDUM B:			6/25/2018	
				CS27 COORDINATE
				CS83 COORDINATE
CONTRACTOR:	DATE STARTED:			40154 - 231 - D
INSPECTOR:	DATE COMPLETED:			

ADDED DUCT SIZE TO DIFFUSER ON BOX 1104

ADDENDUM B

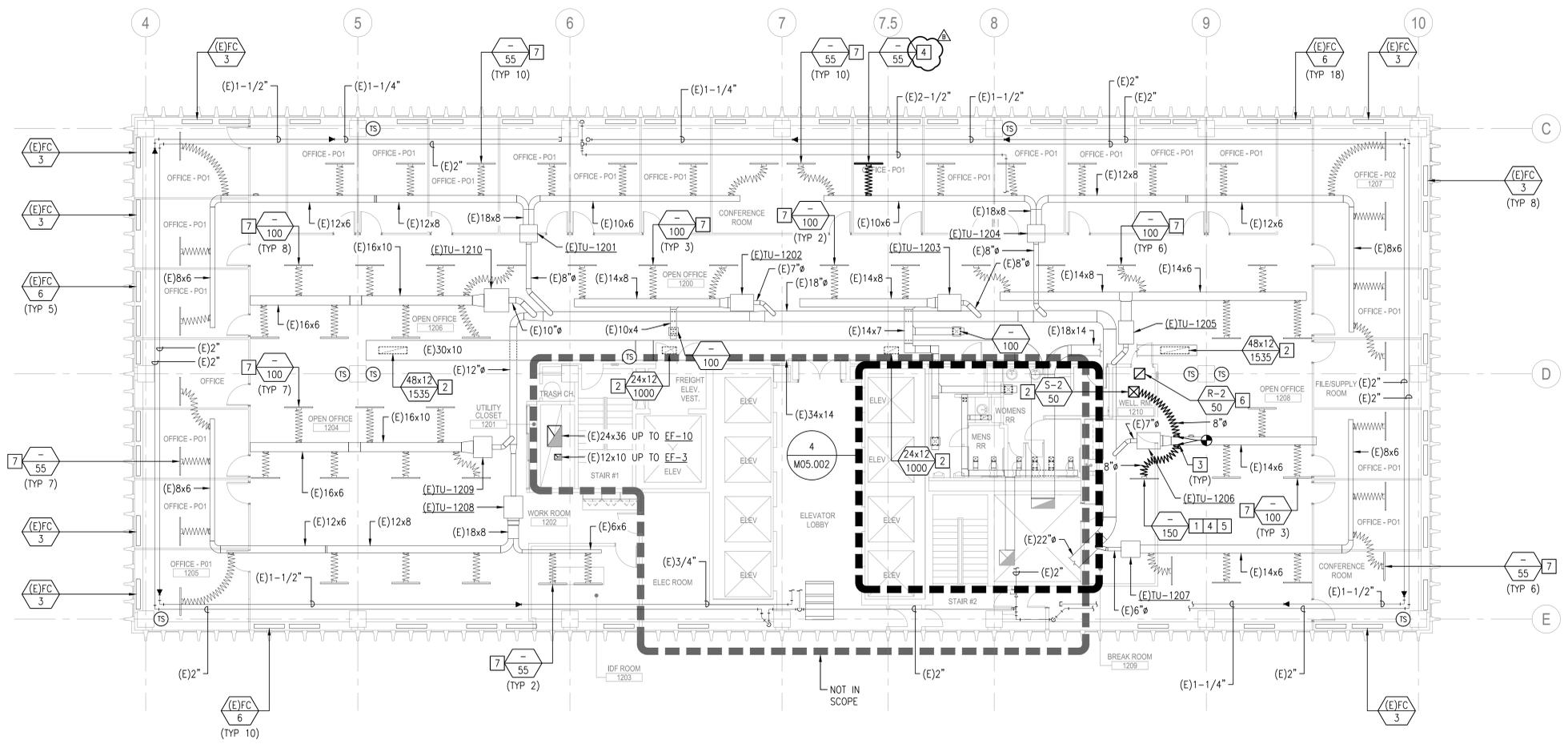
01 MECHANICAL FLOOR PLAN - LEVEL 11
SCALE: 1/8" = 1'-0"

FILE NAME: K:\PROJECTS\GENSLER - 135\003\CITY OF SD - 101 ASH ST TENANT IMPROVEMENT\DRAWINGS\CAD\2013\MECH\135-003-M02.212.DWG PLOT DATE: 6/25/2018 3:52 PM PRINT BY: NICHOLAS CLEMENTS

SHEET NOTES

1. BALANCE ALL EXISTING DIFFUSERS TO MATCH DESIGN AIRFLOW.
2. PROVIDE NEW FLEX DUCT AND MANUAL VOLUME DAMPER. LOCATE DIFFUSER PER PLAN.
3. REBALANCE EXISTING RETURN AIR OPPOSED BLADE VOLUME CONTROL TO CFM SHOWN ON PLANS.
4. SEE 2/M05.001 FOR BRANCH DUCTWORK CONNECTIONS DETAIL.
5. SEE 6/M05.001 LINEAR SLOT DIFFUSER WITH PLENUM DETAIL.
6. CONTRACTOR TO REMOVE SLOT FILL FROM 3 ADJACENT SLOTS IN BREAK ROOM CEILING GRID FOR RETURN AIR.
7. PROVIDE NEW RETURN AIR REGISTER.
8. REBALANCE EXISTING DIFFUSER TO AIR FLOW SHOWN.

KEYNOTES



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Date	Description	AK/SS
07.28.2017	ISSUE PERMIT	AK/SS
09.08.2017	ISSUE FOR BID	AK/SS
05.07.2018	ISSUE FOR BID	AK/SS
06.25.2018	ADDENDUM 'B'	AK/ML

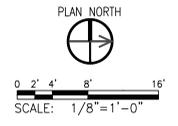


Project Number
 55.7291.013

The City of
SAN DIEGO
 Public Works

M02.212

TAG	ORIGINAL TYPE	MAX / MIN
TU-1201	TU-3	550 / 220
TU-1202	TU-2	400 / 160
TU-1203	TU-3	600 / 240
TU-1204	TU-3	605 / 245
TU-1205	TU-3	600 / 240
TU-1206	TU-2	500 / 180
TU-1207	TU-1	330 / 135
TU-1208	TU-2	495 / 175
TU-1209	TU-3	700 / 280
TU-1210	TU-4	800 / 320



01 MECHANICAL FLOOR PLAN - LEVEL 12
 SCALE: 1/8" = 1'-0"

CITY OF SAN DIEGO
 MECHANICAL LEVEL 12

CITY OF SAN DIEGO, CALIFORNIA
 PUBLIC WORKS DEPARTMENT
 SHEET 232 OF 402 SHEETS

APPROVED: [Signature] DATE: 5/31/2018
 FOR CITY ENGINEER: JASON GRANU DATE: 7/20/18
 PRINT DCE NAME: ROGER

WBS S-17009
 SUBMITTED BY: JORGE ACEVEDO
 PROJECT MANAGER
 CHECKED BY: MARLON PEREZ
 PROJECT ENGINEER

DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL			5/31/2018	
ADDENDUM B			06/25/2018	

CONTRACTOR INSPECTOR: [Signature] DATE STARTED: [Blank] DATE COMPLETED: [Blank]
 40154 - 232 - D

MODIFIED DIFFUSER ON BOX TU-1204

SHEET NOTES

- BALANCE ALL EXISTING DIFFUSERS TO MATCH DESIGN AIRFLOW.
- ALL RETURN GRILLES ABOVE OFFICES/CONFERENCE ROOMS TO BE INSTALLED WITH FLEX TAIL. SEE DETAIL 9/M05.001.

KEYNOTES

- REBALANCE EXISTING DIFFUSERS TO MEET DESIGN AIRFLOW.
- CAP EXISTING DUCTWORK AIRTIGHT AT LOCATION SHOWN.
- SEE 1/M05.001 FOR DUCT INSTALLATION DETAIL.
- SEE 5/M05.001 FOR CEILING DIFFUSER DETAIL.
- PROVIDE MANUAL VOLUME DAMPER, 12" DUCT EXTENSION AND STAINLESS STEEL MESH (1/2" SQUARE). REBALANCE EXHAUST FANS TO MEET SCHEDULED CFM ON SHEET M06.001.
- SEE 2/M05.001 FOR THERMOSTAT/TEMP SENSOR MOUNTING DETAIL.
- SEE 2/M05.001 FOR BRANCH DUCTWORK CONNECTION DETAIL.
- RELOCATED TEMP SENSORS SEE SHEET 1/M01.219 FOR LOCATION.

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Date	Description	AKSS
07.28.2017	ISSUE PERMIT	AKSS
09.08.2017	ISSUE FOR BID	AKSS
05.07.2018	ISSUE FOR BID	AKSS
06.25.2018	ADDENDUM 'B'	AKLM



Project Number
 55.7291.013

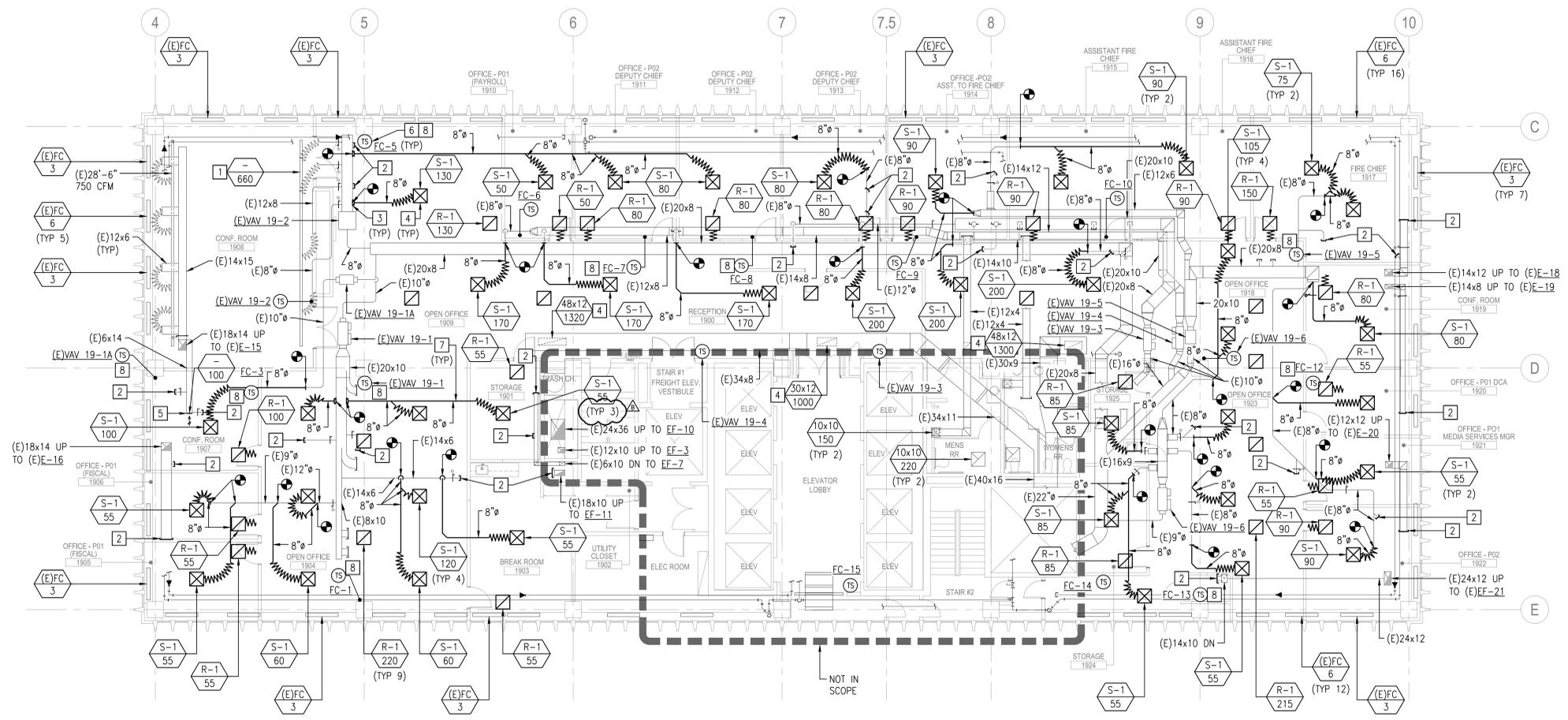
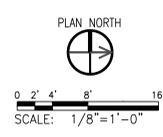
The City of
SAN DIEGO
 Public Works

M02.219

CITY OF SAN DIEGO
 MECHANICAL LEVEL 19

CITY OF SAN DIEGO, CALIFORNIA PUBLIC WORKS DEPARTMENT SHEET 239 OF 402 SHEETS		WBS S-17009
APPROVED: [Signature]	DATE: 5/31/2018	SUBMITTED BY: JORGE ACEVEDO
FOR CITY ENGINEER: JASON GRANU	DATE: 7/20/18	PROJECT MANAGER
PRINT DCE NAME: [Signature]	DATE: [Signature]	PROJECT ENGINEER
DESCRIPTION: ORIGINAL	BY: [Signature]	DATE: 5/31/2018
ADDENDUM B	APPROVED: [Signature]	DATE: 02/25/2018
CONTRACTOR: [Signature]	DATE STARTED: [Signature]	DATE COMPLETED: [Signature]
INSPECTOR: [Signature]	DATE STARTED: [Signature]	DATE COMPLETED: [Signature]
CONTRACTOR: [Signature]		DATE STARTED: [Signature]
INSPECTOR: [Signature]		DATE COMPLETED: [Signature]
CONTRACTOR: [Signature]		DATE STARTED: [Signature]
INSPECTOR: [Signature]		DATE COMPLETED: [Signature]

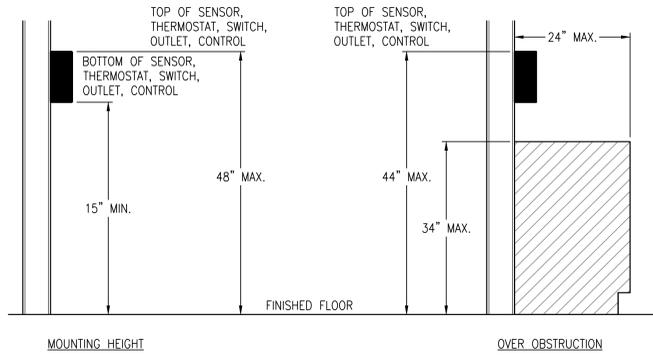
TAG	ORIGINAL TYPE	MAX / MIN
VAV 19-1	KRUEGER LMHS 10	820 / 330
VAV 19-2	TU-3	1000 / 400
VAV 19-3	KRUEGER LMHS 10	680 / 275
VAV 19-4	KRUEGER LMHS 10	810 / 325
VAV 19-5	TU-4	700 / 280
VAV 19-6	KRUEGER LMHS 9	700 / 280
VAV 19-1A	KRUEGER LMHS 5	100 / 40



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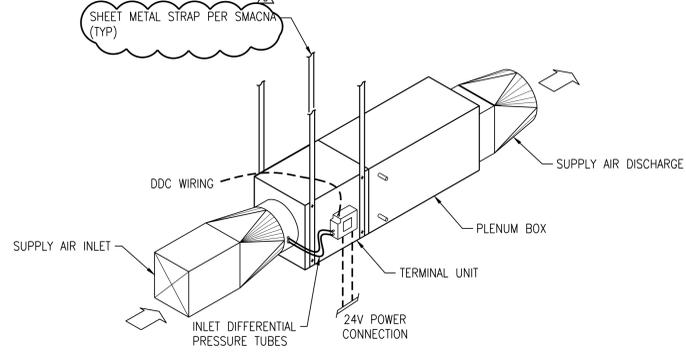
01 MECHANICAL FLOOR PLAN - LEVEL 19
 SCALE: 1/8" = 1'-0"

FILE NAME: C:\PROJECTS\GENSLER - 135\003\CITY OF SD - 101 ASH ST TENANT IMPROVEMENT\DRAWINGS\CAD\2013\MECH\135-003-M05.001.DWG PLOT DATE: 6/25/2018 3:52 PM PRINT BY: NICHOLAS CLEMENTS



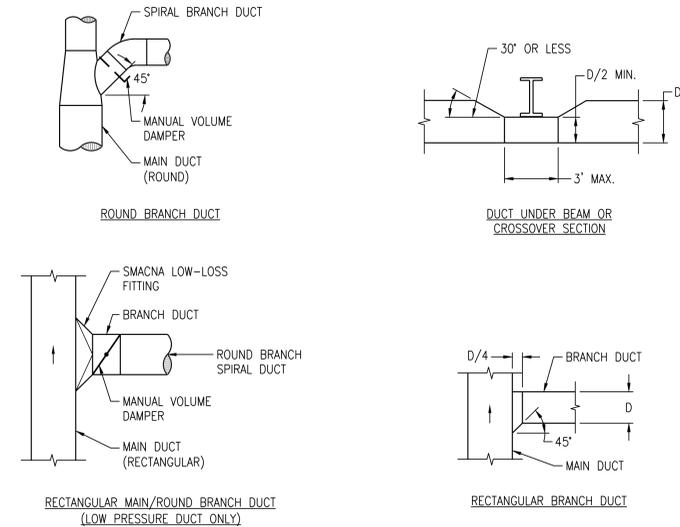
THERMOSTAT/TEMP SENSOR MOUNTING DETAIL

SCALE NONE 7



TERMINAL UNIT/VAV UNIT INSTALLATION DETAIL

SCALE NONE 4



DUCT INSTALLATION DETAIL

SCALE NONE 1

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Date	Description	AKSS
07.28.2017	ISSUE PERMIT	AKSS
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05.07.2018	ISSUE FOR BID	AKSS
6.06.2018	ADDENDUM 'B'	AKLM



Project Number

55.7291.013

The City of **SAN DIEGO** Public Works

M05.001

CITY OF SAN DIEGO

MECHANICAL DETAILS

CITY OF SAN DIEGO, CALIFORNIA
PUBLIC WORKS DEPARTMENT
SHEET 240 OF 402 SHEETS

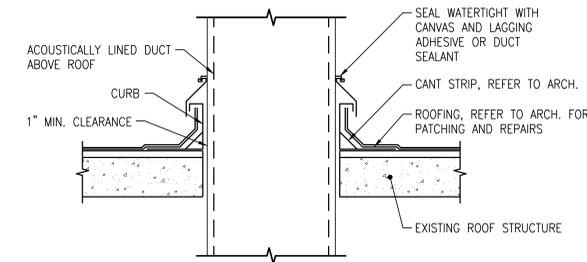
WBS S-17009

APPROVED:	DATE:	5/31/2018	DATE:	7/20/18	DATE:	5/31/2018	DATE:	6/25/2018
FOR CITY ENGINEER	DATE:	5/31/2018	DATE:	7/20/18	DATE:	5/31/2018	DATE:	6/25/2018
PROJECT ENGINEER	DATE:	5/31/2018	DATE:	7/20/18	DATE:	5/31/2018	DATE:	6/25/2018
PROJECT ENGINEER	DATE:	5/31/2018	DATE:	7/20/18	DATE:	5/31/2018	DATE:	6/25/2018
CONTRACTOR	DATE STARTED		DATE COMPLETED		CONTRACTOR	DATE STARTED	DATE COMPLETED	
INSPECTOR					INSPECTOR			

MODIFIED DETAIL 4

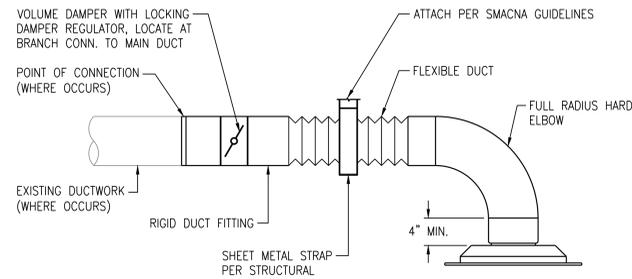
ADDENDUM B

Page 198 of 227



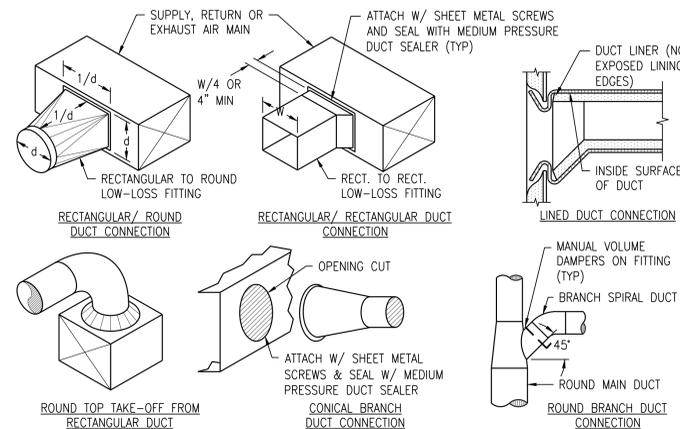
DUCT THRU ROOF DETAIL

SCALE NONE 8



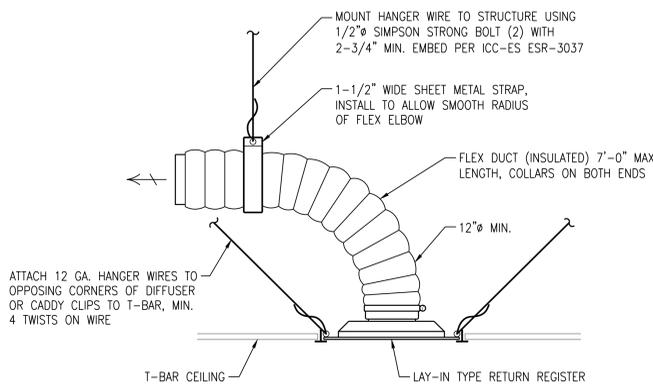
CEILING DIFFUSER CONNECTION DETAIL

SCALE NONE 5



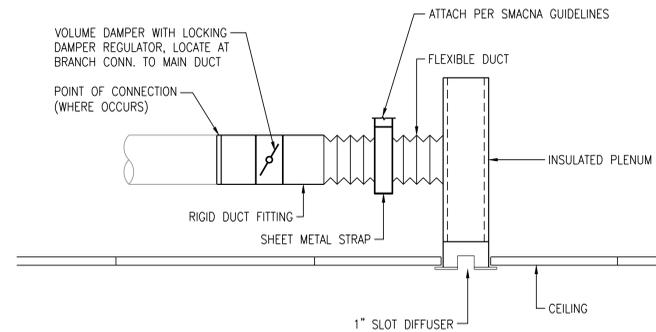
BRANCH DUCTWORK CONNECTIONS DETAIL

SCALE NONE 2



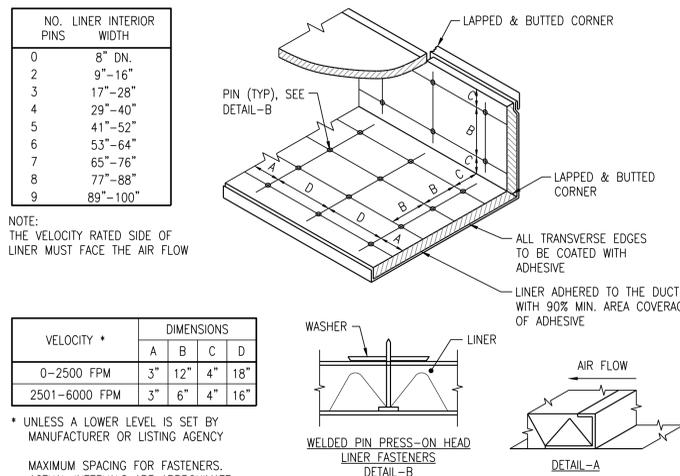
RETURN AIR WITH FLEX DUCT DETAIL

SCALE NONE 9



LINEAR SLOT DIFFUSER WITH PLENUM DETAIL

SCALE NONE 6



DUCT LINING DETAIL

SCALE NONE 3

FILE NAME: C:\PROJECTS\GENSLER - 135\003 CITY OF SD - 101 ASH ST TENANT IMPROVEMENT\DRAWINGS\CAD\2013\MECH\135-003-M-006.003.DWG PLOT DATE: 6/25/2018 3:52 PM PRINT BY: NICHOLAS CLEMENTS

EXISTING AIR HANDLING UNIT SCHEDULE

MARK	MANUFACTURER & MODEL	SERVICE	SUPPLY FAN		RETURN FAN		COOLING COIL								ELECTRIC HEATING COIL			ELECTRICAL		FILTER	OPERATING WEIGHT (LBS)	MIN OSA	REMARKS				
			CFM	SP (IN)	CFM	TSP	CAPACITY (MBH)		EAT (°F)		LAT (°F)		AIR PD (IN)	ROWS	GPM	EWT (°F)	LWT (°F)	CONTROL VALVE	RATED CFM					NUMBER OF CIRCUITS	LOCATION	VOLTAGE (V/PH/Hz)	HP
							SENSIBLE	TOTAL	DB	WB	DB	WB															
(E)AC 1	-	TOWER FLOORS	97880	5.5	-	-	-	-	88	71	55	55	0.71	8	600	48	66	3-WAY	-	-	-	440/3/60	125	-	-	42,540	REBALANCE TO 85075 CFM
(E)RA 1	-	TOWER FLOORS	-	-	80600	1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	440/3/60	40	-	-	-	REBALANCE TO 73,285 CFM
(E)AC 2	TRANE	1ST FLOOR	13205	3.5	-	-	-	-	87	64	57	53	0.72	6	100	44	33.3	3-WAY	13400	3	AHU	440/3/60	10	HP-200	-	5000	
(E)RA 2	TRANE	1ST FLOOR	-	-	8400	.75	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	440/3/60	3	-	-	-	
(E)AC 3	TRANE	2ND FLOOR	15100	2	-	-	-	-	87	69	57	54	0.63	6	100	44	56	3-WAY	-	-	-	440/3/60	10	HP-200	-	4800	
(E)RA 3	TRANE	2ND FLOOR	-	-	13750	.625	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	440/3/60	3	-	-	-	
(E)AC 4	TRANE	1ST FLOOR	2750	1.75	-	-	-	-	85	66	57	54	0.63	6	20	44	54	3-WAY	-	-	AHU	440/3/60	2	HP-200	-	560	
(E)AC 6	TRANE	1ST FLOOR	6000	1.5	-	-	-	-	85	66	57	54	0.65	6	40	44	56	3-WAY	6000	3	AHU	440/3/60	3	HP-200	-	400	
(E)AC 7	TRANE	1ST FLOOR	2800	1.75	-	-	-	-	86	66	57	54	0.63	6	20	44	56	3-WAY	2800	2	AHU	440/3/60	2	HP-200	-	300	REBALANCE TO 2100 CFM
(E)AC 8	TRANE	1ST FLOOR	700	1	-	-	-	-	85	66	57	54	0.23	4	5	44	53	3-WAY	-	-	AHU	440/3/60	0.5	HP-200	-	150	
(E)AC 9	TRANE	1ST FLOOR	13000	2	-	-	-	-	87	69	57	54	0.71	6	120	44	66	3-WAY	4130	2	DUCT IN 1ST FLOOR	440/3/60	10	HP-200	-	*2315	REBALANCE TO 8875 CFM
(E)RA 9	TRANE	1ST FLOOR	-	-	11350	.625	-	-	-	-	-	-	-	-	-	-	-	3-WAY	-	-	-	440/3/60	3	HP-200	-	-	REBALANCE TO 5360 CFM
(E)AC 10	TRANE	2ND FLOOR	12850	2.25	-	-	-	-	86	68	53	53	0.71	6	100	44	56	3-WAY	16400	3	AHU	440/3/60	10	HP-200	-	2200	

*REBALANCE TO MEET DESIGN AIRFLOW

EXISTING LINEAR DIFFUSER - TYPE C SCHEDULE (LEVELS 3-19)

TYPE	NO. OF SLOTS	DUCT SIZE (IN)	OVERALL WIDTH WITH FRAME (IN)	REMARKS
C-1	1	2-1/4	3	

EXISTING 1ST AND 2ND LEVELS VAV/CAV BOXES SCHEDULE

BOX SIZE	MANUFACTURER & MODEL	CFM RANGE	INLET SIZE (DIA)	DISCHARGE PLENUM LENGTH (FT)	HEATING HOT WATER COIL (WHERE INDICATED)		REMARKS
					HEATER KW	RATED VOLTAGE	
04	DUAL DUCT "TITUS" MODEL "DEDC"	60-225	4	4	-	-	
06		250-500	6	4	-	-	
08		600-900	8	4	-	-	
10		1000-1400	10	8	-	-	
12		1600-2000	12	8	-	-	
14		2200-3000	14	8	-	-	
16	3100-4000	16	8	8	-	-	
04	SINGLE ZONE "TITUS" MODEL "DESV" WITH ELECTRIC HEATING COIL	60-250	4	4	3.0	480	
06		250-450	6	4	7.5	480	
08		450-700	8	4	9.5	480	
10		700-1400	10	4	9.5	480	
12		1400-1900	12	4	9.5	480	
14		1900-2700	14	8	9.5	480	
16	2700-3100	16	8	8	9.5	480	

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Date	Description	AK/SS
07.28.2017	ISSUE PERMIT	AK/SS
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06.25.2018	ADDENDUM 'B'	AK/LM



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The City of
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Public Works

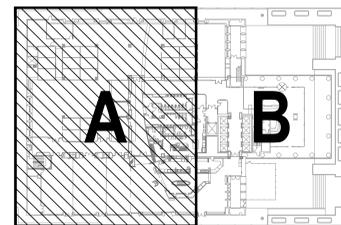
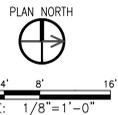
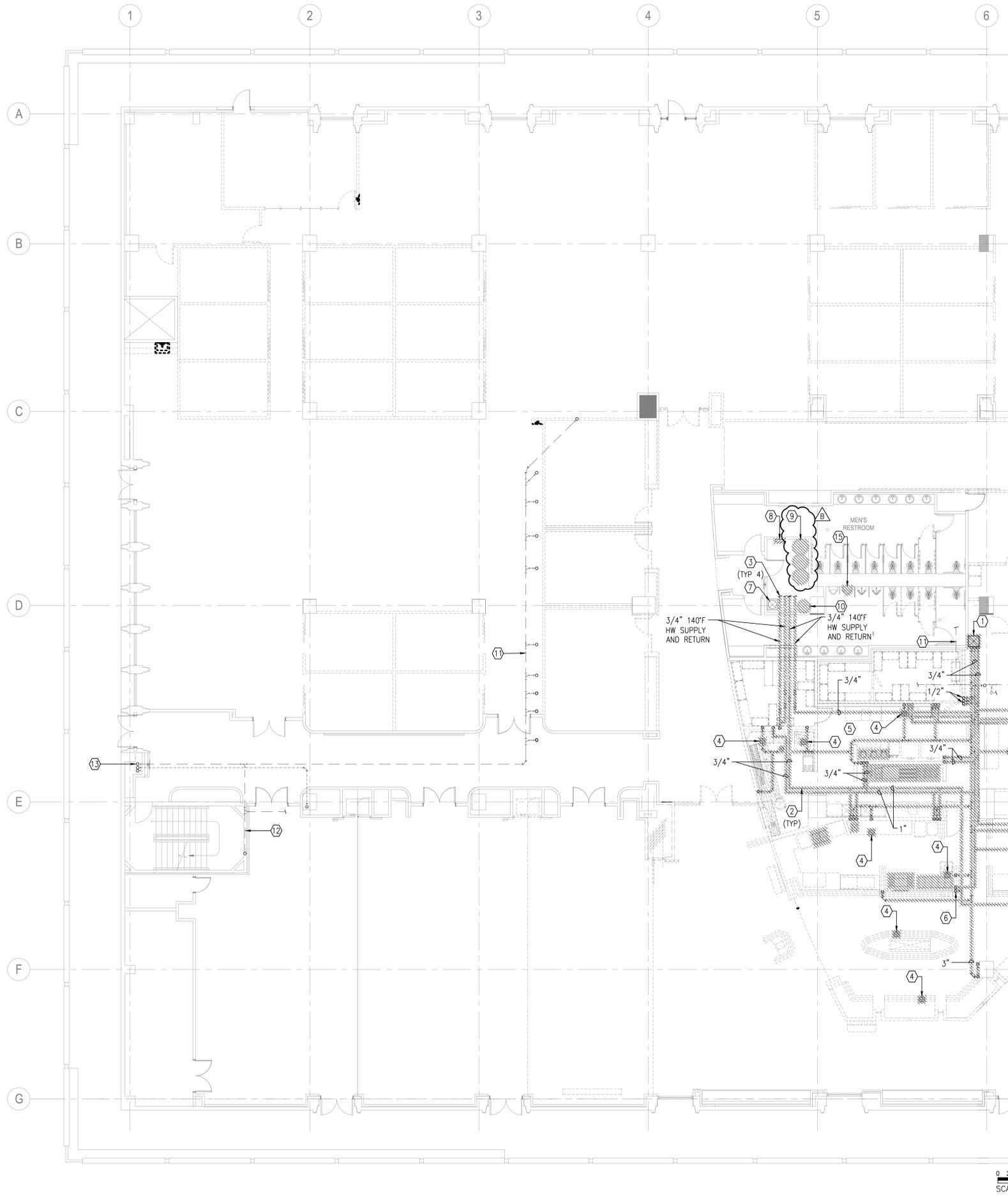
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CITY OF SAN DIEGO

MECHANICAL SCHEDULES

CITY OF SAN DIEGO, CALIFORNIA PUBLIC WORKS DEPARTMENT SHEET 244 OF 402 SHEETS		WBS S-17009	
APPROVED: [Signature]	DATE: 5/31/2018	SUBMITTED BY: JORGE ACEVEDO	PROJECT MANAGER
FOR CITY ENGINEER: JASON GRAN	DATE: 7/20/18	PROJECT ENGINEER: MARLON PEREZ	PROJECT ENGINEER
DESCRIPTION: ADDENDUM B	BY: [Signature]	APPROVED: [Signature]	DATE FILMED: 5/31/2018
ORIGINAL	5/31/2018	CS27 COORDINATE	
ADDENDUM B	6/25/2018	CS83 COORDINATE	
CONTRACTOR INSPECTOR:	DATE STARTED:	DATE COMPLETED:	40154 - 244 - D

FILE NAME: C:\PROJECTS\GENSLER - 135\003 CITY OF SD - 101 ASH ST TENANT IMPROVEMENT\DRAWINGS\CAD\2013\PLUMB\135-003-P-01_201A.DWG PLOT DATE: 6/25/2018 3:57 PM PRINT BY: NICHOLAS CLEMENTS



KEYNOTES

- ① REMOVE EXISTING MOP SINK. CAP EXISTING WASTE PIPE BELOW LEVEL "A". PATCH FLOOR PER ARCHITECTURAL PATCHING RECOMMENDATIONS.
- ② REMOVE ALL DOMESTIC WATER PIPING FROM WALLS AND CEILING SPACE.
- ③ REMOVE EXISTING DOMESTIC HOT WATER, DOMESTIC COLD WATER, 140°F HOT WATER, 140°F HOT WATER RETURN AND DOMESTIC HOT WATER RETURN PIPING.
- ④ REMOVE EXISTING FLOOR SINK, CAP WASTE PIPE BELOW LEVEL "A" AND VENT PIPING.
- ⑤ REMOVE ALL EXISTING KITCHEN FIXTURES AND EQUIPMENT.
- ⑥ CAP MAIN DOMESTIC COLD WATER PIPE BELOW LEVEL "A".
- ⑦ EXISTING ELECTRIC WATER HEATER AND MOP SINK TO REMAIN.
- ⑧ REMOVE EXISTING MIXING VALVE ASSEMBLY.
- ⑨ REMOVE EXISTING ELECTRIC WATER HEATERS SUPPLYING HOT WATER TO EXISTING KITCHEN. REFER TO PLUMBING SHEETS P04.002 AND P04.003 FOR EXTENT OF DEMOLITION WORK. PLUMBING CONTRACTOR TO FIELD VERIFY EXISTING CONDITION PRIOR TO COMMENCING DEMOLITION WORK.
- ⑩ REMOVE EXISTING WATER SOFTENER EQUIPMENT SUPPLYING EXISTING KITCHEN.
- ⑪ EXISTING SANITARY WASTE PIPING SERVING LEVEL 02 RESTROOMS TO REMAIN.
- ⑫ EXISTING SANITARY WASTE PIPING SERVING BREAK ROOM ON LEVEL 02.
- ⑬ EXISTING PLUMBING UTILITIES CHASE.
- ⑭ EXISTING 4" SANITARY WASTE STACK DOWN TO LEVEL "B" TO REMAIN.
- ⑮ REMOVE EXISTING URINAL. CAP ROUGH-IN WALL FOR FUTURE CONNECTION.

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Date	Description	AKISS
07.28.2017	ISSUE PERMIT	AKISS
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05.07.2018	ISSUE FOR BID	AKISS
06.25.2018	ADDENDUM 'B'	AKJLM



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The City of
SAN DIEGO
 Public Works

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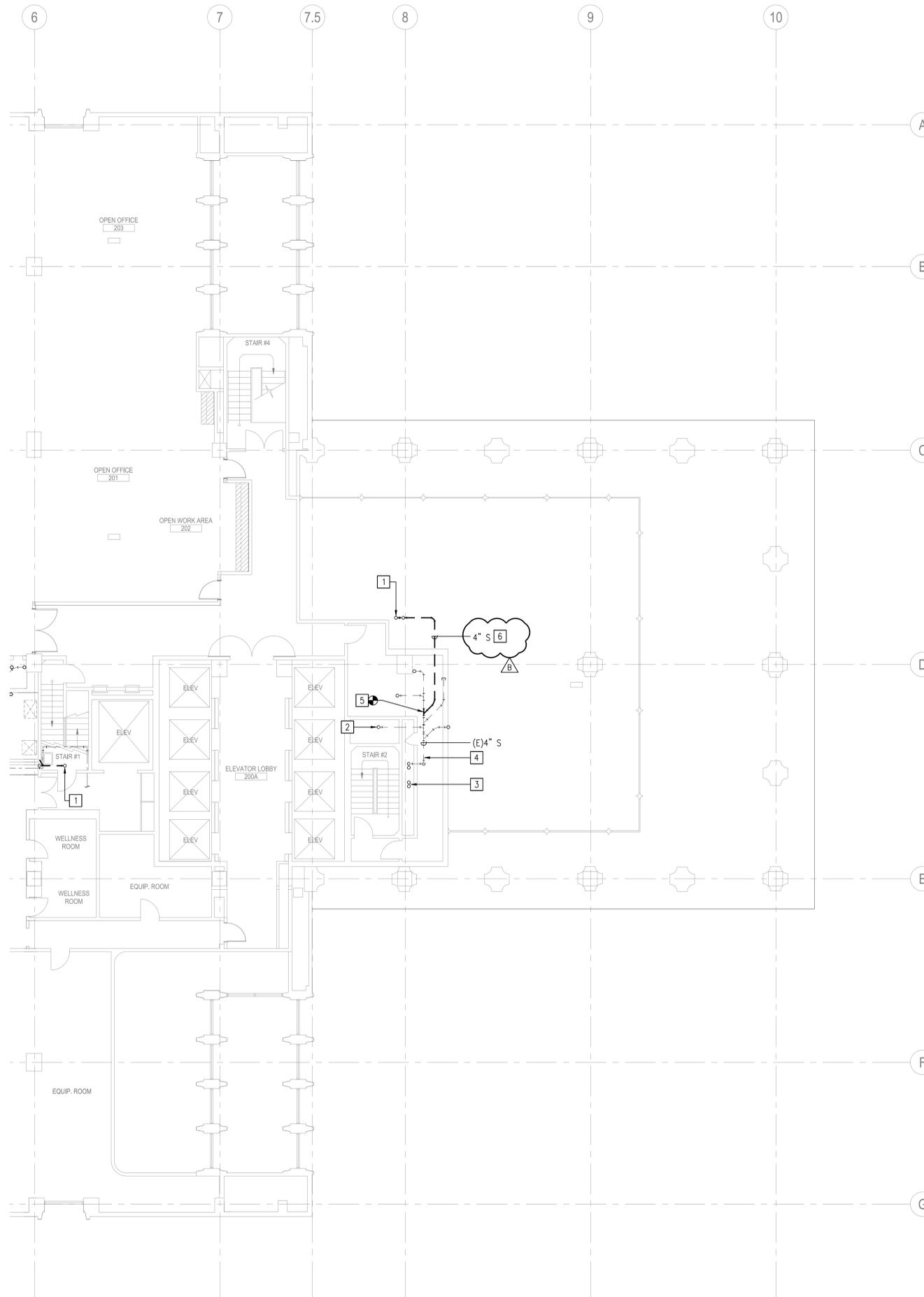
CITY OF SAN DIEGO
 PLUMBING DEMO LEVEL 01 SOUTH

CITY OF SAN DIEGO, CALIFORNIA PUBLIC WORKS DEPARTMENT SHEET 248 OF 402 SHEETS		WBS S-17009
APPROVED: [Signature]	DATE: 5/31/2018	SUBMITTED BY: JORGE ACEVEDO
FOR CITY ENGINEER: JASON GRANI	DATE: 7/20/18	PROJECT MANAGER
PRINT DCE NAME: [Signature]	DATE: [Signature]	PROJECT ENGINEER
DESCRIPTION	BY	APPROVED
ORIGINAL		DATE FILMED
ADDENDUM B		DATE FILMED
CONTRACTOR		DATE STARTED
INSPECTOR		DATE COMPLETED
		40154 - 248 - D

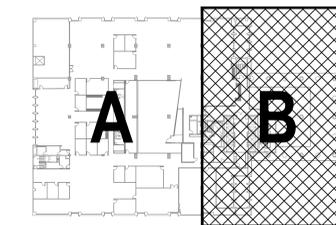
01 PLUMBING DEMO FLOOR PLAN - LEVEL 01 SOUTH
 SCALE: 1/8" = 1'-0"

02 LEVEL 01 - KEYPLAN
 SCALE: 1/84" = 1'-0"

FILE NAME: C:\PROJECTS\GENSLER - 135\003 CITY OF SD - 101 ASH ST TENANT IMPROVEMENT\DRAWINGS\CAD\2013\PLUMB\135-003-P-02.202B.DWG PLOT DATE: 6/25/2018 3:57 PM PRINT BY: NICHOLAS CLEMENTS



01 PLUMBING FLOOR PLAN - LEVEL 02 NORTH
SCALE: 1/8" = 1'-0"



02 LEVEL 02 - KEYPLAN
SCALE: 1/64" = 1'-0"

KEYNOTES

- 1 2" SANITARY WASTE PIPE UP TO SINK ON LEVEL 03. REFER TO PLUMBING SHEET P02.203.
- 2 EXISTING PLUMBING UTILITIES SERVING PLUMBING FIXTURES ON LEVEL 03.
- 3 EXISTING SANITARY AND VENT STACKS.
- 4 PLUMBING CONTRACTOR FIELD VERIFY EXISTING CONDITION PRIOR TO COMMENCING WORK.
- 5 POC TO 4" S PIPING TO EXISTING 4" S PIPING.
- 6 RUN 4" SANITARY WASTE PIPE AT 2% SLOPE PER FOOT AS HIGH AS POSSIBLE TO UNDERSIDE STRUCTURE. WHEN THE 2% IS NOT ABLE TO MAINTAINED DUE TO OBSTACLES SUCH AS I-BEAM DROP UNDER THE BEAM AND CHANGE SLOPE TO 1% SLOPE.

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Date	Description	
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05.07.2018	ISSUE FOR BID	AKSS
06.25.2018	ADDENDUM 'B'	AKJM



Project Number
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P02.202B

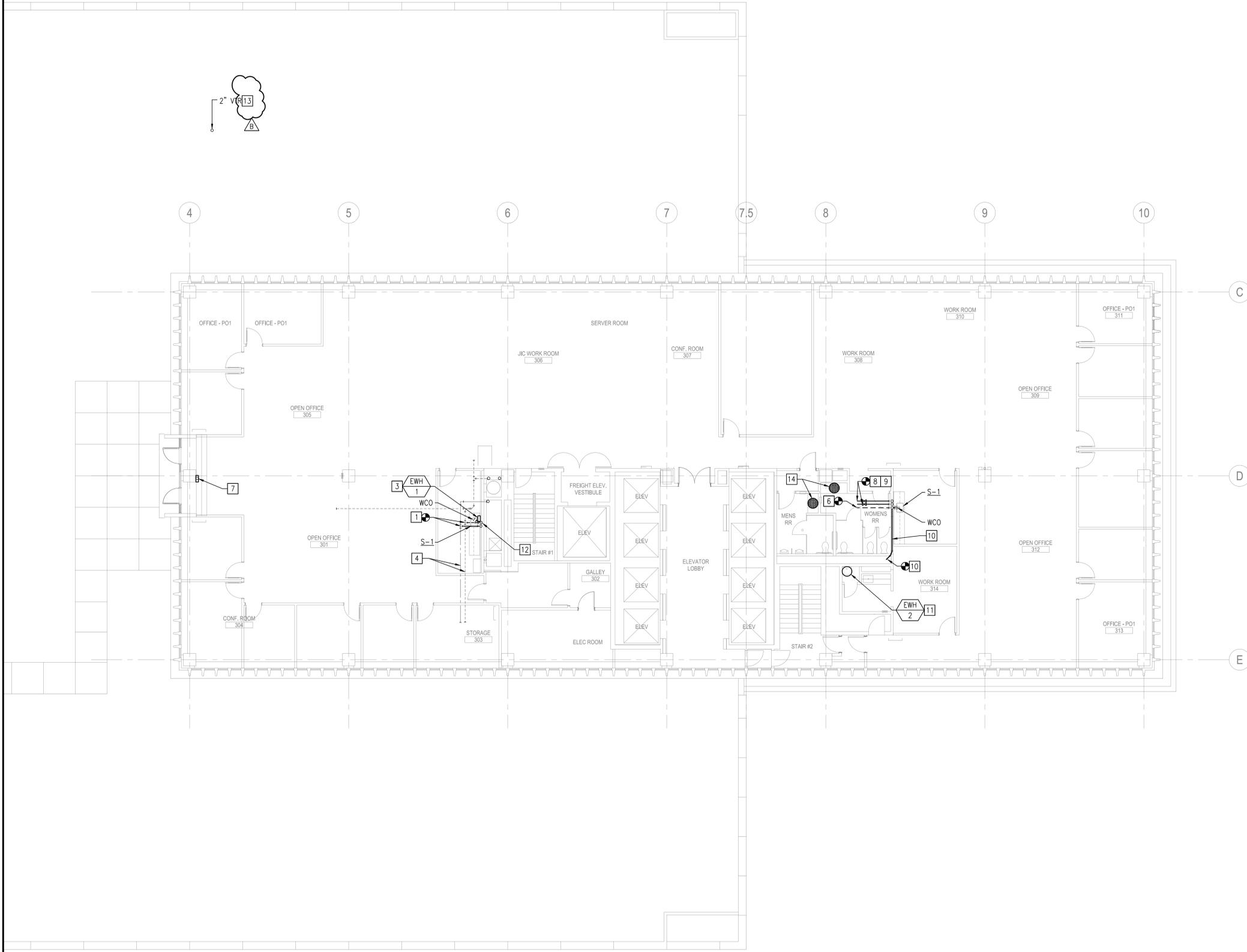
CITY OF SAN DIEGO
PLUMBING LEVEL 02 NORTH

CITY OF SAN DIEGO, CALIFORNIA PUBLIC WORKS DEPARTMENT SHEET 266 OF 402 SHEETS		WBS S-17009
APPROVED: [Signature] FOR CITY ENGINEER JASON GRANU PRINT DCE NAME	DATE: 5/31/2018 7/20/18 ROGER	SUBMITTED BY: JORGE ACEVEDO PROJECT MANAGER CHECKED BY: MARLON PEREZ PROJECT ENGINEER
DESCRIPTION	BY	APPROVED
ORIGINAL		5/31/2018
ADDENDUM B		6/25/2018
CONTRACTOR INSPECTOR		DATE STARTED DATE COMPLETED
		40154 - 266 - D

REVISOR'S NOTE # 6.

ADDENDUM B

FILE NAME: K:\PROJECTS\GENSLER - 135\003\CITY OF SD - 101 ASH ST TENANT IMPROVEMENT\DRAWINGS\CAD\2013\PLUMB\135-003-P-02.203.DWG PLOT DATE: 6/25/2018 3:57 PM PRINT BY: NICHOLAS CLEMENTS



KEYNOTES

- 1 POC 1-1/2" VENT PIPE AND 3/4" DOMESTIC COLD WATER TO EXISTING 2" VENT PIPE AND 2" DOMESTIC COLD WATER IN 3RD LEVEL CEILING SPACE.
- 2 POC 2" SANITARY WASTE PIPE TO EXISTING 4" SANITARY WASTE PIPE IN 2ND. LEVEL CEILING SPACE.
- 3 POINT OF USE INSTANTANEOUS ELECTRIC WATER HEATER UNDER SINK. SEE DETAIL 2/P05.001.
- 4 EXISTING UTILITIES LOCATED ON 3RD LEVEL CEILING SPACE. CONTRACTOR FIELD VERIFY EXISTING CONDITIONS PRIOR TO ROUTING NEW PIPING.
- 5 RUN 2" SANITARY WASTE PIPE AT 2% SLOPE PER FOOT AS HIGH AS POSSIBLE TO UNDERSIDE OF STRUCTURE. WHEN THE 2% SLOPE IS NOT ABLE TO MAINTAINED DUE TO OBSTACLES SUCH AS I-BEAM, DROP UNDER THE BEAM AND CHANGE SLOPE TO 1% SLOPE AND INCREASE THE PIPE SIZE TO 4" PIPE.
- 6 POC 1-1/2" VENT PIPE TO EXISTING VENT PIPING IN RESTROOM'S CEILING SPACE.
- 7 3" SAN PIPING DOWN INSIDE FURRING WALL.
- 8 POC 3/4" DOMESTIC COLD WATER AND 3/4" DOMESTIC HOT WATER TO EXISTING DOMESTIC WATER SUPPLY INSIDE RESTROOM'S CEILING SPACE.
- 9 CONTRACTOR FIELD VERIFY EXISTING CONDITION PRIOR TO CONNECTING OR DISCONNECTING PIPING.
- 10 POC 2" WASTE PIPE TO EXISTING 4" WASTE PIPE INSIDE PLUMBING CHASE. RUN 2" WASTE PIPE INSIDE THE WALL MAINTAINING 2% SLOPE.
- 11 INSTALL NEW ELECTRIC WATER HEATER WITH A 2.0 GALLON EXPANSION TANK AS PER 2016 CALIFORNIA PLUMBING CODE SECTION 608.3 AND PROVIDE THE APPROPRIATE SEISMIC STRAPS AS PER 2016 CALIFORNIA PLUMBING CODE SECTION 507.2 AND SECTION 608.4 FOR PRESSURE RELIEF VALVE. SEE DETAIL 1/P05.001. DISCHARGE PRESSURE RELIEF VALVE PIPE VIA 1-INCH AIR GAP INDIRECTLY INTO MOP SINK.
- 12 POC 2" SANITARY WASTE PIPE DOWN TO EXISTING 3" WASTE PIPE IN 2ND. LEVEL CEILING SPACE.
- 13 2" SANITARY VENT THRU ROOF SERVING SINK ON LEVEL 01. FOR VENT THRU ROOF DETAIL REFER TO DETAIL #5/P05-001
- 14 PLUMBING CONTRACTOR TO ADJUST EXISTING PLUMBING ROUGH-IN TO EXISTING LAVATORY AS PER DETAIL 4/P05.001.

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Public Works

P02.203

CITY OF SAN DIEGO

PLUMBING LEVEL 03

CITY OF SAN DIEGO, CALIFORNIA
PUBLIC WORKS DEPARTMENT
SHEET 267 OF 402 SHEETS

APPROVED: 	DATE: 5/31/2018	SUBMITTED BY: JORGE ACEVEDO		
FOR CITY ENGINEER: JASON GRAN	DATE: 7/20/18	PROJECT MANAGER		
PRINT DCE NAME: _____	RCER: _____	PROJECT ENGINEER: MARLON PEREZ		
DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL			5/31/2018	
ADDENDUM B			6/25/2018	
CONTRACTOR INSPECTOR: _____				
DATE STARTED: _____				
DATE COMPLETED: _____				

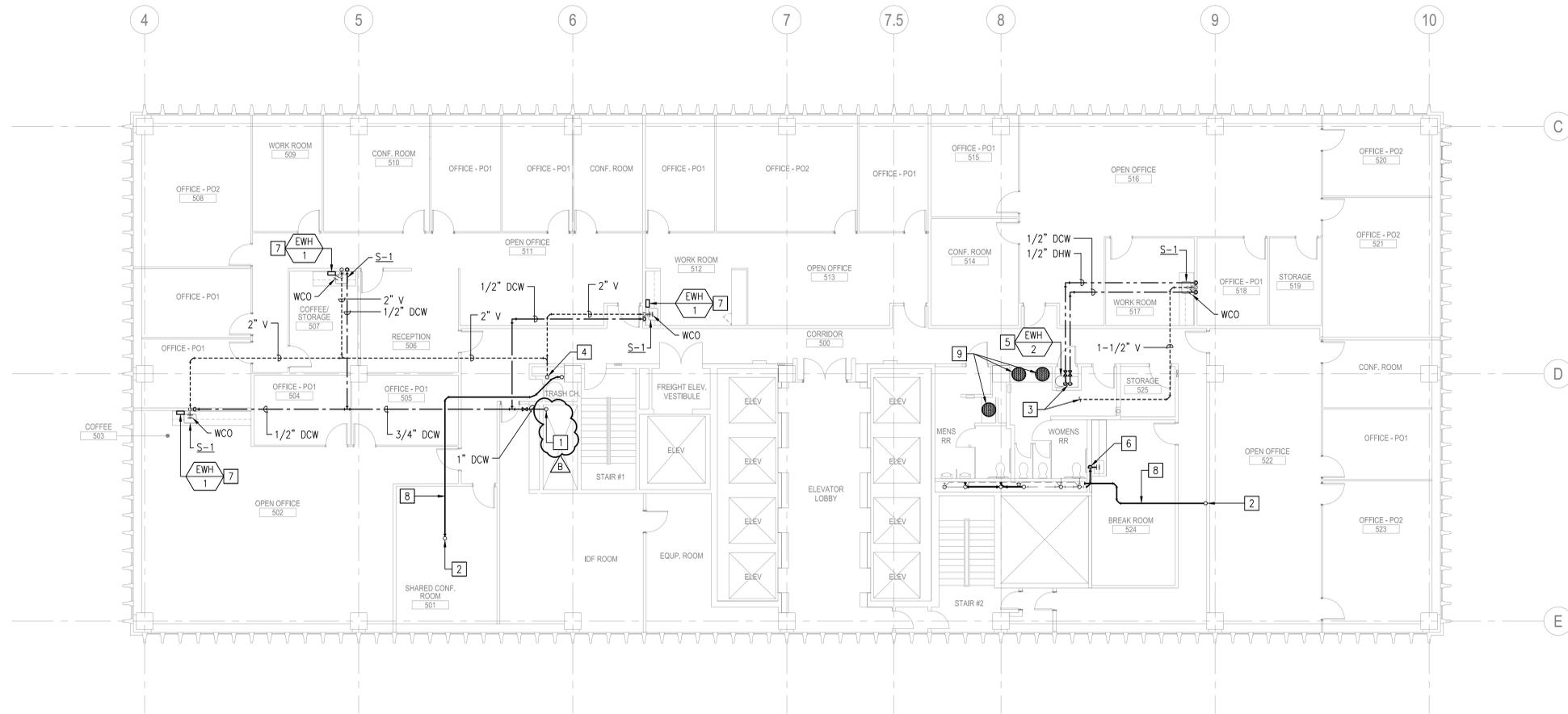
WBS S-17009

PROJECT MANAGER
PROJECT ENGINEER

40154 - 267 - D

01 PLUMBING FLOOR PLAN - LEVEL 03
SCALE: 1/8" = 1'-0"

FILE NAME: K:\PROJECTS\GENSLER - 135\003\CITY OF SD - 101 ASH ST TENANT IMPROVEMENT\DRAWINGS\CAD\2013\PLUMB\135-003-P-02_205.DWG PLOT DATE: 6/25/2018 3:57 PM PRINT BY: NICHOLAS CLEMENTS



KEYNOTES

- 1 POC TO 1" DCW PIPING TO EXISTING DOMESTIC COLD WATER RISER. PATCH WALL AS PER ARCHITECT'S RECOMMENDATIONS.
- 2 2" SANITARY WASTE UP TO STAINLESS STEEL SINK ON 6TH LEVEL. REFER TO PLUMBING SHEET P02.206.
- 3 RUN 1-1/2" V, 1/2" DCW, AND 1/2" DHW PIPING ABOVE CEILING SPACE TO POC TO EXISTING SERVICES ABOVE RESTROOM CEILING SPACE. CONTRACTOR FIELD VERIFY EXISTING CONDITION PRIOR TO COMMENCING WORK.
- 4 POC TO 2" VENT PIPING TO EXISTING VENT STACK. CONTRACTOR FIELD VERIFY EXISTING CONDITION PRIOR TO COMMENCING WORK.
- 5 INSTALL NEW ELECTRIC WATER HEATER WITH A 2.0 GALLON EXPANSION TANK AS PER 2016 CALIFORNIA PLUMBING CODE SECTION 608.3 AND PROVIDE THE APPROPRIATE SEISMIC STRAPS AS PER 2016 CALIFORNIA PLUMBING CODE SECTION 507.2 AND SECTION 608.4 FOR PRESSURE RELIEF VALVE. SEE DETAIL 1/P05.001. DISCHARGE PRESSURE RELIEF VALVE VIA 1-INCH AIR GAP INDIRECTLY INTO MOP SINK.
- 6 EXISTING SINK TO REMAIN.
- 7 POINT OF USE INSTANTANEOUS ELECTRIC WATER HEATER UNDER SINK. REFER TO DETAIL 2/P05.001.
- 8 RUN 2" SANITARY WASTE PIPE AT 2% SLOPE PER FOOT AS HIGH AS POSSIBLE TO UNDERSIDE STRUCTURE. WHEN THE 2% IS NOT ABLE TO MAINTAINED DUE TO OBSTACLES SUCH AS I-BEAM DROP UNDER THE BEAM AND CHANGE SLOPE TO 1% AND INCREASE THE PIPE SIZE TO 4" PIPE.
- 9 PLUMBING CONTRACTOR TO ADJUST EXISTING PLUMBING ROUGH-IN TO EXISTING LAVATORY AS PER DETAIL 4/P05.001.

CITY OF SAN DIEGO

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BSE PROJECT NO. 135-003
BSE ENGINEERING, INC.
10640 Terra Blvd., Suite 100 San Diego, CA 92121 TEL: 619.279.2200 FAX: 619.279.2204

Date	Description	AK/SS
07.28.2017	ISSUE PERMIT	AK/SS
09.08.2017	ISSUE FOR BID	AK/SS
05.07.2018	ISSUE FOR BID	AK/SS
06.25.2018	ADDENDUM 'B'	AK/LM



Project Number

55.7291.013

The City of **SAN DIEGO** Public Works

P02.205

CITY OF SAN DIEGO

PLUMBING LEVEL 05

CITY OF SAN DIEGO, CALIFORNIA
PUBLIC WORKS DEPARTMENT
SHEET 289 OF 402 SHEETS

WBS S-17009

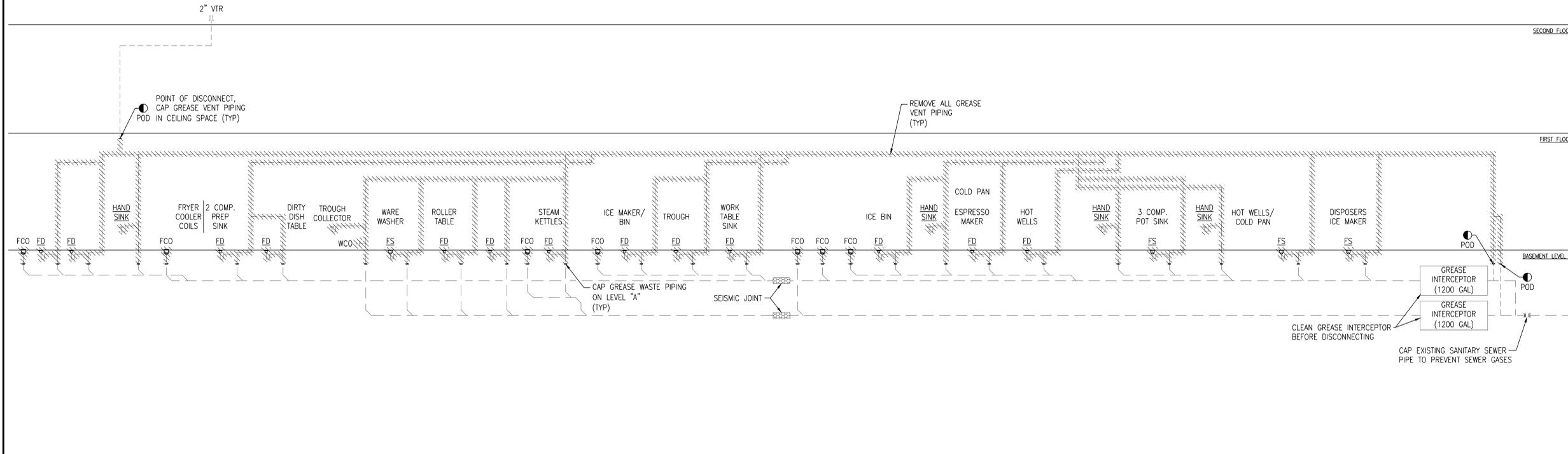
APPROVED	FOR CITY ENGINEER	DATE	5/31/2018	DATE	7/20/18	DATE	5/31/2018	DATE	6/25/2018	DATE	5/31/2018
JASON GRANU		RCEM		JORGE ACEVEDO		MARLON PEREZ		CS27 COORDINATE		CS83 COORDINATE	
DESCRIPTION		BY	APPROVED	DATE	FILMED						
ORIGINAL											
ADDENDUM B											
CONTRACTOR		DATE STARTED	DATE COMPLETED	40154 - 269 - D							



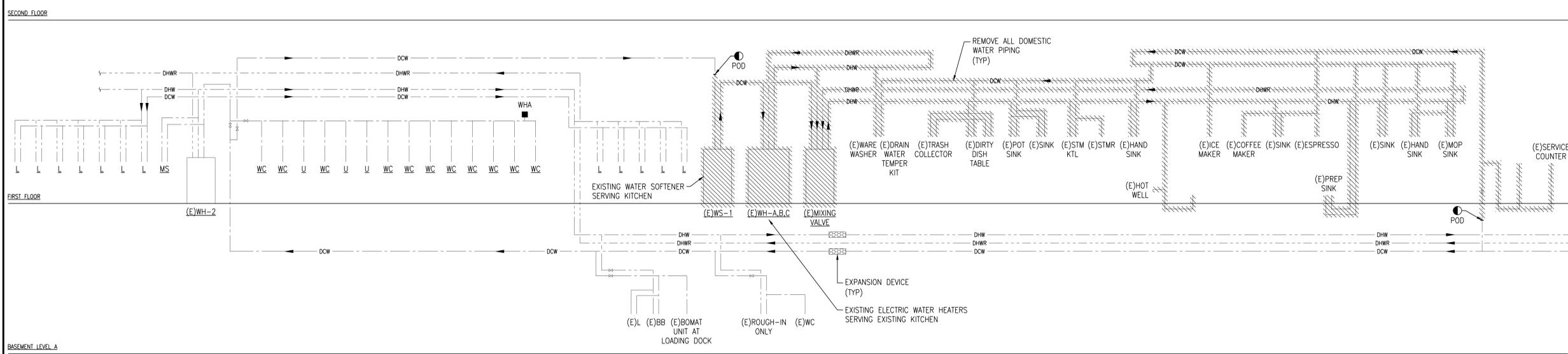
0 2' 4' 8' 16'
SCALE: 1/8" = 1'-0"

01 PLUMBING FLOOR PLAN - LEVEL 05
SCALE: 1/8" = 1'-0"

REVISOR NOTE #1 TO INDICATE WHERE THE WALL WILL NEED TO BE PATCH/REPAIR. **ADDENDUM B**



01 PLUMBING DEMO WASTE & VENT RISER DIAGRAM (KITCHEN) - EXISTING CONDITION AS PER 2005 CONSTRUCTION DOCUMENTS FIRST FLOOR REMODEL
SCALE: NONE



02 PLUMBING DEMO DOMESTIC WATER RISER DIAGRAM (KITCHEN) - EXISTING CONDITION AS PER 2005 CONSTRUCTION DOCUMENTS FIRST FLOOR REMODEL
SCALE: NONE

Date	Description	AK/SS
07.28.2017	ISSUE PERMIT	AK/SS
09.08.2017	ISSUE FOR BID	AK/SS
05.07.2018	ISSUE FOR BID	AK/SS
06.25.2018	ADDENDUM 'B'	AK/JM



Project Number
55.7291.013

The City of
SAN DIEGO
Public Works

P04.002

CITY OF SAN DIEGO
PLUMBING RISER DIAGRAMS

CITY OF SAN DIEGO, CALIFORNIA
PUBLIC WORKS DEPARTMENT
SHEET 279 OF 402 SHEETS

APPROVED: *[Signature]* DATE: 5/31/2018
FOR CITY ENGINEER: JASON GRANI DATE: 7/20/18
PRINT DGE NAME: RCEB

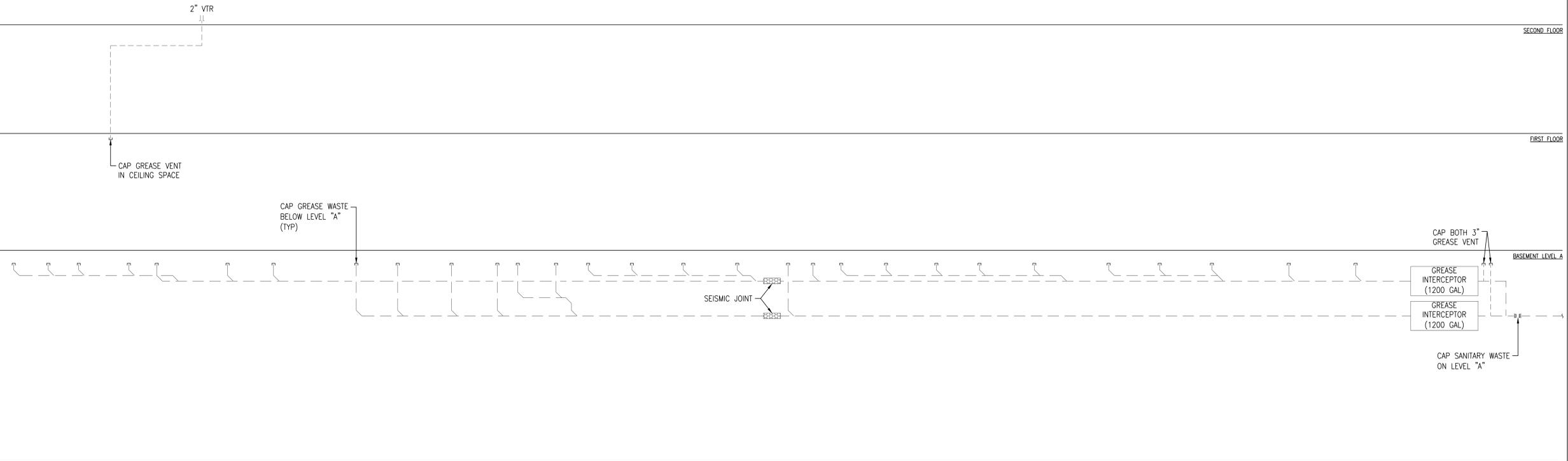
WBS S-17009
SUBMITTED BY: JORGE ACEVEDO
PROJECT MANAGER
CHECKED BY: MARLON PEREZ
PROJECT ENGINEER

DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL			5/31/2018	
ADDENDUM B			6/25/2018	

CONTRACTOR INSPECTOR: _____ DATE STARTED: _____ DATE COMPLETED: _____
40154 - 279 - D

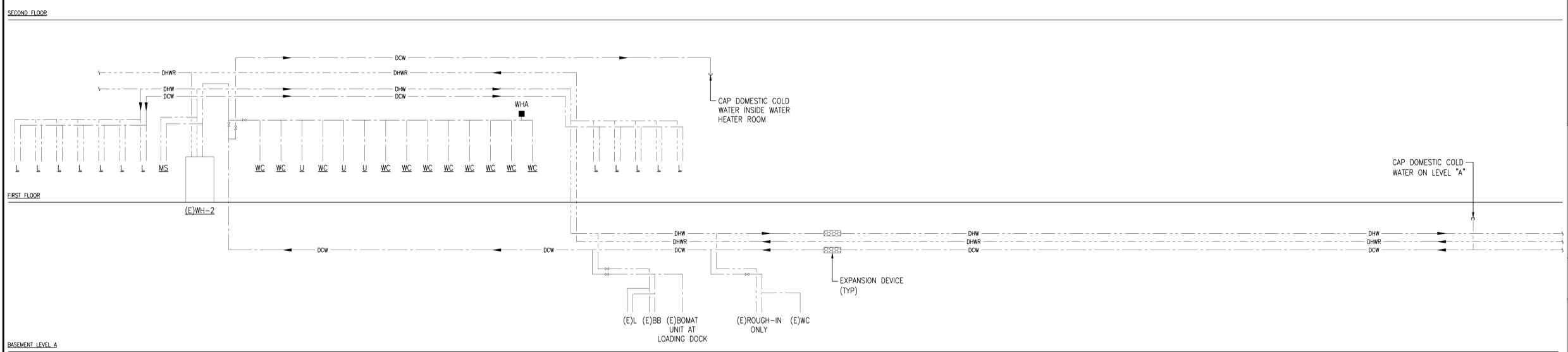
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FILE NAME: K:\PROJECTS\GENSLER - 135\003\CITY OF SD - 101 ASH ST TENANT IMPROVEMENT\DRAWINGS\CAD\2013\PLUMB\135-003-P-004.002.DWG PLOT DATE: 6/25/2018 3:57 PM PRINT BY: NICHOLAS CLEMENTS



01 PLUMBING WASTE & VENT RISER DIAGRAM (KITCHEN)
SCALE: NONE

Date	Description	AKISS
07.28.2017	ISSUE PERMIT	AKISS
09.08.2017	ISSUE FOR BID	AKISS
05.07.2018	ISSUE FOR BID	AKISS
06.25.2018	ADDENDUM 'B'	AKJLM



02 PLUMBING DOMESTIC WATER RISER DIAGRAM (KITCHEN)
SCALE: NONE



Project Number
55.7291.013

The City of
SAN DIEGO
Public Works

P04.003

CITY OF SAN DIEGO
PLUMBING RISER DIAGRAMS

CITY OF SAN DIEGO, CALIFORNIA PUBLIC WORKS DEPARTMENT SHEET 280 OF 402 SHEETS		WBS S-17009
APPROVED FOR CITY ENGINEER JASON GRANI PRINT DGE NAME	DATE 5/31/2018 77208	SUBMITTED BY JORGE ACEVEDO PROJECT MANAGER CHECKED BY MARLON PEREZ PROJECT ENGINEER
DESCRIPTION	BY	APPROVED
ORIGINAL		5/31/2018
ADDENDUM B		6/25/2018
CONTRACTOR	DATE STARTED	40154 - 280 - D
INSPECTOR	DATE COMPLETED	

REMOVE REFERENCE NOTE FROM DIAGRAMS

FILE NAME: K:\PROJECTS\GENSLER - 135\003\CITY OF SD - 101 ASH ST TENANT IMPROVEMENT\DRAWINGS\CAD\2013\PLUMB\135-003-P-004.003.DWG PLOT DATE: 6/25/2018 3:57 PM PRINT BY: NICHOLAS CLEMENTS

CITY OF SAN DIEGO

101 W. ASH
101 W. ASH STREET
SAN DIEGO, CA 92101

Gensler

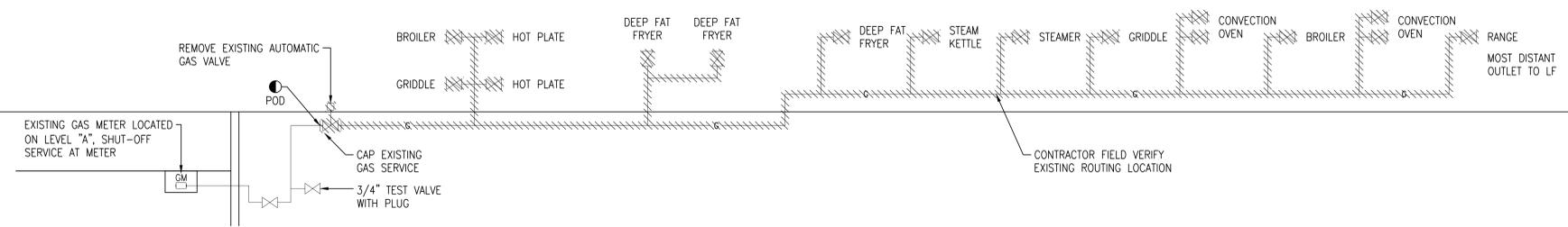
225 Broadway Suite 100
San Diego, CA 92101
United States
Tel 619.557.2500
Fax 619.557.2520

BSE PROJECT NO. 135-003
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FAX: 619.279.2204

SECOND FLOOR

FIRST FLOOR

BASEMENT LEVEL A



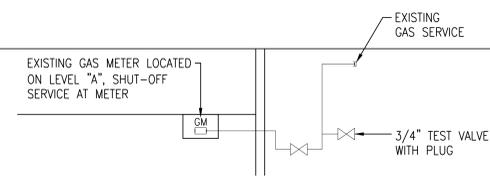
01 PLUMBING DEMO NATURAL GAS RISER DIAGRAM (KITCHEN) - EXISTING CONDITION AS PER 2005 CONSTRUCTION DOCUMENTS FIRST FLOOR REMODEL

SCALE: NONE

SECOND FLOOR

FIRST FLOOR

BASEMENT LEVEL A



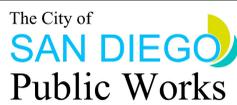
02 PLUMBING EXISTING NATURAL GAS RISER DIAGRAM (KITCHEN - AFTER DEMO)

SCALE: NONE

Date	Description	
07.28.2017	ISSUE PERMIT	AKSS
09.08.2017	ISSUE FOR BID	AKSS
03.07.2018	ISSUE FOR BID	AKSS
06.25.2018	ADDENDUM 'B'	AKJM



Project Number
55.7291.013



P04.004

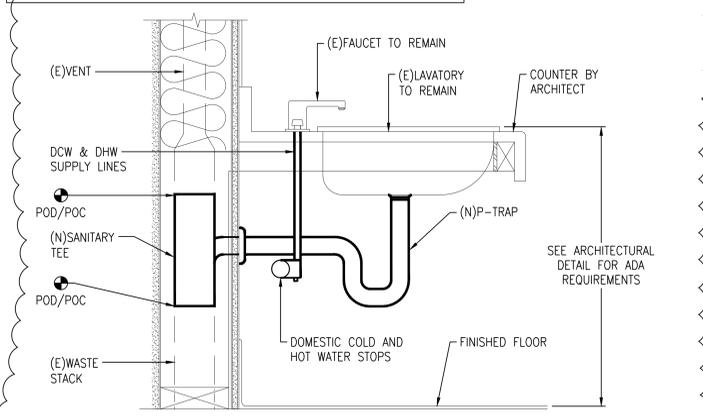
CITY OF SAN DIEGO
PLUMBING RISER DIAGRAMS

CITY OF SAN DIEGO, CALIFORNIA PUBLIC WORKS DEPARTMENT SHEET 281 OF 402 SHEETS				WBS S-17009
APPROVED BY: FOR CITY ENGINEER JASON GRANI PRINT DGE NAME	DATE 5/31/2018 77208	DATE 5/31/2018 02/25/2018	DATE FILMED	DATE
DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL				
ADDENDUM B				
CONTRACTOR INSPECTOR	DATE STARTED	DATE COMPLETED	40154 - 281 - D	

REMOVE REFERENCE NOTE FROM DIAGRAMS
ADDENDUM B

FILE NAME: C:\PROJECTS\GENSLER - 135\003 CITY OF SD - 101 ASH ST TENANT IMPROVEMENT\DRAWINGS\CAD V2013\PLUMB\135-003-P-004.004.DWG - PLOT DATE: 6/25/2018 3:57 PM - PRINT BY: NICHOLAS CLEMENTS

NOTE:
ALL LAVATORY'S ROUGH-INS AS SHOWN ARE NEW.
PLUMBING CONTRACTOR TO PROVIDE NEW SANITARY TEE, P-TRAP,
TAIL PIECE, DOMESTIC COLD AND HOT WATER STAINLESS STEEL BRAIDED HOSE,
STOPS, AND ALL NECESSARY FITTINGS TO ACCOMMODATE NEW COUNTER HEIGHT
AND TO COMPLY WITH ACCESSIBILITY (ADA) REQUIREMENTS.

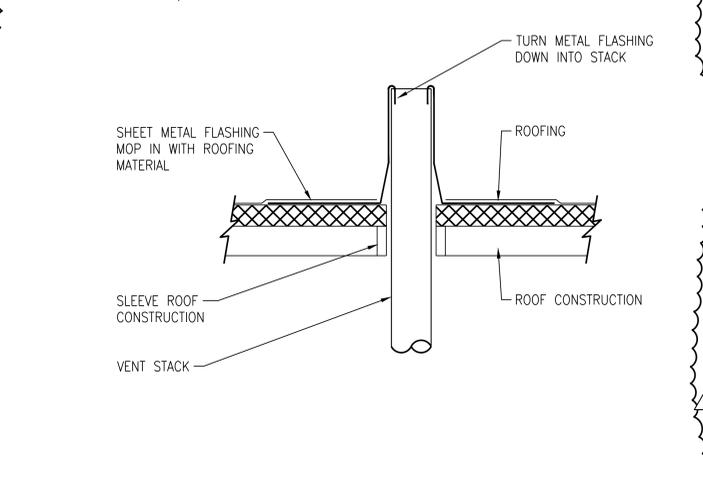


NOTE:
CONTRACTOR FIELD VERIFY EXISTING SANITARY WASTE PIPE BEHIND WALL
TO DETERMINE IT'S CONDITION PRIOR TO CUTTING TO ACCOMMODATE NEW
SANITARY FITTING.

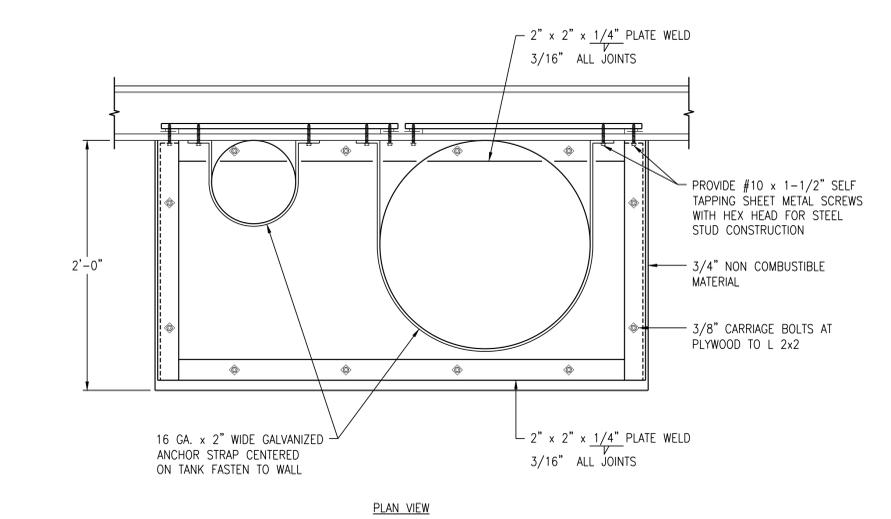
"REFERENCE ONLY"
FIELD CONDITIONS MIGHT DIFFERED
FROM DETAIL.

LAVATORY - ADA REMODEL DETAIL SCALE NONE 4

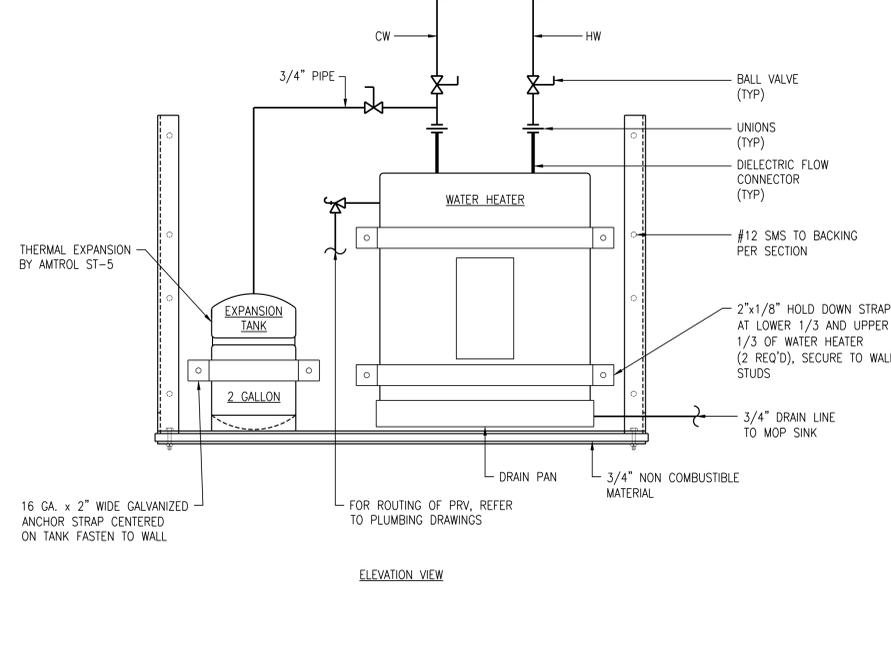
NOTES:
1. EXTEND VENT PIPING A MINIMUM OF 6" ABOVE ROOFING.
2. CONTRACTOR TO WEATHERPROOF ROOF PENETRATION TO MATCH
EXISTING AND/OR PER ARCHITECT'S RECOMMENDATIONS.



VENT THRU ROOF DETAIL SCALE NONE 5

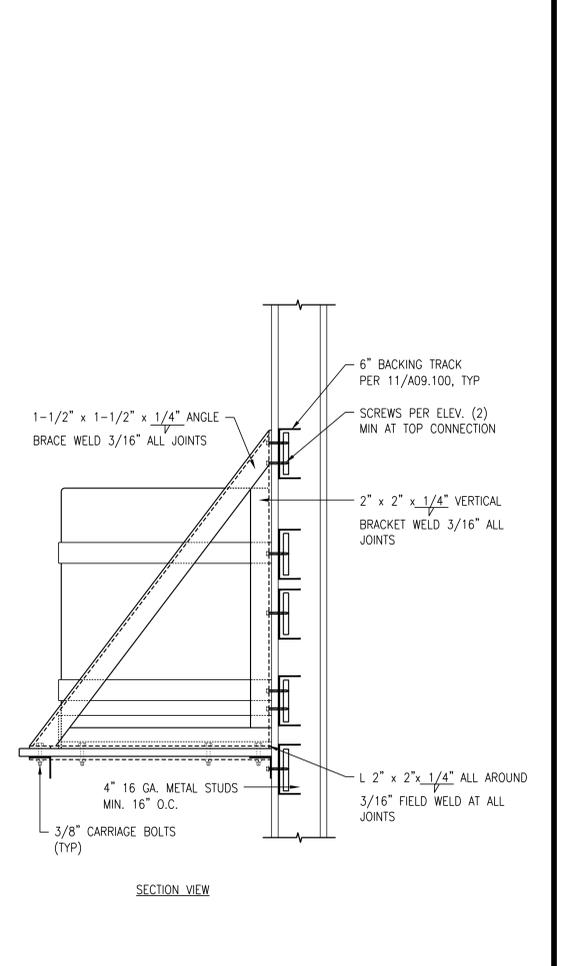


ELECTRIC WATER HEATER DETAIL SCALE NONE 1

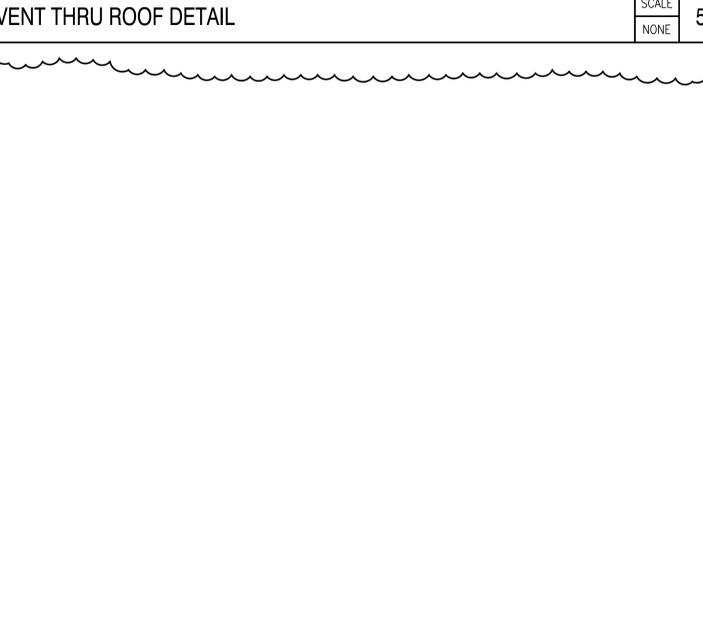


ELECTRIC WATER HEATER DETAIL SCALE NONE 1

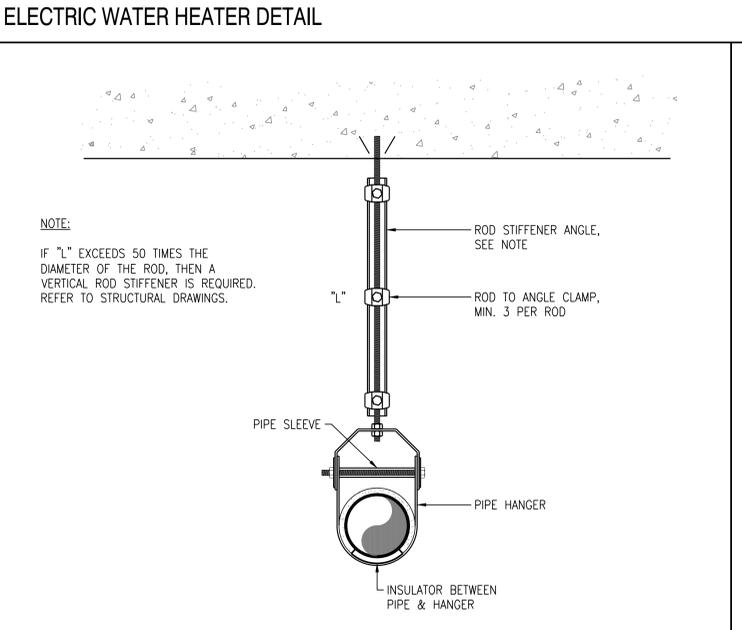
NOTES:
1. FOR NEW CONSTRUCTION, PROVIDE 3/8" x 3" LAG SCREWS FOR ALL
ATTACHMENTS AT WALL.
2. FOR CONCRETE CONSTRUCTION, PROVIDE HILTI KB-11 EXPANSION ANCHORS
(REF. ICBO REPORT #4627) FOR ALL ATTACHMENTS AT WALL.
3. THIS DETAIL IS FOR NEW WATER HEATERS THAT ARE 20 GALLONS AND BELOW.
4. REFER TO PLUMBING SHEET P06.001 FOR WATER HEATER OPERATING WEIGHTS
INCLUDING EXPANSION TANK.



ELECTRIC WATER HEATER DETAIL SCALE NONE 1



TYPICAL PIPE HANGER DETAIL SCALE NONE 6



SINK WITH INSTANTANEOUS POINT OF USE WATER HEATER DETAIL SCALE NONE 2

NOT USED SCALE NONE 6

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BSE PROJECT NO. 135-003
BSE ENGINEERING, INC.
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Date	Description	AKISS
07.28.2017	ISSUE PERMIT	AKISS
09.08.2017	ISSUE FOR BID	AKISS
05.07.2018	ISSUE FOR BID	AKISS
06.25.2018	ADDENDUM 'B'	AKJLM



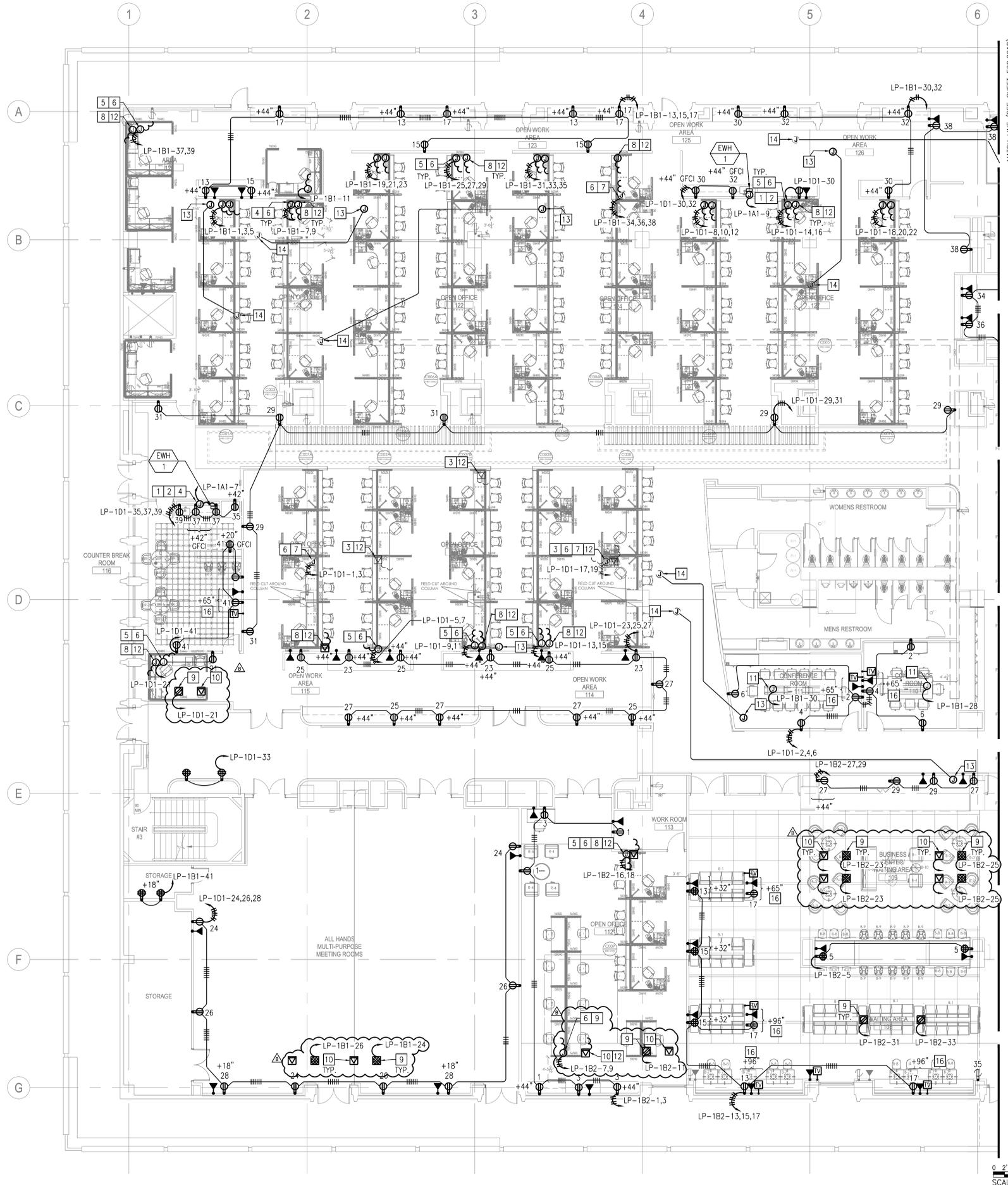
Project Number
55.7291.013
The City of
SAN DIEGO
Public Works
P05.001

CITY OF SAN DIEGO
PLUMBING DETAILS

CITY OF SAN DIEGO, CALIFORNIA PUBLIC WORKS DEPARTMENT SHEET 282 OF 402 SHEETS		WBS S-17009
APPROVED: [Signature]	DATE: 5/31/2018	SUBMITTED BY: JORGE ACEVEDO
FOR CITY ENGINEER: JASON GRANU	DATE: 7/20/18	PROJECT MANAGER
PRINT DCE NAME: [Signature]	RCER	CHECKED BY: MARLON PEREZ
DESCRIPTION	BY	APPROVED
ORIGINAL		DATE FILMED
ADDENDUM B		CS287 COORDINATE
		CS83 COORDINATE
CONTRACTOR	DATE STARTED	40154 - 282 - D
INSPECTOR	DATE COMPLETED	

FILE NAME: K:\PROJECTS\GENSLER - 135\003\CITY OF SD - 101 ASH ST TENANT IMPROVEMENT\DRAWINGS\CAD V2013\PLUMB\135-003-P-R05.001.DWG PLOT DATE: 4/25/2018 3:57 PM PRINT BY: NICHOLAS CLEMENTS

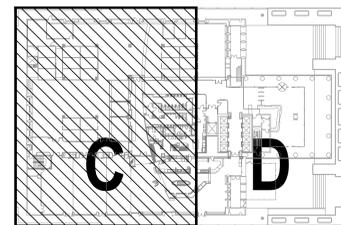
FILE NAME: K:\PROJECTS\GENSLER - 135\003\CITY OF SD - 101 ASH ST TENANT IMPROVEMENT\DRAWINGS\CAD\2013\ELEC\135-003-E-E02.201C.DWG PLOT DATE: 4/25/2018 4:58 PM PRINT BY: NICHOLAS CLEMENTS



MATCH LINE (SEE SHEET E02.201D)



0 2' 4' 8' 16'
SCALE: 1/8" = 1'-0"



POWER SHEET NOTES

1. CORE DRILL CONCRETE FLOOR FOR NEW LOCATIONS OF POWER AND DATA. REFER TO DETAILS 1,2,4,5/E05.001.
2. USE EXISTING UNDERFLOOR RACEWAYS FOR NEW POWER/DATA CIRCUITS. REFER TO DETAILS 1,2,4,5/E05.001.
3. COORDINATE ALL POWER/DATA LOCATIONS WITH FURNITURE CONSULTANT.
4. FOR RECEPTACLE AND DATA OUTLETS ON EXISTING WALLS, CONTRACTOR TO CUT WALL FOR CONDUIT ROUTING, PATCH AND PAINT WALL TO MATCH EXISTING COLOR AND FINISH.
5. ENSURE UNDERFLOOR RACEWAY DOES NOT HAVE MORE THAN 20 CURRENT CARRYING CONDUCTORS. IF THERE ARE GREATER THAN 20 CURRENT CARRYING CONDUCTORS IN A RACEWAY, PROVIDE UL RATED SEPARATION IN RACEWAY TO CRETE TWO SEPARATE RACEWAYS. ENSURE NO GREATER THAN 40% RACEWAY FILL.
6. ENSURE NO MORE THAN 20 CURRENT CARRYING CONDUCTORS ARE RUN IN ONE CELL OF THE CELLULAR FLOOR RACEWAY. UTILIZE ADJACENT CELLS AS NEEDED TO MAINTAIN A COUNT OF UNDER 20 CURRENT CARRYING CONDUCTORS.

POWER KEYNOTES

- 1 PROVIDE JUNCTION BOX AND CONNECT TO WATER HEATER.
- 2 PROVIDE 2 #8, #8G, 1" C TO PANEL.
- 3 REUSE EXISTING DATA.
- 4 PROVIDE CIRCUIT TO WATER HEATER AS SHOWN.
- 5 PROVIDE POWER AND ROUTE POWER DOWN WALL. PROVIDE WALL MOUNT JUNCTION BOX FOR POWER FOR WHIP TO MODULAR FURNITURE.
- 6 COORDINATE WITH FURNITURE MANUFACTURER FOR FURNITURE POWER CONNECTIONS.
- 7 REUSE EXISTING JUNCTION BOX TO PROVIDE POWER TO DEVICES AS SHOWN.
- 8 PROVIDE 2" C FOR DATA AND ROUTE DATA DOWN WALL. PROVIDE WALL MOUNT SURFACE JUNCTION BOX FOR DATA FOR WHIP TO MODULAR FURNITURE.
- 9 PROVIDE FLUSH MOUNT POWER FLOOR BOX PER 3/E05.001. ROUTE THRU CELLULAR FLOOR AND ROUTE UP NEAREST WALL TO CEILING SPACE. CORE HOLE ON CONCRETE AS REQUIRED.
- 10 PROVIDE FLUSH MOUNT DATA FLOOR BOX. ROUTE THRU CELLULAR FLOOR AND ROUTE UP NEAREST WALL TO CEILING SPACE. CORE HOLE ON CONCRETE AS REQUIRED.
- 11 PROVIDE JUNCTION BOX IN CEILING FOR PROJECTOR. COORDINATE LOCATION AND REQUIREMENTS PRIOR TO ROUGH IN.
- 12 FOR DATA WHIP, REFER TO DETAIL 3/E05.001. COORDINATE WITH CITY OF SAN DIEGO FOR FURNITURE DATA CONNECTIONS.
- 13 NEW VAV BOX LOCATION. SPLICE NEW WIRES TO EXTEND CIRCUIT OF EXISTING VAV BOX. REFER TO MECHANICAL DRAWINGS M02.201A AND M02.201B.
- 14 LOCATION OF EXISTING JUNCTION BOX FOR VAV BOX. SPLICE WIRES FOR RESPECTIVE VAV BOX RELOCATIONS. REFER TO MECHANICAL DRAWINGS M02.201A AND M02.201B.
- 15 CIRCUIT EXISTING DEVICE TO CIRCUIT SHOWN.
- 16 PROVIDE CLOCK TYPE OUTLETS FOR TV.

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BSE ENGINEERING, INC.
13540 TORREYA BL., SUITE 100
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Date	Description	AKSS
07.28.2017	ISSUE PERMIT	AKSS
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05.07.2018	ISSUE FOR BID	AKSS
06.25.2018	ADDENDUM 'B'	AKLM



Project Number
55.7291.013

The City of
SAN DIEGO
Public Works

E02.201C

CITY OF SAN DIEGO
ELECTRICAL LEVEL 01 SOUTH - POWER

CITY OF SAN DIEGO, CALIFORNIA
PUBLIC WORKS DEPARTMENT
SHEET 320 OF 402 SHEETS

WBS S-17009

APPROVED: JASON GRAN
FOR CITY ENGINEER
DATE: 7/20/18
PROJECT MANAGER: JORGE ACEVEDO
PROJECT ENGINEER: MARLON PEREZ

DESCRIPTION	BY	APPROVED	DATE	FILED
ORIGINAL			5/31/2018	
ADDENDUM B			02/25/2018	

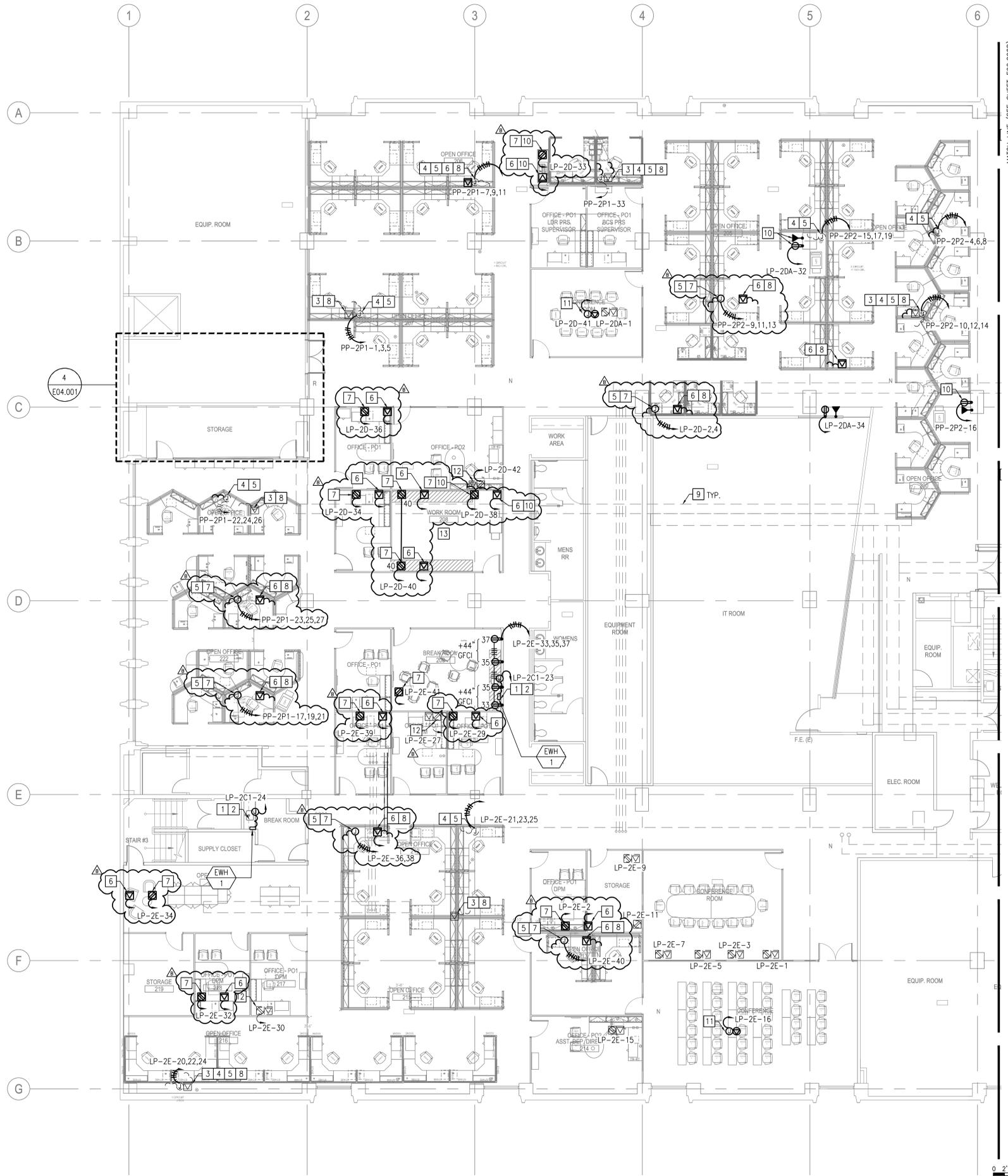
CONTRACTOR: DATE STARTED: DATE COMPLETED: 40154 - 320 - D

REVISIONS:
1 REVISE FLOOR BOX LOCATIONS

01 ELECTRICAL POWER PLAN - LEVEL 01 SOUTH
SCALE: 1/8" = 1'-0"

02 LEVEL 01 - KEYPLAN
SCALE: 1/64" = 1'-0"

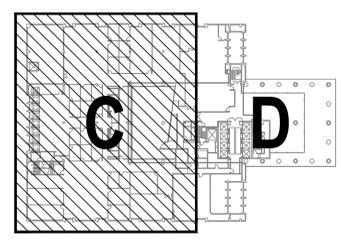
FILE NAME: K:\PROJECTS\GENSLER - 135\003\CITY OF SD - 101 ASH ST TENANT IMPROVEMENT\DRAWINGS\CAD\2013\ELEC\135-003-E-E02.202C.DWG PLOT DATE: 4/25/2018 4:59 PM PRINT BY: NICHOLAS CLEMENTS



MATCH LINE (SEE SHEET E02.202D)



SCALE: 1/8" = 1'-0"



02 LEVEL 02 - KEYPLAN
SCALE: 1/8" = 1'-0"

POWER SHEET NOTES

- CORE DRILL CONCRETE FLOOR FOR NEW LOCATIONS OF POWER AND DATA. REFER TO DETAILS 1,2,4,5/E05.003.
- USE EXISTING UNDERFLOOR RACEWAYS FOR NEW POWER/DATA CIRCUITS. REFER TO DETAILS 1,2,4,5/E05.003.
- COORDINATE ALL POWER/DATA LOCATIONS WITH FURNITURE CONSULTANT.
- FOR RECEPTACLE AND DATA OUTLETS ON EXISTING WALLS, CONTRACTOR TO CUT WALL FOR CONDUIT ROUTING, PATCH AND PAINT WALL TO MATCH EXISTING COLOR AND FINISH.
- ENSURE UNDERFLOOR RACEWAY DOES NOT HAVE MORE THAN 20 CURRENT CARRYING CONDUCTORS. IF THERE ARE GREATER THAN 20 CURRENT CARRYING CONDUCTORS IN A RACEWAY, PROVIDE UL RATED SEPARATION IN RACEWAY TO CREATE TWO SEPARATE RACEWAYS. ENSURE NO GREATER THAN 40% RACEWAY FILL.
- ENSURE NO MORE THAN 20 CURRENT CARRYING CONDUCTORS ARE RUN IN ONE CELL OF THE CELLULAR FLOOR RACEWAY. UTILIZE ADJACENT CELLS AS NEEDED TO MAINTAIN A COUNT OF UNDER 20 CURRENT CARRYING CONDUCTORS.

POWER KEYNOTES

- PROVIDE JUNCTION BOX AND CONNECT TO WATER HEATER.
- PROVIDE 2 #8, #8G, 1" C TO PANEL.
- REUSE EXISTING DATA.
- REUSE EXISTING JUNCTION BOX TO PROVIDE POWER TO DEVICES AS SHOWN.
- COORDINATE WITH FURNITURE MANUFACTURER FOR FURNITURE POWER CONNECTIONS.
- CORE DRILL CONCRETE FLOOR, PROVIDE FLUSH MOUNT DATA FLOOR BOX.
- CORE DRILL CONCRETE FLOOR, PROVIDE FLUSH MOUNT POWER FLOOR BOX PER DETAIL 3/E05.003.
- FOR DATA WHIP, REFER TO DETAIL 3/E05.003. COORDINATE WITH CITY OF SAN DIEGO FOR FURNITURE DATA CONNECTIONS.
- EXISTING FLOOR DUCT. REFER TO DETAILS 1,2,4,5/E05.003.
- PROVIDE POWER AND DATA FOR COPIER.
- PROVIDE JUNCTION BOX IN CEILING FOR PROJECTOR.
- REUSE EXISTING FLOOR BOX DEVICE(S). COORDINATE FURNITURE LOCATION SUCH THAT FLOOR BOX DEVICE IS NOT A TRIPPING HAZARD.
- ROUTE POWER FROM FLOOR TO INSIDE MILLWORK FOR CONTINUED CONNECTION. COORDINATE WITH ARCHITECT.

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SAN DIEGO, CA 92101

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Fax 619.557.2520

BSE PROJECT NO. 135-003
BSE ENGINEERING, INC.
10480 TERRA BLVD., SUITE 100
SAN DIEGO, CA 92121
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FAX: 619.279.2204

Date	Description	AKSS
07.28.2017	ISSUE PERMIT	AKSS
09.08.2017	ISSUE FOR BID	AKSS
05.07.2018	ISSUE FOR BID	AKSS
06.25.2018	ADDENDUM 'B'	AKLM



Project Number
55.7291.013

The City of
SAN DIEGO
Public Works

E02.202C

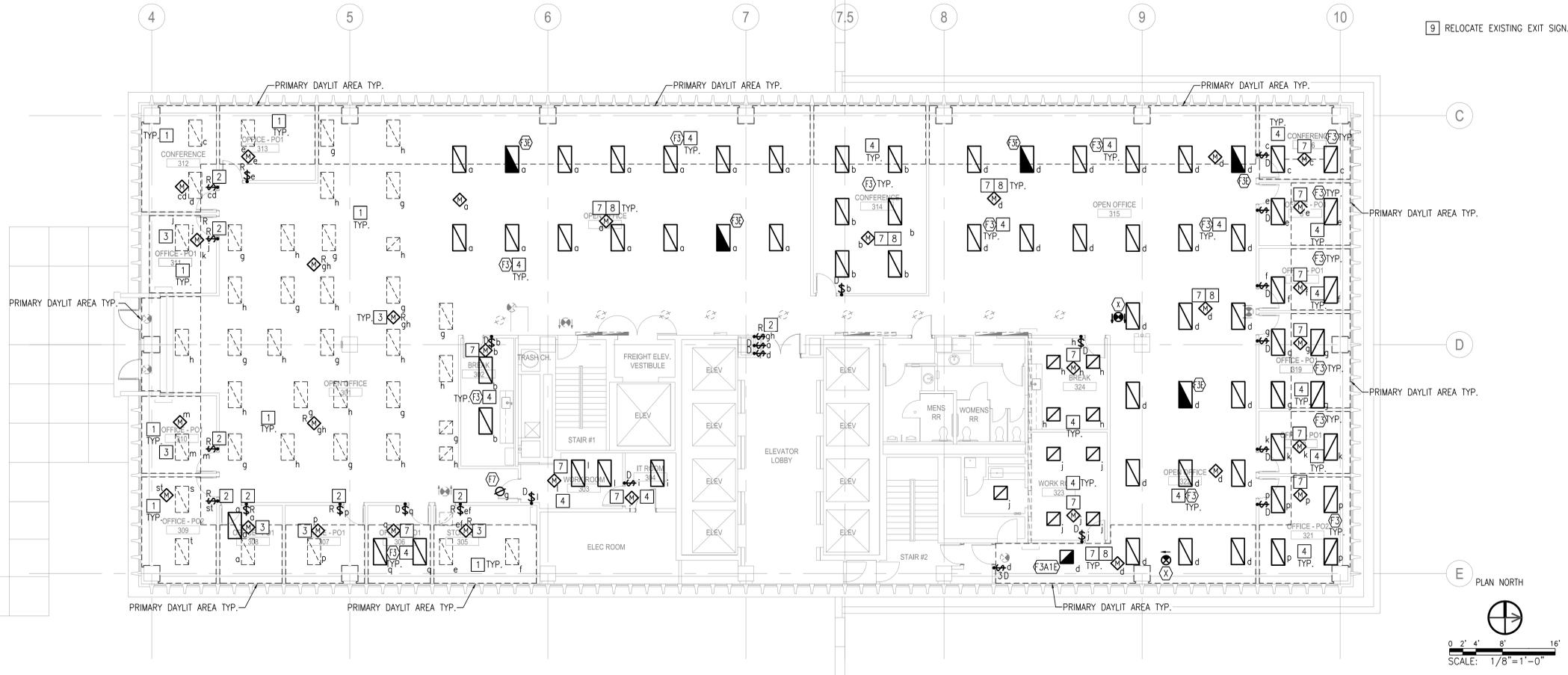
CITY OF SAN DIEGO
ELECTRICAL LEVEL 02 SOUTH - POWER

CITY OF SAN DIEGO, CALIFORNIA PUBLIC WORKS DEPARTMENT SHEET 325 OF 402 SHEETS		WBS S-17009
APPROVED: [Signature]	DATE: 5/31/2018	SUBMITTED BY: JORGE ACEVEDO
FOR CITY ENGINEER: JASON GRANI	DATE: 7/20/18	PROJECT MANAGER
PRINT DATE NAME	RCER	CHECKED BY: MARLON PEREZ
DESCRIPTION	BY	APPROVED
DATE	FILED	
ORIGINAL	5/31/2018	
ADDENDUM B	6/25/2018	CS27 COORDINATE
		CS83 COORDINATE
CONTRACTOR	DATE STARTED	40154 - 325 - D
INSPECTOR	DATE COMPLETED	

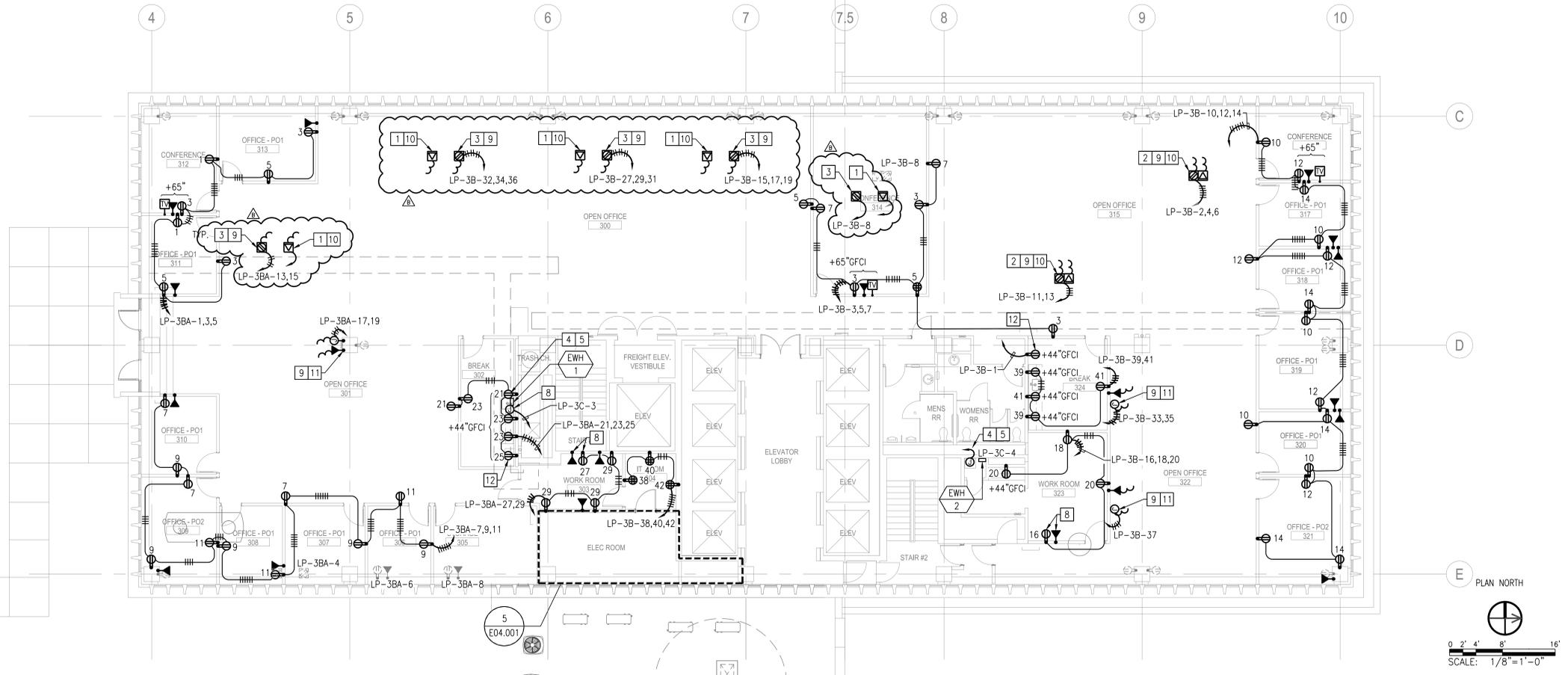
REVISION: REVISE FLOOR BOX LOCATIONS
ADDENDUM B

01 ELECTRICAL POWER PLAN - LEVEL 02 SOUTH
SCALE: 1/8" = 1'-0"

FILE NAME: K:\PROJECTS\GENSLER - 135\003 CITY OF SD - 101 ASH ST TENANT IMPROVEMENT\DRAWINGS\CAD\2013\ELEC\135-003-E-E02.203.DWG PLOT DATE: 6/25/2018 4:59 PM. PRINT BY: NICHOLAS CLEMENTS



01 ELECTRICAL LIGHTING PLAN - LEVEL 03
SCALE: 1/8" = 1'-0"



02 ELECTRICAL POWER PLAN - LEVEL 03
SCALE: 1/8" = 1'-0"

- LIGHTING KEYNOTES**
- 1 RELOCATE EXISTING EXIT SIGN.
 - 1 RECIRCUIT LUMAIRES TO CONTROL SHOWN.
 - 2 RELOCATED SWITCH.
 - 3 RELOCATE OCCUPANCY SENSOR.
 - 4 RECIRCUIT LUMAIRES TO EXISTING LIGHTING CIRCUIT. REFER TO LCP-3 FOR WORK.
 - 5 PROVIDE SWITCH FOR EXISTING LUMAIRES AS SHOWN.
 - 6 RELOCATE EXISTING LUMINAIRE.
 - 7 PROVIDE TYPE I LIGHTING CONTROL PER 1/E05.002.
 - 8 PROVIDE QUANTITY AND LOCATION OF OCCUPANCY SENSOR PER MANUFACTURER RECOMMENDATION.

- POWER SHEET NOTES**
1. CORE DRILL CONCRETE FLOOR FOR NEW LOCATIONS OF POWER AND DATA. REFER TO DETAILS: 1,2,4,5/E05.001.
 2. USE EXISTING UNDERFLOOR RACEWAYS FOR NEW POWER/DATA CIRCUITS. REFER TO DETAILS: 1,2,4,5/E05.001.
 3. COORDINATE ALL POWER/DATA LOCATIONS WITH FURNITURE CONSULTANT.
 4. FOR RECEPTACLE AND DATA OUTLETS ON EXISTING WALLS, CONTRACTOR TO CUT WALL FOR CONDUIT ROUTING, PATCH AND PAINT WALL TO MATCH EXISTING COLOR AND FINISH.
 5. ENSURE UNDERFLOOR RACEWAY DOES NOT HAVE MORE THAN 20 CURRENT CARRYING CONDUCTORS. IF THERE ARE GREATER THAN 20 CURRENT CARRYING CONDUCTORS IN RACEWAY, PROVIDE UL RATED SEPARATION IN RACEWAY TO CRETE TWO SEPARATE RACEWAYS. ENSURE NO GREATER THAN 40% RACEWAY FILL.
 6. ENSURE NO MORE THAN 20 CURRENT CARRYING CONDUCTORS ARE RUN IN ONE CELL OF THE CELLULAR FLOOR RACEWAY. UTILIZE ADJACENT CELLS AS NEEDED TO MAINTAIN A COUNT OF UNDER 20 CURRENT CARRYING CONDUCTORS

POWER KEYNOTES

Date	Description	AKSS
07.28.2017	ISSUE PERMIT	AKSS
09.08.2017	ISSUE FOR BID	AKSS
05.07.2018	ISSUE FOR BID	AKSS
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- POWER KEYNOTES**
- 1 CORE DRILL CONCRETE FLOOR, PROVIDE FLUSH MOUNT DATA FLOOR BOX.
 - 2 REUSE EXISTING FLOOR BOX DEVICE(S). COORDINATE FURNITURE LOCATION SUCH THAT FLOOR BOX DEVICE IS NOT A TRIPPING HAZARD.
 - 3 CORE DRILL CONCRETE FLOOR, PROVIDE FLUSH MOUNT POWER FLOOR BOX PER 3/E05.001.
 - 4 PROVIDE JUNCTION BOX AND CONNECT TO WATER HEATER.
 - 5 PROVIDE 2#8, #8G, 1" TO PANEL.
 - 6 EXISTING FLOOR DUCT. REFER TO DETAIL 1,2,4,5/E05.001.
 - 7 PROVIDE CLOCK TYPE OUTLETS FOR TV.
 - 8 PROVIDE POWER & DATA FOR COPIER POWER.
 - 9 PROVIDE POWER WHIP. COORDINATE WITH FURNITURE MANUFACTURER FOR FURNITURE POWER CONNECTIONS.
 - 10 FOR DATA WHIP REFER TO DETAIL 3/E05.001.
 - 11 PROVIDE WALL MOUNTED JUNCTION BOX.
 - 12 PROVIDE RECEPTACLE FOR BREAK ROOM FRIDGE.

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BSE ENGINEERING, INC.
10480 Torreyana Dr., Suite 100
San Diego, CA 92121
TEL: 619-279-8200
FAX: 619-279-8204

Date Description

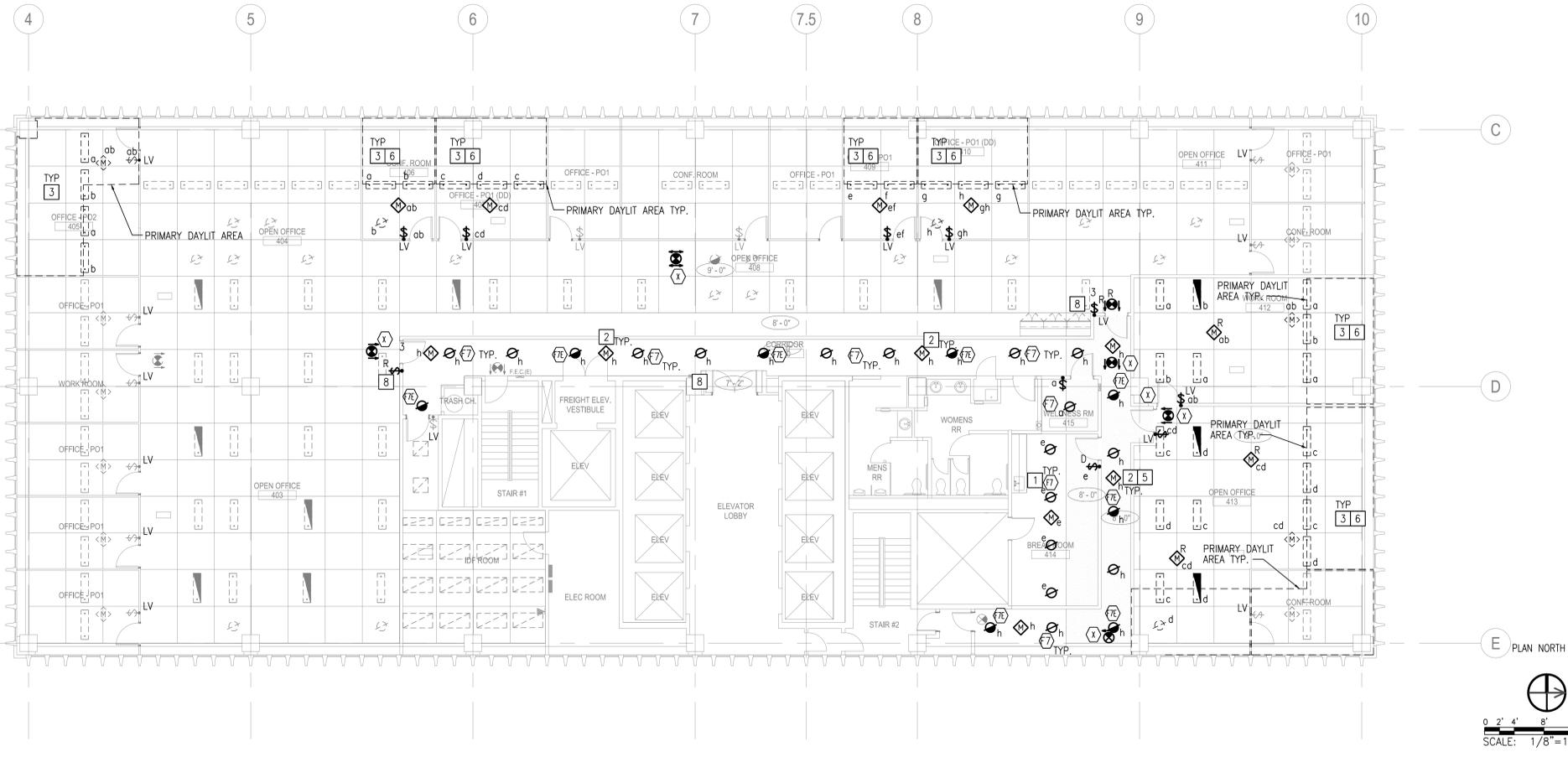
Date	Description	AKSS
07.28.2017	ISSUE PERMIT	AKSS
09.08.2017	ISSUE FOR BID	AKSS
05.07.2018	ISSUE FOR BID	AKSS
06.25.2018	ADDENDUM 'B'	AKLM



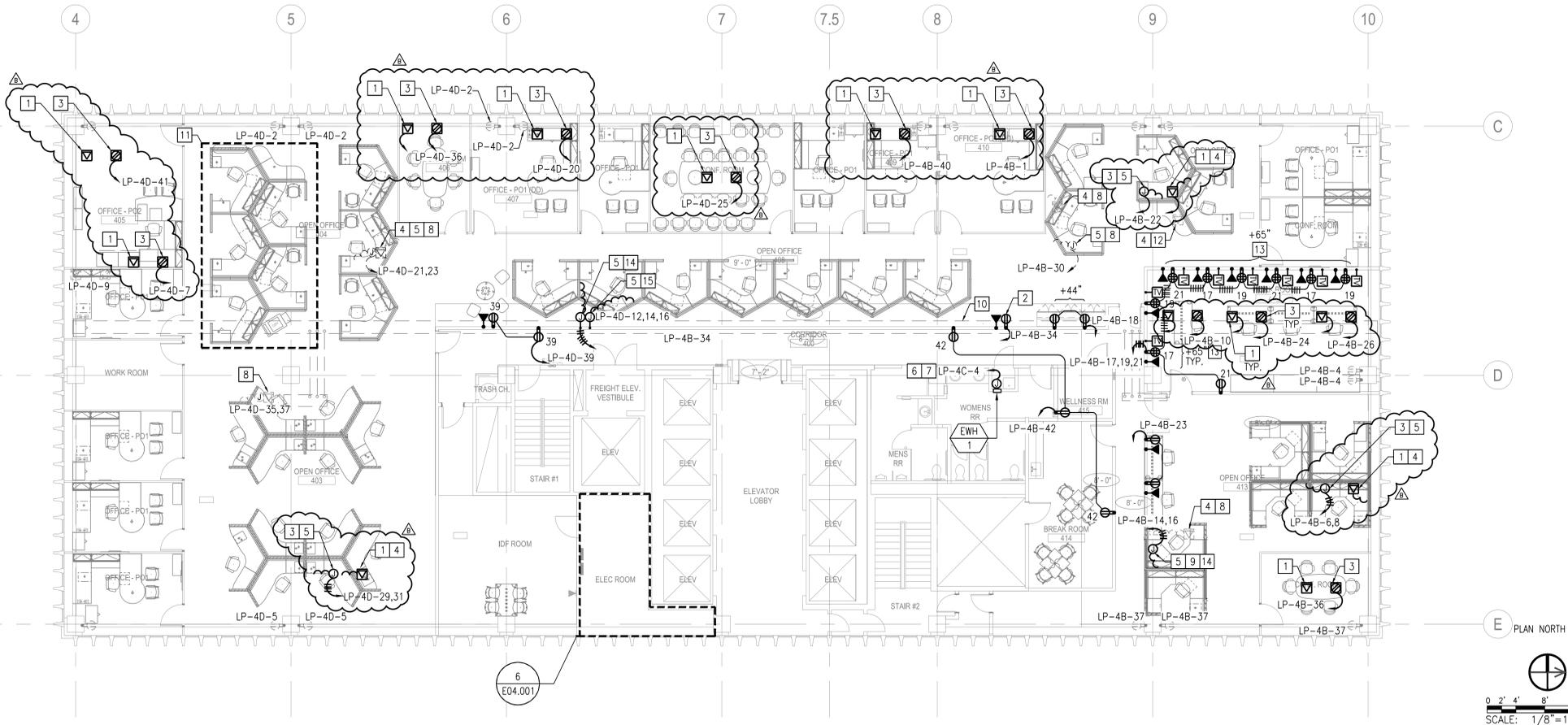
Project Number: 55.7291.013
The City of **SAN DIEGO** Public Works
E02.203

CITY OF SAN DIEGO
ELECTRICAL LEVEL 03

CITY OF SAN DIEGO, CALIFORNIA PUBLIC WORKS DEPARTMENT SHEET 329 OF 402 SHEETS		WBS S-17009
APPROVED: FOR CITY ENGINEER DATE: 5/31/2018 PRINT DCE NAME: JASON GRANU	DATE: 7/20/18 RCER	SUBMITTED BY: JORGE ACEVEDO PROJECT MANAGER CHECKED BY: MARLON PEREZ PROJECT ENGINEER
DESCRIPTION	BY	APPROVED
ORIGINAL		5/31/2018
ADDENDUM B		6/25/2018
		CS287 COORDINATE
		CS83 COORDINATE
CONTRACTOR INSPECTOR	DATE STARTED	DATE COMPLETED
		40154 - 329 - D



01 ELECTRICAL LIGHTING PLAN - LEVEL 04
SCALE: 1/8" = 1'-0"



02 ELECTRICAL POWER PLAN - LEVEL 04
SCALE: 1/8" = 1'-0"

- LIGHTING KEYNOTES**
- 1 PROVIDE TYPE I LIGHTING CONTROL PER 1/E05.002.
 - 2 PROVIDE TYPE II LIGHTING CONTROL PER 2/E05.002.
 - 3 RECURCUIT LUMINAIRE TO CONTROL SHOWN.
 - 4 RELOCATE SWITCH.
 - 5 PROVIDE QUANTITY AND LOCATION OF OCCUPANCY SENSOR PER MANUFACTURER RECOMMENDATION.
 - 6 RECURCUIT USING EXISTING LIGHTING CIRCUIT. REFER TO LCP-4 FOR WORK.
 - 7 CONTRACTOR TO INSTALL LED LUMINAIRE IN EXISTING FLUORESCENT FRAME AND SUPPORT.
 - 8 RECURCUIT AND RELOCATE EXISTING SWITCH FOR OPEN AREA TO SWAY SWITCHING SYSTEM PROVIDE SWITCHES AS NECESSARY.

- POWER SHEET NOTES**
1. CORE DRILL CONCRETE FLOOR FOR NEW LOCATIONS OF POWER AND DATA. REFER TO DETAILS 1,2,4,5/E05.001.
 2. USE EXISTING UNDERFLOOR RACEWAYS FOR NEW POWER/DATA CIRCUITS. REFER TO DETAILS 1,2,4,5/E05.001.
 3. COORDINATE ALL POWER/DATA LOCATIONS WITH FURNITURE CONSULTANT.
 4. FOR RECEPTACLE AND DATA OUTLETS ON EXISTING WALLS, CONTRACTOR TO CUT WALL FOR CONDUIT ROUTING. PATCH AND PAINT WALL TO MATCH EXISTING COLOR AND FINISH.
 5. ENSURE UNDERFLOOR RACEWAY DOES NOT HAVE MORE THAN 20 CURRENT CARRYING CONDUCTORS. IF THERE ARE GREATER THAN 20 CURRENT CARRYING CONDUCTORS IN A RACEWAY, PROVIDE UL RATED SEPARATION IN RACEWAY TO CREATE TWO SEPARATE RACEWAYS. ENSURE NO GREATER THAN 40% RACEWAY FILL.
 6. ENSURE NO MORE THAN 20 CURRENT CARRYING CONDUCTORS ARE RUN IN ONE CELL OF THE CELLULAR FLOOR RACEWAY. UTILIZE ADJACENT CELLS AS NEEDED TO MAINTAIN A COUNT OF UNDER 20 CURRENT CARRYING CONDUCTORS.

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10480 TRENDA BL., SUITE 100
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FAX: 619.279.2506

POWER KEYNOTES

- 1 CORE DRILL, PROVIDE FLUSH MOUNT DATA FLOOR BOX.
- 2 PROVIDE POWER AND DATA FOR COPIER.
- 3 CORE DRILL, PROVIDE FLUSH MOUNT POWER FLOOR BOX PER 3/E05.001.
- 4 FOR DATA WHIP, REFER TO DETAIL 3/E05.001. COORDINATE WITH CITY OF SAN DIEGO FOR FURNITURE DATA CONNECTIONS.
- 5 COORDINATE WITH FURNITURE MANUFACTURER FOR FURNITURE POWER CONNECTIONS.
- 6 PROVIDE JUNCTION BOX AND CONNECT TO WATER HEATER.
- 7 PROVIDE 2#8, #8G, 1" C TO PANEL.
- 8 REUSE EXISTING FLOOR BOX DEVICE(S). COORDINATE FURNITURE LOCATION SUCH THAT FLOOR BOX DEVICE IS NOT A TRIPPING HAZARD.
- 9 PROVIDE WALL MOUNT JUNCTION BOX.
- 10 EXISTING FLOOR DUCT. REFER TO DETAILS 1,2,4,5/E05.001.
- 11 NOT IN CONTRACT.
- 12 REUSE EXISTING DATA.
- 13 PROVIDE CLOCK TYPE OUTLETS FOR TV.
- 14 PROVIDE POWER AND ROUTE POWER DOWN WALL. PROVIDE WALL MOUNT JUNCTION BOX FOR POWER FOR WHIP TO MODULAR FURNITURE.
- 15 PROVIDE 2" DATA AND ROUTE DATA DOWN WALL. PROVIDE WALL MOUNT JUNCTION BOX FOR WHIP TO MODULAR FURNITURE.

Date	Description	AKISS
07.28.2017	ISSUE PERMIT	AKISS
09.08.2017	ISSUE FOR BID	AKISS
05.07.2018	ISSUE FOR BID	AKISS
06.25.2018	ADDENDUM 'B'	AKJLM

PROFESSIONAL ENGINEER
J. BROWN
No. 13353
Exp. 09-30-18
ELECTRICAL
STATE OF CALIFORNIA

Project Number
55.7291.013

The City of
SAN DIEGO
Public Works

E02.204

CITY OF SAN DIEGO
ELECTRICAL LEVEL 04

CITY OF SAN DIEGO, CALIFORNIA
PUBLIC WORKS DEPARTMENT
SHEET 331 OF 402 SHEETS

WBS S-17009

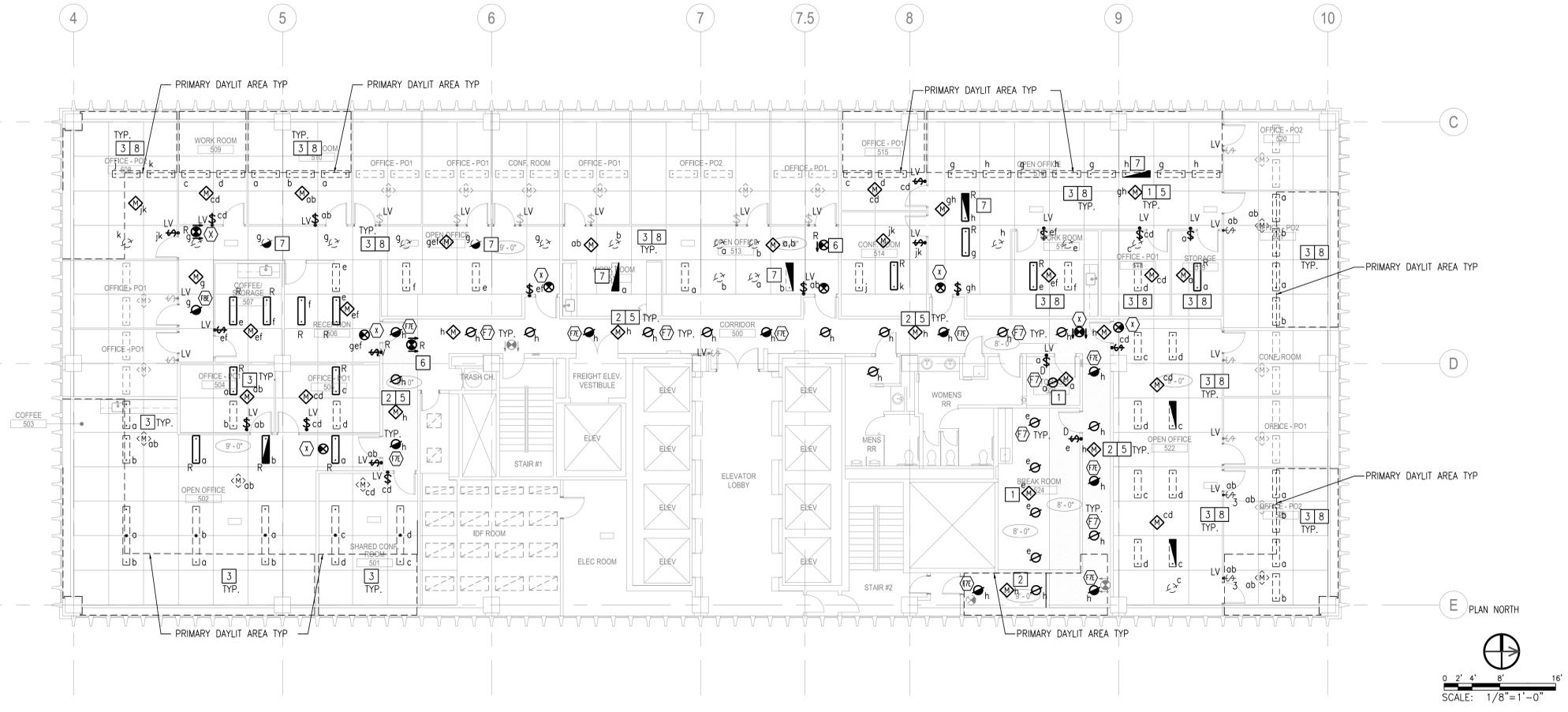
APPROVED:	DATE:	5/31/2018
FOR CITY ENGINEER	DATE:	7/20/2018
JASON GRAN	DATE:	
PRINT DATE NAME	DATE:	
DESCRIPTION	BY	APPROVED
ORIGINAL		
ADDENDUM B		
CONTRACTOR	DATE STARTED	
INSPECTOR	DATE COMPLETED	

REVISIONS:

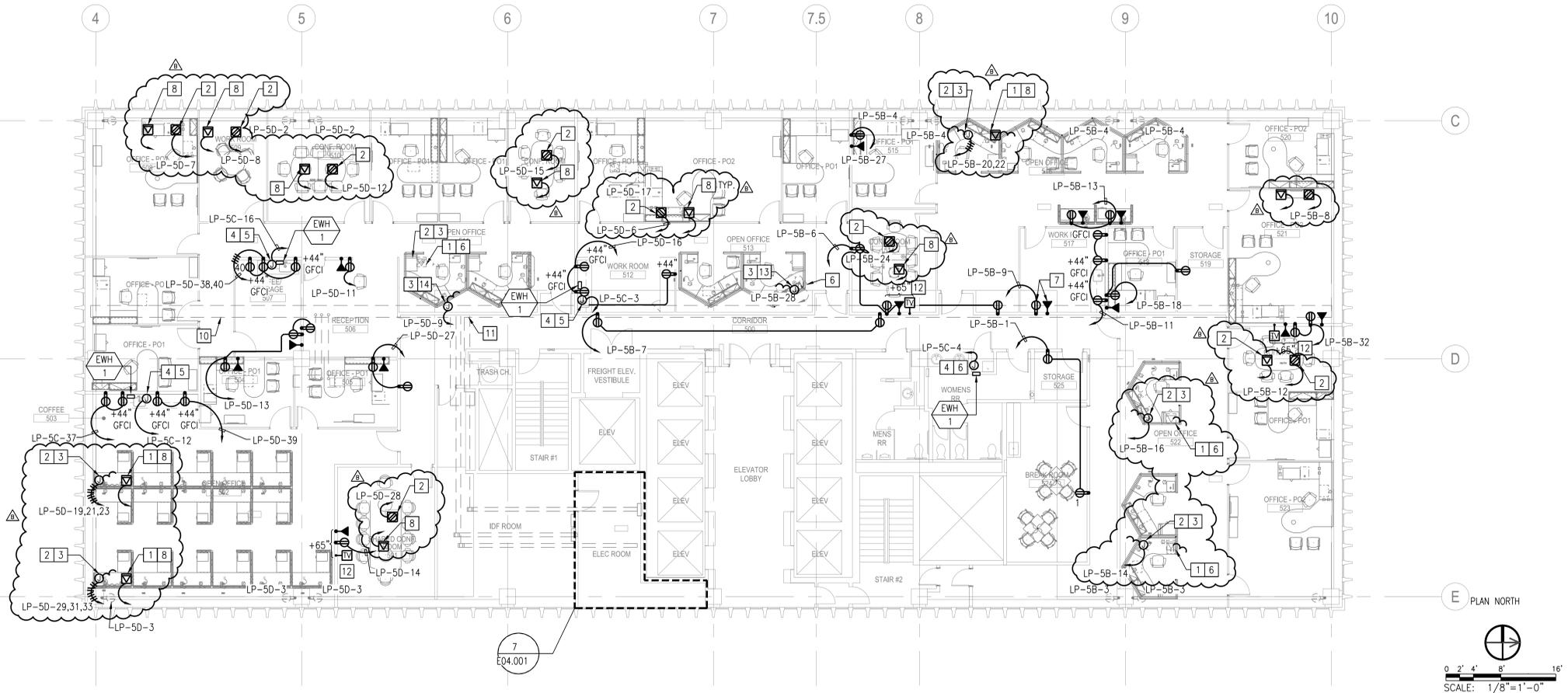
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CONTRACTOR: 40154 - 331 - D

FILE NAME: C:\PROJECTS\GENSLER - 135\003\CITY OF SD - 101 ASH ST TENANT IMPROVEMENT\DRAWINGS\CAD\2013\ELEC\135-003-E-E02.204.DWG PLOT DATE: 6/25/2018 4:59 PM. PRINT BY: NICHOLAS CLEMENTS



01 ELECTRICAL LIGHTING PLAN - LEVEL 05
SCALE: 1/8" = 1'-0"



02 ELECTRICAL POWER PLAN - LEVEL 05
SCALE: 1/8" = 1'-0"

- LIGHTING KEYNOTES**
- 1 PROVIDE TYPE I LIGHTING CONTROL PER 1/E05.002.
 - 2 PROVIDE TYPE II LIGHTING CONTROL PER 2/E05.002.
 - 3 RECIRCUIT LUMINAIRE TO CONTROL SHOWN.
 - 4 RELOCATE SWITCH.
 - 5 PROVIDE QUANTITY AND LOCATION OF OCCUPANCY SENSOR PER MANUFACTURER RECOMMENDATION.
 - 6 RELOCATE EXISTING LUMINAIRE TO NEAREST EXISTING EMERGENCY LIGHTING CIRCUIT.
 - 7 RECIRCUIT EXISTING LUMINAIRE USING EXISTING LIGHTING CIRCUIT. REFER TO LCP-5 SCHEDULE FOR WORK.
 - 8

- POWER SHEET NOTES**
1. CORE DRILL CONCRETE FLOOR FOR NEW LOCATIONS OF POWER AND DATA. REFER TO DETAILS 1,2,4,5/E05.001.
 2. USE EXISTING UNDERFLOOR RACEWAYS FOR NEW POWER/DATA CIRCUITS. REFER TO DETAILS 1,2,4,5/E05.001.
 3. COORDINATE ALL POWER/DATA LOCATIONS WITH FURNITURE CONSULTANT.
 4. FOR RECEPTACLE AND DATA OUTLETS ON EXISTING WALLS, CONTRACTOR TO CUT WALL FOR CONDUIT ROUTING, PATCH AND PAINT WALL TO MATCH EXISTING COLOR AND FINISH.
 5. ENSURE UNDERFLOOR RACEWAY DOES NOT HAVE MORE THAN 20 CURRENT CARRYING CONDUCTORS. IF THERE ARE GREATER THAN 20 CURRENT CARRYING CONDUCTORS IN A RACEWAY, PROVIDE UL RATED SEPARATION IN RACEWAY TO CREATE TWO SEPARATE RACEWAYS. ENSURE NO GREATER THAN 40% RACEWAY FILL.
 6. ENSURE NO MORE THAN 20 CURRENT CARRYING CONDUCTORS ARE RUN IN ONE CELL OF THE CELLULAR FLOOR RACEWAY. UTILIZE ADJACENT CELLS AS NEEDED TO MAINTAIN A COUNT OF UNDER 20 CURRENT CARRYING CONDUCTORS.

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07.28.2017	ISSUE PERMIT	AKSS
09.08.2017	ISSUE FOR BID	AKSS
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06.25.2018	ADDENDUM 'B'	AKLM

- POWER KEYNOTES**
- 1 FOR DATA WHIP. REFER TO DETAIL 3/E05.001. COORDINATE WITH CITY OF SAN DIEGO FOR FURNITURE DATA CONNECTIONS.
 - 2 CORE DRILL CONCRETE FLOOR. PROVIDE FLUSH MOUNT POWER FLOOR BOX PER 3/E05.001.
 - 3 COORDINATE WITH FURNITURE MANUFACTURER FOR FURNITURE POWER CONNECTIONS.
 - 4 PROVIDE JUNCTION BOX AND CONNECT TO WATER HEATER.
 - 5 PROVIDE 2 #8, #8G, 1" C TO PANEL.
 - 6 REUSE EXISTING FLOOR BOX DEVICE(S). COORDINATE FURNITURE LOCATION SUCH THAT FLOOR BOX DEVICE IS NOT A TRIPPING HAZARD.
 - 7 PROVIDE POWER AND DATA FOR COPIER.
 - 8 CORE DRILL. PROVIDE FLUSH MOUNT DATA FLOOR BOX.
 - 9 PROVIDE WALL MOUNT SURFACE JUNCTION BOX.
 - 10 PROVIDE POWER AND DATA FOR COPIER.
 - 11 EXISTING FLOOR DUCT. REFER TO DETAIL 1,2,3,4,5/E05.003.
 - 12 PROVIDE CLOCK TYPE OUTLETS FOR TV.
 - 13 PROVIDE 2" C FOR DATA AND ROUTE DATA DOWN WALL. PROVIDE WALL MOUNT SURFACE JUNCTION BOX FOR DATA FOR WHIP TO MODULAR FURNITURE.
 - 14 PROVIDE POWER AND ROUTE POWER DOWN WALL. PROVIDE WALL MOUNT JUNCTION BOX FOR POWER FOR WHIP TO MODULAR FURNITURE.

PROFESSIONAL ENGINEER
No. 13353
ELECTRICAL
STATE OF CALIFORNIA

Project Number
55.7291.013

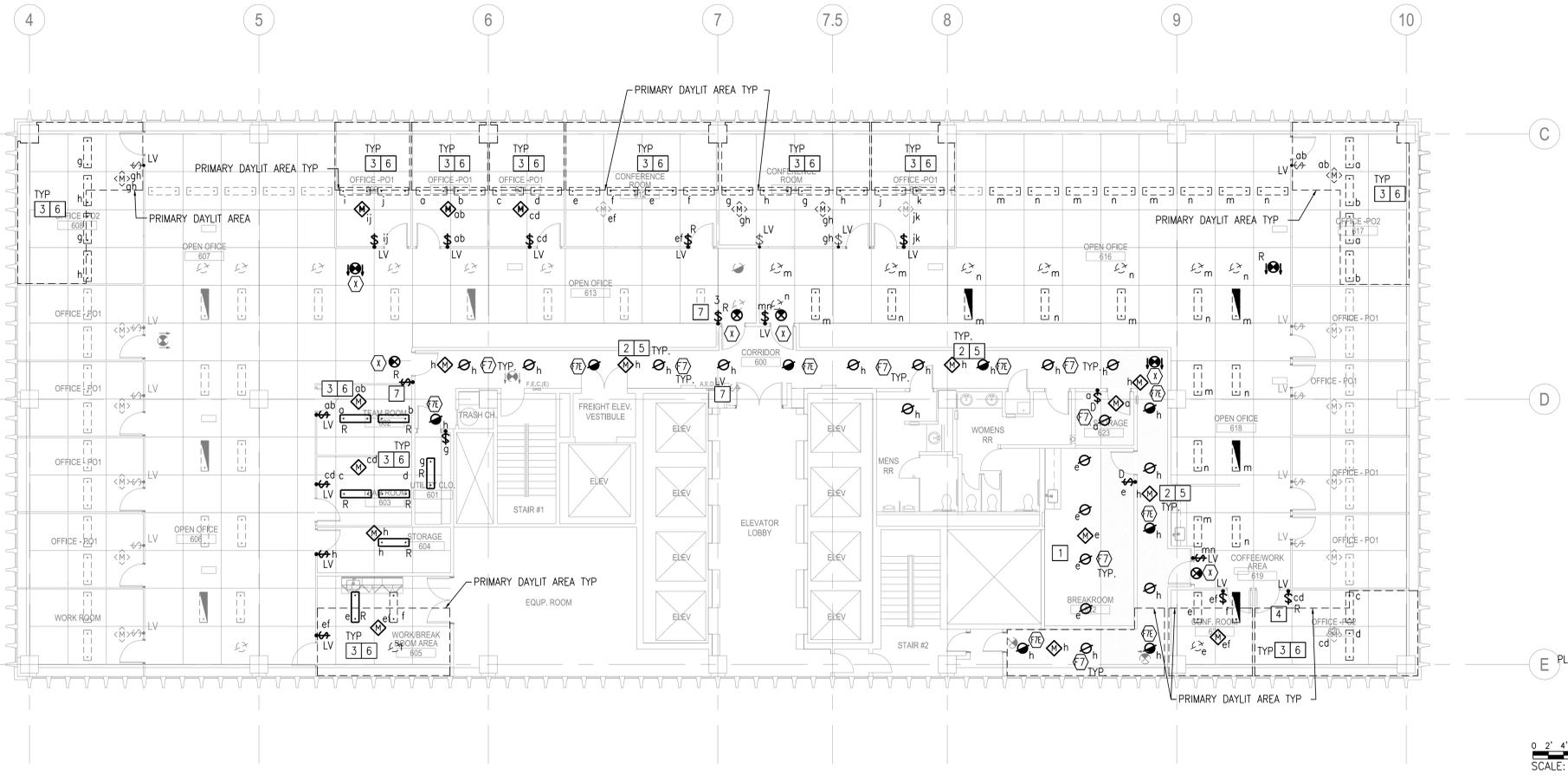
The City of
SAN DIEGO
Public Works

E02.205

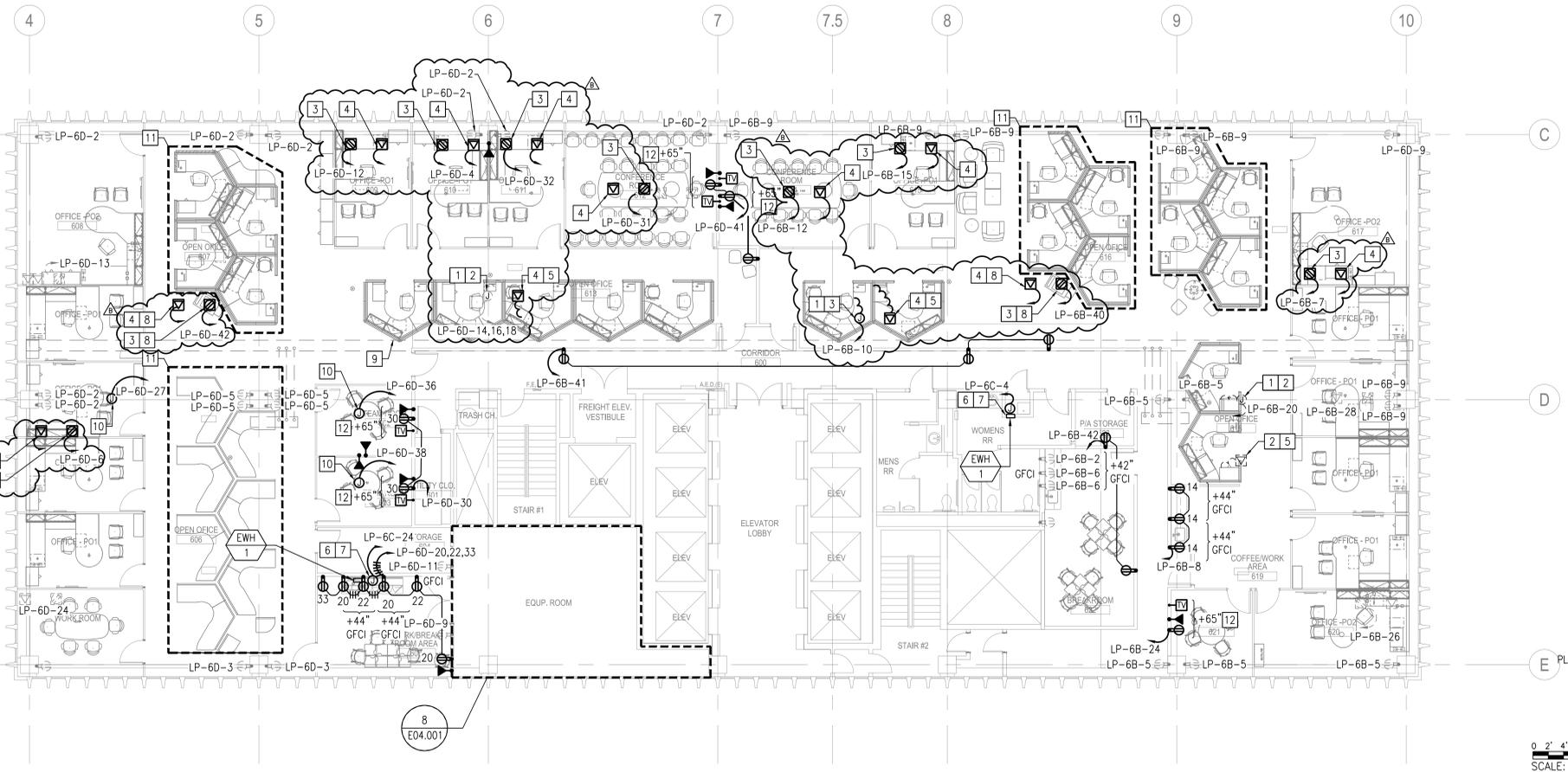
CITY OF SAN DIEGO
ELECTRICAL LEVEL 05

CITY OF SAN DIEGO, CALIFORNIA PUBLIC WORKS DEPARTMENT SHEET 334 OF 402 SHEETS		WBS S-17009
APPROVED: FOR CITY ENGINEER JASON GRAN PRINT DATE NAME	DATE 5/31/2018 77208	SUBMITTED BY JORGE ACEVEDO PROJECT MANAGER CHECKED BY MARLON PEREZ PROJECT ENGINEER
DESCRIPTION	BY	APPROVED
ORIGINAL		5/31/2018
ADDENDUM B		6/25/2018
CONTRACTOR		DATE STARTED
INSPECTOR		DATE COMPLETED
		40154 - 334 - D

FILE NAME: K:\PROJECTS\GENSLER - 135\003\CITY OF SD - 101 ASH ST TENANT IMPROVEMENT\DRAWINGS\CAD\2013\ELEC\135-003-E-ED2.205.DWG PLOT DATE: 6/25/2018 4:59 PM. PRINT BY: NICHOLAS CLEMENTS
June 29, 2018
101 Ash St Tenant Improvements
ADDENDUM B



01 ELECTRICAL LIGHTING PLAN - LEVEL 06
SCALE: 1/8" = 1'-0"



02 ELECTRICAL POWER PLAN - LEVEL 06
SCALE: 1/8" = 1'-0"

LIGHTING KEYNOTES

- 1 PROVIDE TYPE I LIGHTING CONTROL PER 1/E05.002.
- 2 PROVIDE TYPE II LIGHTING CONTROL PER 2/E05.002.
- 3 RECURT LUMINAIRE TO CONTROL SHOWN.
- 4 RELOCATE SWITCH.
- 5 PROVIDE QUANTITY AND LOCATION OF OCCUPANCY SENSOR PER MANUFACTURER RECOMMENDATION.
- 6 RECURT EXISTING LUMINAIRE USING EXISTING LIGHTING CIRCUIT. REFER TO LCP 6 SCHEDULE FOR WORK.
- 7 RECURT AND RELOCATE EXISTING SWITCH FOR OPEN AREA TO 3WAY SWITCHING SYSTEM. PROVIDE SWITCHES AS NECESSARY.

POWER SHEET NOTES

1. CORE DRILL CONCRETE FLOOR FOR NEW LOCATIONS OF POWER AND DATA. REFER TO DETAILS 1,2,4,5/E05.001.
2. USE EXISTING UNDERFLOOR RACEWAYS FOR NEW POWER/DATA CIRCUITS. REFER TO DETAILS 1,2,4,5/E05.001.
3. COORDINATE ALL POWER/DATA LOCATIONS WITH FURNITURE CONSULTANT.
- FOR RECEPTACLE AND DATA OUTLETS ON EXISTING WALLS, CONTRACTOR TO CUT WALL FOR CONDUIT ROUTING, PATCH AND PAINT WALL TO MATCH EXISTING COLOR AND FINISH.
4. ENSURE UNDERFLOOR RACEWAY DOES NOT HAVE MORE THAN 20 CURRENT CARRYING CONDUCTORS. IF THERE ARE GREATER THAN 20 CURRENT CARRYING CONDUCTORS IN A RACEWAY, PROVIDE UL RATED SEPARATION IN RACEWAY TO CREATE TWO SEPARATE RACEWAYS. ENSURE NO GREATER THAN 40% RACEWAY FILL.
5. ENSURE NO MORE THAN 20 CURRENT CARRYING CONDUCTORS ARE RUN IN ONE CELL OF THE CELLULAR FLOOR RACEWAY. UTILIZE ADJACENT CELLS AS NEEDED TO MAINTAIN A COUNT OF UNDER 20 CURRENT CARRYING CONDUCTORS.

POWER KEYNOTES

- 1 COORDINATE WITH FURNITURE MANUFACTURER FOR FURNITURE POWER CONNECTIONS.
- 2 REUSE EXISTING FLOOR BOX DEVICE(S). COORDINATE FURNITURE LOCATION SUCH THAT FLOOR BOX DEVICE IS NOT A TRIPPING HAZARD.
- 3 CORE DRILL CONCRETE FLOOR, PROVIDE FLUSH MOUNT POWER FLOOR BOX PER 3/E05.001.
- 4 CORE DRILL CONCRETE FLOOR, PROVIDE FLUSH MOUNT DATA FLOOR BOX.
- 5 FOR DATA WHIP, REFER TO DETAIL 3/E05.001. COORDINATE WITH CITY OF SAN DIEGO FOR FURNITURE DATA CONNECTIONS.
- 6 PROVIDE JUNCTION BOX AND CONNECT TO WATER HEATER.
- 7 PROVIDE 2#8, #8G, 1" C TO PANEL.
- 8 PROVIDE POWER AND DATA FOR COPIER.
- 9 EXISTING FLOOR DUCT. REFER TO DETAIL 1,2,4,5/E05.001.
- 10 PROVIDE JUNCTION BOX IN CEILING FOR PROJECTOR. COORDINATE LOCATION PRIOR TO ROUGH IN.
- 11 NOT IN CONTRACT.
- 12 PROVIDE CLOCK TYPE OUTLET FOR TV.

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BSE PROJECT NO. 135-003
BSE ENGINEERING, INC.
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FAX: 619.279.2204

Date	Description	AKSS
07.28.2017	ISSUE PERMIT	AKSS
09.08.2017	ISSUE FOR BID	AKSS
05.07.2018	ISSUE FOR BID	AKSS
06.25.2018	ADDENDUM 5'	AKJM



Project Number
55.7291.013

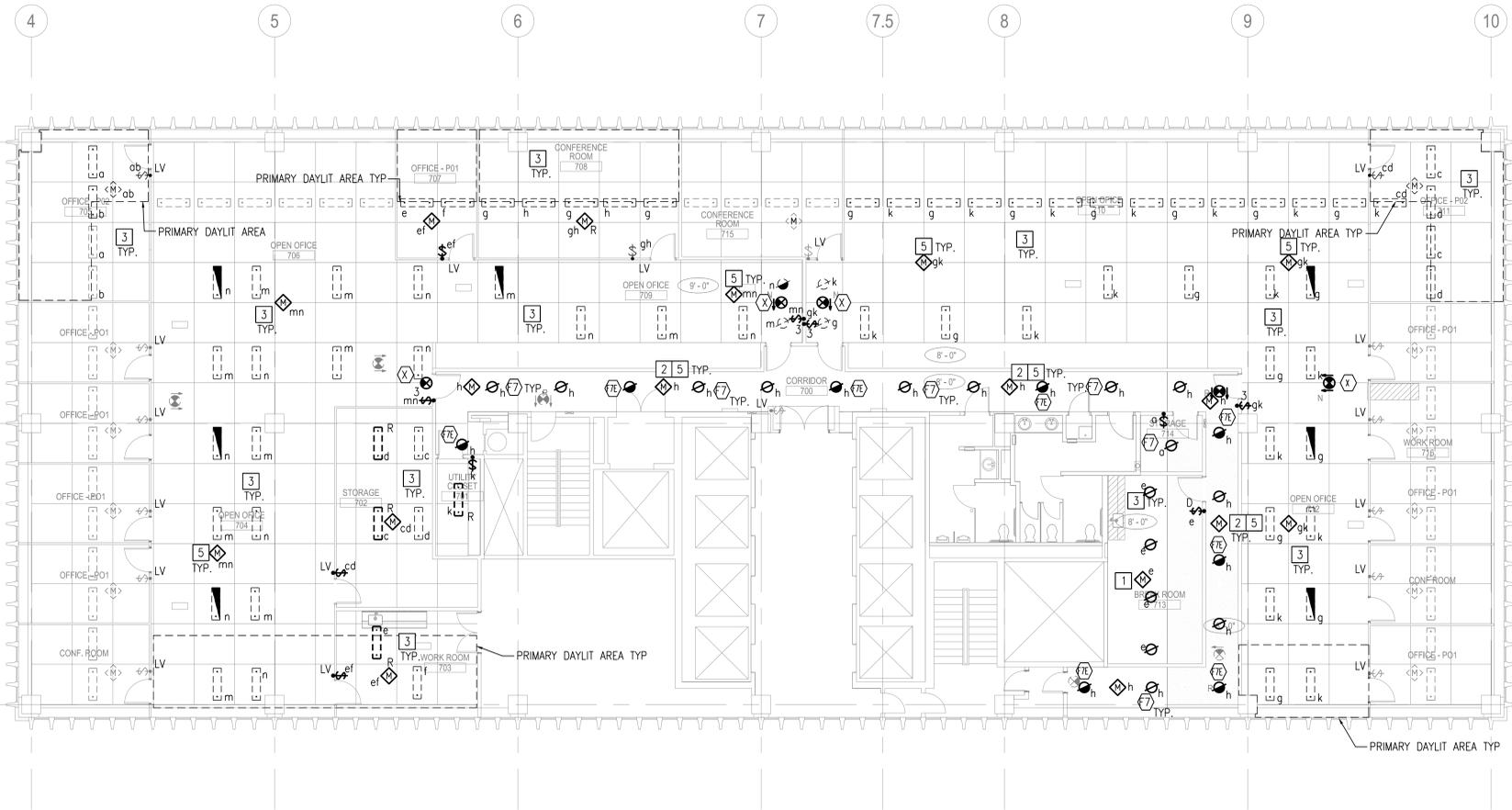
The City of
SAN DIEGO
Public Works

E02.206

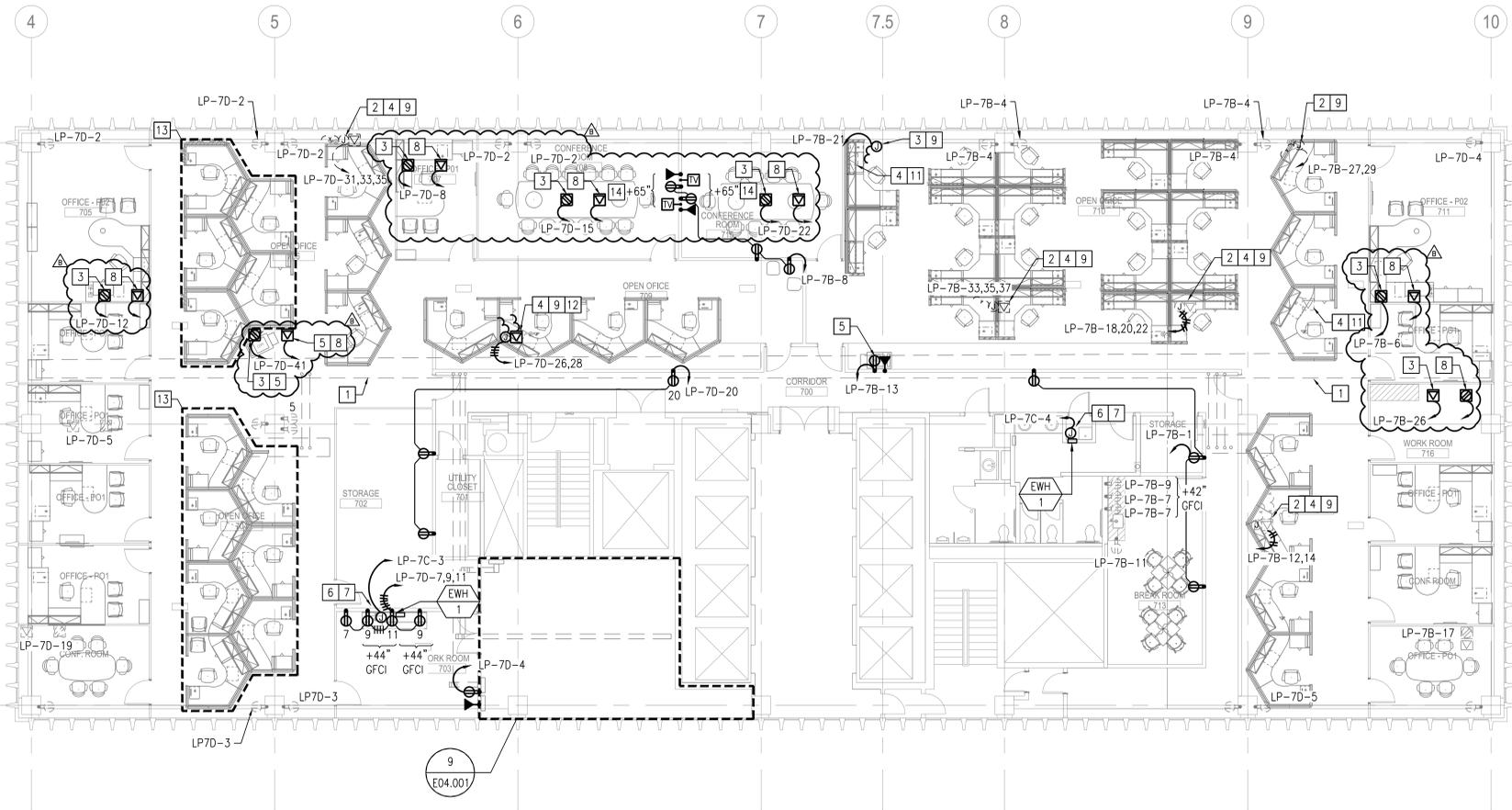
CITY OF SAN DIEGO, CALIFORNIA PUBLIC WORKS DEPARTMENT SHEET 337 OF 402 SHEETS		WBS S-17009
APPROVED	DATE: 5/31/2018	SUBMITTED BY: JORGE ACEVEDO
FOR CITY ENGINEER	DATE: 7/20/2018	PROJECT MANAGER
PRINT DCA NAME	RCER	CHECKED BY: MARLON PEREZ
DESCRIPTION	BY	APPROVED
DATE	DATE	DATE
FILED	FILED	FILED
ORIGINAL	5/31/2018	CS287 COORDINATE
ADDENDUM B	02/25/2018	CS287 COORDINATE
CONTRACTOR	DATE STARTED	CS283 COORDINATE
INSPECTOR	DATE COMPLETED	40154 - 337 - D

REVISE FLOOR BOX LOCATIONS
ADDENDUM B

FILE NAME: K:\PROJECTS\GENSLER - 135\003 CITY OF SD - 101 ASH ST TENANT IMPROVEMENT\DRAWINGS\CAD\2013\ELEC\135-003-E-E02.206.DWG PLOT DATE: 6/25/2018 4:59 PM. PRINT BY: NICHOLAS CLEMENTS



01 ELECTRICAL LIGHTING PLAN - LEVEL 07
SCALE: 1/8" = 1'-0"



02 ELECTRICAL POWER PLAN - LEVEL 07
SCALE: 1/8" = 1'-0"

LIGHTING SHEET NOTES

1. PULL CIRCUITS FROM DEMOLISHED DEVICES BACK TO PANEL.
- LIGHTING KEYNOTES**
- 1 PROVIDE TYPE I LIGHTING CONTROL PER 1/E05.002.
- 2 PROVIDE TYPE II LIGHTING CONTROL PER 2/E05.002.
- 3 RECIRCUIT LUMINAIRE TO CONTROL SHOWN.
- 4 RELOCATE SWITCH.
- 5 PROVIDE QUANTITY AND LOCATION OF OCCUPANCY SENSOR PER MANUFACTURER RECOMMENDATION.
- 6 RECIRCUIT LUMINAIRE USING EXISTING LIGHTING CIRCUIT. REFER TO LCP 7 SCHEDULE FOR WORK.

POWER SHEET NOTES

1. CORE DRILL CONCRETE FLOOR FOR NEW LOCATIONS OF POWER AND DATA. REFER TO DETAILS 1,2,4,5/E05.001.
2. USE EXISTING UNDERFLOOR RACEWAYS FOR NEW POWER/DATA CIRCUITS. REFER TO DETAILS 1,2,4,5/E05.001.
3. COORDINATE ALL POWER/DATA LOCATIONS WITH FURNITURE CONSULTANT.
4. FOR RECEPTACLE AND DATA OUTLETS ON EXISTING WALLS, CONTRACTOR TO CUT WALL FOR CONDUIT ROUTING, PATCH AND PAINT WALL TO MATCH EXISTING COLOR AND FINISH.
5. ENSURE UNDERFLOOR RACEWAY DOES NOT HAVE MORE THAN 20 CURRENT CARRYING CONDUCTORS. IF THERE ARE GREATER THAN 20 CURRENT CARRYING CONDUCTORS IN A RACEWAY, PROVIDE UL RATED SEPARATION IN RACEWAY TO CREATE TWO SEPARATE RACEWAYS. ENSURE NO GREATER THAN 40% RACEWAY FILL.
6. ENSURE NO MORE THAN 20 CURRENT CARRYING CONDUCTORS ARE RUN IN ONE CELL OF THE CELLULAR FLOOR RACEWAY. UTILIZE ADJACENT CELLS AS NEEDED TO MAINTAIN A COUNT OF UNDER 20 CURRENT CARRYING CONDUCTORS.

POWER KEYNOTES

- 1 EXISTING FLOOR DUCT. REFER TO DETAIL 1,2,4,5/E05.001.
- 2 REUSE EXISTING FLOOR BOX DEVICE(S). COORDINATE FURNITURE LOCATION SUCH THAT FLOOR BOX DEVICE IS NOT A TRIPPING HAZARD.
- 3 CORE DRILL CONCRETE FLOOR, PROVIDE FLUSH MOUNT POWER FLOOR BOX PER 3/E05.001.
- 4 FOR DATA WHIP, REFER TO DETAIL 3/E05.001. COORDINATE WITH CITY OF SAN DIEGO FOR FURNITURE DATA CONNECTIONS.
- 5 PROVIDE POWER AND DATA FOR COPPER.
- 6 PROVIDE JUNCTION BOX AND CONNECT TO WATER HEATER.
- 7 PROVIDE 2 #8, #8C, 1°C TO PANEL.
- 8 CORE DRILL CONCRETE FLOOR, PROVIDE FLUSH MOUNT DATA FLOOR BOX.
- 9 COORDINATE WITH FURNITURE MANUFACTURER FOR FURNITURE POWER CONNECTIONS.
- 10 PROVIDE NEW WIRES AS SHOWN VIA HOMERUN.
- 11 REUSE EXISTING DATA.
- 12 PROVIDE WALL MOUNT SURFACE JUNCTION BOX. CORE DRILL TO CELLULAR RACEWAY.
- 13 NOT IN CONTRACT.
- 14 PROVIDE CLOCK TYPE OUTLET FOR TV.

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BSE PROJECT NO. 135-003
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Date	Description	AKSS
07.28.2017	ISSUE PERMIT	AKSS
09.08.2017	ISSUE FOR BID	AKSS
05.07.2018	ISSUE FOR BID	AKSS
06.25.2018	ADDENDUM 'B'	AKLM

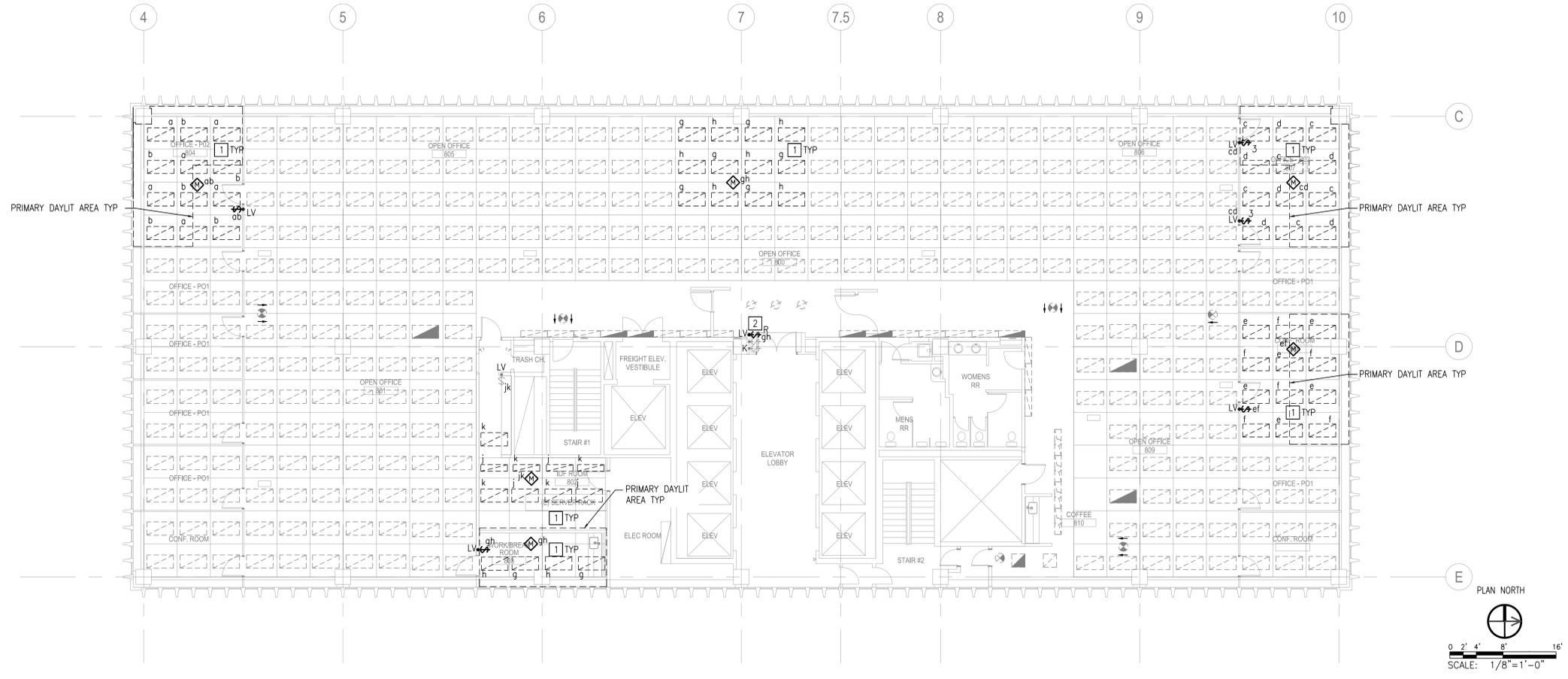


Project Number: 55.7291.013
The City of **SAN DIEGO** Public Works
E02.207

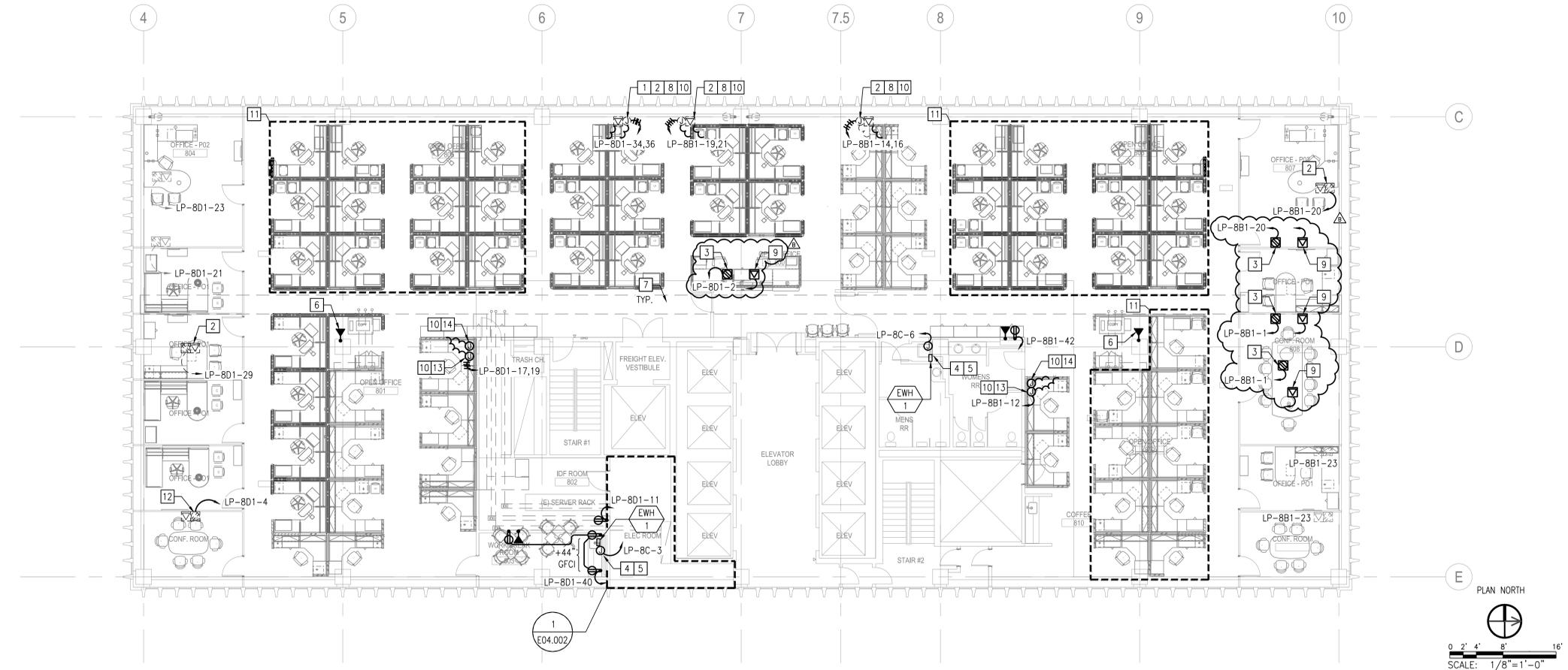
CITY OF SAN DIEGO ELECTRICAL LEVEL 07		WBS S-17009	
CITY OF SAN DIEGO, CALIFORNIA PUBLIC WORKS DEPARTMENT SHEET 340 OF 402 SHEETS			
APPROVED:	DATE:	5/31/2018	SUBMITTED BY:
JASON GRAN	DATE:	7/20/18	JORGE ACEVEDO
PROJECT ENGINEER	DATE:		PROJECT MANAGER
MARLON PEREZ	DATE:		PROJECT ENGINEER
DESCRIPTION	BY	APPROVED	DATE
ORIGINAL			5/31/2018
ADDENDUM B			6/25/2018
			CS27 COORDINATE
			CS83 COORDINATE
CONTRACTOR	DATE STARTED	DATE COMPLETED	
			40154 - 340 - D

REVISIONS: REVISE FLOOR BOX LOCATIONS
ADDENDUM B

FILE NAME: K:\PROJECTS\GENSLER - 135\003 CITY OF SD - 101 ASH ST TENANT IMPROVEMENT\DRAWINGS\CAD\2013\ELEC\135-003-E-E02.207.DWG PLOT DATE: 6/25/2018 4:59 PM. PRINT BY: NICHOLAS CLEMENTS



01 ELECTRICAL LIGHTING PLAN - LEVEL 08
SCALE: 1/8" = 1'-0"



02 ELECTRICAL POWER PLAN - LEVEL 08
SCALE: 1/8" = 1'-0"

LIGHTING KEYNOTES

- RECIRCUIT LUMAIRES TO CONTROL SHOWN.
- RELOCATED SWITCH.

CITY OF SAN DIEGO
101 W. ASH
101 W. ASH STREET
SAN DIEGO, CA 92101

POWER SHEET NOTES

- CORE DRILL CONCRETE FLOOR FOR NEW LOCATIONS OF POWER AND DATA. REFER TO DETAILS 1,2,4,5/E05.001.
- USE EXISTING UNDERFLOOR RACEWAYS FOR NEW POWER/DATA CIRCUITS. REFER TO DETAILS 1,2,4,5/E05.001.
- COORDINATE ALL POWER/DATA LOCATIONS WITH FURNITURE CONSULTANT.
- FOR RECEPTACLE AND DATA OUTLETS ON EXISTING WALLS, CONTRACTOR TO CUT WALL FOR CONDUIT ROUTING, PATCH AND PAINT WALL TO MATCH EXISTING COLOR AND FINISH.
- ENSURE UNDERFLOOR RACEWAY DOES NOT HAVE MORE THAN 20 CURRENT CARRYING CONDUCTORS. IF THERE ARE GREATER THAN 20 CURRENT CARRYING CONDUCTORS IN A RACEWAY, PROVIDE UL RATED SEPARATION IN RACEWAY TO CREATE TWO SEPARATE RACEWAYS. ENSURE NO GREATER THAN 40% RACEWAY FILL.
- ENSURE NO MORE THAN 20 CURRENT CARRYING CONDUCTORS ARE RUN IN ONE CELL OF THE CELLULAR FLOOR RACEWAY. UTILIZE ADJACENT CELLS AS NEEDED TO MAINTAIN A COUNT OF UNDER 20 CURRENT CARRYING CONDUCTORS.

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FAX: 619.279.2504

POWER KEYNOTES

- PROVIDE NEW WIRES AS SHOWN VIA HOMERUN.
- REUSE EXISTING FLOOR BOX DEVICE(S). COORDINATE FURNITURE LOCATION SUCH THAT FLOOR BOX DEVICE IS NOT A TRIPPING HAZARD.
- CORE DRILL CONCRETE FLOOR, PROVIDE FLUSH MOUNT POWER FLOOR BOX PER 3/E05.001.
- PROVIDE JUNCTION BOX AND CONNECT TO WATER HEATER.
- PROVIDE 2 #8, #8G, 1" TO PANEL.
- PROVIDE DATA FOR COPIER.
- EXISTING FLOOR DUCT. REFER TO DETAIL 1,2,4,5/E05.001.
- FOR DATA WHIP, REFER TO DETAIL 3/E05.001. COORDINATE WITH CITY OF SAN DIEGO FOR FURNITURE DATA CONNECTIONS.
- CORE DRILL CONCRETE FLOOR, PROVIDE FLUSH MOUNT DATA FLOOR BOX.
- COORDINATE WITH FURNITURE MANUFACTURER FOR FURNITURE POWER CONNECTIONS.
- NOT IN CONTRACT.
- CIRCUIT DEVICE TO CIRCUIT SHOWN.
- PROVIDE POWER AND ROUTE POWER DOWN WALL. PROVIDE WALL MOUNT JUNCTION BOX FOR POWER FOR WHIP TO MODULAR FURNITURE.
- PROVIDE 2" FOR DATA AND ROUTE DATA DOWN WALL. PROVIDE WALL MOUNT JUNCTION BOX FOR DATA FOR WHIP TO MODULAR FURNITURE.

Date	Description	AK/SS
07.28.2017	ISSUE PERMIT	AK/SS
09.08.2017	ISSUE FOR BID	AK/SS
05.07.2018	ISSUE FOR BID	AK/SS
06.25.2018	ADDENDUM 'B'	AK/ML



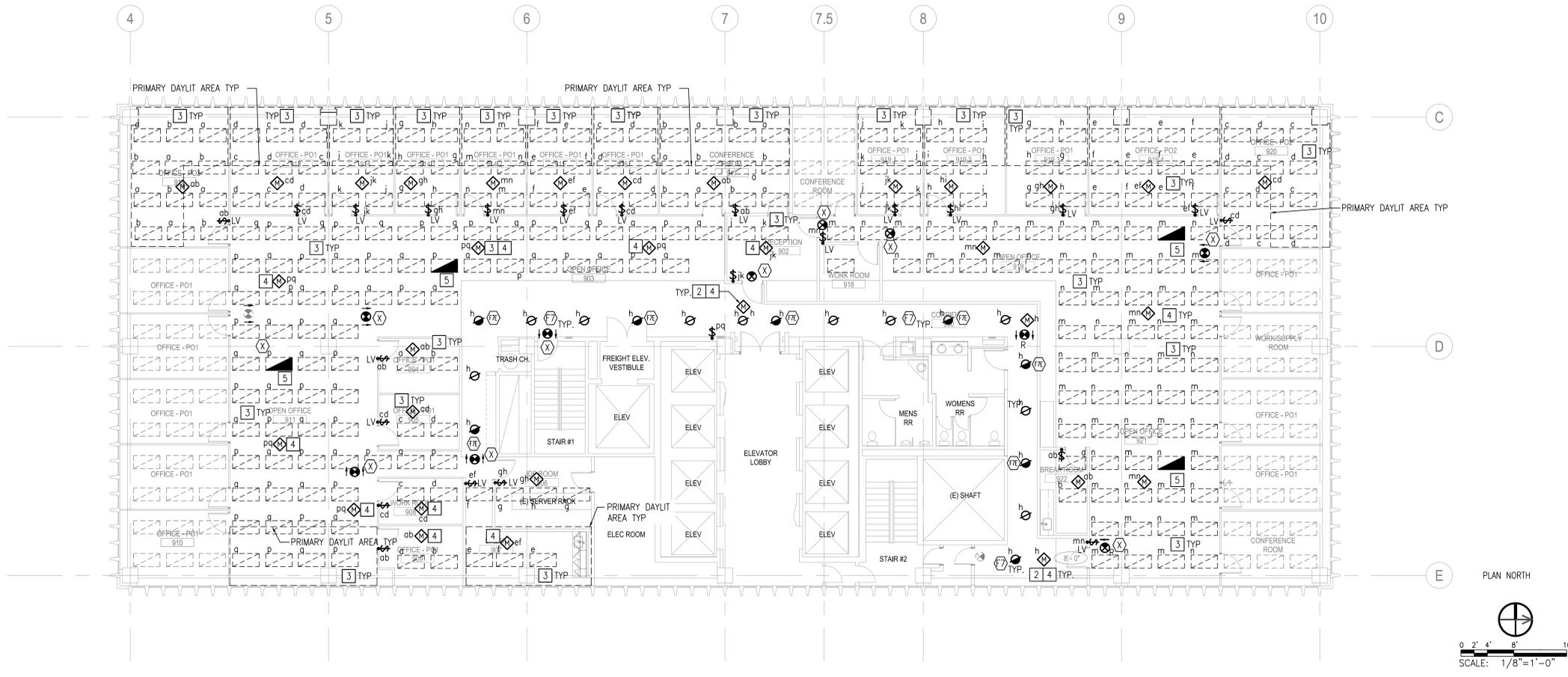
Project Number: 55.7291.013
The City of SAN DIEGO Public Works
E02.208

CITY OF SAN DIEGO
ELECTRICAL LEVEL 08

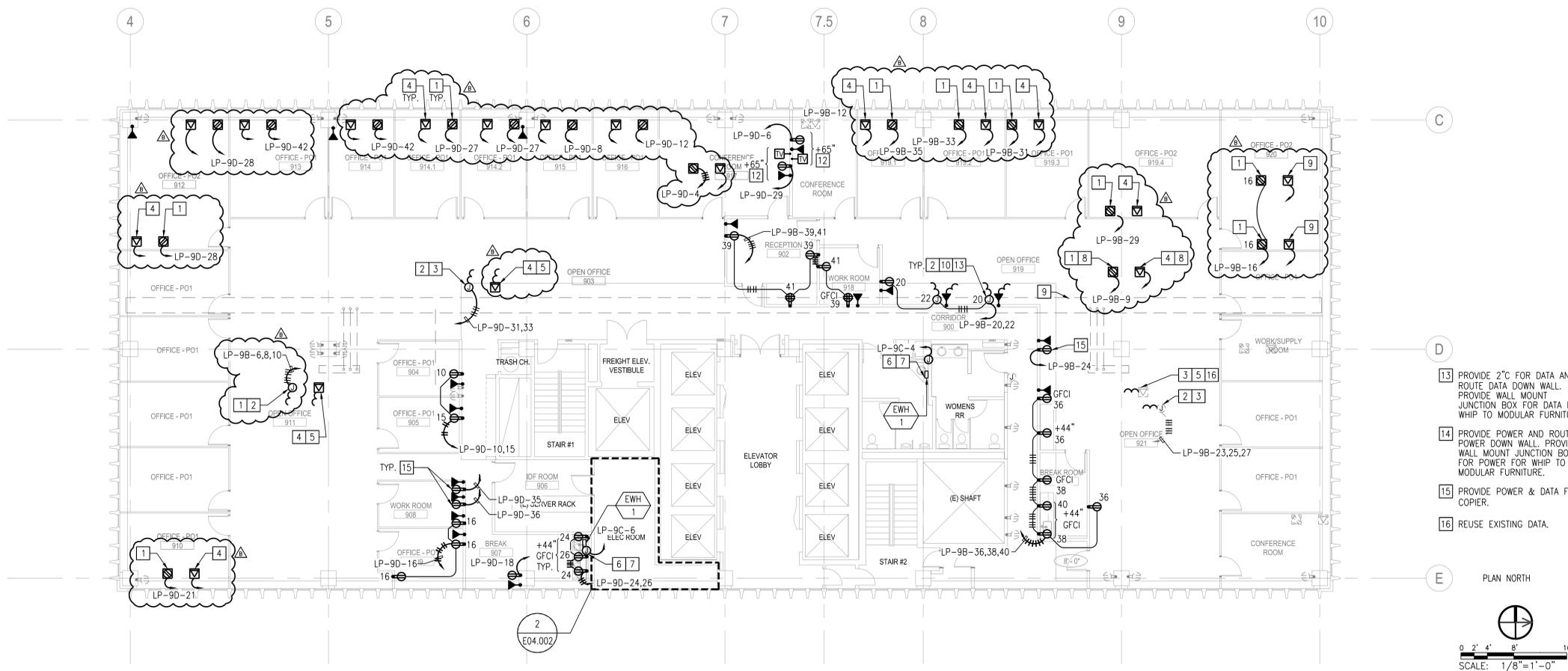
CITY OF SAN DIEGO, CALIFORNIA PUBLIC WORKS DEPARTMENT SHEET 343 OF 402 SHEETS		WBS S-17009	
APPROVED: [Signature]	DATE: 5/31/2018	SUBMITTED BY: JORGE ACEVEDO	PROJECT MANAGER
FOR CITY ENGINEER: JASON GRANU	DATE: 7/20/08	DESIGNED BY: MARLON PEREZ	PROJECT ENGINEER
PRINT DCN NAME: [Name]	RCER: [Name]	DESCRIPTION: [Blank]	BY: [Blank]
APPROVED: [Signature]	DATE: [Blank]	FILED: [Blank]	[Blank]
ORIGINAL: [Blank]	5/31/2018		
ADDENDUM B: [Blank]	6/25/2018		CS27 COORDINATE
			CS83 COORDINATE
CONTRACTOR: [Blank]	DATE STARTED: [Blank]		40154 - 343 - D
INSPECTOR: [Blank]	DATE COMPLETED: [Blank]		

REVISE FLOOR BOX LOCATIONS
ADDENDUM B

FILE NAME: K:\PROJECTS\GENSLER - 135\003\CITY OF SD - 101 ASH ST TENANT IMPROVEMENT\DRAWINGS\CAD V2013\ELEC\135-003-E-E02.208.DWG PLOT DATE: 6/25/2018 4:59 PM. PRINT BY: NICHOLAS CLEMENTS
June 29, 2018
101 Ash St Tenant Improvements
Page 215 of 227



01 ELECTRICAL LIGHTING PLAN - LEVEL 09
SCALE: 1/8" = 1'-0"



02 ELECTRICAL POWER PLAN - LEVEL 09
SCALE: 1/8" = 1'-0"

LIGHTING KEYNOTES

- 1 PROVIDE TYPE I LIGHTING CONTROL PER 1/E05.002.
- 2 PROVIDE TYPE II LIGHTING CONTROL PER 2/E05.002.
- 3 RECURT LUMINAIRE TO CONTROL SHOWN.
- 4 PROVIDE QUANTITY AND LOCATION OF OCCUPANCY SENSOR PER MANUFACTURER RECOMMENDATION.
- 5 RECURT EXISTING LUMINAIRE TO EXISTING EMERGENCY LIGHTING CIRCUIT.

POWER SHEET NOTES

1. CORE DRILL CONCRETE FLOOR FOR NEW LOCATIONS OF POWER AND DATA. REFER TO DETAILS 1,2,4,5/E05.001.
2. USE EXISTING UNDERFLOOR RACEWAYS FOR NEW POWER/DATA CIRCUITS. REFER TO DETAILS 1,2,4,5/E05.001.
3. COORDINATE ALL POWER/DATA LOCATIONS WITH FURNITURE CONSULTANT.
4. FOR RECEPTACLE AND DATA OUTLETS ON EXISTING WALLS, CONTRACTOR TO CUT WALL FOR CONDUIT ROUTING, PATCH AND PAINT WALL TO MATCH EXISTING COLOR AND FINISH.
5. ENSURE UNDERFLOOR RACEWAY DOES NOT HAVE MORE THAN 20 CURRENT CARRYING CONDUCTORS. IF THERE ARE GREATER THAN 20 CURRENT CARRYING CONDUCTORS IN A RACEWAY, PROVIDE UL RATED SEPARATION IN RACEWAY TO CREATE TWO SEPARATE RACEWAYS. ENSURE NO GREATER THAN 40% RACEWAY FILL.
6. ENSURE NO MORE THAN 20 CURRENT CARRYING CONDUCTORS ARE RUN IN ONE CELL OF THE CELLULAR FLOOR RACEWAY. UTILIZE ADJACENT CELLS AS NEEDED TO MAINTAIN A COUNT OF UNDER 20 CURRENT CARRYING CONDUCTORS.

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Date	Description	AKSS
07.28.2017	ISSUE PERMIT	AKSS
09.08.2017	ISSUE FOR BID	AKSS
05.07.2018	ISSUE FOR BID	AKSS
06.25.2018	ADDENDUM 'B'	AKLM

POWER KEYNOTES

- 1 CORE DRILL CONCRETE FLOOR, PROVIDE FLUSH MOUNT POWER FLOOR BOX PER 3/E05.001.
- 2 COORDINATE WITH FURNITURE MANUFACTURER FOR FURNITURE POWER CONNECTIONS.
- 3 REUSE EXISTING FLOOR BOX DEVICE(S). COORDINATE FURNITURE LOCATION SUCH THAT FLOOR BOX DEVICE IS NOT A TRIPPING HAZARD.
- 4 CORE DRILL CONCRETE FLOOR, PROVIDE FLUSH MOUNT DATA FLOOR BOX.
- 5 FOR DATA WHIP, REFER TO DETAIL 3/E05.001. COORDINATE WITH CITY OF SAN DIEGO FOR FURNITURE DATA CONNECTIONS.
- 6 PROVIDE JUNCTION BOX AND CONNECT TO WATER HEATER.
- 7 PROVIDE 2 #8, #8G, 3/4" C TO PANEL.
- 8 PROVIDE POWER AND DATA FOR COPIER.
- 9 EXISTING FLOOR DUCT. REFER TO DETAIL 1,2,4,5/E05.001.
- 10 PROVIDE WALL MOUNT SURFACE JUNCTION BOX.
- 11 NOT IN CONTRACT.
- 12 PROVIDE CLOCK TYPE OUTLET FOR TV.



Project Number
55.7291.013

The City of
SAN DIEGO
Public Works

E02.009

CITY OF SAN DIEGO
ELECTRICAL LEVEL 09

CITY OF SAN DIEGO, CALIFORNIA
PUBLIC WORKS DEPARTMENT
SHEET 345 OF 402 SHEETS

WBS S-17009

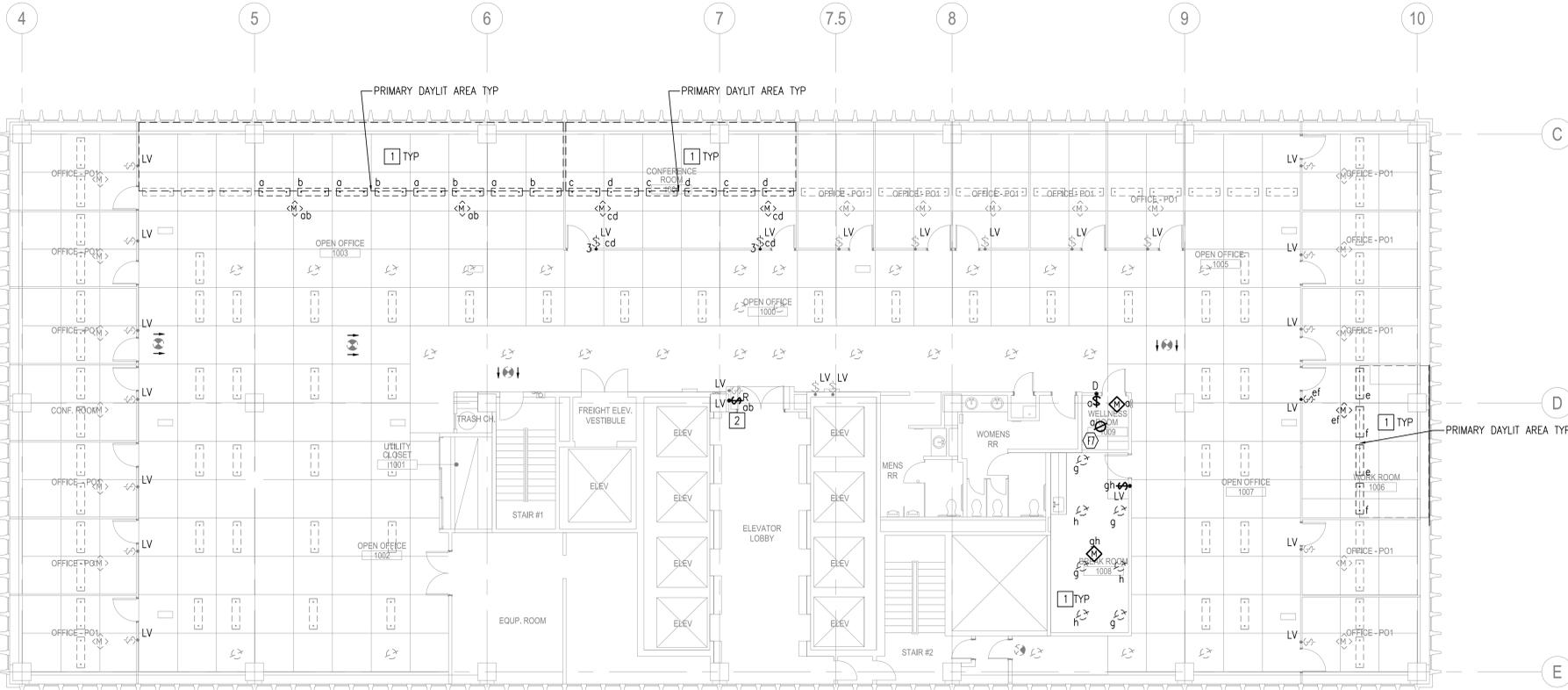
APPROVED:	DATE:	5/31/2018
FOR CITY ENGINEER	DATE:	7/20/18
PRINT DGE NAME:	DATE:	

DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL			5/31/2018	
ADDENDUM B			02/25/2018	

CONTRACTOR: _____ DATE STARTED: _____
INSPECTOR: _____ DATE COMPLETED: _____

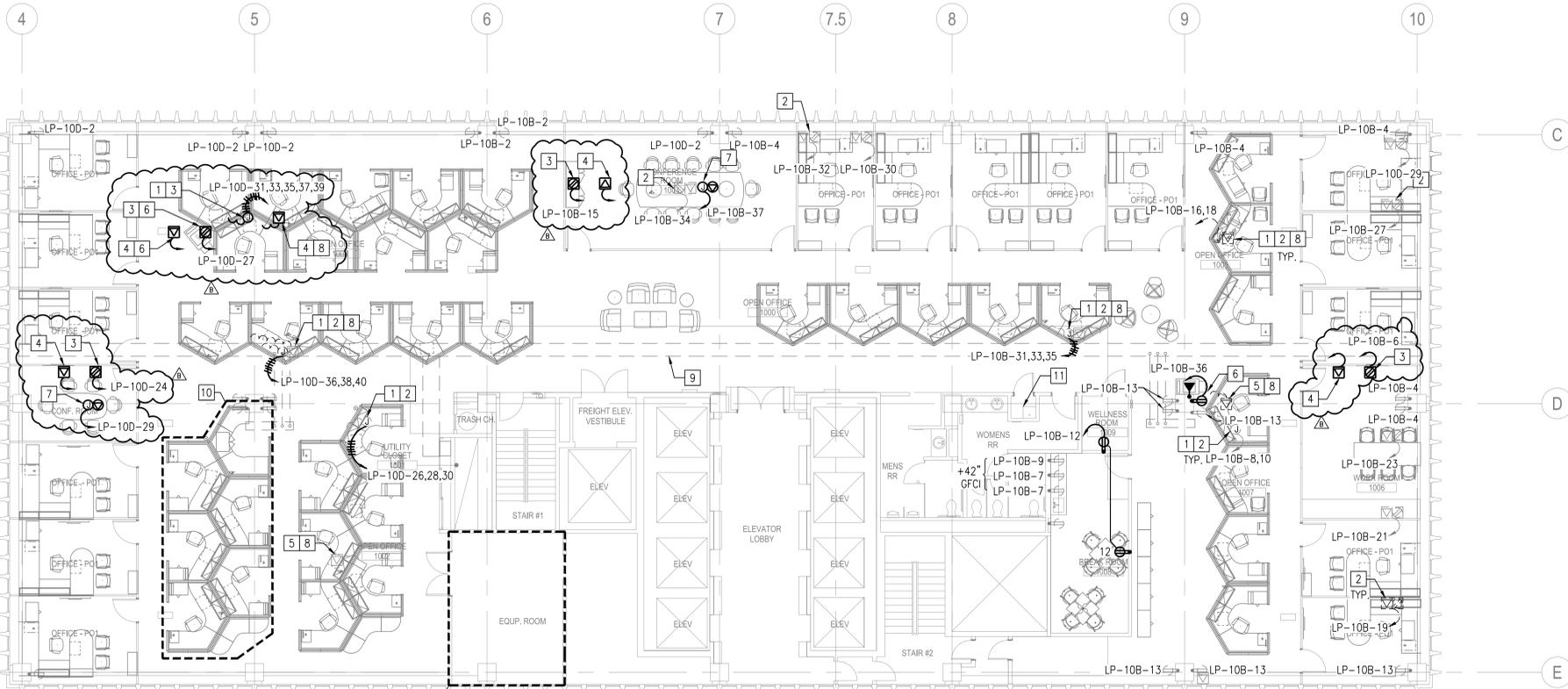
REVISIONS:
CS287 COORDINATE
CS883 COORDINATE
40154 - 345 - D

FILE NAME: K:\PROJECTS\GENSLER - 135\003\CITY OF SD - 101 ASH ST TENANT IMPROVEMENT\DRAWINGS\CAD\2013\ELEC\135-003-E-E02.009.DWG PLOT DATE: 6/25/2018 4:59 PM. PRINT BY: NICHOLAS CLEMENTS



01 ELECTRICAL LIGHTING PLAN - LEVEL 10

SCALE: 1/8" = 1'-0"



02 ELECTRICAL POWER PLAN - LEVEL 10

SCALE: 1/8" = 1'-0"

LIGHTING KEYNOTES		
1	RECIRCUIT LUMAIRES TO CONTROL SHOWN.	
2	RELOCATED SWITCH.	
POWER SHEET NOTES		
1.	CORE DRILL CONCRETE FLOOR FOR NEW LOCATIONS OF POWER AND DATA. REFER TO DETAILS 1,2,4,5/E05.001.	
2.	USE EXISTING UNDERFLOOR RACEWAYS FOR NEW POWER/DATA CIRCUITS. REFER TO DETAILS 1,2,4,5/E05.001.	
3.	COORDINATE ALL POWER/DATA LOCATIONS WITH FURNITURE CONSULTANT.	
4.	FOR RECEPTACLE AND DATA OUTLETS ON EXISTING WALLS, CONTRACTOR TO CUT WALL FOR CONDUIT ROUTING. PATCH AND PAINT WALL TO MATCH EXISTING COLOR AND FINISH.	
5.	ENSURE UNDERFLOOR RACEWAY DOES NOT HAVE MORE THAN 20 CURRENT CARRYING CONDUCTORS. IF THERE ARE GREATER THAN 20 CURRENT CARRYING CONDUCTORS IN A RACEWAY, PROVIDE UL RATED SEPARATION IN RACEWAY TO CREATE TWO SEPARATE RACEWAYS. ENSURE NO GREATER THAN 40% RACEWAY FILL.	
6.	ENSURE NO MORE THAN 20 CURRENT CARRYING CONDUCTORS ARE RUN IN ONE CELL OF THE CELLULAR FLOOR RACEWAY. UTILIZE ADJACENT CELLS AS NEEDED TO MAINTAIN A COUNT OF UNDER 20 CURRENT CARRYING CONDUCTORS.	
POWER KEYNOTES		
1	COORDINATE WITH FURNITURE MANUFACTURER FOR FURNITURE POWER CONNECTIONS.	
2	REUSE EXISTING FLOOR BOX DEVICE(S). COORDINATE FURNITURE LOCATION SUCH THAT FLOOR BOX DEVICE IS NOT A TRIPPING HAZARD	
3	CORE DRILL CONCRETE FLOOR, PROVIDE FLUSH MOUNT POWER FLOOR BOX PER 3/E-E05.001.	
4	CORE DRILL CONCRETE FLOOR, PROVIDE FLUSH MOUNT DATA FLOOR BOX.	
5	REUSE EXISTING DATA. COORDINATE FURNITURE SO THAT RAISED FLOOR BOX IS NOT A TRIPPING HAZARD.	
6	PROVIDE POWER AND DATA FOR COPIER.	
7	PROVIDE JUNCTION BOX IN CEILING FOR PROJECTOR, COORDINATE LOCATION PRIOR ROUGH IN.	
8	FOR DATA WHIP, REFER TO DETAIL 3/E05.001. COORDINATE WITH CITY OF SAN DIEGO FOR FURNITURE DATA CONNECTIONS.	
9	EXISTING FLOOR DUCT. REFER TO DETAILS 1,2,3,4,5/E05.001.	
10	NOT IN CONTRACT.	
11	DISCONNECT AND REMOVE CONNECTION TO WATER HEATER.	
Date	Description	
07.28.2017	ISSUE PERMIT	AKISS
09.08.2017	ISSUE FOR BID	AKISS
05.07.2018	ISSUE FOR BID	AKISS
06.25.2018	ADDENDUM 'B'	AKJLM

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Date Description

07.28.2017	ISSUE PERMIT	AKISS
09.08.2017	ISSUE FOR BID	AKISS
05.07.2018	ISSUE FOR BID	AKISS
06.25.2018	ADDENDUM 'B'	AKJLM



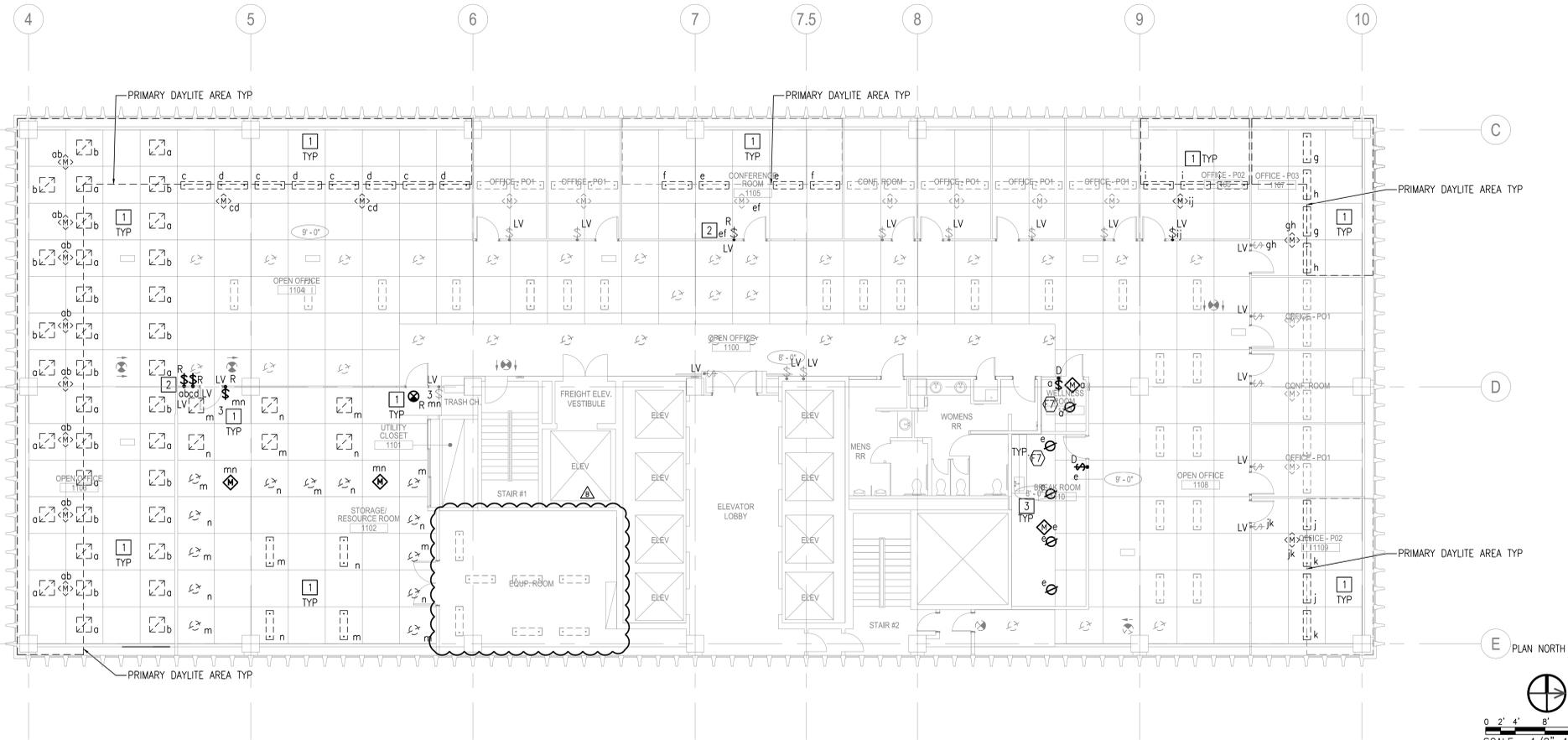
Project Number
55.7291.013

The City of
SAN DIEGO
Public Works

E02.210

CITY OF SAN DIEGO
ELECTRICAL LEVEL 10

CITY OF SAN DIEGO, CALIFORNIA PUBLIC WORKS DEPARTMENT SHEET 347 OF 402 SHEETS		WBS S-17009	
APPROVED FOR CITY ENGINEER	DATE 5/31/2018	SUBMITTED BY	JORGE ACEVEDO
PRINT DCE NAME	DATE 7/20/18	PROJECT MANAGER	MARLON PEREZ
DESIGNER	BY	APPROVED	DATE
ORIGINAL		5/31/2018	
ADDENDUM B		6/25/2018	
CONTRACTOR		DATE STARTED	40154 - 347 - D
INSPECTOR		DATE COMPLETED	
		REVISE FLOOR BOX LOCATIONS	ADDENDUM B



LIGHTING KEYNOTES

- 1 RECONFIGURE LUMAIRES TO CONTROL SHOWN.
- 2 RELOCATED SWITCH.
- 3 PROVIDE TYPE I LIGHTING CONTROL PER 1/E05.002.

POWER SHEET NOTES

1. CORE DRILL CONCRETE FLOOR FOR NEW LOCATIONS OF POWER AND DATA. REFER TO DETAILS 1,2,4,5/E05.001.
2. USE EXISTING UNDERFLOOR RACEWAYS FOR NEW POWER/DATA CIRCUITS. REFER TO DETAILS 1,2,4,5/E05.001.
3. COORDINATE ALL POWER/DATA LOCATIONS WITH FURNITURE CONSULTANT.
4. FOR RECEPTACLE AND DATA OUTLETS ON EXISTING WALLS, CONTRACTOR TO CUT WALL FOR CONDUIT ROUTING, PATCH AND PAINT WALL TO MATCH EXISTING COLOR AND FINISH.
5. ENSURE UNDERFLOOR RACEWAY DOES NOT HAVE MORE THAN 20 CURRENT CARRYING CONDUCTORS. IF THERE ARE GREATER THAN 20 CURRENT CARRYING CONDUCTORS IN A RACEWAY, PROVIDE UL RATED SEPARATION IN RACEWAY TO CREATE TWO SEPARATE RACEWAYS. ENSURE NO GREATER THAN 40% RACEWAY FILL.
6. ENSURE NO MORE THAN 20 CURRENT CARRYING CONDUCTORS ARE RUN IN ONE CELL OF THE CELLULAR FLOOR RACEWAY. UTILIZE ADJACENT CELLS AS NEEDED TO MAINTAIN A COUNT OF UNDER 20 CURRENT CARRYING CONDUCTORS.

POWER KEYNOTES

- 1 COORDINATE WITH FURNITURE MANUFACTURER FOR FURNITURE POWER CONNECTIONS.
- 2 REUSE EXISTING FLOOR BOX DEVICE(S). COORDINATE FURNITURE LOCATION SUCH THAT FLOOR BOX DEVICE IS NOT A TRIPPING HAZARD.
- 3 CORE DRILL CONCRETE FLOOR, PROVIDE FLUSH MOUNT POWER FLOOR BOX PER 3/E05.001.
- 4 REUSE EXISTING DATA.
- 5 EXISTING FLOOR DUCT. REFER TO DETAIL 1,2,4,5/E05.001.
- 6 CORE DRILL CONCRETE FLOOR, PROVIDE FLUSH MOUNT DATA FLOOR BOX.
- 7 PROVIDE CIRCUIT FOR COPIER.
- 8 FOR DATA WHIP, REFER TO DETAIL 3/E05.001. COORDINATE WITH CITY OF SAN DIEGO FOR FURNITURE DATA CONNECTIONS.
- 9 PROVIDE NEW WIRES AS SHOWN VIA HOMERUN.
- 10 CIRCUIT DEVICE TO CIRCUIT SHOWN.
- 11 PROVIDE JUNCTION BOX IN CEILING FOR PROJECTOR. COORDINATE LOCATION PRIOR TO ROUGH IN.

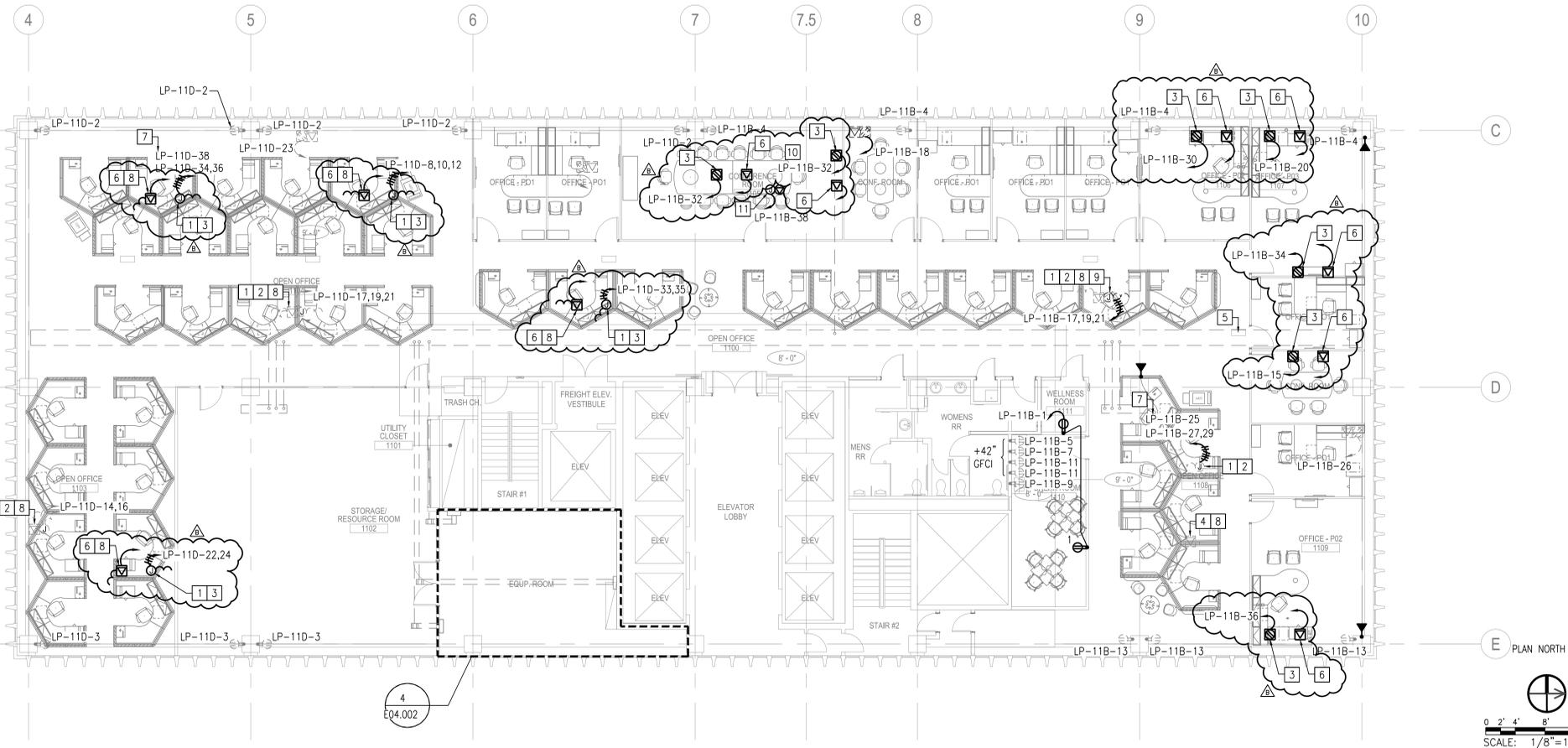
CITY OF SAN DIEGO
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Date	Description	AKSS
07.28.2017	ISSUE PERMIT	AKSS
09.08.2017	ISSUE FOR BID	AKSS
05.07.2018	ISSUE FOR BID	AKSS
06.25.2018	ADDENDUM 'B'	AKLM

01 ELECTRICAL LIGHTING PLAN - LEVEL 11
 SCALE: 1/8" = 1'-0"



PROJECT NUMBER

55.7291.013

The City of
SAN DIEGO
 Public Works

E02.211

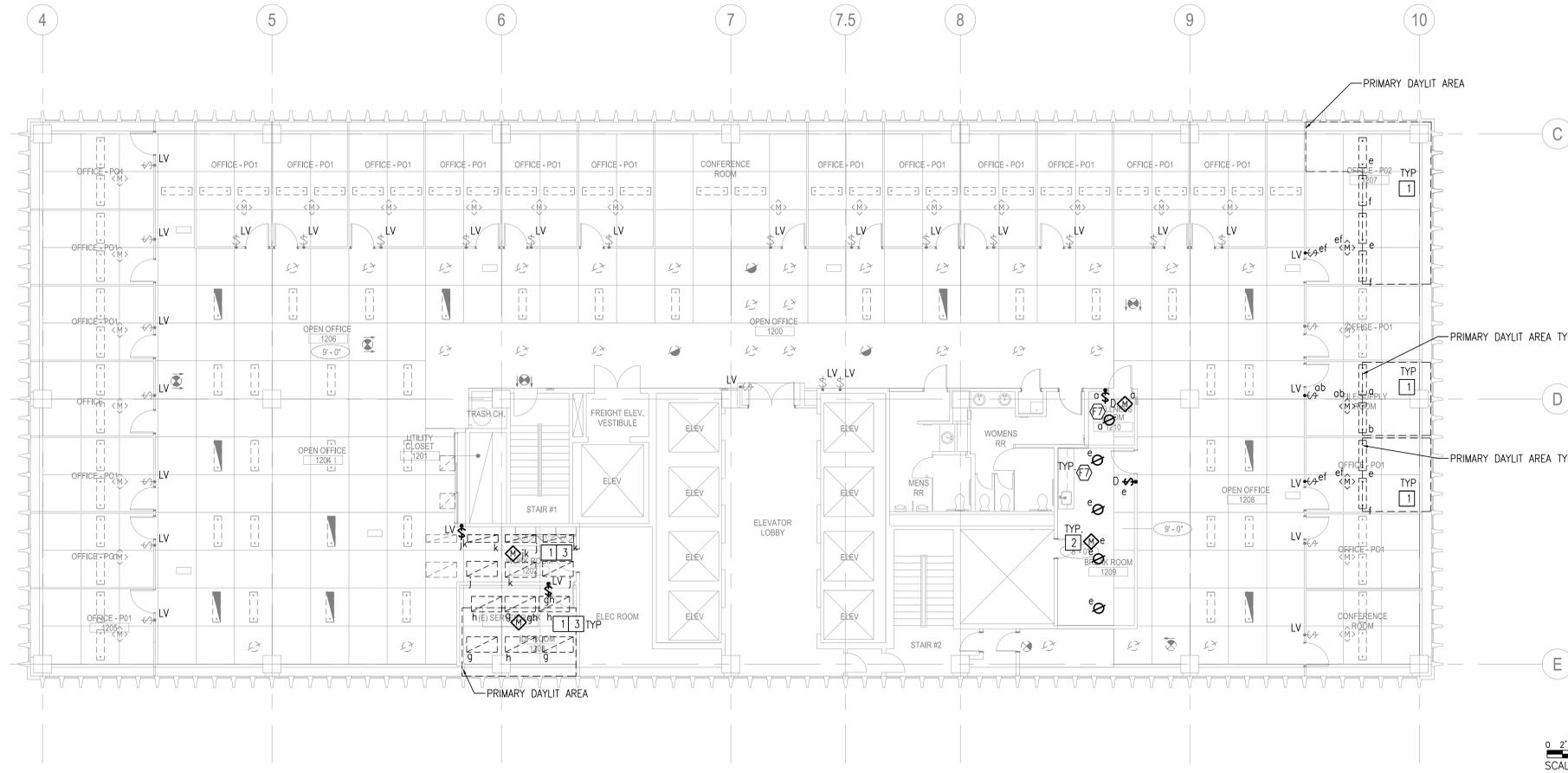
CITY OF SAN DIEGO
 ELECTRICAL LEVEL 11

CITY OF SAN DIEGO, CALIFORNIA PUBLIC WORKS DEPARTMENT SHEET 350 OF 402 SHEETS		WBS S-17009	
APPROVED FOR CITY ENGINEER JASON GRAN	DATE 5/31/2018	SUBMITTED BY JORGE ACEVEDO	PROJECT MANAGER
PRINT DCE NAME	DATE 7/20/18	DESIGNED BY MARLON PEREZ	PROJECT ENGINEER
DESCRIPTION	BY	APPROVED	DATE FILMED
ORIGINAL			5/31/2018
ADDENDUM B			6/25/2018
CONTRACTOR		DATE STARTED	DATE COMPLETED
INSPECTOR			
			40154 - 350 - D

02 ELECTRICAL POWER PLAN - LEVEL 11
 SCALE: 1/8" = 1'-0"

REVISIONS: REVISE FLOOR BOX LOCATIONS
 ADDENDUM B

FILE NAME: K:\PROJECTS\GENSLER - 135\003\CITY OF SD - 101 ASH ST TENANT IMPROVEMENT\DRAWINGS\CAD\2013\ELEC\135-003-E-E02.211.DWG PLOT DATE: 6/25/2018 5:00 PM. PRINT BY: NICHOLAS CLEMENTS
 June 29, 2018
 101 Ash St Tenant Improvements
 Page 216 of 227



- ### LIGHTING KEYNOTES
- 1 RECIRCULATED LUMINAIRES TO CONTROL SHOWN.
 - 2 PROVIDE TYPE 1 LIGHTING CONTROL PER 1/E05.002.
 - 3 PROVIDE ON-OFF SWITCH AND OCCUPANCY SENSOR FOR EXISTING LUMINAIRES.

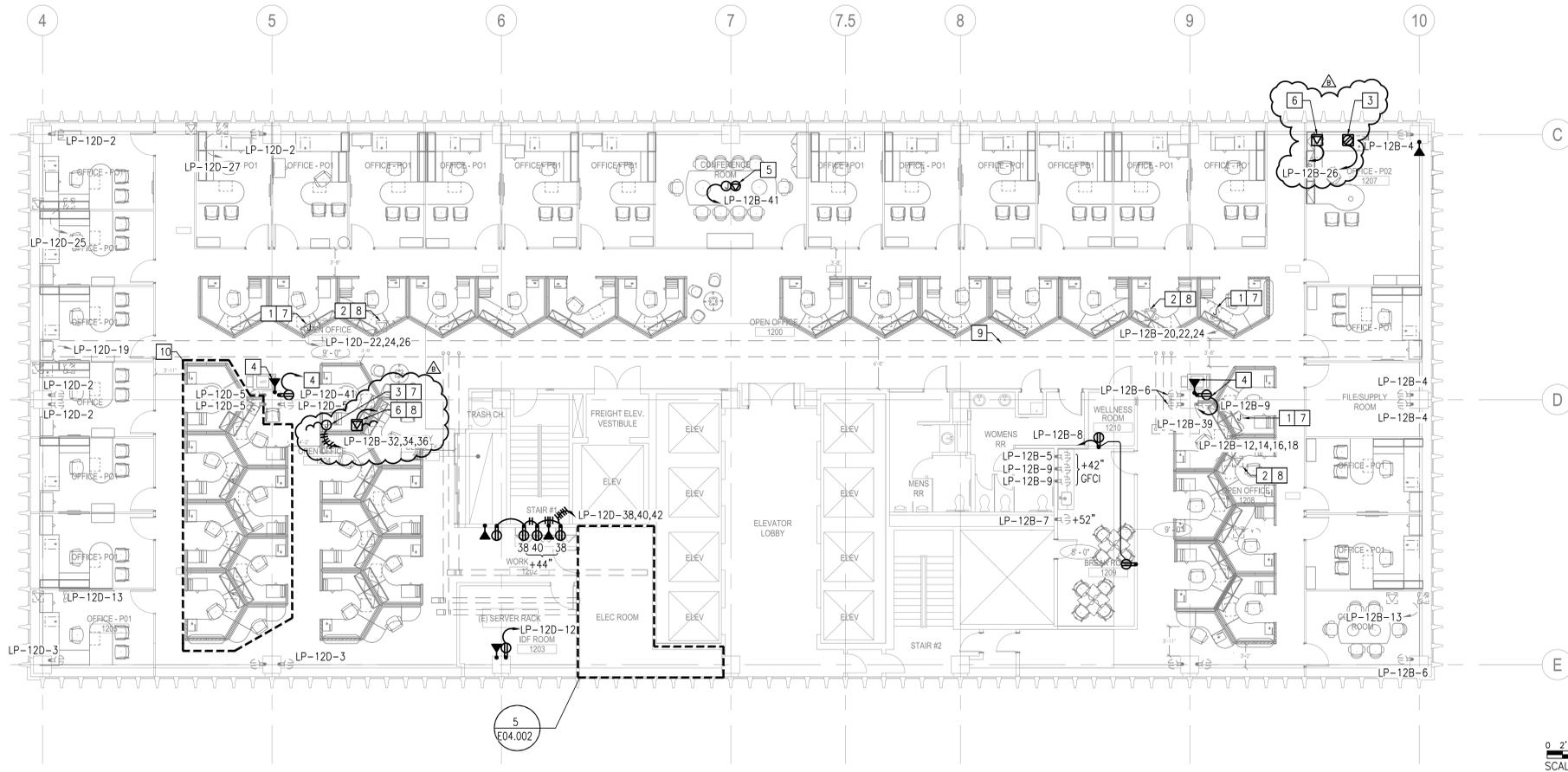
- ### POWER SHEET NOTES
1. CORE DRILL CONCRETE FLOOR FOR NEW LOCATIONS OF POWER AND DATA. REFER TO DETAILS 1,2,4,5/E05.001.
 2. USE EXISTING UNDERFLOOR RACEWAYS FOR NEW POWER/DATA CIRCUITS. REFER TO DETAILS 1,2,4,5/E05.001.
 3. COORDINATE ALL POWER/DATA LOCATIONS WITH FURNITURE CONSULTANT.
 4. FOR RECEPTACLE AND DATA OUTLETS ON EXISTING WALLS, CONTRACTOR TO CUT WALL FOR CONDUIT ROUTING, PATCH AND PAINT WALL TO MATCH EXISTING COLOR AND FINISH.
 5. ENSURE UNDERFLOOR RACEWAY DOES NOT HAVE MORE THAN 20 CURRENT CARRYING CONDUCTORS. IF THERE ARE GREATER THAN 20 CURRENT CARRYING CONDUCTORS IN A RACEWAY, PROVIDE UL RATED SEPARATION IN RACEWAY TO CREATE TWO SEPARATE RACEWAYS. ENSURE NO GREATER THAN 40% RACEWAY FILL.
 6. ENSURE NO MORE THAN 20 CURRENT CARRYING CONDUCTORS ARE RUN IN ONE CELL OF THE CELLULAR FLOOR RACEWAY. UTILIZE ADJACENT CELLS AS NEEDED TO MAINTAIN A COUNT OF UNDER 20 CURRENT CARRYING CONDUCTORS.

CITY OF SAN DIEGO
 101 W. ASH
 101 W. ASH STREET
 SAN DIEGO, CA 92101

Gensler
 225 Broadway
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 San Diego, CA 92101
 United States
 Tel: 619.557.2500
 Fax: 619.557.2520

BSE PROJECT NO. 135-003
BSE ENGINEERING, INC.
 12040 TERRA BLVD., SUITE 100
 SAN DIEGO, CA 92131
 TEL: 619.279.2500
 FAX: 619.279.2506

01 ELECTRICAL LIGHTING PLAN - LEVEL 12
 SCALE: 1/8" = 1'-0"



- ### POWER KEYNOTES
- 1 REUSE EXISTING FLOOR BOX DEVICE(S). COORDINATE FURNITURE LOCATION SUCH THAT FLOOR BOX DEVICE IS NOT A TRIPPING HAZARD.
 - 2 REUSE EXISTING DATA.
 - 3 CORE DRILL CONCRETE FLOOR, PROVIDE FLUSH MOUNT POWER FLOOR BOX PER 3/E05.001.
 - 4 PROVIDE POWER AND DATA FOR COPIER.
 - 5 PROVIDE JUNCTION BOX IN CEILING FOR PROJECTOR. COORDINATE LOCATION PRIOR TO ROUGH IN.
 - 6 CORE DRILL CONCRETE FLOOR, PROVIDE FLUSH MOUNT DATA FLOOR BOX.
 - 7 COORDINATE WITH FURNITURE MANUFACTURER FOR FURNITURE POWER CONNECTIONS.
 - 8 FOR DATA WHIP, REFER TO DETAIL 3/E05.001. COORDINATE WITH CITY OF SAN DIEGO FOR FURNITURE DATA CONNECTIONS.
 - 9 EXISTING FLOOR DUCT. REFER TO DETAILS 1,2,4,5/E05.001.
 - 10 NOT IN CONTRACT.



Project Number
 55.7291.013

The City of **SAN DIEGO**
Public Works

CITY OF SAN DIEGO
 ELECTRICAL LEVEL 12

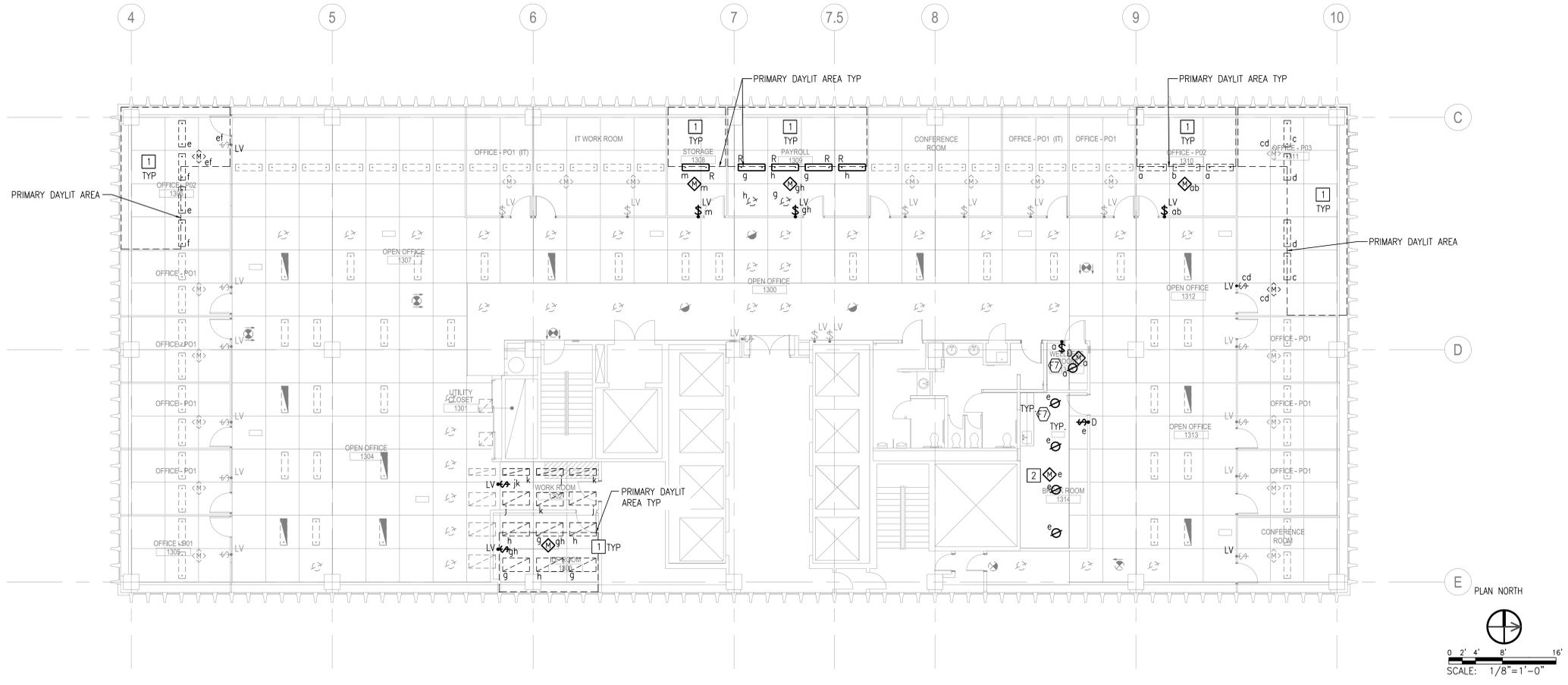
CITY OF SAN DIEGO, CALIFORNIA PUBLIC WORKS DEPARTMENT SHEET 353 OF 402 SHEETS		WBS S-17009
APPROVED:	DATE: 5/31/2018	SUBMITTED BY: JORGE ACEVEDO
FOR CITY ENGINEER:	DATE: 7/20/18	PROJECT MANAGER
PRINT DGE NAME:	RCER	CHIEF BY: MARLON PEREZ
DESCRIPTION:	BY:	APPROVED:
DATE:	DATE:	DATE:
FILED:	FILED:	FILED:
ORIGINAL:	5/31/2018	CS27 COORDINATE
ADDENDUM B:	6/25/2018	CS27 COORDINATE
CONTRACTOR:	DATE STARTED:	DATE COMPLETED:
INSPECTOR:	DATE STARTED:	DATE COMPLETED:
40154 - 353 - D		

02 ELECTRICAL POWER PLAN - LEVEL 12
 SCALE: 1/8" = 1'-0"

REVISIONS:
 1 REVISE FLOOR BOX LOCATIONS

ADDENDUM B

FILE NAME: K:\PROJECTS\GENSLER - 135\003\CITY OF SD - 101 ASH ST TENANT IMPROVEMENT\DRAWINGS\CAD\2013\ELEC\135-003-E-E02.212.DWG PLOT DATE: 6/25/2018 5:00 PM PRINT BY: NICHOLAS CLEMENTS



LIGHTING KEYNOTES

- 1 RECURRING LUMINAIRE TO CONTROL SHOWN.
- 2 PROVIDE TYPE 1 LIGHTING CONTROL PER 2/E05.002.

POWER SHEET NOTES

- 1. CORE FLOOR FOR NEW LOCATIONS OF POWER AND DATA. REFER TO DETAILS 1,2,4,5/E05.001.
- 2. USE EXISTING UNDERFLOOR RACEWAYS FOR NEW POWER/DATA CIRCUITS. REFER TO DETAILS 1,2,4,5/E05.001.
- 3. COORDINATE ALL POWER/DATA LOCATIONS WITH FURNITURE CONSULTANT.
- 4. FOR RECEPTACLE AND DATA OUTLETS ON EXISTING WALLS, CONTRACTOR TO CUT WALL FOR CONDUIT ROUTING, PATCH AND PAINT WALL TO MATCH EXISTING COLOR AND FINISH.
- 5. ENSURE UNDERFLOOR RACEWAY DOES NOT HAVE MORE THAN 20 CURRENT CARRYING CONDUCTORS. IF THERE ARE GREATER THAN 20 CURRENT CARRYING CONDUCTORS IN A RACEWAY, PROVIDE UL RATED SEPARATION IN RACEWAY TO CREATE TWO SEPARATE RACEWAYS. ENSURE NO GREATER THAN 40% RACEWAY FILL.
- 6. ENSURE NO MORE THAN 20 CURRENT CARRYING CONDUCTORS ARE RUN IN ONE CELL OF THE CELLULAR FLOOR RACEWAY. UTILIZE ADJACENT CELLS AS NEEDED TO MAINTAIN A COUNT OF UNDER 20 CURRENT CARRYING CONDUCTORS.

POWER KEYNOTES

- 1 REUSE EXISTING FLOOR BOX DEVICE(S). COORDINATE FURNITURE LOCATION SUCH THAT FLOOR BOX DEVICE IS NOT A TRIPPING HAZARD.
- 2 REUSE EXISTING DATA.
- 3 CORE DRILL, PROVIDE FLUSH MOUNT POWER FLOOR BOX PER 3/E05.001.
- 4 COORDINATE WITH FURNITURE MANUFACTURER FOR FURNITURE POWER CONNECTIONS.
- 5 PROVIDE POWER AND DATA FOR COPIER.
- 6 PROVIDE MODULAR FURNITURE ELECTRICAL CONNECTION BY INSTALLING WHIP IN EXISTING JUNCTION BOX LOCATION.
- 7 CORE DRILL, PROVIDE FLUSH MOUNT DATA FLOOR BOX.
- 8 FOR DATA WHIP, REFER TO DETAIL 3/E05.001. COORDINATE WITH CITY OF SAN DIEGO FOR FURNITURE DATA CONNECTIONS.
- 9 EXISTING FLOOR DUCT. REFER TO DETAILS 1,2,4,5/E05.001.

CITY OF SAN DIEGO

101 W. ASH
101 W. ASH STREET
SAN DIEGO, CA 92101

Gensler

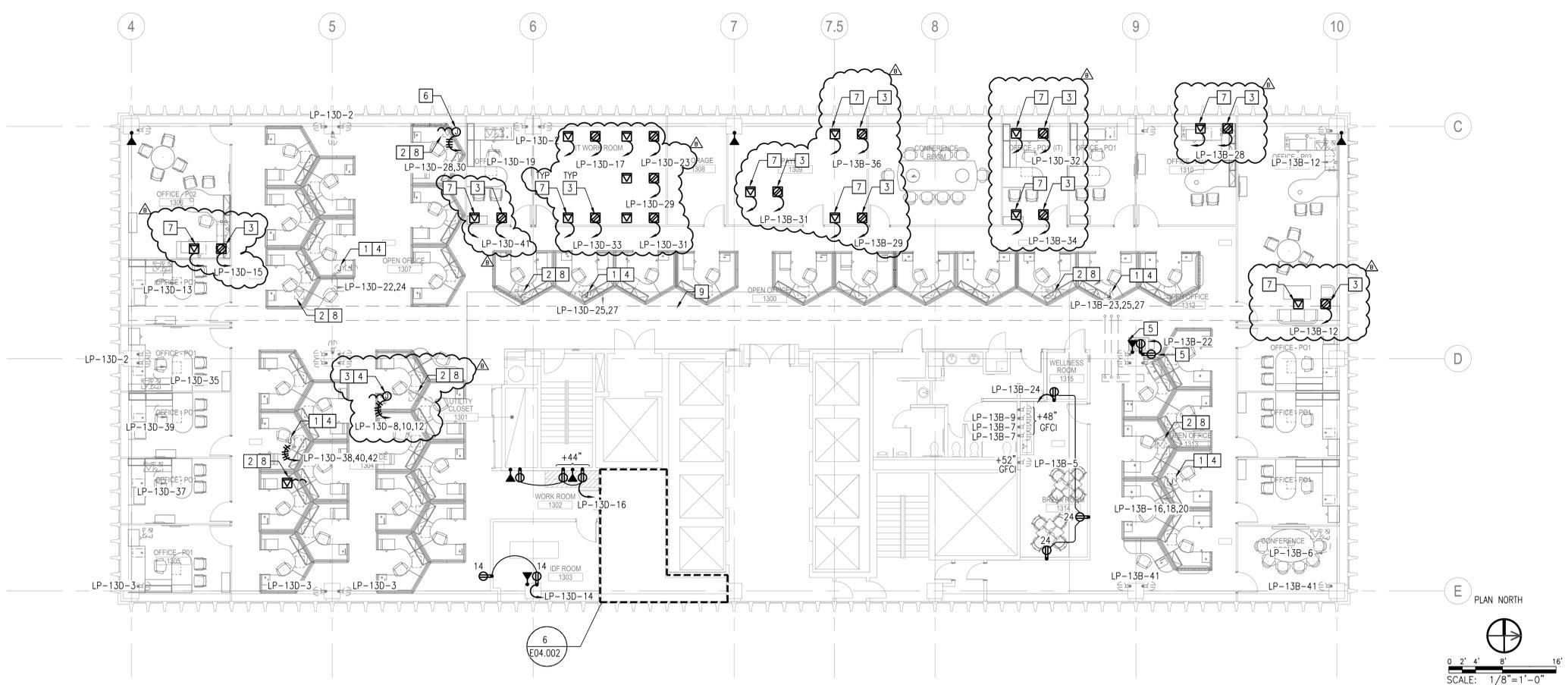
225 Broadway
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United States

Tel 619.557.2500
Fax 619.557.2520

BSE PROJECT NO. 135-003

BSE ENGINEERING, INC.
10480 Torrey Pines Dr., Suite 100
San Diego, CA 92121
TEL: 619.279.2500
FAX: 619.279.2504

01 ELECTRICAL LIGHTING PLAN - LEVEL 13
SCALE: 1/8" = 1'-0"



02 ELECTRICAL POWER PLAN - LEVEL 13
SCALE: 1/8" = 1'-0"

Date	Description	AKSS
07.28.2017	ISSUE PERMIT	AKSS
09.08.2017	ISSUE FOR BID	AKSS
05.07.2018	ISSUE FOR BID	AKSS
06.25.2018	ADDENDUM 'B'	AKLM



Project Number
55.7291.013

The City of
SAN DIEGO
Public Works

E02.213

CITY OF SAN DIEGO
ELECTRICAL LEVEL 13

CITY OF SAN DIEGO, CALIFORNIA
PUBLIC WORKS DEPARTMENT
SHEET 356 OF 402 SHEETS

WBS S-17009

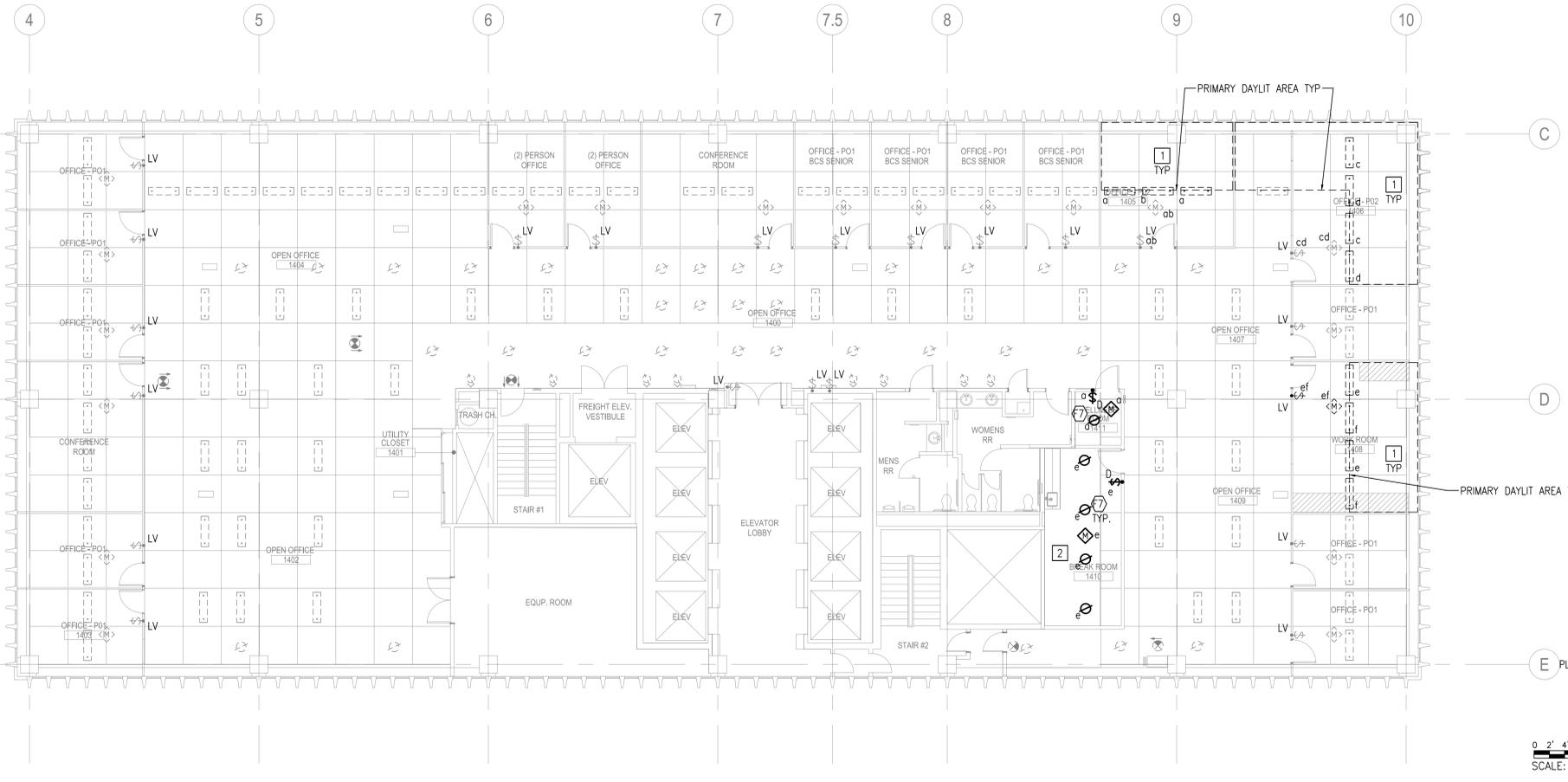
APPROVED: JASON GRANU
FOR CITY ENGINEER
DATE: 5/31/2018
PROJECT MANAGER
DATE: 7/20/18
PROJECT ENGINEER
DATE: 7/20/18

DESCRIPTION: ORIGINAL
BY: JASON GRANU
APPROVED: JORGE ACEVEDO
DATE: 5/31/2018
FILMED: 6/25/2018

CONTRACTOR: 40154 - 356 - D
DATE STARTED: 5/31/2018
DATE COMPLETED: 6/25/2018

REVISIONS:
1. REVISE FLOOR BOX LOCATIONS

FILE NAME: K:\PROJECTS\GENSLER - 135\003\CITY OF SD - 101 ASH ST TENANT IMPROVEMENT\DRAWINGS\CAD\2013\ELEC\135-003-E-E02.213.DWG PLOT DATE: 6/25/2018 5:00 PM. PRINT BY: NICHOLAS CLEMENTS



LIGHTING KEYNOTES

- 1 RECURVIT LUMINAIRE TO CONTROL SHOWN.
- 2 PROVIDE TYPE I LIGHTING CONTROL PER 1/E05.002.

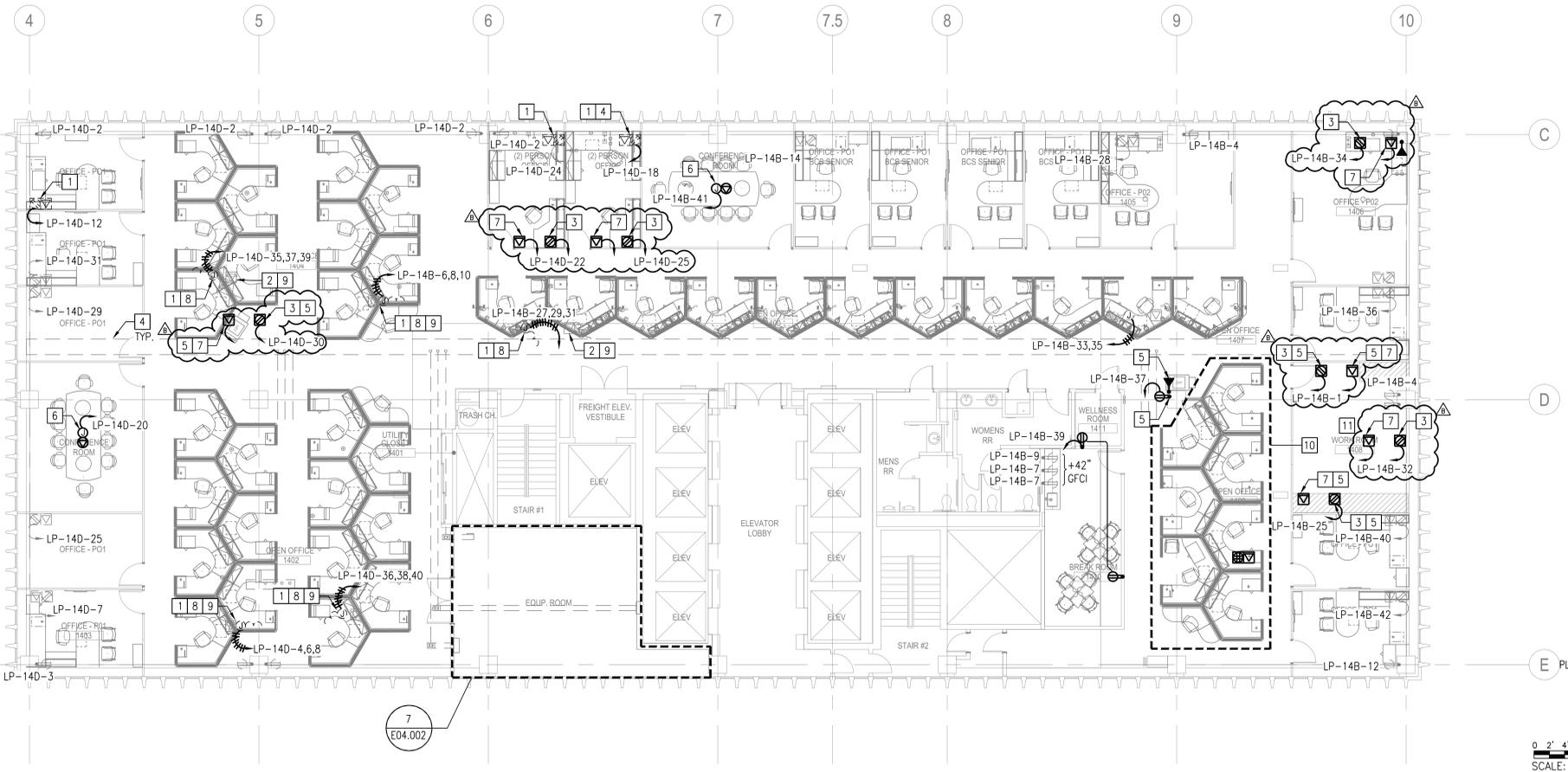
POWER SHEET NOTES

1. CORE DRILL CONCRETE FLOOR FOR NEW LOCATIONS OF POWER AND DATA. REFER TO DETAILS 1,2,4,5/E05.001.
2. USE EXISTING UNDERFLOOR RACEWAYS FOR NEW POWER/DATA CIRCUITS. REFER TO DETAILS 1,2,4,5/E05.001.
3. COORDINATE ALL POWER/DATA LOCATIONS WITH FURNITURE CONSULTANT.
4. FOR RECEPTACLE AND DATA OUTLETS ON EXISTING WALLS, CONTRACTOR TO CUT WALL FOR CONDUIT ROUTING, PATCH AND PAINT WALL TO MATCH EXISTING COLOR AND FINISH.
5. ENSURE UNDERFLOOR RACEWAY DOES NOT HAVE MORE THAN 20 CURRENT CARRYING CONDUCTORS. IF THERE ARE GREATER THAN 20 CURRENT CARRYING CONDUCTORS IN A RACEWAY, PROVIDE UL RATED SEPARATION IN RACEWAY TO CREATE TWO SEPARATE RACEWAYS. ENSURE NO GREATER THAN 40% RACEWAY FILL.
6. ENSURE NO MORE THAN 20 CURRENT CARRYING CONDUCTORS ARE RUN IN ONE CELL OF THE CELLULAR FLOOR RACEWAY. UTILIZE ADJACENT CELLS AS NEEDED TO MAINTAIN A COUNT OF UNDER 20 CURRENT CARRYING CONDUCTORS.

POWER KEYNOTES

- 1 REUSE EXISTING FLOOR BOX DEVICE(S). COORDINATE FURNITURE LOCATION SUCH THAT FLOOR BOX DEVICE IS NOT A TRIPPING HAZARD.
- 2 REUSE EXISTING DATA.
- 3 CORE DRILL CONCRETE FLOOR, PROVIDE FLUSH MOUNT POWER FLOOR BOX PER 3/E05.001.
- 4 EXISTING FLOOR DUCT. REFER TO DETAIL 1,2,4,5/E05.001.
- 5 PROVIDE POWER AND DATA FOR COPIER.
- 6 PROVIDE JUNCTION BOX IN CEILING FOR PROJECTOR. COORDINATE LOCATION PRIOR TO ROUGH IN.
- 7 CORE DRILL CONCRETE FLOOR, PROVIDE FLUSH MOUNT DATA FLOOR BOX.
- 8 COORDINATE WITH FURNITURE MANUFACTURER FOR FURNITURE POWER CONNECTIONS.
- 9 FOR DATA WHIP, REFER TO DETAIL 3/E05.001. COORDINATE WITH CITY OF SAN DIEGO FOR FURNITURE DATA CONNECTIONS.
- 10 NOT IN CONTRACT.
- 11 ROUTE POWER FROM FLOOR TO INSIDE MILLWORK FOR CONTINUED CONNECTION. COORDINATE WITH ARCHITECT.

01 ELECTRICAL LIGHTING PLAN - LEVEL 14
SCALE: 1/8" = 1'-0"



02 ELECTRICAL POWER PLAN - LEVEL 14
SCALE: 1/8" = 1'-0"

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BSE PROJECT NO. 135-003
BSE ENGINEERING, INC.
10480 Torreyana Dr., Suite 100
San Diego, CA 92121
TEL: 619.279.2500
FAX: 619.279.2504

Date	Description	AKISS
07.28.2017	ISSUE PERMIT	AKISS
09.08.2017	ISSUE FOR BID	AKISS
05.07.2018	ISSUE FOR BID	AKISS
06.25.2018	ADDENDUM 'B'	AKJLM



Project Number
55.7291.013
The City of
SAN DIEGO
Public Works

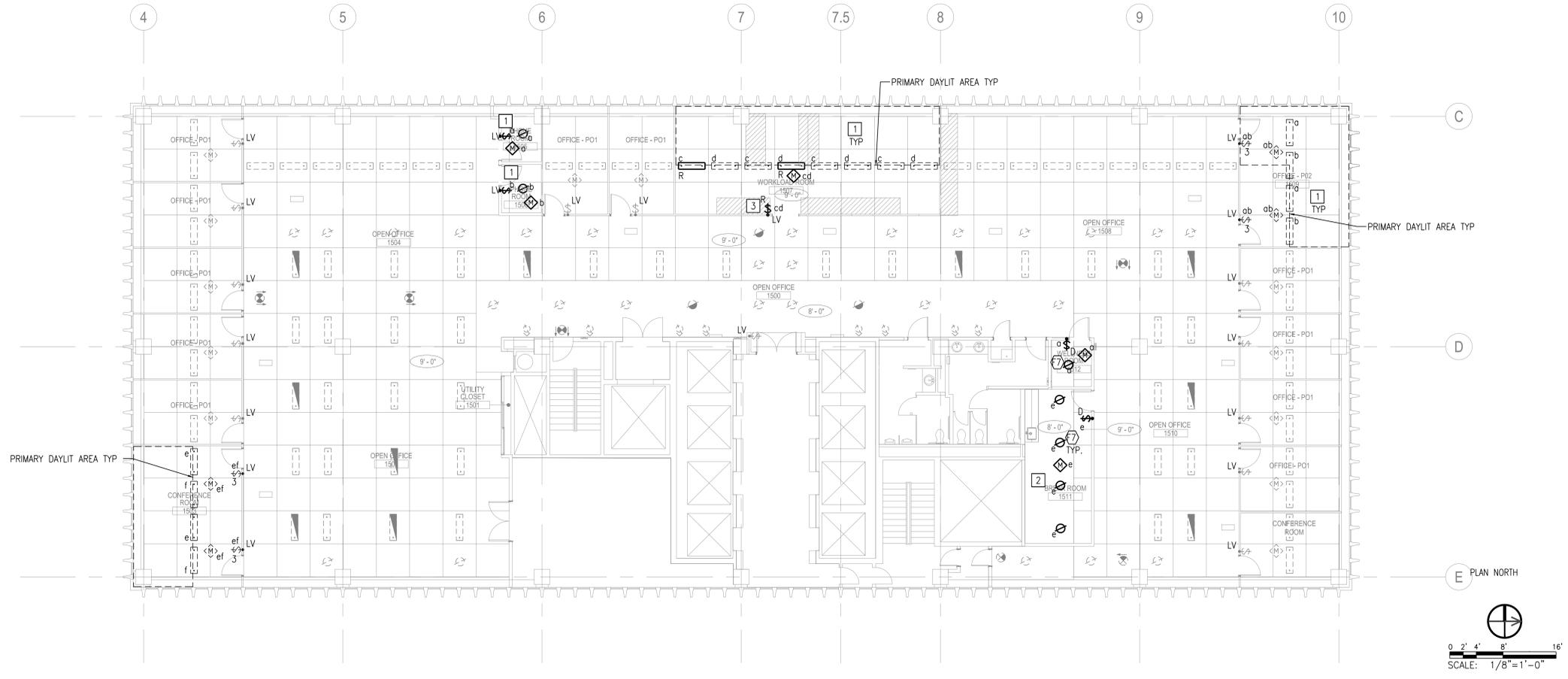
E02.214

CITY OF SAN DIEGO
ELECTRICAL LEVEL 14

CITY OF SAN DIEGO, CALIFORNIA PUBLIC WORKS DEPARTMENT SHEET 359 OF 402 SHEETS		WBS S-17009
APPROVED:	DATE: 5/31/2018	SUBMITTED BY: JORGE ACEVEDO
FOR CITY ENGINEER	DATE: 7/20/18	PROJECT MANAGER
PRINT DCE NAME:	RCER	CHIEF BY: MARLON PEREZ
DESCRIPTION	BY	APPROVED
DATE	DATE	FILMED
ORIGINAL	5/31/2018	
ADDENDUM B	02/25/2018	CS27 COORDINATE
		CS83 COORDINATE
CONTRACTOR	DATE STARTED	40154 - 359 - D
INSPECTOR	DATE COMPLETED	

REVISOR: REVISE FLOOR BOX LOCATIONS
ADDENDUM B

FILE NAME: K:\PROJECTS\GENSLER - 135\003\CITY OF SD - 101 ASH ST TENANT IMPROVEMENT\DRAWINGS\CAD\2013\ELEC\135-003-E-E02.214.DWG PLOT DATE: 6/25/2018 5:00 PM. PRINT BY: NICHOLAS CLEMENTS
June 29, 2018
101 Ash St Tenant Improvements
Page 221 of 227



LIGHTING KEYNOTES

- 1 RE-CIRCUIT LUMINAIRE TO CONTROL SHOWN.
- 2 PROVIDE TYPE 1 LIGHTING CONTROL PER 2/E05.002.
- 3 RELOCATE SWITCH.
- 4 RELOCATE EXISTING LUMINAIRE.

POWER SHEET NOTES

1. CORE DRILL CONCRETE FLOOR FOR NEW LOCATIONS OF POWER AND DATA. REFER TO DETAILS 1,2,4,5/E05.001.
2. USE EXISTING UNDERFLOOR RACEWAYS FOR NEW POWER/DATA CIRCUITS. REFER TO DETAILS 1,2,4,5/E05.001.
3. COORDINATE ALL POWER/DATA LOCATIONS WITH FURNITURE CONSULTANT.
4. FOR RECEPTACLE AND DATA OUTLETS ON EXISTING WALLS, CONTRACTOR TO CUT WALL FOR CONDUIT ROUTING, PATCH AND PAINT WALL TO MATCH EXISTING COLOR AND FINISH.
5. ENSURE UNDERFLOOR RACEWAY DOES NOT HAVE MORE THAN 20 CURRENT CARRYING CONDUCTORS. IF THERE ARE GREATER THAN 20 CURRENT CARRYING CONDUCTORS IN A RACEWAY, PROVIDE UL RATED SEPARATION IN RACEWAY TO CREATE TWO SEPARATE RACEWAYS. ENSURE NO GREATER THAN 40% RACEWAY FILL.
6. ENSURE NO MORE THAN 20 CURRENT CARRYING CONDUCTORS ARE RUN IN ONE CELL OF THE CELLULAR FLOOR RACEWAY. UTILIZE ADJACENT CELLS AS NEEDED TO MAINTAIN A COUNT OF UNDER 20 CURRENT CARRYING CONDUCTORS.

CITY OF SAN DIEGO

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Gensler

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United States

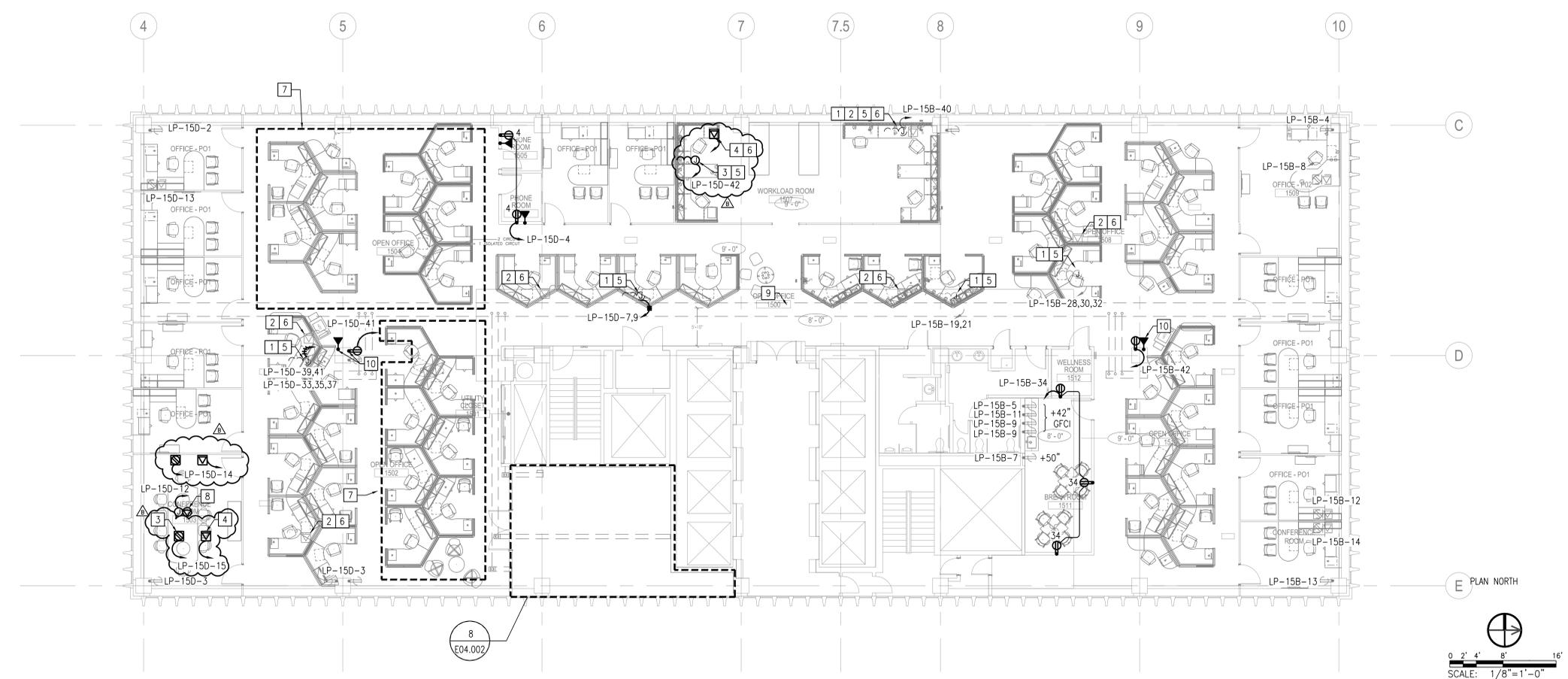
Tel 619.557.2500
Fax 619.557.2520

BSE PROJECT NO. 135-003

BSE ENGINEERING, INC.

10480 Torreyana Dr., Suite 100
San Diego, CA 92121
Tel: 619.279.2200
Fax: 619.279.2204

01 ELECTRICAL LIGHTING PLAN - LEVEL 15
SCALE: 1/8" = 1'-0"



POWER KEYNOTES

- 1 REUSE EXISTING FLOOR BOX DEVICE(S). COORDINATE FURNITURE LOCATION SUCH THAT FLOOR BOX DEVICE IS NOT A TRIPPING HAZARD.
- 2 REUSE EXISTING DATA.
- 3 CORE DRILL CONCRETE FLOOR, PROVIDE FLUSH MOUNT POWER FLOOR BOX PER 3/E05.001.
- 4 CORE DRILL CONCRETE FLOOR, PROVIDE FLUSH MOUNT DATA FLOOR BOX.
- 5 COORDINATE WITH FURNITURE MANUFACTURER FOR FURNITURE POWER CONNECTION.
- 6 FOR DATA WHIP, REFER TO DETAIL 3/E05.001. COORDINATE WITH CITY OF SAN DIEGO FOR FURNITURE DATA CONNECTIONS.
- 7 NOT IN CONTRACT.
- 8 PROVIDE JUNCTION BOX IN CEILING FOR PROJECTOR. COORDINATE LOCATION PRIOR TO ROUGH IN.
- 9 EXISTING FLOOR DUCT. REFER TO DETAILS 1,2,4,5/E05.001.
- 10 PROVIDE POWER AND DATA FOR COPIER.

Date	Description	AK/SS
07.28.2017	ISSUE PERMIT	AK/SS
09.08.2017	ISSUE FOR BID	AK/SS
05.07.2018	ISSUE FOR BID	AK/SS
06.25.2018	ADDENDUM 'B'	AK/ML

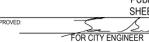


Project Number
55.7291.013

The City of
SAN DIEGO
Public Works

E02.215

CITY OF SAN DIEGO
ELECTRICAL LEVEL 15

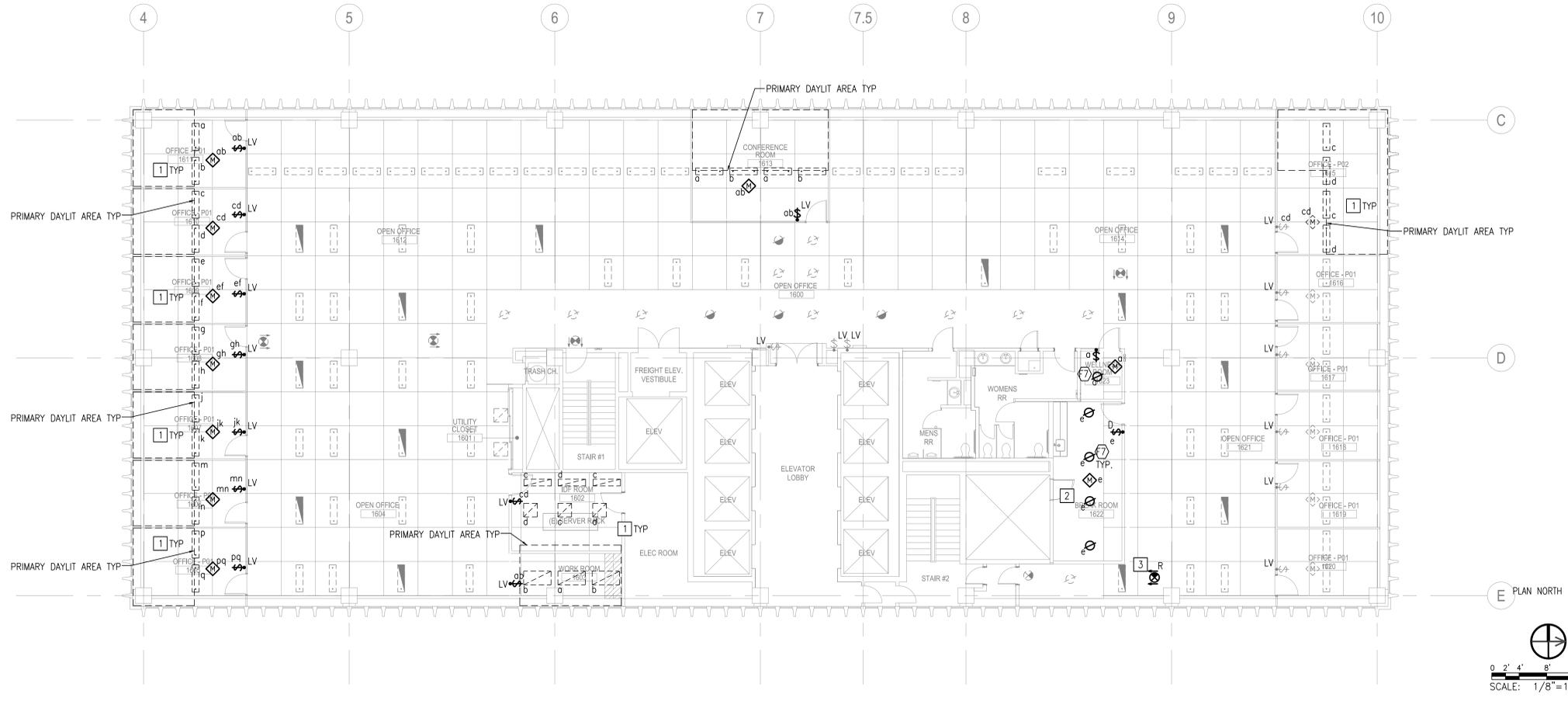
CITY OF SAN DIEGO, CALIFORNIA PUBLIC WORKS DEPARTMENT SHEET 362 OF 402 SHEETS		WBS S-17009
APPROVED: 	DATE: 5/31/2018	SUBMITTED BY: JORGE ACEVEDO
FOR CITY ENGINEER: JASON GRAN	DATE: 7/20/18	PROJECT MANAGER
PRINT DCE NAME: _____	RCER: _____	CHECKED BY: MARLON PEREZ
DESCRIPTION	BY	APPROVED
DATE	FILMED	
ORIGINAL	5/31/2018	
ADDENDUM B	6/25/2018	CS27 COORDINATE
		CS83 COORDINATE
CONTRACTOR INSPECTOR: _____	DATE STARTED: _____	DATE COMPLETED: _____
		40154 - 362 - D

02 ELECTRICAL POWER PLAN - LEVEL 15
SCALE: 1/8" = 1'-0"

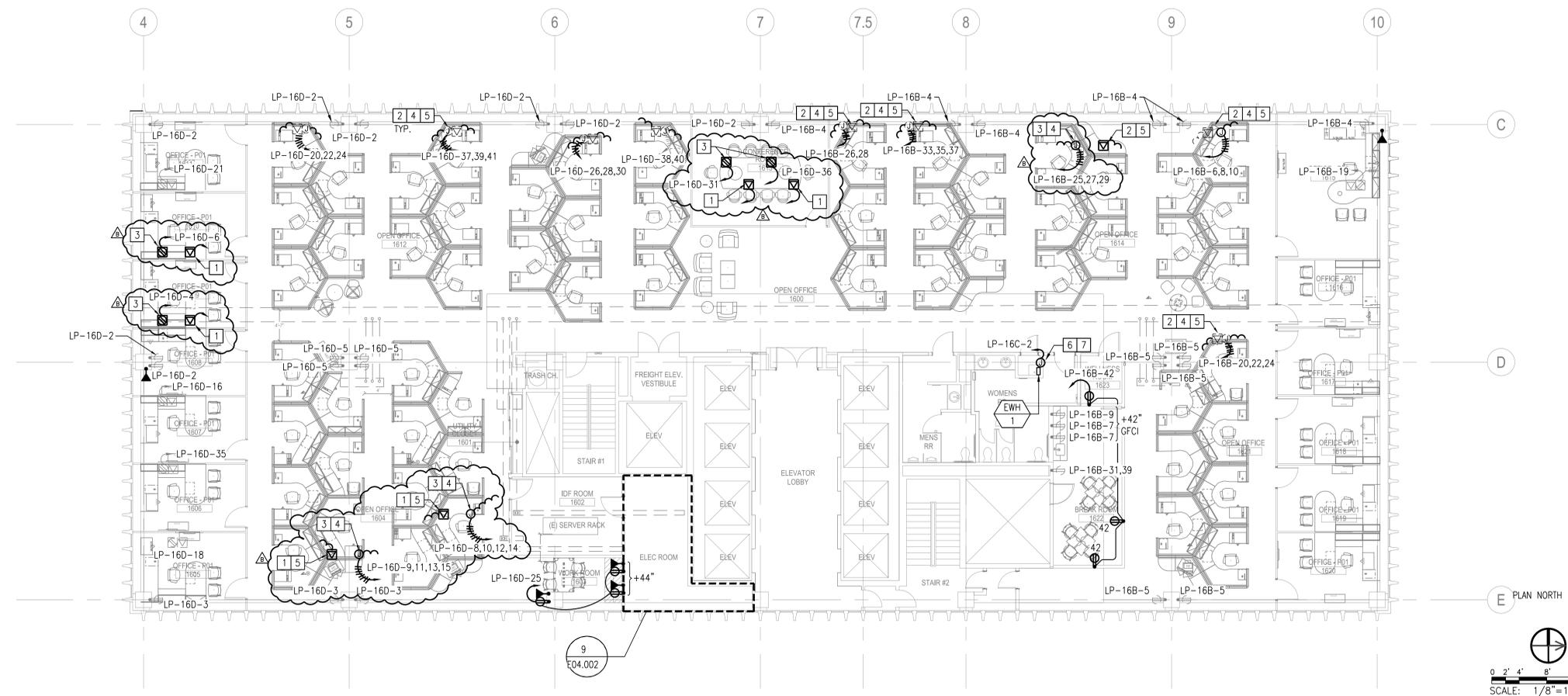
REVISOR: _____
REVISION: _____
ADDENDUM B

FILE NAME: K:\PROJECTS\GENSLER - 135\003\CITY OF SD - 101 ASH ST TENANT IMPROVEMENT\DRAWINGS\CAD\2013\ELEC\135-003-E-E02.215.DWG PLOT DATE: 6/25/2018 5:00 PM. PRINT BY: NICHOLAS CLEMENTS

FILE NAME: K:\PROJECTS\GENSLER - 135\003 CITY OF SD - 101 ASH ST TENANT IMPROVEMENT\DRAWINGS\CAD\2013\ELEC\135-003-E-E02.216.DWG PLOT DATE: 6/25/2018 5:01 PM. PRINT BY: NICHOLAS CLEMENTS



01 ELECTRICAL LIGHTING PLAN - LEVEL 16
SCALE: 1/8" = 1'-0"



02 ELECTRICAL POWER PLAN - LEVEL 16
SCALE: 1/8" = 1'-0"

- LIGHTING KEYNOTES**
- 1 RECIRCUIT LUMINAIRE TO CONTROL SHOWN.
 - 2 PROVIDE TYPE 1 LIGHTING CONTROL PER 2/E05.002.
 - 3 RELOCATE EXISTING EXIT SIGN.

- POWER SHEET NOTES**
1. CORE DRILL CONCRETE FLOOR FOR NEW LOCATIONS OF POWER AND DATA. REFER TO DETAILS 1,2,4,5/E05.001.
 2. USE EXISTING UNDERFLOOR RACEWAYS FOR NEW POWER/DATA CIRCUITS. REFER TO DETAILS 1,2,4,5/E05.001.
 3. COORDINATE ALL POWER/DATA LOCATIONS WITH FURNITURE CONSULTANT.
 4. FOR RECEPTACLE AND DATA OUTLETS ON EXISTING WALLS, CONTRACTOR TO CUT WALL FOR CONDUIT ROUTING, PATCH AND PAINT WALL TO MATCH EXISTING COLOR AND FINISH.
 5. ENSURE UNDERFLOOR RACEWAY DOES NOT HAVE MORE THAN 20 CURRENT CARRYING CONDUCTORS. IF THERE ARE GREATER THAN 20 CURRENT CARRYING CONDUCTORS IN A RACEWAY, PROVIDE UL RATED SEPARATION IN RACEWAY TO CREATE TWO SEPARATE RACEWAYS. ENSURE NO GREATER THAN 40% RACEWAY FILL.
 6. ENSURE NO MORE THAN 20 CURRENT CARRYING CONDUCTORS ARE RUN IN ONE CELL OF THE CELLULAR FLOOR RACEWAY. UTILIZE ADJACENT CELLS AS NEEDED TO MAINTAIN A COUNT OF UNDER 20 CURRENT CARRYING CONDUCTORS.

POWER KEYNOTES

Date	Description	AK/SS
07.28.2017	ISSUE PERMIT	AK/SS
09.08.2017	ISSUE FOR BID	AK/SS
05.07.2018	ISSUE FOR BID	AK/SS
06.25.2018	ADDENDUM 'B'	AK/ML

- 1 CORE DRILL CONCRETE FLOOR, PROVIDE FLUSH MOUNT DATA FLOOR BOX.
- 2 REUSE EXISTING FLOOR BOX DEVICE(S). COORDINATE FURNITURE LOCATION SUCH THAT FLOOR BOX DEVICE IS NOT A TRIPPING HAZARD.
- 3 CORE DRILL CONCRETE FLOOR, PROVIDE FLUSH MOUNT POWER FLOOR BOX PER 3/E05.001.
- 4 COORDINATE WITH FURNITURE MANUFACTURER FOR FURNITURE POWER CONNECTION.
- 5 FOR DATA WHIP, REFER TO DETAIL 3/E05.001. COORDINATE WITH CITY OF SAN DIEGO FOR FURNITURE DATA CONNECTIONS.
- 6 PROVIDE JUNCTION BOX AND CONNECT TO WATER HEATER.
- 7 PROVIDE 2 #8, #8G, 1°C TO PANEL.
- 8 EXISTING FLOOR DUCT. REFER TO DETAILS 1,2,4,5/E05.001.

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Tel: 619.557.2500
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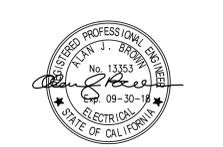
BSE PROJECT NO. 135-003
BSE ENGINEERING, INC.
12480 Torreyana Dr., Suite 100
San Diego, CA 92121
TEL: 619.279.2500
FAX: 619.279.2506

Date Description

Project Number

55.7291.013

The City of
SAN DIEGO
Public Works



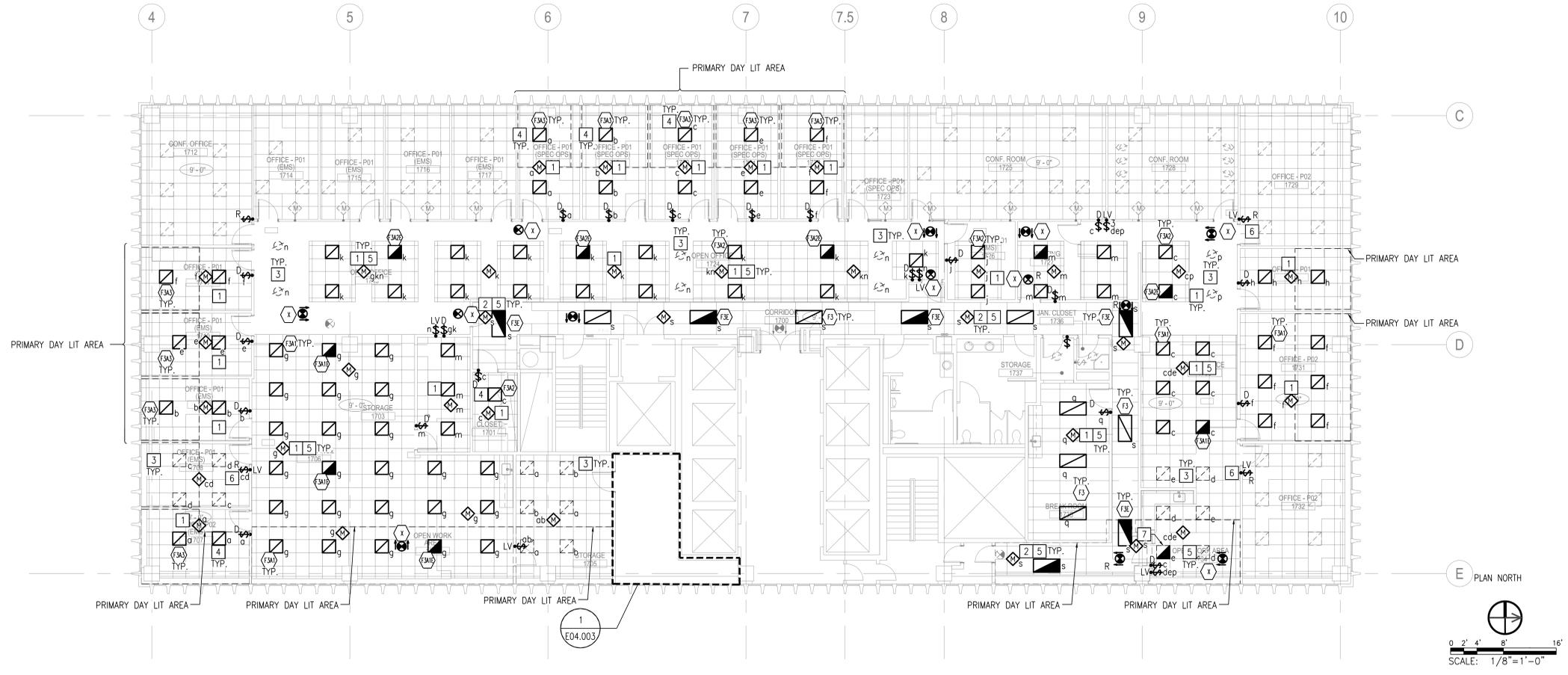
E02.216

CITY OF SAN DIEGO
ELECTRICAL LEVEL 16

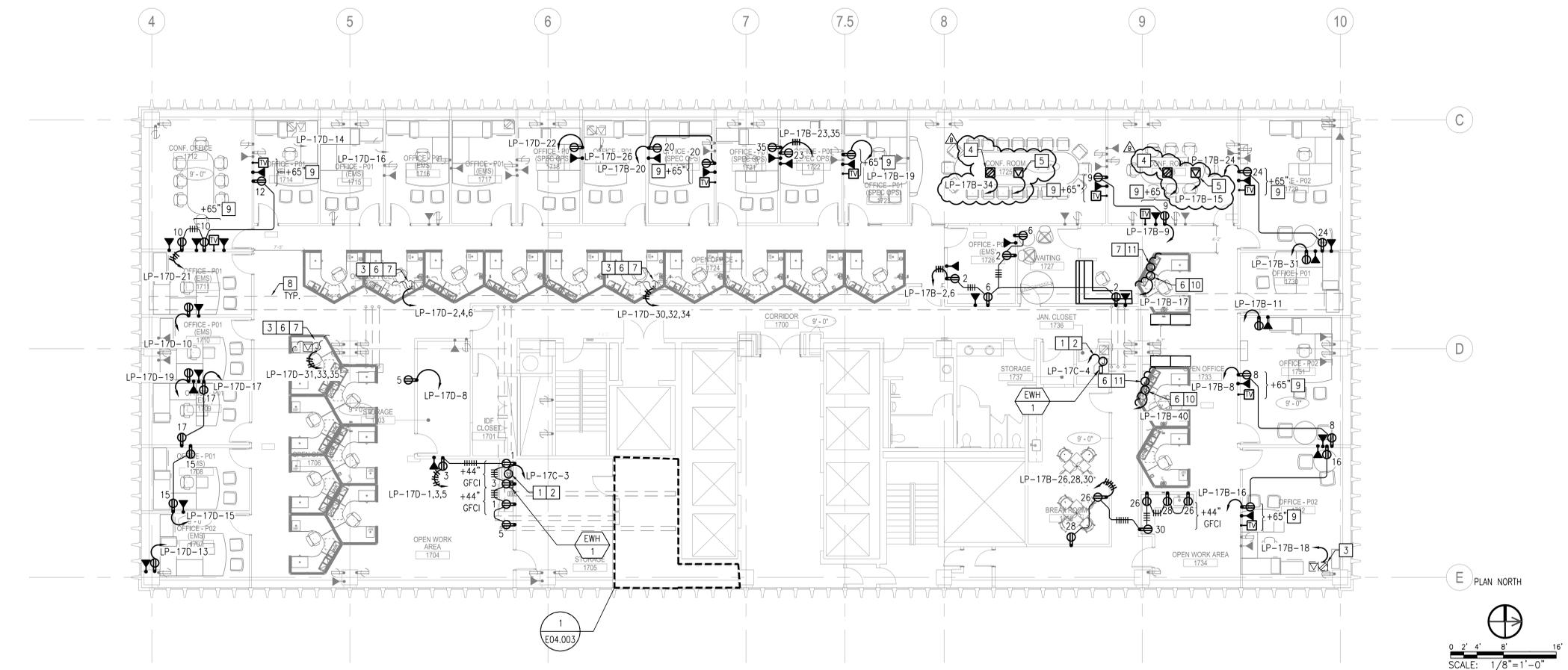
CITY OF SAN DIEGO, CALIFORNIA PUBLIC WORKS DEPARTMENT SHEET 365 OF 402 SHEETS		WBS S-17009
APPROVED: [Signature]	DATE: 5/31/2018	SUBMITTED BY: JORGE ACEVEDO
FOR CITY ENGINEER: JASON GRANI	DATE: 7/20/18	PROJECT MANAGER: [Signature]
PRINT DCE NAME: [Signature]	DATE: [Signature]	PROJECT ENGINEER: MARLON PEREZ
DESCRIPTION: ORIGINAL	BY: [Signature]	APPROVED: [Signature]
DATE STARTED: 5/31/2018	DATE FILMED: 6/25/2018	FILED: [Signature]
CONTRACTOR: [Signature]	DATE STARTED: [Signature]	DATE COMPLETED: [Signature]
INSPECTOR: [Signature]	DATE STARTED: [Signature]	DATE COMPLETED: [Signature]

REVISIONS: REVISE FLOOR BOX LOCATIONS
ADDENDUM B

FILE NAME: K:\PROJECTS\GENSLER - 135\003 CITY OF SD - 101 ASH ST TENANT IMPROVEMENT\DRAWINGS\CAD\2013\ELEC\135-003-E-E02.217.DWG PLOT DATE: 6/25/2018 5:01 PM. PRINT BY: NICHOLAS CLEMENTS



01 ELECTRICAL LIGHTING PLAN - LEVEL 17
SCALE: 1/8" = 1'-0"



02 ELECTRICAL POWER PLAN - LEVEL 17
SCALE: 1/8" = 1'-0"

LIGHTING KEYNOTES

- 1 PROVIDE TYPE I LIGHTING CONTROL PER 1/E05.002.
- 2 PROVIDE TYPE II LIGHTING CONTROL PER 2/E05.002.
- 3 RECURUIT LUMINAIRE TO CONTROL SHOWN.
- 4 CONTRACTOR TO INSTALL LED LUMINAIRE IN EXISTING FLUORESCENT FRAME AND SUPPORT.
- 5 PROVIDE QUANTITY AND LOCATION OF OCCUPANCY SENSOR PER MANUFACTURER RECOMMENDATION.
- 6 RELOCATED SWITCH.
- 7 RECURUIT EXISTING LUMINAIRE TO NEAREST EXISTING EMERGENCY LIGHTING CIRCUIT.

POWER SHEET NOTES

1. CORE DRILL CONCRETE FLOOR FOR NEW LOCATIONS OF POWER AND DATA. REFER TO DETAILS 1,2,4,5/E05.001.
2. USE EXISTING UNDERFLOOR RACEWAYS FOR NEW POWER/DATA CIRCUITS. REFER TO DETAILS 1,2,4,5/E05.001.
3. COORDINATE ALL POWER/DATA LOCATIONS WITH FURNITURE CONSULTANT.
4. FOR RECEPTACLE AND DATA OUTLETS ON EXISTING WALLS, CONTRACTOR TO CUT WALL FOR CONDUIT ROUTING, PATCH AND PAINT WALL TO MATCH EXISTING COLOR AND FINISH.
5. ENSURE UNDERFLOOR RACEWAY DOES NOT HAVE MORE THAN 20 CURRENT CARRYING CONDUCTORS. IF THERE ARE GREATER THAN 20 CURRENT CARRYING CONDUCTORS IN A RACEWAY, PROVIDE UL RATED SEPARATION IN RACEWAY TO CREATE TWO SEPARATE RACEWAYS. ENSURE NO GREATER THAN 40% RACEWAY FILL.
6. ENSURE NO MORE THAN 20 CURRENT CARRYING CONDUCTORS ARE RUN IN ONE CELL OF THE CELLULAR FLOOR RACEWAY. UTILIZE ADJACENT CELLS AS NEEDED TO MAINTAIN A COUNT OF UNDER 20 CURRENT CARRYING CONDUCTORS.

CITY OF SAN DIEGO
101 W. ASH
101 W. ASH STREET
SAN DIEGO, CA 92101

Gensler
225 Broadway
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San Diego, CA 92101
United States
Tel 619.557.2500
Fax 619.557.2520

BSE PROJECT NO. 135-003
BSE ENGINEERING, INC.
10480 Torrey Pines Dr., Suite 100
San Diego, CA 92121
TEL: 619.279.2000
FAX: 619.279.2009

Date	Description	AK/SS
07.28.2017	ISSUE PERMIT	AK/SS
09.08.2017	ISSUE FOR BID	AK/SS
05.07.2018	ISSUE FOR BID	AK/SS
06.25.2018	ADDENDUM 'B'	AK/ML

POWER KEYNOTES

- 1 PROVIDE JUNCTION BOX AND CONNECT TO WATER HEATER.
- 2 PROVIDE 2 #8, #8G, 1" TO PANEL.
- 3 REUSE EXISTING FLOOR BOX DEVICE(S). COORDINATE FURNITURE LOCATION SUCH THAT FLOOR BOX DEVICE IS NOT A TRIPPING HAZARD.
- 4 CORE DRILL CONCRETE FLOOR. PROVIDE FLUSH MOUNT POWER FLOOR BOX PER 3/E05.001.
- 5 CORE DRILL CONCRETE FLOOR. PROVIDE FLUSH MOUNT DATA FLOOR BOX.
- 6 COORDINATE WITH FURNITURE MANUFACTURER FOR FURNITURE POWER CONNECTIONS.
- 7 FOR DATA WHIP, REFER TO DETAIL 3/E05.001. COORDINATE WITH CITY OF SAN DIEGO FOR FURNITURE DATA CONNECTIONS.
- 8 EXISTING FLOOR DUCT. REFER TO DETAILS 1,2,4,5/E05.001.
- 9 PROVIDE CLOCK TYPE OUTLETS FOR TV.
- 10 PROVIDE POWER AND ROUTE POWER DOWN WALL. PROVIDE WALL MOUNT JUNCTION BOX FOR POWER FOR WHIP TO MODULAR FURNITURE.
- 11 PROVIDE 2" C FOR DATA AND ROUTE DATA DOWN WALL. PROVIDE WALL MOUNT JUNCTION BOX FOR DATA FOR WHIP TO MODULAR FURNITURE.



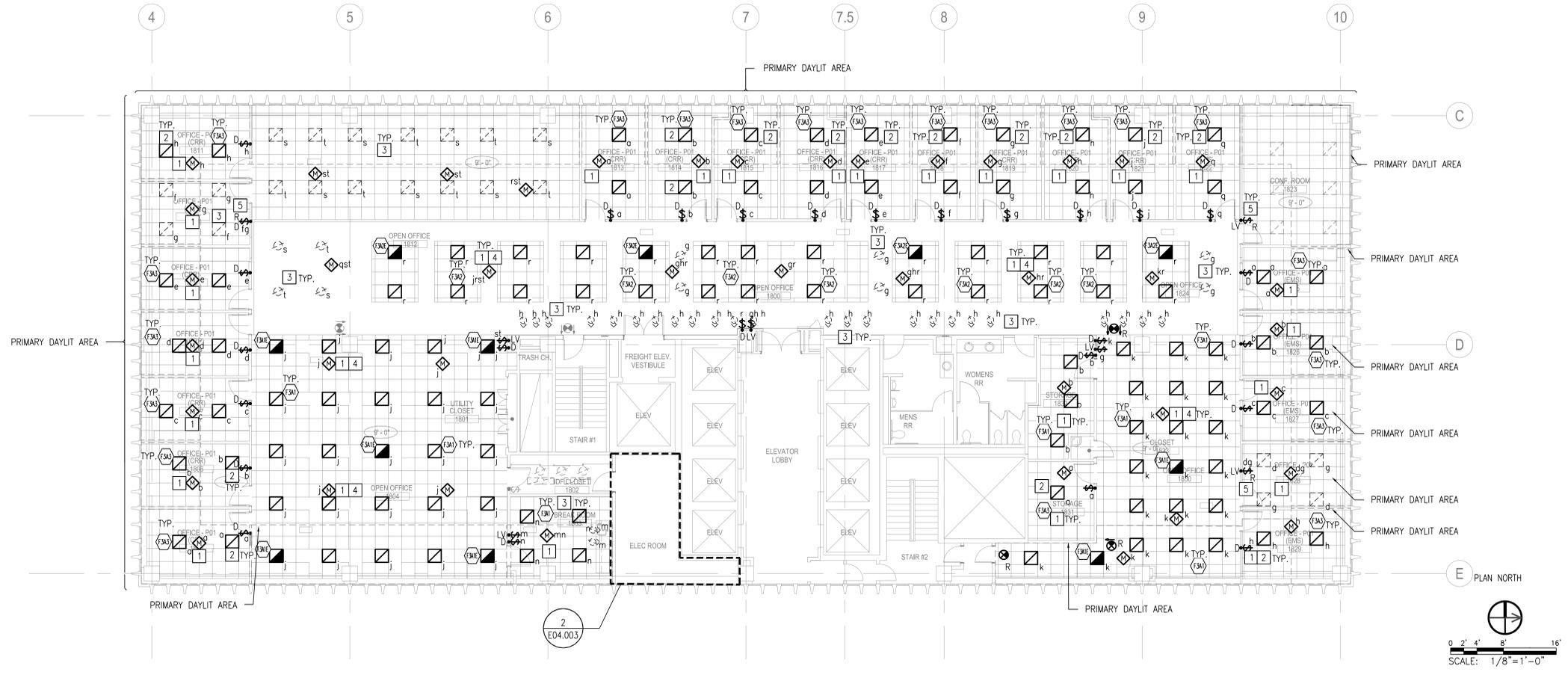
Project Number
55.7291.013

The City of
SAN DIEGO
Public Works

E02.217

CITY OF SAN DIEGO ELECTRICAL LEVEL 17		WBS S-17009
CITY OF SAN DIEGO, CALIFORNIA PUBLIC WORKS DEPARTMENT SHEET 368 OF 402 SHEETS		DATE: 5/31/2018
APPROVED: FOR CITY ENGINEER JASON GRANI PRINT DATE NAME	DATE: 7/20/18	DATE FILMED: 5/31/2018
DESCRIPTION	BY	APPROVED
ORIGINAL		5/31/2018
ADDENDUM B		6/25/2018
CONTRACTOR INSPECTOR		DATE STARTED: 4/15/18 DATE COMPLETED: 6/25/18
		40154 - 368 - D

REVISION: REVISE FLOOR BOX LOCATIONS
ADDENDUM B



LIGHTING KEYNOTES

- 1 PROVIDE TYPE I LIGHTING CONTROL PER 1/E05.002.
- 2 CONTRACTOR TO INSTALL LED LUMINAIRE IN EXISTING FLUORESCENT FRAME AND SUPPORT.
- 3 RECIRCUIT LUMINAIRE TO CONTROL SHOWN.
- 4 PROVIDE QUANTITY AND LOCATION OF OCCUPANCY SENSOR PER MANUFACTURER RECOMMENDATION.
- 5 RELOCATE SWITCH.

POWER SHEET NOTES

1. CORE DRILL CONCRETE FLOOR FOR NEW LOCATIONS OF POWER AND DATA. REFER TO DETAILS 1,2,4,5/E05.001.
2. USE EXISTING UNDERFLOOR RACEWAYS FOR NEW POWER/DATA CIRCUITS. REFER TO DETAILS 1,2,4,5/E05.001.
3. COORDINATE ALL POWER/DATA LOCATIONS WITH FURNITURE CONSULTANT.
4. FOR RECEPTACLE AND DATA OUTLETS ON EXISTING WALLS, CONTRACTOR TO CUT WALL FOR CONDUIT ROUTING, PATCH AND PAINT WALL TO MATCH EXISTING COLOR AND FINISH.
5. ENSURE UNDERFLOOR RACEWAY DOES NOT HAVE MORE THAN 20 CURRENT CARRYING CONDUCTORS. IF THERE ARE GREATER THAN 20 CURRENT CARRYING CONDUCTORS IN A RACEWAY, PROVIDE UL RATED SEPARATION IN RACEWAY TO CREATE TWO SEPARATE RACEWAYS. ENSURE NO GREATER THAN 40% RACEWAY FILL.
6. ENSURE NO MORE THAN 20 CURRENT CARRYING CONDUCTORS ARE RUN IN ONE CELL OF THE CELLULAR FLOOR RACEWAY. UTILIZE ADJACENT CELLS AS NEEDED TO MAINTAIN A COUNT OF UNDER 20 CURRENT CARRYING CONDUCTORS.

CITY OF SAN DIEGO

101 W. ASH
101 W. ASH STREET
SAN DIEGO, CA 92101

Gensler

225 Broadway
Suite 100
San Diego, CA 92101
United States

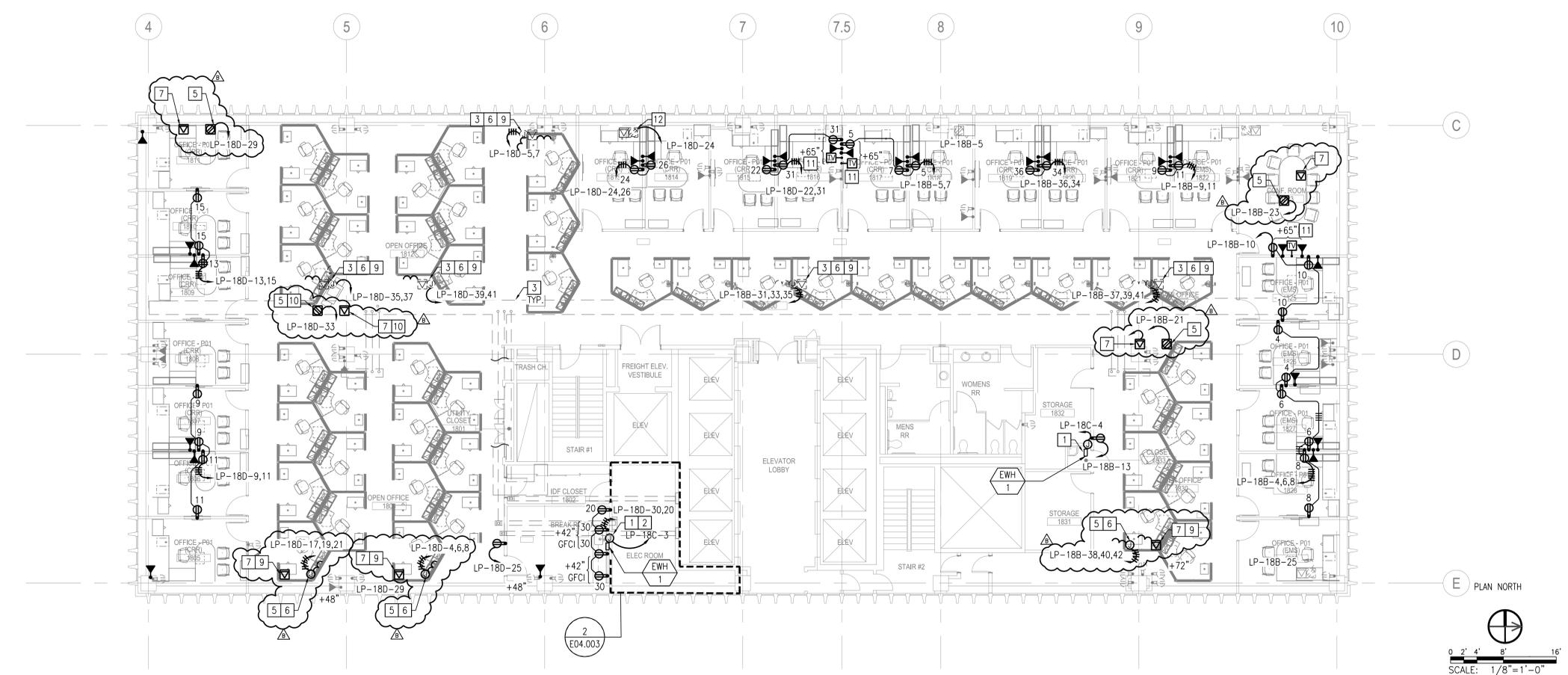
Tel 619.557.2500
Fax 619.557.2520

BSE PROJECT NO. 135-003

BSE ENGINEERING, INC.
10040 Torrey Pines Dr., Suite 100
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Date	Description	AKSS
07.28.2017	ISSUE PERMIT	AKSS
09.08.2017	ISSUE FOR BID	AKSS
05.07.2018	ISSUE FOR BID	AKSS
06.25.2018	ADDENDUM 'B'	AKLM

01 ELECTRICAL LIGHTING PLAN - LEVEL 18
SCALE: 1/8" = 1'-0"



POWER KEYNOTES

- 1 PROVIDE JUNCTION BOX AND CONNECT TO WATER HEATER.
- 2 PROVIDE 2 #8, #8C, 1" TO PANEL.
- 3 REUSE EXISTING FLOOR BOX DEVICE(S). COORDINATE FURNITURE LOCATION SUCH THAT FLOOR BOX DEVICE IS NOT A TRIPPING HAZARD.
- 4 REUSE EXISTING DATA.
- 5 CORE DRILL CONCRETE FLOOR, PROVIDE FLUSH MOUNT POWER FLOOR BOX PER 3/E05.001.
- 6 COORDINATE WITH FURNITURE MANUFACTURER FOR FURNITURE POWER CONNECTIONS.
- 7 CORE DRILL CONCRETE FLOOR, PROVIDE FLUSH MOUNT DATA FLOOR BOX.
- 8 EXISTING FLOOR DUCT. REFER TO DETAILS 1,2,4,5/E05.001.
- 9 FOR DATA WHIP. REFER TO DETAIL 3/E05.001. COORDINATE WITH CITY OF SAN DIEGO FOR FURNITURE DATA CONNECTIONS.
- 10 PROVIDE POWER AND DATA FOR COPIER.
- 11 PROVIDE CLOCK TYPE OUTLETS FOR TV.
- 12 RECIRCUIT TO CIRCUIT AS SHOWN.



Project Number: 55.7291.013

The City of **SAN DIEGO** Public Works

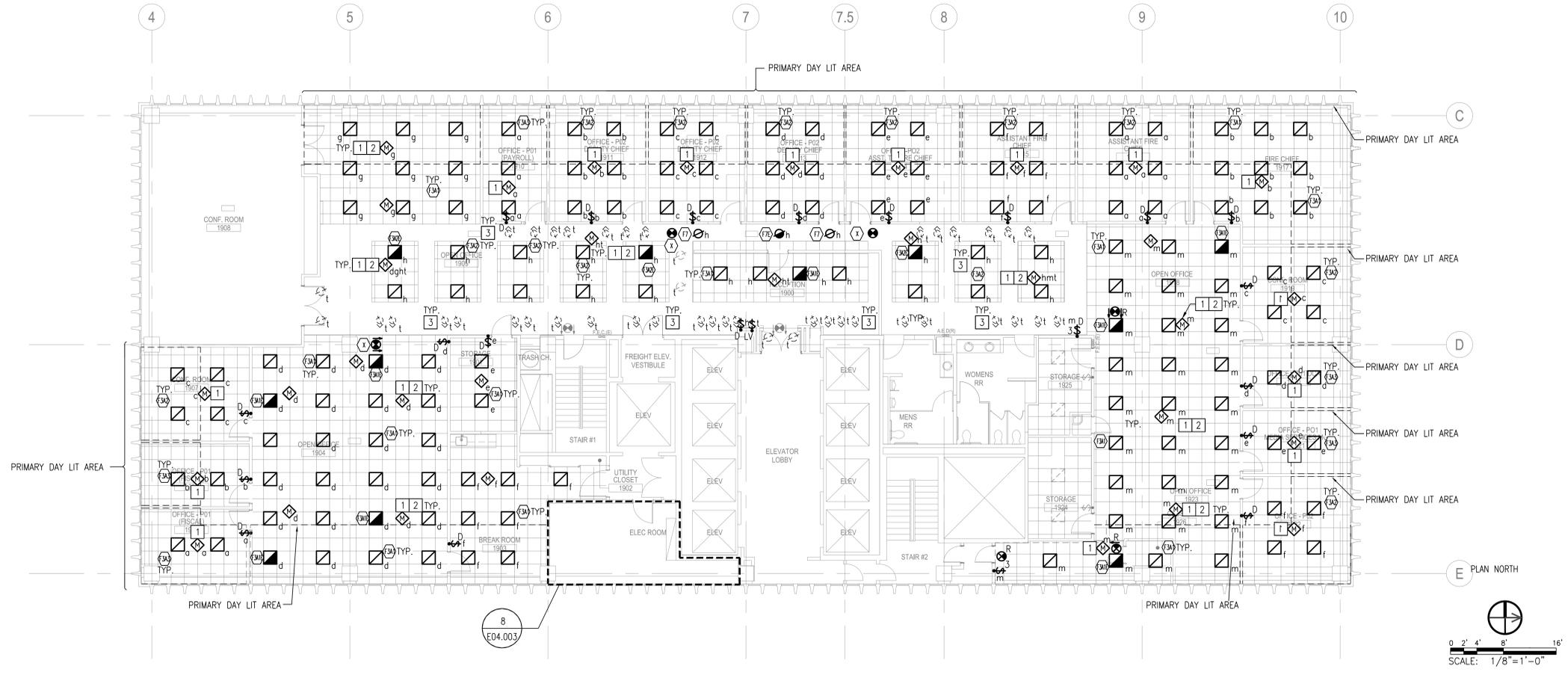
E02.218

CITY OF SAN DIEGO
ELECTRICAL LEVEL 18

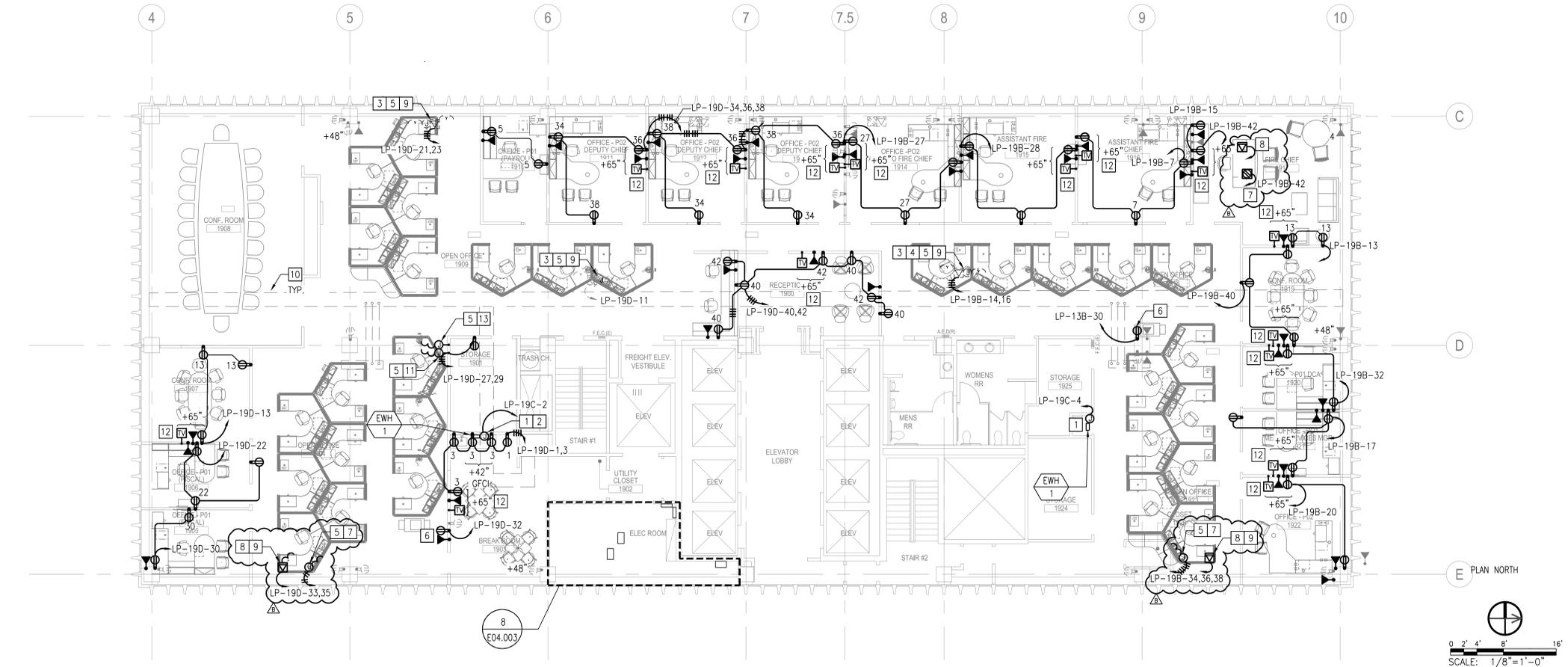
CITY OF SAN DIEGO, CALIFORNIA PUBLIC WORKS DEPARTMENT SHEET 370 OF 402 SHEETS		WBS S-17009
APPROVED: [Signature]	DATE: 5/31/2018	SUBMITTED BY: JORGE ACEVEDO
FOR CITY ENGINEER: JASON GRAN	DATE: 7/20/18	PROJECT MANAGER: JASON GRAN
PRINT DGE NAME: [Signature]	DATE: [Blank]	PROJECT ENGINEER: MARLON PEREZ
DESCRIPTION: ORIGINAL	BY: [Signature]	APPROVED: [Signature]
DATE: 5/31/2018	DATE: 5/31/2018	DATE: 5/31/2018
ADDENDUM B	DATE: 02/20/2018	DATE: 02/20/2018
CONTRACTOR: [Blank]	DATE STARTED: [Blank]	DATE COMPLETED: [Blank]
INSPECTOR: [Blank]	DATE STARTED: [Blank]	DATE COMPLETED: [Blank]
REVISION: REVISE FLOOR BOX LOCATIONS		40154 - 370 - D

02 ELECTRICAL POWER PLAN - LEVEL 18
SCALE: 1/8" = 1'-0"

FILE NAME: K:\PROJECTS\GENSLER - 135\003\CITY OF SD - 101 ASH ST TENANT IMPROVEMENT\DRAWINGS\CAD\2013\ELEC\135-003-E-E02.218.DWG PLOT DATE: 6/25/2018 5:01 PM. PRINT BY: NICHOLAS CLEMENTS



01 ELECTRICAL LIGHTING PLAN - LEVEL 19
SCALE: 1/8" = 1'-0"



02 ELECTRICAL POWER PLAN - LEVEL 19
SCALE: 1/8" = 1'-0"

LIGHTING KEYNOTES

- 1 PROVIDE TYPE I LIGHTING CONTROL PER 1/E05.002.
- 2 PROVIDE QUANTITY AND LOCATION OF OCCUPANCY SENSOR PER MANUFACTURER RECOMMENDATION.
- 3 RECURRIT LUMINAIRE TO CONTROL AS SHOWN.

POWER SHEET NOTES

1. CORE DRILL CONCRETE FLOOR FOR NEW LOCATIONS OF POWER AND DATA. REFER TO DETAILS 1,2,4,5/E05.001.
2. USE EXISTING UNDERFLOOR RACEWAYS FOR NEW POWER/DATA CIRCUITS. REFER TO DETAILS 1,2,4,5/E05.001.
3. COORDINATE ALL POWER/DATA LOCATIONS WITH FURNITURE CONSULTANT.
4. FOR RECEPTACLE AND DATA OUTLETS ON EXISTING WALLS, CONTRACTOR TO CUT WALL FOR CONDUIT ROUTING, PATCH AND PAINT WALL TO MATCH EXISTING COLOR AND FINISH.
5. ENSURE UNDERFLOOR RACEWAY DOES NOT HAVE MORE THAN 20 CURRENT CARRYING CONDUCTORS. IF THERE ARE GREATER THAN 20 CURRENT CARRYING CONDUCTORS IN A RACEWAY, PROVIDE UL RATED SEPARATION IN RACEWAY TO CREATE TWO SEPARATE RACEWAYS. ENSURE NO GREATER THAN 40% RACEWAY FILL.
6. ENSURE NO MORE THAN 20 CURRENT CARRYING CONDUCTORS ARE RUN IN ONE CELL OF THE CELLULAR FLOOR RACEWAY. UTILIZE ADJACENT CELLS AS NEEDED TO MAINTAIN A COUNT OF UNDER 20 CURRENT CARRYING CONDUCTORS.

POWER KEYNOTES

- 1 PROVIDE JUNCTION BOX AND CONNECT TO WATER HEATER.
- 2 PROVIDE 2 #8, #8G, 1" C TO PANEL.
- 3 REUSE EXISTING FLOOR BOX DEVICE(S). COORDINATE FURNITURE LOCATION SUCH THAT FLOOR BOX DEVICE IS NOT A TRIPPING HAZARD.
- 4 REUSE EXISTING DATA.
- 5 COORDINATE WITH FURNITURE MANUFACTURER FOR FURNITURE POWER CONNECTIONS.
- 6 PROVIDE POWER AND DATA FOR COPIER.
- 7 CORE DRILL CONCRETE FLOOR, PROVIDE FLUSH MOUNT POWER FLOOR BOX PER 3/E05.001.
- 8 CORE DRILL CONCRETE FLOOR, PROVIDE FLUSH MOUNT DATA FLOOR BOX.
- 9 FOR DATA WHIP. REFER TO DETAIL 3/E05.003. COORDINATE WITH CITY OF SAN DIEGO FOR FURNITURE DATA CONNECTIONS.
- 10 EXISTING FLOOR DUCT. REFER TO DETAILS 1,2,4,5/E05.001.
- 11 PROVIDE POWER AND ROUTE POWER DOWN WALL. PROVIDE WALL MOUNT JUNCTION BOX FOR POWER FOR WHIP TO MODULAR FURNITURE.
- 12 PROVIDE CLOCK TYPE OUTLETS FOR TV.
- 13 PROVIDE 2" C FOR DATA AND ROUTE DATA DOWN WALL. PROVIDE WALL MOUNT SURFACE JUNCTION BOX FOR DATA FOR WHIP TO MODULAR FURNITURE.

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Fax: 619.557.2520

BSE PROJECT NO. 135-003
BSE ENGINEERING, INC.
12040 Torrey Pines Dr., Suite 100
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Tel: 619.279.2500
Fax: 619.279.2504

Date	Description	AKSS
07.28.2017	ISSUE PERMIT	AKSS
09.08.2017	ISSUE FOR BID	AKSS
05.07.2018	ISSUE FOR BID	AKSS
06.25.2018	ADDENDUM 'B'	AKLM

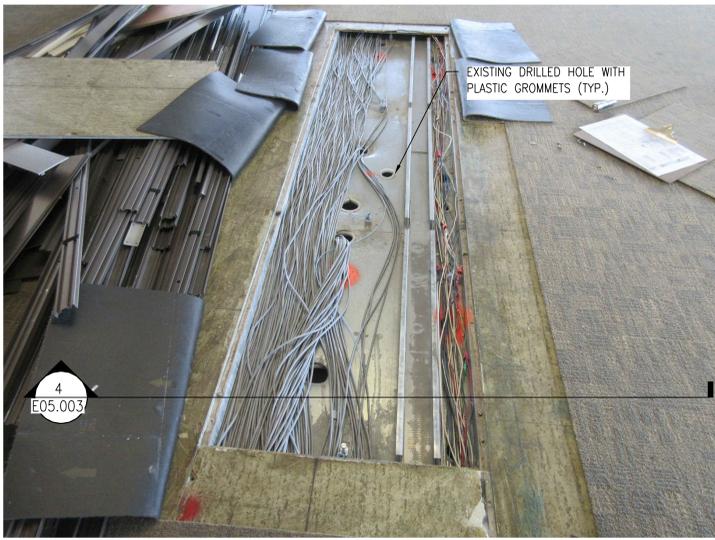


Project Number: 55.7291.013
The City of **SAN DIEGO** Public Works
E02.219

CITY OF SAN DIEGO ELECTRICAL LEVEL 19		WBS S-17009	
CITY OF SAN DIEGO, CALIFORNIA PUBLIC WORKS DEPARTMENT SHEET 372 OF 402 SHEETS		APPROVED: 5/31/2018	SUBMITTED BY: JORGE ACEVEDO
FOR CITY ENGINEER: JASON GRANU		DATE: 7/20/2018	PROJECT MANAGER: JASON GRANU
PRINT DCN NAME: RCEB		DATE: 7/20/2018	CHECKED BY: MARLON PEREZ
DESCRIPTION	BY	APPROVED	DATE
ORIGINAL			5/31/2018
ADDENDUM B			6/25/2018
			CS27 COORDINATE
			CS83 COORDINATE
CONTRACTOR INSPECTOR	DATE STARTED	DATE COMPLETED	40154 - 372 - D

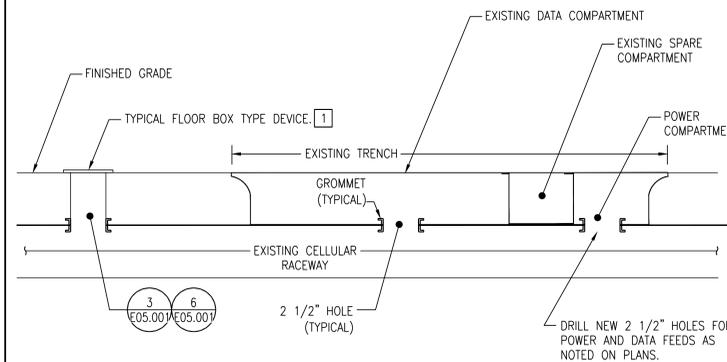
REVISOR: REVISE FLOOR BOX LOCATIONS
ADDENDUM B

FILE NAME: K:\PROJECTS\GENSLER - 135\003\CITY OF SD - 101 ASH ST TENANT IMPROVEMENT\DRAWINGS\CAD\2013\ELEC\135-003-E-E02.219.DWG PLOT DATE: 6/25/2018 5:01 PM. PRINT BY: NICHOLAS CLEMENTS



EXISTING DUCT FEED - FOR REFERENCE ONLY

SCALE NONE 7

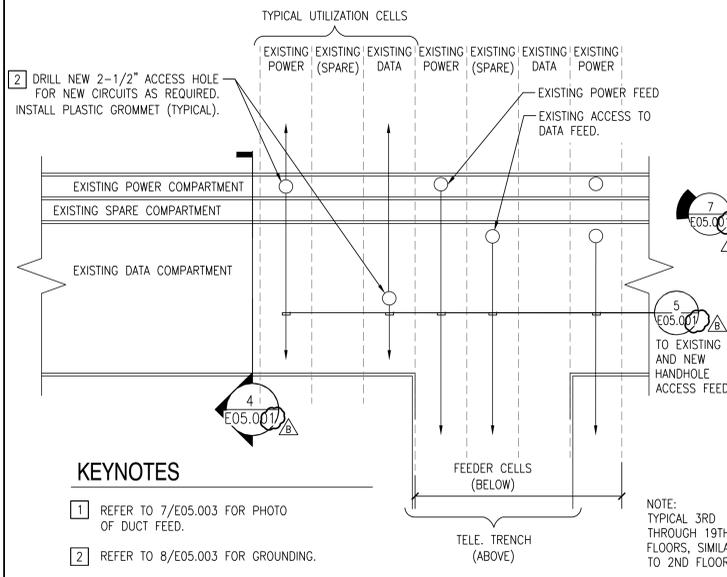


KEYNOTES

1 EXISTING BOXES MAY BE REUSED FOR FURNITURE SYSTEM FEEDS. THE CONTRACTOR SHALL REMOVE WIRING DEVICES AND PLATES AND SHALL PROVIDE NEW DEVICE PLATES SUITABLE FOR FURNITURE SYSTEM FEEDS.

EXISTING TRENCH DUCT FEED SECTION

SCALE NONE 4



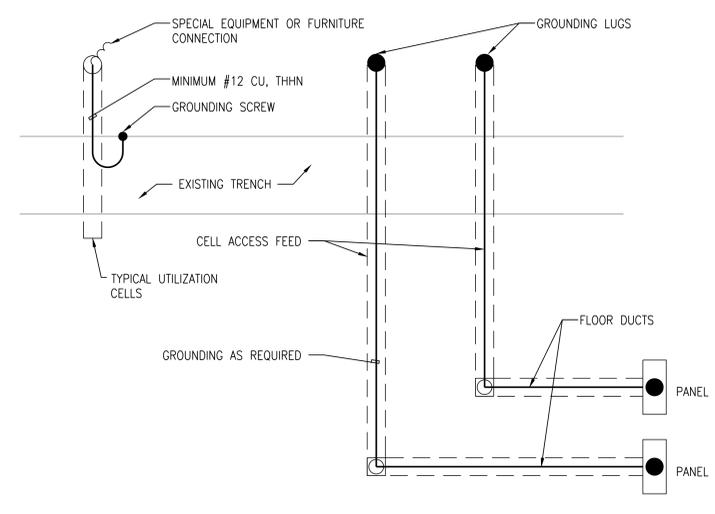
KEYNOTES

1 REFER TO 7/E05.003 FOR PHOTO OF DUCT FEED.

2 REFER TO 8/E05.003 FOR GROUNDING.

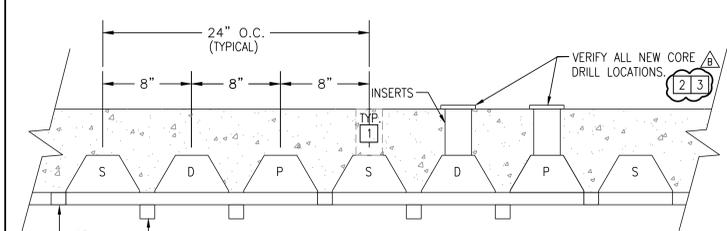
EXISTING TRENCH DUCT FEED

SCALE NONE 1



GROUNDING SCHEMATIC

SCALE NONE 8



KEYNOTES

1 PROVIDE FLUSH FLOOR BOX COVER FOR ALL UNUSED CORES.

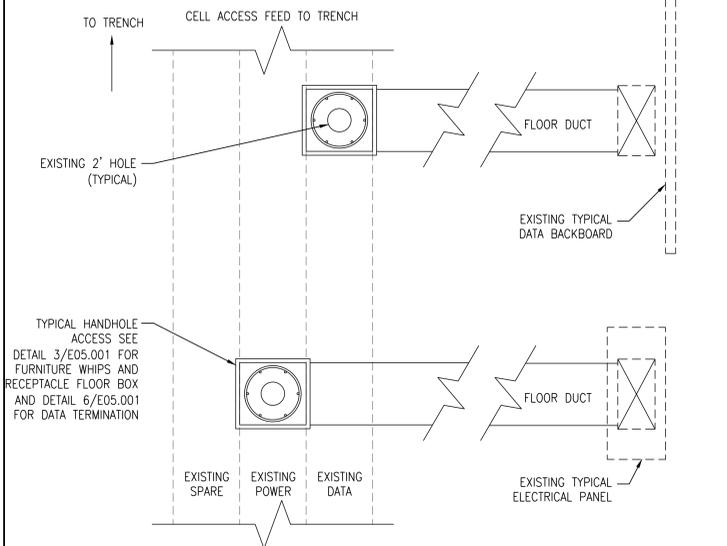
2 FOR POWER AND DATA WHIPS, ALL NEW PENETRATIONS SHALL BE 4" DIAMETER MAXIMUM AND SHALL BE MINIMUM 18" CLEAR OF ADJACENT OPENINGS WHERE OPENINGS ARE ALIGNED PERPENDICULAR TO THE DECK, AND 3X THE DIAMETER WHERE THEY ARE ALIGNED PARALLEL TO THE DECK.

3 FOR DATA TERMINATIONS, ALL NEW PENETRATIONS SHALL BE 6" DIAMETER MAXIMUM AND SHALL BE MINIMUM 32" CLEAR OF ADJACENT OPENINGS WHERE OPENINGS ARE ALIGNED PERPENDICULAR TO THE DECK, AND 3X THE DIAMETER WHERE THEY ARE ALIGNED PARALLEL TO THE DECK.

P = POWER
D = DATA
S = SPARE

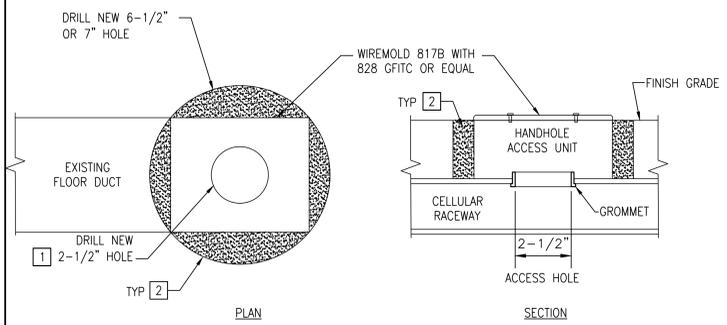
TYPICAL CELLULAR FLOOR SECTION

SCALE NONE 5



FLOOR DUCT FEED

SCALE NONE 2



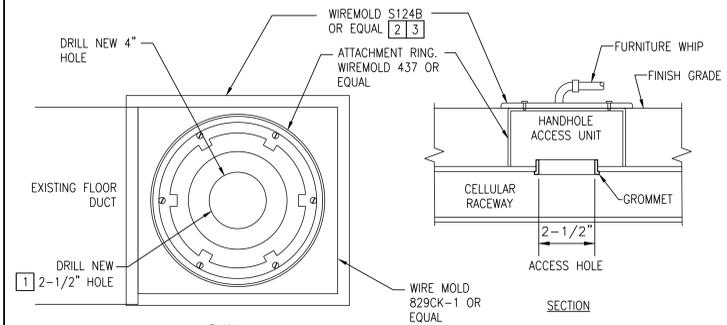
KEYNOTES

1 DEBUR HOLE, INSTALL NEW PLASTIC GROMMET, SILICONE INTO PLACE.

2 INSTALL MUDCAPS AND FILL SPACE AROUND BOX WITH GROUT.

FLOOR BOX DETAIL - DATA TERMINATIONS

SCALE NONE 6



KEYNOTES

1 DEBUR HOLE, INSTALL NEW PLASTIC GROMMET, SILICONE INTO PLACE.

2 FOR FLOOR BOXES WITH RECEPTACLE PROVIDE WIREMOLD S165B WITH 897AR ADJUSTING RING OR EQUAL.

3 REFER TO 6/E05.001 FOR FLOOR BOXES WITH DATA TERMINATIONS.

FLOOR BOX DETAIL - FURNITURE WHIP

SCALE NONE 3

NOT USED

SCALE NONE 9

CITY OF SAN DIEGO
101 W. ASH
101 W. ASH STREET
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225 Broadway Suite 100 San Diego, CA 92101 United States
Tel 619.557.2500 Fax 619.557.2520

BSE PROJECT NO. 135-003
BSE ENGINEERING, INC.
10640 Torreyana Blvd., Suite 100 San Diego, CA 92121 TEL: 619.279.2500 FAX: 619.279.2506

Date	Description	AK/SS
07.28.2017	ISSUE PERMIT	AK/SS
09.08.2017	ISSUE FOR BID	AK/SS
05.07.2018	ISSUE FOR BID	AK/SS
06.25.2018	ADDENDUM 'B'	AK/JM



Project Number 55.7291.013

The City of **SAN DIEGO** Public Works

E05.001

CITY OF SAN DIEGO
ELECTRICAL DETAILS

CITY OF SAN DIEGO, CALIFORNIA PUBLIC WORKS DEPARTMENT SHEET 377 OF 402 SHEETS		WBS S-17009
APPROVED: JASON GRANU FOR CITY ENGINEER PRINT DGE NAME	DATE 5/31/2018 7/20/2018	DATE 5/31/2018 7/20/2018
DESCRIPTION ORIGINAL ADDENDUM B	BY	APPROVED: JORGE ACEVEDO PROJECT MANAGER MARLON PEREZ PROJECT ENGINEER
CONTRACTOR: DATE STARTED: DATE COMPLETED:		COS87 COORDINATE COS83 COORDINATE 40154 -377 - D

FILE NAME: K:\PROJECTS\GENSLER - 135\003 CITY OF SD - 101 ASH ST TENANT IMPROVEMENT\DRAWINGS\CAD V2013\ELEC\135-003-E-E05.001.DWG PLOT DATE: 6/25/2018 5:01 PM. PRINT BY: NICHOLAS CLEMENTS

City of San Diego

CITY CONTACT: Angelica Gil, Contract Specialist, Email: AngelicaG@san-diego.gov
Phone No. (619) 533-3622

ADDENDUM A



FOR

101 ASH ST TENANT IMPROVEMENTS

BID NO.: _____ **K-18-1586-DBB-3-A** _____
SAP NO. (WBS/IO/CC): _____ **S-17009** _____
CLIENT DEPARTMENT: _____ **1613** _____
COUNCIL DISTRICT: _____ **3** _____
PROJECT TYPE: _____ **BS** _____

BID DUE DATE:

**2:00 PM
JULY 12, 2018
CITY OF SAN DIEGO
PUBLIC WORKS CONTRACTS
525 B STREET, SUITE 750, MS 908A
SAN DIEGO, CA 92101**

ENGINEER OF WORK

The engineering Specifications and Special Provisions contained herein have been prepared by or under the direction of the following Registered Architect:

Thomas P. Hefferman

6/21/18

Seal:

1) Registered Architect

Date



Jason D. Grani

6/21/18

Seal

2) For City Engineer

Date



Nikki Damian Lewis

6/21/18

Seal

3) For City Engineer
(for Right-of-Way Improvements Only)

Date



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. SUPPLEMENTARY SPECIAL PROVISIONS

1. To Section 9, Measurement and Payment, page 47, **ADD** the following:

The payment for Bid Item "IT Improvements at 101 Ash Street, San Diego, California, 92101" shall include full compensation for furnishing labor, materials, tools, equipment, apparatus and all incidentals required to complete the work as shown in the contract documents.

The payment for Bid Item "Construction of Sidewalk Improvements at 101 Ash Street, San Diego, California, 92101" shall include full compensation for furnishing labor, materials, tools, equipment, apparatus and all incidentals required to complete the work as shown in the contract documents.

2. To Supplementary Special Provisions, Appendices, **ADD** "Appendix K – Information Technology", page 5 through page 41 of this Addendum.

C. ADDITIONAL CHANGES

1. The following are additional changes to the Line Items in the PlanetBids Tab:

For clarity where applicable, **ADDITIONS**, if any, have been **Underlined** and **DELETIONS**, if any, have been **~~Stricken out.~~**

Section	Item Code	Description	UoM	Quantity	Payment Reference
<u>Main Bid</u>	<u>238210</u>	<u>IT Improvements on Floors (1,2,17,18, and 19)</u>	<u>LS</u>	<u>1</u>	<u>9-3.1</u>
<u>Additive Alternate A</u>	<u>238210</u>	<u>IT Improvements on Floors (3-16)</u>	<u>LS</u>	<u>1</u>	<u>9-3.1</u>

James Nagelvoort, Director
Public Works Department

Dated: *June 26, 2018*
San Diego, California

JN/AJ/egz

APPENDIX K
INFORMATION TECHNOLOGY

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B. DEFINITIONS	
C. REFERENCE SPECIFICATIONS, CODES, AND STANDARDS	
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Part 3 EXECUTION	27
• APPENDIX A - BROCHURE	

INFORMATION TECHNOLOGY

Part 1 GENERAL

A. SCOPE OF WORK

(Base Bid)

Removal of existing cabling (Base Bid)

Remove existing horizontal cabling from patch panels to work area outlet on floors 1, 2, 17, 18, & 19. Includes removing carpet squares over trench plates, and removal and replacement of trench plates and replacing carpet squares.

Removal of existing cabling (Additive Alternate)

Remove existing horizontal cabling from patch panels to work area outlet on floors 3, 4, 5, and 6. Floors 7 through 16 cable removal is included in the IDF changes. Includes removing carpet squares over trench plates, and removal and replacement of trench plates and replacing carpet squares.

Relocate IDF's (Additive Alternate)

Relocate 5 IDFs on floors 8, 9, 12, 13, & 16. Coordinate work with design team to insure placement of relocated cable tray and rack have room for cable tray and pathway entries and proper clearances from walls, walkways, and door swings. Remove in floor cabling on 2 floors from IDF patch panels to outlets. Remove 25 pr. voice cables from rack patch panels to IDFs. Remove fiber optic cable(s) and miscellaneous riser cables between racks and Electric room Risers. Disconnect and remove electrical from Cable trays and racks. Remove vacant cable trays and rack systems Remove and relocate fire suppression as required: Re install 4 Racks, cable managers and cable tray. Install new pathway (Conduit and /or cable tray) from new room through electrical room to Riser wall install conduit and electrical outlets on cable trays/racks. Re-install (2) 25 pair Voice cables from voice backboard for each floor, reusing an existing 24 port voice patch panel with 2 pairs per outlet. Install new SM fiber to each IDF from 4th floor MDF, install new horizontal cable from rack to work area outlet ,printers, WAP, etc. per pending design.

Level A: 1st Parking Level (Base Bid)

Requirements: Quantity of 4, NEMA L6-30P outlets on 208 volt, 30 amp circuits. Within three feet of the network racks and cabinets.

1st Floor (Base Bid)

Number of Workstations: 83

Number of Conference Rooms: 2
Number of Wireless Access Points: 24
Printer Stations: 2
IDF Present: No, fed from Level A

Requirements: Two data ports per workstation, conference room, and printer station. Please see Section D: Cabling Standards, CAT 6. Please refer to Section F: Wireless Access Points, for placement of wireless access points.

2nd Floor (Base Bid)

Number of Workstations: 104
Open Office Space: 2
Number of Conference Rooms: 3
Number of Wireless Access Points: 24
Printer Stations: 2
IDF Present: Yes

Requirements: Two data ports per workstation, conference room, and printer station. Please see Section D: Cabling Standards, CAT 6. In the IDF, Quantity of 4, NEMA L5-20P outlets on 120 volt, 20 amp circuits. Within three feet of the network racks and cabinets. In the Data Center, Install 144 strands of single mode fiber cable from the MPOE/Demarc in the basement up to the second floor data center. Vendor will utilize a Corning 144 strand single mode fiber cable for this run. The distributor for this product has a minimum order length of 1,312 ft. The installation will use approximately 200ft, the remaining fiber will be delivered to the City for future applications. A new fiber termination enclosure will be provided and installed in both locations. All 144 strands of fiber will be terminated on Dual SC connectors, and tested for continuity and power loss. All test results will be provided at the project's conclusion. In addition while on site, the vendor will document the existing cabinet interconnection cabling within the datacenter. Please refer to Section F: Wireless Access Points, for placement of wireless access points.

3rd Floor (Additive Alternate)

Number of Workstations: 14
Open Office Space: 4
Number of Conference Rooms: 3
Number of Wireless Access Points: 6
Printer Stations: 2
IDF Present: Yes

Requirements: Two data ports per workstation, conference room, and printer

station. Please see Section D: Cabling Standards, CAT 6. In the IDF, Quantity of 4, NEMA L5-20P outlets on 120 volt, 20 amp circuits. Within three feet of the network racks and cabinets. Please refer to Section F: Wireless Access Points, for placement of wireless access points.

4th floor (Additive Alternate)

Number of Workstations: 52
Number of Conference Rooms: 4
Number of Wireless Access Points: 8
Printer Stations: 2
IDF Present: Yes

Requirements: Contractor needs to maps and test each fiber run located in Fiber panels. Contractor needs to provide these test results to the city. Contractor will need to create an AS-IS diagram and matrix of the fiber paths. Two data ports per workstation, conference room, and printer station. Please see Section D: Cabling Standards, CAT 6. In the IDF, Quantity of 4, NEMA L6-30P outlets on 208 volt, 30 amp circuits. Within three feet of the network racks and cabinets. Please refer to Section F: Wireless Access Points, for placement of wireless access points.

5th floor (Additive Alternate)

Number of Workstations: 46
Number of Conference Rooms: 4
Number of Wireless Access Points: 9
Printer Stations: 2
IDF Present: Yes

Requirements: Two data ports per workstation, conference room, and printer station. Please see Section D: Cabling Standards, CAT 6. In the IDF, Quantity of 4, NEMA L5-20P outlets on 120 volt, 20 amp circuits. Within three feet of the network racks and cabinets. Please refer to Section F: Wireless Access Points, for placement of wireless access points.

6th floor (Additive Alternate)

Number of Workstations: 47
Number of Conference Rooms: 2
Number of Wireless Access Points: 8
Printer Stations: 2
IDF Present: No, fed from 5th Floor IDF

Requirements: Two data ports per workstation, conference room, and printer station. Please see Section D: Cabling Standards, CAT 6. Please refer to Section F: Wireless Access Points, for placement of wireless access points.

7th floor (Additive Alternate)

Number of Workstations: 53
Number of Conference Rooms: 4
Number of Wireless Access Points: 8
Printer Stations: 2
IDF Present: No, fed by 8th floor IDF

Requirements: Two data ports per workstation, conference room, and printer station. Please see Section D: Cabling Standards, CAT 6. Please refer to Section F: Wireless Access Points, for placement of wireless access points.

8th floor (Additive Alternate)

Number of Workstations: 74
Number of Conference Rooms: 3
Number of Wireless Access Points: 7
Printer Stations: 2
IDF Present: Yes

Requirements: Two data ports per workstation, conference room, and printer station. Please see Section D: Cabling Standards, CAT 6. Quantity of 4, NEMA L5-20P outlets on 120 volt, 20 amp circuits. Within three feet of the network racks and cabinets. Please refer to Section F: Wireless Access Points, for placement of wireless access points.

9th floor (Additive Alternate)

Number of Workstations: 26
Number of Conference Rooms: 3
Number of Wireless Access Points: 8
Printer Stations: 2
IDF Present: Yes

Requirements: Two data ports per workstation, conference room, and printer station. Please see Section D: Cabling Standards, CAT 6. Quantity of 4, NEMA L5-20P outlets on 120 volt, 20 amp circuits. Within three feet of the network racks and cabinets. Please refer to Section F: Wireless Access Points, for placement of wireless access points.

10th Floor (Additive Alternate)

Number of Workstations: 55
Number of Conference Rooms: 2
Number of Wireless Access Points: 9
Printer Stations: 2
IDF Present: No, fed by 9th floor IDF

Requirements: Two data ports per workstation, conference room, and printer station. Please see Section D: Cabling Standards, CAT 6. Please refer to Section F: Wireless Access Points, for placement of wireless access points.

11th Floor (Additive Alternate)

Number of Workstations: 50
Number of Conference Rooms: 3
Number of Wireless Access Points: 7
Printer Stations: 3
IDF Present: No, fed by 12th floor IDF

Requirements: Two data ports per workstation, conference room, and printer station. Please see Section D: Cabling Standards, CAT 6. Please refer to Section F: Wireless Access Points, for placement of wireless access points.

12th Floor (Additive Alternate)

Number of Workstations: 61
Number of Conference Rooms: 2
Number of Wireless Access Points: 7
Printer Stations: 2
IDF Present: Yes

Requirements: Two data ports per workstation, conference room, and printer station. Please see Section D: Cabling Standards, CAT 6. Quantity of 4, NEMA L5-20P outlets on 120 volt, 20 amp circuits. Within three feet of the network racks and cabinets. Please refer to Section F: Wireless Access Points, for placement of wireless access points.

13th Floor (Additive Alternate)

Number of Workstations: 57
Number of Conference Rooms: 2
Number of Wireless Access Points: 9
Printer Stations: 2
IDF Present: Yes

Requirements: Two data ports per workstation, conference room, and printer station. Please see Section D: Cabling Standards, CAT 6. Quantity of 4, NEMA L5-20P outlets on 120 volt, 20 amp circuits. Within three feet of the network racks and cabinets. Please refer to Section F: Wireless Access Points, for placement of wireless access points.

14th Floor (Additive Alternate)

Number of Workstations: 60
Number of Conference Rooms: 2

Number of Wireless Access Points: 7
Printer Stations: 2
IDF Present: No, fed from 13th floor IDF

Requirements: Two data ports per workstation, conference room, and printer station. Please see Section D: Cabling Standards, CAT 6. Please refer to Section F: Wireless Access Points, for placement of wireless access points.

15th Floor (Additive Alternate)

Number of Workstations: 67
Number of Conference Rooms: 2
Number of Wireless Access Points: 9
Printer Stations: 2
IDF Present: No, fed from 16th floor IDF

Requirements: Two data ports per workstation, conference room, and printer station. Please see Section D: Cabling Standards, CAT 6. Please refer to Section F: Wireless Access Points, for placement of wireless access points.

16th Floor (Additive Alternate)

Number of Workstations: 70
Number of Conference Rooms: 1
Number of Wireless Access Points: 8
Printer Stations: 2
IDF Present: Yes

Requirements: Two data ports per workstation, conference room, and printer station. Please see Section D: Cabling Standards, CAT 6. Quantity of 4, NEMA L5-20P outlets on 120 volt, 20 amp circuits. Within three feet of the network racks and cabinets. Please refer to Section F: Wireless Access Points, for placement of wireless access points.

17th Floor (Base Bid)

Number of Workstations: 40
Number of Conference Rooms: 3
Number of Wireless Access Points: 7
Printer Stations: 2
IDF Present: Yes

Requirements: Two data ports per workstation, conference room, and printer station. Please see Section D: Cabling Standards, CAT 6. Quantity of 4, NEMA L5-20P outlets on 120 volt, 20 amp circuits. Within three feet of the network racks and cabinets. Please refer to Section F: Wireless Access Points, for placement of

wireless access points.

18th Floor (Base Bid)

Number of Workstations: 66
Number of Conference Rooms: 1
Number of Wireless Access Points: 8
Printer Stations: 2
IDF Present: Yes

Requirements: Two data ports per workstation, conference room, and printer station. Please see Section D: Cabling Standards, CAT 6. Contractor will need to identify where the fibers from the 18th floor IDF go to the 4th Floor MDF. Contractor will need to test and provide those test results to the city. Contractor will need to create an AS-IS diagram and matrix of the fiber paths. Quantity of 4, NEMA L5-20P outlets on 120 volt, 20 amp circuits. Within three feet of the network racks and cabinets. Please refer to Section F: Wireless Access Points, for placement of wireless access points.

19th Floor (Base Bid)

Number of Workstations: 41
Number of Conference Rooms: 3
Number of Wireless Access Points: 7
Printer Stations: 2
IDF Present: No

Requirements: Two data ports per workstation, conference room, and printer station. Please see Section D: Cabling Standards, CAT 6. Contractor will need to identify where the fibers from the 19th floor IDF go to the 4th Floor MDF. Contractor will need to test and provide those test results to the city. Contractor will need to create an AS-IS diagram and matrix of the fiber paths. Quantity of 4, NEMA L5-20P outlets on 120 volt, 20 amp circuits. Within three feet of the network racks and cabinets. Please refer to Section F: Wireless Access Points, for placement of wireless access points.

Install fiber optic backbone

Replace existing 62.5 MM fiber optic cables between 4th floor MDF to each of the IDFs feeding floors 1 & 2 and floors 5 through 19 with 12 SM fibers (OM-2) per floor. Further fielding may make the 1st floor with 3 cable unnecessary.

Ladder Tray Specifications

- Needs to match existing cable runways. Please refer to attached specifications.

B. Definitions

1. Backbone- A larger transmission line that carries data gathered from smaller lines that interconnect with it.
 - a) At the local level, a backbone is a line or set of lines that local area networks connect to for a wide area network connection or within a local area network to span distances efficiently (for example, between buildings).
 - b) On the Internet or other wide area network, a backbone is a set of paths that local or regional networks connect to for long-distance interconnection. The connection points are known as network nodes or telecommunication data switching exchanges (DSEs).
2. Computer Network- Also called a data network, is a series of points, or a connection point that can receive, create, store or send data along distributed network routes, interconnected by communication paths for the purpose of transmitting, receiving and exchanging data, voice and video traffic.
3. Definitive Estimate- Definitive Estimates are prepared by the vendor in the form of quote. Definitive Estimates are based upon refined requirements proved by the sponsoring department. The accepted variation between projected cost and final cost is -10 and 10%. They require time-consuming research to achieve the acceptable variance. At each phase of the project, definitive quotes will be generated for the next phase.
4. Demarc- Also called point of demarcation (POD), demark extension, or demarc, it is the physical point at which the public network of a telecommunications company (i.e., a phone or cable company) ends and the private network of a customer begins - this is usually where the cable physically enters a building.
5. Gateway- A network node that connects two networks using different protocols together.
6. IDF (Intermediate Distribution Frame)- An intermediate distribution frame (IDF) is a free-standing or wall-mounted rack for managing and interconnecting the telecommunications cable between end user devices and a main distribution frame (MDF). For example, an IDF might be located on each floor of a multi-floor building routing the cabling down the walls to an MDF on the first floor.
7. Intranet- An intranet is a private network that is contained within an enterprise. It may consist of many interlinked local area networks and also use leased lines in the wide area network. Typically, an intranet includes

connections through one or more gateway computers to the outside Internet. The main purpose of an intranet is to share company information and computing resources among employees. An intranet can also be used to facilitate working in groups and for teleconferences.

8. Internet- The Internet, sometimes called simply "the Net," is a worldwide system of computer networks - a network of networks in which users at any one computer can, if they have permission, get information from any other computer (and sometimes talk directly to users at other computers).
9. Internet Service Provider (ISP)- An ISP (Internet service provider) is a company that provides individuals and other companies' access to the Internet and other related services.
10. LAN (Local Area Network)- A local area network (LAN) is a network that connects computers and other devices in a relatively small area, typically a single building or a group of buildings. Most LANs connect workstations and personal computers and enable users to access data and devices (e.g., printers and modems) anywhere on the network.
11. MDF (Main Distribution Frame)- A signal distribution frame or cable rack used in telephony to interconnect and manage telecommunication wiring between itself and any number of intermediate distribution frames and cabling from the telephony network it supports.
12. MPOE- Demarcation point is sometimes abbreviated as demarc, DMARC, or similar. The term MPOE (minimum or main point of entry) is synonymous, with the added implication that it occurs as soon as possible upon entering the customer premises. A network interface device often serves as the demarcation point.
13. Network Services- An application running at the network application layer. It provides data storage, presentation, communications, or other capability in a client-server environment.
14. Network Service Provider- A company that provides backbone services.
15. Network Port- A process-specific or an application-specific software construct serving as a communication endpoint, which is used by the Transport Layer protocols of Internet Protocol suite, such as User Datagram Protocol (UDP) and Transmission Control Protocol (TCP).
16. Protocol- The special set of rules that end points in a telecommunication connection use when they communicate. Protocols specify interactions between the communicating entities.
17. ROM Estimate- A ROM Estimate is developed during the Unit demand? Of

the project and is based upon historical data. It is a budgetary estimate based upon initial requirements provided by the sponsoring department. The accepted variation between projected cost and final cost is -25% and 75%.

18. WAN (wide area network)- A wide area network (WAN) is a geographically distributed private telecommunications network that interconnects multiple local area networks (LANs). In an enterprise, a WAN may consist of connections to a company's headquarters, branch offices, colocation-facilities, cloud services and other facilities.

C. REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

Section A: MDF/IDF Standards

MDF/IDF must be able to accommodate at a minimum; one, four post cabinet rack and two, two post racks with three feet of access front and back of cabinets/racks.

2-post rack

- Heights: 84" (2.1 m)
- Width: 20.3" (516.1 mm)
- Depth: 15" (381 mm)

4-Post Cabinet Rack

- Width: EIA Standard 19" Rack Rails
- External Width: 23.6" – 600mm
- Height: 78.74" – 2,000mm – Rack Units: 42U
- Depths: 39.37" & 41.34"

Section B: Service Provider Site Requirements

- Place a minimum 4' x 4' x ¾" fire-rated plywood backboard
- Place a 120V AC dedicated outlet on a dedicated 15Amp circuit breaker. Single standard 3 prong 120V AC, 15Amp dedicated receptacle. Within 5' of equipment mount
- Place new #6 ground wire bonded to an MGN (except in CA) or UFER Ground terminated to a grounding bus bar 2" Sleeve(s).
- Backboard must be mounted to wall with proper drywall anchors and not just screws
- Active equipment must not be installed within 3' of electrical panels
- Active equipment must not be installed within 3' of water sources (sinks, wash basins)

- All equipment needs to be installed in accordance of all ADA code (leaving 36" open fare ways)

Section C: Ingress/Egress Conduit Requirements

1. Four, 2 or 4 inch diameter schedule 80 PVC electrical conduit
2. Pull rope to be installed shall be low friction; polyethylene jacketed polyester core rope with 1800 psi tensile strength.
3. Subsurface conduit to be installed a minimum of 18 inches below the finished surface in paved areas, 30 inches below finished surface in unpaved areas, and 36 inches below the bottom of railroad ties.

Section D: Cabling Standards

1. 1-Gigabit Ethernet over Copper
 - a) CAT6 Cabling
 - i) Cross-over cable to use T568A Pinout and T568B Pinout
 - ii) Straight-through cable to use T568B Pinout
2. 10-Gigabit Ethernet over Copper
 - a) CAT6a Cabling
 - i) Cross-over cable to use T568A Pinout and T568B Pinout
 - ii) Straight-through cable to use T568B Pinout
3. Cables that are to run through the ceiling or under the floor must be plenum-rated.
4. One year warranty on work

Section E: Site Power Requirements

Site power requirements are determined based upon the number of users and number of network devices being deployed.

- Small Deployments
Quantity of 2, 5-15P outlets on 120 volt, 15 amp circuits. Within three feet of the network racks and cabinets.
- Medium Deployments
Quantity of 2, NEMA L5-20P outlets on 120 volt, 20 amp circuits. Within three feet of the network racks and cabinets.
- Large Deployments

Quantity of 4, NEMA L6-30P outlets on 208 volt, 30 amp circuits. Within three feet of the network racks and cabinets.

Section F: Wireless Access Points

Conduit and junction boxes should be installed in the ceilings per the wireless heat map survey. Locations are indicated by an icon of a wireless router and a red circle.

Section G: Fiber Optic Infrastructure Standards

STANDARDS DOCUMENTS

The optical fiber infrastructure shall conform to the latest issue of the following standards documents, which are incorporated by reference into this specification:

ICEA S-104-696	Standard for Indoor/Outdoor Optical Fiber Cable
ICEA S-83-696	Fiber Optic Premises Distribution Cable (Indoor/Outdoor)
IEEE Std 383	Flame Retardancy
MIL-STD 1678	Fiber Optics Test Methods
NEC Article 770	Optical Fiber Cables and Raceways
NFPA 262	Standard Method of Test for Flame Travel and Smoke of Wires and Cables for use in Air Handling Spaces
TIA/EIA-310	Racks, Panels and associated equipment
TIA/EIA-472	Generic Specifications for Fiber optic cable
TIA/EIA-455	Standard Fiber Optic Test Procedures (FOTP's)
TIA/EIA-4750000	Generic Specification for Fiber Optic Connectors
TIA/EIA-492	Specifications for Optical Fiber Cables
TIA/EIA-568	Commercial Building Telecommunications Cabling Standard: Optical Fiber Cabling Components
TIA/EIA-598	Optical Fiber Cable Color Coding
TIA/EIA-604-10	Fiber Optic Connector Intermateability
UL 1666	Safety Test for Flame-Propagation Height of Electrical and Optical Fiber Cables in Vertical Shafts

Where reference is made to one of the above standards, the latest revision shall apply.

Part 2: PRODUCTS

2.1 Fiber Optic Cable

The cable shall be the ALTOS or Clear Curve Series as manufactured by Corning Cable Systems, or equal.

The cable jacket shall be marked with manufacturer's name, sequential meter or foot markings, date of manufacture and a telecommunication handset symbol, as required by Section 350G of the National Electrical Safety Code (NESC). The markings shall be in contrasting color to the cable jacket.

Optical fibers for back-haul shall be single-mode (SM) step index optical glass waveguides with a nominal core diameter of 8 to 9 microns. The fiber shall have a transmission window centered at 1310 nanometer (nm) wavelength and an optical window from 1300 to 1600 nm. Multi-mode fiber should only be used for repairs to existing multi-mode cables and for short hauls in order to mitigate issues related to receiver saturation caused by lack of attenuation.

For all fibers the attenuation specification shall be a maximum attenuation for each fiber over the entire operating temperature range of the cable.

- (1) @ 1,310 nm, 20 C: less than 0.4 dB/km
- (2) @ 1,383 nm, 20 C: less than 0.4 dB/km
- (3) @ 1,550 nm, 20 C: less than 0.3 dB/km

The Fiber Optic Cable shall have individual glass fibers evenly distributed among buffer tubes, 12 fibers per tube.

Loose buffer tubes shall provide clearance between the fibers and the inside of the tube to allow for expansion without constraining the fiber. The fibers shall be loose or suspended within the tubes and shall not adhere to the inside of the tube. Buffer tubes shall be constructed with a water-swellaable component located near the fibers or be filled with filing compound or water-swellaable yarn.

Cable shall have dry core buffer tube with water swellaable strength member surrounding the core buffer tube to prevent water migration.

The loose buffer tubes shall be extruded from a material having a coefficient of friction sufficiently low to allow free movement of the fibers. The material shall be tough and abrasion resistant to provide mechanical and environmental protection of

the fibers, yet designed to permit safe intentional “scoring” and breakout, without damaging or degrading the internal fibers.

Each fiber shall be distinguishable by means of color-coding in accordance with TIA/EIA-598-A, “Optical Fiber Cable Color Coding” and shall be targeted in accordance with the Munsell color shades. The color formulation shall be compatible with the fiber coating and the buffer tube filling compound, and be heat stable. In buffer tubes containing multiple fibers, the colors shall be stable across the specified storage and operating temperature range and not subject to fading or smearing onto each other or into the gel filling material. Colors shall not cause fibers to stick together.

Optical fibers shall be distinguishable from others in the same buffer tube by means of color coding according to the following:

1. Blue (BL)
2. Orange (OR)
3. Green (GR)
4. Brown (BR)
5. Slate (SL)
6. White (WT)
7. Red (RD)
8. Black (BK)
9. Yellow (YL)
10. Violet (VL)
11. Rose (RS)
12. Aqua (AQ)

Completed buffer tubes shall be stranded around the central dielectric strength member using stranding methods, lay lengths and positioning such that the cable shall meet mechanical, environmental and performance Specifications. A polyester binding shall be applied over the stranded buffer tubes to hold them in place. Binders shall be applied with sufficient tension to secure the buffer tubes to the central member without crushing the buffer tubes. The binders shall be non-hygroscopic, non-wicking, and dielectric with low shrinkage.

The dielectric central member shall prevent buckling and shall be a glass reinforced plastic rod, or approved equivalent, with similar expansion and contraction characteristics as the optical fibers and buffer tubes. A linear overcoat of low density polyethylene shall be applied to the dielectric strength member to achieve the

optimum diameter to provide the proper spacing between buffer tubes during stranding.

Fillers may be included in the cable to lend symmetry to the cable cross-section where needed. Filler rods shall be solid polymeric compound. The diameter of filler rods shall be the same as the outer diameter of the buffer tubes.

The cable shall have a ripcord enabling the jacket to be split.

All fiber optical cables shall be constructed in accordance with EIA-455, and 100 percent of all optical fibers and jacketing shall meet or exceed the requirements contained in this specification.

Outdoor, Loose Tube, Fiber-Optic Cable shall be constructed with loose buffer tubes containing fibers in the quantities specified and indicated. All fiber-optic cable shall be from the same manufacturer. Cable shall meet or exceed the following specifications and conform with the latest issue of ICEA S-104-696 Standard for Indoor-Outdoor Optical Fiber Cable.

The loose tube cables shall comply with the optical and mechanical requirements over an operating temperature range of -40°C to +70°C. The cable shall be tested in accordance with EIA-455-3A (FOTP-3), "Procedure to Measure Temperature Cycling Effects on Optical Fiber, Optical Cable, and Other Passive Fiber Optic Components." The change in optical attenuation at extreme operational temperature (-40°C to +70°C) shall not be greater than 0.20 dB/km, with 80 percent of the measured values no greater than 0.10 dB/km.

Materials used within a given cable shall be compatible with all other materials used in the same cable when such materials come into contact. All cable components used shall not adversely affect the optical transmission or the mechanical integrity of the fiber placed in the cable. All materials used shall be non-toxic, non-corrosive, and shall present no dermal hazard. Cable shall be manufactured continuous with no factory splices in the fiber.

The fiber optic cable shall not be adversely affected by the following mechanical and environmental conditions.

Crush Resistance: The cable shall not be crushed by a 10,000 n/m (6.78 lb/ft) load.

Minimum Bending Radius: The cable shall be designed for a minimum bending radius of:

Installation (Loaded): 20 x cable diameter

Static (Installed): 10 x cable diameter

Temperature:

Operational: -40 to +70C

Storage: -40 to +70C

Humidity: 0 to 100%

Tensile Strength:

The cable shall not be damaged under the following tensile load:

Installation: 2,700 N (600 lbf) (16 ft)

Static: 600 N (135 lbf) (16 ft)

Compressive Load: When tested in accordance with FOTP-41, "Compressive Loading Resistance of Fiber-optic cables," the cable shall withstand a minimum compressive load of 220 N/cm (125 lbf/in) applied uniformly over the length of the sample. The 220 N/cm (125 lbf/in) load shall be applied at a rate of 2.5 mm (0.1 in) per minute. The load shall be maintained for a period of 1 minute. The load shall then be decreased to 110 N/cm (63 lbf/in). Alternatively, it is acceptable to remove the 220 N/cm (125 lbf/in) load entirely and apply the 110 N/cm (63 lbf/in) load within five minutes at a rate of 2.5 mm (0.1 in) per minute. The 110 N/cm (63 lbf/in) load shall be maintained for a period of 10 minutes. Attenuation measurements shall be performed before release of the 110 N/cm (63 lbf/in) load. The change in attenuation shall not exceed 0.40 dB at 1550 nm for single-mode fibers.

2.2 Fiber-Optic Terminations

All components shall be the size and type required for the specified fiber. Cable and cable assemblies (jumpers and pigtails) shall be products of the same manufacturer.

2.2.1 Jumpers

Jumpers may be of simplex or duplex design. All jumpers shall be at least 2 meters in length, sufficient to avoid stress and allow orderly routing.

The outer jacket of duplex jumpers shall be colored according to the singlemode color (yellow) specified. The two inner simplex jackets shall be contrasting colors to provide easy visual identification for polarity.

2.2.2 Connectors

Fiber optic connectors shall be ceramic ferrule LC Duplex type for single-mode fiber. Indoor LC Duplex connector body housings shall be either nickel plated zinc or glass reinforced polymer construction. Outdoor LC Duplex connector body housing shall be glass reinforced polymer. LC connectors shall be constructed with materials suitable for both indoor and outdoor environments.

The associated coupler shall be of the same material as the connector housing and contain ceramic sleeves. The coupler shall meet all the specifications as outlined in TIA/EIA-604-10.

The LC Duplex connector operating temperature range shall be -40°C to $+85^{\circ}\text{C}$. Insertion loss shall not exceed 0.4dB, and the return reflection loss shall be a minimum of -55dB. All LC connectors, adapters and assemblies shall comply with the mechanical, environmental and performance criteria as outlined and specified in the TIA/EIA-604-10 and relevant FOTP standards. All connectors shall have blue or yellow color on the body and/or boot, as stated in the TIA/EIA standard, which identifies the system as single-mode.

2.3 Fiber Distribution Unit (FDU)

All FDU types shall conform to the following requirements:

Patch panels shall provide a hold-down clamp securing the Fiber Optic Cable to the patch panel housing and for providing strain relief.

Patch panels shall have adequate facilities for storing Fiber Optic Cable buffer tube slack and shall include routing guides.

The patch panel housing shall have multiple locations for jumper egress.

Each patch panel shall be furnished with single mode LC duplex (dual fiber) jumpers 2 meters in length.

Fiber distribution units shall be installed as close to the top of the rack as possible and shall be clearly labeled with the Fiber Optic Cable that is terminated into it.

2.4 Splice Closures

All splice closures shall be re-enterable type splice closures which shall be complete with splice organizer trays, brackets, clips, cable ties, and sealants, as needed.

Closures shall be rodent proof, water proof, and expandable from 2 cables per end to 8 cables per end by using adapter plates. Cable entry ports shall accommodate 0.28 inches (7 mm) to 0.79 inches (20 mm) diameter cables.

The fiber splice closure shall be mounted horizontally in a manner that allows the cables to enter at the end of the closure. Splice closures located in vaults shall have not less than 9 m of each cable coiled in the vault for the fiber splice closure to be removed for future splicing.

The splice closures shall be suitable for a temperature range of 15° F (-9°C) to 130° (54°C), accommodate up to 13 splice trays and be suitable for “butt” or “through” cable entry configurations.

Each splice shall be individually mounted and mechanically protected in the splice tray. The closure shall have cable retention clamps to prevent pullout of the fiber optic cable in accordance with Telcordia™ standards.

2.4.1 Type 1 - Aerial Fiber Optic Cable Splice Closure

Splice enclosure shall be securely fastened to and supported from the 3/8 inch EHS galvanized steel strand wire using a mechanical clamping method. Closure shall be designed for aerial application and be ultraviolet radiation resistant in conformance with Telcordia™ aerial weather tight closure standards.

2.4.2 Type 2 - Fiber Optic Cable Splice Closure Located in a Vault

The fiber optic splice closures shall be securely fastened to the fiber optic vault or wall using standard hardware as recommended by the closure manufacturer. The fiber optic splice closure shall be mounted horizontally in a manner that allows the cables to enter at the end of the closure. Not less than 30 feet (9 m) of each cable entering the closure shall be coiled in vault to allow the fiber splice closure to be removed for future splicing.

2.4.3 Type 3 - Fiber Optic Cable Splice Closure Located in an Equipment Rack

The fiber optic splice closure shall be rack mounted in a 19-inch rack and shall have the capacity to splice the number of fibers found in the connecting cables (i.e., 12, 24, 72, and 144 strands).

2.5 Conduit

2.5.1 General

Conduit shall be two to four-inch diameter Schedule 80 PVC electrical conduit including fittings for underground installation. Conduit shall be UL listed for the indicated application. Conduit sections shall be joined in accordance with the Manufacturers' recommendations. All joints shall be watertight.

All conduits shall be cleaned and tested prior to installation of cables.

Conduits entering pullboxes shall be sealed with Tyco Simplex Seal or equal.

Pull rope shall be installed in the conduit and shall be low friction; polyethylene jacketed polyester core rope with 1800 psi tensile strength. Provide Vikamatic "Fiber Glide" or equal.

The conduit shall gradually and smoothly slope up to the elevation of the pullbox entrance. Use of manufactured bends shall be limited to an absolute minimum. Factory bends, if required, shall be no more than 22½ degrees.

All subsurface conduit shall be installed a minimum of 18 inches below the finished surface in paved areas, 30 inches below the finished surface in unpaved areas, and 36 inches below the bottom of railroad ties.

Conduit trenching and backfill shall comply with San Diego Regional Standard Drawing G-33, Type A, with the following change to Note 10: Select material with a minimum sand equivalent of 50 shall be backfilled to 3 inches minimum above the conduit.

2.5.2 Conduit Installation along Pipelines

For conduits installed with a pipeline, conduits shall clear concrete structures and vaults associated with the pipeline by a minimum of one foot.

Conduits shall be installed on one side of the trench, at least 2 inches and not more than 12 inches from the trench wall, at a depth of 3 to 4 feet below grade along the entire pipeline route. The conduit shall not cross over the pipe.

Conduit shall be installed in the annular space between the carrier pipe and the casing or tunnel liner for all two-pass tunnel or jack and bore sections of the pipeline alignment.

Marker signs for fiber optic cable shall be installed on all marker posts for the pipeline.

2.6 Cabinets

Cabinets shall be standard CALTRANS Type 332, furnished without traffic control components. Cabinet material shall be 0.125 inch aluminum, with full front and back doors, shall have stainless steel handles with padlock feature, and shall be furnished with Best locks (lock core will be provided by the City). Finish shall be natural aluminum. Cabinets shall accommodate 19-inch standard EIA rack assemblies. Cabinets shall be installed on reinforced concrete pads.

2.7 Pullboxes

Pullboxes shall be Caltrans standard No. 6, approximately 32 inches wide by 49 inches long by 36 inches deep. Covers for pullboxes in paved areas shall be galvanized steel, rated for H-20 traffic loading. Covers for pullboxes in sidewalks and unpaved areas shall be concrete. Bolts shall be 316 stainless steel. Covers shall have the words "Fiber Optic" OR "Communications" in letters on the top. Covers shall have locking devices and form a watertight seal to prevent surface water from entering. Knockouts in the sidewalls shall permit underground conduit side entry and exit.

Pullboxes shall be located according to the following criteria:

The maximum distance between any two pullboxes shall not exceed 1,200 feet. Within the 1,200-foot distance, pullboxes shall be installed at locations wherever the cumulative change of direction of the conduit exceeds 180 degrees.

The minimum bending radius for conduit shall be 3 feet.

A pullbox shall be installed on one side of a tunneled crossing. However, for any crossing which requires more than 180 degrees of conduit bends to account for elevation differences or route adjustments, a pullbox shall be provided on both sides of the crossing.

Pullboxes shall be installed a minimum of 12 inches from all structures.

Pullbox covers shall be installed so that the top of the cover is flush with the restored pavement. Pullboxes installed in soil areas shall be installed so that the top of the cover is at least one inch but not more than 4 inches above the final grade level of the restored surface to prevent accumulation of dirt, silt and debris on the top of the hand hole cover. Pullboxes installed in areas not subject to flooding or standing water shall have a minimum of five (5)-inch drainage holes in the bottom of the box.

Conduit integrity tests shall be performed for each section between the pullboxes after backfilling and compaction using the test and procedures described in this Section. These tests shall be performed prior to installation of the pull rope.

Pullbox conduit entries shall be sealed with duct plugs to prevent the intrusion of water and debris into the pullboxes.

Pullboxes shall be installed on a compacted level foundation consisting of 4 inches of granular material.

Part 3: EXECUTION

3.1 SPLICING

FOC splices shall be fusion type. Every splice shall be tested. The mean splice loss shall be obtained by measuring the loss through the splice in both directions and then averaging the resultant values. The test shall be conducted at 1550 nanometers using an OTDR.

At locations where new FOCs are being spliced together, the mean splice loss shall not exceed 0.05 dB per splice. At locations where new Fiber Optic Cable is to be spliced onto existing FOC, the mean splice loss shall be lower than 0.1 dB per splice.

The field splices shall connect the fibers of the two Fiber Optic Cable lengths together. These splices shall be placed in a splice tray and the splice tray(s) shall then be placed in the splice closure.

Fibers of the same buffer tube, but not being spliced shall be placed in a splice tray along side spliced fibers. Buffer tubes that do not require enclosed fibers to be spliced shall not be disturbed and placed in the splice closure.

The termination splices shall connect the Fiber Optic Cable span ends with pigtails. The termination splices shall be placed in a splice tray and the splice tray(s) shall then be placed in the fiber distribution unit (FDU).

The individual fibers shall be looped one full turn within the splice tray to avoid micro bending.

A 50 mm minimum bend radius shall be maintained during installation and after final assembly in the optical fiber splice tray. Each bare fiber shall be individually restrained in a splice tray. The optical fibers in buffer tubes and the placement of the bare optical fiber in the splice tray shall be such that there is no discernible tensile force on the optical fiber.

All splices shall be protected with a metal reinforced thermal shrink sleeve.

Splices shall be made in pullboxes and shall use re-enterable splice closures.

3.2 FIBER OPTIC CABLE INSTALLATION

The cable shall not be pulled through more than 180 degrees of total bends in a continuous run. Where the cable is to be pulled through a raceway containing more than 180 degrees of load change, the cable shall be installed through multiple pulls by setting up pull and payoff points at intermediate vaults, manholes, or pull boxes.

The cable shall be looped in all pullboxes to provide approximately fifteen (15) feet of extra cable in the pullbox. At termination points, such as at cabinets or computers, a fifteen (15)-foot loop shall also be provided wherever space permits. The fiber optic cable shall be coiled and secured with cable ties in the pullbox.

3.2.1 Pulling Method

The take-up reel shall be started and the cable pulled at a speed no more than 5 miles per hour. Once cable movement has started a constant pull speed shall be maintained.

The brake at the payoff reel shall be engaged to maintain adequate back tension and to prevent the cable from running free. Loss of back tension during the pull may result in twisting and possible damage to the cable.

At all times during the pull, the tensional operator shall monitor the tension meter to assure that the maximum pulling tension is not exceeded.

The cable shall be continuously inspected as it leaves the reels. If any damage or deformity is found, stringing shall be stopped and corrective action shall be taken prior to continuing the pull.

When the pulling grip is removed, cut off a minimum of twenty feet past the end of the grip to assure no stressed cable is used.

3.2.2 Air Blown Method

The “Air Blown Method” shall be an installation method that uses a mechanical device combined with a high speed air flow or compressed air to place cables into conduits, ducts, or subducts.

The “Air Blown Method” shall conform to the following:

The method shall install cable without exceeding the cable manufacturer’s tensile and compressive strength ratings.

The mechanical device shall be used to provide a pushing force on the cable into the conduit. The cable installation equipment shall also have, at a minimum, the following features:

- a. Controls to regulate the flow rate of compressed air entering the conduit, duct or subduct, and any hydraulic pneumatic pressure applied to the cable.
- b. Safety shutoff valves to disable the system in the event of sudden changes in pneumatic or hydraulic pressure.
- c. Measuring device to determine the speed of the cable during installation and the length of the cable installed.

Provide Kellem grips and other supporting devices as required to support the cable in all vertical runs.

Apply an approved cable pulling lubricant to the cable as it is pulled off the payoff reel to minimize friction.

3.3 Aerial Fiber Optic Cables

All installation Work shall strictly adhere to the practices and procedures defined by the California Public Utilities Commission (CPUC) General Order No. 95 and 128 (GO 95 and GO 128). Attachment points shall be selected so that clearances required by GO 95 are maintained in all cases and does not interfere with the performance of the existing catenary assemblies.

Fiber optic cable shall be carried on a single messenger supported and routed on catenary poles as shown on the plans. Fiber Optic Cable shall be double lashed to the strand through the use of a mechanical cable lasher. Lashing wire shall be stainless steel wire, 0.045 inch diameter.

Splices shall not be permitted in the aerial fiber optic cable except where shown on plans. Aerial storage and splice closure assemblies shall be installed at locations shown on plans. The aerial storage and splice closure assemblies shall be firmly supported from the 3/8 inch guy strand.

Heat-shrinkable end caps shall be placed on cable ends that are exposed to an outdoor environment (including in a pull box) to prevent water penetration until splicing. End caps are not required if the cable end is located in an environmentally controlled communication room or equipment enclosure.

Cable-warning tags shall be installed at every structure attachment location. All cable tags shall be affixed to the cable at an orientation at which they will be easily read from the ground. All cable tags shall be tightly fastened with at least 2 cable ties to the cable in such a manner that will not permit slippage or rotation in any direction.

3.4 Fiber Optic Cables Pulled in Conduits and Raceways

All wiring and cabling shall be installed in conduit, except where overhead, or where cable is run inside the pole.

When new Fiber Optic Cable or signal conductors are added or existing conductors removed from existing conduit, all conductors shall be removed, the conduit shall be cleaned and both old and new cables and/or conductors shall be pulled into the conduit as a unit.

A trace wire shall be installed along the entire fiber optic cable route for use in active cable location. The trace wire shall be a #8 AWG bare-copper solid strand. No insulation or other coating material shall be on the trace wire. The trace wire shall provide a termination at each pullbox for connection to testing equipment.

Identification Tape: A 6-inch wide magnetically detectable warning tape with orange protective polyethylene jacket resistant to alkalis, acids, and other destructive elements shall be installed along the entire length of the conduit route. The polyethylene tape shall be continuously imprinted "CAUTION-FIBER OPTIC CABLE". The warning tape shall be Teletrace by Vikamatic, or equal.

3.5 TESTING

3.5.1 Pre-Installation Tests

The purpose of these tests is to perform acceptance tests on the cable prior to installation to verify that the cable conforms to the manufacturer's specifications, and is free of defects, breaks and damages by transportation and manufacturing processes.

Prior to removal of each cable from the delivery reel, all optical fibers within the cables shall be tested using an OTDR. The OTDR tests shall consist of end-to-end length and fiber attenuation (dB/km) measurements to ensure proper performance of the fiber optic cable. The tests shall be performed from both ends of each fiber to ensure complete fiber continuity within the cable structure.

Pre-installation, "on-reel" test results shall be compared with the manufacturer's test report delivered with the cable. Gross dissimilarities shall be noted and remedied between the contractor and manufacturer. In all cases, all fibers must meet the optical attenuation specifications prior to cable installation.

Maximum allowable attenuation is 0.4 dB/km at 1310 and 1550 nm.

3.5.2 Post-Installation Tests:

After Fiber Optic Cable has been installed the following tests shall be performed:

A recording OTDR shall be used to test for end-to-end continuity and attenuation of each optical fiber. The OTDR shall be equipped with a 1310 nm and 1550 nm light source for the single mode fiber (SMF). The OTDR shall have an X-Y plotter to provide a hard copy record of each trace of each fiber. The OTDR shall be equipped with sufficient internal masking to allow the entire cable section to be tested. This may be achieved by using an optical fiber pigtail of 30 feet or more to display the required cable section.

The maximum permissible end-to-end loss shall be 0.5 dB/km at 1310 nm and 1550 nm.

When conducting tests, a Launch reel shall be used in conjunction with the OTDR. This provides the tester with the ability to accurately measure the connector loss, connection back reflectance and the adjacent splice loss on a short span (15-30 meters from the terminating distribution panel). Pigtail tests taken with long patch

cords or any other “adaptation” shall not be allowed. All testing shall be conducted at both ends of the fiber.

The following index of refraction shall be used: 1.4675 @ 1310 nm and 1.4681 @ 1550 nm. Both wavelengths 1310 nm and 1550 nm shall be used in testing.

Upon completion of testing, all Fiber Optic Cable coils shall be secured with ends capped to prevent intrusion of dirt and water.

3.6 Required OTDR Trace Information

All traces shall display the entire length of cable under test, highlighting any localized loss discontinuities (installation-induced losses and/or connector losses). The trace shall display fiber length (in kilofeet), fiber loss (dB), and average fiber attenuation (in dB/km) as measured between two markers placed as near to the opposite ends of the fiber under test as is possible while still allowing an accurate reading. Care shall be taken to ensure that the markers are placed in the linear region of the trace: away from the front-end response and far-end Fresnel reflection spike. Time averaging shall be used to improve the display signal to noise ratio. The pulse width of the OTDR shall be set to a sufficient width to provide adequate injected power to measure the entire length of the fiber under test.

If connectors exist in the cable under test, then two traces shall be recorded. One trace shall record the fiber loss (dB) and average attenuation (dB/km) of the entire cable segment under test, including connectors. The second trace shall display a magnified view of the connector regions, revealing the connector losses (dB). All connector losses shall be measured using the 5-point splice loss measurement technique.

The OTDR trace shall also include the following information:

- a. The date and time of the test
- b. The cable ID number
- c. The cable segment ID number
- d. The fiber color or sub-cable number
- e. Launch point connector number
- f. The optical wavelength used for the test
- g. The refractive index setting of the OTDR
- h. The pulse width setting of the OTDR
- i. The averaging interval of the test

3.7 Splice Tests

At the conclusion of all splices at one location, and before they are enclosed and sealed, all splices shall be tested with the OTDR, in both directions. Splices in segments shall be tested at 1310 nm and at 1550 nm. Individual fusion splice losses shall not exceed 0.1 dB bi-directionally. Measurement results shall be recorded, dated, validated by the OTDR trace printout and filed with the records of the respective cable runs.

In developing the distribution interconnect package, each LC termination (pigtail or jumper) shall be tested for insertion attenuation loss with the use of an optical power meter and light source. In addition, all singlemode terminations shall be tested for return reflection loss.

3.8 System Verification Testing at Completion

For terminated fibers, jumpers shall be used at both ends under test to validate connector loss. Once the passive cabling system has been installed and is ready for activation, 100 percent of the fiber links shall be tested with the OTDR for attenuation. Print out shall include at a minimum, link number, fiber color, buffer color and cable number. Test results shall be recorded, dated, compared and filed with previous copies.

The OTDR testing equipment shall be calibrated to detect anomalies of no less than 0.2 dB. The OTDR testing equipment shall support generation of test reports on paper. All testing shall be performed in accordance with the fiber optic test procedures defined in EIA 455-59 and as follows:

- a. Verify the fiber length given by the trace corresponds to the estimated fiber run length.
- b. Verify no significant anomaly/loss exists on the "test fiber" that adds loss to the fiber run.
- c. Singlemode fibers shall be tested at 1310 nm and 1550 nm.

Power Meter and Light Source -- At the conclusion of the final OTDR testing, 100 percent of all fiber links shall be tested end to end with a power meter and light source, in accordance with EIA Optical Test Procedure 171 and in the same wavelengths specified for the OTDR tests. These tests shall be conducted in both directions. Test results shall be recorded, compared and proven to be within the design link loss budgets, and filed with the other recordings of the same links.

Design Link Budget – Design Link budget shall be calculated following the following example:

Fiber loss (including splices): 0.4 dB/km at 1310 nm

Connector loss: 0.30 dB per connection

If testing a run that is 30 km long with one patch-through (via patch cords) in the span, an expected loss at 1310 nm would be:

Fiber loss = 30 km x 0.4 dB/km = 12 dB

Connector loss = 4 connectors x 0.30 dB/connector = 1.2 dB

(one connector on each end and two connectors at the patch-through)

Therefore, a total expected loss = 13.2 dB.

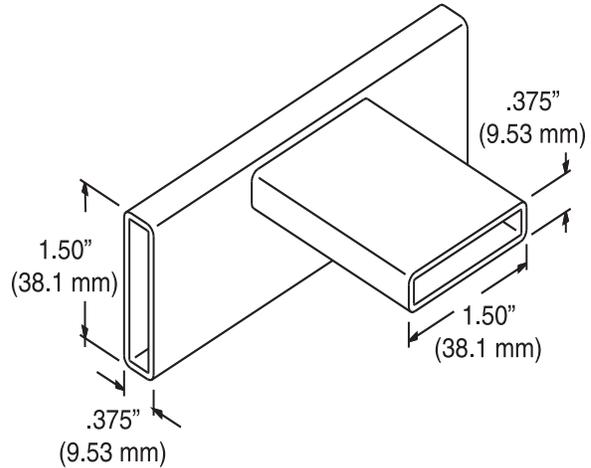
APPENDIX A
BROCHURE

Product Information Sheet

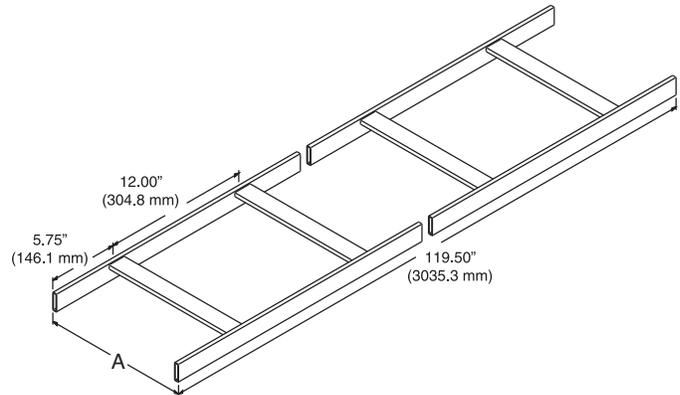
UNIVERSAL CABLE RUNWAY (OR Approved Equal)

Our most popular cable runway is designed for value conscious customers. The Universal Cable Runway offers the industry standard features you've come to expect. With the runway supported every 5' (1.5 m), maximum load with minimal deflection is 132 lb/ft (59.9 kg).

- Made of 3/8" x 1-1/2" x .065" (9.53 mm x 38 mm x 1.65 mm) wall rectangular steel tubing
- Cross members welded at 12" (300 mm) intervals
- Individually boxed to prevent scratches and damage
- Standard length is 9'-11 1/2"/119.5" (3035 mm)
- Installation Best Practices includes Runway Elevation Kit



Part Number/Color			Width (Dim. A)* in (mm)	Shipping Weight lb (kg)
Gray	White	Black		
10250-104	10250-204	10250-704	4 (100)	18 (8.2)
10250-106	10250-206	10250-706	6 (150)	19 (8.6)
10250-109	10250-209	10250-709	9 (230)	20 (9.1)
10250-112	10250-212	10250-712	12 (300)	25 (11.3)
10250-115	10250-215	10250-715	15 (380)	27 (12.2)
10250-118	10250-218	10250-718	18 (460)	29 (13.2)
10250-124	10250-224	10250-724	24 (610)	32 (14.5)
10250-131	10250-231	10250-731	30 (760)	35 (15.7)
10250-137	10250-237	10250-737	36 (910)	38 (17.2)



Note: Shown in two sections for illustrative purposes, actual product is one piece.

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Itray

IT'S CABLE TRAY, REINVENTED

(OR Approved Equal)



designed to be better.™

Introducing Itray from Legrand

WHAT'S NEW!

EASY TO UNDERSTAND PRODUCT CODING

Straight Sections identified by NEMA Class

STRAIGHT SECTION CATALOG NUMBERING EXAMPLE:

BOTTOM TYPE	← 09 - 4 A 12 B - S 144 - 06 →			WIDTH
VENTED				06 - 6"
06 - 6" Rung Spacing				09 - 9"
09 - 9" Rung Spacing				12 - 12"
12 - 12" Rung Spacing				18 - 18"
VC - Vented Corrugated				24 - 24"
NON-VENTED				30 - 30"
SC - Solid Corrugated				36 - 36"
SB - Solid Bottom				
	RAIL HEIGHT	NEMA CLASS	LENGTH	
	4 - 4"	A	S120 - 120"	
	5 - 5"		S144 - 144"	
	6 - 6"		S240 - 240"	
	7 - 7"		S288 - 280"	

Overall rail height is clearly marked with 4" to 7" heights available.

The tray system number is the same as the NEMA Class - no cross-reference needed.

The tray material is listed as well. Currently Itray will only be offered in Aluminum. Stronger I-beam construction means no series choice is needed.

It's the newest addition to the PW Line of cable tray products. It was designed with many value-added features to streamline the engineering, purchasing and installation of cable tray. Itray will replace our current aluminum 4" to 7" side rail height ladder tray line. Our current Heavy-Duty, 8" and 10" sidewall height Long Span tray will still be offered as before.

Easy to understand fitting dimensions

HORIZONTAL ELBOW CATALOG NUMBERING EXAMPLE:

BOTTOM TYPE	← LD - 4 A - 90 HB 12 - 06 →			WIDTH
VENTED				06 - 6"
LD - Ladder Rung				09 - 9"
VC - Vented Corrugated				12 - 12"
NON-VENTED				18 - 18"
SC - Solid Corrugated				24 - 24"
SB - Solid Bottom				30 - 30"
	RAIL HEIGHT	FITTING DESCRIPTION	RADIUS	
	4 - 4"	A	12 - 12"	
	5 - 5"		24 - 24"	
	6 - 6"		36 - 36"	
	7 - 7"			

Overall rail height is clearly marked with 4" to 7" heights available.

Radius measurement is now clearly shown.

The tray material is listed as well. Currently Itray will only be offered in Aluminum. Stronger I-beam construction means no series choice is needed.

No complicated Fitting System Number or Product Number. The Fitting Description is now an abbreviated form of the product name.

WHAT'S NEW!

REVOLUTIONARY SPLICE DESIGN

Splicing made easy

ITRAY SPLICE SNAPS IN PLACE DURING INSTALLATION

- Keeps tray sections aligned while installer inserts and tightens bolts
- Functions as a self-holding drill template

ITRAY SPLICE REDUCES HARDWARE NEEDED BY HALF

- Only four bolts required per splice
- Features round holes for easier field fabrication
- Uses self-holding, rib-necked bolts
- Bolts also feature Phillips-type head for oversized field drilled bolt holes

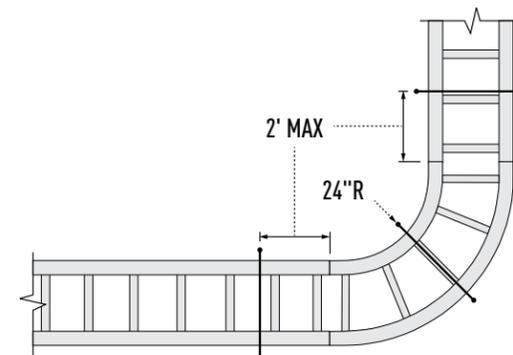
Mid-span splicing standard

OPTIMIZED SIDE RAIL DESIGN ALLOWS MID-SPAN SPLICING WHILE MAINTAINING FULL NEMA LOAD CLASS

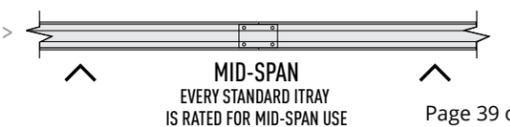
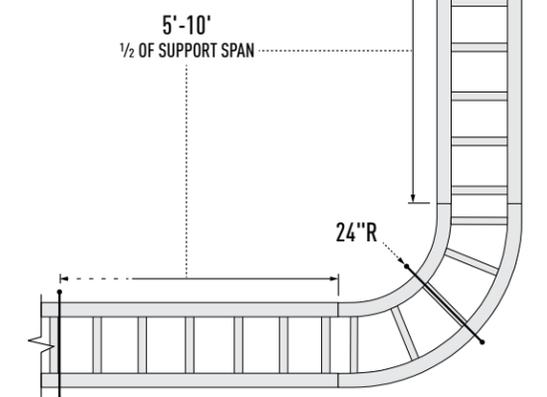
- Mid-span splice makes Itray easy to design and engineer
- Needs fewer supports for fittings than VE-2 NEMA requirements
- Reduces number of straight sections to be cut to avoid mid-span splicing
- Eliminates field drilling and extra hardware for "special" mid-span splice plates



NEMA VE-2 SUPPORT REQUIREMENT



PW ITRAY SUPPORT REQUIREMENT



WHAT'S NEW!

ENGINEERED SIDE RAIL

I-beam side rail design creates a stronger tray

Its all aluminum construction features space saving I-beam construction, a side rail engineered with structural offsets and a matching splice. These features allow Itray to be installed up to 30% faster than standard tray, using half the hardware.

OPTIMIZED SIDE RAIL DESIGN FEATURES A STRUCTURAL OFFSET FOR A LIGHTER, STRONGER TRAY

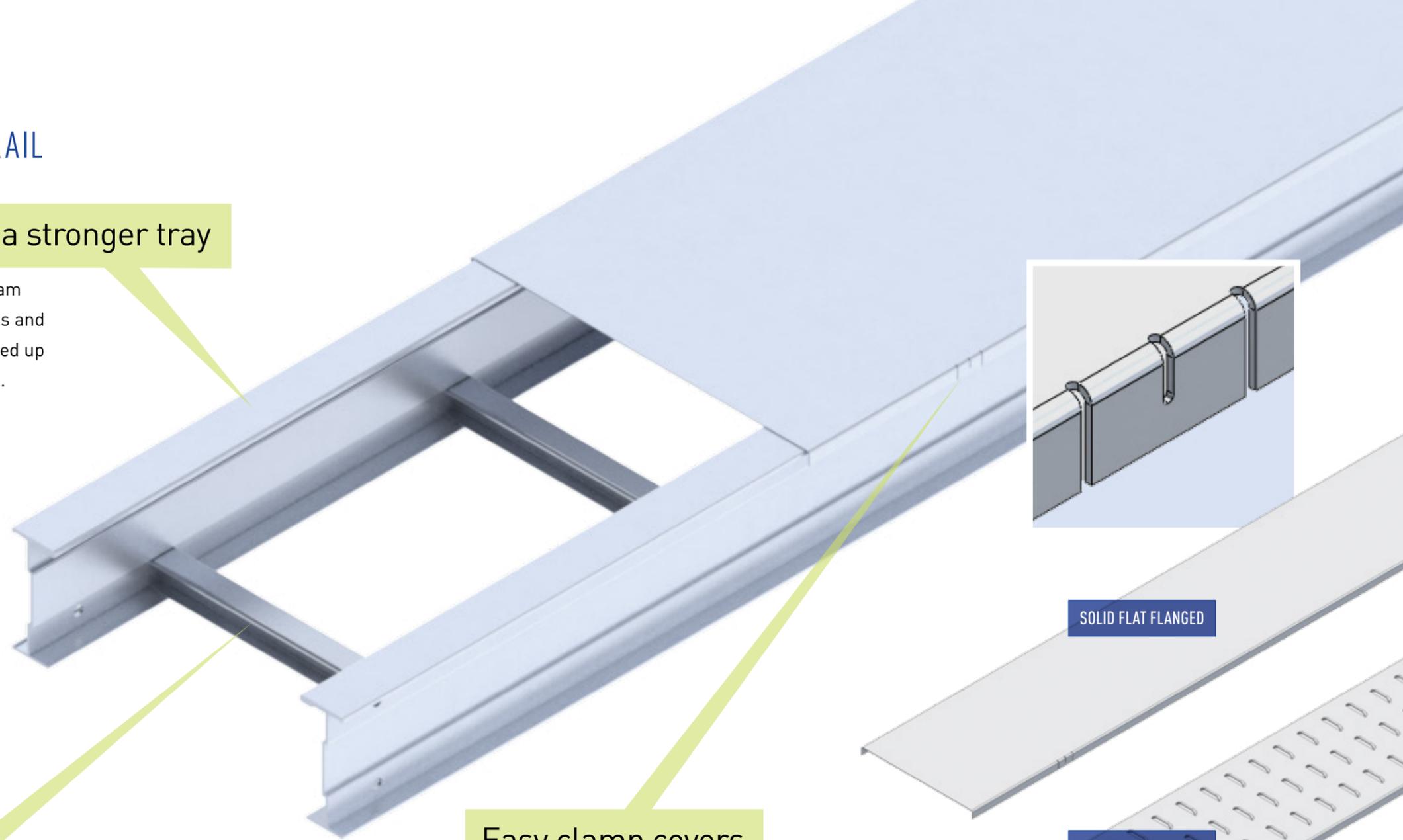
- Creates better rung attachment
- Keeps weld marks to a minimum

I-BEAM DESIGN MINIMIZES TOTAL TRAY WIDTH FOR TIGHT SPACES

- Combines the best features of flange-in and flange-out tray styles

I-BEAM EDGE PROFILE KEEPS ATTACHMENT HARDWARE IN PLACE

- Keeps support attachments from slipping off tray lip



Stronger I-beam rung design



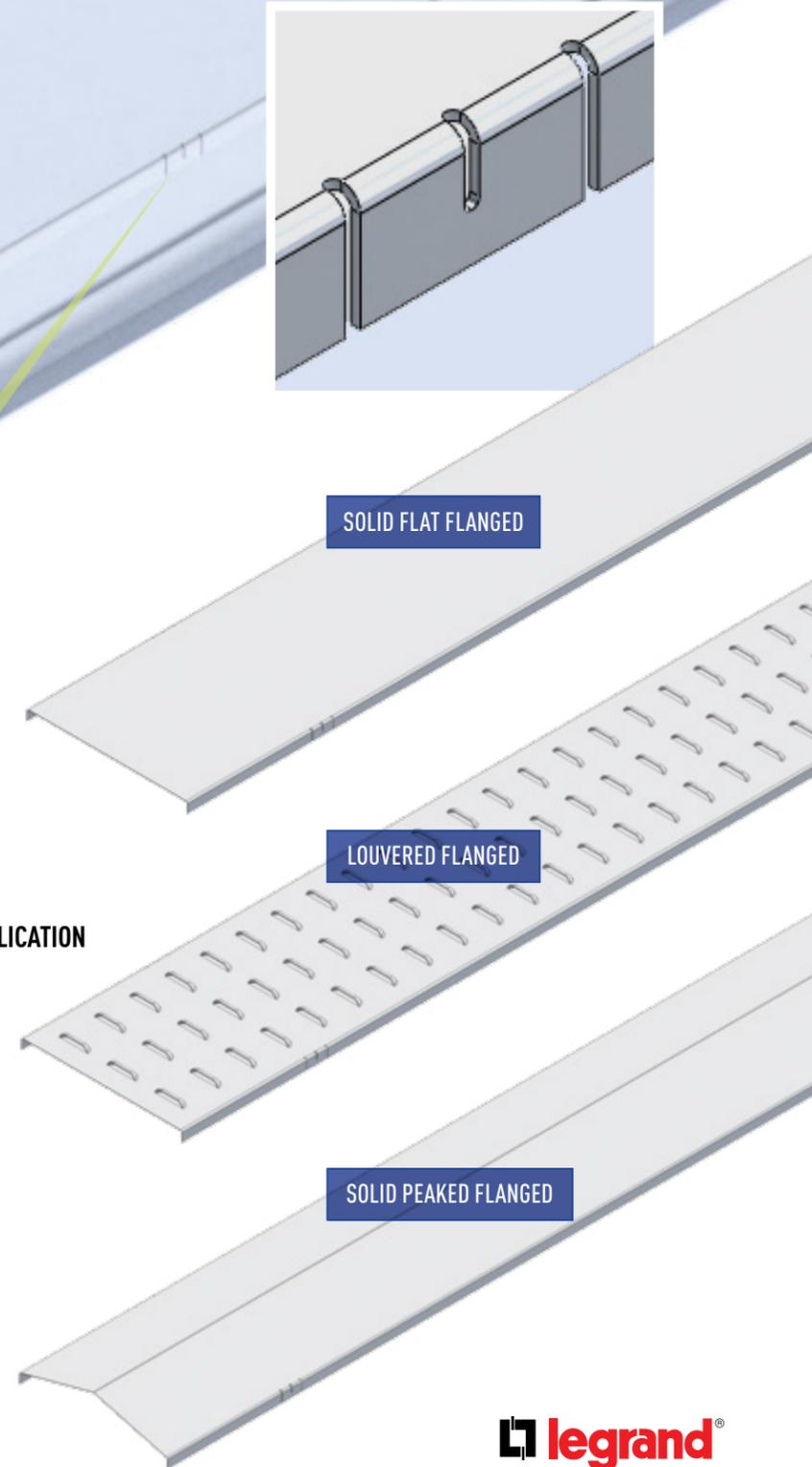
ITRAY FEATURES THE STRONGEST RUNG IN THE INDUSTRY

- I-beam rung design reduces twist and deflection under load
- Heavier I-beam rungs are standard on wider tray – no need for special order

Easy clamp covers

ITRAY FEATURES THREE COVER STYLES TO FIT YOUR APPLICATION

- All covers are flanged with bend-over tabs for easy clamping
- Itray side rails are contoured to keep clamped covers secure
- Covers can also be screwed in place
- Wrap-around cover clamps are available for outdoor applications



WHAT'S NEW!

FITTINGS THAT FIT WELL

Smoother finished installations

SMOOTH SIDE RAIL DESIGN CREATES NATURAL PATH FOR CABLES

- 3" tangent follows industry standards
- Transition splices are available for older, existing installations

TRAY FITTINGS AND STRAIGHT SECTIONS HAVE MATCHING SIDE RAIL CONFIGURATIONS

- No protruding edges at spliced joints
- Makes cable pulling easier and reduces damage to the cable sheath

Symmetric side rail design

- Ceiling-to-wall transitions can be made without field fabrication
- Allows hold clamps from inside or outside flanges

