The City of SAN DIEGO









THE "WHITEBOOK"

Standard Specifications For Public Works Construction

2024 Edition

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Written as a City of San Diego Supplement to the 2024 Greenbook by the
Engineering & Capital Projects Department,
Program & Project Development Division,
Standards & Contract Documents Section

INTRODUCTION

Use the "WHITEBOOK" (also known as the City Supplement) in conjunction with the Standard Specifications for Public Works Construction ("The GREENBOOK"), 2024 Edition (http://www.greenbookspecs.org/).

To address the special conditions of alternative contracting methods, Part 1 - GENERAL PROVISIONS and Part 4 – EXISTING IMPROVEMENTS, have been divided as follows:

1. **GENERAL PROVISIONS (A).** These provisions apply to all contracts.
2. **GENERAL PROVISIONS (B).** When applicable, these *additional* provisions to GENERAL PROVISIONS (A) apply to the alternative project contracting methods "Design-Build" (DB) and "Multiple Award Construction Contract" (MACC).
3. **GENERAL PROVISIONS (C).** When applicable, these *additional* provisions to GENERAL PROVISIONS (A) apply to the alternative project contracting method "Job Order Contracting" (JOC).
4. **EXISTING IMPROVEMENTS (A).** These provisions apply to all contracts.
5. **EXISTING IMPROVEMENTS (B).** When applicable, these *additional* provisions to EXISTING IMPROVEMENTS (A) apply to the alternative project contracting methods "Design-Build" (DB) and "Multiple Award Construction Contract" (MACC) only.

STYLE OF SPECIFICATIONS

The City has standardized the style and language of The "WHITEBOOK". This style follows the Federal guidelines for "Plain Language" (http://www.plainlanguage.gov/) to the extent possible. Therefore, when used in the Contract Documents, statement or command phrases (active voice and imperative mood) refer to and are directed at the "Bidder" or "Contractor" as applicable. The specifications are written to the "Bidder" before award and the "Contractor" after award.

Before award, interpret sentences written in the imperative mood as starting with "The Bidder shall". Interpret the term "you" as "the Bidder" and interpret the term "your" as "the Bidder's".

After award, interpret sentences written in the imperative mood starting with "The Contractor shall". Interpret the term "you" as "the Contractor" and interpret the term "your" as "the Contractor's.

DOCUMENT AVAILABILITY AND COMMENTS

An electronic copy of The "WHITEBOOK" is available for download from the City's web site:

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

The City of San Diego is committed to the quality of this publication and desires to correct any errors, omissions, or ambiguities. If you have any suggestions, comments, corrections, or additions, you may submit them to: engineering@sandiego.gov.

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PART 1

GENERAL PROVISIONS (A)

SECTION 1 - GENERAL, TERMS, DEFINITIONS, ABBREVIATIONS, UNITS OF MEASURE,AND SYMBOLS

1-1 GENERAL. ADD the following:

1. The word "provide" shall mean "furnish and install", unless otherwise stated.

1-2 TERMS AND DEFINITIONS. DELETE in its entirety and SUBSTITUTE with the following:

1. **Acceptance** – When the Work, including all Punchlist items, is formally deemed complete by the Engineer. The Acceptance date ends the Contract Time accounting.
2. **Addendum** - Written or graphic instrument issued prior to the opening of Bids which clarifies, corrects, or changes the Contract Documents. The term "Addendum" shall include bulletins and all other types of written notices issued to potential bidders prior to opening of the Bids.
3. **Agency** - The City of San Diego.
4. **Agreed Price** - The cost for Extra Work, or for adjustments in the Contract Unit Price for changes in the character of the Work as specified in 7-3.7, "Agreed Prices", established by mutual agreement between you and the City.
5. **Agreement** - See Contract.
6. **Allowance (AL)** - Payment under Allowance Bid items, denoted as "AL", shall be based on the actual expenditures and for pre-authorized items of the Work in accordance with the Contract Documents. The unused portions of the Allowances shall revert to the City upon Acceptance of the Project.
7. **Apparent Low Bidder** - The Bidder whose Bid having been publicly opened, initially meets the material requirements of the Bid Documents and whose Bid price is the lowest received.
8. **Applicable Laws** - Laws, statutes, ordinances, rules, orders, and regulations of governmental authorities and courts having jurisdiction over the Project.
9. **As-Builts** - The CADD drawings prepared from the approved Red-lines for record keeping purposes.
10. **Award of Contract (Award)** - The date on which the Mayor or designee executes the Contract.
11. **Assessment Act Contract** - A Contract financed by special assessments authorized under a State Act or procedural ordinance of a City or County.
12. **Base** - A layer of specified material of planned thickness placed immediately below the pavement or surfacing.

13. **Bid** - The offer or proposal of the Bidder submitted on the prescribed form setting forth the prices for the Work.

14. **Bidder** - Any individual, firm, partnership, corporation, or combination thereof, submitting a Bid for the Work, acting directly or through a duly authorized representative.

15. **Board** - The officer or body constituting the awarding authority of the City.

16. **Bond** - Bid, performance, payment bond, or other instrument of security.

17. **Business Day** - See Working Day.

18. **Calendar Day** - See Days.

19. **Caltrans** - The State of California Department of Transportation.

20. **Cash Contract** - A Contract financed by means other than special assessments.

21. **Certificate of Compliance** - A written document signed and submitted by a supplier or manufacturer that certifies that the material or assembled material supplied to the Work site conforms to manufacturer's installation requirements and the requirements of the Contract Documents.

22. **Change Order** - An amendment to the agreement signed by the City authorizing an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract time issued after the effective date of the Contract. A Change Order may or may not also be signed by you.

23. **City** - The City of San Diego. See also Agency.

24. **City Forces** - The City's employees who perform construction work.

25. **City Supplement** - the City of San Diego Standard Specifications for Public Works Construction, the "WHITEBOOK".

26. **Code** - Refer to the statutes of the State of California.

27. **Contract** - The written agreement between the City and you that covers the Work.

28. **Contract Documents** - Contract Documents include the following: The signed Agreement, Addenda, Notice Inviting Bids, funding agency provisions, Bid and documentation accompanying the Bid and any post-bid documentation submitted prior to the Notice of Award when attached as an exhibit to the Contract, Bonds, Permits, CEQA documents, Supplementary Special Provisions (SSP), City's EOCP Requirements, Standard Specifications (the "GREENBOOK"), City Supplement (the "WHITEBOOK"), Plans, Standard Drawings, Construction Documents, Reference Specifications listed in the Notice Inviting Bids, and Change Orders. Contract Documents, when applicable, shall also include: Site and Coastal development permits, NEPA documents, re-vegetation plans, biological letters or technical reports, habitat mitigation plans, storm water documents, and local, state, and federal resource agency permits.

29. **Contractor** - The individual, partnership, corporation, joint venture, or other legal entity having a Contract with the City to perform the Work. In the case of Work being done under a permit issued by the City, the Contractor shall also be construed as the permittee. The Contractor is referred to as "you".

30. **Contract Price** - The total amount of money for which the Contract is awarded.

31. **Contract Unit Price** - The amount stated in the Bid for a single unit of an item of Work.

32. **Construction Work** - The portion of the Work to construct the Project as set forth in the Contract Documents in conformance with 2-1, "WORK TO BE DONE".

33. **Construction Documents** - Your plans and details, including plans showing installation of major systems, equipment, fixed furnishings and graphics, the technical specifications and all other technical drawings, schedules, diagrams and specifications, accepted Shop Drawings, Working Drawings, and submittals that are necessary to set forth in detail the requirements for the Project.

34. **Contract Time -** The number of the Working Days (or Calendar Days when specified as such) to complete the Work as specified in the Contract Documents and approved Change Orders. Contract Time begins at Notice to Proceed (NTP) and ends at Acceptance.

35. **County Sealer** - The Sealer of Weights and Measures of the county in which the Contract is awarded.

36. **Days** - Days shall mean consecutive Calendar Days **unless otherwise specified in the Supplementary Special Provisions**.

37. **Defective Work** - Work that does not conform to the Contract Documents.

38. **Disputed Work –** The Work subject to disagreements between you and the City over the interpretation of Contract Documents, such as Plans, Specifications, and compensation.

39. **Drawings** - See Plans.

40. **Electrolier** - Street light assembly complete, including foundation, standard, mast arm, luminaire, etc.

41. **Extra Work** - New or unforeseen Work not covered by a Contract Unit Price or Stipulated Unit Price.

42. **Engineer** - The City Engineer, Director, or other person designated, acting either directly or through authorized agents such as the Resident Engineer when acting as such within their authority.

43. **Field Book** - The City of San Diego Sewer Field Book or Water Gate Book showing sewer and water facilities.

44. **Field Order** - A Field Order is a written agreement by the Engineer to compensate you for Work items in accordance with 2-8, "EXTRA WORK" or 2-9, "CHANGED CONDITIONS". A Field Order does not change the Contract Price, Contract Time, or the scope intent of the Contract. The unused portion of the Field Order shall revert to the City upon Acceptance.

45. **Final Environmental Document** - The CEQA document issued for the Project, such as a certified environmental impact reports, mitigated negative declarations (MNDs), negative declarations, or exemptions.

46. **Final Payment** - The last payment for the Contract made to you, excluding Retention.

47. **Holiday** - Holidays observed by the City are listed below:

Holiday	**Observed On**
New Year's Day	January 1
Martin Luther King Day	3rd Monday in January
Presidents' Day	3rd Monday in February
Caesar Chavez Day	March 31
Memorial Day	Last Monday in May
Independence Day	July 4
Juneteenth	June 19
Labor Day	1st Monday in September
Veteran's Day	November 11
Thanksgiving Day	4th Thursday in November
Christmas Day	December 25

If any Holiday listed falls on a Saturday, the Saturday and the preceding Friday are both legal Holidays. If the Holiday falls on a Sunday, both Sunday and the following Monday shall be legal Holidays. **Unless specified otherwise in the Contract Documents or authorized by the Engineer**, do not work on Holidays.

48. **House Connection Sewer** - A sewer, within a public street or right-of-way, proposed to connect any parcel, lot, or part of a lot with a mainline sewer.

49. **Limited Notice to Proceed (LNTP)** - A written notice given from the City that authorizes you to start certain elements of the Work at your risk, as described in the notice, that is not Construction Work.

50. **Luminaire** - The lamp housing including the optical and socket assemblies (and ballast if so specified).

51. **Mast Arm** - The structural member, or bracket, which, when mounted on a Standard, supports the luminaire.

52. **Mayor or Designee** - The City's Mayor or a designated representative.

53. **Modification** - Includes Change Orders and Supplemental Agreements. A Modification may only be issued after the effective date of the Contract.

54. **Night Work** - See Working Night.

55. **Normal Working Hours**: Unless otherwise specified on the Traffic Control Permits, the Normal Working Hours shall be **7:30 AM to 3:30 PM, Monday through Friday**, inclusive. Saturdays, Sundays, and City Holidays are excluded.

56. **Notice of Award** - The written notice by the City to the successful Bidder stating that, upon its compliance with the required conditions, the City shall execute the Contract.

57. **Notice of Completion (NOC)** - A document recorded at the City's discretion with the County of San Diego to signify that the Contract Work has been completed and accepted by the City.

58. **Notice to Proceed (NTP)** - A written notice given by the City to you fixing the date on which the Contract time shall start.

59. **Occupancy** – When the Owner deems a building is ready for use, the Owner will issue a certificate of Occupancy in writing.

60. **Operation, Maintenance, and Warranty Instructions** - Documents published by manufactures of pre-manufactured products describing operation, maintenance, and any other action that shall be performed by the City as a condition for the manufacture to honor the specified warranty.

61. **Owner** - See City.

62. **Party or Parties** - The City, you, or both, their respective permitted successors or assigns, and any other future signatories to the Contract.

63. **Person** - Any individual, firm, association, partnership, corporation, trust, joint venture, or other legal entity.

64. **Plans** - The Drawings, profiles, cross sections, Standard Plans, Working Drawings, and Shop Drawings, or reproductions thereof, approved by the Engineer, which show the location, character, dimensions, or details of the Work.

65. **Prime Contractor** - See Contractor.

66. **Private Contract** – The Work subject to City inspection, control, and approval, involving private funds, not administered by the City.

67. **Private Development Projects** - See Private Contract.

68. **Project** - The object of the Contract to be designed, constructed, or both by you as specified, described, and shown in the Contract Documents.

69. **Project Site (Site)** - Areas where the Work is performed pursuant to the Contract.

70. **Proposal** - See Bid.

71. **Punchlist –**A list of the incomplete Work items, deficiencies, or corrections generated after a Walk-through. The Punchlist may be completed in phases if defined in the Contract or as agreed to by the Engineer.

72. **Quality Control Standards and Procedures** - The standards and procedures that are stated in a written manual that can be furnished to the Engineer upon request. The standards and procedures are followed by the Supplier in the production of materials supplied to the Work site.

73. **Red-lines** - Plans with annotations of changes made during construction to reflect the actual product built during construction whether concealed or visible.

74. **Reference Specifications** - The latest edition, including amendments, in effect as of the date of advertisement of the Contract or issuing the permit, unless otherwise specified, of the following:

    a. Bulletins e.g., The City Engineer Announcements

    b. Standards

    c. Rules

    d. Methods of analysis or testing

    e. Codes

    f. Installation instructions

    g. Specifications of other agencies, engineering societies, manufactures, or industrial associations referred to in the Contract Documents.

75. **Retention** - The amount withheld from the money due to you in accordance with 7-3.2, "Partial and Final Payment."

76. **Roadway** - The portion of a street reserved for vehicular use.

77. **Samples** - Physical examples which illustrate materials, equipment, or workmanship and which establish standards that the Work shall be evaluated.

78. **Schedule** - A Critical Path Method (CPM) schedule prepared by you in accordance with 6-1, "CONSTRUCTION SCHEDULE AND COMMENCEMENT OF THE WORK" and accepted by the Engineer.

79. **Scope of Work (SOW)** - Labor, materials, equipment, facilities, and services required to be performed or provided by you to complete the entire Project or the various separately identifiable parts of the Project pursuant to the provisions of the Contract Documents.

80. **Services** - Professional services such as design, engineering, and construction management of the Project that are required in accordance with the Contract Documents. Services are included in the Work.

81. **Service Connection** - All or any portion of the conduit cable or duct, including meter, between a utility distribution line and an individual consumer.

82. **Service Lateral Connection** - The interface of the House Connection Sewer with the host pipe.

83. **Separate Contractors** - Those individuals or entities that have entered into arrangements with the City for the provision of labor, materials, or other services in connection with the Project who are not under contract with you.

84. **Sewer** - Any conduit intended for the reception and transfer of sewage and fluid industrial waste.

85. **Shop Drawings** - Drawings showing details of manufactured or assembled products proposed to be incorporated into the Work.

86. **Signal Pre-Check** - The procedure that the City uses to evaluate traffic signal systems prior to Signal Turn-On and generating a Punchlist.

87. **Signal Turn-On** - The day the City activates new traffic signals.

88. **Special Provisions** - Additions and revisions to the Standard Specifications setting forth conditions and requirements peculiar to the Work. Examples include the City's EOCP Requirements, provisions for Design-Build and Job Order Contracting Contracts, funding agency provisions, technical specifications prepared in CSI format, the "WHITEBOOK" (City Supplement), and Supplementary Special Provisions (SSP).

89. **Specifications** - Standard Specifications, Reference Specifications, Special Provisions, and specifications in Change Orders or Supplemental Agreements between you and the City.

90. **Standard (Signal and Lighting)** - The shaft or pole used to support street lighting luminaires, traffic signal heads, mast arms, etc.

91. **Standard Plans** - Details of standard structures, devices, or instructions referred to on the Plans or in the Specifications by title or number.

92. **Standard Specifications** - The Standard Specifications for Public Works Construction (SSPWC), the "GREENBOOK".

93. **State** - State of California.

94. **Stipulated Unit Price** - Unit prices established by the City in the Contract Documents.

95. **Storm Drain** - Any conduit and appurtenances intended for the reception and transfer of storm water.

96. **Street** - Any road, highway, parkway, freeway, alley, walk, or way.

97. **Subbase** - A layer of specified material of planned thickness between the base and the subgrade.

98. **Subcontractor** - An individual, firm, or corporation having a direct contract with you or with any other Subcontractor for the performance of a part of the Work.

99. **Subgrade** - For roadways, that portion on which pavement, surfacing, base, subbase, or a layer of other material is placed. For structures, the soil prepared to support a structure.

100. **Substantial Completion** – When all Contract Work is deemed complete by the Contractor in writing, and as verified by the Owner. Substantial Completion may be completed in phases if defined in the Contract.

101. **Supervision** - Supervision, where used to indicate supervision by the Engineer, shall mean the performance of obligations, and the exercise of rights, specifically imposed upon and granted to the City in becoming a party to the Contract. Except as specifically stated herein, supervision by the City shall not mean active and direct superintendence of details of the Work.

102. **Supplemental Agreement** – An additional agreement to the Contract Documents signed by you and the City.

103. **Surety** - The company who issued the performance and payment bond.

104. **Surface Seal** - a preventative maintenance application which may include one or more of the following: fog seal, slurry seal, microsurfacing, chip seal, scrub seal, or cape seal.

105. **Time and Materials (T&M) –** The City agrees to pay the Contractor based on the time spent and materials and equipment used by the Contractor to complete the Work.

106. **Utility** - Tracks, overhead or underground wires, pipelines, conduits, ducts, structures, sewers, or storm drains owned, operated, or maintained in or across a public right of way or private easement.

107. **Walk-through -** An inspection the City uses to verify the completion status of the Project or phase of the Project and to generate a Punchlist prior to Acceptance. It is conducted when you consider that the Work is complete.

108. **Work -** The work of improvement proposed to be constructed or done under the Contract or permit, including furnishing all labor, materials, equipment, services, and the Project's required documentation, e.g., records, reporting, operational manuals, and other information.

109. **Working Day** - Any day other than Holidays, Saturdays, and Sundays.

110. **Working Night (Night Work)** - Night Work is allowed only on Sunday through Thursday.

111. **Working Drawings** - Drawings showing details not shown on the Plans which are required to be designed by you.

112. **Work Site** - See Project Site (Site).

1-3.2 Common Usage. ADD the following:

	Abbreviation	**Word or Words**
1.	AML	Approved Material List
2.	CADD	Computer Aided Design and Drafting
3.	CA MUTCD	California Manual on Uniform Traffic Control Devices
4.	CCT	Correlated Color Temperature
5.	CEQA	California Environmental Quality Act
6.	CFR	Code of Federal Regulations
7.	CIPM	Cured-In-Place-Manhole
8.	CMS	Content Management System Database
9.	CNC	Computer Numerical Control
10.	CRI	Color Rendering Index
11.	CSA	Canadian Standards Association
12.	DBE	Disadvantaged Business Enterprise
13.	DCE	Data Computer Equipment
14.	DG	Decomposed Granite
15.	DVBE	Disabled Veteran Business Enterprise
16.	DWT	Detectable Warning Tiles
17.	EBE	Emerging Business Enterprise
18.	ELBE	Emerging Local Business Enterprise
19.	EOCP	Equal Opportunity Contracting Program
20.	ESL	Environmentally Sensitive Lands
21.	ESO	Electrical Service Orders
22.	FRP	Fiberglass Reinforced Thermosetting Plastic
23.	GFE	Good Faith Effort
24.	GMT	Greenwich Mean Time
25.	GPS	Global Positioning System

26. IDA ..... International Dark Sky Association
27. IP ..... Ingress Protection
28. LCD ..... Liquid Crystal Display
29. LD..... Laser Diode
30. LER..... Luminaire Efficiency Rating
31. MBE ..... Minority Business Enterprise
32. MDFT ..... Minimum Dry Film Thickness
33. MHPA ..... Multiple Habitat Planning Area
34. MHs ..... Manholes
35. MIL..... Military
36. MJ ..... Mechanical Joint
37. M&M..... Maintenance and Monitoring
38. MMC ..... Mitigation and Monitoring Coordination
39. MOV..... Metal Oxide Varistor
40. NA ..... Numerical Aperture
41. NC ..... Not connected
42. NEPA..... National Environmental Policy Act of 1969
43. NEXT ..... Near End Crosstalk
44. NCHRP..... National Cooperative Highway Research Program
45. NOC ..... Notice of Completion
46. NTP ..... Notice to Proceed
47. OC..... On Center
48. ODP ..... Open Drip Proof
49. ONFR ..... Optical Fiber Nonconductive Riser
50. OTDR ..... Optical Time Domain Reflectometer
51. PB..... Pull Box
52. PCMS ..... Portable Changeable Message Signs
53. PCU..... Photoelectric Control Unit
54. PEP..... Plant Establishment Period
55. PIC..... Polyethylene Insulated Cable
56. RFP..... Request for Proposal
57. RPMS ..... Rubber Polymer Modified Slurry

58. SIC..... Standard Industry Classification
59. SLBE..... Small Local Business Enterprise
60. SMS..... Short Message Service
61. SMTP ..... Simple Mail Transfer Protocol
62. SOW..... Statement of Work
63. SOV..... Schedule of Values
64. SPDT ..... Single Pole Double Throw
65. SSD ..... Surge Suppression Devices
66. TDR ..... Time Domain Reflectometer
67. TEES..... Transportation Electrical Equipment Specifications
68. TFFN ..... Thermoplastic Flexible Fixture Wire Nylon Jacketed
69. TIG ..... Tungsten Inert Gas
70. UF..... Underground Feeder
71. UPRR..... Union Pacific Railroad Company
72. VAC ..... Volts AC
73. VPC ..... Vitrified Polymer Composite
74. WBE ..... Women Business Enterprise

1-3.3 **Institutions.** ADD the following:

	Abbreviation	**Word or Words**
1.	AMTRACK.....	American Track National Railroad Passenger Corp.
2.	BNSF.....	Burlington Northern Santa Fe Railway
3.	DSD.....	Development Services Department
4.	IPCEA	Insulated Power Cable Engineers Association
5.	IES	Illuminating Engineering Society (Photometric Data)
6.	ISO	International Organization for Standardization
7.	MTS.....	San Diego Metropolitan Transit System
8.	NACE.....	National Association of Corrosion Engineers
9.	NAFP.....	National Association of Pipe Fabricators
10.	NCTD	North County Transit District
11.	NFPA.....	National Fire Protection Association
12.	PCI.....	Prestressed Concrete Institute
13.	PUD.....	Public Utilities Department

14. SANDAG ..... San Diego Association of Governments

15. SD&AE ..... San Diego & Arizona Eastern Railroad

16. SDTI ..... San Diego Trolley, Inc.

17. SDUSD ..... San Diego Unified School District

18. UPRR..... Union Pacific Railroad Company

1-6.2 Subcontractor Listing. ADD the following:

1. The use of Subcontractors in no way relieves you of any obligations or responsibilities under the Contract.

2. For Subcontractor Extra Work, you shall submit Form CC10, "CONTRACT CHANGE ORDER (CCO)" with each CCO proposal. Form CC10 is available for download from the City's EOCP internet site: http://www.sandiego.gov/eoc/

1-7.1 General. DELETE in its entirety and SUBSTITUTE with the following:

1-7.1 Standard Contract Provisions.

1-7.1.1 Successor's Obligations.

1. All grants, covenants, provisions and claims, rights, powers, privileges and abilities contained in the Contract Documents shall be read and held as made by and with, and granted to and imposed upon, you, the City, and the City's respective heirs, executors, administrators, successors, and assigns.

1-7.1.2 Waiver of Legal Rights.

1. The City's failure to insist, in any one or more instances, upon the performance of any provision of the Contract, or to exercise any right therein, shall not be construed as a waiver or relinquishment of such provisions or rights.

2. Any waiver of any breach of the Contract shall not be held to be a waiver of any other or subsequent breach.

3. Any waiver the City issues to any provision of the Contract shall only be effective if it is agreed upon in writing by the City and if it is specific to the particular matter concerned.

1-7.1.3 Requests for Information (RFI).

1. Should you discover a conflict, omission, errors in the Contract Documents, differences with existing field conditions, or have any questions concerning interpretation or clarification of Contract Documents, or when you propose deviations to the standards or design, you shall submit a Request for Information (RFI) to the City regarding your question or clarification within **1 Working Day**.

2. Your RFI shall meet the following requirements:

   a. All RFIs, whether by you or your Subcontractor or supplier at any tier, shall be submitted by you to the City.

b. RFIs shall be numbered sequentially.

c. You shall clearly and concisely set forth the single issue for which interpretation or clarification is sought, indicate Specification Section numbers, Contract Drawing numbers, and details, or other items involved, and state why a response is required from the City.

d. RFIs shall be submitted within **1 Working Day** in order that they may be adequately researched and answered before the response affects any critical activity of the Work.

e. Should you believe that a response to an RFI causes a change to the requirements of the Contract, you shall, before proceeding, give written notice to the City, indicating that you believe that City response to the RFI to be a Change Order. Failure to give such written notice within **5 Working Days** of receipt of the City's response to the RFI shall waive your right to seek additional time or cost.

3. The City will respond to RFIs within **5 Working Days** unless the City notifies you in writing that a response will take longer. The **5 Working Days** shall begin when the RFI is received and dated by the City. Responses from the City will not change any requirement of the Contract unless so noted by the City in the response to the RFI. The City will not issue a Change Order for Extra Work or additional time when the issue raised in the RFI was due to your fault, neglect, or any unauthorized deviations from the project design or specifications.

4. If you proceed in resolving a conflict, omission, or any error in the Contract Documents without sending the City an RFI in accordance with the requirements stated above, the City may require you to remove such work at your cost or back charge You the cost to remove this work.

1-7.1.4 Assignment to Awarding Body.

1. In accordance with §7103.5(b) of the California Public Contract Code, you and your Subcontractors shall conform to the following requirements:

   a. In entering into a public works contract or a Subcontract to supply goods, services, or materials pursuant to a public works contract, you or your Subcontractor offer and agree to assign to the awarding body all rights, title, and interest in and to all causes of action it may have under §4 of the Clayton Act (15 U.S.C. Sec. 15) or under the Cartwright Act (Chapter 2 (commencing with §16700) of Part 2 of Division 7 of the Business and Professions Code) arising from purchases of goods, services, or materials pursuant to the public works contract or the Subcontract.

   b. This assignment shall be made and become effective at the time the awarding body tenders to you, without further acknowledgment by the Parties.

1-7.2 Contract Bonds. DELETE in its entirety and SUBSTITUTE with the following:

1. Before execution of the Contract or Task Order (JOC), file payment and performance bonds with the City to be approved by the Board in the amounts and for the purposes noted. Bonds shall be executed by a responsible surety as follows:

    a. If the Work is being funded with state or local money, consistent with California Code of Civil Procedure §995.670, the Surety shall be an "admitted surety" authorized by the State of California Department of Insurance to transact surety insurance in the State.

    b. If the Work is being funded with federal money, the Surety shall be listed in the U.S. Treasury Department Circular 570 and shall be in conformance with the specified Underwriting Limitations.

2. Each bond shall incorporate, by reference, the Contract or Task Order and shall be signed by both the Bidder and the Surety. The signature of the authorized agent of the Surety shall be notarized. You shall provide the following bonds:

    a. For Contracts less than $10,000:

        1) A "Payment Bond" (Materials and Labor Bond) is optional. If no bond is submitted, no payment shall be made until 35 Calendar Days after Acceptance and any lien requirements have been fulfilled. If a bond is submitted, progress payments shall be made in accordance with these Specifications.

        2) A "Faithful Performance Bond" is not required.

    b. For Contracts over $10,000 and less than $25,000:

        1. A "Payment Bond" (Materials and Labor Bond) is optional. If no bond is submitted, progress payments may be made with a minimum of 20% retention. If a bond is submitted, progress payments shall be made in accordance with these Specifications.

        2. A "Faithful Performance Bond" is not required.

    c. For Contracts over $25,000 and less than $100,000:

        1) A "Payment Bond" (Materials and Labor Bond) for not less than 100% of the Contract Price or Task Order Price to satisfy claims of material Suppliers and of mechanics and laborers employed on the Work. You shall maintain the bond in full force and effect until Acceptance and until all claims for materials and labor are paid and shall otherwise comply with the Government Code.

        2) A "Faithful Performance Bond" is not required.

d. For Contracts over $100,000:

1) A "Payment Bond" (Materials and Labor Bond) for 100% of the Contract Price or Task Order Price to satisfy claims of material Suppliers and of mechanics and laborers employed on the Work. You shall maintain the bond in full force and effect until Acceptance and until all claims for materials and labor are paid and shall otherwise comply with the Government Code.

2) A "Faithful Performance Bond" for 100% of the Contract Price or Task Order Price to guarantee faithful performance of Work, within the time prescribed and in a manner satisfactory to the City, that materials and workmanship shall be free from original or developed defects.

e. For Contracts over $100,000 which include Community Development Block Grant (CDBG) - HUD Program Funds:

1) A "Payment Bond" (Material and Labor Bond) for 100% of the Contract Price or Task Order Price to satisfy claims of material Suppliers and of mechanics and laborers employed on the Work. You shall maintain the bond in full force and effect until the Acceptance and until all claims for materials and labor are paid and shall otherwise comply with the Government Code.

2) A "Faithful Performance Bond" for 100% of the Contract Price or Task Order Price to guarantee faithful performance of Work, within the time prescribed and in a manner satisfactory to the City, that materials and workmanship shall be free from original or developed defects.

3. Should any bond become insufficient, renew the bond within 10 Days after receiving notice from the City. Should any surety at any time be unsatisfactory to the Board, notice to that effect shall be given. No further payments shall be deemed due or shall be made under the Contract until a new surety qualifies and is accepted.

4. Changes in the Work or extensions of time, made pursuant to the Contract, shall in no way release you or the Surety from its obligations. Notice of such changes or extensions shall be waived by the Surety.

5. The bond shall remain in effect until the end of warranty period set forth in the Contract Documents.

6. If the Surety on any bond furnished by you is declared bankrupt, becomes insolvent, or its right to do business is terminated in any state where any part of the Project is located, immediately notify the Engineer and immediately substitute another bond and surety acceptable to the City.

7. You shall require the Surety to mail its standard "Bond Status" form to the Engineer at the following address:

   Deputy Director
   Construction Management and Field Engineering Division
   9573 Chesapeake Drive San Diego, CA 92123

ADD:

1-7.2.1 Payment.

1. The Bid item for "Bonds (Payment and Performance)" includes full compensation for actual costs of payment and performance bonds. You may submit a request for payment of actual invoiced costs up to the bid amount, but not to exceed 2.5% of the Contract Price, no less than 10 Working Days after the award of the Contract.

2. If the Bid item for "Bonds (Payment and Performance)" exceeds actual invoiced costs, any such differential amount up to the bid amount shall be paid as a part of the Final Payment.

SECTION 2 - SCOPE OF THE WORK

2-1 WORK TO BE DONE. ADD the following:

1. Where approval or acceptance by the City is required, you shall understand it to be a general approval only and that it does not relieve you from your responsibility for complying with Contract Documents and all applicable laws, codes, and best industry practices.

2. In accordance with the provisions of California Law, you shall possess or require your Subcontractor(s) to possess valid appropriate license(s) and other required qualifications for the Work being performed as conveyed in the Contract Documents.

ADD

2-1.1 Certified Electricians.

1. All workers responsible for installing, maintaining, testing, troubleshooting, repairing, and operating high and low voltage/amperage electrical components, systems, and equipment e.g., traffic signals, streetlights, and detection systems, including locating problems; determining appropriate courses of action; and coordinating repairs with affected parties must be appropriately certified by the State of California (or equivalent). Copies of the certifications must be submitted to the Engineer prior to the Work.

2-2 PERMITS. DELETE in its entirety and SUBSTITUTE with the following:

2-2 PERMITS, FEES, AND NOTICES.

1. You shall obtain and pay for all business taxes, permits, and fees required for constructing the Project and licenses and inspections necessary for the proper execution and completion of the Work, **unless specified otherwise in the Contract Documents**.

    a. To the extent that there is a change in the type or cost of any of such permits, fees, licenses, or inspection occurring after Award of Contract, there shall be an equitable adjustment in the Contract Price on account of such change under the Extra Work provisions.

    b. You shall comply with and give notices required by applicable laws. You are not entitled to damages or additional payment for delays attributable to the acquisition of permits.

    c. You shall pay the City for regulatory fees, fines, or penalties imposed on the City arising from your failure to complete the Work in accordance with the Contract Documents.

2-2.1 Building Permits.

1. You shall obtain the required building permits from DSD. Any prior approval obtained for the Plans shall not in any way waive this requirement.

2. Request inspections in accordance with the building codes in effect on the permitted plans and by DSD. Any Work performed without the benefit of the required permit and subsequent inspection shall be removed and replaced at the discretion of the City Building Inspector at no additional cost.

2-2.2 Caltrans Encroachment Permit.

1. **Unless specified otherwise**, the City has applied for the Caltrans Encroachment Permit.

    a) You shall arrange and pay for inspection as required by Caltrans.

2-2.3 Payment.

1. The payment for procuring Building Permits shall be included in the Allowance Bid item for "Building Permits".

2. When provided, the Allowance Bid item for "Caltrans Encroachment Permit Submittal" shall include the payment for applying and obtaining the Caltrans Encroachment Permit and shall include costs for preparing plans and addressing Caltrans comments.

2-3 RIGHT-OF-WAY. ADD the following:

1. You shall be responsible for coordinating with property owners on the timing of accessing private property when the City has already obtained rights of entry. You shall protect any private improvements.

2-5.2 Temporary Utility Services. ADD the following:

1. You shall provide and pay for all electrical, gas, and water required for construction and maintenance activities until Acceptance.

ADD:

2-5.2.1 Water for Construction Purposes.

1. You shall purchase all water for construction such as water used for initial filling and final flushing of new pipeline, Site maintenance, and maintenance of the vegetation and landscaping items of the Work.

2. You shall use the 2.5-inch (63.5 mm) fire hydrant port.

3. You shall obtain a meter and comply with the Fire Hydrant Meter Policy, Water Department Instruction, Department Instruction #55.27, dated April 21, 2000, that **will be attached to the Contract**. Violation of these requirements shall be subject to fines or penalties pursuant to the City municipal code, §§67.15 and 67.37.

ADD:

2-5.2.2 Payment.

1. Providing and paying for all electrical, gas, and water required for construction and maintenance activities until Acceptance shall be included in the Contract Price.

2-6 CHANGES REQUESTED BY THE CONTRACTOR. ADD the following:

1. Any plan or method of Work suggested to you by the City, but not specified or required by the Contract or Change Order, which is adopted or followed by you in whole or in part shall be done at your sole risk and responsibility.

2. The Contract Price is not subject to adjustment for any type of tax increases after the Award.

ADD:

2-6.1 Cost Reduction Proposal.

1. You may submit to the Engineer in writing, proposals for modifying the Plans, Specifications, or other requirements of the Contract for the sole purpose of reducing the total cost of construction.

2. The cost reduction proposal shall not impair, in any manner, the essential functions or characteristics of the Project such as service life, economy of operation, ease of maintenance, desired appearance, or design and safety standards.

3. Include the following information in the cost reduction proposal:

    a. A description of both the existing Contract requirements for performing the Work and the proposed changes.

    b. An itemization of the Contract requirements that shall be changed if the proposal is adopted.

    c. A detailed estimate of the cost of performing the Work under the existing Contract and under the proposed change.

    d. A statement of the time within which the Engineer shall make a decision.

    e. The Contract items of Work affected by the proposed changes, including any quantity variation attributable thereto.

4. This subsection does not require the Engineer to consider any cost reduction proposal. The City shall not be liable to you for not approving or acting upon any cost reduction proposal you submitted nor for any delays to the Work attributable to the proposal.

5. If a cost reduction proposal is similar to the information included in the Contract Documents or adopted by the City after the advertisement for the Contract, the Engineer will not accept such proposal and reserves the right to make such changes without compensation to you under the provisions of this subsection.

6. You shall continue to perform the Work in accordance with the requirements of the Contract until a Change Order incorporating the cost reduction proposal has been issued.

7. The Engineer is the sole judge of the acceptability of a cost reduction proposal and the estimated net savings. In determining the estimated net savings, the City has the right to disregard the Contract Bid prices if, in the judgment of the Engineer, such prices do not represent a fair measure of the value of the Work to be performed or to be deleted.

8. The City reserves the right to require you to share in the City's costs of investigating your cost reduction proposal. When this is required, you shall indicate your acceptance in writing allowing the City to deduct amounts payable to you.

9. If the Engineer accepts your cost reduction proposal in whole or in part, the Engineer shall issue a Change Order to incorporate the changes in the Plans and Specifications which are necessary to permit the cost reduction proposal or such part of it as has been accepted to be put into effect. If the Engineer's approval is conditional, the Change Order shall include any conditions upon which the Engineer's approval is based.

10. The Change Order also includes the estimated net savings in the cost of performing the Work due to the accepted cost reduction proposal and provides that the Contract cost be adjusted by crediting the City with 50% of estimated net savings amount.

11. The Contract Time shall not be extended by the acceptance of the cost reduction proposal and the performance of the Work unless specified otherwise in the Change Order.

12. The amount specified as payable to you in the Change Order is full compensation for the cost reduction proposal and the performance of the Work.

13. The City expressly reserves the right to adopt a cost reduction proposal for general use on contracts administered by the City when it determines that said proposal is suitable for application to other contracts. When an accepted cost reduction proposal is adopted for general use, only the Contractor who first submitted such proposal shall be eligible for compensation subject to this subsection, and in that case, only for contracts awarded prior to submission of the accepted cost reduction proposal.

14. The cost reduction proposals identical or similar to previously submitted proposals shall be eligible for consideration and compensation under the provisions of this subsection if the identical or similar previously submitted proposals were not adopted for general application to other contracts administered by the City.

15. Subject to the provisions contained herein, the City or any other public agency shall have the right to use all or any part of any submitted cost reduction proposal without obligation or compensation of any kind to you.

16. You shall bear all costs to revise bonds for the Project to include the cost reduction incentive proposal Work.

2-7.1 **General.** ADD the following:

1. The Engineer may substitute specific sites for asphalt overlay, slurry seal, or concrete ramp and sidewalk replacement due to utility or construction conflicts or urgent community needs. The Engineer will adjust the location list provided in the Contract Documents as needed.

2-8 **EXTRA WORK.** ADD the following:

1. Any request by you for Extra Work shall be in writing to the Engineer and shall include itemized estimates. You shall fully itemize your Extra Work cost estimates such as labor and payroll costs, quantities, crew composition, production rates, material costs, Subcontractor and Supplier costs, equipment costs, supplemental costs, and time impact.
2. Compensation for "Time-and-Material" emergency Contracts:
    a. You will be compensated for charges directly associated with the project. staff
    b. Any invoiced off site work shall include a summary of work.
    c. Markup for off site work shall be the same as on site work.

ADD:

2-10.1 **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 6-10, "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.

2-10.1.1 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.

2-10.1.1.1 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.

2-10.1.2 Initial Determination.

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

2-10.1.3 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.

2-10.1.4 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 2-10.2, "Dispute Resolution Process".
3. Failure to give notice of objection within the 15 Working Days period shall waive your right to pursue the Claim.

2-10.1.5 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.

2-10.1.5.1 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 2-10.1.5, "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.

ADD:

2-10.2 Dispute Resolution Process.

2-10.2.1 Mandatory Non-binding Mediation.

1. If a dispute arises out of or relates to the Contract, or the breach thereof, and if said dispute cannot be settled through contract provisions provided for claim settlement or negotiations, the parties agree to first endeavor to settle the dispute in an amicable manner, using mandatory mediation under the Construction Industry Mediation Rules of the American Arbitration Association before having recourse in a court of law.
2. To initiate mediation, the initiating party shall serve a Request for Mediation at the American Arbitration Association (AAA).

2-10.2.2 Mandatory Mediation Costs.

1. The expenses of witnesses for either side shall be paid by the party producing such witnesses. All other expenses of the mediation, including required traveling and other expenses of the mediator and the cost of any proofs or expert advice produced at the direct request of the mediator, shall be borne equally by the parties, unless they agree otherwise.

2-10.2.3 Selection of Mediator.

1. A single mediator, knowledgeable in construction aspects and acceptable to both parties, shall be used to mediate the dispute.

2. 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.

3. 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.

4. 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.

2-10.2.4 Conduct of Mediation Sessions.

1. Mediation hearings shall be conducted in an informal manner and discovery shall not be allowed.

2. Discussions, statements, and/or admissions shall be confidential to the proceedings and shall not be used for any other purpose as it relates to the party's legal position. The parties may agree to exchange any information they deem necessary.

3. Both parties shall have an authorized representative attend the mediation. Each representative shall have the authority to recommend entering into a settlement. Either party may have attorney(s), witnesses, or expert(s) present. Either party may request a list of witnesses and notifications of whether attorney(s) shall be present.

4. Any resulting agreements from mediation shall be documented in writing. Mediation results and documentation, by themselves, shall be "non-binding" and inadmissible for any purpose in any legal proceeding, unless such admission is otherwise agreed upon in writing by both parties. Mediators shall not be subject to any subpoena or liability and their actions shall not be subject to discovery.

ADD:

2-10.3 Forum for Litigation.

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:

2-10.4 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 3 – CONTROL OF THE WORK

3-3 **SUBCONTRACTORS.** ADD the following:

1. You shall incorporate these Specifications in your subcontracts for the Work being performed by your Subcontractor.
2. You shall obtain or require that each Subcontractor obtains insurance policies in accordance with 5-4, "INSURANCE" which shall be kept in full force and effect for the duration of the Contract and in any attached supplemental agreements.
3. In any dispute between you and your Subcontractors, the City shall not be made a party to any judicial or administrative proceeding to resolve the dispute.
4. You shall ensure that your Subcontractors are appropriately licensed for the duration of the Work that is performed under the subcontracts in accordance with **2-1, "WORK TO BE DONE".** In the event the Subcontractor is not properly licensed, you shall cease payment to the Subcontractor for all Work performed when the Subcontractor was not properly licensed. You shall return to the City any payment you made to a Subcontractor for Work performed when the Subcontractor was not licensed.
5. Where the Contract Documents require that a particular product be installed or applied by an applicator approved by the manufacturer, ensure the Subcontractor or Supplier employed for such Work is approved by the manufacturer.
6. When a Subcontractor fails to prosecute a portion of the Work in a manner satisfactory to the City, you shall remove such Subcontractor immediately upon written request of the City, and shall request approval of a replacement Subcontractor to perform the Work in accordance with California Public Contract Code (PCC), Subletting and Subcontracting, Section 4107, at no added cost to the City.

3-4 **AUTHORITY OF THE BOARD AND THE ENGINEER.** DELETE in its entirety and SUBSTITUTE with the following:

1. The City has the final authority in all matters affecting the Work. Within the scope of the Contract, the Resident Engineer has the authority to enforce compliance with the Plans and Specifications. You shall promptly comply with instructions from the Resident Engineer.
2. The decision of the Resident 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.
3. The Resident Engineer shall be the single point of contact and shall be included in all communications.

3-5 **INSPECTION.** ADD the following:

1. The City may utilize consultants to assist the Engineer during construction in observing your performance. The consultant is for the purpose of assisting the Engineer and shall not be confused with a building inspector with the City or with a Special Inspector.
2. Code compliance testing (including Special inspection and all Geotechnical requirements) and inspections required by codes or ordinances is your responsibility.
3. Your quality control testing and inspections is your responsibility. Coordinate and schedule all inspections and tests. Give the Engineer notice of when and where tests and inspections are to be made by others. Give at least 5 Working Days of notice for offsite inspection. Notices are not deemed effective until the Engineer has responded and agreed to your schedule.
4. The City shall make any inspections and tests as the City deems necessary to ensure the Work is accomplished in accordance with the requirements of the Contract Documents (other than inspections for Work performed in accordance with a permit). You are responsible for the inspection of all Work performed in accordance with a permit.
5. Provide access in accordance with Cal-OSHA Standards where necessary.
6. Remove and replace any items of Work performed without the required permit. For required subsequent inspection, remove and replace Work at the discretion of Engineer at no additional cost to the City. Inspection of the Work does not relieve you of full compliance with the Contract Documents.
7. Do not cover the Work prior to inspection, testing, or approval required by the Contract Documents, the Engineer's prior written request, or by other agencies. If any item of Work is covered prior to obtaining the required approvals, when requested by the Engineer, uncover the Work for inspection, testing, and/or approval. Upon successful completion of the inspection, testing, or approval, cover the Work afterwards again where required. You bear all direct and indirect costs and damages of such uncovering and re-covering and are not entitled to an increase in the Contract Price or the Contract Time, unless you have given the Engineer and any other affected agencies written notice of your intention to cover the Work and the Engineer has not acted in response to such notice.
8. **When specified**, make arrangements for tests, inspections, and approvals with an independent testing laboratory or entity acceptable to the Engineer, or with the appropriate public authority. The payment for such tests, inspections, and approvals are included in the Contract Price.
9. **Unless specified otherwise**, you shall pay the cost of inspections and tests. In the event that inspections or tests reveal non-compliance with the requirements of the Contract Documents, you shall bear the cost of corrective measures deemed necessary by the Engineer and the cost of the City's subsequent re-inspection and re-testing.

ADD:

3-5.1 Remote Control Camera Inspection.

3-5.1.1 General.

1. A time lapse video robotic camera shall be installed on all stationary project sites and Group Jobs where open trench pipe installation is to take place. A camera is not required for Operations and Maintenance type projects such as slurry, overlay, and sidewalk panel replacement. The camera shall be installed at a location where most construction activity shall be captured and remain operational throughout the project. The selected location shall be approved by the Engineer prior to installation.

    a. The camera(s) shall be operational during all hours and days when excavation, pipe installation, and backfill is taking place. Time lapse video robotic cameras shall provide a clear view of backfill and compaction operations. For Group Jobs or other linear projects, the camera shall be mounted on a portable tower or similar device and repositioned as Work progresses.

    b. The camera shall be Heavy Duty Outdoor Vehicle Mounted RobotCam System manufactured by EarthCam, Inc. or approved equal.

    c. The camera shall be removed when installed on permanent project locations or fixtures. Electrical services shall be deactivated and properly concealed and mounting hardware shall be removed to the satisfaction of the Engineer.

3-5.1.2 System Requirements.

1. The camera system shall feature:

    a. An outdoor robotic infrared camera system.

    b. A compact and rugged PTZ camera designed to endure the harsh elements from extreme temperatures and caustic environments such as salt air.

2. The system shall include:

    a. A vibration isolation feature, providing jitter-free video for applications that call for mobility.

    b. A heavy-duty camera, video web caster, and matched cellular modem in a rugged all weather enclosure with 12 VDC Power cord with lugs for vehicle battery power connection with Fuse/Diode-protected power cord.

3. The indoor and outdoor robotic camera system shall consist of nitrogen charged powder coated aluminum housing with an impact resistant viewing window and fiberglass equipment enclosure.

4. The camera shall have the ability to take still images every 5 minutes and shall have the ability to provide live video at 1 frame per second (FPS).

5. The camera shall upload the still images over a wireless cellular modem or hardwire connection to a DSL or cable modem.

6. The content shall be sent to a secure and password protected website with interface and online software features provided by the vendors as a managed service.

7. The system shall operate on 12 VDC and shall have a maximum power consumption of 30 W.

8. The system shall be available with an optional wiper and sun shield.

3-5.1.3 Equipment.

1. The robotic camera shall be a pressurized marine grade robotic outdoor infrared camera with a remotely controlled focal lens with the following features:

   a. Pan angle range 440°

   b. Tilt angle range 240°

   c. Max pan speed 135°/s

   d. Max tilt speed 50°/s

   e. Pan/tilt encoder resolution 0.5

   f. Housing material cast aluminum

   g. Vibration 3 grms 3 axis, random, 5 to 1000 Hz

   h. Temperature -4° F to 158° F (-20° C to 70° C)

   i. Mounting quick connect

   j. Zoom 26x optical, 12x digital

   k. Imaging code color/near infrared

   l. Resolution 470NTSC, 460PAL TV Lines

   m. Pixel count 680,000 NTSC / 800,000 PAL

   n. Dynamic range 50 dB

   o. Light sensitivity 0.05 Lux NIR mode

   p. Auto features Focus, ISO, iris, shutter, and white balance

   q. Optional Infrared camera core 320 x 240

   r. Heater built in thermostatically controlled

   s. Window impact resistant viewing window

   t. Window wiper remotely controlled

u. Sun shield optional

v. Dimensions 6.73 inch (171 mm) W x 7.8 inch (198 mm) H, and 7 inch (180 mm) in diameter

w. Power 12 VDC, 2A peak

x. Weight of 9.04 lbs (4.1kg)

3-5.1.4 Electronics Enclosure.

1. The electronic enclosure shall conform to the following:

a. IP66 fiberglass enclosure.

b. EVDO-RevA cellular modem built in.

c. EarthCam video webcaster built-in.

d. Dimensions: 14.55 inch H x 12.55 inch W x 8.31 inch D (37 cm H x 31.9 cm W x 21.1 cm D).

e. Operational Voltage: 12 VDC.

3-5.1.5 Interface and Online Software.

1. Online interface shall feature the following:

a. Software delivered by vendor as a managed service.

b. Displays agency logo and project name.

c. Capable of viewing live video.

d. Robotic pan, tilt, zoom control of camera system.

e. Calendar based navigation system for selecting specific images.

f. Multifunction images browsing.

g. Record up to 120 hours of video.

h. Share image snapshots, video clips, and entire events seamlessly.

i. A multi-view screen to view all cameras for the Project at the same time.

j. Graphical mark-up tools for detailing and creating overlays on images.

k. Graphical weather applet displaying 10 points of location weather data.

l. Share image tools allowing for saving, printing, emailing, and posting to message boards or mobile devices.

m. Aerial and satellite photography library.

n. Time lapse features that include instant time lapse play back by day, week, month, or year.

o. Machine to machine self-healing technology automating maintenance of camera up to 288 times daily.

p. Account security features that include 4 levels of password protection, IP address blocking/permission, and SSL protection of User Login Password.

3-5.1.6 Payment.

1. The payment for the remote control camera inspection shall be included in the Bid item for "Remote Control Camera Inspection".

3-6 THE CONTRACTOR'S REPRESENTATIVE. ADD the following:

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

ADD:

3-6.1 Project Meetings.

1. Your project team shall attend scheduled construction meetings as required by the Engineer. If any of your staff cannot attend, you shall notify the Engineer a minimum of 24 hours in advance, prior to the start of the scheduled meeting. If you do not provide the required notification, you shall pay for the costs of the City's staff, Consultants, or both that attended. You shall be charged a minimum of 2 hours of the attendee's time.

ADD:

3-6.1.1 Payment.

1. The payment for your attendance to Project meetings is included in the Contract Price. The Engineer shall deduct costs assessed to you for not attending the meetings from the monthly progress payment via Change Order.

3-7.1 General. ADD the following:

1. Specifications and Plans are divided into groups by engineering discipline for the City's convenience. These divisions are not for the purpose of apportioning the Work or responsibility for the Work among Subcontractors and Suppliers.

2. You shall supply any Work that may reasonably be inferred from the Specifications or Plans as being required to produce the intended result whether or not it is specifically called for, at no additional cost to the City.

3. If referenced documents have been discontinued by the issuing organization, references to those documents means the replacement documents issued or otherwise identified by that organization or, if there are no replacement.

3-7.2 **Precedence of Contract Documents.** DELETE in its entirety and SUBSTITUTE with the following:

1. If there is a conflict between any of the Contract Documents, the document highest in the order of precedence shall control. If there is a conflict between any of the Contract Documents and the Municipal Code, the most stringent requirements shall control. The order of precedence, from highest to lowest, shall be as follows:
    a. Permits (issued by jurisdictional regulatory agencies including environmental documents).
    b. Change Orders and Supplemental Agreements; whichever occurs last.
    c. The signed written Agreement.
    d. Addenda.
    e. Bid / Proposal.
    f. Supplemental Special Provisions.
    g. Project Plans.
    h. Standard Drawings.
    i. "WHITEBOOK" (City Supplement).
    j. "GREENBOOK" (Standard Specifications for Public Works Construction).
    k. Reference Specifications.
2. When additional EOCP requirements by funding sources are included in the Contract Documents, the funding source's requirements shall govern.
3. With reference to the Drawings, the order of precedence shall be as follows:
    a. Figures govern over scaled dimensions.
    b. Detail Drawings govern over general Drawings.
    c. Addenda and Change Order Drawings govern over Plans.
    d. Plans govern over Standard Drawings.
4. When a conflict exists between the ADA, Title 24, City Standards Drawings, and the City Supplement, the most restrictive requirement shall be followed.
5. When there is a conflict between 700-1.2, "Standards, Poles, Steel Pedestals, and Posts" and the current adopted edition of Caltrans Standard Specifications and/or Standard Plans, the Caltrans standards shall control.

ADD:

3-7.3 Red-lines and Record Documents.

3-7.3.1 General.

1. Keep to the satisfaction of the Engineer accurate, legible, and current records on a set of full size Plans of additions and deletions to the Work and of changes in location, elevation, and character of the Work not otherwise shown or noted in the Contract Documents.

2. Coordinate Red-lines drawings with field measurements, approved Shop Drawings, Working Drawings, samples, product data, and available records. You shall immediately give written notice of any conflicts between these documents to the Engineer.

3. Keep the Red-lines current with entries checked by the Engineer before the Work is buried or covered. Your failure to update and deliver Red-lines information monthly to the Engineer for review and approval may result in the withholding of monthly progress payments.

4. Note the source identification, such as RFI numbers and Change Order numbers, as required identifying the source of the change to the Contract Documents.

5. Deliver the Red-lines to the Engineer upon completion of the construction Work.

3-7.3.2 Asset Specific Red-lines.

1. **Irrigation System Red-lines**: 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. Water Meter - Size, type of water (potable or reclaimed), and water meter address.

    b. Electrical Meter, including meter address.

    c. Backflow Device - Size, available static pressure in psi, the psi and flow in gallons per minutes for which the irrigation system is designed, and device serial number.

    d. Irrigation Controller - Location, number of stations, identifying call-out.

    e. Master Control Valve.

    f. Flow Sensor.

    g. Pressure Regulator Valve.

    h. Isolation Valves.

i. Remote Control Valves - Size, irrigation controller, valve station number, and flow demand in gallons per minute.

j. Quick Coupling Valves and Size.

k. Irrigation Mainline and Size.

l. Potable Water Mainline and Size.

m. Irrigation Lateral Line and Size.

n. Irrigation Sleeves and Size.

o. Remote Control Valve Wiring.

p. Communication Cables.

q. Pull Boxes.

r. Rain Shut Off Switch.

s. Electrical lines from electrical meter to irrigation controller, including the power disconnect switch.

t. Irrigation sprinkler heads which have been added or deleted from the approved plans. Changes in manufacturer nozzle size shall be noted on the red-lined drawings including operating pressure, gallons per minute, and radius of throw.

2. **Re-vegetation Red-lines**:

a. Within 4 weeks of the end of the Plant Establishment Period, as determined and accepted by the Project Biologist, furnish and submit to the Engineer 1 full scale Red-lines set showing field changes to grade, erosion control, and seeding for the re-vegetated areas.

3. **Utility Red-lines**: Utility Red-lines shall show the location of the following:

a. Blow off valves by stationing and offsets.

b. Air vacuum valves by stationing and offsets.

c. Water meter boxes replaced.

d. Locations of all sewer laterals and cleanouts.

e. Items abandoned in place.

f. Items abandoned in place following dewatering operation.

4. **Building Red-lines**: Building Red-lines shall show the following:

a. Location by dimension and the depth by elevation of underground lines, valves, plugged tees, and capped ends.

b. By dimension or scale plans, wiring, conduits, and pull boxes as installed.

c. Information necessary to maintain and service concealed items of Work.

d. Dimensional changes to the drawings.

e. Revisions to details shown on the drawings.

f. Depths of foundations below the first floor.

g. Locations and depths of underground utilities.

h. Revisions to the routing of piping and conduits.

i. Revisions to electrical circuitry.

j. Actual equipment locations.

k. Duct size and routing.

l. Locations of concealed internal utilities.

m. Changes made by Change Orders.

n. Details not shown on original Plans.

5. **Traffic Signals and Street Lighting**:

   a. Provide the Engineer with a cable route diagram indicating the actual cable route and meter marks for all intersections, directional change points in the cable routing, and all termination points. Record these points during cable installation. Provide cable system Red-lines showing the accurate cable route to the Engineer. Record information such as the location of slack cable and its quantity in the cable route diagram.

   b. Provide 3 copies of D-Sheet sized Red-lines.

6. **SWPPP**:

   a. Upon completion of construction, submit the SWPPP and all of its appendices, records, reports, and maps to the Engineer with the Red-lines.

7. **Slurry Seal and Asphalt Concrete Overlay**:

   a. Clearly record on the forms the City provides in MS Excel format the actual dates and quantity of each Bid item applied to each street segment and comments regarding each segment. Record reasons if no Work is performed.

8. **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.

3-7.3.3 Payment.

1. The payment for Red-lines Drawings shall be included in the Contract Price.

ADD:

3-7.4 Measurements and Dimensions.

1. Scaled dimensions are approximate. Before ordering materials or commencing the Work, measure the Site for proper size and fit. Verify dimensions and quantities by taking measurements in the field. You shall be responsible for their accuracy.

3-8.1 General. ADD the following:

1. For products for which a City Approved Materials List (AML) is available, products listed in the AML shall be used. For more information, visit the City's website at:

   https://www.sandiego.gov/ecp/edocref/

2. A submittal review shall be conducted for products not identified on an AML on a case-by-case basis when:

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

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

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

      1) In the case of conducting a submittal review when required by the Plans or Special Provisions or when requested by the Engineer, all submittals shall be accompanied by the City's submittal form. The Product Submittal Form is available for download at:

         https://www.sandiego.gov/ecp/edocref/

3-8.2 Working Drawings. DELETE in its entirety and SUBSTITUTE with the following:

1. Working Drawings shall be of a size and scale to clearly show all necessary details.

2. Six (6) copies and 1 reproducible shall be submitted. If no revisions are required, 3 of the copies shall be returned. If revisions are required, the Engineer shall return 1 copy along with the reproducible for resubmission. Upon acceptance, the Engineer shall return 2 of the copies and retain the remaining copies and the reproducible.

3. Working Drawings are required in the subsections shown in table below.

TABLE 3-8.2

Item	Section/Drawing Number	Title	Subject
1	3-12.5.2	Sewage Bypass and Pumping Plan	Sanitary Sewers
2	3-12.8.2	Dewatering Plan	Water Pollution Control
3	5-7.2.2	Shoring Plan	Safety
4	300-3.2	Cofferdams	Structure Excavation & Backfill
5	303-1.6.1	General	Falsework
6	303-1.7.1	General	Placing Reinforcement
7	303-3.1	General	Prestressed Concrete Construction
8	304-1.1.2	Falsework Plans	Structural Steel
9	306-3.3.5.3	Asbestos Cement Pipe Submittals	Asbestos Cement Pipe Work Plan Submittal
10	306-8.8 SDW-154*	Valves, Hydrants, and Appurtenances	Water Valve Bypass Details For Mainlines 16-Inch And Larger
11	306-8.8.3	Thrust Blocks and Anchor Blocks	**Unless specified otherwise,** design of all size water main thrust blocks and anchor blocks
12	307-1.1	General	Jacking Operations
13	307-2.1	General	Tunneling Operations
14	308-3	Submittals	Microtunneling

Item	Section/Drawing Number	Title	Subject
15	601-2.1.2	Engineered Traffic Control Plan (TCP)	Temporary Traffic Control For Construction And Maintenance Work Zones
16	1101-3	Storm Water Pollution Prevention Plan (SWPPP)	Water Pollution Control
17	1101-4	Water Pollution Control Plan (WPCP)	Water Pollution Control

*Note: The distance dimensions shown between the bypass pipes and the mainlines are subject to change to field conditions.

4. Items listed in Table 3-8.2, except for items 1, 2 and, 5, shall be prepared by a Civil or Structural Engineer registered by the State of California.

5. Item 16 shall be prepared by a Qualified SWPPP Developer (QSD) in accordance with 1101-3, "Storm Water Pollution Prevention Plan (SWPPP)".

6. Item 17 shall be prepared in accordance with 1101-4, "Water Pollution Control Plan (WPCP)".

3-8.4 Supporting Information. ADD the following:

1. Submit samples of the materials with cut sheets of the products. Organize cut sheets in a binder for review and approval by the Engineer prior to use on the Project. Identify deviation from any of the specified material clearly, including cut sheets and samples of both the specified material and basis for the substitution. Include the City's Project Name, Project Number, and the Engineer's name, Contractor Name, and Submittal Number and clearly indicate the specific product to be used.

2. When photos of material are required, they shall be clear in resolution, identify the specific item for review, and shall indicate the name of the item, source, and date taken. The material shown in the photo shall be currently available for use on the Project.

3. For landscaping and irrigation materials, submit samples and test results to the Engineer within 15 Working Days of the NTP.

3-8.6 Manufacturer's Operation, Maintenance, and Warranty Instructions. To sentence (1), DELETE in its entirety and SUBSTITUTE with the following:

For each pre-manufactured product covered by a manufacturer's warranty, you shall submit 1 electronic copy and 3 bound original or legal copies prior to acceptance of the Contract.

ADD:

3-8.7 Contractor's Quality Control Plan (QCP).

1. You shall establish, implement, and maintain an effective Quality Control Plan (QCP) to perform quality control inspection and testing for all items of paving Work required by the Contract Documents, including those performed by subcontractors and material suppliers.
2. The QCP shall ensure conformance to applicable specification and plan requirements with respect to materials, workmanship, construction, finish, and functional performance.
3. The QCP shall detail the methods and procedures that will be taken to ensure that all materials and construction required for street pavement restoration will conform to the Contract Documents, and to ensure that information included will be recorded in Daily Quality Control (QC) Inspection Reports for the Engineer's verification and approval.
4. You shall establish a level of control that will:
    a. Provide for the production and delivery of acceptable quality materials.
    b. Provide documentation that construction meets Contract requirements.
5. During the pre-construction meeting, you shall be prepared to discuss and present details of your QCP. You shall not begin any production of materials or construction of surface preparation, pavement restoration, and other related work until your QCP has been reviewed and approved by the Engineer. No partial payment will be made for materials subject to specific quality control requirements until the QCP has been approved.
6. The quality control requirements contained in this section and elsewhere in the Contract Documents are in addition to and separate from the acceptance testing requirements discussed elsewhere.

3-8.7.1 QCP Submittal.

1. Submit the QCP in a written document to the Engineer at the pre-construction meeting. The QCP shall be reviewed and approved by the Engineer prior to the start of any material delivery or paving work.
2. The QCP shall be organized to address, at a minimum, the following items:
    a. Quality Control Administrator
    b. Surface preparation and paving schedule
    c. Inspection and documentation requirements (Daily Quality Control Inspection Report)
    d. Material quality control testing plan
    e. Documentation of quality control activities

f. Procedures for corrective action when quality control and/or acceptance criteria are not met

g. If paving Work will be in areas prone to shade, provide curing time of product

3. You are encouraged to add any additional elements to the QCP as deemed necessary to adequately control all production and construction processes required by Contract Documents.

3-8.7.2 QCP Administrator.

1. You shall designate a QCP Administrator to implement the QCP.

a. The QCP Administrator shall be your full-time employee or your consultant. The QCP Administrator shall have full authority to institute any and all actions necessary for the successful implementation of the QCP to ensure compliance with the Contract Documents.

b. The QCP Administrator shall ensure that the following functions are performed and documented:

1) Inspection of all materials, construction, plant, and equipment for conformance to the specifications.

2) Performance of all quality control tests as required by the Contract Documents.

3) Performance of density tests for the Engineer when required.

3-8.7.3 Inspection Requirements.

1. Quality control inspection functions shall be organized to provide inspections for all definable features of Work. You shall document all inspections.

2. Inspections shall be performed daily to ensure continuing compliance with contract requirements until completion of the particular feature of Work. These shall include the following minimum requirement:

a. During field operations, quality control test results and periodic inspections shall be utilized to ensure the quality of all materials and workmanship meets the requirements of the contract. All equipment utilized in placing, finishing, and compacting shall be inspected to ensure its proper operating condition and to ensure that all such operations are in conformance to the specifications and are within the plan dimensions, lines, grades, and tolerances specified. The QCP shall document how these and other quality control functions will be accomplished and utilized.

3-8.7.4 Documentation.

1. You shall maintain current quality control records of all inspections performed. These records shall include factual evidence that the required inspections or tests have been performed, including type and number of

inspections or tests involved; results of inspections or tests; nature of defects, deviations, causes for rejection, etc.; proposed remedial action; and corrective actions taken.

2. These records shall cover both conforming and defective or deficient features and shall include a statement that all supplies and materials incorporated in the Work are in full compliance with the terms of the Contract. Legible copies of these records for the entire week of paving work shall be furnished to the Engineer after 2 Working Days. The records shall cover all Work placed subsequent to the previously furnished records and shall be verified and signed by the QCP Administrator.

3. Specific QCP records required for the Contract shall include, but are not necessarily limited to, the following records:

    a. **Daily Quality Control (QC) Inspection Reports.** The QCP Administrator shall maintain a daily log of all inspections performed for both Contractor and subcontractor operations. These daily QC inspection reports shall provide factual evidence that continuous quality control inspections have been performed and shall, as a minimum, include the following items:

        1) Date and location/s of paving work performed.
        2) Asphalt mix specifications and supplier.
        3) Dig out locations.
        4) Tack coat application rate for each location.
        5) Asphalt temperature at placement for each location.
        6) Asphalt depth for each location.
        7) Compaction test results for each location.
        8) Documentation that the following have been verified to be in compliance:
            a) Proper storage of materials and equipment.
            b) Proper operation of all equipment.
            c) Adherence to plans and technical specifications.
            d) Review of quality control tests.
            e) Safety inspection.
            f) Mixing properties of products against the approved submittal limits.
        9) Location and nature of defects with remedial and corrective actions.
        10) Presence of City Laboratory representative.
        11) Deviations from QCP.
        12) Signature of QCP Administrator.

The daily QC inspection reports shall identify inspections conducted, results of inspections, location and nature of defects found, causes for rejection, and remedial or corrective actions taken or proposed.

b. The daily QC inspection reports shall be signed by the QCP Administrator. The Engineer shall be provided at least 1 copy of each daily QC inspection report for the entire week 2 Working Days following the end of the week.

c. When applicable, a sample of the daily QC inspection report will be **included in your Contract Documents**. An updated version of this sample report will be provided at the pre-construction meeting and can be found at the link below:

https://www.sandiego.gov/ecp/edocref/

3-8.7.5 Corrective Action Requirements.

1. The QCP shall indicate the appropriate action to be taken when a process is deemed, or believed, to be out of control (out of tolerance) and detail what action will be taken to bring the process into control.

2. The requirements for corrective action shall include both general requirements for operation of the QCP as a whole and for individual items of Work contained in the specifications.

3. The QCP shall detail how the results of quality control inspections will be used for determining the need for corrective action and shall contain clear sets of rules to gauge when a process is out of control and the type of correction to be taken to regain process control.

3-8.7.6 Noncompliance.

1. The Engineer will notify you of any noncompliance with any of the foregoing requirements. You shall, after receipt of such notice, immediately take corrective action. Any notice, when delivered by the Engineer to you, shall be considered sufficient notice.

2. In cases where quality control activities do not comply with either the QCP or the contract provisions, or where you fail to properly operate and maintain an effective QCP, as determined by the Engineer, the Engineer may:

   a. Require replacement of ineffective or unqualified QCP personnel or subcontractors.

   b. Stop operations until appropriate corrective actions are taken.

3-8.7.7 Payment.

1. The payment for preparation, submittal, implementation, and maintenance of the Quality Control Plan in accordance with the Contract Documents shall be included in the Contract Price.

3-9 **SUBSURFACE DATA.** DELETE in its entirety and SUBSTITUTE with the following:

3-9 **TECHNICAL STUDIES AND SUBSURFACE DATA.**

1. If reports of explorations and tests of Site conditions are referenced in the Contract Documents, you are encouraged to inspect the Site, acquire and review these reports, and take other necessary steps to thoroughly familiarize yourself with the Site conditions. If a review of the documents and Site inspection indicate an obstruction or utility conflict with the proposed Work, immediately notify the Engineer.
2. Subsurface data shall include geotechnical reports, groundwater elevations, soil analyses and characterization, and other information included or referenced in the Special Provisions and shall **apply only at the location of the test holes and to the depths indicated.**
3. Additional exploration may be performed at your own expense.
4. The indicated groundwater elevation is that which existed on the date specified in the data. It shall be your responsibility to determine and allow for the groundwater elevation on the date the Work is performed. A difference in groundwater elevation between what is shown in soil boring logs and what is actually encountered during construction shall not be considered as a basis for Extra Work in accordance with 2-8, "Extra Work".

3-10 **SURVEYING.** DELETE in its entirety and SUBSTITUTE with the following:

3-10 **SURVEYING (DESIGN-BID-BUILD).**

3-10.1 **General.**

1. You shall provide all required site layout and general grade checking work not specified in 3-10.2, "Survey Services Provided by City".
2. Notify the City, in writing, at least 2 Working Days prior to requesting survey services provided by the City.

3-10.2 **Survey Services Provided by City.**

1. Monument Perpetuation, including mark-outs. You are responsible for requesting the coordination of these services.
    a. If at any time a monument will be destroyed or covered, such monument shall be perpetuated in accordance with state law. Inform the City Engineering Support & Technical Services Division's Land Survey Section (LSS), via project Resident Engineer, if any monument will be destroyed or covered during any construction activity.
2. The following surveying services (including construction staking), as defined in California Business & Professions Code §8726, shall be provided by the City:
    a. Locating or establishing alignment or elevations of all features or structures shown on project Plans.

b. Locating or establishing geodetic control points for all site feature or structure locations.

c. Produce topographic as-built data.

d. Locating, establishing, or re-establishing monuments, property lines, right-of-way lines, or easement lines.

e. Verifying structure finish grade elevations.

3. All construction survey stakes, control points, and other survey related marks provided by the City shall be preserved for the duration of the Project. If any construction survey stakes, control points, or other survey related marks are lost or disturbed and need to be replaced, such replacement shall be performed at your expense.

3-10.3 Payment.

1. The payment for site layout and general grade checking Work, coordination, and preservation of all survey related marks shall be included in the Contract Price.

3-11 CONTRACT INFORMATION SIGNS. DELETE in its entirety and SUBSTITUTE with the following:

3-11 TEMPORARY PROJECT SIGNS.

3-11.1 Street Name Signs.

1. Upon the completion of rough grading and prior to underground construction, provide and maintain temporary street name signs at each intersection until the permanent street name signs have been placed.

2. Construct and place temporary street name signs to the following requirements:

a. 5 inch (127 mm) high black lettering on 8 inch by 32 inch (203.2 mm by 812.8 mm) white blades.

b. The bottom of the blades shall be at least 7 feet (2.1 m) above ground line and mounted on white 4 inch by 4 inch (101.6 mm by 101.6 mm) posts.

c. Posts shall be placed radial to the mid-point of curb returns, 15 feet (4.6 m) in from the future face of curb.

3-11.2 Project Identification Signs.

1. The City shall provide 1 to 4 signs. Project signs will include the funding source if the project is funded in part by State Gas Tax Revenue (SB1). Contact the Engineer to pick up the Project signs, install them at the Work location(s), and maintain them in a manner approved by the Engineer.

2. Display project identification signs as follows:

a. **Utility Group Projects.** Display a project identification sign and a project location sign at the beginning and ending of the street where construction is actively occurring.

b. **Open Sites.** For Work locations that are open and accessible to the public, mount the signs on a standard Type II barricade and display them every day during Work hours, then remove and store during non-Work hours.

c. **Secure and Confined Sites.** For Work locations that are closed and secure from public access, mount the signs continuously, as directed by the Engineer, and display them for the duration of the Contract.

3. Remove and return the signs to City locations designated by the Engineer upon Acceptance.

3-11.3 Contract Information Signs.

1. The names, addresses, and specialties of you, your Subcontractors, architects, or engineers may be displayed on removable signs. The size, location, and details shall conform to the details specified in the Contract Documents or as shown on the Plans.

2. Commercial advertising matter shall not be attached to or painted on the surfaces of buildings, fences, canopies, or barricades.

3. Any advertisement referring to the City as a user of a product, material, or service by you or your Subcontractor and Supplier is expressly prohibited without the City's prior written approval.

3-11.4 Payment.

1. The payment for Street Name and Project Identification signs shall be included in the Bid item for "Traffic Control" in accordance with 601-7, "Payment". If no "Traffic Control" Bid item exists, the payment shall be included in the Contract Price.

3-12.1 General. ADD the following:

1. Maintain Site improvements including any temporary facilities, equipment, or other materials. Remove graffiti encountered on the Site within 24 hours. See also SECTION 400 - PROTECTION AND RESTORATION.

2. **When specified**, you shall provide a PM-10 certified self-loading motorized street sweeper equipped with a functional water spray system for this project.

ADD:

3-12.1.1 Affidavit of Legal Disposal.

1. As a condition of Final Payment, you shall submit a signed and notarized affidavit stating that all brush, trash, debris, and surplus materials resulting from this Project have been disposed of in a legal manner. See the Affidavit of Disposal in the Contract Documents. Disposal of refuse generated as a result

of the Contract at the City landfills shall be subject to a fee. Contact the Refuse Disposal Division at (858) 573-1418 for fee information.

ADD:

3-12.1.2 Sanitation.

1. **If required in the Special Provisions**, provide and maintain enclosed toilets for the use of the City's and your officers, employees, or agents. Keep these accommodations in a neat and sanitary condition and ensure that they comply with all applicable laws, ordinances, and regulations pertaining to public health and sanitation of dwellings and camps.

ADD:

3-12.1.3 Payment.

1. The payment for Work Site maintenance, as described in 3-12.1, "General" through 3-12.4, "Storage of Equipment and Materials" shall be included in the Contract Price.
2. Disposal of refuse generated as a result of the Contract at the City landfills as described in 3-12.1.1, "Affidavit of Legal Disposal" shall include all fees and shall be included in the Contract Price.

ADD:

3-12.2.1 Dust Abatement.

1. You shall carry out effective measures whenever and as often as necessary to prevent your operation from producing dust in amounts damaging to property, cultivated vegetation, domestic animals, or causing a nuisance to persons living or occupying buildings in the vicinity. You shall be responsible for any damage resulting from any dust originating from your operations. The dust abatement measures shall be continued until you are relieved of further responsibility by the Engineer

3-12.4.1 General. ADD the following:

1. Equipment and material storage shall be confined to areas approved by the Engineer. Disposal of all rubbish and surplus materials shall be at your expense. Disposal shall be made off the Site and shall be in accordance with:
    a. Local codes and ordinances that govern locations and methods of disposal.
    b. All applicable safety laws.
    c. Requirements of Subpart H, §1926.252 of the OSHA Safety and Health Standards for Construction.

ADD:

3-12.4.3 Storage and Staging Areas.

1. If the Plans designate or the Engineer approves an area for storage and staging within the Project limits or in proximity, utilize such area for your use. Otherwise, storage and staging areas are your responsibility. The storage and staging areas shall be as close as possible to the Site. You are responsible for obtaining any permits, leases, or any other items necessary to obtain staging areas.
2. The City does not allow the storage of hazardous wastes, construction equipment material, and parking and fueling of equipment in the Multiple Habitat Planning Area (MHPA) or other biologically sensitive areas. Ensure the fueling of vehicles occurs only within designated storage and staging areas using appropriate catch basins and devices.
3. Maintain and protect the existing improvements throughout the duration of construction and return the storage and staging area to an equal or better condition as deemed necessary by the Engineer, at no additional cost to the City at the completion of construction and vacation of the staging and storage area.
4. Remove and replace trees damaged or declining with new trees from minimum 24-inch box containers and remove and replace shrubs damaged or declining with new shrubs from 15-gallon containers. Replant the damaged lawn areas with sod only following soil testing, soil preparation, and fine grading per these specifications. The Engineer determines the condition of all plant materials.

3-12.5.1 General. ADD the following:

1. You shall observe and comply with the City's policy of zero spills. You shall be liable for all damages sustained by the City that result from sewage spills caused by your actions.
2. You shall designate a person responsible for the development and enforcement of the Spill Prevention and Emergency Response Plan, and for ensuring sewer spills are minimized to the maximum extent possible. You shall provide a status of all bypass related Work at biweekly progress meetings as requested by the City.

3-12.5.2 Sewage Bypass and Pumping Plan. ADD the following:

1. You shall submit to the Engineer for approval, a Sewage Bypass and Pumping Plan at least 15 Working Days prior to the implementation of flow diversion in compliance with the City's policy of "Zero Spills". The Sewage Bypass and Pumping Plan shall indicate the sequence of diversion operations, all other operations that you shall establish to maintain wastewater service during the construction period, and a quality assurance and quality control plan for the

diversion Work. The Sewage Bypass and Pumping Plan shall include an emergency response plan indicating the procedures, equipment, and activities that shall be implemented in the event of an emergency shutdown or failure of the flow diversion equipment used for construction. You shall be responsible for the implementation of the emergency plan in accordance with 3-12.5.3, "Spill Prevention and Emergency Response Plan".

2. Your Sewage Bypass and Pumping Plan shall be reviewed and approved by the Wastewater Collection Division of the City before flow can be diverted. No deviation from the approved Sewage Bypass and Pumping Plan shall be allowed without prior approval from the Engineer.

3. You shall be fully responsible for preventing, containing, recovering, and legally disposing sewage spills. This shall include any fines, penalties, claims, and liabilities arising from negligently causing a sewage spill and any violation of any law, ordinance, code, order, or regulation as a result of the spill.

4. You shall exercise care not to damage existing public and private improvements and not to interrupt existing services or facility operations which may cause sewage spills. Any reasonably anticipated utility or improvement which is damaged by your actions shall be immediately repaired at your expense. In the event that you damage an existing utility or interrupt an existing service which causes a sewage spill, immediately call the emergency number at (619) 515-3525.

5. You shall provide all facilities, labor, power, and appurtenances necessary to divert wastewater flows as necessary to allow proper installation of the pipeline and/or manhole linings.

6. You shall submit as part of your Sewage Bypass and Pumping Plan the monitoring procedure and frequency and shall continuously monitor the flow levels downstream and upstream of the flow diversion to detect any possible failure that may cause a sewage backup and spills. You shall maintain a log of the monitoring and provide daily copies to the Engineer in a manner acceptable to the Engineer.

7. You shall inspect and maintain the diversion system daily, including the back-up system. You shall submit with your Sewage Bypass and Pumping Plan the maintenance procedures and frequency. You shall maintain a log of all inspection, maintenance, and repair records and shall provide copies to the Engineer upon request in a manner acceptable to the Engineer.

8. You shall size the flow diversion system to handle the peak flow and shall include a 100% backup in the flow diversion system. You shall provide temporary means to maintain and handle the sewage flow in the existing system as required to complete the necessary construction. You shall utilize the flow diversion system to mitigate any additional wet weather flows, perform the necessary maintenance and repairs on the flow diversion system, and exercise and ensure the operation of the backup system. Each pump, including the backup pumps, shall be a complete unit with its own suction and discharge piping.

9. You shall operate the backup flow diversion system for a minimum of 25% of the total diversion time on a weekly basis. The backup flow diversion system shall be fully installed, operational, and ready for immediate use. The diversion system shall be hydraulically tested with clean water prior to wastewater flow diversion. You shall demonstrate to the satisfaction of the Engineer that both the primary and backup flow diversion systems are fully functional and adequate and shall certify the same in writing to the Engineer in a manner acceptable to the Engineer.

10. If fuel or generator driven pumps are used, you shall provide one dedicated fuel tank for every single pump or generator. You shall provide an emergency standby power generator if electric power driven pumps are used. You shall provide a fuel level indicator outside each fuel tank. While in use, continuously monitor the fuel level in the tanks and ensure that the fuel level does not drop below a level equivalent of 2 hours of continuous flow diversion system operation. You shall take the necessary measures to ensure that the fuel supply is protected against contamination. This includes but is not limited to fuel line water traps, fuel line filters, and protecting fuel stores from precipitation. You shall monitor all hoses and repair leaks immediately.

3-12.5.3 Spill Prevention and Emergency Response Plan. ADD the following:

1. Prior to the start of construction, you shall develop and submit to the Engineer for review and approval, a written Spill Prevention and Emergency Response Plan. The plan shall include a sewage spill response plan, spill containment and cleanup plan, staging area, and sewage bypass and pumping plan.

2. The Spill Prevention and Emergency Response Plan shall be developed to respond to any construction related sewage spills. The plan shall include:

    a. Identifying all nearby environmentally-sensitive areas such as waterways, channels, catch basins, and entrances to existing underground storm drains.

    b. Making arrangements for an emergency response unit stationed at or near the Site that is comprised of emergency response equipment and trained personnel to be immediately dispatched in the event of a sewage spill. If in an environmentally-sensitive area such as a canyon, this shall include field biologists, archaeologists, or both.

    c. An emergency notification procedure that includes an emergency response team with telephone numbers and arrangements for backup personnel and equipment. The emergency response unit shall be able to dispatch to the Site 24 hours a day, 7 Days a week including weekends and Holidays. You shall designate primary and secondary representatives by their respective phone numbers, pager numbers, and mobile phone numbers. Your representatives shall be accessible and available at all times to respond immediately to any sewer spill event.

d. Identifying any property owners who may be affected such as the City Park and Recreation Department.

3. At the pre-construction meeting you shall be provided with a list of the City representatives to contact in case of sewage spills. In case of a sewage spills, you shall immediately call the Sewage Spill Hotline number at (619) 527-5481 and shall act immediately without instructions from the City, to control the spill and take all appropriate steps to contain it in accordance with the 3-12.5.3 "Spill Prevention and Emergency Response Plan" and 3-12.5.2, "Sewage Bypass and Pumping Plan". You shall immediately notify the City representatives of the spill and shall report the Project name, location, Contractor name, Project Engineer name, and the Engineer name.

4. Within 3 Working Days from the occurrence of the spill, submit to the Engineer a written report describing the following information related to the spill: the location, the nature and estimated volume, the date and time, the duration, the cause, the type of remedial and/or clean up measures taken (including erosion control measures), the date and time of implementation, the corrective and/or preventive actions taken to avoid further spills, the equipment used in the spill response, and the environmentally-sensitive habitat, such as a water body, if any, that has been impacted and the results of any necessary monitoring. You shall provide a list of names from the City of which whom were notified, the date and time of notification, the date and time you were notified of the spill, and the date and time you arrived on Site.

5. The Engineer may institute further corrective actions, as deemed necessary, to fully comply with existing laws, ordinances, codes, orders, or other pertinent regulations. In addition to any penalties provided by federal, state, and local laws, you shall be responsible for all costs incurred for the corrective actions including mitigation measures (habitat restoration and etc.) and obtaining after-the-fact permits, if necessary, in environmentally sensitive areas. These permits include but are not limited to those from the City Planning Department Development Services, California Coastal Commission, U.S. Army Corps of Engineers, and the California Department of Fish and Game.

6. It shall be your responsibility to ensure that all field forces, including Subcontractors, know and obey all safety and emergency procedures, including the Spill Prevention and Emergency Response Plan applicable to the Work to be maintained and followed at the Site. Impacts shall be minimized if the Site is in an environmentally sensitive area, such as canyons, streams, or lagoons. Crews shall be aware at the start of the job of any sensitive environmental habitats, breeding season restrictions, and etc.

7. You shall prevent spills when working on sewer lines, such as when making temporary connections and when connecting new lines into the sewer system, and shall ensure that no laterals are connected to mains being abandoned. Ensure that diversions are appropriately installed and that diversions are completely removed when finished so there are no blockages. You shall not

trap debris and discharge rock or debris downstream. Avoidance of streams is paramount, unless authorized via permits.

8. You shall defend, indemnify, protect, and hold harmless the City, its agents, officers, and employees, from and against all claims asserted or liability established for damages or injuries to any person or property resulting from any sewage spill caused or claimed to be caused by your action or failure to take measures to prevent a spill. You shall be responsible for the payment of any fines assessed against the City for such sewage spills. Your duty to indemnify and hold harmless shall not include any claims or liability arising from the established active or sole negligence or willful misconduct of the City, its agents, officers or employees.

9. You shall obtain and maintain an additional insurance coverage for Pollution Liability with its limits and requirements as set forth in 5-4, "INSURANCE" of the Contract Documents. The limits and requirements for Pollution Liability shall be in an amount sufficient to cover potential losses from sudden and accidental pollution.

ADD:

3-12.5.4 Payment.

1. The payment for the Sewage Bypass and Pumping Plan and its implementation including labor, facilities, equipment, power, appurtenances, and all incidental Work shall be included in the Bid item for "Sewage Bypass and Pumping Plan".

2. **Full compensation for the Spill Prevention and Emergency Response Plan** and its implementation including labor, facilities, equipment, power, appurtenances, and all incidental Work shall be included in the Contract Price.

3-12.6 Water Pollution Control. DELETE all sections and subsections in its entirety and SUBSTITUTE with the following:

1. See Part 11 - STORM WATER for permanent and construction storm water requirements.

ADD:

3-12.7 Drinking Water Discharge Requirements.

3-12.7.1 Discharges to Storm Drains.

1. All discharge related to the project of water used for testing and acceptance of new water mains to the storm drain shall comply with the State Water Resources Control Board, ORDER WQ 2014-0194-DWQ, STATEWIDE GENERAL NPDES PERMIT FOR DRINKING WATER SYSTEMS DISCHARGES (Order) found at the State Boards website at the following location:

http://www.waterboards.ca.gov/water_issues/programs/npdes/docs/drinkingwater/final_statewide_wqo2014_0194_dwq.pdf

2. All monitoring, sampling, and reporting for compliance with the Order shall be completed by a QSP.

3. Best Management Practices (BMPs) shall be in place prior to the start of discharge. At a minimum, you shall:

   a. Sweep the gutter and street in the flow path.

   b. Provide inlet protection at all inlets receiving discharge.

   c. Provide dechlorination.

   d. Implement sediment and erosion control measures such as diffusers, check dams, flow controls, etc.

   e. You shall not allow discharges to flow across unimproved areas prior to it reaching the inlet.

4. Monitoring and Samples.

   a. As required by the Order, you shall monitor, sample and report all discharges to the storm drain. You shall record the results for each discharge event on the City's Drinking Water Discharge Monitoring form **included as an Appendix in the Contract Documents**. Submit completed forms to the Engineer within 5 Working Days of the discharge event.

   b. You shall notify the Regional Water Quality Control Board at (619) 521-3966 and the Storm Water Department at (619) 235-1000 prior to the start of any large volume discharge (greater than 1 acre-foot volume).

   c. You shall notify The County of San Diego, Department of Environmental Health (DEH) at (858)495-5579 prior to the start of discharges 100,000 gallons or more within ¼ mile of the ocean or bay coastline.

   d. Sampling and reporting requirements are outlined in the Order.

      1) For superchlorinated discharges, at a minimum you shall sample chlorine, turbidity, and pH the first 10 minutes of discharge, between 50 to 60 minutes from the start of the discharge, and at the last 10 minutes of discharge and provide an estimate of the total volume of water discharged.

      2) For large volume discharges (or discharges greater than 1 acre-foot in total volume), at a minimum you shall sample chlorine and turbidity the first 10 minutes of discharge, between 50 to 60 minutes from the start of the discharge, and at the last 10 minutes of discharge and provide an estimate of the total volume of water discharged.

3) For discharges that are not superchlorinated and are under 1 acre-foot in total volume, at a minimum you shall provide an estimate of the total volume of water discharged.

e. Effluent limits for receiving waters are as follows:

1) Total chlorine field measurement of 0.1 mg/L.

2) Visual turbidity measurement of 20 turbidity units (NTUs) for surface waters and 225 NTU for ocean.

3) Total pH field measurement of 6.5 to 8.5.

f. Receiving Water Monitoring: if effluent limits are exceeded, the discharge shall be stopped immediately, BMPs shall be adjusted until discharge is no longer exceeding limits. The QSP shall monitor receiving waters for adverse effects to water quality. The QSP shall document where the discharge enters the receiving water with photographs. The QSP shall document if it is unsafe to access or if unable to determine the location of where the discharge enters receiving waters. If any adverse effect to water quality is observed, the Resident Engineer and Regional Water Quality Control Board shall be notified immediately.

5. Areas of Special Biological Significance (ASBS).

a. Non-storm water discharges including drinking water discharges to Areas of Special Biological Significance (ASBS) are prohibited. These are ocean areas requiring protection of species or biological communities to the extent that alteration of natural water quality is undesirable and are classified as a subset of State Water Quality Protection Areas. Non-storm water discharges shall be located outside of the designated areas to ensure maintenance of natural water quality conditions in these areas.

b. A map showing ASBS locations can be found in the Storm Water Standards Manual Part 2 Appendix A. The areas in the San Diego Region include: La Jolla (ASBS #29), Scripps (ASBS #31), and La Jolla Shores watershed boundaries.

3-12.7.2 Discharges to Sewer Systems.

1. If prior approval is obtained to discharge to the sewer system, you shall discharge the water used for testing and acceptance of new water mains to the sewer system in accordance with the Contract Documents as shown on the batch discharge Plans. You shall submit to the Engineer a "Request for Batch Discharge Authorization to Discharge Potable Pipe Flushing Water to Sewer" form.

a. The request form is found on the City website at the following location:

https://www.sandiego.gov/sites/default/files/pipe_flush_batch_disch_0.pdf

b. When discharging to the sewer system has been approved, you shall use a totalizer flow meter to record the total volume discharged to sewer and shall submit to the Engineer a log of actual discharged water quantities, dates, and locations. Failure to report this information to the Engineer is a violation of the authorization for discharge to the sanitary sewer. Within 5 Working Days of the discharge, the Resident Engineer shall receive and report actual total flows to the sanitary sewer to the Public Utilities Department (PUD), Industrial Wastewater Control Program (IWCP).

c. If the discharge to the sewer system is not approved, you shall discharge the water used for the testing of new mains to surface waters, storm drain inlets, or to other approved sources and shall comply with 3-12.7, "Drinking Water Discharge Requirements".

3-12.7.3 Payment.

1. The payment for complying with the requirements of drinking water systems discharge to storm drains shall be included in the Bid item for "Drinking Water Discharge Monitoring by QSP".

2. The payment for complying with the discharge requirements for discharges to sewer systems shall be included in the Bid item for the new water main.

ADD:

3-12.8 Dewatering.

1. The dewatering shall include Site dewatering and the treatment of contaminated water to lower and control groundwater levels and hydrostatic pressures to permit excavation and construction to be performed properly under dry conditions.

2. Dewatering operations shall be adequate to stabilize vertical excavations during trenching or cofferdam installation and shall provide for sound soil conditions suitable for subgrade applications for the item being constructed.

3. Where the excavation is below the groundwater table, sheet piles shall be used and driven to a depth of at least 5 feet (1.5 m) below the bottom of the excavation. For the groundwater table and other information, refer to the subsurface information **when provided in the Contract Documents** for this project. Dewatering shall be performed by you when specifically required by the Plans or Specifications and as necessary for the construction of the Work. Dewatering shall be performed in conformance with all applicable local, state, and Federal laws and permits issued by jurisdictional regulatory agencies. Permits necessary for the treatment and disposal of accumulated water shall be obtained by you. Accumulated ground water shall be treated prior to disposal if so **specified in the Special Provisions** or required by a permit.

4. You shall be responsible for the integrity of the finished product and the protection of adjacent structures and facilities impacted by dewatering operation.

5. Prepare a Community Health and Safety Plan in accordance with 5-15.3, "Community Health and Safety Plan (CHSP)".

3-12.8.1 Permits.

1. Unless the type of the permit is **specified in the Special Provisions**, necessary permits from regulatory agencies or Public Utilities Department - Wastewater Section, if applicable, shall be obtained for the disposal of water. If you decide to discharge into the sewer system, you shall obtain a permit from Public Utilities Department - Wastewater Section for discharging into the sewer system as outlined in the Public Utilities Department - Wastewater Section policy for Ground Water Discharges attached to the Contract. If you choose to discharge into the storm drain system, you shall obtain and comply with Regional Water Quality Control Board (RWQCB) permit Order No. R9-2008-0002 NPDES No. CAG919002 (San Diego Region for groundwater remediation and dewatering waste discharges to surface waters within the San Diego region except for San Diego Bay), or Order No. R9-2007-0034 NPDES No. CAG919001 (discharges tributary to the San Diego Bay), as well as comply with 3-12.7, "**Drinking Water Discharge Requirements"** as applicable.

3-12.8.2 Dewatering Plan.

1. You shall submit a dewatering plan in accordance with 3-8, "SUBMITTALS" detailing its proposed plan and methodology of dewatering and treatment and disposal of accumulated water (when contaminated water is present) prior to the commencement of excavation.

2. The Dewatering Plan shall include the following:

   a. Pump test report.

   b. Identification of location, type, and size of dewatering devices such as head and capacity of dewatering pumps and related equipment, the size and type of materials composing the collection system, the size and type of equipment to be used to retain and, if required, treat accumulated water, and the proposed disposal locations.

   c. Number and location of dewatering wells.

   d. Depth and size of dewatering wells.

   e. Descriptions of methods and placement of equipment, as well as supporting calculations signed by a Professional Engineer registered in the State of California for dewatering of excavations.

   f. Field demonstration of proposed system and verification that adequate personnel, materials, and equipment are readily available.

g. Written evidence of permission from California RWQCB or approved Public Utilities Department - Wastewater Section discharge permit, if not obtained by the City, original signed permits from jurisdictional regulatory agencies, or written evidence that such permits are not required.

3. The pump test and report shall be conducted under the direct supervision of a certified hydrogeologist. The pump test shall provide adequate data to support the groundwater hydrology calculations. This submittal shall include all raw data and calculations. It shall also be signed and stamped by the certified hydrogeologist.

4. You shall refer to the reports prepared by the City and included in the Contract Documents in accordance with 3-9, "TECHNICAL STUDIES AND SUBSURFACE DATA" for the preparation of the dewatering plan.

3-12.8.3 Equipment.

1. The dewatering system shall include:

   a. Well points.
   b. Sump pumps.
   c. Temporary pipelines for water disposal.
   d. Flow meter.
   e. Rock or gravel placement.
   f. Sedimentation tanks.
   g. Equipment necessary for the treatment of contaminated groundwater.
   h. Other means and services, including standby pumping equipment maintained on the Site continuously.

      1) The standby pumping equipment shall include at least two standby pumping units secured on site that are completely ready to be inserted into a dewatering well to prevent groundwater from rising during the course of construction.

2. Sufficient dewatering equipment shall be installed to pre-drain the water-bearing strata below the bottom of foundations, drains, sewers, and other excavations.

3. You shall remove equipment when no longer required for dewatering, monitoring, or water controlling operations.

4. The approved dewatering system shall include a suitably sized pipeline to transport extracted groundwater from the Work Site to the indicated point of discharge as applicable under the dewatering permit in force during the dewatering operations. The alignment of this pipeline shall be subject to the approval by the Engineer. Where the pipeline is allowed to cross roadways or parking areas, you shall be required to install a conduit below the traveled surface. The installation shall provide protection for the temporary pipeline and a smooth

transition across the traveled Surface in accordance with Standard Drawing SDG-107, “Pavement Restoration for Asphalt Concrete Surfaced Streets - Major Excavation" or a concrete trench cap in accordance with Standard Drawing SDG-108, "Pavement Restoration for Concrete Surfaced Streets and Alleys - Major Excavation".

3-12.8.4 Dewatering Operation.

1. The hydrostatic head in water-bearing strata below foundations, drains, sewers and other excavations shall be reduced to ensure that the water level and piezometric water levels are below the excavation surface at all times. Dewatering shall be continuously maintained a minimum of 3 feet (0.9 m) below the excavation during the entire construction period until the backfill and compaction is completed.
2. The dewatering system shall be placed into operation prior to excavation below ground water level to lower the ground water level and shall be operated continuously 24 hours a Day and 7 Days a week until drains, sewers, and structures have been constructed, fill materials have been placed, and dewatering is no longer required.
3. The Site shall be graded to facilitate drainage. Surface runoff shall be diverted from excavations. Water entering the excavation from surface runoff shall be collected in shallow ditches around the perimeter of the excavation, drained to sumps, and pumped or drained by gravity away from the excavation.
4. Adequate control shall be maintained to ensure that the stability of excavated and constructed slopes are not adversely affected by water, that erosion is controlled, and that flooding of excavation or damage to structures does not occur.
5. Where critical structures or facilities exist immediately adjacent to areas of proposed dewatering, reference points shall be established and observed at frequent intervals to detect any settlement which may develop.
6. Dewatering shall at all times be conducted in such a manner as to preserve the undisturbed bearing capacity of the subgrade soils at the proposed bottom of excavation.
7. Flotation of structures and facilities shall be prevented by maintaining a positive and continuous removal of water.
8. The release of groundwater to its original level shall be performed in such a manner as not to disturb natural foundation soils, prevent disturbance of compacted backfill, and prevent flotation or movement of structures, pipelines, and sewers.
9. If foundation soils are disturbed or loosened by the upward seepage of water or an uncontrolled flow of water, the affected areas shall be excavated and replaced with drain rock at no additional cost to the City.

10. If well points or wells are used, they shall be adequately spaced to provide the necessary dewatering and shall be sand-packed and shall prevent the pumping of fine sands or silts from the subsurface. Other means may be used to prevent the pumping of fine sands or silts from the subsurface. A continual check shall be maintained to ensure that the subsurface soil is not being removed by the dewatering operation.

11. Water and debris shall be disposed of in a suitable manner without damage to adjacent property. No water shall be drained into Work built or areas under construction. Water shall be filtered to remove sand and fine-sized soil particles and further treated if required by regulatory agencies before disposal into any drainage or sewer system.

12. You may discharge water into the sewer system as outlined in the Public Utilities Department - Wastewater Section policy for Ground Water Discharges attached to the Contract. When applicable, the discharge points and flow data for the existing sewer system will be in the Contract Documents.

13. You shall maintain operation of monitoring and settlement measurement systems until their removal is approved. To the extent approved, well points and like items may be abandoned in place. Otherwise, all temporary dewatering, recharging facilities, or both shall be removed in a manner satisfactory to the Engineer. Any items abandoned in place shall be indicated on the Red-lines Plans.

14. You shall include adequate time in the schedule to obtain permits prior to the start of construction. If required by the permitting entity, the City may assist you in obtaining permit approval.

3-12.8.5 Contaminated Water.

1. Contaminated water shall mean any type of contamination present in the collected water that precludes direct discharge to the sewer or storm drain as outlined in the discharge permit issued by the respective regulatory agency.

2. **If indicated in the Contract Documents** or following groundwater testing during construction it is found to be contaminated with petroleum, you shall provide, install, maintain and operate the equipment necessary to treat the contaminated water to bring it to compliance with the dewatering and discharging permits from RWQCB, Public Utilities-Wastewater Section, or both.

3. For contaminated water treated as Hazardous Waste refer to 5-15, "ENCOUNTERING OR RELEASING HAZARDOUS SUBSTANCES" and the specifications in this subsection.

3-12.8.6 Dewatering System.

1. You shall prepare a dewatering system with the contingency of encountering hazardous materials such as gasoline and other fuel constituents in the specified areas. The dewatering system plan shall be designed to process

contaminated groundwater with the contingency of processing flammable liquids.

2. If other types of hazardous constituents are encountered, additionally encountered along with petroleum constituents, or are indicated in the Contract Documents, the dewatering system shall be designed to process those contaminants in order to comply with the regulatory discharge permit.

3-12.8.7 Hazardous Waste Operations and Emergency Response (HAZWOPER) Certificate.

1. If flammable liquids or other hazardous wastes are encountered during dewatering activities, construction staff shall be required to have a HAZWOPER certificate in accordance with 5-15.2, "General" and in compliance with CCR Title 8, Section 5192 and 29 CFR, Part 1910.

3-12.8.8 Payment.

1. The payment for preparing a Community Health and Safety Plan shall be paid in accordance with 5-15.15, "Payment".

2. The Allowance Bid item for "Dewatering Permit and Discharge Fees" shall cover all costs for fees and related expenses for obtaining permits.

3. The payment for dewatering hazardous contaminated water shall be included in the lump sum Bid item for "Dewatering Hazardous Contaminated Water" and shall include furnishing, setting up and removal, and operating all equipment necessary to treat and discharge the hazardous contaminated groundwater.

    a. Submit supporting invoices and a Schedule of Values for the Lump Sum Bid item for "Dewatering Hazardous Contaminated Water" in accordance with 7-2.1, "Schedule of Values (SOV)". The SOV shall itemize the Work to show the following:

        1) All costs associated with handling contaminated groundwater specified in 3-12.8.6, "Dewatering System", and 3-12.8.7, "Hazardous Waste Operations and Emergency Response (HAZWOPER) Certificate".

        2) All costs associated with equipment used for dewatering hazardous contaminated groundwater, including costs for mobilization and demobilization.

        3) All rental and operating costs for equipment used for dewatering contaminated groundwater.

4. The payment for the handling and disposal of the hazardous contamination shall be in accordance with 5-15.15, "Payment".

5. The payment for dewatering non-hazardous contaminated water shall be included in the lump sum Bid item for "Dewatering Non-Hazardous Contaminated Water" and shall include furnishing, setting up and removal, and operating all equipment necessary to complete the Work.

6. The payment for Hazardous Waste Operations and Emergency Response (HAZWOPER) certification and training for construction staff shall be paid in accordance with 5-15.15," Payment".

3-13.1 Completion. DELETE in its entirety and SUBSTITUTE with the following:

1. You shall submit a written assertion that the Work has been completed and is ready for Owner Acceptance. If, in the Engineer's judgment, the Work has been completed in accordance with the Contract Documents, the Engineer will set forth in writing the date the Work was completed. This will be the date that you are relieved from responsibility to protect and maintain the Work and to which liquidated damages will be computed.

ADD:

3-13.1.1 Requirements Before Requesting Substantial Completion.

1. The following items are required prior to requesting a Substantial Completion:
   a. Remove temporary facilities from the Site.
   b. Thoroughly cleaning the Site and removing all mark outs and construction staking.
   c. Provide completed and signed Red-lines in accordance with 3-7.3 "Redlines and Record Documents".
   d. Provide all material and equipment maintenance and operation instructions and/or manuals.
   e. Provide all tools which are permanent parts of the equipment installed in the Project.
   f. Provide and properly identify all keys for construction and all keys for permanent Work.
   g. Provide all final Special Inspection reports required by the applicable building Code.
   h. Provide all items specified to be supplied as extra stock. Wrap, seal, or place in a container all items as necessary to allow for storage by the City for future use. Verify the specified quantities.
   i. Ensure that all specified EOCP and certified wage rate documentations covering the Contract Time have been submitted.
   j. If the Work includes installing an irrigation system, provide the spare parts for the proposed irrigation system **as specified in the Special Provisions**.
   k. If the Work includes sewer and storm drain installations, the inspection shall include televising in accordance with 306-18, "VIDEO INSPECTION".
   l. If the Work includes a Plant Establishment Period, Work in accordance with 801-6, "MAINTENANCE AND PLANT ESTABLISHMENT" shall be

completed prior to requesting Substantial Completion, unless approved otherwise by the Owner.

m. Notify the Engineer to arrange a final inspection of any permanent BMPs installed.

ADD:

3-13.1.2 Walk-through and Punchlist Procedure.

1. You shall notify the Engineer 15 Working Days in advance of date of anticipated Substantial Completion to allow time for Engineer to schedule a Walk-through.

2. After you complete the requirements in 3-13.1.1, "Requirements Before Requesting Substantial Completion" and when you consider that the Work is Substantially Complete, you will notify the Engineer in writing that the Project is Substantially Complete and request a Walk-through. The Engineer will review your request and determine if the Project is ready for a Walk-through, by verifying whether you have completed all items as required by 3-13.1.1, "Requirements Before Requesting Substantial Completion". Within 7 Working Days, the City will either reject your request for a Walk-through in writing or schedule and conduct a Walk-through inspection. The Engineer shall facilitate the Walk-through.

3. The following documents shall be provided at the time of your Walk-through request: As-Built markup, Plans, specifications, technical data such as submittals and equipment manuals, draft final payment, warranties, material certifications, bonds, guarantees, maintenance service agreements, and maintenance and operating manuals.

4. Written warranties, except manufacturer's standard printed warranties, shall be on a letterhead addressed to you. Warranties shall be submitted in the format described in this section, modified as approved by the City, to suit the conditions pertaining to the warranty. Lack of submitting these items will delay start of Walk-through.

5. The Engineer will provide you with the Punchlist within 15 Working Days after the date of the Walk-through. The City shall not provide a preliminary Punchlist.

6. If the Engineer finds that the Project is not Substantially Complete as defined herein, the Engineer will terminate the Walk-through and notify you in writing.

7. If, at any time during the Engineer's evaluation of the corrective Work required by the Punchlist, the Engineer discovers that additional corrective Work is required, the Engineer may include that corrective Work in the Punchlist.

8. You shall remain solely responsible for the Project Site until the Project is completely operational, all Punchlist items have been corrected, all operation and maintenance manuals have been approved, all necessary warranty letters have been received, and the work is formally accepted by the City.

9. The Engineer shall meet with you within 5 Working Days of notification that all Punchlist items are corrected. You shall complete the Punchlist within 30 Working Days, and the Working Days will continue to be counted until Acceptance of the Project.

3-13.2 Acceptance. DELETE in its entirety and SUBSTITUTE with the following:

1. You shall provide the completed, signed, and stamped DS-563 to the Engineer prior to Acceptance.
2. You shall deliver the final As-builts and final billing upon project acceptance and prior to filing the project Notice of Completion.
3. You shall assemble and deliver to the Engineer a Final Summary Report and Affidavit of Disposal upon project acceptance and prior to filing the project Notice of Completion.
4. Acceptance shall occur after all of the requirements contained in the Contract Documents have been fulfilled. If, in the Engineer's judgment, you have fully performed the Contract, the Engineer will recommend to the City Engineer that your performance of the Contract be accepted. You shall receive notification of Acceptance in writing from the Owner and counting of working days shall cease and Warranty begins.
5. Retention can be released 35 Calendar Days after NOC. Submit your request for retention to the Resident Engineer and they will mail to you a "Release of Claims" form which shall be completed and returned before the retention will be released.

3-13.3 Warranty. DELETE in its entirety and SUBSTITUTE with the following:

1. You shall warranty and repair all defective materials and workmanship for a period of 1 year. This call back warranty period shall start on the date the Work was accepted by the City unless the City has Beneficial Use or takes Occupancy of the project earlier (excluding water, sewer, and storm drain projects).
2. You shall warranty the Work free from all latent defects for 10 years and patent defects for a period of 4 years.
3. The warranty period for specific items covered under manufacturers' or suppliers' warranties shall commence on the date they are placed into service at the direction of the Engineer in writing.
4. All express warranties from Subcontractors, manufacturers', or Suppliers', of any tier, for the materials furnished and Work performed shall be assigned, in writing, to the City, and shall be delivered to the Engineer prior to the Acceptance of your performance of the Contract.
5. Replace or repair defective materials and workmanship in a manner satisfactory to the Engineer after notice to do so from the Engineer and within the time specified in the notice. If you fail to make such replacements or repairs within the time specified in the notice, the City may perform the

replacement or repairs at your expense. If you fail to reimburse the City for the actual costs, your Surety shall be liable for the cost

6. Items that shall be warrantied free from defective workmanship and materials for a period longer than 1 year are as follows:

Specified Item	**Minimum Warranty Period**
Detectable Warning Tile Construction	3 Years of Manufacturer's Warranty
All Work Under SECTION 500 – PIPELINE REHABILITATION	3 Years
Fiber Optic Interconnect Cables	2 Years
Luminaires*	10 Years of Manufacturer's Warranty
LED Signal Modules	3 Years of Manufacturer's Warranty
Field Devices Associated with 700-6.3, "Adaptive Control Note"	See 700-6.3.9, "Warranty"

* Provide documentation verifying that the induction luminaire models being offered for the Project are covered by the 10 year warranty.

7. If installed, you shall provide the City and property owner a copy of the manufacturer's warranty for private sewer pumps, including the alarm panel and all other accessories.

   a. You shall involve the manufacturer in the installation and startup as needed to secure any extended warranty required.

   b. Nothing in here is intended to limit any manufacturer's warranty which provides the City with greater warranty rights than set forth in this section or the Contract Documents.

   c. The warranty shall include all components. The form of the warranty shall be approved by the Engineer in accordance with **3-13.3**.2, "Warranty Format Requirements".

8. If, during the warranty period, any item of the Work is found to be Defective Work, you shall correct it promptly after receipt of written notice from the City to do so. The warranty period shall be extended with respect to portions of the Work corrected as part of the warranty requirements.

ADD:

3-13.3.1 Defective Work.

1. If the Engineer finds any part of the Work, to be defective or not in compliance with the Contract Documents, you shall correct the Defective Work in accordance with the Engineer's written instructions and within the specified time limits.

2. The Engineer may order you to stop all or part of the Project if, upon notice, you fail to immediately correct the Defective Work in conformance with the Contract Documents. You bear all direct and indirect costs and damages that result from the City's Stop Work notice.

3. The Engineer may determine in its sole discretion to accept Defective Work instead of having you correct the Defective Work. However, you will still be financially responsible for the Defective Work. The Engineer shall issue a deductive Change Order and will incorporate the necessary revisions in the Contract Documents for the Defective Work, the diminished value to the Project, or for the cost to repair the Defective Work.

4. If you fail to correct Defective Work within the specified time limits, the Engineer may correct your Defective Work. The City has the right to correct any Defective Work without notice in the event of an emergency. You shall bear all direct and indirect costs of the Defective Work that the City corrects.

5. When undertaking remedial action under this section, the City may exclude you from all or part of the Site, take possession of all or part of the Work and suspend your Work and or Services, and incorporate into the Project all materials and equipment stored at the Site or for which the City has paid but you have stored elsewhere.

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 Punchlist within 30 Working Days after the Contract Time, you shall reimburse the City for all costs to provide inspection services required to monitor Work beyond the 30 Working Days. The City shall bill you for the additional inspection at the City's established rates.

7. If you complete the Project or portions of the Project prior to NOC, you shall preserve equipment by developing and implementing a preventive maintenance program in compliance with manufacturer's recommendations.

ADD:

3-13.3.2 Warranty Format Requirements.

1. Written warranties, except manufacturer's standard printed warranties, shall be on yours and your agents', material suppliers', installers', or manufacturers' own letterhead, addressed to and for the City's benefit. Submit warranties in the format described in this section, modified as approved by Engineer to suit the conditions pertaining to the warranty.

2. Obtain warranties, executed in triplicate by responsible Subcontractors and Suppliers, within 10 Working Days after completion of the applicable item of Work. Except for items put into use with the Engineer's permission with date mutually agreed upon in writing, ensure that the beginning time of the warranty is the project completion date.

3. Verify that the documents are in proper form, contain full information, and are notarized.

4. Verify that warranties are signed by both you and the appropriate party.

5. Provide warranties to the Engineer with a neatly typed table of contents, identifying each warranty with the number and title of the applicable specification section requiring the warranty and the name of the product or Work item.

6. Separate each warranty with index tab sheets keyed to the table of contents listing. Provide complete information using separate typed sheets as necessary. The information shall include a list of Subcontractors and Suppliers with the name, address, and telephone number of the responsible principals.

ADD:

3-13.3.3 Long-Term Warranty Contract (LTWC).

1. **If specified in the Special Provisions** and when a LTWC is included in the Contract Documents, you shall execute and submit the supplemental agreement for the extended Project warranty (the LTWC covering the workmanship and materials).

2. The first 3 years of warranty protection after installation shall be secured by the faithful performance and payment bonds in accordance with 1-7.2, "Contract Bonds".

3. At the conclusion of the initial 3 year bonded warranty period, an "n"-year subsequent manufacturer's warranty for labor and materials shall commence and run concurrently with the LTWC, where "n" is the number of additional years beyond the initial 3 years **as specified in the Special Provisions**. Alternatively and with respect to the 3 year bonded warranty, you may submit a 2-year bond followed by 1-year bond. If the alternate option is selected, the 1-year bond shall be submitted to the City at least 90 Days before the expiration of the original 2-year bond. You shall clearly inform the Contract Specialist of the option selected. The protection provided shall not be for less than 3 + "n" years continuously.

4. The manufacturer's warranty for parts and labor shall secure performance of the LTWC by you. Additional security in the form of bonds for both the LTWC and the manufacturer's extended "n"-year warranty (in years 4 and on following Acceptance) for labor and materials may, but is not required to be, provided per the compensation provisions of the LTWC.

5. The manufacturer warranty shall extend to performance of the LTWC by you, including without limitation the performance of periodic inspections, preparation of periodic reports, and performance of repairs or replacements including parts and labor. If the manufacturer warranty does not expressly extend to the LTWC or is qualified in any way to exclude warranty of the performance of the LTWC by you, the surety bond shall be provided for the LTWC in accordance with 1-7.2, "Contract Bonds".

6. If you are unable to obtain a bond which extends the "n"-year term of the LTWC, to obtain a manufacturer warranty or both which clearly and unambiguously extends to secure performance of the LTWC by you for the "n"-year term, the City shall accept either form of security provided that at least one of these forms is provided before award.

7. Provision of the manufacturer's warranty, bonds, or both as specified is a pre-condition to award of the Contract.

8. Refer to the LTWC for additional information. The provisions of 3-3, "SUBCONTRACTORS" shall not apply to LTWC.

ADD:

3-14 FORMAL PARTNERING.

1. You may request the formation of a formal partnering relationship (Partnering) by submitting a request in writing to the Engineer after approval of the Contract. If your request for Partnering is approved by the Engineer, scheduling of a Partnering workshop, selecting the Partnering facilitator and workshop, selecting the Partnering facilitator and workshop site, and other administrative details shall be as agreed to by both Parties.

2. The establishment of a Partnering shall not change or modify the terms and conditions of the Contract and shall not relieve either party of the legal requirements of the contract.

3. The goals of partnering include the following:

   a. The Engineer and your representatives, including your Subcontractors, actively working together as partners.

   b. Avoidance of destructive confrontation and litigation among the parties.

   c. Mutual understanding on how the Work is to be conducted.

   d. Establishment of mutual key results to facilitate Project success.

   e. Establishment of an atmosphere of team work, trust, and open communication.

3-14.1 Payment.

1. The payment for providing a facilitator and a workshop site shall be borne equally by the City and you. You shall pay in advance all compensation for the costs of the facilitator and for the costs of obtaining the workshop site.

2. Unless a Bid item has been provided for "Partnering", the City's share of such costs shall be reimbursed to you as Extra Work. Markups shall not be added. Other costs associated with the Partnering relationship shall be borne separately by the party incurring the costs.

ADD:

3-15 SITE ACTIVITIES BY THE CITY OR SEPARATE CONTRACTORS.

3-15.1 The City's Right to Award Separate Contracts.

1. The City reserves the right to perform work or operations outside the Scope of Work of the Contract related to the Project with City Forces, Separate Contractors, or both. If work to be performed by another party was not noted in the Contract, the City shall give written notice to you 10 Working Days prior to the start of any work. If you determine that the work being performed by the City or others may interfere with or cause damage to Work being performed by you, notify the Engineer in writing within 3 Working Days of the Engineer's notice.

3-15.2 Integration of the Work with Separate Contractors.

1. **When specified in the Contract Documents**, prepare a plan in order to integrate the work performed by Separate Contractors, City Forces, or both with the performance of the Work and submit the plan to the Engineer for approval. The plan shall be fair and reasonable for you and the Separate Contractors. Work with Separate Contractors to reach an agreement for the prepared plan. Arrange the performance of the Work so that the Work and the work of the Separate Contractors are, to the extent applicable, properly integrated and jointed in a manner that avoids any damage to the Work or to the work of the Separate Contractors.

3-15.3 Coordination.

1. Coordinate your activities and the Schedule with the activities and schedules of the Separate Contractors and make any revisions to the Schedule deemed necessary to avoid any disruption to the Work or to the work of the Separate Contractors.

3-15.4 Use of Site.

1. Provide the City and the Separate Contractors reasonable opportunities for the storage of materials and equipment and performance of their work. Connect and coordinate Work and operations with the work and operations of the City and the Separate Contractors as required by the Contract Documents.

2. Coordinate traffic control with the Separate Contractors for other projects and minimize the impact to the community. Prior to the start of construction, submit your plan for coordination.

3-15.5 Deficiency in Work of Separate Contractors.

1. If part of your Work depends on proper execution or results upon construction or operations by the City or a Separate Contractor, prior to proceeding with that portion of the Work, promptly report to the Separate Contractor and the Engineer any apparent discrepancies or defects in construction that would render it unsuitable for proper execution and results. Use good faith efforts to resolve any such discrepancies or defects or any related disagreements. Your failure to report constitutes your acceptance of the Work of Separate Contractors as fit, proper, and coordinated with the Work.

3-15.6 Payment.

1. Payment for reporting deficiencies, coordinating, and resolving discrepancies shall be included in the Contract Price.

SECTION 4 – CONTROL OF MATERIALS

4-2 **PROTECTION.** ADD the following:

1. Repair or replace any equipment and materials in the event of vandalism, damage, or theft at no additional cost to the City.

4-3.1 **General.** ADD the following:

1. Materials typically accepted by Certificate of Compliance shall not require inspection at the source **unless specified in the Special Provisions**. For a list of these items or materials, you may refer to the Contract Documents.

2. Location changes to the source of materials requiring inspection without the required 24 hour notification may result in non-compliant material subject to rejection. You shall be responsible for staff charges resulting from last minute changes or cancellations once staff has been deployed. The Engineer shall issue a deductive Field Order for a minimum of 2 hours of staff time to reimburse the City for misdirected staff charges. For private contracts, the permittee shall be notified in writing of the additional staff charges incurred.

3. Steel pipe in sizes larger than 18 inches shall require inspection at the source of production.

4. City lab staff or a qualified inspection agency approved by the Engineer shall witness all welding, lining, coating, and testing. You shall incur additional inspection costs outlined in 4-3.3, "Inspection of Items Not Locally Produced".

5. All parts of production (including but not limited to product fabrication, welding, testing, lining, and coating of straight pieces and specials) shall be performed or produced in the United States.

6. Welding and all testing shall be performed by certified welders and testing staff with credentials traceable in the United States.

4-3.2 **Inspection by the Agency.** DELETE in its entirety and SUBSTITUTE with the following:

1. The City will provide inspection and testing laboratory services within 200-mile radius of the geographical limits of the City.

4-3.3 **Inspection of Items Not Locally Produced.** 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 Working 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. Specialty Testing of Foreign Materials.

   a. Materials that are manufactured, produced, or fabricated outside of the United States shall be delivered to a distribution point in California, **unless otherwise specified**. Quality Control and related testing shall be performed to all applicable specified US standards. Manufacturer's testing and staff certification shall be traceable to a United States regulatory agency. Retain the materials for a sufficient period of time to permit inspection, sampling, and testing. You shall not be entitled to an extension of time for acts or events occurring outside of, at point of entry, or during transport to the United States

ADD:

4-3.4 Specialty Inspection Paid for by the Contractor.

1. You shall employ and pay for the services of a qualified inspection agency to perform specialty inspection services as required by the Contract Documents.

4-3.4.1 Payment.

1. The payment for the specialty inspection service Work shall be included under the Bid item for "Specialty Inspection Paid For By the Contractor".

2. When an Allowance Bid item for "Specialty Testing Under the Direction of the Engineer" is provided, you shall employ and pay for the services of a qualified third party independent laboratory to perform the required testing. You shall be reimbursed for the cost of testing under this Bid item.

ADD:

4-3.5 Special Inspection.

1. Special Inspection and testing by the Special Inspectors shall meet the minimum requirements of the prevailing Codes and by the Development Services Department (DSD) and is referenced at:

   http://www.sandiego.gov/development-services/industry/index.shtml

2. Each Special Inspector shall be certified by DSD prior to performing any duties. Special Inspectors shall carry approved identification, as stipulated by the DSD, when performing the function of a Special Inspector.

3. Responsibilities:

   a. You shall notify the Special Inspector prior to performing any item of Work that requires Special Inspection and shall review the Contract Documents and perform any necessary preparatory Work at the Site.

   b. You are responsible for providing the Special Inspector access to Plans and Specifications at the Project's Site.

   c. You are responsible for retaining at the Site all Special Inspection records submitted by the Special Inspector and providing these records for review by the DSD inspector upon request.

   d. You shall not perform any items of Work that requires Special Inspection without the presence of the Special Inspector(s) during the performance of that Work. Work requiring continuous inspection performed without Special Inspection is subject to removal.

   e. You shall employ a sufficient number of Special Inspectors to assure inspection of all Work requiring Special Inspection without hindering the progress of the Work.

   f. The Special Inspector shall comply with all requirements of DSD and the building permit.

   g. Upon completion of the task requiring Special Inspection, you shall submit to the Engineer all Special Inspection reports that certify that the Work requiring Special Inspection has been completed in accordance with the Contract Documents and the applicable building codes and approved by the Engineer and DSD.

4. You shall ensure the following requirements are met by the Special Inspectors employed by you.

   a. The Special Inspector is not authorized to do any of the following:

1) Inspect or approve any items of Work for which the building permit has not been issued.

2) Inspect or approve any items of Work before DSD has made the initial inspection. Deviations from this procedure shall be requested in writing from DSD.

3) Inspect or approve any items of Work other than that for which they are specifically certified.

4) Accept alternate materials, structural changes, or revisions to the Plans.

b. The Special Inspector shall observe the Work for conformance with the DSD approved Plans and Specifications. Shop Drawings, Working Drawings, or both may be used only as an aid to inspection. Special Inspections shall be performed on a continuous basis. The Special Inspector shall be on site at all times observing the Work requiring Special Inspection.

c. The Special Inspector shall bring nonconforming items to your immediate attention and shall note all such items in the daily report. If any item is not resolved in a timely manner or is about to be incorporated in the Work, the Special Inspector shall immediately notify DSD (by telephone or in person) and the Engineer and shall post a discrepancy notice.

d. Each Special Inspector shall complete and sign both the Special Inspection record and the daily report form for each daily inspection to remain at the Site with you for review.

e. The Special Inspector or inspection agency shall furnish weekly reports of tests and inspections directly to the Engineer, DSD, and others as designated on the Plans, permits, or in these specifications. These reports shall include the following:

1) Descriptions of daily inspections and tests made with applicable locations.

2) Listings of all nonconforming items.

3) Reports on how nonconforming items were resolved or unresolved as applicable.

4) Itemized changes authorized by the Engineer and DSD if not included in the nonconformance items list.

f. The Special Inspector shall submit a final signed report to the Engineer and DSD stating that Work requiring Special Inspection and testing were inspected, tested, reported, and, to the best of Special Inspector's knowledge, is in conformance with the approved drawings and Contract Documents, approved revisions, and the applicable workmanship provisions of the building codes, whichever is in effect on the permitted Plans. Items not in conformance, unresolved items, or any discrepancies

in inspection coverage (missed inspections, periodic inspections when continuous was required, and etc.) shall be specifically itemized in this report.

g. Final inspection of the structure shall not be scheduled until the final report for all Work items requiring Special Inspection have been reviewed and approved by the Engineer and DSD.

4-3.5.1 Payment.

1. The payment for the special inspection and testing Work shall be included in the Contract Price.

ADD:

4-3.6 Preapproved Materials.

1. Materials such as concrete, asphalt concrete, slurry, backfill and bedding, gravel, crushed rock, and other materials that are not produced or delivered until the day they are used do not require a submittal if they are determined by the Engineer to be standard materials provided in conformance with Part 2, "CONSTRUCTION MATERIALS" and Part 5, "SYSTEM REHABILITATION" **unless specified otherwise**. You shall be required to submit if you intend to provide materials that deviate or does not comply with the standard specifications.

2. For materials listed on the City's Approved Materials List (AML), in lieu of the submittal, you shall certify in writing, that the proposed equipment and material to be incorporated in the Work complies with the Contract requirements and the AML.

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

4-6 TRADE NAMES. ADD the following:

1. Whenever materials or equipment are indicated in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the naming of the item is intended to establish the type, function, and quality required.

2. Unless stated otherwise, materials or equipment of other Suppliers may be accepted if sufficient information is submitted to the Engineer for review to determine whether the material or equipment proposed is equivalent or equal to that named.

3. For reviews prior to Bid:

   a. The Engineer shall respond to your substitution proposal by at least 3 Working Days prior to the Bid due date. If the Engineer fails to respond to your substitution proposal within the specified time period, the substitution proposal shall be deemed denied.

b. You may bring forward a substitution proposal after Award that was denied based on the Engineer's failure to respond by submitting a Cost Reduction Proposal in accordance with 2-6.1, "Cost Reduction Proposal".

4. Include the following information in the request for substitution:

   a. Whether or not acceptance of the substitute for use in the Work shall require a change in any of the Contract Documents to adopt the design to the proposed substitute.

   b. Whether or not incorporation or use of the substitute in connection with the Work is subject to the payment of any license fee or royalty.

   c. All variations of the proposed substitute from the items originally specified shall be identified.

   d. Available maintenance, repair, and replacement service requirements. The manufacturer shall have a local service agency within 50 miles (80.5 km) of the site which maintains properly trained personnel and adequate spare parts and is able to respond and complete repairs within 24 hours.

   e. Certifications that the proposed substitute shall perform functions adequately, achieve the results called for by the general design, be similar and of equal substance to that indicated, and be suited to the same use as that specified.

5. There is no guaranteed time frame for the Engineer's review of the substitution requests. Any lack of action on the Engineer's side within your requested time does not constitute acceptance of the substitution.

6. The burden of proof as to the type, function, and quality of any such substitute product, material or equipment shall be upon you. The Engineer may require at your expense additional data about the proposed substitute.

7. Acceptance by the Engineer of a substitute item does not relieve you of the responsibility for full compliance with the Contract Documents. If the Engineer takes no exceptions to the proposed substitution, it shall not relieve you from your responsibility to the efficiency, sufficiency, quality, and performance of the substitute material or equipment in the same manner and degree as the material and equipment specified by name.

8. Refer to the AML standard review process for the substitution review process or to have materials listed on the AML. See 3-8.1, "General".

9. The Bid submittal shall be based on the material and equipment specified by name in the Contract. If the proposal is rejected by the Engineer, you shall not be entitled to either an extension in Contract Time, an increase in the Contract Price, or both.

10. As applicable, no Shop Drawing or Working Drawing submittals shall be made for a substitute item nor shall any substitute item be ordered, installed, or utilized without the Engineer's prior written approval.

SECTION 5 – LEGAL RELATIONS AND RESPONSIBILITIES

5-1 LAWS AND REGULATIONS. ADD the following:

1. If you observe that the Contract Documents are at variance with any laws, ordinances, rules, or regulations, you shall promptly notify the Engineer in writing of such variance. The Engineer shall promptly review the matter and, if necessary, shall issue a Change Order or take any other action necessary to bring about compliance with the law, ordinance, rule, or regulation in question.

ADD:

5-1.1 Environmental and Safety Laws.

1. The following is a partial list of specific laws that you shall be aware of and shall comply with:

   a. Environmental Protection Agency regulations (40 CFR, Part 15).

   b. Clean Air Act of 1970 [§306 (42 U.S.C. 7606), Executive Order 11738 prohibiting contracting with Clean Air Act violators and §§608 and 609 (42 U.S.C. 7671g, 7671h) as amended November 15, 1990 prohibiting the intentional release of chlorofluorocarbons into the environment when performing Work].

   c. Clean Water Grant Program Bulletin 76A which augments the National Historic Preservation Act of 1966 (16 U.S.C. 470) as specified under §01560, "Temporary Environmental Controls" of the General Requirements.

   d. CAL OSHA 5189 “Process Safety Management,” CAL OSHA 3220 “Emergency Action Plan,” Federal OSHA 29, CFR 1910, facilities Process Safety Management (PSM) manual, and the City’s Risk Management Plan.

   e. California Title 8, §5208 and §1529, and Title 40 CFR Part 61.

   f. Flood Disaster Protection Act of 1973 (42 USC 4001 et seq, as amended).

   g. Senate Bill 198 and specifically shall have a written Injury Prevention Program on file with the City in accordance with all applicable standards, orders, or requirements of California Labor Code, §6401.7. This Program shall be submitted to the Engineer at the Pre-Construction Meeting.

   h. State Energy Conservation Plan issued in compliance with the Energy Policy and Conservation Act (P.L. 94-163) as set forth in Division 15 of the Public Resources Code of the State.

   i. Clean Water Act (CWA) - The Federal Water Pollution Control Act enacted in 1972 by Public Law 92-500 and amended by the Water

Quality Act of 1987. The Clean Water Act prohibits the discharge of pollutants to Waters of the United States unless said discharge is in accordance with an NPDES permit. The 1987 amendments include guidelines for regulating municipal, industrial, and construction storm water discharges under the NPDES program.

j. Endangered Species Act of 1973 (ESA; 7 U.S.C. §136, 16 U.S.C. §1531 et seq).

ADD:

5-1.2 California Building Code, California Code of Regulations Title 24 and Americans with Disabilities Act.

1. You shall warrant and certify that all Project Plans and Specifications prepared by you in accordance with the Contract meet all current requirements of the California Building Code, California Code of Regulations, Title 24, and the Americans with Disabilities Act (ADA). As a condition precedent to Award of the Contract, submit to City the Contractor/Design-Builder Certification for Title 24/ADA Compliance.

2. You shall comply with all portions of the ADA and Title 24. For specific services and public accommodations, you may contact: The Office of ADA Compliance and Accessibility at ADACompliance@sandiego.gov or 619-236-5979.

3. You acknowledge and agree that you are aware of and shall comply with Council Policy 100-04, incorporated herein by this reference, adopted by Resolution No. R-282153, relating to the federally-mandated ADA.

4. You and your Subcontractors are responsible for administering your own ADA and Title 24 program in your Work area. You shall ensure that these ADA requirements are included in the subcontracts.

5. You shall pay all claims, costs, losses, and damages incurred by the City in undertaking remedial action to correct your violations of ADA or Title 24. The City shall be entitled to an appropriate decrease in the Contract Price, and, if the Parties are unable to agree as to the amount thereof, the City may unilaterally issue the Change Order.

6. Code Implementation:

   a. The most current and adopted Americans with Disabilities Act Accessibility Standards.

   b. The most current Public Rights – of – Way Accessibility Guidelines.

   c. The most current and adopted California Building Code, California Code of Regulations (Title 24) Accessibility Guidelines – Chapter 11B Accessibility to Public Accommodations, Commercial Buildings and Publicly Funded Housing.

7. The City's Resolution No. R-282153 and Council Policy 100-04 apply equally to you and all Subcontractors. For the purpose of City's Resolution No. R-282153 and Council Policy 100-04, the following definitions shall apply:

   a. "Qualified individual with a disability" means an individual with a disability who satisfies the requisite skill, experience, education, and other job-related requirements of the employment position such individual holds or desires, and who, with or without reasonable accommodation, can perform the essential functions of the position.

   b. "Employee" means your employee.

8. You shall certify to the City that you shall comply with the ADA by adhering to all of the provisions of the ADA listed. See Contract Forms.

9. You shall not discriminate against qualified persons with disabilities in any aspects of employment including recruitment, hiring, promotions, conditions and privileges of employment, training, compensation, benefits, discipline, layoffs, and termination of employment.

10. No qualified individual with a disability may be excluded on the basis of disability, from participation in, or be denied the benefits of services, programs, or activities by you or your Subcontractors providing services for the City.

11. You shall post a statement addressing the requirements of the ADA in a prominent place at the Work Site.

12. You shall require in each subcontract that your Subcontractor shall abide by these provisions.

13. Questions about the City's ADA Policy should be referred to the City's Contract Specialist.

ADD:

5-1.3 Drug-Free Workplace.

1. The Contract is subject to the City's Resolution No. R-277952 adopted on May 20, 1991. You shall become aware of the provisions of Council Policy 100-17 which was established by Resolution No. R-277952. The policy applies equally to you and your Subcontractors. The elements of the policy are outlined below.

2. Definitions:

   a. "Drug-free Workplace" means a site for the performance of Work done in connection with a contract with the City for the construction, maintenance, or repair of any facility or public work by an entity at which employees of the entity are prohibited from engaging in the unlawful manufacture, distribution, dispensation, possession, or use of a controlled substance in accordance with the requirements of this section.

   b. "Employee" means your employee.

c. “Controlled substance” means a controlled substance in schedules I through V of Section 202 of the Controlled Substances Act (21 U.S.C. Sec. 812).

d. “Contractor” means You.

3. Prior to Award, you shall certify to the City that you shall provide a Drug-free Workplace by doing all of the following:

1. Publishing a statement notifying employees that the unlawful manufacture, distribution, dispensation, possession, or use of a controlled substance is prohibited in the person's organization's workplace and specifying the actions that shall be taken against employees for violations of the prohibition.

2. Establishing a drug-free awareness program to inform employees about all of the following:

a. The dangers of drug abuse in the workplace.

b. The person's or organization's policy of maintaining a Drug-free Workplace.

c. Any available drug counseling, rehabilitation, and employee assistance programs.

d. The penalties that may be imposed upon employees for drug abuse violations.

3. Posting the statement required by subsection “a” in a prominent place at your main office. For projects large enough to necessitate a construction trailer at the Site, the required signage would also be posted at the Site.

4. You shall require in each Subcontract that your Subcontractor shall abide by these provisions. You and your Subcontractors are individually responsible for your own Drug-free Workplace programs.

5. The requirements of a drug-free awareness program can be satisfied by periodic tailgate sessions covering the various aspects of drug-abuse education. Although an in-house employee assistance program is not required, you should be able to provide a listing of drug rehabilitation and counseling programs available in the community at large.

6. Refer questions about the City’s Drug-free Workplace Policy to the Contract Administrator.

ADD:

5-1.4 Contractor Standards and Pledge of Compliance.

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:

5-1.5 Equal Benefits.

1. The Contract is subject to the City's Equal Benefits Ordinance (EBO), Chapter 2, Article 2, Division 43 of the San Diego Municipal Code (SDMC).

2. In accordance with the EBO, you shall certify that you shall provide and maintain equal benefits as defined in SDMC §22.4302 for the duration of the Contract [SDMC §22.4304(f)]. Failure to maintain equal benefits is a material breach of the Contract [SDMC §22.4304(e)].

3. You shall notify employees of their equal benefits policy at the time of hire and during open enrollment periods and shall post a copy of the following statement in an area frequented by employees:

   "During the performance of a Contract with the City of San Diego, this employer shall provide equal benefits to its employees with spouses and its employees with domestic partners."

4. You shall give the Engineer access to documents and records sufficient for the Engineer to verify that you are providing equal benefits and otherwise complying with EBO requirements.

5. Full text of the EBO and the Rules Implementing the Equal Benefits Ordinance can be requested from the Equal Benefits Program at (619) 533-3948.

ADD:

5-1.6 Notice of Labor Compliance Program Approval.

1. The City received initial approval as a Labor Compliance Program on August 11, 2003. The Labor Compliance Program Manual is available at http://www.sandiego.gov/eoc/laborcompliance/#manual
2. The limited exemption from prevailing wages pursuant to Labor Code §1771.5(a) does not apply to contracts under jurisdiction of the Labor Compliance Program.
3. Inquiries, questions, or assistance about the Labor Compliance Program should be directed to: Equal Opportunity Contracting Program, 1200 Third Ave., Suite 200 MS56P, San Diego, CA 92101, Tel. 619-236-6000.

ADD:

5-1.7 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.

5-3.3 Payroll Records. ADD the following:

1. Your attention is directed to the City of San Diego Labor Compliance Program, Section IV, pages 4-7, and the State of California Labor Code §§1771.5(b) and 1776 (Stats. 1978, Ch. 1249). These require, in part, that you and your Subcontractors maintain and furnish to the City, at a designated time, a certified copy of each weekly payroll containing a statement of compliance signed under penalty of perjury.
2. You and your Subcontractors shall submit weekly certified payrolls reflecting the wages of all yours and Subcontractors' employees engaged in the Work online via Prism®, the City's web-based labor compliance program.

5-6 PATENTS FEES AND ROYALTIES. DELETE in its entirety and SUBSTITUTE with the following:

1. You shall pay, at no additional cost to the City, all applicable royalties and license fees arising from the Work. You shall indemnify and defend all claims

and lawsuits for infringement of patent, trademark, and copyrights against the City and shall hold the City harmless from any loss.

5-7.1.1 General. ADD the following:

1. When trenching, place your name and emergency telephone number adjacent to the Work at intervals and locations approved by the Engineer. The method of marking shall be approved by the Engineer.

2. Respond and initiate corrective action in accordance with OSHA and within 24 hours of the notice of the nonconforming Work that poses an imminent threat to person or property.

ADD:

5-7.1.4 Emergency Drills.

1. When specified, 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".

ADD:

5-7.1.3 Health and Safety Plan (HSP).

1. You are ultimately responsible for the health and safety of your employees and personnel entering your project site. These specifications shall not be construed to limit your liability nor to assume that the City, its employees, or designate shall assume any of your liability associated with Site safety considerations.

2. You shall have a HSP in effect at least 1 week prior to the commencement of the Work. The HSP shall comply with all OSHA and other applicable requirements.

3. The HSP shall specifically address procedures and protocols that shall be followed to monitor for the presence of hazardous atmosphere, possibility for engulfment, gasses due to organic soils or proximity to landfills, exposure to hazardous products such as may be released when grinding, cutting, or torching galvanized or painted surfaces, contaminated soil, and groundwater. Identify response actions that shall be taken when these conditions are encountered.

4. The City shall not assume any role in determining the adequacy of the HSP on your behalf.

5-7.5.1 Confined Space Entry Program (CSEP). To paragraph (2), subsection "a", DELETE in its entirety and SUBSTITUTE with the following:

a. Training of personnel including both yours and the Engineer.

ADD:

5-7.7.3 Playground Safety.

1. Provide a secured fence around the playground to prevent use or access. Do not remove the fence until the independent Playground Safety Audit has been done by you and the Engineer, the Engineer has accepted the playground design and installation, and the Punchlist items have been completed.
2. Provide certification by a National Playground Safety Institute (NPSI) certified playground inspector that confirms that the installed equipment is compliant with all applicable codes.

ADD:

5-7.7.4 Payment.

1. The payment for security fencing Work for open excavations shall be included in the Contract Price.
2. The payment for the fencing around the playground and the playground safety audit is included in the Contract Price.

5-7.8.1 General. ADD the following:

1. Protect transverse or longitudinal cuts, voids, trenches, holes, and excavations in the right-of-way that cannot be properly completed within 1 Working Day by adequately designed barricades and structural steel plates (plates) that shall support legal vehicle loads in such a way as to preserve unobstructed traffic flow.
2. Secure approval in advance from authorities concerning the use of any bridging proposed on the Work.
3. Shore the trench adequately to support the bridging and traffic loads.
4. Design plates for HS 20-44 truck loading in accordance with Caltrans Bridge Design Specifications Manual. Evaluate soil conditions and ensure that the plate extends enough beyond the trench walls to support traffic loads.
5. Make the surface of the plates skid-resistant with a nominal Coefficient of Friction (COF) of 0.35 as determined by California Test Method 342.
6. Plates shall provide complete coverage to prevent any person, bicycle, motorcycle, or motor vehicle from being endangered due to plate movement causing separations or gaps.

7. Alternative installation methods may be submitted in accordance with 3-8, “SUBMITTALS” for the Engineer’s approval.

8. You shall install signage and postings with a 2 inch (50.8 mm) minimum letter height indicating the steel plate cover load limit, the Company’s name, and a 24 hour emergency contact phone number. See 601-1, “GENERAL”.

9. You are responsible for the maintenance of the plates, shoring, and asphalt concrete ramps or any other approved device used to secure the plates. You shall immediately mobilize necessary personnel and equipment after being notified by the Engineer, the City’s “Station 38”, or a member of the public of a repair needed for such items as plate movements, noise, anchors, and asphalt ramps. Failure to respond to the emergency request within 2 hours shall be grounds for the City to perform necessary repairs that shall be invoiced at the actual cost including overhead or $500 per incident, whichever is greater.

10. When plates are removed, repair any damage to the pavement with fine graded asphalt concrete mix or slurry seal satisfactory to the Engineer.

ADD:

5-8 INFORMATION SECURITY POLICY (ISP).

1. The Contract is subject to the City’s Information Security Policy as defined in the City’s Administrative Regulation 90.63. By submitting a Bid, you agree to fully comply with the ISP. Full text of the ISP and the Administrative Regulation 90.63 can be requested from the Contract Specialist.

2. Your failure to abide by the City’s Administrative Regulation 90.63 shall be a breach of the Contract. You shall notify employees of their ISP responsibilities and shall post a copy of the following statement in an area frequented by employees who access the City’s computer systems:

    a. Uses of City computer equipment, network services, electronic systems, and electronic data, including Email and Internet services, are for City business or Work-related purposes. The use of City computer equipment or information technology services for personal use shall be prohibited.

    b. Computer files developed, created, or enhanced within the scope and course of City contract employment, or a City third-party contractual relationship, are the property of the City of San Diego regardless of their physical location or the form in which they are maintained.

    c. The City reserves the right to access and disclose all messages and other electronic data sent over its Email systems or stored in computer files on City Computer Equipment. The City-related computer files created, developed, or enhanced on remote access personal computers shall be provided upon the City’s request in City standard formats.

d. Users shall be responsible in their use of City computer equipment and network services. Any action that may cause interference with City computer systems, exposes the City's computer systems to risk, or adversely impacts the work of others in using these computer systems is prohibited.

e. Every end user shall have a single unique user ID and a personal password which shall be kept confidential. This user ID and password shall be required for access to all multi-user computer equipment and network services. User passwords shall comply with the Information Security Guidelines and Standards.

f. Users accessing City computer systems are prohibited from gaining unauthorized access to any other computer systems or in any way damaging, altering, or disrupting the operations of these systems. Users are prohibited from capturing or otherwise obtaining passwords, encryption keys, or any other access control mechanism which could permit unauthorized access.

g. You shall give the Engineer access to documents and records sufficient for the Engineer to verify that you are complying with ISP requirements.

ADD:

5-9 INDEMNIFICATION AND HOLD HARMLESS AGREEMENT.

1. You shall defend, indemnify, protect, and hold harmless the City, the City's agents, officers, and employees, from and against all claims asserted, or liability established for damages or injuries to any person or property resulting from your action or failure to take the necessary measures to prevent such damages and injuries.

2. You are responsible for the payment of any fines resulting from citations issued to the City by either the federal, state, or local environmental and safety enforcement agencies due to your failure to abide by applicable safety, health, and environmental standards.

3. You agree to defend, indemnify, protect and hold the City, the City's agents, officers, and employees, harmless from and against any dispute between you and your Subcontractors if the City is made a party to any judicial or administrative proceeding.

4. The obligation to indemnify shall be effective even if the City, the City's agents, officers, or employees established passive negligence contributes to the loss or claim. You agree that the City may elect to conduct its own defense or participate in its own defense of any claim related to this project. Your duty to indemnify and hold harmless does not include any claims or liability arising from the established active or sole negligence or willful misconduct of the City, its officers, or employees.

ADD:

5-10 COMMUNITY OUTREACH.

5-10.1 General.

1. To ensure consistency with the City's community outreach plan for the project, the City shall work with you to inform the public (which includes, but shall not be limited to, property owners, renters, homeowners, business owners, recreational users, and other community members and stakeholders) of construction impacts. Your efforts to mitigate construction impacts by communicating with the public require close coordination and cooperation with the City.

2. You shall perform the community outreach activities required throughout the Contract Time. You shall assign a staff member who shall perform the required community outreach services.

3. You shall closely coordinate the Work with the businesses, institutions, residents, and property owners impacted by the Project.

4. Your example duties include notifying businesses, institutions, and residents of the commencement of construction activities not less than 5 Working Days in advance, coordinating access for vehicular and pedestrian traffic to businesses, institutions, and residences impacted by the Project, reporting activities at all Project progress meetings scheduled by the Engineer, attending the Project pre-construction meeting, attending 2 community meetings, responding to community questions and complaints related to your activities, and documenting, in writing, as well as logging in all inquiries and complaints received into the City's internal public contact tracking system.

5. You shall execute the Information Security Policy (ISP) Acknowledgement Form - For Non-City Employees within 15 Working Days of the award of the Contract if any of the following apply:

    a. Your contact information is made available on any outreach materials.

    b. You will be the primary point of contact to resolve project related inquiries and complaints.

6. Electronic Communication.

    a. All inquiries and complaints shall be logged in to the City's internal public contact tracking system within 24 hours of receipt of inquiries and complaints.

    b. Any updates or a resolution of inquiries and complaints shall be documented in the City's internal public contact tracking system within 24 hours.

    c. Copies of email communications shall be saved individually on to the City's internal public contact tracking system in an Outlook Message Format (*.msg).

d. All graphics, photos, and other electronic files associated with inquiries and/or complaints shall be saved into the individual records, located within the City's internal public contact tracking system.

5-10.1.1 Quality Assurance.

1. During the course of community outreach, you shall ensure that the character of all persons that conduct community outreach (distributing door hangers, attending community meetings, interacting with the public, and etc.) on your behalf shall:

   a. Have the ability to speak and comprehend English and/or Spanish, as appropriate for the community or public they are informing.

   b. Possess and display easily verifiable and readable personal identification that identifies the person as your employee.

   c. Have the interpersonal skills to effectively, professionally, and tactfully represent you, the project, and the City to the public.

5-10.1.2 Submittals.

1. You shall submit to the Resident Engineer, for review and approval, all drafts of letters, notices, postcards, door hangers, signs, mailing lists, proposed addresses for hand-delivery, and any other notices and letters that are to be mailed and or distributed to the public.

   a. Prior to distributing or mailing, you shall submit final drafts of letters, notices, postcards, door hangers, signs, and any other notices and letters to the Resident Engineer for final review and approval. Submit a PDF copy of the approved door hangers to the Engineer.

   b. After distributing or mailing, you shall submit verification of delivery and any copies of returned notices to the Resident Engineer. Submit a PDF copy of the approved letters and notices to the Engineer.

2. You shall use the City's internal public contact tracking system to identify and summarize communications (via phone, in person, and email) with the public within 24 hours of receipt, even if your response to the individual is still incomplete. You shall upload to the City's internal public contact tracking system copies of all written, electronic, and verbal communications and conversations with the public.

5-10.2 Community Outreach Services.

5-10.2.1 Public Notice by Contractor.

1. Post Project Identification Signs in accordance with 3-11.2, "Project Post Project Identification Signs in accordance with 3-11.2, "Project Identification Signs".

2. No less than 5 and no more than 10 Working Days in advance of Project construction activities and utility service interruptions, you shall notify all critical facilities, businesses, institutions, property owners, residents, or any

other impacted stakeholders within a minimum 300-foot (90 m) radius of the Project i.e., work area and any other affected areas as shown on the "Notification of Planned Water Shutdown" when you perform the Work.

3. The notification process must be repeated for delays and long pauses in construction activities. Verbal and written notifications, such as door hangers, shall be sent to critical facilities (including but not limited to police stations, fire stations, hospitals, and schools). A copy of written notifications sent to any critical facility shall also be sent to the Engineer.

4. You shall keep records of the people contacted, along with the dates of notification, and shall provide the record e.g., time-stamped pictures of the notices, to the Engineer upon request. You shall identify all other critical facilities that need to be notified.

5. Verbal and written notifications shall also include specific impacts from the construction of the City facilities, e.g., fire hydrants, air vacuum and blow-off devices, pedestrian ramps, and sidewalks, e.g., the loss of parking, access, and impact to private property, e.g., landscaping.

6. Furnish and distribute public notices in the form of door hangers using the City's format to all occupants and/or property owners along streets and all critical facilities such as police stations, fire stations, hospitals, and schools.

7. Where Work is to be performed at least 5 and at most 10 Working Days before starting construction, survey activities, or impacting the community as approved by the Engineer.

8. Within 5 Working Days of the completion or pausing of your construction activities where Work was performed, you shall distribute public notices in the form of door hangers, which outline the anticipated dates of Asphalt Resurfacing, Slurry Seal, Sidewalk, or Curb Ramp Work. Upon resuming construction activities, you shall redistribute door hangers.

9. "No Parking" signs shall be placed 72 hours before the scheduled construction activities and must include the name and phone number of the Contractor. The Contractor shall document the placement of the signs with time-stamped pictures.

10. Leave the door hanger notices on or at the front door of each dwelling and apartment unit and at each commercial building tenant abutting each street block segment.

11. Where the front doors of apartment units are inaccessible or occupants are unavailable, distribute the door hanger notices to the apartment manager or security officer and leave your contact information, such as business cards.

12. Provide time-stamped pictures of the notices to the Engineer.

13. Door Hanger Material: You shall use Blanks/USA brand, Item Number DHJ5B6WH, 1¼ inch (31.8 mm) Holes (removed), 2-up Jumbo Door Hanger in Bristol White, or approved equal.

14. Door hangers shall include the funding source if project is funded in part by State Gas Tax Revenue (SB1).

15. Mailed Notice Material: You shall use Cougar by Domtar, Item Number 2834, or approved equal.

16. For all Work on private property, contact each owner and occupant individually a minimum of 15 Working Days before the Work. If the Work has been delayed, re-notify owners and occupants of the new Work schedule, as directed by the Engineer.

17. A sample of public notices will be included in the Contract.

5-10.2.2 Communications with the Public.

1. Coordinate access for vehicular and pedestrian traffic to businesses, institutions, and residences impacted by the Project.

2. You shall provide updates on construction impacts to the Resident Engineer. You shall notify the Resident Engineer in advance about time-sensitive construction impacts and may be required to distribute construction impact notices to the public on short notice.

3. You shall incorporate community outreach activities related to construction impacts in the baseline schedule and update the Resident Engineer with each week's submittal of the Three-Week Look Ahead Schedule.

4. At the request of the Resident Engineer, you shall attend and participate in project briefings at community meetings.

5. You shall coordinate with the Resident Engineer on all responses and actions taken to address public inquiries and complaints within the 24 hours that they are received.

5-10.2.3 Communications with Media.

1. The City may allow members of the media access to its construction site(s) on a case-by-case basis only.

2. Occasionally, uninvited members of the media may show up at construction Sites. Members of the media (including, but not limited to newspapers, magazines, radios, television, bloggers, and videographers) do not have the legal right to be in the construction Site without the City’s permission.

3. In the event that media representatives arrive near or on the construction Site(s), you shall keep them off the Site(s) in a courteous and professional manner until a Public Information Officer is available to meet them at an approved location.

4. You shall report all visits from members of the media to the Resident Engineer as quickly as possible so that the City’s Public Information Officer can meet with the members of the media at the construction Site(s).

5. If the City allows members of the media to access a construction Site, you shall allow the City to escort the media representatives while they are on the construction Site and shall ensure their safety.

6. You shall require media representatives to sign in and out of the Site Visitor Log and to use personal protective equipment.

7. You have a right to speak to members of the media about your company and its role on the project. All other questions shall be referred to the City.

5-10.3 Exclusive Community Liaison Services.

1. **When required in the Special Provisions,** you shall retain an Exclusive Community Liaison for the Project whose sole responsibilities shall be to implement 5-10.2, "Community Outreach Services" and the following:

   a. Develop a contact list of community, tenants, property owners, and agencies with a stake in the project.

   b. Prepare and present of materials in coordination with the Resident Engineer.

   c. Respond to community questions and complaints related to your activities.

   d. Write, edit, update, or produce brochures, pamphlets, and news releases.

   e. Provide standard telephone inquiries and e-mail responses.

      1) Respond to telephone calls and e-mails from the public.

      2) Record calls and e-mails on to the City's internal public contact tracking system.

   f. Provide a monthly summary report of all inquiries and complaints, including the name of the person, source of inquiry (via information line or email), phone number, address, date, and time of inquiry, who responded, and a summary of resolutions or pending resolutions to the Resident Engineer.

   g. Report Exclusive Community Liaison activities at all progress meetings scheduled by the Resident Engineer.

   h. Attendance at Pre-Construction, community and stakeholders meetings.

5-10.3.1 Exclusive Community Liaison Work Plan.

1. The Work plan for the Exclusive Community Liaison shall address the items of Work specified in these specifications. When required, present your Exclusive Community Liaison and submit your exclusive community outreach plan in writing within 15 Working Days of the award of the Contract.

5-10.4 Payment.

1. The payment for the community outreach services shall be included in the Contract Price.

2. When required, the payment for the exclusive community liaison services shall be included in the Bid item for "Exclusive Community Liaison Services".

ADD:

5-11 NEWSLETTER.

1. **If required in the Special Provisions,** you shall provide the required information to create and distribute newsletters for a project including: a written update on the progress of Work, a 1 month look-ahead schedule, contact names and phone numbers, and any other information which may be of interest to the public for this purpose.

5-11.1 Payment.

1. The payment for providing information for the newsletter and all associated Work shall be included in the Contract Price.

ADD:

5-12 CONFLICT OF INTEREST.

1. Establish and make known to your employees appropriate safeguards to prohibit employees from using their positions for a purpose that is or gives the appearance of being motivated by desire for private gain for themselves or others and particularly those with whom they have family, business, or other relationships. Project personnel shall not accept gratuities or any other favors from Subcontractors or potential Subcontractors.

2. You are subject to all federal, state, and local conflict of interest laws, regulations, and policies applicable to public contracts and procurement practices (California Government Code §§1090, et. seq., and 81000, et. seq., and the City Ethics Ordinance, codified in the City Municipal Code at §§27.3501 to 27.3595). If, in performing the Work, you make or participate in a "governmental decision" in accordance with title 2, §18701(a)(2) of the California Code of Regulations, or perform the same or substantially all the same duties for City that would otherwise be performed by a City employee holding a position specified in the applicable department's conflict of interest code, you shall be subject to a conflict of interest code requiring the completion of one or more statements of economic interests disclosing your relevant financial interests.

3. Statements of economic interests shall be made on Fair Political Practices Commission Form 700 and filed with the City Clerk. You shall file a Form 700 (Assuming Office Statement) within 30 Calendar Days of the City's written determination that you shall be subject to a conflict of interest code. File a Form 700 (Annual Statement) on or before April 1st disclosing any financial interests held during the previous calendar year for which you were subject to a conflict of interest code.

4. If the City requires you to file a statement of economic interests as a result of the Work performed, you shall be considered a "City Official" subject to the provisions of the City Ethics Ordinance, including the prohibition against

lobbying the City for 1 year following the expiration or termination of the Contract.

5. Your personnel employed on the Project shall not accept gratuities or any other favors from any Subcontractors or potential Subcontractors. You shall not recommend or specify any product, supplier, or other Contractor with whom you have a direct or indirect financial or organizational interest or relationship that would violate conflict of interest laws, regulations, or policies.

6. If you violate any conflict of interest laws or any of these conflict of interest provisions, the violation shall be grounds for immediate termination of this Contact. Further, the violation subjects you to liability to the City for all damages sustained as a result of the violation.

5-13 ELECTRONIC COMMUNICATION.

1. **Unless specified otherwise**, Virtual Project Manager shall be used on the Contract.

2. You shall post all communications addressed to the Engineer concerning construction including RFIs, submittals, daily logs including the Weekly Statement of Working Days (WSWD), Storm Water, and transmittals to the Virtual Project Manager (VPM) website established for the Projects. This shall not supersede any Federal requirements.

3. Maintain a list of scheduled activities including planned and actual execution dates for all major construction activities and milestones defined in the approved Schedule.

4. Review and act on all communications addressed to you in the VPM project website.

5. A user's guide to the VPM system is available on the City's website and shall be provided to you at the Pre-construction Meeting. Refer to the VPM training videos and forms at the location below:

   https://www.sandiego.gov/ecp/edocref/

6. Submit the Sensitive Information Authorization Acknowledgement Form and VPM User Agreement located in the VPM user's guide at the Pre-construction Meeting.

5-13.1 Payment.

1. The payment for electronic communications shall be included in the Contract Price.

ADD:

5-14 CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT.

5-14.1 General.

1. This subsection specifies construction and demolition waste reduction in compliance with Municipal Code §§66.0601–66.0610 (the City's Construction and Demolition Debris Diversion Deposit Program) and the City of San Diego's California Environmental Quality Act (CEQA) Significance Determination Thresholds. Pursuant to the City's Thresholds, projects that result in the generation of less than 60 tons during the construction phase and 60 tons in the ongoing project use phase shall be considered to have no significant impacts. Adherence to the following specifications is intended to ensure compliance with both the City's Municipal Code and CEQA.

2. Additional information about the C&D Debris Diversion Deposit Program can be found online at:

   http://www.sandiego.gov/environmental-services/recycling/cd/index.shtml

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.

4. You shall comply with the City's Environmentally Preferred Purchasing Program (EP3), which can be found online at:

   http://www.sandiego.gov/environmental-services/recycling/ep3/index.shtml

5-14.2 Submittals.

1. You shall submit the following:

   a. The Waste Management Form showing a weight based "good faith" estimate of each type of construction waste that would be generated and specifying how construction waste shall be recycled. If space is limited or non-existing on Site for source separation, the Engineer shall evaluate the diversion goals after a review of the Waste Management Form. You shall be responsible for implementation of the measures specified on the Waste Management Form Part 1 and meeting the waste reduction goals.

   b. Documentation from the recycling services that are not listed in the City Construction, Demolition, and Yard Waste Recycling Guide (available from City website) as follows:

      1) Identifying where the construction and demolition material is taken.

2) The method or process used to recycle the waste material.

3) Identification of applicable state and local permits held by the recycling service provider and recycling facility.

4) The Waste Management Form at the 50% progress payment and at the completion of the Work.

c. The Waste Management Form Part 2 with each progress payment.

5-14.3 Waste Reduction Program.

5-14.3.1 Waste Diversion Strategy.

1. Use one or a combination of the following waste management methods. Source separation of construction and demolition materials is required unless you can demonstrate that separation is not practical due to site size constraints, safety considerations, or both.

2. Source Separation.

   a. For construction and demolition projects, segregated temporary bins shall be provided for each type of material used on site, including packaging such as paper, cardboard, and metal. The bins shall be serviced on a weekly or as-needed basis and the contents shall be taken to an appropriate local processor.

3. Identify and contact processors in the area that accept each type of building material before construction begins. If not re-used on Site, salvaged materials shall be taken to the appropriate and proximal facility for recycling. Generating income through the sale of salvaged materials is permitted. Hand demolition shall be considered and chosen over mechanical demolition when it is considered to be cost effective.

4. Commingled or offsite separation.

   a. If source separation is not possible due to Site or safety constraints, materials may be comingled for offsite separation.

5. Time based separation.

   a. For phased construction projects, source separation of excess construction materials shall be required.

6. Backhaul of inert materials and packaging to original source locations shall be done when trips can be minimized and materials diverted from disposal in this manner.

7. On Site sales auctions and removal.

   a. Architectural items shall be removed and salvaged when practical. Windows, doors, mirrors, structural metal, or other specialty items shall be donated or auctioned on-site or at a local urban center.

8. If not reused on Site, excess cut and fill dirt shall be donated to another project or advertised as available via print ad, online, or any other suitable means.

5-14.3.2 Waste Management Hierarchy.

1. The waste material management hierarchy shall be in the following order:
    a. Reuse on Site
    b. Recycle on Site
    c. Reuse offsite
    d. Recycle offsite

5-14.3.3 Alternative Approach.

1. You may use any other innovative approaches as approved by the Engineer to meet and exceed the minimum diversion goals in accordance with the Municipal Codes §§66.0601–66.0610 and the City's thresholds of significance for solid waste.

5-14.4 Disposal Site, Recyclers, and Waste Materials Processors.

1. Use only facilities properly permitted by the State, County of San Diego, or local authorities where applicable. Notify the Miramar Landfill at least 24 hours in advance of bringing in 10 tons or more of waste in any one day or 60 tons or more in any one month.

5-14.5 Construction and Demolition Waste Management Plan.

1. As part of the Pre-Construction meeting, review and present the Waste Management Form. Discuss and coordinate procedures, schedules, and specific requirements for waste materials, recycling, and disposal.
2. Identify potential compliance problems and matters requiring further resolution. Construction and demolition waste management shall be agenda items at all future construction meetings. Make the agreed upon revisions to the proposed Waste Management Form subsequent to the meeting and submit the revised plan to Engineer for acceptance.

5-14.6 Special Project Conditions.

1. When removal of sediments and debris from channels and storm drains are required, you shall make a preliminary estimate of the materials that can be diverted to beneficial use. Receipts from disposal, re-use, and recycling options shall indicate that 65% of materials are diverted.
2. These uses shall include:
    a. Recycling
    b. Composting
    c. Use as a fill material
    d. Alternative daily cover
    e. Land application
    f. Cement, brick, block, or asphalt constituent

g. Roadbed

h. Beach replenishment

i. Other non-disposal use

3. Projects involving old landfill and contamination site cleanups shall be exempt from diversion requirements **unless specified otherwise in the Special Provisions**.

5-14.7 Implementation.

1. Designate an on Site party responsible for instructing workers and implementing the Waste Management Form.
2. Distribute copies of Waste Management Form to the Site supervisor and each Subcontractor.
3. Include waste management and recycling in worker orientations.
4. Provide on Site instruction on appropriate separation, handling, recycling, and recovery methods to be used by all parties at the appropriate stages of the Work at the Site.
5. Include the discussion of waste management and recycling in regular job meetings and job safety meetings conducted during the course of Work at the Site.
6. Remove and relocate reusable materials to be reinstalled or retained in a manner to prevent damage or contamination.
7. Conduct construction and demolition in such a manner to minimize damage to trees, plants, and natural landscape environment.
8. Arrange for adequate collection, transportation, and delivery of the recovered materials to the approved recycling center or processing facility.
9. Maintain records accessible to the Engineer for verification of the diversion of the recovered waste materials.

5-14.8 Storage and Handling.

1. If Site conditions warrant, provide separate containers for different types of materials.
2. Label each container with signs, instructions, and a list of all acceptable materials. The information shall be in English and in Spanish with recycling signs, stickers, and graphic symbols commonly used by the construction industry including the National Fire Protection Association labels, recycling signs, and stickers.
3. Remove all materials for recycling and recovery from the Work locations to approved containers. Failure to remove waste or recovered materials may be considered cause for withholding payment.

4. Place containers for recyclable and recoverable materials at the designated locations on the Site. If materials are sorted on Site, you shall provide a sorting area and necessary storage containers.

5. Change loaded containers for empty containers as demand requires.

6. Provide adequate security from pilferage if recovered materials are stored on Site for the Project duration.

7. Deposit indicated recyclable and recoverable materials in storage areas or containers in a clean (no mud, adhesive, solvents, petroleum contamination) and debris-free condition. You shall not deposit contaminated materials into the containers unless the materials have been cleaned.

8. Ensure all recovered materials are safe for handling and storage.

9. Prevent any chemical contamination of recyclable material. If recyclable material becomes contaminated, you shall report the incident to the Engineer. You shall not deposit the material into the recycling containers. Contaminated materials shall be handled in accordance with 5-15, "Encountering or Releasing Hazardous Substances".

5-14.9 Payment.

1. The payment for construction and demolition waste management shall be included in the following Bid items:

BID DESCRIPTION	**UNIT**
Preparation of Waste Management Form	LS
Site Storage And Handling Of Construction And Demolition Waste	TN
Disposal of Construction And Demolition Waste	TN

2. If no Bid items have been provided for construction and demolition waste management, the payment shall be included in the Contract Price.

3. Final payment shall be withheld until you adequately demonstrate the final disposition, either diverted or disposed, of materials generated by the Project. A final status report is required before the final payment.

ADD:

5-15 ENCOUNTERING OR RELEASING HAZARDOUS SUBSTANCES.

5-15.1 Terms, Definitions, and Acronyms.

1. **Burn Ash -** The residual ash that results from the low temperature combustion of solid waste. Burn ash is generally found at a location where solid waste has been burned and the resulting debris have been buried or stockpiled.

2. **Chemical Release -** Any spilling, leaking, pumping, pouring, emitting, emptying, discharging, dumping, injecting, escaping, leaching, or disposing into the environment as defined by HSC 25501 (s), 19 CCR, 40 CFR 302, and any other applicable regulatory definition.

3. **Closed Container -** A container is closed when the lid, ring, gaskets, and bung are latched, screwed, and tightened in such a way that the contents, including vapors, are confined within the space of the container.

4. **DEHQ –** The San Diego County Department of Environmental Health and Quality. One of the City's local environmental regulators.

5. **Empty Hazardous Materials Containers -** A container which previously held a Hazardous Material shall be considered empty when:
   a. No continuous stream of liquid material releases when the open container is held in any orientation.
   b. No solid material can be removed by physical methods.
   c. The container is an aerosol can at ambient pressure with no product or propellant.

   Empty Hazardous Material containers are Hazardous Waste unless managed in accordance with 22 CCR 66261.7.

6. **Handling Facility -** A facility that is not licensed as a TSDF and has been permitted in California to legally accept a Hazardous Material or recyclable waste for reuse, recycling, or other legal handling method. This excludes facilities accepting petroleum contaminated soils. See the Petroleum Contaminated Soil Disposal and Recycling Facility definition below.

7. **Hazardous Material -** A material which may cause harm to humans, animals, or the environment as defined by HSC 25501 (o) and implemented in HSC Chapter 6.5 and 22 CCR.

8. **Hazardous Substance -** A Hazardous Material, Hazardous Waste, petroleum product, or any chemical product for which a manufacturer is required to prepare a Safety Data Sheet or as defined by HSC 25501(p) and 25281 (h).

9. **Hazardous Waste -** A Hazardous Material that can no longer be used for its intended purpose as defined in HSC 25115, HSC 25117, and HSC 25316 and implemented in HSC Chapter 6.5 and 22 CCR and 40 CFR Part 260 – 299.

10. **Hazardous Waste Determination -** The process which shall be used to determine if a waste is hazardous, regulated, or non-hazardous as required in 22 CCR and testing methods in SW-846.

11. **Hazardous Waste Manifest -** The state and federal approved shipping document required by law to track the transportation and disposal of Hazardous Waste. The document is originated and signed by the generator of the waste in accordance with 22 CCR.

12. **HMMP –** Hazardous Materials Management Program within the City's Environmental Services Department.

13. **Licensed Hazardous Waste Transporter -** A transportation company which holds all the following valid permits, identification numbers, licenses, and registrations:
    a. California Department of Toxic Substances Control permit
    b. California Department of Motor Vehicles – Motor Carrier Permit
    c. U. S. Environmental Protection Agency – Identification number
    d. U. S. Department of Transportation – Identification number
    e. U. S. Department of Transportation – Hazardous Materials Certificate of Registration
    f. California Highway Patrol – License

14. **Non-RCRA Hazardous Waste -** A waste that is defined and regulated as Hazardous Waste only within the State of California and defined in California regulation 22 CCR Division 4.5, Chapter 11, Article 3.

15. **Petroleum Contaminated Soil Disposal and Recycling Facility -** A recycling or disposal facility which has a valid California Regional Water Quality Control Board permit, including Waste Discharge Requirements (DWRs) and air emission permit, to receive petroleum contaminated soil for processing, bioremediation, recycling, alternative fuel, or disposal. A facility located outside the jurisdiction of California, or within Indian Tribal lands, shall have the same or higher standards for the recycling or disposal of petroleum contaminated soil as the State of California.

16. **RCRA Hazardous Waste** - A waste which is managed as Hazardous Waste within and outside the State of California and is defined in Federal regulation 40 CFR Part 261 and California regulation 22 CCR Division 4.5, Chapter 11, Article 4.

17. **Regulated Waste** - A waste that is not considered Hazardous Waste but due to its chemical or physical properties, petroleum contamination, or other properties, must be disposed of at a facility with Regional Water Quality Control Board approved Waste Discharge Requirements (WDRs), such as a municipal Class III landfill or other facility with WDRs that allow disposal of the Regulated Waste.

18. **SDS** - Safety Data Sheet.

19. **Spill** - Refer to the definition of Chemical Release and Threatened Release.

20. **Threatened Release** – a condition creating a substantial probability of harm when the probability and potential extent of harm make it reasonably necessary to take immediate action to prevent, reduce, or mitigate damage to persons, property, or environment.

21. **Treated Wood** - Wood that has been treated with a chemical preservative for the purposes of protecting the wood against attacks from insects, microorganisms, fungi, and other environmental conditions that can lead to decay of the wood and the chemical preservative is registered pursuant to the Federal Insecticide, Fungicide, and Rodenticide Act (7 U.S.C. §136 and following).

22. **TSDF –** A Hazardous Waste transfer, treatment, storage, or disposal facility that has received a California Department of Toxic Substances Control permit, grant of interim status or a variance, or is otherwise authorized by California law to receive RCRA and/or non-RCRA Hazardous Waste for processing, recycling, or disposal. TSDFs located outside the jurisdiction of California shall have the same or higher standards for the processing, recycling, or disposal of Hazardous Waste as the State of California.

23. **Universal Waste** - An item, substance, or object which shall be stored, handled, and disposed of as defined by CCR Title 22, Chapter 23, §§66273.1-66273.90.

5-15.2 General.

1. If you encounter, cause the release of, or have knowledge of a release or an imminent release of Hazardous Substances or petroleum products, construction activities in the area shall immediately cease except in an emergency.

2. If you encounter unforeseen Hazardous Substances or petroleum products, you shall immediately notify the Engineer and (DEHQ) at (858) 505-6880. If there is an immediate fire, explosion, or health or safety threat, notify the Fire Department via 9-1-1.

3. If your construction activities have encountered flammable liquids or other Hazardous Substances, you shall ensure that construction staff have the required Hazardous Waste Operations and Emergency Response (HAZWOPER) certification. Construction staff shall include: City Engineers, City Laboratory Technicians, and City staff that perform onsite inspections.

    a. If your Work encounters flammable liquids or other hazardous substances, you shall be responsible for scheduling training for all construction staff to attend and for submitting verification to the Engineer that construction staff have the required HAZWOPER certification prior to continuing that Work in that area. You shall maintain the HAZWOPER certifications annually until the construction activities triggering the requirement is complete, as approved by the Resident Engineer.

    b. You shall be responsible for implementing, training, and submitting verification to the Engineer that construction staff have the required

HAZWOPER certification before the Notice to Proceed (NTP) has been issued.

4. A Hazardous Waste Determination shall be performed on all potentially Hazardous Waste or Regulated Waste generated at a Site within 10 Working Days of the generation to determine if it meets Hazardous Waste or Regulated Waste criteria in accordance with 22 CCR Division 4.5, 23 CCR Division 3, or any other pertinent law or regulation which could restrict reuse onsite or the disposal of the waste to a municipal landfill, sewer discharge, or storm drain discharge. The results of all Hazardous Waste Determinations shall be submitted to the City for approval prior to any disposal or discharge of the waste in question.

5. Incomplete or inconclusive Hazardous-Waste Determinations conducted by you, as determined by the City, shall be returned for additional information or testing. The City's approval of the final determination of the waste and the disposal or discharge location shall be required.

6. Substances requiring analytical testing shall be sampled and tested in accordance with the sampling and analytical testing requirements in these specifications.

7. If a Community Health and Safety Plan is required for a specific site or Project, you shall fully comply with all of the requirements. Submit the Community Health and Safety Plan and the hazardous removal plan in accordance with 3-8, "SUBMITTALS". Work shall not start until the plans are approved.

8. You shall follow and comply with all applicable Federal, State, and local laws and regulations and notification requirements.

9. You shall not resume Work in any such affected area until after you have determined that such condition and any affected area has been rendered safe for the resumption of Work or until after specifying any special conditions under which Work may be resumed safely.

10. The business entities related to hazardous substance or petroleum product management you propose to use shall be in good regulatory standing and shall have not received regulatory fines totaling more than $25,000 in the past 3 years. These entities shall include:

    a. The licensed Hazardous Waste Transporter

    b. The Petroleum Contaminated Soil Disposal and Recycling facility

    c. The TSDF

    d. The handling Facility

11. For asbestos containing materials (ACM), refer to 306-3.3.5, "Asbestos Materials".

5-15.3 Community Health and Safety Plan (CHSP).

5-15.3.1 General.

1. You shall prepare and submit a CHSP to address the potential of encountering hazardous substances at the Work Site. These substances include, but are not limited to:

    a. Hazardous Substance and Regulated Waste contaminants in soil and groundwater as identified in site assessment data, Special Provisions, historic environmental documents, or on the Geotracker website.

    b. Petroleum products, and their constituent contaminants, with the potential to create flammable or combustible liquids in the groundwater during dewatering activities in the areas specified in the site assessment data, Special Provisions, historic environmental documents, or on the Geotracker website.

2. The Geotracker website can be found at:

    http://geotracker.waterboards.ca.gov/

5-15.3.2 Certified Industrial Hygienist (CIH).

1. A Certified Industrial Hygienist shall oversee the CHSP and monitor Site activities to confirm that no health and safety violations exist during the Work. The CIH shall outline, in the CHSP, the actions to be taken by themselves and you when health and safety concerns or measured contaminants are encountered.

5-15.3.3 Monitoring Devices.

1. You shall have the CIH, or other trained staff, utilize the following monitoring devices at the Work Site and adhere to the action levels for each contaminant identified in the CHSP:

    a. Photo Ionization Detector (PID)

    b. Combustible gas indicator (CGI)

    c. Benzene Monitor (required when gasoline or other petroleum fuels may be encountered in a specific area)

    d. X-Ray Fluorescence (XRF) analyzer (required when lead bearing contaminated soil may be encountered in a specific area)

5-15.3.4 CHSP Elements.

5-15.3.4.1 Site Identification and Location.

1. Provide a detailed plot plan that identifies all on Site and surrounding structures, topography, prevailing wind directions, all surrounding land uses, nearby populations and environments, and any known receptors of special concern.

5-15.3.4.2 Evaluation of Potential Public Exposure to Hazards.

1. Provide a description of the potential public health hazards and exposure pathways resulting from Work Site activities, including vapors, dust, fires, explosions, and physical hazards. Consider both immediate and long-term hazards.

5-15.3.4.3 Monitoring Equipment.

1. Provide a description of the Site monitoring equipment specified in 5-15.3.3, "Monitoring Devices" and any additional equipment identified in the CHSP to monitor contaminants, the action levels for each contaminant identified in the CHSP, and the protocol to be used to protect the public.

5-15.3.4.4 Control Methods.

1. Provide a discussion of the administrative and engineering controls that shall be implemented to prevent or minimize public exposure to chemical and physical hazards. Include control methods necessary to prohibit public access, prevent fugitive dust, mist, odors, and vapors. As a part of the administrative controls, the CIH shall conduct training with all your staff on the requirements of the CHSP.

5-15.3.4.5 Site Security.

1. Describe the methods that shall be used to exclude the public from, or limit public access to, the Work area and the Site in general.

5-15.3.4.6 Vapors, Mists, and Odors.

1. Describe the methods that shall be used to minimize public exposure to potential vapor, mist emissions, and odors resulting from the proposed activities. Engineering and construction practices can typically reduce such emissions. Acceptable control methods include, but shall not be limited to, pumping out non-aqueous phase liquids (NAPL), covering off-gassing excavations or stockpiles, misting excavations or stockpiles with water, covering excavations or stockpiles with foam or other vapor suppressing agents, locating stockpiles away from and downwind of public receptors, and stopping Work.

5-15.3.4.7 Dust.

1. Describe the methods that shall be used to minimize potential public exposure to dust generated as a result of the proposed activities. Acceptable control methods include, but shall not be limited to, covering sources, misting sources with water, reducing the pace of site activities, and stopping Work.

5-15.3.4.8 Open Excavations.

1. Discuss the management of any excavations that may result from the proposed activities. Open excavations present a clear risk to the community and adequate Site security is critical to protect the public.

5-15.3.4.9 Stockpiled or Containerized Soil.

1. Discuss the soil management procedures and the proposed disposition of the stockpiled and containerized soil including the time frame in which activities shall occur.

2. Stockpiled soil shall be contained within berms and covered to prevent runoff, vapor, and dust exposures as specified in 5-15.13.2, "Stockpiling Contaminated Soil". Stockpiled and containerized soil shall be stored in a secured area of the Work Site to prevent public access.

5-15.3.4.10 Other Hazardous Wastes.

1. Discuss the secured storage area for any other hazardous waste generated at the Site.

5-15.3.4.11 Contact Information.

1. Provide the name and telephone number of a Site safety manager who shall be available 24 hours a day and who shall have the knowledge and authority necessary to shut down all on-Site activities in the event of an emergency.

2. Provide the name and qualifications of the CIH. They shall have adequate experience monitoring for each type of contaminant identified in the CHSP.

3. Provide the names of the workers assigned to assist in the implementation of the CHSP and the scope of their roles. If a worker is identified to assist by using a monitoring device, provide information such as resumes, experiences, and training certificates that demonstrate the employee has the knowledge, skills, and ability to adequately complete the task.

5-15.3.4.12 Emergency Planning.

1. Provide a description of the methods and equipment that shall be used to address possible community emergency situations. Possible situations include, but are not limited to, natural gas leaks, water main ruptures, ignition of flammable substances, and large chemical releases.

2. Identify the roles of the Site safety manager, CIH, and workers regarding Site management and cleanup activities in the event of a sudden release of a Hazardous Substance or Regulated Waste to the environment. Include procedures on how the chemical release is assessed for regulatory reporting criteria and who is responsible for completing the proper notifications and contacting the Engineer. Minimum requirements are specified in 5-15.15.

5-15.3.4.13 Public Notification.

1. Provide a description of the Public Notification Program (Program). The Program shall include the preparation and distribution of notices to residences and businesses adjacent to, or in the vicinity of, potential impacts from the Site or area where Work is being performed. Notices shall also be posted around the perimeter of the Site.

2. At a minimum, the notification shall contain the following information:

a. The name and 24-hour telephone number of the Site safety manager and all other people who may be contacted regarding public inquiries.

b. A brief description of the proposed activities.

c. The dates and times that the Work shall be conducted and when the Work shall be completed.

d. Any requisite Proposition 65 warnings. Check the current Proposition 65 (California Health and Safety Code, §25249.6) list for chemicals requiring such warnings.

5-15.4 Hazardous Substances Management Plan (HSMP).

1. For general management of Hazardous Materials, hazardous wastes, petroleum contaminated soil, and Regulated Wastes at the Site, you shall submit a "Hazardous Substances Management Plan" subject to the following regulations prior to start of the Work:

   a. 49 Code of Federal Regulations (49 CFR)

   b. 40 Code of Federal Regulations (40 CFR)

   c. California Code of Regulations, Title 22 (22 CCR)

   d. California Code of Regulations, Title 19 (19 CCR)

   e. California Health and Safety Code, Chapter 6.5 (HSC)

   f. Uniform Fire Code (UFC)

2. Your submittal shall include the following:

   a) A description on how you shall store, manage, and inspect all Hazardous Materials brought to the Site including the management of all containers, drums, and tanks.

   b) A listing of all hazardous wastes, petroleum contaminated soils, and Regulated Wastes anticipated to be generated, or encountered, during the course of the Project and the name of the trained Hazardous Waste Contractor(s) who shall perform the testing, removal, storage, transportation, and disposal activities for each waste type listed.

3. When disposing of the RCRA Hazardous Waste, Non-RCRA Hazardous Waste, petroleum contaminated soil, and Regulated Waste outside the State of California or to Indian Country or Indian tribal lands, you shall utilize facilities as defined in these specifications.

4. You shall include the following for each RCRA Hazardous Waste, Non-RCRA Hazardous Waste, petroleum contaminated soil, and Regulated Waste that is expected to be encountered during the project:

   a. Name of the RCRA Hazardous Waste, Non-RCRA Hazardous Waste, petroleum contaminated soil, or Regulated Waste.

b. Disposal Method (recycling, alternative fuel, bioremediation, thermal desorption incineration, treatment, or Class I, II or III Landfill).

c. Name of Licensed Hazardous Waste Transporter(s).

d. Name of TSDF, Petroleum Contaminated Soil Disposal/Recycling Facility, or Handling Facility where the waste shall be treated, recycled, and/or disposed. Include the name(s) of any interim facilities where the hazardous waste, petroleum contaminated soil, and/or Regulated Waste shall be stored, handled, or treated prior to shipping to the final destination facility.

e. Waste Matrix Example: Hazardous Waste, Petroleum Contaminated Soil, and Regulated Waste Disposal Information Submittal.

Waste Stream	**Disposal Method**	**Transporter 1**	**Transporter 2**	**Facility 1**	**Facility 2**
HazWaste #1	Treatment	ABC Haz Waste Transporter	None	Acme Neutralization	None
Regulated Waste #1	Recycle	XYZ Transporter	HazMat Hauler	Smith Recyclers	None
HazWaste #2	Incinerate	ABC Haz Waste Transporter	HazWaste Transporter	ABC Transfer Station	Acme Incineration
Petroleum Contaminated Soil	Thermal Desorption	XYZ Transporter	None	XYZ soil recyclers	None

f. You shall include the following for each hazardous waste transporter and facility listed in the HSMP:

1) Full business name, phone number, and a company contact.
2) A list of all registrations, permits, licenses, and identification numbers pursuant to these specifications.

g. You shall provide the following for laboratory testing of samples:

1) Name, address, phone number, company contact, and certification number for each California State certified laboratory used.
2) A list of the tests each laboratory is certified to perform under the laboratory's State certification.

5. After the start of the Work, the following submittals shall be made:

a. Hazardous Waste Storage Logs submitted weekly.

b. Chemical Release Spill Report Forms periodically during Work, as necessary.

c. Hazardous Waste Disposal and Laboratory Testing, as needed.

d. Draft Hazardous Waste Manifests for approval submitted prior to scheduling disposal.

e. Two legible copies of each Hazardous Waste Manifest used submitted immediately after receipt from the transporter.

f. Copies of all other disposal receipts and documentation, such as Bills of Lading, submitted immediately after receipt from the transporter.

g. Copies of analytical test data submitted within 1 Working Day of receipt from the laboratory.

h. Approved waste profiles submitted prior to scheduling disposal.

5-15.5 Employee Training.

1. Your employees and Subcontractors shall be trained to ensure compliance with regulations that govern working with Hazardous Waste. By submitting a Bid, you certify that you and your Subcontractors are fully informed of all the applicable regulations which in any manner affect those employed in the Work involving Hazardous Waste. You shall at all times observe and comply with such regulations (22 CCR 66265.16).

2. Your employees and Subcontractors working at the Site shall be able to respond effectively to emergency situations including Chemical Releases.

5-15.6 Sampling and Analytical Testing Requirements.

1. Any waste that is potentially hazardous, regulated, or petroleum contaminated shall be separated from other waste and stored properly pursuant to these specifications. A Hazardous Waste Determination shall be conducted on the suspect waste.

2. Each testing method used in the Hazardous Waste Determination shall be appropriate for the sample being tested. All methods must be approved by the City prior to having a certified laboratory conduct the test.

3. Representative samples shall be obtained by you for each waste to be tested with the sampling procedure and sample naming sequence pre-approved by the City. The City shall be contacted prior to sampling and may be present to observe the sampling. Items sampled without the presence or approval of the City may require the item or waste to be re-sampled.

4. Containers used for sampling shall be certified by a licensed laboratory as "pre-cleaned." Samples shall be sent to a California State licensed laboratory for testing. The laboratory shall have a valid State license for each requested test to be conducted on the samples.

5. A final copy of all analytical test results and the sampling chain-of-custody form shall be provided to the City within one working day of receipt from the laboratory.

5-15.7 Hazardous Materials and Wastes Storage and Management.

1. Hazardous Substances, as well as the items and equipment containing them, shall be handled in a way that minimizes the possibility of a release.
2. Hazardous Substances shall always be kept in an approved, compatible, and closed container with a legible label identifying the contents. Interim containers such as bags, transfer containers, buckets, or pails shall not be acceptable.
3. Containers used to package Hazardous Waste shall 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).
4. Different waste types shall be stored in separate containers. Incompatible wastes shall never be combined or stored near each other.
5. Any packaging used to store and or transport Hazardous Waste offsite such as a container, roll-off bin, tank or other device shall comply with 49 CFR Parts 173, 178, and 179 and shall be labeled and prepared for transportation in accordance with 22 CCR Article 3.
6. A Hazardous Waste label shall be affixed to the container and filled out when the first amount of Hazardous Waste or Hazardous Substance is placed in the container. The label shall include the generator information, contents of the container, physical state and hazardous properties of the waste, and the initial accumulation date. When applicable, a sample Hazardous Waste label will be included in the Contract Documents.
7. You shall use a numbering system to identify each Hazardous Waste container. Each Hazardous Waste container shall be marked with an identification number specific to that individual container.
8. Additional pre-transportation labeling and marking or using placards shall be conducted prior to transporting Hazardous Waste offsite and in accordance with 22 CCR Chapter 12, Article 3 and 49 CFR.
9. Containers, containment systems, and tanks of Hazardous Materials and Hazardous Waste shall 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 (22 CCR 66265.31).
10. Secondary containment shall be provided at a minimum for storage areas containing 55 gallons (208.2 L) or more of Hazardous Material or hazardous waste. The secondary containment area shall be capable of holding the contents of the largest container plus 10% of that volume or in accordance with applicable regulations (22 CCR 66264.175).
11. Secondary containment shall be maintained so that any releases shall be confined within the secondary containment area.

12. Secondary containment systems shall be maintained free of dirt, debris, or liquids of any kind. If any chemical is released into the secondary containment system, it shall be removed immediately.

13. Material used in or around the secondary containment area which has been contaminated with a Hazardous Material or Hazardous Waste shall not be disposed until a Hazardous Waste Determination has been performed in accordance with these specifications. Contaminated materials include, but are not limited to, plastic sheeting, absorbents, dirt, sand, and kitty litter. Contaminated materials found in or around containment areas shall be immediately cleaned.

14. When conducting a waste determination on soil, procedures and protocol specified in the Site Assessment and Mitigation Manual (SAM Manual) shall be followed.

15. You shall perform weekly inspections of their Hazardous Material and Hazardous Waste storage areas to comply with the regulations (22 CCR 66265.174). An inventory of Hazardous Waste containers shall be kept that notes each waste container and its accumulation start date. Inspections shall be documented and copies provided to the City upon request.

5-15.8 Treated Wood Waste (TWW) Management and Disposal.

1. TWW is regulated under California Code Regulations Title 22, division 4.5, chapter 34 and Department of Toxic Substances Control (DTSC).

2. TWW contains hazardous chemicals and shall be managed as hazardous waste or as specified in CCR Title 22, Chapter 34 "Alternative Management Standards for Treated Wood Waste". A summary of the regulations can be found on DTSC's website:

   https://dtsc.ca.gov/regs/alternative-management-standards-for-treated-wood-waste/

3. The generation of TWW during construction projects shall be handled, labeled, stored, tested, and disposed of as described in CCR Title 22, Chapter 34 "Alternative Management Standards for Treated Wood Waste". A summary of the regulations can be found in DTSC's "Requirements for Generators of Treated Wood Waste Fact Sheet" under the section noted "Businesses generating TWW during the normal course of business".

4. TWW shall be disposed of at an authorized composite lined solid waste facility or through a licensed hazardous waste facility.

5. An employer resizing, sorting, or segregating TWW shall provide training for all employees handling TWW and all employees that may reasonably be expected to contact TWW (22 CCR 67386.10). A record of the training shall be maintained for a period of 3 years and shall be made available for review. The training shall include the following:

   a. All applicable requirements of the California Occupational Safety and Health Act of 1973 [Ch. 1, Part 1, Div. 5 (commencing with §6300) of the

Labor Code], including all rules, regulations, and orders relating to hazardous waste.

b. Procedures for identifying and segregating TWW.

c. Safe handling practices.

d. Requirements of the alternative management standards.

e. Proper disposal methods.

5-15.9 Hazardous Waste, Regulated Waste, Petroleum Contaminated Soil Accumulation Time.

1. Each container or pile of Hazardous Waste shall be shipped offsite for disposal by a licensed Hazardous Waste transporter within 90 Days of the date of initial generation or by the end of the Project, whichever comes first. Regulated Wastes and petroleum contaminated soils shall be shipped offsite for proper recycling or disposal within 90 Calendar Days of the initial generation or by the end of the project, whichever comes first.

5-15.10 Hazardous Waste Transportation Requirements.

1. The City shall provide you with the EPA Generator Identification number for the Site. This number is Site specific and shall only be used on Hazardous Waste disposal documentation for the appropriate Site where the waste was generated.

2. A Hazardous Waste Manifest or, when appropriate, a Bill of Lading, non-Hazardous Waste Manifest or other appropriate disposal documentation shall be completed in accordance with 22 CCR Chapter 12, Article 2 and 49 CFR for any shipment of Hazardous Waste leaving the Site.

3. The Engineer or other designated City representative shall sign the Hazardous Waste Manifest or disposal documentation as representing the Hazardous Waste generator at the time the Hazardous Waste is being removed from the Site. Pre-signed Hazardous Waste Manifests or bills of lading are not acceptable.

4. You shall only ship Hazardous Waste using a City pre-approved Hazardous Waste Licensed Hazardous Waste Transporter with valid insurance certificates in accordance with 5-4, "INSURANCE". The Hazardous Waste shall be sent only to a TSDF that is approved by the City in the Hazardous Substances Management Plan submittal in accordance with 22 CCR Chapter 13. Any Contractor who allows the transportation or disposal of Hazardous Waste from a City Site by an unlicensed Hazardous Waste Transporter, upon conviction, shall be subject to 1 year in prison and fined up to $100,000 per day (HSC 25163, 25189.5).

5-15.11 Management of Specified Wastes.

1. The Hazardous Material that is removed from Empty Hazardous Materials Containers shall be used as Hazardous Material or disposed of as a Hazardous Waste. You shall mark each container with the date it was emptied and manage the container within one year by one of the following methods:
    a. Reclaim the scrap value of the container
    b. Send the container offsite for reconditioning or remanufacturing
    c. Send the container back to the manufacturer
    d. Dispose of as hazardous waste
2. For containers 5 gallons (18.9 L) capacity or less, once the container is empty, it may be disposed of to the regular trash.
3. 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 (the spray mechanism was not defective and thus allowed complete discharge of the contents and propellant). Aerosol spray containers shall not be punctured, crushed, or altered in order to remove or release any remaining contents or propellants for the purpose of emptying the container for disposal to the trash.
4. A compressed gas cylinder is empty when the pressure in the container approaches atmospheric pressure.

5-15.12 Regulatory Reporting for Chemical Releases or Threatened Releases.

1. Chemical Releases or Threatened Releases shall be immediately assessed utilizing DEHQ's Incident/Release Assessment Form to determine if the incident requires regulatory reporting. See the contract appendices for a copy of DEHQ's Incident/Release Assessment Form.
2. Incomplete or delayed reporting of a Chemical Release or Threatened Release is subject to fines by DEHQ and any other pertinent regulatory agency.
3. You shall immediately contact the City following any Chemical Release or Threatened Release regulatory reporting.
4. Chemical Releases and any contaminated media (rags, absorbents, soil, and etc.) shall be immediately contained, cleaned up, and handled as Hazardous Waste at your expense. The waste shall be handled as Hazardous Waste unless a complete Hazardous Waste Determination, as approved by the City, is performed indicating that the waste is non-hazardous.

5-15.13 Encountering Contaminated Soil.

1. Contaminated soils are designated as either RCRA Hazardous Waste, Non-RCRA Hazardous Waste, petroleum contaminated soil, or Regulated Waste.
2. When encountering petroleum contaminated soil, abandoned underground storage tanks, petroleum transmission pipelines, Burn Ash, or unidentified

contamination, you shall follow the guidelines of the current edition of the SAM Manual.

3. If you encounter unforeseen contaminated soil, you shall immediately notify the Engineer. The Engineer shall contact HMMP at (858) 573-1294.

5-15.13.1 Monitoring of Potentially Petroleum Contaminated Soil.

1. Monitoring for the presence of petroleum contamination shall be your responsibility and shall be performed in areas of known or suspected contamination during construction activities. You shall notify the Engineer 5 Working Days prior to excavation in areas of known contamination and shall immediately notify the Engineer if suspected or unforeseen contamination is encountered.

2. You shall use an Explosimeter (Combustible Gas Indicator - CGI) calibrated for and capable of automatically detecting explosive gases at 20% of the Lower Explosive Limit (LEL). The functional requirements of the CGI shall comply with the SAM Manual. If 20% or greater of the LEL is detected in an excavation, surface area, or confined space, the Fire Department and DEHQ shall be notified immediately.

3. A Photo Ionization Device (PID) shall also be used at all times in areas of known or suspected contamination. Any soil that triggers PID detection shall be segregated and stockpiled for further characterization.

4. You shall not be reimbursed for costs associated with monitoring activities as the City considers these efforts to be integral and essential to best management health and safety practices for trenching and excavation operations.

5-15.13.2 Stockpiling Contaminated Soil.

1. You shall stockpile all suspect contaminated soil (as indicated by appearance, odor, or PID detection) at a location approved by the Engineer and the HMMP and in accordance to the following procedure. Stockpiled contaminated soil or Hazardous Waste shall be:
   a. Placed on a minimum 8 mil (200 µm) thick polyethylene sheeting and atop non-earthen ground, if possible.
   b. Moistened to minimize dust emissions during stockpiling. However, no runoff shall be permitted at any time.
   c. Securely covered by 8 mil (200 µm) polyethylene sheeting to minimize vapor emissions and prevent runoff from rain (sheeting shall be maintained and remain in satisfactory condition).
   d. Configured in such a manner that surface water runoff from the stockpile does not carry soil, leachate, or both beyond the stockpile perimeter berm.
   e. Separated from uncontaminated soil.
2. You shall manage the contaminated soil properly. The City shall not be liable for contaminated soil improperly handled or disposed by you.

5-15.13.3 Disposal of Contaminated Soil.

1. Contaminated soil that is a RCRA Hazardous Waste or Non-RCRA Hazardous Waste shall be transported to a licensed TSDF and as approved in the Hazardous Substances Management Plan submittal.

2. Contaminated soil that is a Regulated Waste shall be transported to a licensed treatment facility which meets the California Regional Water Quality Control Board's WDRs for that waste type and is approved in the Hazardous Substances Management Plan submittal in accordance with 5-15.4, "Hazardous Substances Management Plan". If the treatment facility shall not accept the contaminated soil, the Regulated Waste shall then be sent to a State licensed Class III landfill or other facility with WDRs that accept the Regulated Waste.

3. You shall obtain pre-approval for your proposed treatment or disposal facility in accordance with 5-15.4, "Hazardous Substances Management Plan". You shall obtain all necessary approvals and authorizations from the treatment or disposal facility and shall provide them to the Engineer and City's HMMP a minimum of 5 Working Days prior to scheduling transport.

4. You shall use a Regulated Waste or Non-Hazardous Waste data form to document the disposal from the Work Site of the contaminated soil that is identified as Regulated Waste. You shall use a Hazardous Waste Manifest for all soils identified as RCRA or Non-RCRA Hazardous Waste.

5. You shall provide the Engineer and City's HMMP with manifests for each load at least 48 hours prior to the scheduled pickup date. The City's HMMP shall review the manifests for accuracy. All manifests shall be signed off by the Engineer or HMMP on the date of loading and transport. Copies of executed manifests and treatment or disposal certificates shall be provided to the Engineer and City's HMMP as specified in 5-15.4, "Hazardous Substances Management Plan".

6. You shall manage the contaminated soil properly. The City shall not be liable for contaminated soil improperly handled or disposed by you.

5-15.14 City's Responsibility.

1. The City shall be responsible for any Hazardous Substances and Hazardous Waste as defined by §§25316 and 25117 of the California Health and Safety Code, uncovered or revealed at the Site which existed prior to the date of the NTP and was not identified in the Contract Documents to be within the scope of the Work. The City shall not be responsible for any such materials brought to the Site after the NTP.

5-15.15 Payment.

1. The payment for waste management shall be included in the applicable Bid items as follows:

a. "Preparation of Hazardous Waste Management Plan and Reporting" (LS).

b. "Monitoring of Contaminated Soil" (HR).

c. "Testing, Sampling, Site Storage, and Handling of Soils Containing RCRA Hazardous Waste" (TON).

d. "Loading, Transportation, and Disposal of soils containing RCRA Hazardous Waste" (TON).

e. "Testing, Sampling, Site Storage, and Handling of Petroleum Contaminated Soil" (TON).

f. "Loading, Transportation, and Disposal of Petroleum Contaminated Soil" (TON).

g. "Testing, Sampling, Site Storage, and Handling of Soils Containing Non-RCRA Hazardous Waste" (TON).

h. "Loading, Transportation, and Disposal of Soils Containing Non-RCRA Hazardous Waste" (TON).

i. Testing, Sampling, Site Storage, Handling, Transportation, and Disposal of Containerized RCRA Hazardous Waste" (55 Gal DRUMS).

j. "Testing, Sampling, Site Storage, Handling, Transportation, and Disposal of Containerized Non-RCRA Hazardous Waste" (55 Gal DRUMS).

k. "Testing, Sampling, Site Storage, Handling, Transportation, and Recycling/Disposal of Universal Waste" (EACH).

l. "Testing, Sampling, Site Storage, Handling, Transportation, and Recycling/Disposal of Regulated Waste" (TON).

m. "Testing, Sampling, Site Storage, Handling, Transportation, and Disposal of RCRA Hazardous Waste Contamination from the Treatment of Contaminated Ground Water" (GAL).

n. "Testing, Sampling, Site Storage, Handling, Transportation, and Disposal of Non-RCRA Hazardous Waste Contamination from the Treatment of Contaminated Ground Water" (GAL).

2. Shorter testing time and availability of preliminary results may be required by the Engineer and shall be paid as Extra Work.

3. The payment for the management and disposal of TWW shall be paid as Extra Work unless a separate lump sum Bid item has been provided for "Management and Disposal of Treated Wood Waste".

4. The payment for the preparation and implementation of the Community Health and Safety Plan shall be included in the Contract Price unless a Bid item for "Community Health and Safety Plan" has been provided.

5. The payment for Hazardous Waste Operations and Emergency Response (HAZWOPER) certification and training for construction staff shall be included in the allowance Bid item for "Hazardous Waste Operations and Emergency Response (HAZWOPER) Certification.

SECTION 6 – PROSECUTION AND PROGRESS OF THE WORK

6-1.1 **Construction Schedule.** To paragraph (1), sentence (1), DELETE in its entirety and SUBSTITUTE with the following:

After notification of award of the Contract and prior to the start of any Work, you shall submit your proposed Cost Loaded Construction Schedule to the Engineer at the pre-construction meeting.

ADD the following:

1. Cost Loaded Construction Schedule (Schedule).

    a. You shall be responsible for developing, coordinating, revising, updating, and maintaining the Cost Loaded Construction Schedule (Schedule) utilizing the Critical Path Method (CPM).

    b. Schedule versions shall be based solely on the Work as awarded and shall exclude any substitute proposals even if you pursue a substitution in accordance with the provisions of the Contract.

    c. Include the approved proposals and approved Change Orders in the Schedule updates.

    d. Total Float is the number of days by which a part of the Work in the Schedule may be delayed from its early dates without necessarily extending the Contract Time. The Contract Float is the number of days between your anticipated date for early completion of the Work, or specified part, and the corresponding Contract Time. Total Float and Contract Float belong to the Project and belong to any Party. They are available to either party to accommodate changes in the Work or to mitigate the effect of events which may delay performance or completion.

    ~~e.~~ Monthly progress payments are contingent upon the submittal of an updated Schedule to the Engineer. The Engineer may refuse to process the whole or part of any monthly payment if you refuse or fail to provide an acceptable schedule.

    f. The Schedule shall show a breakdown of Work into activities and relationships between the activities to the extent required to effectively manage the Work. The Schedule shall show the division of the Work into activities and shall specify the progression from the NTP to the end of the Contract Time.

    g. The Schedule shall include appropriate time allowances and constraints for submittals, items of interface with Work performed by others, and specified construction, start-up, and performance tests.

    h. Your Schedule shall include 7 Working Days for the Engineer to schedule and conduct a Walk-through inspection and 15 Working Days 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.

i. If you modify or change the Schedule for Change Order Work or otherwise, notify the Engineer in writing with an explanation.

j. Comments made by the Engineer on the Schedule during review shall not relieve you from compliance with requirements of the Contract. The Engineer may request that you and your major Subcontractors (defined herein as being any Subcontractor or Supplier with 5% or more of the value of the Contract) participate in the review of any Schedule submission. Submit the Schedule revisions within 10 Working Days after the Engineer's review.

k. The Schedule shall show work to be done by the City's personnel, such as but not limited to: submittal reviews (separate tasks for each), sewer televising, water main connections, water testing, and operational performance tests as separate tasks. The Schedule shall show appropriate time allowances for work performed by the City and other agencies.

l. If completion of any part of the Work, delivery of equipment or materials, or provision of your submittals is behind schedule and will impact the completion date of the Work, you shall submit a written recovery plan acceptable to the Engineer for completing the Work by the current Contract completion date.

m. You shall not be entitled to any extension in Contract Time or recovery for any delay incurred because of extensions in an early completion date until all Contract Float is used, performance of the Work extends beyond the corresponding Contract Time, and a recovery plan is submitted demonstrating that the delay cannot be mitigated or offset through actions such as rescheduling the Work.

n. Misrepresentation of actual Work durations in order to suppress available Float Time shall be cause for rejection of the Schedule and any revisions or updates.

o. The Schedule shall include procurement related activities which lead to the delivery of permanent materials to the Site in a timely manner. Procurement activities include activities such as preparation of Shop Drawings and Working Drawings, review and acceptance of Shop Drawings and Working Drawings, materials fabrication, materials delivery, and etc. as appropriate.

p. The Schedule shall be reasonably balanced over the construction duration. Upon receipt, the Engineer shall review the Schedule and shall provide comments, as appropriate, for revision.

q. Assign a budget to each Schedule activity. Separate Bid items shall be separate activities. The Schedule shall show costs for each phase of

the Contract. The cost value of all Schedule activities shall equal the Contract values shown in the Bid both individually and in total. Include Change Orders.

r. The Engineer may at any time request a Schedule narrative that describes the approach to the Work and the rationale used to develop the Schedule relationships and logic.

s. Submit an updated cash flow forecast with every pay request (for each Project ID or WBS number provided in the Contract) 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.

1) Refer to the Sample City Invoice materials attached to the Contract Documents and use the format shown.

2) See also the "Cash Flow Forecast Example" at the location below:

https://www.sandiego.gov/ecp/edocref/

2. For phased funded contracts, the Schedule shall include the Work to be completed as part of the first phase of the Phased Funding Schedule and all subsequent phases and shall be in accordance with 6-1.4, "Phased Funding".

ADD:

6-1.1.1 Contracts Less Than Or Equal To $500,000 In Value.

1. Use a scheduling program such as Microsoft Project or an approved equal capable of producing the required information in accordance with 6-1, "CONSTRUCTION SCHEDULE AND COMMENCEMENT OF THE WORK" and these specifications for the computerized CPM scheduling and monthly update reports.

2. Provide the Schedule to the Engineer at the Pre-Construction meeting and as required in accordance with 6-1.1, "Construction Schedule".

3. Provide a fully developed horizontal bar-chart type schedule.

4. Provide a separate time bar for each significant construction activity.

5. Provide a continuous vertical line to identify the first Working Day of each week.

6. Within each time bar, indicate estimated completion percentages in 10% increments. As Work progresses, place a contrasting mark in each bar to indicate actual completion.

7. Graphically indicate sequences necessary for the completion of related portions of the Work.

8. Be of sufficient size to show data for the entire Contract Time.

ADD:

6-1.1.2 Contracts More Than $500,000 In Value.

1. Provide the Schedule to the Engineer in accordance with 6-1.1, "Construction Schedule" and 6**-1.2, "Commencement of the Work"**.

2. Use any scheduling product by ORACLE'S PRIMAVERA or approved equal program capable of producing the required information in accordance with 6-1, "CONSTRUCTION SCHEDULE AND COMMENCEMENT OF THE WORK" for the computerized CPM scheduling and monthly update reports. Electronic file submittals shall be compatible with Primavera P6 format used by the City.

3. In addition to the electronic submittal of the Schedule, submit hard copy tabular reports.

4. The Schedule shall begin with the date of issuance of the NTP and end at Acceptance and shall contain as a minimum the following information:

    a. Project name, the City's Project identification numbers, your name, address and phone number, dates of original schedule and latest revision, revision number, and Contract Time.

    b. Sufficient detail to assure adequate planning has been done for proper execution of the Work such that, in the sole judgment of the Engineer, it provides an appropriate basis for monitoring progress.

    c. The sequence, duration, both early and actual starts and end dates of each activity, interdependence, critical path, and percentage of completion status of all activities required for the complete performance of Work.

    d. Construction activities including submittal review, operation checks, final Walk-through, and Punchlist generation.

    e. The cost associated with each activity and the total cost for each phase of the Contract. The cost information shown in the Schedule shall be used for schedule evaluation and budgetary forecasting purposes only and shall not be construed as entitlement for payment.

    f. Graphical reports, when specified or required by the Engineer, in precedence diagram format and plotted on a time-scaled calendar. Expressly identify the Contract Time, the critical path(s), and the activities.

    g. Activities shall be shown on their early dates with their total float noted beside them. Connections between activities whether on the same sheet or on different sheets, shall identify both predecessor and successor Work. Activity data shall include the description of Work, activity costs (budget), activity duration, and special codes.

    h. Activity data shall include the description of the Work, activity duration, percent completed, and any special codes required with the following information:

1) Current status of the activity.

2) Remaining duration of the activity.

3) Actual start and finish dates for the activity in progress or completed.

i. The Schedule updates shall include both forecast and actual cost and schedule data.

j. The Schedule of Values (SOV) for lump sum Bid items shown on the Schedule shall be submitted in accordance with 7-2, "LUMP SUM WORK".

k. The Schedule shall indicate the estimated person days and material quantities for each construction activity.

5. For those activities started but not yet completed at the time of submittal, the updated Schedule shall reflect the percentage of costs remaining, as agreed between you and the Engineer, for an estimate of the remaining budget.

6-1.1.3 Payment.

1. The payment for the Schedule shall be included in the Contract Price.

6-1.2 Commencement of the Work. DELETE in its entirety and SUBSTITUTE with the following:

1. Unless specified otherwise, you shall start construction within 5 Working Days after NTP and shall diligently prosecute the Work to completion within the Contract Time. Do not start any construction activities at the Site until the Pre-Construction meeting is held and until the NTP has been issued by the Engineer.

2. Upon your written request, the Engineer may delay the issuance of the NTP as described in the following:

a. Up to 5 Working Days from the Pre-construction meeting.

b. Up to 40 Working Days from the LNTP for the preparation, submittal, obtaining approval for and filing of the Permit Registration Documents (PRDs) in accordance with 1101-1.8, "Permit Registration Documents (PRDs)".

c. Up to 60 Working Days from the LNTP for the preparation, submittal, and approval of the engineered Traffic Control Plan (TCP) when specified in 601-2.1.2, "Engineered Traffic Control Plans (TCP)".

3. For areas that do not require engineered TCP on D-sheets, you may at any time after the Pre-construction meeting obtain a TCP Permit via Working Drawings or the City's over the counter process and start the Work. If you decide to commence the construction Work before the completion of the D-sheet TCPs, you shall forfeit the 60 Working Days specified here. The D-sheet TCP shall be done concurrently and no additional time shall be granted.

4. For paving Work, coordinate the Work to facilitate the installation and protection of the new curb ramps and associated concrete Work prior to commencing the asphalt overlay operations. Do not start the Work at a specific location until all layouts and measurements are agreed upon by you and the Engineer.

5. You shall submit a Cost Loaded Construction Schedule in accordance with 6-1.1, "Construction Schedule" at the scheduled pre-construction meeting.

6. If a Cost Loaded Construction Schedule is not provided, the pre-construction meeting will still be held. The Contract Time shall commence at issuance of the NTP, but you shall be limited to the following activities until the Cost Loaded Construction Schedule has been submitted to the Resident Engineer with no exceptions taken:

    a. Mobilization of your trailers, associated utility setup, and grading for trailer area

    b. Permit Procurement

    c. Fencing and temporary utilities for your storage areas

    d. Submittal of anticipated critical path submittals

ADD:

6-1.2.1 Construction Phasing.

1. When project phasing is provided in the Special Provisions do not proceed to the next phase unless the Engineer has accepted the preceding phase.

2. For mainline projects, use of multiple mainline crews shall require prior approval from the Engineer.

ADD:

6-1.3 Work Outside Normal Working Hours.

1. Unless otherwise indicated in the Contract Documents or approved by the Engineer, Work at the Site shall be performed during Normal Working Hours. The Engineer may approve Work beyond Normal Working Hours in connection with the safety or protection of persons, property, or the Work at the Site or adjacent to the Site.

2. The Engineer shall coordinate inspection staff, to the extent possible, to accommodate Project inspection requirements. If your request for working during outside Normal Working Hours is approved, you shall be responsible for reimbursing the City for all costs to provide inspection services outside Normal Working Hours. The Engineer shall issue a deductive Change Order to compensate the City.

3. You shall obtain a noise abatement permit and shall install any permit requirements when such a permit is required to perform the Work outside Normal Working Hours.

6-1.3.1 Payment.

1. The payment for the noise abatement permits shall be included in the Contract Price.

ADD:

6-1.4 Phased Funding.

6-1.4.1 General.

1. Phase Funding means that construction will be broken down into various phases that will take place over multiple City fiscal years. The decision to utilize phased funding will be specified in the Contract Documents.

6-1.4.2 Pre-award Schedule.

1. The Pre-Award Schedule, in accordance with 6-1, "CONSTRUCTION SCHEDULE AND COMMENCEMENT OF THE WORK", shall be prepared for the first phase of the Contract and shall be used as a basis for the first Phased Funding Schedule Agreement which will be developed by the City.
2. You shall coordinate the estimated construction start date with the City's project manager. Upon receipt, the City's project manager shall review the Pre-Award Schedule and provide comments, as appropriate, for revision. The project manager may require backup documentation and calculations to justify schedules.

6-1.4.3 Phased Funding Schedule Agreement.

1. Once executed by both parties, the Phased Funding Schedule Agreement shall become part of the Contract Documents. The Phased Funding Schedule Agreement Form is included in the Bidding Documents.
2. The City reserves the right to award the first phase with duration of fewer than 90 Working Days.

6-1.4.4 Final Phased Funding Schedule Agreement.

1. After Award your approved schedule shall serve as the basis for the final Phased Funding Schedule Agreement which includes the total contract amount and all phases. You and the City may mutually agree to revise the first phase. However, the total funds allocated as part of the previously approved Pre-Award Schedule shall not be exceeded.
2. The final Phased Funding Schedule Agreement shall define payment limitations and the respective obligations of the parties in accordance with 7-3.10, "Phased Funding Compensation".

ADD:

6-1.5 Excusable Delays.

1. If a delay in the Work occurs and affects Work activities, delays may either be Excusable Compensable Delays or Excusable Non-Compensable Delays.

6-1.5.1 Excusable Compensable Delays.

1. If an Excusable Delay meets the requirements of 6-4.2, "Extensions of Time", the following circumstances shall be compensable:

    a. The City's failure or inability to make available any portion of the entire Site in accordance with the requirements of the Schedule.

    b. The City's failure or inability to obtain necessary zoning changes, variances, code changes, permits or approvals from any governmental authority, or failure to obtain any street or alley vacations required for the performance of the Work, except to the extent due to your fault or neglect as determined by the Engineer.

    c. Delays resulting from the acts or omissions of Separate Contractors, except to the extent Separate Contractors perform their work properly and in accordance with the Schedule.

    d. Differing or concealed site conditions that could not have been reasonably anticipated at the time of Bid.

    e. Delays resulting from the existence or discovery of hazardous materials or waste on the Site not brought in by you and not included in the Contract.

    f. Delays resulting from any changes made to any City of San Diego Municipal Code after the date of execution of the Contract.

    g. Delays due to the City's acts or omissions and those within the City's control.

    h. Delays requested by the City.

6-1.5.2 Excusable Non-Compensable and Concurrent Delays.

1. The City shall only issue an extension of time for Excusable Delays that meet the requirements of 6-4.2, "Extensions of Time" for the following circumstances:

    a. Delays resulting from Force Majeure.

    b. Delays caused by weather.

    c. Delays caused by changes to County, State, or Federal law.

2. When a non-excusable delay is concurrent with an Excusable Delay, you shall not be entitled to an extension of Contract Time for the period the non-excusable delay is concurrent with the Excusable Delay.

3. When an Excusable Non-Compensable Delay is concurrent with an Excusable Compensable Delay, you shall be entitled to an extension of Contract Time, but shall not be entitled to compensation for the period the Excusable Non-Compensable Delay is concurrent with the Excusable Compensable Delay.

ADD:

6-1.6 Pre-construction Meeting.

1. Within 20 Working Days from the LNTP the Engineer shall schedule a mandatory Pre-construction meeting with you. The agenda shall include items such as NTP, design services and submittal and review process, critical elements of the Work schedule, submittal schedule, cost breakdown of major lump sum items, payment requests and processing, environmental and community concerns, coordination with the involved utility firms, the level of record project documents required, and emergency telephone numbers for all representatives involved in the course of construction.

ADD:

6-2.1 Moratoriums.

1. When moratorium periods are **specified in the Special Provisions**, you shall stop work and completely demobilize all construction related activity, equipment, and materials within the stated limits prior to the beginning of the moratorium periods at no additional cost to the City. Complete any Work that has been started prior to the start of the moratorium.
2. You shall restore and clean the site prior to each moratorium. Do not leave equipment, materials, or traffic control on the Site during the moratorium periods. Cover trenches during moratorium periods. Do not use temporary resurfacing.
3. Do not Work within 1 mile from the nearest polling location that would impact access to the polling location. This construction moratorium applies to Work that includes, but is not limited to: trench and utility work, saw cutting, and paving. You shall remove all traffic control that reduces lanes or reduces lane speeds and shall also remove sidewalk closures within 1 mile of polling locations. Additionally, you shall not schedule power outages with private utilities that would impact voters and polling locations. This construction moratorium shall take effect during all general elections and shall be considered included in your Schedule. Refer to the San Diego County website for designated polling locations.

6-2.1.1 Payment.

1. The payment for complying with moratorium requirements shall be included in the Contract Price.
2. You shall not be entitled to any additional costs for repeated mobilization and demobilization to continue the Work after the moratorium periods.

6-3.1 General. DELETE in its entirety and SUBSTITUTE with the following:

1. **Unless otherwise specified in the Contract,** the time of completion of the Contract shall be expressed in Working Days.

2. The number of Working Days specified for the Walk-through, preparation, and the completion of Punchlist items **until acceptance shall be included in the stipulated Contract Time.**

3. **For pipeline projects, the following shall be included in the stipulated Contract Time:**

   a. 30 Working Days for the first phase and 10 Working Days for each subsequent phase for City Force high-line work for water mains.

   b. 30 Working Days for the City Forces TV inspection of sewer mains.

   c. If weather condition is inclement, complete each street segment within 15 Working Days from the day the slurry seal or asphalt overlay is placed. Each completed segment shall include other incidental Work items (weed abatement, damaged asphalt pavement replacement, asphalt patching, resurfacing, striping, markings, raised pavement markers, and inlet markers).

   d. 30 Calendar Days for full depth asphalt final mill and resurfacing work required per SDG-107, "Pavement Restoration for Asphalt Concrete Surfaced Streets - Major Excavation".

   e. Where shutdowns of 16 inch and larger pipes are required, there is a shutdown moratorium from May until October. Plan and schedule Work accordingly and submit a tentative schedule for the anticipated shutdowns prior to NTP. No additional payment or Working Days will be granted for delays due to the moratorium.

4. **When specified in the Contract Documents**, the Plant Establishment Period (PEP) is included in the stipulated Contract Time and shall begin with the acceptance of the installation of the vegetation plan in accordance with Part 8 – LANDSCAPING AND IRRIGATION.

6-4.1 **General.** ADD the following:

1. The City shall only grant an extension of time if the Extra Work or unforeseen condition impacts the Project's critical path. All requests for an extension in Contract Time for any Extra Work or unforeseen event shall be demonstrated by using the Critical Path Method (CPM). No other scheduling method shall be used to calculate the Project's schedule.

6-4.2 **Extensions of Time.** DELETE in its entirety and SUBSTITUTE with the following:

1. The Contract Time shall not be modified except by Change Order.

2. You shall notify the City in writing within 1 Working Day after the occurrence and discovery of an event that impacts the Project Schedule.

   a. If you believe this event requires a Change Order, you shall submit a **written Change Order request with a report to** the City that explains the request for Change Order within 5 Working Days. The Change Order request must include supporting data, a general

description of the discovery, the basis for extension, and the estimated length of extension. The City may grant an extension of time, in writing, for the Change Order request if you require more time to gather and analyze data.

3. The Engineer shall not grant an extension of Contract Time in accordance with 6-1.5, "Excusable Delays" unless you demonstrate, through an analysis of the critical path, the following:

   a. The event causing the delay impacted the activities along the Project's critical path.

   b. The increases in the time to perform all or part of the Project beyond the Contract Time arose from unforeseeable causes beyond your control and without your fault or negligence and that all project float has been used.

4. Any modifications to the Contract Time will be incorporated into the weekly document that the Engineer issues that stipulates the Contract Time. If you do not agree with this document, submit to the Engineer for review a written protest supporting your objections to the document within 30 Calendar Days after receipt of the statement. Your failure to file a timely protest shall constitute your acceptance of the Engineer's weekly document.

   a) Your protest will be considered a claim for time extension and shall be subject to 2-10.1, "Claims".

6-4.4 **Written Notice and Report.** DELETE in its entirety and SUBSTITUTE with the following:

1. Your failure to notify the Resident Engineer within 1 Working Day OR provide a Change Order request within 5 Working Days after the event, in accordance with 6-4.2, "Extensions of Time", will be considered grounds for refusal by the City to consider such request if your failure to notify prejudices the City in responding to the event**.**

6-6.1 **General.** ADD the following:

1. The City reserves the right to shut down any trenching operation if you are not proceeding within a reasonable period of time to restore the pavement and Site cleanup. A reasonable period of time is considered to be 5 to 10 Working Days after backfilling any one block, approximately 600 feet (182.9 m), of pipeline. The Engineer shall determine the period of time allowed which shall not be subject to dispute.

2. During periods when the Work is suspended, you shall be prepared for any emergency Work that shall be supervised by your representative, including site safety and maintenance.

6-6.2 Archaeological and Paleontological Discoveries. DELETE in its entirety and SUBSTITUTE with the following:

6-6.2 Archaeological, Native American, and Paleontological Discoveries.

1. If a Mitigation, Monitoring, and Reporting Program (MMRP) for Historical, Paleontological, or both resources have been prepared for the Project, then the MMRP shall control in lieu of this subsection (except for reference to 6-4, "DELAYS AND EXTENSION OF TIME") unless the MMRP is silent to these issues. For Paleontological discoveries, either the MMRP or Paleontological Monitoring and Reporting Program (PMRP) shall control in lieu of this subsection (whichever is applicable). Refer to the MMRP or the "Paleontological Construction Monitoring Requirements" attached in the Contract Documents.
2. If discovery is made of items of Native American, Archaeological, and/or Paleontological interest, you shall immediately notify the Engineer and cease any soil disturbing activity in the area of discovery and any nearby area. You shall also notify the San Diego County Coroner (Medical Examiner) at (858) 694-2895 in accordance with the California Health and Safety Code §§7050.5 and 7051.
3. The City shall not authorize any further excavation or disturbance of the Site or any nearby area until the medical examiner has concluded an investigation of the circumstances, manner, and cause of any death and the recommendations concerning the treatment and disposition of the remains have been made to the City. Excavation in the areas of interest shall not resume until authorized by the Engineer in writing as approved by the Archeologist.
4. You shall make allowances for temporary Work stoppages to evaluate and salvage Native American, Archaeological, and Paleontological discoveries. If suspension of construction activities for analysis, salvaging of resources, or both exceed 5 Working Days along the entire alignment, you shall be entitled to an extension of time in accordance with the provisions of 6-4, "DELAYS AND EXTENSIONS OF TIME".
5. Discoveries encountered may include fossil resources, historic or prehistoric human bones or remains, animal bones or remains, stone implements or other artifacts and remnants of dwelling sites, and any items created or altered by humans more than 45 years ago, excluding pipes, laterals, and appurtenances.
6. There are severe civil and criminal consequences for failure to treat Native American, Archaeological, Paleontological, or both discoveries in accordance with local, State, and Federal laws. You shall notify Subcontractors and Suppliers of the requirements of this subsection.
7. You shall indemnify and hold the City, its officers, and employees harmless from any claims asserted or liability established, including penalties from local, state, or federal agencies arising from your failure or your Subcontractors and Suppliers failure to notify the Engineer of such discoveries in accordance with this subsection.

ADD:

6-6.2.1 Archeological and Native American Monitoring Program.

1. **Unless specified otherwise** in the Contract Documents, you shall retain a qualified archaeologist approved by the City's Environmental Analysis Section (EAS). In accordance with City Historical Resources Guidelines and prior to the Pre-Construction meeting, you shall provide references for at least 1 successfully completed project of the approved archaeologist within the last 5 years of similar size and complexity in Southern California. The City shall verify the information provided and only qualified monitors shall be accepted. The Archeologist shall retain the appropriate Native American representative. The Archeologist and the Native American representative shall attend the Pre-construction meeting. The areas shown on the Plans subject to monitoring are approximate. The Archaeologist shall confirm the sites and implement the required monitoring per the Contract Appendices.
2. If a discovery is made, your archaeological monitor shall make a determination as to whether excavation in the area shall cease or shall continue. The time you wait for this determination from their monitor shall not be claimed as delay time.
3. If any significant archaeological sites are known to exist in the project area, they shall be shown in the Archaeological Data Recovery Program as part of Appendix A.

6-6.2.1.1 Payment.

1. The full compensation for the Archaeological and Native American monitoring program and report preparation, as prescribed in Contract Appendices, shall be included in the lump sum or linear foot of Main pipeline Bid item for "Archaeological and Native American Monitoring Program" and shall include the payment for Work performed, if any, on sewer laterals, water services, potholing and trenching for mainline. No payment shall be made unless the qualified archaeologist is present to verify during the performance of the Work.
2. In the event of a significant discovery, foreseen or unforeseen, and if no Allowance Bid item for "Archaeological and Native American Mitigation and Curation" is included in the Contract, you shall be entitled to additional compensation in accordance with 2-8, "EXTRA WORK" for the implementation of a Mitigation Program as set forth in Contract appendices.
3. The payment for Work delays in excess of the 5 Working Days as described in item 4 of 6-6.2, "Archaeological, Native American, and Paleontological Discoveries" shall be included in the Bid item for "Suspension of Work – Resources".

ADD:

6-6.2.2 Paleontological Monitoring Program.

1. **Unless specified otherwise** in the Contract Documents, you shall retain a qualified paleontologist approved by EAS. In accordance with City Historical Resources Guidelines and prior to the pre-construction meeting, you shall provide references for at least 1 successfully completed project of the approved paleontologist within the last 5 years of similar size and complexity in Southern California. The City shall verify the information provided and only qualified monitors shall be accepted. The paleontologist shall attend the pre-construction meeting. The areas shown in the Contract Documents that are subject to monitoring are approximate. The paleontologist shall confirm the sites and implement the required monitoring in Contract Appendices.
2. If a discovery is made, your paleontological monitor shall make a determination as to whether excavation in the area shall cease or shall continue. The time you wait for this determination from their monitor shall not be claimed as delay time.

6-6.2.2.1 Payment.

1. The full compensation for the paleontological monitoring program and report preparation, as prescribed in Contract Appendices, shall be included in the lump sum or linear foot of main pipeline Bid item for "Paleontological Monitoring Program" and shall include the payment for Work performed, if any, on sewer laterals, water services, potholing and trenching for the mainline. No payment shall be made unless the qualified paleontologist is present to verify during the performance of the Work.
2. In the event of a significant discovery, and if no bid item for "Paleontological Mitigation and Excavation" is included in the Contract, you shall be entitled to additional compensation in accordance with 2-8, "EXTRA WORK" for the implementation of a Mitigation Program as set forth in Contract Appendices.
3. The payment for Work delays in excess of the 5 Working Days as described in item 4 of 6-3.2.1, "Archaeological, Native American, and Paleontological Discoveries" shall be included in the Bid item for "Suspension of Work – Resources".

ADD:

6-6.2.3 Archaeological and Native American Mitigation and Curation.

1. In the event of a significant Native American or archaeological discovery, foreseen or unforeseen, and after consultation with EAS staff, you shall implement a mitigation program as set forth in Appendix A.

2. In accordance with the Mitigation and Monitoring Reporting Program, the mitigation Work shall include, but shall not be limited to the preparation and implementation of an Archaeological Data Recovery Program (ADRP), the following for artifact remains:

   a. Excavation for recovery

   b. Sorting

   c. Cleaning

   d. Cataloging/identifying/analyzing

   e. Curation (bagging, placement into archival boxes, delivery to an appropriate institution, and any fees required by the institution)

   f. Reporting

3. The Archaeological Principal Investigator (PI), as defined in the MMRP, shall make a recommendation if all or a portion (a representative sample) of the items discovered need to be curated.

4. The excavation Work shall include coordination of all parties involved and traffic control for a period of up to 2 weeks.

6-6.2.3.1 Payment.

1. The Work for archaeological and Native American mitigation and curation shall be paid under the Allowance Bid item for "Archaeological and Native American Mitigation and Curation". You shall provide the Engineer with invoices for the Work performed, including the invoice from the archaeological monitor in the format shown in the attached Appendix, and shall be reimbursed from the amount allocated.

2. If there is an ADRP or known site that is indicated in the Contract Documents, the payment shall be included in the Allowance Bid item for "Archeological and Native American Mitigation and Curation".

ADD:

6-6.2.4 Paleontological Mitigation and Excavation.

1. In the event of a significant paleontological discovery and after consultation with EAS staff, implement a mitigation program in accordance with the Contract Documents. In accordance with the Mitigation and Monitoring Reporting Program or Paleontological Monitoring and Reporting Program, the mitigation Work shall include the following for fossil remains:

   a. Excavation for recovery

   b. Sorting

   c. Cleaning

d. Cataloging/identifying/analyzing

e. Reporting

f. Delivery to and any fees required by the appropriate institution

2. The excavation Work shall include coordination of all parties involved and traffic control for a period of up to 2 weeks.

6-6.2.4.1 Payment.

1. The Work for paleontological mitigation and related excavation shall be paid under the cubic yard Bid item for "Paleontological Mitigation and Excavation". Excavation Work over 10 feet (3 m) deep or, as determined by the paleontologist, of areas outside of the trench for further recovery of fossils (test pits) shall be included in this Bid item.

6-7.1 General. DELETE in its entirety and SUBSTITUTE with the following:

1. Prior to the Acceptance of the Work, you shall be found in default of the Contract if:

   a. You become insolvent, assign your assets for the benefit of your creditors, are unable to pay your debts as they become due, or are otherwise financially unable to complete the Work.

   b. You abandon the Work by failing to report to the site and by failing to diligently execute the Work to completion.

   c. You disregard written instruction from the Engineer or materially violate provisions of the Contract Documents.

   d. You fail to execute the Work according to the Schedule approved by the Engineer.

   e. You disregard laws or regulations of any public body having jurisdiction.

   f. You commit continuous or repeated violations of regulatory or statutory safety requirements.

   g. You fail to notify the Engineer upon discovery of items of Native American, Archaeological, or Paleontological interests.

2. Notices, and other written communications regarding default between the Contractor, the City, and the Surety shall be transmitted in accordance with 5-2, "SPECIAL NOTICES".

6-8 TERMINATION OF THE CONTRACT FOR CONVENIENCE. DELETE in its entirety and SUBSTITUTE with the following:

1. At any time, the City may at its sole discretion terminate this Contract in whole or in part. If the City decides to terminate this Contract for convenience, the City shall issue a written notice of termination for convenience in accordance with 5-2, "SPECIAL NOTICES". Upon receipt of this notice, you shall immediately proceed as follows:

a. Stop Work immediately or in accordance with the Notice of Termination.

b. Notify Subcontractors and Suppliers to immediately cease their Work and place no further subcontracts for materials, services, or facilities except as necessary to complete any authorized continued portion of the Contract.

c. Terminate all subcontracts to the extent that they relate to the Work terminated.

d. With approval by the Engineer, settle all outstanding obligations arising from the termination of subcontracts. This approval shall be final for the purposes of this section.

e. As directed by the Engineer, transfer and deliver completed or partially completed drawings, plans, calculations, specifications, and any other documents and records that, if the Contract had been completed, would be required to be furnished to the City.

f. Complete the performance of the Work not terminated.

g. Take all necessary steps and actions to minimize all costs to the City as a result of the termination.

h. Take any action that may be necessary or that the Engineer may direct for the protection and preservation of the property related to the Contract that is in your possession and in which the City has or may acquire an interest.

6-8.1 Termination Cost.

1. The City shall determine and pay you the fair and reasonable amounts for your termination cost as follows:

   a. The Contract Price for completed services accepted by the Engineer not previously paid or adjusted for any saving of freight and other charges.

   b. The fair and reasonable cost of settling and paying termination settlements for terminated subcontracts that are chargeable to the terminated portion of the Contract.

   c. The City shall pay you a prorated amount of profit on your Contract for the amount of Work that you performed. The City shall not pay for lost profit on Work that was not performed by you.

6-8.2 Termination Settlement.

1. After termination, you shall submit a final termination settlement proposal to the Engineer no later than 3 months from the effective date of termination, unless extended in writing by the Engineer.

2. If you fail to submit the proposal within the time allowed, the City may determine and pay the fair and reasonable amount that may be due you as a result of the termination. If you do not agree that the amount determined by the Engineer is fair and reasonable, notify the Engineer within 30 Calendar Days of receipt of payment.

6-8.3 Determination of Amount Due the Contractor.

1. In determining the amount due you, the City shall deduct the following:

   a. The fair value of property destroyed, lost, stolen, or damaged that has become undeliverable to the City.

   b. Any claim which the City has against you under the Contract.

6-8.4 Records and Documents Relating to Termination.

1. **Unless otherwise specified** or by statute, you shall maintain all records and documents relating to the terminated portion of the Contract for 3 years after final settlement. This includes all books and other evidence bearing on your costs, expenses, and settlement under the Contract. You shall make these records and documents available to the City, at your office, at all reasonable times, without any direct charge. If approved by the Engineer, you may maintain photographs, microphotographs, and other authentic reproductions instead of original records and documents.

6-8.5 The City's Right to Terminate or Suspend for Loss of Project Funds.

1. The City may terminate or suspend the Contract at its sole discretion if the State of California or its agents render the Redevelopment Agency funds being used to fund this Project unavailable. If the City chooses to suspend the Contract, that suspension shall last until funds are identified and approved by the City Council or Mayor, whichever is appropriate, to be used to complete this project. If the City elects under this provision to terminate the Contract, then neither Party is entitled to compensation from the other Party for any costs arising from such termination. The City may also elect to terminate after invoking a suspension under this provision.

6-9 LIQUIDATED DAMAGES. DELETE in its entirety and SUBSTITUTE with the following:

1. Your failure to complete the Work within the time allowed shall result in damages being sustained by the City. Such damages are, and shall continue to be, impracticable and extremely difficult to determine. For each consecutive Working Day in excess of the time specified for the completion of the Work, as adjusted in accordance with 6-4, "DELAYS AND EXTENSIONS OF TIME", you shall pay to the City, or have withheld from monies due it, the sum described in the table below, **unless otherwise specified in the Special Provisions**.

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 value of the 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 Damages Daily Amount
Less than $200,001	$1,000
$200,001 to $500,000	$1,500
$500,001 to $1,000,000	$2,000
$1,000,001 to $2,000,000	$2,500
$2,000,001 to $5,000,000	$3,000
$5,000,001 to $10,000,000	$5,500
$10,000,001 to $20,000,000	$6,500
Greater Than $20,000,000	$7,000

ADD:

6-10 RIGHT TO AUDIT.

6-10.1 General.

1. The City retains the right to review, audit, reasonably access your and all your Subcontractor's premises to review and audit your compliance with the provisions of the Contract. This includes the right to inspect, photocopy, and retain copies, outside of your premises, of any and all records with appropriate safeguards if such retention is deemed necessary by the City in its sole discretion. The City will keep this information in strictest confidence.

2. You shall include the right to audit in the subcontracts and ensure that these specifications are binding upon all Subcontractors.

6-10.2 Audit.

1. The right to audit includes the right to examine any and all books, records, documents, and any other evidence of procedures and practices that the City determines is necessary to discover and verify that you are in compliance with all requirements under the Contract.

2. If there is a claim for additional compensation or for changes in Work, the right to audit also includes the right to verify all direct and indirect costs which are claimed to have been incurred, anticipated to be incurred, or for which a claim for additional compensation or for changes in the Work have been submitted.

3. You shall maintain complete and accurate records in accordance with generally accepted accounting practices in the construction industry. Make available to the Engineer for review and audit all Project related accounting records and documents and any other financial data. Upon the Engineer's request, you shall submit exact duplicates of originals of all requested records to the Engineer.

6-10.3 Compliance Required Before Mediation and Litigation.

1. As a condition precedent to proceeding with mandatory mediation and further litigation under 2-10.2, "Dispute Resolution Process" you shall comply with the audit specifications within 60 Days of the Engineer's notice to review and audit compliance. See 5-2, "SPECIAL NOTICES".

6-10.4 Access to Records on Federally Funded Projects.

1. You shall retain all records, books, papers, and documents directly pertinent to the Contract for a minimum of 5 years after the City makes final payments and all other pending matters are closed and shall allow access to those records to the City, the Federal grantor agency, the Comptroller General of the United States, or any duly authorized representatives.

SECTION 7 – MEASUREMENT AND PAYMENT

ADD:

7-2.1 Schedule of Values (SOV).

1. Submit an SOV for the lump sum Bid items of the Work to the Engineer for review and approval at the Pre-construction meeting.
2. The Schedule of Values shall:
   a. Subdivide the Work into its respective parts.
   b. Include values for all items comprising the Work.
   c. Serve as the basis for monthly progress payments.
3. The Engineer is the sole judge of acceptable numbers, details, and description of values established. If, in the opinion of the Engineer, a greater number of SOV items than proposed by you is necessary, add the additional items identified by the Engineer. When requested by the Engineer, provide substantiating data in support of the SOV.
4. Incorporate the SOV into the cost loading function of the Schedule in accordance with 6-1, "CONSTRUCTION SCHEDULE AND COMMENCEMENT OF THE WORK". Monthly progress payment amounts for Lump Sum items shall be determined from the monthly updates of the Schedule activities.
5. Develop the SOV independently but simultaneously with the development of the Schedule activities and logic. Incorporate phase funding impacts, if applicable, into the Schedule.
6. Break down the Work not specifically included in the Bid as necessary for establishment of cost and Schedule activity.
7. Following acceptance of the SOV, incorporate the changes (if any) into the cost loading portion of the Schedule. Where coordination of the Schedule and the SOV requires changes made to one or both documents, propose changes to the SOV and to the Schedule activities to satisfy the Schedule cost loading requirements.
8. Update and submit these listings in conjunction with the Schedule monthly submittals.
9. Incorporate issued Change Orders or Field Orders in the Schedule into the SOV as single units identified by the Change Order or Field Order number.
10. Changes to the Schedule which add activities not included in the original Schedule but included in the original Work (schedule omissions) shall have values assigned as accepted by the Engineer. Other activity values shall be

reduced to provide equal value adjustment increases for added activities as accepted by the Engineer.

11. In the event that you and the Engineer agree to make adjustments to the original SOV because of inequities discovered in the original accepted SOV, increases and equal decreases to values for activities may be made.

ADD:

7-2.2 Payment.

1. The payment for the preparation of the SOV shall be included in the Contract Price.

7-3.1 General. To paragraph (8), DELETE in its entirety and SUBSTITUTE with the following:

If, within the time fixed by law, a properly executed notice to stop payment is filed with the City, due to your failure to pay for labor or materials used in the Work, all money due for such labor or materials will be withheld from payment in accordance with applicable laws.

ADD the following:

1. **Unless specified otherwise,** the Contract Price includes use, consumer, and other taxes mandated by applicable legal requirements.

2. As provided in §7105 of the California Public Contract Code, if the Contract is not financed by revenue bonds, you are not responsible for the cost of repairing or restoring damage to the Project when damage was proximately caused by an act of God, in excess of 5% of the Contract Price, if the following occur:

    a. The Project damaged was built in accordance with the Contract requirements.
    b. There are no insurance requirements in the Contract for the damages.

3. COST OVERRUN NOTIFICATION FOR TIME & MATERIALS (T&M) CONTRACTS: You shall promptly notify the City in writing of any potential cost overruns. Cost overruns shall include, but are not limited to the following:

    a. Where the total cost for the performance of the scope of services defined in the Scope of Work appears that it may be greater than the maximum compensation for the Contract.

7-3.2 Partial and Final Payment. ADD the following:

1. The Final Payment, which is the release of Retention, shall be paid to you after you have successfully submitted the following required documents:

    a. An affidavit that payrolls and bills for materials, equipment, and other indebtedness connected with the Work for which the City or the City's property might be responsible for or encumbered by.

b. A certificate evidencing that insurances required by the Contract Documents shall remain in force after Final Payment is currently in effect and shall not be canceled or allowed to expire until at least a 30 Calendar Days prior written notice has been given to the Engineer.

c. Consent of Surety to Final Payment.

d. If required by the Engineer, other data establishing payment or satisfaction of obligations such as receipts, releases and waivers of liens, claims, and security interests or encumbrances arising out of the Contract Documents. If a Subcontractor refuses to furnish a release or waiver required by the City, you may furnish a bond satisfactory to the Engineer to indemnify the City against such lien.

e. If required in the Contract Documents, the successful completion and submittal of the required reports such as construction demolition, waste recycling, and hydrostatic discharge reports.

f. Required EOCP Final Summary Report in accordance with Section 0-12, "Contract Records and Reports", record drawings, operations manuals, test reports, warranty documentation, and UL labels shall be submitted before requesting the release of retention.

g. Acceptance of the completed Project by the asset owning Department.

2. Submit an invoice for payment after you successfully complete the required documents and the City will pay the invoice within 30 Calendar Days. The City will pay 6% annually for late retention payments.

ADD:

7-3.2.1 Application for Progress Payment.

1. By the 10th day of each month, sign, fill out, and submit to the Engineer a partial payment estimate that identifies acceptable Work performed during the previous month, or since the last partial payment estimate was submitted. If requested by the Engineer, provide such additional data as may be required to support the payment estimate. Such data may include submission of signed field orders and satisfactory evidence of payment for equipment, materials, and labor, including payments to Subcontractors and Suppliers.

2. For application for progress payments, you shall use the format required by the City. An electronic copy of the invoice form is available from the Engineer upon request. Progress payments shall be signed and the date of the invoice shall be the date that the invoice is submitted.

3. The City shall not pay progress or partial payments until you submit to the Engineer an acceptable updated Schedule. It is solely your responsibility to prepare and submit the Schedule updates.

4. The City shall pay you within 30 Calendar Days after the presentation of undisputed and properly submitted applications for payment.

5. Disputed or incorrect applications shall be returned to you within 7 Calendar Days with documentation describing the reason for the rejection of the payment request.

ADD:

7-3.2.2 Amount of Progress Payments.

1. The City will pay 6% annually for late progress payments.

2. Progress payments will be considered "late" if the following occur:

   a. The City does not pay the contractor within 30 Calendar Days from receipt of an undisputed and properly submitted invoice. A properly submitted payment invoice means that the City has approved for payment the entire invoice amount or if the Resident Engineer has not disputed any portion of the application within 7 Calendar Days of the date of submission.

   b. The application for payment does not require signing of a Contract Change Order.

3. The Engineer may withhold payment for any of the following reasons:

   a. Defective or incomplete Work.

   b. Not providing an updated and accurate Cost Loaded Construction Schedule in accordance with 6-1.1, "Construction Schedule".

   c. Stop notices, wage orders, or other withholdings required by Applicable Law. Your failure to comply with 5-3.3, "Payroll Records" and the Contractor Registration and Electronic Reporting System requirements of the Contract Documents.

4. The Engineer may back charge the contract for any of the following reasons:

   a. Defective or incorrect Work not remedied.

   b. Damage to City property or a third party's property that was caused by you.

   c. Liquidated Damages.

7-3.2.2.1 Progress Payment for Pipelines.

1. Progress payments for pipelines shall be determined by multiplying the total number of linear feet of each of the following operations completed during the payment period, by the corresponding percentage given below, and the Contract Unit Price for the particular main(s) or drain(s).

2. The progress payment may include payment for items in the Bid proposal, other than mains, which have been installed complete during the payment period.

3. Payment break-down shall be as follows:

OPERATION	**PERCENTAGE**
WATER:	
Trench Excavation, Pipe in Place, Backfill and Cleanup.	80%
Hydrostatic and Bacterial Testing, Pavement Restoration and Final Cleanup	20%
SEWER:	
Trench Excavation, Pipe in Place, Backfill and Cleanup.	80%
Testing (Wayneball and/or Mandrel), Pavement Restoration and Final Cleanup.	20%
STORM DRAIN:	
Trench Excavation, Pipe in Place, Backfill and Cleanup.	80%
Pavement Restoration and Final Cleanup.	20%
SEWER MAIN REHABILITATION:	
Cleaning, Televising, liner installation, point repairs, and lateral reinstatements.	80%
Approval of pipeline rehabilitation verified by Final Video.	20%

4. In asphalt-surfaced streets, the City shall pay 15% for hydrostatic and bacterial testing, Wayneball and Mandrelling (where necessary), for water and sewer utility constructions respectively, and operational testing for storm drains, including the trench cap and cleanup. The City shall pay the remaining 5% after completing the asphalt wearing surface, Trench Capping per SDG-107 “Pavement Restoration for Asphalt Concrete Surfaced Streets - Major Excavation", and final cleanup.

5. Trench excavation, pipe in place, backfill, and cleanup of construction debris are one operation that shall be complete before the City pays the first 80%.

ADD:

7-3.2.3 Waiver of Claims at Final Payment.

1. Your acceptance of Final Payment constitutes a waiver of affirmative Claims by you, except those previously made in writing and identified as unsettled at the time of Final Payment.

ADD:

7-3.3.1 Payment for Stored Materials on Site.

7-3.3.1.1 General.

1. When authorized, you may request payment for materials and equipment which has not been incorporated into the Work but will be at a later date and will be delivered and stored at the Project Site.
2. The material shall meet the Contract requirements and the material's required test results and certifications shall be filed with the Engineer.
3. Only non-perishable materials for major items of Work or Materials Subject to Price Adjustment shall be considered for payment for on-site storage. However, each individual item has a value of more than 1% of the Contract Price and shall become a permanent part of the Work.
4. Materials cost shall be evidenced by the manufacturer's paid invoice bearing the statement that you have paid all invoices in full.
5. The payments for the stored materials shall not exceed the invoice price or 60% of the Bid prices for the pay items into which the materials are to be incorporated, whichever is less, unless otherwise approved by the Engineer.
6. Apply for the payment for materials stored on a form provided by the Engineer and attach documentation to show the following:
    a. The amount paid on the invoice (or other record of production cost) for the stored items.
    b. The dollar amount of the material incorporated into each of the various Work items for the month.
    c. The amount that should be retained for stored materials.
    d. That you have received the materials and equipment free and are clear of all liens, charges, secured interests, and encumbrances.
    e. That the materials and equipment are covered by the appropriate property insurance in accordance with the insurance provisions and other arrangements that protect the City's interest.

7. You shall provide the Engineer, upon request and prior to any partial payment, documentation which transfers full legal title to such materials to the City conditional only upon receipt of the Final Payment. Such transfer of title or any partial payment shall not constitute acceptance by the City of the materials nor shall it void the right to reject materials subsequently found to be unsatisfactory in accordance with SECTION 4 – CONTROL OF MATERIALS. This shall also not relieve you of any obligation arising under the Contract Documents.

8. The payments for materials on-site are subject to retention as set forth in 7-3.2, "Partial and Final Payment".

9. You shall assume all risks associated with the loss or damage to the stored products for which payment has or has not been received.

10. Equipment and materials shall be stored in accordance with manufacturer's recommendations. The stored products shall be in a form ready for installation. The City shall not pay for raw materials or parts and pieces of equipment.

11. Any and all surplus materials that are not incorporated in the Work shall become your property at no additional cost to the City.

12. **Unless specifically provided in the contract**, payment for the materials on hand shall not be included when determining the percentage of Work completed.

7-3.3.1.2 Payment for Stored Materials Offsite.

1. The payment of materials and equipment delivered and stored offsite shall be contingent upon your compliance with the storage and protective maintenance requirements set forth in the Contract Documents and all other requirements necessary to preserve equipment warranties for the benefit of the City.

2. The City reserves the right to refuse approval for the payment of any equipment or materials suitably stored offsite in its sole discretion, regardless of whether all conditions herein have been met.

3. Partial payment may be made for products eligible for offsite delivery and storage only upon your presentation of a bill of sale, a paid invoice, or an affidavit certifying that the material is received by the contractor fee and clear of all liens, encumbrances, and secured interested of any kind including offsite delivery.

4. Partial payment for products delivered and stored offsite shall be contingent upon your compliance with the storage and protective maintenance requirements set forth in the Contract Documents and all other requirements necessary to preserve equipment warranties for the benefit of the City.

5. Costs associated with the delivery to and storage at an offsite facility shall be at your expense regardless of the Engineer's approval to deliver and store the materials.

6. You shall provide written evidence to the Engineer of having made arrangements for unrestricted access by the City and the City's authorized representatives to the materials wherever stored, including provisions for the City to take control and possession of such materials at any time and without restriction. You shall furnish the Engineer a permit of entry, from the owner of the property, for at least 6 months after the NOC has been filed. The permit of entry shall contain information similar to the following:

   PERMIT OF ENTRY: Permission is hereby granted to the City and its designated employees or agents to enter upon the property described herein for a period of not less than 6 months after the NOC has been filed for (Project Name) for the purpose of removing materials for which advance materials on hand payment has been made to (Contractor's Name). The property is owned by (Owner's Name) and is described as follows: (Address and Description of Property). (Include signature(s) and date(s) for owner and lessee or purchaser, and, if appropriate, attach a copy of a warehouse receipt or contract for storage.)

7. The material shall be clearly marked and identified as being specifically fabricated, produced, and reserved for use on the Project. Provide payment documentation for the materials.

7-3.4 **Mobilization.** ADD the following:

1. Mobilization consists of Work necessary for the movement of personnel, equipment, supplies, and incidentals to and from the Site; for establishment of all offices, buildings, storage yards, and other facilities necessary for the Work; and for all other Work and operations which shall be performed prior to beginning the Work and after completion of the Work on the various Contract items on the Site.

2. You shall properly design the Project parameters to incorporate construction mobility for moving on and off the Site in a manner that limits disturbance to the surrounding residences, businesses, and any other citizens. This includes the designated staging areas, loading areas, and assemblage areas. You shall consider and address access rights of the public at all times. Prepare a mobilization plan that shall describe and govern your mobilization activities.

ADD:

7-3.4.1 Payment.

1. When a Bid item has been provided for "Mobilization", payment for mobilization Work shall be distributed equally over the first 2 progress payments up to the bid amount of the "Mobilization" Bid item but shall not exceed 3% of the Contract Price. If your Bid item for "Mobilization" exceeds 3% of the Contract Price, then anything above 3% of the Contract Price shall be paid as a part of the Final Payment.
2. The complete dismantling and removal of all of your properties, temporary facilities, equipment, materials, construction wastes, and personnel at the Site referred to as demobilization is included in the payment for mobilization.
3. If a separate Bid item has not been provided for mobilization, the payment for mobilization is included in the Contract Price.
4. When Phased Paving is required in the Contract Documents, the cost for mobilization shall exclude the costs for all mobilization and demobilization Work associated with each paving phase. The costs for all mobilization and demobilization Work associated with each paving phase shall be paid in accordance with 306-1.2.1, "Payment".

7-3.5.1 General. ADD the following:

1. Unit Bid prices shall not be subject to adjustment regardless of quantity used, or if none is used, for the following Bid items:
    a. imported backfill
    b. shoring
    c. water services
    d. house connection sewers
    e. water pollution control items
2. Unit Bid prices for "Potholing Existing Utilities Not Shown on Plans (Depth up to 7 feet)" shall not be subject to adjustment regardless of quantity used or if none is used.
3. Upon discovery and prior to the Work, you shall notify the Resident Engineer if there is a change in Bid item quantity that increases the total Contract Price by 5% or $100,000 or more, whichever is less.

ADD:

7-3.9 Field Orders.

1. If the cumulative total of Field Order items of Work does not exceed the "Field Orders" Bid Item, the City shall pay those Field Orders as shown below:

TABLE 7-3.9

FIELD ORDER LIMITS

Contract Price	Maximum Field Order Work Amount
Less than $1,000,001	$10,000
$1,000,001 to $5,000,000	$20,000
$5,000,001 to $10,000,000	$25,000
$10,000,001 to $30,000,000	$40,000
Greater than $30,000,000	$70,000

ADD:

7-3.10 Phased Funding Compensation.

1. For phased funded contracts in accordance with 6-1.4, "Phased Funding":

   a. Total compensation to be paid to you for the Work performed under each phase of the Contract may not exceed the amount specified for each phase in the final Phased Funding Schedule Agreement unless specified otherwise by a Change Order.

   b. Identify the Work to be performed as part of the first phase in the Pre-Award Schedule. The Work elements to be completed as part of each phase shall be functional and complete for the intended purpose in the event the subsequent phases are not authorized by the City.

   c. The subsequent phases to the first phase are subject to funding availability by the City. Do not start subsequent phases without prior written authorization from the Engineer.

   d. Fund availability for the performance of Work is described in the first, subsequent, and final Phased Funding Schedule Agreements. The amount of funds available at award shall be sufficient for the performance of the first phase only. When additional funds are available for the full requirements of the next funding phase, the Engineer shall notify you. The City may modify the amount of funds as available for Contract performance in subsequent and final Phase Funding Schedule Agreements via Change Order.

e. The City is not obligated to provide you any amount over what has been specified in the first, subsequent, or final Phased Funding Schedule Agreements for Contract performance and as authorized by the City Council.

f. You are not obligated to incur costs for the performance of the Work for any funding phase after the first funding phase until written notification is received from the Engineer of an increase in the availability of funds. If notified, your obligation shall increase only to the extent the Contract performance is required for the additional funding phase for which funds are made available.

g. If the Contract is terminated in accordance with 6-8, "TERMINATION OF THE CONTRACT FOR CONVENIENCE" the settlement proposal shall be determined pursuant to the procedures established in that section for Work under specific funding phases for which funds have been made available. If the Contract is terminated for default, the City's rights under the Contract shall apply to the entire multi-phase requirements.

h. A notification to you of an increase or decrease in the funds available for the performance of the Contract under another clause (an "option" or "changes" clause) shall not constitute the notification contemplated in subsection "a" above.

ADD:

7-3.11 Compensation Adjustments for Price Index Fluctuations.

1. **Unless otherwise specified**, the provisions of this section apply only to the paving asphalt used in the following:
   a. Asphalt Concrete Pavement
   b. Asphalt Pavement Repair
   c. Scheduled and Unscheduled Base Repair
   d. Slurry Seal or any other asphalt emulsion
2. The compensation for paving asphalt shall be increased or decreased for paving asphalt price fluctuations in accordance with 7-3.11 "Compensation Adjustments for Price Index Fluctuations" in the Caltrans Standard Specifications.
3. The adjustment in compensation shall also be subject to the following:
   a. Show the compensation adjustments provided herein separately on payment estimates. You are liable to the City for decreased compensation adjustments and the Engineer may deduct the amount from moneys payable or that may become payable to you.
   b. In the event of an overrun of contract time, adjustment in compensation for asphalt binder included in estimates during the overrun period shall be determined using the California Statewide

Crude Oil Price Index in effect on the first business day of the month within the pay period in which the overrun began.

c. In the event that the companies discontinue posting their prices for a field, the Engineer shall determine an index from the remaining posted prices. The City reserves the right to include in the index determination the posted prices of additional fields.

4. You may opt out of the payment adjustments for price index fluctuations **when specified in the SSP** by submitting a letter with the Bid.

7-4.1 **General.** DELETE in its entirety and SUBSTITUTE with the following:

When the cost for the Extra Work as directed by the Engineer cannot be agreed upon or the extent or duration of the Work cannot be accurately estimated with any reasonable degree of confidence (e.g., emergency contracts and unforeseen conditions), the payment is subject to these specifications.

1. Only costs directly attributable to the Work are reimbursable. With each payment request, submit a monthly and cumulative breakdown of the Work performed.

2. The markup allowances outlined in section 7-4.3 include all indirect expenses, such as profit, home office overhead, general supervision, insurance, and bond premiums.

3. Use the Tentative Daily Extra Work Report ("T&M TICKET") form to document labor, materials, subcontractors, and equipment used in the Work. The Engineer's signature does not represent a final agreement on payment. The T&M TICKET is available for download on the City's website (https://www.sandiego.gov/ecp/edocref) or upon request from the Engineer.

4. The Engineer will compare City-maintained records with the T&M TICKET. If discrepancies arise, the City will pay based only on its records.

7-4.2.1 **Labor.** ADD the following:

1. The payment for labor includes items defined by the Code of Federal Regulations, the California Department of Industrial Relations, and CALTRANS.

2. Labor surcharge percentage to be applied shall be per the latest edition of the Caltrans Publication entitled "Labor Surcharge and Equipment Rental Rates" preceding the date the Work is accomplished. The latest edition of the Caltrans publication is available at www.dot.ca.gov.

3. Use the DIR "PUBLIC WORKS PAYROLL REPORTING FORM" to list the labor rates of its personnel and Subcontractors who Work on the Project:

   www.sandiego.gov/eoc/pdf/payrollreport.pdf

4. No separate payment will be made for preparing payroll reports.

5. For the Work performed outside normal working hours, labor charges will

include base wages and applicable overtime/shift premiums. Fringe benefits will not apply to the premium portion.

6. Prior to commencing the Extra Work, the Contractor shall provide a list of all the labor, equipment and materials as well as the hourly rate required to complete the Work

7. The Contractor shall provide the following upon the Engineer's request:

   a. Financial records of salaries for an employee.

   b. Wage rates.

   c. Bonuses and deductions.

7-4.2.2 Materials. ADD the following:

1. The payment for materials is full compensation for furnishing and using the materials. The Engineer will base the cost on the documented purchase price plus delivery, adjusted as follows:

   a. Subtract vendor discounts, whether utilized or not.

   b. If prices are deemed excessive, reimbursement will be based on the lowest current wholesale price, at the City's discretion.

   c. For materials purchased from a source wholly or partially owned by the Contractor, the cost will be the lower of:

      1. The price paid by purchasers for similar quantities.

      2. The current wholesale price.

2. If material cost records are not submitted within 30 days of the submission of the T&M TICKET that included those material costs, the City will determine the cost based on the lowest wholesale price during that period in comparable quantities.

7-4.2.3 Tool and Equipment Rental. DELETE in its entirety and SUBSTITUTE with the following:

7-4.2.3 Tool and Equipment.

1. No reimbursement for tools/equipment with a replacement value of $400 or less.

2. If the local rental rates exceed those listed in the latest edition of the Caltrans publication entitled "Labor Surcharge and Equipment Rental Rates" preceding the date the Work is accomplished by more than 15%, and you provide substantiation, you may request an adjustment to the Engineer for approval prior to the Work.

3. For compensation for idle equipment, refer to "Labor Surcharge and Equipment Rental Rates."

4. For equipment already on-site,

    a. The time paid includes the time:

        1) To move the equipment to the location of the Work, plus an equal amount of time to move the equipment to another location on the job site when the Work is completed.

        2) To load and unload equipment.

    b. Hourly rates are paid in 1/2-hour increments, and daily rates are paid in 1/2-day increments.

5. All equipment must be in good working condition and appropriate for the task at the Engineer's discretion.

6. The equipment rental rates paid are deemed to include the cost of:

    a. Rental cost

    b. Fuel, oil, and lubrication

    c. Small tools

    d. Attachments

    e. Repairs, maintenance, and storage

    f. Depreciation

    g. Self-powered transport

    h. Transport of non-self-moving equipment (no payment for transported equipment during haul)

7. If equipment is being returned to a location other than where it originated, payment shall not exceed the cost of returning to the original location. If the equipment is used for other work on site, transportation costs are non-reimbursable without prior authorization.

8. The Engineer determines equipment rental rates using:

    1. Caltrans Labor Surcharge and Equipment Rental Rates based on equipment classification and manufacturer's ratings; or

    2. Documented rates for rented equipment from independent businesses or where listed rates are $10/hour or more; or

    3. Engineer-established rates for unlisted equipment (based on submitted cost data).

The Engineer may authorize higher rates if they are reasonable and can be documented. You must obtain approval for the higher rate(s) from the Engineer prior to the Work.

9. Owner-operated equipment rental is considered a subcontractor for the purpose of markup.

7-4.3 Markup. DELETE in its entirety and SUBSTITUTE with the following:

1. Work paid under Allowance Bid items for permits, governmental fees and taxes, or direct payments specified in the Contract Documents shall not be subject to any markups.
2. Labor Markup shall be per CALTRANS Force Account provisions (Section 9-1.04)
    a. Surcharge: Use the percentage specified in the latest edition of the Caltrans Publication titled "Labor Surcharge and Equipment Rental Rates" preceding the date the Work is performed.
3. Markups for materials shall be per CALTRANS Force Account provisions (Section 9-1.04) applied to the actual cost of the material before applying the sales tax.
4. Markup for Equipment and Tools shall per CALTRANS Force Account provisions (Section 9-1.04).
5. 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 a Subcontractor's tasks for Extra Work, you may only apply 10% for the Subcontractor's portion of accumulated total cost.
    b. Regardless of the number of hierarchical tiers of Subcontractors, you may only markup a Subcontractor's Work once.

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SECTION 8 - FACILITIES FOR AGENCY PERSONNEL

ADD:

8-1.1 Field Office Maintenance.

1. Service, maintain, and clean the field office on a weekly basis to the Engineer's satisfaction.
2. Service, clean, and maintain the portable chemical toilet and replenish bottled drinking water supplies.
3. Service and maintain field office equipment. For the air conditioning system, perform the maintenance at intervals recommended by the supplier or manufacturer or as directed by the Engineer.
4. You are responsible for the maintenance of all items supplied. Repair or replace any equipment or furnishing in the event of damage or theft at no additional cost to the City.

ADD:

8-1.2 Field Office Security.

1. You are responsible for field office security. Provide field office security measures necessary for personal protection and for the prevention of vandalism and theft.

ADD:

8-1.3 Submittals to Be Provided.

1. A proposed layout of the interior of the field office showing wall partitions, doors, and telephone and electrical outlets.
2. A proposed Site plan showing the field office location at the Site.
3. Location and mailing address of the field office.
4. Computer workstation literature specifying peripherals and software included.
5. Manufacturer's information for the FAX machine.

8-2 FIELD OFFICE FACILITIES. ADD the following:

1. **If specified in the Special Provisions**, provide field offices for the City's use. The field office and contents specified in these specifications shall become your property upon completion of the Project.

8-2.1 Class "A" Field Office. DELETE in its entirety and SUBSTITUTE with the following:

1. You shall provide the City with an operational field office for use by the City field personnel for a time period consistent with construction operations and commencing on the date of issuance of the NTP.

2. The field office shall be a standard office trailer, 10 feet wide by 60 feet long (3 m wide by 18.3 m long) minimum in dimension, with an interior layout providing 2 fully partitioned offices and a fully partitioned conference room and any other necessary halls or passageways. Locate the field office at the Site and designate it as the Engineer's Office.

3. The field office shall be completely outfitted and equipped as specified and prepared for occupancy before the start of construction.

ADD:

8-2.1.1 Field Office Features and Equipment.

1. Fit windows with screens and blinds or curtains.

2. Provide air conditioning and heating systems capable of automatically maintaining an office temperature of 72° F (22.2° C) during all seasons.

3. Provide 8 110V duplex convenience outlets.

4. Provide 1 exterior door with an exterior light.

5. Provide a supply of bottled drinking water with a dispenser that provides both hot and cold water. Maintain the supply of bottled drinking water at all times during the construction period.

6. Provide 1 portable chemical toilet located nearby, but separately, from the field office trailer.

ADD:

8-2.1.2 Furnishings.

1. Two (2) matching desks.

2. Two (2) matching cushioned swivel chairs with arms.

3. Three (3) Plan tables with a minimum of 8 feet by 2½ feet (2.4 m by 0.76 m) in dimension.

4. Two (2) bookcases, 60 inches high by 48 inches wide by 12 inches deep (1.5 m by 1.2 m by 0.3 m), with 5 adjustable shelves.

5. Eight (8) stacking chairs.

6. One (1) 4 foot by 6 foot (1.2 m by 1.8 m) whiteboard for use by felt tip-type markers. Provide 3 markers each in red, green, blue, and black colors and 2 erasers.

7. Two (2) 4-drawer, legal-sized, metal filing cabinets with integral drawer locks.

8. Two (2) matching wastebaskets.

9. One (1) high speed internet access line with paid Internet Service Provider (ISP).

10. One (1) small refrigerator.

11. One (1) telephone line with voice messaging, caller ID, and conference call capabilities.

12. One (1) non-coin-operated cordless telephone with a 50 foot (15.2 m) range capability.

13. One (1) computer desk with 2 drawers. Desk shall be sized to fit the computer, monitor, and printer.

14. Four (4) swivel chairs for computer workstation.

15. One (1) computer workstation complete with all standard peripherals and printer and scanner per the City's IT standards.

16. One (1) photocopier complete with an automatic feeder, sorter, and stand per the City's standard IT requirements. Contact the City's project manager for more information. Provide a monthly maintenance service. Include all labor and parts, excluding paper, and including travel and consumable supplies such as drums, developer toner, and fuser rollers. The maintenance is based on 5,000 copies per month. Provide an appropriate storage cabinet or stand with the photocopier.

ADD:

8-2.4 Class "D" Field Office.

1. Provide a field office for the City's exclusive use, detached from your field office. The City's field office shall consist of a minimum 175 ft^2 (16.3 m^2) trailer equipped with the following:

   a. One (1) chemical toilet facility adjacent to the field office.

   b. One (1) exterior door and window area of not less than 22 ft^2 (2 m^2). Provide doors and windows with screens.

   c. Electric power to include a minimum of 4 duplex convenience outlets. The office shall be illuminated at the tables and desk. An outdoor lighting fixture with 300 W bulb or equal installed to effectively light the area around the field office facility when required by the Engineer.

   d. Furniture and equipment:

      1) Two (2) desks and 6 chairs.

      2) One (1) file cabinet (2-drawer, legal).

      3) One (1) bookcase.

      4) One (1) computer workstation complete with scanner, monitor, and printer per the City's standard systems. The computer workstation shall become your property at the completion of Work.

      5) One (1) table reference, 30 inches by 60 inches, (0.76 m by 1.5 m).

6) One (1) non-coin-operated cordless telephone with a 50 foot (15.2 m) range capability.

7) One (1) high speed internet access line with paid Internet Service Provider (ISP) services for a period consistent with the construction operations.

8) One (1) copy machine and supplies.

END OF PART 1 - GENERAL PROVISIONS (A)

PART 1

GENERAL PROVISIONS (B)

DESIGN-BUILD (DB) AND MULTIPLE AWARD CONSTRUCTION CONTRACT (MACC) CONTRACTING ONLY

To Part 1 - GENERAL PROVISIONS (A), REVISE with the following:

SECTION 1 - GENERAL, TERMS, DEFINITIONS, ABBREVIATIONS, UNITS OF MEASURE, AND SYMBOLS

1-2 TERMS AND DEFINITIONS. ADD the following:

113. **Apparent Winner** - The Design-Builder whose Proposal is selected to be the most advantageous (best value) to the City.

114. **Architect-Engineer** - You or your designated Architect-Engineering firm.

115. **Bridging Documents** - The City's preliminary and conceptual plans and specifications that shall be used by you as a minimum basis to design and construct the Project. See the RFP, Attachment A.

116. **Construction Phase** - The period set forth in the Schedule beginning with the issuance of the Construction Notice to Proceed and ending on the date of Acceptance.

117. **Designer** - See Architect-Engineer.

118. **Design-Builder** - See Contractor.

119. **Design Work** - That portion of the Work consisting of the professional design services required to be provided in connection with the design of the Project or portions of the Project as set forth in the Contract Documents.

120. **Design Materials** - Documents, Shop Drawings, Working Drawings, electronic information, data, plans, drawings, sketches, illustrations, specifications, descriptions, models, and other information developed that are prepared, furnished, delivered or required to be delivered by you to the Engineer under the Contract Documents and/or or developed or prepared by you specifically to discharge your responsibilities.

121. **Design Phase** - The period set forth in the Schedule commencing with your receipt of a Limited NTP and ending upon the date the Engineer approves the Construction Documents.

122. **Multiple Award Construction Contract (MACC)** - Also known as Multiple Award Design-Build Contracts. Provisions for Design-Build contracts shall apply to MACC contracting.

123. **Order of Magnitude Documents** - The drawings, specifications and other documents by you for the City's review and approval prior to the preparation of the Construction Documents.

124. **Request for Proposal (RFP):**

a. The City's solicitation to prospective proposers upon which an evaluated selection of a Design-Builder shall be made.

b. The standardized form used by the City to request a Proposal from you for proposed changes in the Work.

125. **Request for Qualifications (RFQ)** - The City's solicitation to prospective Design-Builders for SOQ.

126. **Statement of Qualifications (SOQ)** - The document you submit for the City's consideration in response to the RFQ stating your expertise, experience, and capabilities and for providing other required information to design and build the Project.

127. **Task** - See Task Order.

128. **Task Order** - A project assigned to a specific As-Needed Contract which shall be constructed by you in accordance with the terms of the As-Needed Contract to which it is assigned.

129. **Task Order Authorization** - For As-needed Contracts, the documents the City transmit to you which indicate the Work instructions, Scope of Work, and time duration allotted for a particular Task or Project.

130. **Task Order Proposal** - For As-needed Contracts, your irrevocable offer to perform Work associated with a Task Order that refers to your quote for a firm fixed-price and schedule for the completion of the specified Scope of Work. Your Proposal shall be on electronic forms provided by the City and shall be in an electronic version compatible with the City's systems. The Proposal Submittal may also require a Work schedule, EOC forms, or other documentation that the City may require for a specific Task Order.

1-7 AWARD AND EXECUTION OF THE CONTRACT. DELETE in its entirety and SUBSTITUTE with the following:

1. The award and execution of the Contract shall be as provided for in the Special Provisions, Instruction to Bidders, Notice Inviting Bids, or the Request for Proposals (RFP).

ADD:

1-7.1.5 Document Ownership.

1. Once you have received any compensation for the Work performed, all electronic or hard copy documents, including but not limited to original plans, studies, sketches, drawings, computer printouts and files, and specifications prepared in connection with or related to the Work shall become the City's property.

2. The City's ownership of these documents includes use, reproduction, or reuse of all incidental rights whether or not the item of the Work for which they were prepared has been performed.

3. The City's ownership entitlement arises upon payment or any partial payment for the Work performed and includes ownership of Work products completed under the Contract.

4. This subsection shall apply whether your services are terminated by the completion of the Project or in accordance with other provisions of the Contract. You may make copies of all such plans, studies, sketches, drawings, computer printouts and files, and specifications.

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SECTION 2 - SCOPE OF THE WORK

2-1 WORK TO BE DONE. ADD the following:

3. The minimum design requirements for the Project are set forth in the Bridging Documents, the information provided for sample or model facility, or both. Do not proceed with nor pay for any Design Work until the City issues a Limited NTP.

4. Comply with the Final Environmental Document, including incorporating environmental considerations into the Project design, modifying the Project design, where applicable, and mitigating impacts.

5. Keep the Engineer informed of the progress and quality of the design and construction of the Project.

6. Organization of the Design Materials into divisions, sections and articles and arrangement of drawings is for convenience and does not control dividing the Work among Subcontractors or in establishing the extent of the Work performed by any trade.

7. **Unless otherwise specified** in the Contract Documents, provide and pay for design, labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for the proper execution and completion of the Work, whether temporary or permanent and incorporated in the Work.

8. Respond to, and ensure Subcontractors respond to, RFI, substitution requests, and Change Order requests. Provide the Engineer with copies of all correspondence within 24 hours of receipt, and conduct weekly review meetings with the Engineer to discuss these items.

ADD:

2-1.1 Construction Obligations.

1. Do not perform any construction Work in connection with the Project prior to receipt of NTP. The City shall make no payment for any construction Work performed prior to issuance of the NTP and applications for payment for such Work are not binding on the City.

2. If you desire to begin constructing a portion of the Project prior to achieving final design of the Project, you shall in writing notify the Engineer at least 3 Working Days in advance of proposed construction activities to seek the Engineer's approval and include proof of receipt of all applicable permits. The Engineer shall provide you with a standard form for this purpose. Do not move forward with any construction activities without providing such notice and receiving the Engineer's approval.

3. If you desire to modify the design documents after they have been approved by the Engineer, obtain the Engineer's prior written approval before making any such modifications and any construction changes based upon such modifications.

ADD:

2-1.2 Standards of Performance.

1. Use the degree of care and skill ordinarily exercised by reputable professionals practicing in the same field of service in the State of California.
2. The Construction Documents shall be prepared, signed, and stamped by and under the direct responsible charge of an architect or engineer duly licensed in the State of California.
3. Perform the Work in accordance with the professional standards applicable to projects, buildings, or Work of complexity, quality and scope comparable to the Project.
4. You are the Engineer of Record (Engineer of Work).

ADD:

2-1.3 Use of Design Materials.

1. The Engineer has unlimited rights to copy and use in connection with the Project all Design Materials, including the right to use them on the Project at no additional cost to the City regardless of degree of completion provided that said services performed have been fully paid for, exclusive of the amounts disputed by the City in good faith, as required by the terms of the Contract.
2. You agree to and grant to the City and any assignee or successor of the City as owner of the Project a royalty-free license to any such Design Materials as to which you may assert any rights under the patent or copyright laws. You agree to assign outright and exclusively to the City all copyrights in the design appearance of the Project. You, as part of your agreements with Subcontractors, shall secure such license and use rights from each such entity, and shall defend, indemnify and hold the City and any successors or assigns harmless from any claims by such entities for copyright or patent infringement.

ADD:

2-1.4 Local Conditions.

1. You represent that you have taken steps necessary to ascertain the nature and location of the Work and that you have investigated and satisfied yourself as to the general and local conditions which are applicable to the Work such as the following:
    a. Conditions bearing on transportation, disposal, handling, and storage of materials.
    b. The availability of labor, water, power, and roads.

c. Normal weather conditions.

d. Observable physical conditions at the Site.

e. The surface conditions of the ground.

f. The character of equipment and facilities needed prior to and during the performance of the Work.

2. To the extent you encounter subsurface or concealed conditions which differ materially from those represented in the Contract Documents, you shall notify the Engineer promptly before conditions are disturbed and in no event later than 4 Working Days after the first observance of the conditions if a Change Order is contemplated by you due to such condition.

3. If the subsurface or concealed conditions are determined to be of Hazardous Materials or Waste, you shall immediately notify the City no later than 1 Working Day and shall proceed as set forth in these specifications and the exhibits of the Contract.

4. You shall not be entitled to any adjustment in Contract Price or Contract Time or shall have been deemed to have waived your right to such a Claim if:

   a. You knew of the existence of such conditions at the time you made a final commitment to the City in respect to the Contract Price and Contract Time by becoming bound under the Contract.

   b. The existence of such condition could reasonably have been discovered or revealed as a result of any examination or investigation of the Site and contiguous areas suggested or required by the Contract Documents.

   c. You failed to give the written notice within the time and as required by this subsection.

ADD:

2-1.5 Model or Example Facility Information.

1. If any element required by the Contract Documents is not clearly defined, rely on the model or example facility information provided in the Contract Documents for the standard requirements. Contact the City's project manager for a site visit of facility prior to finalization of Bid.

ADD:

2-1.6 Procedures for Review of Design Materials.

1. The review process for submitted materials shall be as follows:

   a. The Engineer shall respond to your Submittals or re-Submittals within 15 Working Days of their receipt unless the Engineer gives you prior notice. Within 5 Working Days of receipt of the Engineer's comments, you shall resolve and discuss with the Engineer any outstanding issues as a result of the Engineer's comments.

b. Unless agreed with the Engineer in advance, submit any required revised or final Submittals within 10 Working Days of the resolution of the submittal issues.

c. Ensure that the comments of the Engineer are addressed by the designers. 1 copy of all Submittals reviewed by the designer shall be provided to the Engineer.

2. Provide shop drawings and material specifications to the Engineer of all materials to be specified within the final design prior to incorporating them into the construction documents.

SECTION 3 - CONTROL OF THE WORK

3-3 **SUBCONTRACTORS.** ADD the following:

6. You shall not hire or allow any entity such as the City's consultant and any sub-consultant who participated in creating the Bridging Documents or Contract Documents for this project to participate in design services, construction management, and any other construction services related in any way to this project without the City's written consent.

7. You shall pay the Subcontractors for your approved invoice amounts out of amounts paid by the City to you no later than 14 Calendar Days from your receipt of payment from the City. Nothing in this paragraph is construed to impair your right and any Subcontractor's right to negotiate fair and reasonable pricing and payment provisions among yourselves.

8. In the case of a deficiency in the performance of the Subcontractor's services, you shall notify the Engineer in writing of any withholding of payment to the Subcontractor, specifying the following:

    a. The amount withheld.

    b. The specific cause under the terms of the subcontract for withholding payment.

    c. The connection between the cause for withholding payment and the amount withheld.

    d. The remedial action the Subcontractor shall take in order to receive the amount withheld.

9. Once the Subcontractor corrects the deficiency, you shall pay the Subcontractor the amount withheld within 14 Calendar Days of your receipt of the City's next payment.

3-7.2 **Precedence of Contract Documents.** DELETE in entirety and SUBSTITUTE with the following:

1. If there is a conflict between any of the Contract Documents, the document highest in the order of precedence shall control. If there is a conflict between any of the Contract Documents and the Municipal Code, the most stringent requirements shall control. The order of precedence, from highest to lowest, shall be as follows:

    a. Permits (issued by jurisdictional regulatory agencies including environmental documents).

    b. Change Orders and Supplemental Agreements; whichever occurs last.

    c. The signed written Agreement.

    d. Addenda.

    e. Bid / Price Proposal.

f. Request for Proposal (RFP).

g. Supplemental Special Provisions.

h. Project Plans.

i. Standard Drawings.

j. "WHITEBOOK" (City Supplement).

k. "GREENBOOK" (Standard Specifications for Public Works Construction).

l. Reference Specifications.

2. When additional EOCP requirements by the funding sources are included or incorporated by reference in the Contract Documents, the funding source's requirements shall govern **unless specified otherwise in the Special Provisions.**

3. With reference to the drawings the order of precedence shall be as follows:

a. Figures govern over scaled dimensions.

b. Detail drawings govern over general drawings.

c. Addenda and Change Order drawings govern over Plans.

d. Plans govern over Standard Drawings.

4. When a conflict exists between the ADA, Title 24, City Standards Drawings, and the City Supplement, the most restrictive requirement shall be followed.

5. When there is a conflict between 700-1.2, "Standards, Poles, Steel Pedestals, and Posts" and the current adopted edition of Caltrans Standard Specifications and/or Standard Plans, the Caltrans standards shall control.

6. The Work instructions on the Task Order Scope of Work shall have the same rank as "Special Provisions" and "Project Plans" when used in conjunction with 3-7.2, "Precedence of Contract Documents".

7. Task Order modifications and revised Scope of Work shall have the same rank as "Change Orders and Supplemental Agreements" when used in conjunction with 3-7.2, "Precedence of Contract Documents".

ADD:

3-7.5 As-Builts.

1. You are responsible for the completion of As-Built drawings.

2. The As-Built drawings shall include the information required for various asset types listed in 3-7.3.2, "Asset Specific Red-lines".

3. Prior to Acceptance, prepare and submit 1 complete set of full sized, 24 inch by 36 inch, original Mylar final As-Built Drawings (CADD plots) prepared in accordance with the City's CADD standards. Each CADD Mylar drawing sheet

shall be wet stamped and signed by qualified responsible engineers registered in the State of California and shall be stamped and wet signed by the architect or engineer of record as required by law. Other applicable portions of the drawing title blocks shall also be signed by you.

4. Drawing Mylars shall be 3 mils minimum thickness.

ADD:

3-7.5.1 Payment.

1. The payment for As-Built drawings shall be included in the Contract Price.

ADD:

3-7.6 Order of Magnitude Documents and Construction Documents.

1. After the Limited NTP, prepare the Order of Magnitude Documents for review and approval by the City and then prepare the Construction Documents. Develop and detail the Order of Magnitude Documents and Construction Documents consistent with the intent of the Contract Documents. Include documents customarily required for regulatory approval by governmental agencies.

2. The Order of Magnitude Documents shall show the scale and relationship of Project components, outline the nature and structural exterior and 3 dimensional scale of the Project, and shall set and describe in detail the configuration and character of the Project for the complete and final preparation of the Construction Documents.

3. The Construction Documents shall provide information customarily necessary for the use of such documents by those in the building trades and shall include all documents required for the complete and final construction of the Project other than such details customarily developed in the Working Drawings and Shop Drawings or otherwise during construction.

4. You are responsible for obtaining all reviews and approvals for building permit(s) independently of the Order of Magnitude Documents review.

3-7.6.1 Use of Computer Aided Drafting and Design.

1. Use CADD for the preparation of Plans and As-Built drawings in accordance with the City's CADD Standards. Conversions of CADD Work from any CADD format to City standard CADD format shall not be acceptable **unless specified otherwise** in the Contract Documents.

ADD:

3-7.6.2 Reliance on Approvals.

1. You may rely on the Engineer's approval for the general scope and purpose included in the Bridging Documents. The Engineer's approval is not a specific approval with respect to the Design Materials. The Engineer has the right to accept, reject, or suggest changes to the Order of Magnitude Documents to

achieve conformity with the general scope included in the Bridging Documents with no increase in Contract Price or Contract Time.

a) Any design element that is not in conformance with the performance requirements included in the Bridging Documents shall be approved by the Engineer prior to its incorporation into the final design.

b) If the Engineer revokes, modifies, or otherwise changes a material in any way after such portion of the Work has been designed and approved or modifies the original Bridging Documents in a material manner requiring modification to one or more systems which have been designed and approved, you may request a Change Order in accordance with SECTION 3 – CONTROL OF THE WORK provided that, prior to such approval, you have made the City aware of future design decisions which may be affected by such approval.

2. The Engineer shall not issue a Change Order for Extra Work when the Extra Work is due to your fault or neglect or unauthorized deviations from the Bridging Documents.

ADD:

3-7.6.3 Review of Construction Documents and Field Conditions.

1. You are responsible for errors, inconsistencies, or omissions in the Construction Documents. You shall take field measurements, verify field conditions, and compare such field conditions and other information known to you with the Contract Documents before commencing activities.

ADD:

3-7.6.4 Shop Drawings and Working Drawings, Product Data, and Samples.

1. Maintain at the Site 1 record copy of the Contract Documents, Drawings, Specifications, Addenda, Construction Documents, and any Change Orders in good order and marked to record changes and selections.

2. Maintain approved Shop Drawings and Working Drawings, product data, samples and similar required submittals at the Site.

3. Review and take appropriate actions for Shop Drawings and Working Drawings, product data, samples, and similar submittals. Upon request by the Engineer, provide documents for the review of Shop Drawings and Working Drawings, product data, samples, and similar submittals.

4. Provide a register of all Submittals that are scheduled for review by the City, designers, or both.

5. You are not relieved of the responsibility for the deviations from requirements of the Contract Documents by the Engineer's approval of Shop Drawings and Working Drawings, product data, samples, or similar submittals unless you have specifically informed the Engineer of such deviations at the time of the submittal and the Engineer has given written approval to the specific deviation.

6. You are not relieved of responsibility for errors or omissions in the Shop Drawings and Working Drawings, product data, samples, or similar submittals by the Engineer's approval.

ADD:

3-13.3.4 Latent and Patent Defect Warranty.

a) You shall warrant to the City that the construction, including all materials and equipment furnished as part of the construction, shall be free of latent and patent defects in materials and workmanship. The Engineer shall first provide you an opportunity to correct or replace any latent and patent defect at your own expense, if notified by the City within 4 years after the date of Acceptance for patent deficiency and 10 years for a latent deficiency. If you fail to repair and replace the reported deficiency, the City shall repair the deficiency and charge you for the repair.

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SECTION 4 – CONTROL OF MATERIALS

4-6 **Trade Names.** ADD the following:

11. Provide 1 copy of all designer reviewed submittals to the Engineer.

SECTION 5 – LEGAL RELATIONS AND RESPONSIBILITIES

ADD:

5-9.1 Indemnification and Defense.

1. **Non-Design Services.**

   a. Other than in the performance of Services which shall be solely as addressed in these specifications to the fullest extent permitted by law, you shall defend with legal counsel reasonably acceptable to the City, indemnify and hold harmless the City and its officers, agents, departments, officials, and employees (Indemnified Parties) from and against all claims, losses, costs, damages, injuries (including injury to or death of an employee of yours or your Subcontractor), expense and liability of every kind, nature, and description (including incidental and consequential damages, court costs, litigation expenses and fees of expert consultants or expert witnesses incurred in connection therewith and costs of investigation) that arise out of, pertain to, or relate to, directly or indirectly, in whole or in part, any services (including construction services) performed under the Contract by you, any Subcontractor, anyone directly or indirectly employed by them, or anyone that they control.

   b. Your duty to defend, indemnify, protect, and hold harmless shall not include any claims or liabilities arising from the active negligence, sole negligence, or willful misconduct of the Indemnified Parties.

2. **Design Services.**

   a. **Indemnification.**

      i. To the fullest extent permitted by law (including, without limitation, California Civil Code §2782.8), with respect to the performance of Services, you shall indemnify and hold harmless the City, the City's officers, or employees, from all claims, demands or liability that arise out of, pertain to or relate to your negligence, recklessness, or willful misconduct or those of your officers or employees and others hired or controlled by you.

   b. **Defense.**

      i. You shall Work in good faith to procure applicable insurance coverage for the cost of any defense arising from all claims, demands or liability that arise out of, pertain to or relate to your negligence, recklessness, or willful misconduct and those of your officers or employees.

3. **Enforcement Costs.**

   a. You agree to pay all costs the City incurs enforcing the indemnity and defense provisions set forth in these specifications.

4. **Insurance.**

   a. The provisions of 5-9, "INDEMNIFICATION AND HOLD HARMLESS AGREEMENT" shall not be limited by the requirements of 5-4, "INSURANCE" related to insurance.

5. **Survival of Obligation.**

   a. All representations, indemnifications, warranties, and guarantees made in, required by, or given in accordance with the Contract Documents as well as all continuing obligations indicated in it, shall survive completion and acceptance of the Work and termination or completion of the Contract.

ADD:

5-16 PERSONNEL CHANGES FOR DESIGN-BUILD CONTRACTS.

1. Ensure that key personnel, as identified in your Proposal shall not be replaced or substituted without the Engineer's prior approval. You shall be liable for damages incurred by the City as a result of unauthorized substitution of each key personnel.

2. The City reserves the right to have any of your employees or Subcontractor's employees removed from the Project upon written notice from the City to you without cause.

3. Nothing contained in the Contract Documents shall create a contractual relationship between the City and any third party, or Subcontractors. However, it shall be understood and agreed that the City, as the third party beneficiary, is an intended third-party beneficiary of all Contracts for design or engineering services and all Subcontracts, purchase orders, and other agreements between you and third parties.

ADD:

5-17 DESIGN-BUILDER'S RESPONSIBILITIES.

1. Keep the Engineer informed of the progress and quality of the design and construction of the Project.

2. You shall assume responsibility for all negligent errors, omissions, or acts arising from the design and architectural Services you provide under the Contract, including any negligent errors, omissions, or acts of your agents, officers, and employees.

3. You are responsible for coordinating all construction means, methods, techniques, sequences, and procedures including the following:

a. Coordinate scheduling of Submittals and all design and construction of the Project to ensure the efficient and orderly sequence of the construction. Monitor and report periodically to the Engineer actual performance compared to Project Schedule. Prepare and submit to the Engineer, during both the Design Phase and the Construction Phase, monthly progress reports, in a manner and format acceptable to the Engineer, on the Work accomplished during the prior monthly period.

b. Monthly reports shall be furnished at the time of submission of each monthly Application for Payment. As part of such report, provide an updated Schedule, including CPM illustrating the progress which has been made and specifically whether the Work is on schedule or behind schedule and actions being taken to correct Schedule slippage. The monthly report shall also set forth your projected progress for the forthcoming month.

c. Coordinate design and construction requirements with governmental agencies, utilities, and all other parties either involved in infrastructure improvements or otherwise affected by the design and construction requirements.

d. Provide the City with 2 copies of all Submittals approved by you.

e. Assist the City's staff and reasonably cooperate with the City's legal, financial, design and construction consultants and all other designated representatives during the design and construction of the Project.

f. Implement suitable management systems and Work plans for the Project relative to safety, quality assurance and managing and controlling the Work.

g. Be solely responsible for selecting the means, methods, techniques, sequences, or procedures of performing the Work. If you elect or choose to adopt or follow, in whole or part, any means, means, methods, techniques, sequences or procedures of performing the Work developed or suggested by the City, you do so at your own risk and bear sole responsibility for such election or choice. The City shall assume no responsibility thereof and in no way shall be held liable for any defects in the Work, or increased costs or delays in the Work, which may result from or be caused by your use of such means, methods, techniques, sequences, or procedures.

SECTION 6 - PROSECUTION AND PROGRESS OF THE WORK

6-1.2 **Commencement of the Work.** ADD the following:

7. Do not begin construction of the Project or any portions thereof until the Engineer approves the design for the Project or portion thereof, and issues a Notice to Proceed for Construction, to provide the City the defenses set forth in California Government Code §830.6.

6-3 **TIME OF COMPLETION. ADD** the following:

1. You shall complete the Work within the time specified in the Notice Inviting Bids or RFP for Design-Build or MACC Contracts.

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SECTION 7 – MEASUREMENT AND PAYMENT

7-2.1 Schedule of Values (SOV). ADD the following:

12. Provide a cross reference listing in two parts. The first part lists each scheduled activity with the breakdown of the respective valued items making up the total cost of the activity. The second part lists the valued item with the respective scheduled activity or activities that make up the total cost indicated. In the case where a number of schedule activities make up the total cost for a valued item (shown in the SOV) indicate the total cost for each scheduled activity. The total amount of each part shall equate to the Contract Price.

ADD:

7-3.5.4 Proposal.

1. Your post award proposal in response to the City's RFP shall be on forms acceptable to the Engineer. Your proposal shall certify in writing that the amounts included cover all direct, supplemental, indirect, consequential, and cumulative costs and delays as applicable and that those costs and delays would be or were necessarily incurred, despite your reasonable and diligent efforts to mitigate them. Mitigation efforts undertaken by you shall be described.

2. Where the change in Contract Price is to be determined on the basis of the "cost of the Work involved", your itemized estimates shall detail all applicable elements of cost, including, but not limited to, labor hours and payroll costs, quantities, crew mixes, production rates, material costs, Subcontractor and Supplier costs, equipment costs, and supplemental costs. Where the change in Contract Price arises from changes in the schedule of all or part of the Work or where a change in Contract Time is sought, the submittal shall include analysis required by 6-4.2 "Extensions of Time".

ADD:

7-3.12 Additional Costs.

1. Additional costs are those costs that can be reasonably determined to be related to your errors or omissions, and may include your, ours, or your Subcontractors' overhead, construction, materials, demolition, and related costs. You shall not be paid for Work or Services required due to your errors or omissions and you shall be responsible for any additional costs associated with such errors or omissions.

2. You shall reimburse the City for its additional costs due to your errors or omissions.

ADD:

7-3.13 Additional Services.

1. The City has the right to direct you to perform additional services beyond those Services detailed in the Scope of Work and Services (Additional Services).

2. You shall promptly perform any Additional Services as directed by the Engineer in accordance with the Contract Documents. You shall request a Change Order when seeking reimbursement for Additional Services requested by the City.

3. If at any time you contend that the City is asking you to perform Additional Services which are not specifically identified as such by the City, you shall immediately give the Engineer written notice within 24 hours prior to performing the Services in question. The notice shall state that you intend to seek additional compensation beyond the amount specified in the Bid. Furnishing timely, accurate, and advance written notices shall be a condition precedent to your ability to seek additional compensation from the City.

4. You shall not perform and shall not be entitled to compensation for any Additional Services unless the Engineer has, in advance, authorized in writing performance of the Additional Service. Under no circumstances shall you be paid for Additional Costs.

5. Your Compensation Rate Schedule for design professionals is attached to the Contract. Payment for any Additional Services shall be in accordance with the Compensation Rate Schedule and no increases to the Compensation Rate Schedule may be made during the Contract Time.

6. You shall separately submit to the Engineer a certificate and application for monthly payment of any authorized Additional Services. No markup shall be allowed for Additional Services.

7-4.1 General. ADD the following:

2. If shown on the Bid Proposal, the contingency funds including City Contingency and Allowances may be used by you with the Engineer's prior approval. The contingency funds shall be available to provide additional funds for Extra Work. The contingency funds shall not be available for the following:

   a. Work required due to you and your officers', agents', or employees' failure to perform Work or Services according to the terms of the Contract.

   b. Uninsured losses resulting from your and your officers', agents', or employees' negligence. The City reserves the right to seek reimbursement for any costs expended due to the errors or omissions of your officers, agents, or employees providing Services to the Project.

3. 100% of the unused portions of the City Contingency and Allowances shall revert to the City upon Acceptance.

ADD:

7-6 PRICE CONDITIONS.

1. **If specified in the RFP**, the Contract Price shall not exceed the City's stipulated estimate of the Project's total cost.

ADD:

7-7 SERVICES FEE.

1. Except as otherwise expressly provided in the Contract, as full and complete compensation for performance of all Services and obligations under the Contract, you shall be compensated only for the following:

   a. Architectural, engineering, and other professional Subcontractors such as structural, civil, mechanical, electrical engineers, communications, graphics and art Subcontractors, landscape architects, and acoustical, audio visual, lighting, traffic and security Subcontractors.

   b. Estimating and construction management.

   c. Construction supervision and project management personnel such as superintendents, project managers, project secretaries, project engineers, project accountants, and all your other personnel wherever located.

   d. On-Site and offsite equipment, supplies and facilities such as computers, estimating, dictating, communication and accounting equipment, office space, trailers and storage facilities.

   e. Home-office and field overhead costs of any type including document control and retention.

   f. Your profit.

END OF PART 1 - GENERAL PROVISIONS (B)

PART 1

GENERAL PROVISIONS (C)

JOB ORDER CONTRACTING (JOC) ONLY

To Part 1 - GENERAL PROVISIONS (A), REVISE with the following:

SECTION 1 - GENERAL, TERMS, DEFINITIONS, ABBREVIATIONS, UNITS OF MEASURE, AND SYMBOLS

1-2 TERMS AND DEFINITIONS. ADD the following:

113. **Adjustment Factor (AF)** - Your competitive bid price adjustment to the unit prices published in the Unit Price Book for Normal Working Hours (NWH) and Other Than Normal Working Hours (ONWH).

114. **Apparent Low Bidder** - The Bidder whose Bid, having been publicly opened, initially meets the material requirements of the Bid Documents, and whose JOC (or GRC) Composite Adjustment Factor is the lowest received.

115. **Contract Documents** - The Contract Documents include the signed Agreement, Addenda, Notice Inviting Bids, funding agency provisions, Bid and documentation accompanying the Bid and any post-bid documentation submitted prior to the Notice of Award when attached as an exhibit to the Contract, Bonds, permits from jurisdictional regulatory agencies, Supplementary Special Provisions (SSP), City's EOCP Requirements, Standard Specifications (The "GREENBOOK"), City Supplement (The "WHITEBOOK"), Plans, Standard Drawings, Construction Documents, Mitigation and Monitoring Reporting Program, Reference Specifications listed in the Notice Inviting Bids or the Request for Proposals (RFP), Task Orders, and Change Orders.

116. **Composite AF** - The adjustment factor that is calculated from the competitively bid NWH AF and the ONWH AF. The Composite AF is used to determine the Apparent Low Bidder. See the Notice Inviting Bids or the Bidding Documents for the formula used to calculate the Composite AF.

117. **Maximum Contract Amount** - The maximum potential value of the JOC Contract as defined in the Notice Inviting Bids.

118. **Minimum Contract Amount** - The minimum value of the JOC Contract as defined in the Notice Inviting Bids.

119. **Non-prepriced (NPP) Work Items** - The units of Work that are not included in the Unit Price Book (UPB) but are still within the general scope of Work requested by the Engineer under the Contract.

120. **Pre-priced (PP) Work Items** - The units of Work that are included in the Unit Price Book (UPB) requested by the Engineer under the Contract.

121. **Request for Proposal (RFP)** - The City's request for proposal for a Task Order.

122. **Scope Meeting** - A meeting at the Task Order location, attended by the Engineer, you, and any other interested parties to outline and discuss the Scope of Work for the Task. You are required to make all measurements, assessments, and evaluations at the Scope Meeting such that a valid, detailed Proposal will be submitted by the deadline established in the RFP.

123. **Task** - See Task Order.

124. **Task Order** - A project assigned to a specific JOC Contract which will be constructed by you in accordance with the terms of the JOC Contract and the Scope of Work.

125. **Task Order Proposal** - See Proposal. Include a listing of all of the Pre-priced and Non-prepriced Work Items (including competitive quotes) required to complete the Task Order.

126. **Unit Price** - The price published in the Unit Price Book (UPB) for a specific construction or construction-related Work or line item. Each Unit Price published in the UPB is deemed to be full compensation to accomplish that specific Work or line item.

127. **Unit Price Book (UPB)** - A comprehensive listing of specific construction-related Work or line items identified by the City together with specified units of measurement and Unit Prices.

ADD:

1-7 AWARD AND EXECUTION OF THE CONTRACT. DELETE in its entirety and SUBSTITUTE with the following:

1. After the award of the Contract, you shall wait for a Task Order assignment from the City. The City will initiate a Task Order by scheduling and conducting a Scope Meeting with you and other interested parties at the location of the proposed Task Order. The Scope of Work will be transmitted to you prior to the Scope Meeting so that you may review the Scope of Work prior to the meeting and invite Subcontractors and Suppliers to the Scope Meeting. At the Scope Meeting, the Scope of Work for the Task will be presented and discussed with you and you may seek answers to your questions about the Scope of Work. Upon completion of the Scope Meeting, the City will issue an RFP which requires that you prepare and submit a Proposal for the Task Order under consideration on or before a specified due date.

ADD:

1-7.1.5 Task Orders.

1. The City will fund and execute a Task Order when needed. You may be required to Work at any of the City's facilities. The City makes no commitment as to the award of individual Task Orders. All costs associated with preparing Proposals shall be your responsibility.

2. You may Work only as authorized by Task Orders. Furnish the supplies or services specified in the Task Orders up to and including the Maximum Contract Amount to the City. The City will order at least the Minimum Contract Amount of construction services designated in the Contract Documents.

3. Individual Task Orders determine the Scope of Work. You shall complete the Task Order in accordance with 2-1, "WORK TO BE DONE".

4. Individual Task Orders are subject to the Contract in its entirety. This is an indefinite-quantity Contract for the supplies or services specified and is effective for the period of 24 months from the date of the Notice to Proceed or the expenditure of the Maximum Contract Value Price as stated in the Notice Inviting Bids, whichever occurs first.

5. Before the issuance of the first Task Order under the Contract, a conference will be conducted by the City to acquaint you with the City's policies and procedures that are to be observed during the execution of the Work and to develop a mutual understanding relative to the administration of the Contract.

6. Except in an "emergency response" you shall not proceed with any Task Order without having required permits and an NTP signed by the City.

7. In the event that "immediate emergency response" is necessary, the City may elect to use an alternative procedure for Task Orders as long as the alternative procedure is not substantially more burdensome to you than the procedure described in this subsection.

8. Your proposals are valid for the duration of the Contract.

9. Before ordering any material or doing any Work, you shall verify all measurements at the Site of a specific Task Order and shall be responsible for the accuracy of the measurements. Extra charge or compensation shall not be allowed based on the difference between actual dimensions and the quantities indicated in the Proposal. You shall verify such items prior to the submission of the Proposal.

10. The City will not entertain claims for additional money when such claims are based upon a contention that the Contract fails to mention a specific item or component of the facility covered by the Task Order and the Work is required in the normal course of operations. For example, surfaced area repair statements may not mention culverts. However, culverts are a typical component of roads, streets, or erosion controls and are shown on the plots or maps provided. As culverts are a typical component of the system, you are responsible for providing all necessary repair or replacement of Work or service.

1-7.1.5.1 Procedure for Ordering Work.

1. As the need for Work arises, the City will send you the Task Order Scope of Work and schedule a Scope Meeting.
2. Upon receipt of the Scope Meeting Invitation, respond within 1 Working Day by confirming attendance at the Scope Meeting in writing.
3. The Scope Meeting will include discussion and establishment of the following:
    a. Project number and title.
    b. Existing site conditions.
    c. Methods and alternatives for accomplishing Work.
    d. Definition and refinement of requirements.
    e. Detailed Scope of Work.
    f. Requirements for design drawings, sketches, Shop Drawings, Working Drawings, submittals, etc.
    g. Tentative construction schedule.
    h. Preliminary quantity estimates.
4. The City reserves the right to reject your proposal based on unjustifiable quantities, inappropriate line items, inappropriate adjustments, performance periods, inadequate documentation, or other inconsistencies on your part. The City reserves the right to issue the NTP without having a mutual agreement on a final Task Order price.
5. The City reserves the right to not award a Task Order if it is determined to be in the City's best interests or the proposed cost exceeds the City's estimate. If we do not award a Task, we will not be liable for Proposal expenses.
6. By submitting a signed Proposal to the City, you are agreeing to accomplish the Work outlined in the Task Order Scope of Work. You shall include the necessary scope items in the Proposal prior to delivering it to the Engineer.
7. Each Task Order Acceptance provided to you in writing will state the timeframe for completion and fixed price of performance. The Task Order Acceptance signed by the Engineer constitutes the City's acceptance of your Proposal.

1-7.1.5.2 Processing Time Limits.

1. Upon receiving an RFP, submit a Proposal for each Task Order and Task Order Modification to the Engineer on or before the due date stated in the RFP. Proposals are due within 14 Days of the RFP except in the case of accelerated or emergency projects.

2. Analyze each Task Order and submit all Requests for Information (RFI) and Requests for Change (RFC) within 7 Days after issuance of any RFP. Submission of RFI's or RFC's will in no way extend the proposal due date unless a proposal extension is granted by the Engineer in writing.

3. Request all proposal extensions in writing (email or letter) and include backup information to support the proposal extension. If a proposal extension is not granted by the engineer in writing prior to the proposal due date, the proposal will be considered late if a complete proposal is not submitted on or before the proposal due date.

4. Once you have submitted your proposal, be available for a Proposal Negotiation Meeting within 24 hours of being notified by the Engineer via fax, e-mail, or telephone.

5. In the Proposal Negotiation Meeting, the City will discuss with you the line items and quantities in your proposal in order to determine the validity and reasonableness of your proposal.

6. After the Proposal Negotiation meeting, the City will provide a proposal acceptance and either a counter-proposal or a marked-up proposal based on the proposal negotiation. Within 2 Days of receiving the proposal acceptance and counter-proposal or marked-up proposal, sign and return to the Engineer by email the scanned proposal acceptance OR email a list of the disagreed line items and quantities and the specific reasons for not agreeing with the line item and quantity. For any disagreed line items, include your proposed line item and quantity revisions.

7. The City will review any disagreed line items and either accept, reject, or partially accept your proposed revisions to the counter-proposal or marked-up proposal. If the City accepts any revisions, the City will provide you a revised proposal acceptance and counter-proposal or revised marked-up proposal. You are required to review the revised counter-proposal or marked-up proposal and shall sign and return the revised proposal acceptance within 1 Working Day.

1-7.1.5.3 Payment.

1. The payment for a Task Order and the Task Order price indicated on your Proposal Acceptance is determined by summing the value of all of the Pre-Priced Items (from the UPB) and the Non-Pre-Priced Items (from 2 competitive quotes) required for completing the Task Order.

    a. The price of a PP Item is determined by the following formula:

PP Item Price = Unit Price (from UPB) x quantity x AF (NWH or ONWH)

b. The price of a NPP Item is determined by the following formula:

NPP Item Price = Lowest of two competitive quotes x AF (NWH or ONWH)

c. See the Notice Inviting Bids for the applicable Unit Prices and UPB.

d. Include a list of all the PP Items and NPP Items along with the required quantities and costs as indicated in the formulas above in your Proposal for each Task Order. The Proposal format shall be as indicated in the Notice Inviting Bids.

SECTION 2 - SCOPE OF THE WORK

2-6 CHANGES REQUESTED BY THE CONTRACTOR. ADD the following:

3. You may request a modification in the Task Order price or an extension of time for completion of the Task Order due to changes in the Work that are not within the scope of the Task Order.

4. You shall not be entitled to compensation for any Extra Work performed unless the Engineer has issued a written Task Order Modification designating the following:

   a. The Extra Work to be performed.

   b. The price of the Extra Work.

   c. The time for completion of the Extra Work.

5. If the Engineer agrees that Work is added or deleted, the Task Order price shall be adjusted using the Procedure for Ordering Work in accordance with 1-7.1.5.1, "Procedure for Ordering Work", 1-7.1.5.2, "Processing Time Limits", and 1-7.1.5.3, "Payment".

2-7.1 General. DELETE in its entirety and SUBSTITUTE with the following:

1. If the Engineer deletes any item of the Work in part or in its entirety, the reduction in Contract Price shall reflect a credit for the full value of the deleted portion of the Work, including anticipated profit and overhead.

2. If the Engineer orders Work to be added or deleted, the Task Order price shall be modified in accordance with 1-7.1.5.1, "Procedure for Ordering Work", 1-7.1.5.2, "Processing Time Limits", and 1-7.1.5.3, "Payment".

3. The Engineer will adjust the location list provided in the Contract Documents as needed.

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SECTION 3 - CONTROL OF THE WORK

3-7.1 **General.** ADD the following:

4. There may be no Plans for the purposes of bidding or construction. Specific Work instructions for each Task Order will be issued to you on the Task Order Scope of Work.

3-7.2 **Precedence of Contract Documents.** ADD the following:

6. The Work instructions on the Task Order Scope of Work shall have the same rank as "Supplemental Special Provisions" and "Plans" when used in conjunction with 3-7.2, "Precedence of Contract Documents".

7. Task Order Modifications and revised Scope of Work shall have the same rank as "Change Orders and Supplemental Agreements" when used in conjunction with 3-7.2, "Precedence of Contract Documents".

3-12.6 **Water Pollution Control.** ADD the following:

2. Based on preliminary assessments by the City, Task Orders may be subject to Storm Water Pollution Control requirements in accordance with Part 11 - STORM WATER. Refer to the Task Order Scope of Work.

SECTION 6 - PROSECUTION AND PROGRESS OF THE WORK

6-1.2 **Commencement of the Work.** ADD the following:

7. **The Work shall be completed within the time specified in the Task Order Acceptance.**

6-3 **TIME OF COMPLETION.** ADD the following:

1. You shall complete the Work within the time specified in the Task Order Scope of Work documents.

SECTION 7 – MEASUREMENT AND PAYMENT

7-3.5.1 **General.** ADD the following:

4. The Unit Price Book shall be consistent for the entire term of the JOC Contract including the Task Order Modification Work executed during and after the Contract expiration. The Adjustment Factors shall not change for a period of 2 years (730 Calendar Days) from the Contract Award Date and for any Task Order Modifications executed after the expiration of the Contract that are required to complete a Task Order. See the Contract Documents for the identification of the Unit Price Book.

END OF PART 1 - GENERAL PROVISIONS (C)

END OF PART 1

PART 2

CONSTRUCTION MATERIALS

SECTION 200 – ROCK MATERIALS

200-1 ROCK PRODUCTS.

200-1.2.1 General. To Table 200-1.2.1 (A), ADD the following:

	Percent Passing Sieves				
Sieve Size	**AASHTO No. 57(1)**	**ASTM No. 2(1)**	**ASTM No. 8(1)**	**ASTM No. 89(1)**	**ASTM No. 9(1)**
3 in (75 mm)	-	100	-	-	-
2.5 in (62.5 mm)	-	90 – 100	-	-	-
2 in (50 mm)	-	35 – 70	-	-	-
1.5 in (37.5 mm)	100	0 – 15	-	-	-
1 in (25 mm)	95 – 100	-	-	-	-
0.75 in (19 mm)	-	0 – 5	-	-	-
0.5 in (12.5 mm)	25 – 60	-	100	100	-
0.375 in (9 mm)	-	-	85 – 100	90 – 100	100
No. 4	10 max.	-	10 – 30	20 – 55	85 – 100
No. 8	5 max.	-	0 – 10	5 – 30	10 – 40
No. 16	-	-	0 – 5	0 – 10	0 – 10
No. 50	-	-	-	0 – 5	0 – 5

(1) Material shall be washed cleaned and free of fines.

ADD the following:

1. For ASTM C131 Test Grading C, the Alternate California Test 211 may be used.

ADD:

200-1.2.2.4 **Screenings for Polymer Modified Rejuvenating Emulsion (PMRE).** Screenings for use as cover aggregate over polymer modified rejuvenating emulsion for scrub seal applications shall conform to the gradation requirements shown in Table 200-1.2.2.4.

Table 200-1.2.2.4

Sieve Size	Percentage Passing Sieve		
	Medium 3/8" x No. 6	**Medium Fine 5/16" x No.8**	**Fine 1/4" x No.10**
3/4"	-	-	-
1/2"	100	-	-
3/8"	85-100	100	100
No. 4	0-15	0-50	60-85
No. 8	0-5	0-15	0-25
No. 16	-	0-5	0-5
No. 30	-	0-3	0-3
No. 200	0-2	0-2	0-2

200-1.5.5 **Sand Gradations.** To Table 200-1.5.5, DELETE in its entirety and SUBSTITUTE with the following:

TABLE 200-1.5.5

Sieve Size	Percentage Passing Sieve			
	Asphalt Concrete	**Portland Cement Concrete**	**Mortar**	**Choker Sand – ASTM C33**
3/8 inch (9 mm)	100	100	-	100
No. 4 (5 mm)	-	95 - 100	100	95 - 100
No. 8 (2 mm)	75 - 100	75 - 90	95 - 100	80 - 100
No. 16 (1 mm)	-	55 - 75	70 - 95	50 - 85

Sieve Size	Percentage Passing Sieve			
	Asphalt Concrete	**Portland Cement Concrete**	**Mortar**	**Choker Sand – ASTM C33**
No. 30 (600 µm)	-	30 - 50	35 - 70	25 - 60
No.50 (300 µm)	-	10 - 25	5 - 35	5 - 30
No. 100 (150 µm)	-	2 - 10	0 - 10	0 - 10
No. 200 (75 µm)	0 - 8[1]	0 - 5	0 - 5	0 - 3
1. May be exceeded to permit a maximum of 12%, provided the sand equivalent of the asphalt concrete sand is 35 or greater.				

ADD:

200-1.5.6 Sand for Play Areas.

1. Sand for play areas shall be imported, double washed, manufactured silica sand #20, #30, or "Pro-Tour" as manufactured by Oglebay Norton Industrial Sands, Inc. or approved equal, free of deleterious organic material, loam, clay and debris, with a "mean effective size" between 0.012 inch (0.30 mm) minimum and 0.025 inch (0.65 mm) maximum and a "mean uniformity coefficient" between 1.00 and 2.5. You shall submit certification of these requirements to the Engineer at the time of product submittals. Sand shall only be installed with filter fabric and drain system. The depth of installed sand shall be 12 inches (305 mm) minimum to attenuate falls per ASTM F1292.

ADD:

200-1.5.7 Sand for Graded Aggregate Choker Stone.

1. Sand for graded aggregate choker stone shall be washed and shall conform to the gradation for Choker Sand ASTM C33 in 200-1.5.5 "Sand Gradations".

200-1.7.1 General. ADD the following:

1. The aggregate shall be from Chandler Aggregates, Inc. or equal. The aggregate shall have a specific gravity of no less than 2.60.
2. Type I slurry aggregate shall be allowed. The aggregate shall be of such character that it will not disintegrate from the action of air, water, or the conditions to be met in handling and placing and shall have a specific gravity of no less than 2.60. It shall have a minimum sand equivalent of 55.

ADD:

200-1.9 **Selection of Riprap and Filter Blanket Material.** Riprap and filter blanket material shall conform to the following requirements:

TABLE 200-1.9

Velocity (1)	**Rock Class** (2)	**RipRap Thickness "T"**	**Filter Blanket Upper Layer(s)** (3)				**Filter Blanket Lower Layer** (7)
			Option 1 (4A)	**Option 1** (4B)	**Option 2** (5)	**Option 3** (6)	
6 – 10 ft/sec	No. 2 Backing	1.1 ft (0.3 m)	¼" (6 mm)		B3	D.G.	
10 – 12 ft/sec	¼ Ton	2.7 ft (0.8 m)	¾" (19 mm)			¾" - 1½" (19 mm – 37.5 mm) P.M.B.	SAND
12 – 14 ft/sec	½ Ton	3.5 ft (1 m)	1" (25 mm)			¾" - 1½" (19 mm – 37.5 mm) P.M.B.	SAND
14 – 16 ft/sec	1 Ton	4.4 ft (1.3 m)		1½" (37.5 mm)		TYPE B	SAND
16 – 18 ft/sec	2 Ton	5.4 ft (1.6 m)		2" (50 mm)		TYPE B	SAND

Note: Practical use of this table is limited to situations where Rip-Rap Thickness "T" is less than the inside diameter of the culvert outletting to the energy dissipater.

(1) Average velocity in pipe or bottom velocity in energy dissipater, whichever is greater.

(2) If desired rip rap and filter blanket class is not available, use next larger class.

Light	Rock Class	200 lb (90 kg)
Facing	Rock Class	75 lb (34 kg)
No. 2 Backing	Rock Class	5 lb (2 kg)

(3) Filter blanket thickness = 1 foot (305 mm) or "T", whichever is less.

(4A) **Option 1** shall meet the requirements of Table 200-1.2.1 (A).

(4B) **Option 1** shall meet the requirements of Table 200-1.4 (B).

(5) **Option 2** shall meet the asphalt concrete requirements of Table 203-6.5.4 (A).

(6) D.G. = Disintegrated Granite per Table 200-2.7.2

(7) Sand = 25% passing No. 200 sieve (75% retained).

P.M.B.: Processed Miscellaneous Base in accordance with 200-2.5, "Processed Miscellaneous Base".

TYPE B: Type B bedding material shall conform to the requirements for ½ inch (12.5 mm) crushed rock or No. 4 concrete aggregate in 200-1, "ROCK PRODUCTS", Table 200-1.2.1 (A) or Table 200-1.4 (B).

200-2 UNTREATED BASE MATERIALS.

200-2.1 General. DELETE in its entirety and SUBSTITUTE with the following:

1. Base or subbase materials shall be classified in the order of preference as follows:
   a. Crushed Aggregate Base
   b. Crushed Miscellaneous Base
   c. Processed Miscellaneous Base
   d. Class 2 Aggregate Base
   e. Disintegrated Granite Base
   f. Select Subbase
2. When base material without further qualification is specified, supply crushed aggregate base. When a particular classification of base material is specified, you may substitute any higher classification, following the order of preference listed above, of base material for that specified. All processing or blending of materials to meet the grading requirement shall be performed at the plant or source. The materials shall compact to a hard, firm, unyielding surface and shall remain stable when saturated with water.

ADD:

200-2.9 Class 2 Aggregate Base.

200-2.9.1 General.

1. Class 2 Aggregate Base shall consist of broken or crushed asphalt, concrete, Portland cement concrete, railroad ballast, crushed porcelain material, crushed rock, rock dust, brick, or natural material. The material shall be free from organic matter and other deleterious substances, and shall be of such nature that it can be compacted readily under watering and rolling to form a firm, stable base.

200-2.9.2 Grading.

1. The coarse aggregate material retained on the 0.19 inch (4.75 mm) (No. 4) sieve shall consist of material of which a minimum of 25% by weight shall be crushed particles as determined by California Test 205.

2. Aggregate shall conform to the grading requirements shown in Table 200-2.9.2. The grading for either the 1.5 inch (37.5 mm) maximum or ¾ inch (19 mm) maximum may be used, except that once a grading is selected it shall not be changed without the Engineer's written approval.

TABLE 200-2.9.2 Percentage Passing

Sieve Size	1½ inch (37.5 mm) Maximum Individual Test Results	¾ inch (19 mm) Maximum Individual Test Results
2" (50 mm)	100	-
1½" (37.5 mm)	87 - 100	-
1" (25 mm)	-	100
¾" (19 mm)	45 - 90	87 - 100
No. 4 (4.75 mm)	20 - 50	30 - 60
No. 30 (600 µm)	6 - 29	5 - 35
No. 200 (75 µm)	0 - 12	0 - 12

200-2.9.3 Quality Requirements.

1. Class 2 aggregate base shall conform to the following requirements:

TABLE 200-2.9.3

Tests	California Test	Individual Test
Resistance (R-value)	Calif. 301	78 Min.
Sand Equivalent	Calif. 217	30 Min.
Durability Index	N/A	35 Min.

ADD:

200-2.10 Infield Mix.

200-2.10.1 General.

1. Infield mix shall be designated for use in sports infield areas. Infield mix shall be free from organic matter and other deleterious substances and shall be of such nature that it can be compacted readily under water and rolling to form a firm, stable base.

200-2.10.2 Grading.

1. Infield mix shall meet the following requirements:

Sieve Size	**% Passing Sieve**
4.75 mm (No. 4)	100
2.36 mm (No. 8)	90 – 100
1.18 mm (No. 16)	85 – 95
600 µm (No. 30)	65 – 85
300 µm (No. 50)	35 – 55
150 µm (No. 100)	20 –35
75 µm (No. 200)	10 – 25
Sand Equivalent	15 – 25
pH (7.2 Neutral)	6 – 8.5
Percent Clay	10 – 15

SECTION 201 – CONCRETE, MORTAR AND RELATED MATERIALS

201-1 PORTLAND CEMENT CONCRETE.

201-1.1.2 Concrete Specified by Class and Alternate Class. ADD the following:

1. Monolithic curb and pavement shall not be allowed.
2. To Table 201-1.1.2, REVISE the following:
   a. Concrete class for "Concrete Pavement (not integral with curb)", DELETE "520-A-2500" and SUBSTITUTE with "560-C-3250".
   b. Concrete class for "Sidehill Surface Drainage Facilities", DELETE "500-C-2500" and SUBSTITUTE with "520-C-2500".
   c. Concrete class for "Fence and Guardrail Post Foundations", DELETE "500-C-2500" and SUBSTITUTE with "520-C-2500".

201-1.1.6.3 Mix Design. ADD the following:

1. The maximum water to cementitious ratio shall be 0.3 lb/lb (136 g/g), **unless otherwise specified in the Special Provisions**.

201-1.2.1 Cement. DELETE in its entirety and SUBSTITUTE with the following:

1. Cement to be used or furnished shall be low alkali and shall be either Type I or Type II Portland Cement conforming to ASTM C 150, or Type IP (MS) portland-pozzolan cement conforming to ASTM C595, **unless otherwise specified in the Special Provisions**.
2. You shall furnish a Certificate of Compliance for the cement.
3. Cement shall be stored to protect against contamination and moisture. Should any cement show evidence of contamination or be otherwise unsuitable, the Engineer may reject it and require that it be removed from the site.
4. Cement used in concrete for any individual structure shall be of the same brand and type, unless otherwise approved by the Engineer.

201-1.4.3 Transit Mixers. ADD the following:

1. Time and date of batching shall be machine stamped.

201-9 CEMENT TREATED BASE (CTB).

201-9.1 General. DELETE in its entirety and SUBSTITUTE with the following:

1. CTB shall consist of a mixture of untreated base material, a minimum of 2% Portland Cement by weight of dry aggregate, and water mixed at a central mixing plant. Aggregate shall not exceed 120°F (11°C) at time of mixing. Water added shall be at or near optimum as determined by ASTM D 1557, Method C.

d. Concrete class for "Concrete Pavement (not integral with curb)", DELETE "520-A-2500" and SUBSTITUTE with "560-C-3250".

e. Concrete class for "Sidehill Surface Drainage Facilities", DELETE "500-C-2500" and SUBSTITUTE with "520-C-2500".

f. Concrete class for "Fence and Guardrail Post Foundations", DELETE "500-C-2500" and SUBSTITUTE with "520-C-2500".

201-1.1.6.3 Mix Design. ADD the following:

2. The maximum water to cementitious ratio shall be 0.3 lb/lb (136 g/g), **unless otherwise specified in the Special Provisions**.

201-1.2.1 Cement. DELETE in its entirety and SUBSTITUTE with the following:

5. Cement to be used or furnished shall be low alkali and shall be either Type I or Type II Portland Cement conforming to ASTM C 150, or Type IP (MS) portland-pozzolan cement conforming to ASTM C595, **unless otherwise specified in the Special Provisions**.

6. You shall furnish a Certificate of Compliance for the cement.

7. Cement shall be stored to protect against contamination and moisture. Should any cement show evidence of contamination or be otherwise unsuitable, the Engineer may reject it and require that it be removed from the site.

8. Cement used in concrete for any individual structure shall be of the same brand and type, unless otherwise approved by the Engineer.

201-1.4.3 Transit Mixers. ADD the following:

2. Time and date of batching shall be machine stamped.

201-9 CEMENT TREATED BASE (CTB).

201-9.1 General. DELETE in its entirety and SUBSTITUTE with the following:

2. CTB shall consist of a mixture of untreated base material, a minimum of 2% Portland Cement by weight of dry aggregate, and water mixed at a central mixing plant. Aggregate shall not exceed 120°F (11°C) at time of mixing. Water added shall be at or near optimum as determined by ASTM D 1557, Method C.

201-9.2.1 Untreated Base Material. DELETE in its entirety and SUBSTITUTE with the following:

1. Untreated base material to be treated shall be conforming to 200-2.2, "Crushed Aggregate Base"; 200-2.4, "Crushed Miscellaneous Base"; or conforming to 200-2.8, "Pulverized Miscellaneous Base", except as modified herein.

2. Material shall be uniformly graded and shall conform to the following gradation:

Sieve Size	% Passing Sieve
1" (25 mm) sieve	90 – 100
3/8" (9.5 mm) sieve	65 – 85
No. 4 (4.75 mm) sieve	45 – 65
No. 30 (600 µm) sieve	15 – 35
No. 200 (75 µm) sieve	3 – 15
Sand Equivalent	30 minimum

201-9.3 Mix Designs. DELETE in its entirety and SUBSTITUTE with the following:

1. The materials shall be tested and the mix designs developed in accordance with ASTM D1557. Compressive strength shall be determined in accordance with ASTM D1633, Method A or Caltrans Test Method 312, part V except test specimens shall be compacted in accordance with ASTM D1557, Method A or B or Caltrans Test Method 312, part III section D using split compaction mold, no tamping and compression load shall be 2000 psi.
2. The mix design(s) shall show the following:
   a. The amount and gradation of the base material to be treated.
   b. The amount and type of Portland cement.
   c. The amount of water.
   d. The required 7 Calendar Day compressive strength shall not be less than 400 psi.

ADD:

201-10 MANHOLES (MHs).

201-10.1 Pre-fabricated Manhole Bases (PMB).

1. If Prefabricated Manhole Base is shown on the Plans and if the MH is modified or placed at a new location because of a design change either in the vertical or horizontal position and the PMB does not meet the design criteria, you shall order a new PMB that complies with the modified alignment, location, or both. The City will compensate you for the base, restocking costs, and other related costs.
2. PMB may be allowed, when not shown on the Plans, if you assume all the risk and additional costs of the MH relocation as a result of unforeseen conditions or design changes. If the MH is modified or placed at a new location because of a design change either in the vertical or horizontal position and the PMB does not meet the design criteria, you shall order a new PMB that complies with the modified alignment and location. Otherwise, you shall replace the PMB with a cast in place base at no additional cost to the City.
3. If the PMB channels do not have the proper slopes or configurations as shown on the Plans or if the installation is not in compliance with the Contract

requirements or the manufacturer's recommendations, the PMB will be rejected by the Engineer and you shall cast a new base in place at no additional cost to the City.

201-10.2 Polymer Mortar.

1. The following products shall be acceptable for use in manhole riser joints:

Material	**Manufacturer**
490 Epoxy Putty	Engard Coatings, Huntington Beach, CA
Sikadur 31 Hi-Mod Gel	Sika Corporation, Santa Fe Springs, CA
Sikadur 32 Hi-Mod Gel	Sika Corporation, Santa Fe Springs, CA
CS-102 Butyl Gaskets (rope form)	Concrete Sealants, New Carlisle, OH

201-10.3 Polyurethane Coating.

1. The epoxy primer and polyurethane liner shall be manufactured as listed on the City's AML or approved equal.
2. The color shall be white or beige. You shall submit complete manufacturer specifications, application procedures, and references for review and approval.

201-10.4 Exterior Waterproofing for Manholes.

1. All new manholes shall have exterior water proofing.
2. The exterior coal tar coatings shall be applied prior to delivery to the jobsite. In addition, an EPDM rubber adhesive sleeve with a minimum thickness of 30 mils and is nine (9) inches wide shall be applied at all joints on exterior of new manholes. Sleeves shall be Infi-Shield External Gator Wrap (Sealing Systems, Inc.) or approved equal.
3. An acceptable alternative to coal tar emulsion as described in item 2 of the is a coal tar epoxy as follows:

    a. On all new manholes, the Contractor shall apply water proofing agent consisting of a coal tar epoxy on all exterior surfaces. The Coal Tar epoxy shall be Tnemec 46H-413 or approved equal. The coal tar epoxy shall be applied in one or two coats to achieve a 16-20 mils DFT. The approved equal shall be applied as specified by the manufacturer. The Contractor shall provide evidence of thickness to the City or City representative during application using a wet thickness mil gauge.

4. Full compensation for furnishing and applying water proofing shall be considered as included in the contract unit price bid for manhole and no additional compensation will be allowed, therefore.

5. When completed, all manholes shall be watertight with zero infiltration of ground water.

203-1.6 Measurement and Payment. ADD the following**:**

1. The payment for paving asphalt shall be included in the item of Work to which its use is incidental unless a Bid item has been provided.

203-2.6 Measurement and Payment. ADD the following:

1. The payment for liquid asphalt shall be included in the item of Work to which its use is incidental, unless a Bid item has been provided.

203-3.4.4.1 General. To paragraph (2), ADD the following:

e) Be a product of recycled material from the City if unavailable from the San Diego County region.

ADD:

203-3.4.7 Polymer Modified Rejuvenating Emulsion (PMRE).

203-3.4.7.1 General. PMRE shall be cationic and shall consist of asphalt, latex polymer modifier and a rejuvenating agent. PMRE shall conform to the requirements shown in Table 203-3.4.7

Table 203-3.4.7

Test on Emulsion	Test Method	Specification
Viscosity @ 122°F (SFS)	AASHTO T59	50-350
pH	ASTM E70	2.5-5.0
Sieve, w%, max.	AASHTO D244	0.1
Residue, w%, min.	AASHTO T59	65
Oil distillate, w% (177°C)	ASTM D244	0.5
Storage Stability, 24 Hr, 25°C, max	AASHTO T59	1.0
Test on Residue Recovered by Evaporation (AASHTO T59)		
Viscosity @ 140°F, (P), max.	ASTM D2171 (c,d)	5000
Penetration @ 39.2°F, min.	ASTM D5	40 to 70
Elastic Recovery %, min.	AASHTO T59, T301(a,b)	60

a. Exception to AASHTO T59: Bring the temperature on the lower thermometer slowly to 350° F plus or minus 10°F. Maintain at this temperature for 20 minutes. Complete total distillation in 60 plus or minus 5 minutes from the first application of heat.

b. Elastic Recovery @ 10°C (50° F): Hourglass sides, pull 20 cm, hold 5 minutes then cut, let sit for 1 hour.

c. If it is suspected that a sample may contain solid material, strain the melted sample into the container through a No. 500 (300-µm) sieve conforming to Specification E 11."

d. Use an AI-200 glass capillary tube to run the test. If the viscosity is 4000 or above, use an AI 400 instead.

203-3.4.7.3 Certificate of Compliance.

1. A Certificate of Compliance conforming to SECTION 4-5 CERTIFICATE OF COMPLIANCE of the GREENBOOK shall accompany each shipment of PMRE to the Work site and be submitted to the Engineer prior to application. In addition to the requirements of SECTION 4-5 CERTIFICATE OF COMPLIANCE of the GREENBOOK, the certificate shall show the shipment number, type of material, density, refinery, consignee, destination, quantity, Project title, purchase order number, and date of shipment.
2. PMRE shipped without a Certificate of Compliance will not be allowed to be used.

203-3.5 Certificate of Compliance. ADD the following:

1. Test reports and certifications shall be made in accordance with 4-4, "TESTING"; 4-5, "CERTIFICATE OF COMPLIANCE"; and 203-1.3, "Test Reports and Certification".

203-3.6 Temperature. DELETE in its entirety and SUBSTITUTE the following:

1. Emulsified asphalt may be reheated, but at no time after loading shall the temperature be raised above 160°F (70°C). During reheating, emulsified asphalt shall be agitated to prevent localized overheating. Emulsified asphalt shall not be permitted to cool to a temperature less than 40°F (5°C).
2. **Unless otherwise specified in the Special Provisions**, emulsified asphalt shall be mixed and applied within the temperature range shown in Table 203-3.6.
3. You shall furnish and keep on the Work site a thermometer capable of accurately determining the temperature.

TABLE 203-3.6

Grade of Emulsified Asphalt	Pug Mill Mixing Temperature °F (°C)		Application Temperature °F (°C)	
	Min.	Max.	Min.	Max.
CQS-1h	50 (10)	130 (55)	77 (25)	130 (55)
RS-1, CRS-1			77 (25)	130 (55)
RS-2, CRS-2			110 (45)	160 (70)
SS-1, CSS-1	50 (10)	130 (55)	77 (25)	130 (55)
SS-1h, CSS-1h	50 (10)	130 (55)	77 (25)	130 (55)
CMS-2, CMS-2S, CMS-2h	50 (10)	140 (60)	100 (40)	160 (70)
RPME	60 (15)	140 (60)	-	-

ADD:

203-3.8 Distribution Equipment.

1. Distribution equipment shall conform to 203-2.5, "Distributing Equipment" except that hand spraying by means of a hose or bar through a gear pump or air tank is acceptable for uniform application rates up to 0.10 gallon per square yard (0.45 L/m^2) for work on flat surfaces or tacking of vertical edges.

ADD:

203-3.9 Payment.

1. The payment for emulsified asphalt shall be included in the item of Work to which its use is incidental unless a Bid item has been provided.

ADD:

203-5.6 RUBBER POLYMER MODIFIED SLURRY (RPMS).

203-5.6.1 General.

1. Rubber polymer modified slurry (RPMS) is a crumb rubber asphalt slurry-seal surface treatment. RPMS shall be a stable mixture of asphaltic emulsion, mineral aggregate, set-control additives, specially produced and graded crumb rubber, polymer, mineral fillers, carbon black, and water. The materials for RPMS shall conform to 203-5.4, "Emulsion-Aggregate Slurry (EAS)" and these specifications. Mixing and spreading of RPMS shall be as described in 302-4.12, "Rubber Polymer Modified Slurry (RPMS)".

203-5.6.2 Materials.

1. The ingredients of RPMS immediately prior to the mixing shall conform to the following:

   a. Asphaltic emulsion shall be a quick-set type and shall conform to the requirements of CQS-1h and to the following requirements in accordance with the specified test methods:

Quality Tests for Emulsion	**Test**	**Requirements**
AASHTO T59	Residue after Distillation	60% min.
ASTM D244		
Quality Tests for Residue	**Test**	**Requirements**
AASHTO T49	Penetration at 77° F (25° C)	40% - 90%
ASTM D2397		

   b. Quick setting Type CQS-1h Asphaltic Emulsion shall test positive for Particle Charge when tested in accordance with the applicable ASTM test designation. If the Particle Charge Test result is inconclusive, the asphaltic emulsion shall meet a pH requirement of 6.7 maximum.

   c. Water shall be potable and of such quality that the asphalt will not separate from the emulsion before the application of slurry seal.

   d. If necessary for workability, a set-control agent that will not adversely affect the RPMS material may be added.

   e. Polymer additive shall be SBR Latex or approved equal, which is added at a minimum of 2% by weight of the asphaltic emulsion.

   f. Crumb Rubber.

      1) Crumb rubber shall be ambient granulated or ground from whole passenger tires, truck tires, or a combination only in conformance with the requirements indicated in Tables 203-5.6.2 (A), 203-5.6.2 (B), and 203-5.6.2 (C).

      2) Un-curing or de-vulcanized rubber shall not be acceptable. Rubber tire buffing from either recapping or manufacturing processes may not be used as a supplement to the crumb rubber mixture.

      3) In order to remove steel and fabric, an initial separation stage which subjects the rubber to freezing temperatures may be used.

      4) The crumb rubber shall not be elongated or hair-like in shape and individual particles shall not be greater than 1/20 of an inch in length.

5) The crumb rubber shall be free of contaminants including fiber, metal, and mineral matter within the following tolerances: the fiber content shall be less than 0.30% by weight and the crumb rubber shall be free of metal particles. Metal imbedded in rubber particles shall not be allowed. The amount of mineral contaminants allowed shall not exceed 0.10% by weight.

6) The crumb rubber shall be dry with a moisture content of less than 0.75%.

TABLE 203-5.6.2 (A) CRUMB RUBBER CHEMICAL PROPERTIES SPECIFICATION

Property	**Specification Limits**
Specific Gravity	1.15 ± .05
Percent of Carbon Black	35.0 Maximum
Percent of Rubber Hydrocarbon	55.0 Maximum
Percent Ash	6.0 Maximum
Percent of Acetone Extract	10.0 Maximum
Percent of Chloroform Extract	3.0 Maximum
Percent Natural Rubber	40 Minimum

TABLE 203-5.6.2 (B) CRUMB RUBBER GRADATION REQUIREMENTS

Sieve Size	**Percent Passing**
No. 30	100
No. 40	90 - 100
No. 50	75 - 85
No. 100	25 - 35
No. 200	0 - 10

TABLE 203-5.6.2 (C) TESTING METHODS FOR CRUMB RUBBER ANALYSIS

Property	Test Method
Specific Gravity	ASTM D1817
Carbon Black	ASTM D297
Ash	ASTM D297
Chloroform Extract	ASTM D297
Natural/Synthetic Rubber	ASTM D297
Sieve Analysis	ASTM C136

7) Carbon black solution shall be non-ionic in charge and liquid in form. The carbon black shall be compatible with the emulsion system, polymers, and additives being used and shall conform to the requirements indicated in Table 203-5.6.2 (D) and ASTM D1511.

TABLE 203-5.6.2 (D)

Specification	Tolerances
Total Solids	40 - 44
% Black by Weight	35 - 37
Type Black	Medium Furnace Color
Type Dispersing	Non-ionic

8) Additives may be used to accelerate or retard the break-set of the RPMS. The use of additives shall be in quantities specified in the mix design.

9) Mineral filler such as Portland cement, hydrated lime, limestone dust, fly ash, or other approved filler meeting the requirements of ASTM D242 shall be used if required by the mix design and may be used to facilitate set times as needed. Any cement used shall be considered as part of the dry aggregate weight for mix design purposes.

10) The mineral aggregate used shall be the type and grade specified for the particular Type of RPMS. The aggregate shall be manufactured crushed stone such as granite, slang, limestone, chat, other high quality aggregate, or a combination thereof. Aggregate shall consist of rock dust except that 100% of any aggregate of combination of aggregates larger than the No. 50 sieve size used in the mix shall be obtained by crushing rock. The material shall be free from vegetable matter and

other deleterious substances. The aggregate shall be free of caked lumps and oversized particles. The aggregate shall also conform to the following requirements in Table 203-5.6.2 (E).

TABLE 203-5.6.2 (E)

Test	California Test	Requirements
Sand Equivalent	217	45 min.
Durability Index	229	55 min.

203-5.6.3 Composition and Grading.

1. The percentage composition by weight of the aggregate shall conform to the requirements indicated in the tables below when determined by California Test 202 and modified by California Test 105 when there is a difference in specific gravity of 0.20 or more between blends of different aggregates.

TABLE 203-5.6.3 (A)

TYPE I SLURRY SEAL GRADATION

Sieve Size	Percentage Passing	Stockpile Tolerance
No.4	100	± 5%
No.8	90 - 100	± 5%
No.16	65 - 90	± 5%
No.30	40 - 60	± 5%
No.50	25 - 42	± 4%
No.200	10 - 20	± 2%

TABLE 203-5.6.3 (B)

TYPE II SLURRY SEAL GRADATION

Sieve Size	Percentage Passing	Stockpile Tolerance
No.3/8	100	± 5%
No.4	90 - 100	± 5%
No.8	65 - 90	± 5%
No.16	45 - 70	± 5%
No.30	30 - 50	± 5%
No.50	18 - 36	± 4%
No.100	10 - 24	± 3%
No.200	5 - 15	± 2%

TABLE 203-5.6.3 (C)

TYPE III SLURRY SEAL GRADATION

Sieve Size	Percentage Passing	Stockpile Tolerance
No.3/8	100	± 5%
No.4	70 - 90	± 5%
No.8	45 - 70	± 5%
No.16	28 - 50	± 5%
No.30	19 - 34	± 5%
No.50	12 - 25	± 4%
No.100	7 - 18	± 3%
No.200	5 - 15	± 2%

2. The job mix (target) gradation shall be within the gradation band for the desired type. After the target gradation has been submitted, the percent passing each sieve shall not be more than the stockpile tolerance.

3. The aggregate shall be accepted at the Site or stockpile. The stockpile shall be accepted based on 5 gradation tests according to California Test 202, modified by California Test 105 when there is a difference in specific gravity of 0.2 or more between blends of different aggregates. If the average of the 5 tests is within the gradation tolerances, then the material will be accepted. If the test shows the material to be out of compliance, you may choose to remove the material or blend other aggregates with the stockpile material to bring it into compliance with these specifications. Materials used in blending shall meet the quality test before blending and shall be blended in a manner to produce a consistent gradation.

4. When the results of either the Aggregate Grading or the Sand Equivalent test do not conform to the requirements specified, the aggregate shall be removed. However, if requested in writing and approved by the Engineer, the aggregate may be used and you shall pay to the agency $1.75 per ton for such aggregate left in place. No single aggregate grading or sand equivalent tests shall represent more than 300 tons or one day's production, whichever is smaller.

203-5.6.4 Mix Design.

1. Before Work begins, you shall submit laboratory reports of mix designs performed in accordance with the tests identified in Table 203-5.6.4 at your expense and shall utilize the specific materials to be used on the project. The design shall be prepared by a laboratory experienced in designing rubber asphalt slurry-seal surface treatments. After the mix design is approved, no substitution shall be made unless approved by the Engineer. The proposed rubber asphalt slurry-seal surface treatment mix design shall verify compatibility of the aggregate, emulsion, mineral filler, set-control additive, and rubber blend.

TABLE 203-5.6.4

Test	Description	Specification
ISSA T-106	Slurry Seal Consistency	Pass
ISSA TB-109	Excess Asphalt	50 grams/ft^2 maximum
ISSA TB-100 (Type I)	The Wet Track Abrasion	50 grams/ ft^2 maximum
ISSA TB-100 (Type II)	The Wet Track Abrasion	60 grams/ ft^2 maximum
ISSA TB-100 (Type III)	The Wet Track Abrasion	60 grams/ ft^2 maximum
ISSA TB-113	Mixing Time	Controllable to 150 seconds minimum
ISSA TB-114	The Wet Stripping	Pass

2. The Mixing Time test shall be done at the highest temperatures expected during construction. The original lab report shall be signed by the laboratory that performed the mix design and shall show the results of the tests on individual materials. The report shall clearly show the proportions of aggregate, mineral filler (minimum and maximum), water (minimum and maximum), additive (s) (usage), asphalt emulsion, and asphalt rubber blend based on the dry weight of the aggregate.

3. Component materials used in the mix design shall be representative of your proposed materials. The percentage of each individual material required shall be shown in the laboratory report. Adjustments may be required during the construction based on field conditions.

4. The component materials shall be within the following limits:

    a. Residual Asphalt Type I, 10% - 16% based on dry weight of aggregate.

    b. Residual Asphalt Type II, 7.5% - 13.5% based on dry weight of aggregate.

    c. Residual Asphalt Type III, 6.5% - 12% based on dry weight of aggregate.

    d. The crumb rubber will be added to the rubberized slurry mix at a rate of 5% by volume to the asphalt cement.

    e. Polymer additive shall be added at 2% of finished emulsion.

    f. Carbon Black shall be added at 1.3% to 2% of the finished emulsion.

    g. Mineral filler shall be 0.5% - 2.0% (if required by mix design) based on dry weight of aggregate.

    h. Additives, as needed.

    i. Water, as needed to achieve proper mix consistency (total mix liquids shall not exceed the loose aggregate voids).

203-6.1 General. DELETE in its entirety and SUBSTITUTE with the following:

203-6.1 General.

1. Asphalt concrete shall be the product of mixing mineral aggregate and reclaimed asphalt pavement (RAP) with asphalt binder at a central mixing plant.
2. **When specified in the Special Provisions**, asphalt concrete may be produced using a warm mix asphalt (WMA) technology.
3. **Unless otherwise specified in the Special Provisions** or shown on the Plans, asphalt concrete mixtures shall conform to 203-6.4.
4. If the asphalt concrete mixture contains more than 15% RAP, refer to Caltrans Standard Specifications Section 39, "Asphalt Concrete" for "Materials" and "Construction" requirements only unless specified otherwise in (1) Special Provisions, (2) The WHITEBOOK, and (3) The GREENBOOK in that order of precedence. Replace all references to actions by the "Department" with actions by the "City."

203-6.2.1 Asphalt Binder. ADD the following:

1. Unless otherwise specified, for mixtures containing 15 percent or less RAP, the performance grade of the virgin asphalt binder shall be the grade specified in the Special Provisions with the upper and lower temperature classification of Performance Grade (PG) 64-10.
2. For mixtures containing greater than 15 percent and not exceeding 25 percent RAP, the performance grade of the virgin binder shall be the grade specified in the Special Provisions with the upper and lower temperature classification of PG 58-16.
3. For mixtures containing greater than 25 percent RAP, the performance grade of the asphalt binder shall be determined based on viscosity and blending charts developed in accordance with AASHTO M323.

203-6.2.2 Rock Products for Asphalt Concrete Mixtures. ADD the following:

1. Aggregates must be clean and free from deleterious substances. The aggregates for a leveling course must comply with the gradation specifications for Type A HMA in Caltrans Standard Specification Section 39-2.02B.

203-6.2.3 Rock Products for Type III Asphalt Concrete Mixtures. ADD the following:

1. Aggregate gradation must be determined before the addition of asphalt binder and must include supplemental fine aggregates. Test for aggregate gradation under AASHTO T 27. Do not wash the coarse aggregate. Wash the fine aggregate only. Use a mechanical sieve shaker. Aggregate shaking time must not exceed 10 minutes for each coarse and fine aggregate portion. Choose a TV within the TV limits shown in the tables titled "Aggregate Gradations." Gradations are based on nominal maximum aggregate size.

203-6.2.5.1 General. ADD the following:

1. RAP shall be defined as asphalt concrete pavement that has been processed to a maximum of 1 inch (25 mm) in size and is free of contaminants. RAP may be substituted for part of the virgin aggregate in a quantity up to the lowest level allowed in the Caltrans Standard Specifications by dry weight of the combined aggregates.

2. Unless otherwise specified, RAP may be substituted for part of the virgin aggregate at or above the level allowed in the Caltrans Standard Specifications; currently, 25 percent by dry weight of the combined aggregates.

203-6.2.5.2 RAP Stockpiles. ADD the following:

1. Fractionated RAP stockpiles shall be isolated from other materials. Fractionated RAP shall be stored in conical or longitudinal stockpiles. Fractionated RAP shall not be agglomerated or be allowed to congeal.

203-6.2.5.3 Fractionation. DELETE in its entirety and SUBSTITUTE with the following:

203-6.2.5.3 Fractionation.

1. Fractionation is the processing of RAP into 2 or more sizes. For RAP substitution of 15 percent or less, fractionation is not required. For RAP substitution greater than 15 percent, RAP shall be fractionated into 2 sizes conforming to the requirements shown in Table 203-6.2.5.3. The RAP stockpile fractionation gradation shall conform to the requirements shown in Table 203-6.2.5.3.

Table 203-6.2.5.3

Size	Test Method	Requirement
Coarse (% passing the 1-inch sieve)	California Test 202[a]	100
Fine (% passing the 3/8-inch sieve)	California Test 202[a]	98-100

[a] Maximum mechanical shaking time is 10 minutes.

2. If RAP is from multiple sources, the RAP shall be thoroughly and completely blended before fractionating.
3. The coarse fractionated stockpile, the fine fractionated stockpile, or a combination of the coarse and fine fractionated stockpile may be used.

203-6.2.5.4 Testing. ADD the following:

1. The mix design RAP stockpile shall be sampled and tested in accordance with California Test 384. The average shall be reported on the mix design submittal. When the mix design RAP stockpile is augmented, RAP used to augment the stockpile shall be sampled at a minimum frequency of 1 sample per 500 tons in accordance with California Test 384 before augmenting. Each sample shall be tested to determine the uncorrected binder content in accordance with AASHTO T 308. The same ignition oven shall determine the uncorrected asphalt binder content reported on the mix design submittal.
2. The augmented RAP sample, when tested under AASHTO T 209, shall be within ± 0.06 of the average maximum specific gravity reported on the mix design submittal.
3. For startup of a project:
   a. Less than 5,000 tons of a QC test from another City approved submittal from the same plant within the last 90 days may be submitted for review.

   b. For greater than 5,000 tons the following QC test must be completed and submitted to the Engineer:

Quality Characteristic	Test Method
Asphalt binder content	AASHTO T 308, Method A
HMA moisture content	AASHTO T 329
Combined Aggregate Gradation	California Test 384
Combined Aggregate Sand equivalent	California Test 217 or ASTM D2419

Quality Characteristic	Test Method
Combined Aggregate Moisture content	AASHTO T 255
Air voids content	AASHTO T 269
Voids in mineral aggregate	MS-2 Asphalt mixture volumetrics
Dust proportion	MS-2 Asphalt mixture volumetrics
Hveem Stability	MS-2 and OBC CT 367
Hamburg wheel track	AASHTO T 324 (modified)
Gyration Compaction	AASHTO T 312

4. During production, RAP QC testing shall be sampled twice daily and the following additional tests shall be performed with the minimum frequency:

Quality Characteristic	Test Method	Minimum Frequency
Asphalt binder content	AASHTO T 308, Method A	1 per day with a minimum of 500 tons
Aggregate Gradation – combined with RAP	California Test 384	1 per day with a minimum of 100 tons
Aggregate Sand equivalency	California Test 217 or ASTM D2419	1 per day with a minimum of 100 tons
Aggregate Moisture content	AASHTO T 255	1 per day with a minimum of 100 tons
Hveem Stability	MS-2 and OBC CT 367	1 per day with a minimum of 100 tons
Hamburg wheel track	AASHTO T 324 (modified)	1 per 5,000 tons or 1 per project, whichever is greater
Nuclear gauge density	California Test 375	1 per 50 tons

203-6.2.5.5 Quality., ADD the following:

1. For RAP content higher than 15% in HMA, refer to Sections 39-2.01, "General"; 39-2.02, "Type A Hot Mix Asphalt," and 39-2.03, "Rubberized Hot Mix Asphalt--Gap Graded," of the Caltrans Standard Specifications in effect at the time of Bid for the quality assurance requirements. Under this process, the contractor performs quality control testing, and the City performs acceptance testing and inspection. The acceptance decision is based on the City's test results only.

2. RAP shall conform to the requirements shown in Table 203-6.2.5.5:

Table 203-6.2.5.5

Quality Characteristic	Test method	Requirement
Uncorrected Binder Content (% within the average value reported) [a]	AASHTO T 308	±2.00
Specific gravity (within the average value reported)	AASHTO T 209	±0.06
Combined Aggregates Sand Equivalent (min)	California Test 217 or ASTM D2419	50

[a] Average uncorrected binder content of 3 ignition oven tests performed.

[a] Average maximum specific gravity reported on the JMF.

203-6.3.1 General. DELETE in its entirety and SUBSTITUTE with the following:

203-6.3.1 General.

1. The Contractor shall submit in accordance with 3-8.4 a JMF that summarizes each asphalt concrete mix design for each class and grade of asphalt concrete required to construct the Work. Supporting information for the warm mix asphalt (WMA) technology and/or recycling agent, if included in a mixture, shall also be submitted e.g., C2 PG 58-16 (½ inch) (12.5 mm) and B3 PG 58-16 (¾ inch) (19 mm) asphalt concrete.

2. Asphalt concrete for JMF and Mix Designs shall be Type III and shall not exceed the allowable RAP level.

3. The JMF shall identify the source and the individual grading of each material used to produce the mix design (including the percentage and individual

gradation of any manufactured or natural sands), the combined gradation, the optimum binder content (OBC), void content, reclaimed asphalt pavement (RAP) percentage, RAP gradation, RAP binder content, stability value, plant identification, mix number, WMA technology, and the source and performance grade of the paving asphalt. Upon request, the mix design test data represented by the JMF shall be immediately made available to the Engineer.

4. When greater than 25 percent RAP is to be included in a mixture, a mix design shall be submitted on Caltrans Forms CEM-3511 and CEM-3512 or another format as approved by the Engineer. The submittal shall include supporting information showing the viscosity of the individual binders (both the virgin paving asphalt grade and that of the binder recovered from the RAP); and the amount of recycling agent, if any, and the blended final viscosity in accordance with AASHTO M323.

5. For all mixtures, the asphalt binder content shall be defined as the total bituminous material present in the mix consisting of the blend of virgin paving asphalt, residual paving asphalt from RAP, and recycling agent.

6. Refer to Caltrans Standard Specifications, 39-2.01A(3)(b), "Job Mix Formula" for additional requirements for modifications, renewal, authorization, and quality control plan.

7. A new mix design shall be prepared and a new JMF submitted if:

    a. the combined aggregate gradation is not within ± 3 percentage points of the gradation shown on the referenced mix design on any sieve,

    b. the source of any aggregate is changed,

    c. the performance grade of paving asphalt is changed,

    d. the average binder content in a new fractionated RAP stockpile varies by more than ± 2.00 percent from the average RAP binder content reported on the JMF,

    e. the average maximum specific gravity in a new fractionated RAP stockpile varies by more than ± 0.060 from the average maximum specific gravity value reported on the JMF.

8. AASHTO T 324 (Modified) is AASHTO T 324 (Standard Method of Test for Hamburg Wheel-Track Testing of Compacted Asphalt Mixtures) with the following parameters:

    a. Target air voids must equal 7.0 ± 1.0 percent.

b. Specimen height must be 60 ± 1 mm.

c. Number of test specimens must be 4 to run 2 tests.

d. Do not average the 2 test results.

e. Test specimen must be a 150 mm gyratory compacted specimen.

f. Test temperature must be set at:

1) 113 ± 2 degrees F for PG 58 for use of 25% RAP

2) 122 ± 2 degrees F for PG 64 for use of 15% RAP

3) Measurements for impression must be taken at every 100 passes along the total length of the sample.

g. Inflection point is the number of wheel passes at the intersection of the creep slope and the stripping slope at maximum rut depth.

h. Testing shut off must be set at 25,000 passes.

i. Submersion time for samples must not exceed 4 hours.

9. Take samples under California Test 125.

ADD:

203-6.3.3 Asphalt Binder Replacement.

1. Asphalt binder replacement shall be defined as the asphalt binder from RAP expressed as a percent of the total asphalt binder in the mixture. The asphalt binder replacement shall be calculated as a percentage of the approved JMF target asphalt binder content. The maximum asphalt binder replacement for mixtures containing RAP shall be 25 percent of the optimum binder content (OBC) for surface courses and 40 percent for leveling and base courses.
2. For Type A HMA with a binder replacement percent less than or equal to 25 percent of your specified OBC, you may request that the performance-graded asphalt binder grade with upper and lower temperature classifications be reduced by 6 degrees C from the specified grade.
3. Once the City has approved a mix design, the asphalt binder content shall be within 0.5% of the identified target binder contents for each mix design submitted.
4. Each approved asphalt plant and location shall perform an annual verification process with the City.

203-6.4.3 Combined Aggregates and Reclaimed Asphalt Pavement (RAP). To subsection "a", DELETE in its entirety and SUBSTITUTE with the following:

a. The combined aggregates shall have a minimum sand equivalent of 50 when tested in accordance with California Test 217 or ASTM D2419.

ADD:

203-6.4.5 Miscellaneous Areas and Dikes. For miscellaneous areas and dikes:

1. Choose the aggregate gradation from:
   a. 1/2-inch Type A HMA aggregate gradation.
   b. Dike mix aggregate gradation.
2. Choose asphalt binder Grade PG 58-16 or 64-10.
3. Minimum asphalt binder content must be:
   a. 5.70 percent for 1/2-inch Type A HMA aggregate gradation.
   b. 6.00 percent for dike mix aggregate gradation.
4. If you request and the Engineer authorizes, you may reduce the minimum asphalt binder content. Aggregate gradation for dike mix must be within the TV limits for the specified sieve size as shown below:

Sieve size	Target value limit	Allowable tolerance
1/2"	100	--
3/8"	---	95 - 100
No. 4	73–77	TV ± 10
No. 8	58–63	TV ± 10
No. 30	29–34	TV ± 10
No. 200		0 - 14

5. For HMA used in miscellaneous areas and dikes, sections 203-6.3.1 do not apply.

203-6.5.4 Composition and Grading. To Table 203-6.5.4 (A), Class B2 and Class B3, DELETE in its entirety and SUBSTITUTE with the following:

CLASS	B2		B3	
Sieve Size	Individual Test Result	Moving Average	Individual Test Result	Moving Average
1" (25.0 mm)	100	100	100	100
3/4" (19.0 mm)	87 - 100	90 - 100	90 - 100	95 - 100
1/2" (12.5 mm)	75 - 95	80 - 90	85 - 100	85 - 95
3/8" (9.5 mm)	50 - 80	60 - 75	60 - 84	65 - 80
No. 4 (4.75 mm)	30 - 60	40 - 55	40 - 60	45 - 60
No. 8 (2.36 mm)	22 - 44	27 - 40	24 - 50	30 - 45
No. 30 (600 µm)	8 - 26	12 - 22	11 - 29	14 - 25
No. 200 (75 µm)	1 - 8	3 - 6	1 - 9	3 - 7
Asphalt Binder %	4.6 - 6.0		4.6 - 6.0	

203-6.7 Production. ADD the following:

1. Before production, the HMA plant must have a current qualification under the City's Material Plant Quality Program for each mix design.

203-6.7.1 General. ADD the following:

1. During production, the hot- or cold-feed proportion controls for virgin aggregate and RAP may be adjusted. For RAP substitution of 15 percent or less, RAP must be within ± 5 of the RAP percentage shown in the approved JMF form without exceeding 15 percent. For RAP substitution of greater than 15 percent, RAP must be within ± 5 of the RAP percentage shown in the approved JMF form without exceeding 25 percent.
2. Do not start HMA production before verification and authorization of JMF. The HMA plant must have a current qualification under the City's Material Plant Quality Program. Weighing and metering devices used to produce HMA modified with additives must comply with the City's MPQP. If a loss-in-weight

meter is used for dry HMA additive, the meter must have an automatic and integral material delivery control system for the refill cycle.

3. Calibrate the loss-in-weight meter by:

   a. Including at least 1 complete system refill cycle during each calibration test run

   b. Operating the device in a normal run mode for 10 minutes immediately before starting the calibration process

   c. Isolating the scale system within the loss-in-weight feeder from surrounding vibration

   d. Checking the scale system within the loss-in-weight feeder for accuracy before and after the calibration process and daily during mix production

   e. Using a minimum 15 minute or minimum 250 lb. test run size for a dry ingredient delivery rate of less than 1 ton per hour.

   f. Complying with the limits of City's Conveyor Scale Testing

4. Proportion aggregate by hot or cold-feed control. The aggregate temperature must not be more than 375 degrees F when mixed with the asphalt binder. Asphalt binder temperature must be from 275 to 375 degrees F when mixed with aggregate. Mix HMA ingredients into a homogeneous mixture of coated aggregates.
5. HMA must be produced at the temperatures shown in the following table:

HMA compaction	**Temperature (°F)**
Density based Method	Not to Exceed 325

6. If you stop production for longer than 30 days, a production start-up evaluation is required.

SECTION 206 – MISCELLANEOUS METAL ITEMS

ADD:

206-3.3.5 Underdrain Cleanout Lid (For Other Areas).

1. Cleanout lids for cleanouts in the road, sidewalk, or any other area where water is not expected to pool shall be Alhambra Foundry A-2302-B cast iron water-tight cover and frame that is rated for traffic applications or approved equal.

2. The cleanout lid shall have a clear opening of 8 inches (203 mm) and have an overall diameter of 13 inches (330 mm). The frame shall be 1 inch (25 mm) deep. The frame shall be set into the concrete collar and the lid shall seat firmly into the frame without rocking and shall be flush with the surface. Lock screws shall be provided to lock lid to frame. The cleanout lid shall be stamped "SD STORM DRAIN".

ADD:

206-7 STREET NAME SIGN.

1. Street name signs shall conform to the requirements of SDM-102, "Street Name Sign".

SECTION 207 – GRAVITY PIPE

ADD:

1. Pipe installed as sewer main shall be Vitrified Clay (Extra Strength) or Polyvinyl Chloride (PVC). PVC pipe shall be SDR-35 unless otherwise designated on the plans.
2. Pipe and fittings for house connection sewer (laterals) shall be Vitrified Clay (Extra Strength), PVC, or Acrylonitrile-Butadiene-Styrene (ABS) solid wall pipe.
3. Asbestos cement pipe shall not be acceptable.

207-2.9.1 General. ADD the following:

1. The basis for acceptance shall be by the D-load bearing strength test, compliance with these Specifications, and inspection of the pipe manufacture and inspection of the completed pipe.

207-17.1 General. DELETE in its entirety and SUBSTITUTE with the following:

1. The ASTM Designation, SDR, pipe stiffness, and type of joint shall be specified on the plans and/or specifications.
2. House Connection Sewer Laterals shall use glued, gasketed, or stainless steel shielded couplings listed on the Wastewater Approved Materials List or approved equal.

207-17.2.1 Identification Marks. DELETE in its entirety and SUBSTITUTE with the following:

1. **Polywrap shall not be used as pipe color identification for plastic pipe**. All pipe, fittings, and couplings shall be clearly marked at intervals not to exceed 5 feet as follows:
    a. Color: Green (for wastewater applications).
    b. Nominal pipe diameter.
    c. PVC cell classification.
    d. Company, plant, shift, ASTM, SDR, and date designation.
    e. Service designation or legend.
    f. For fittings and couplings, the SDR designation is not required.

207-17.2.2 Cell Classification. ADD the following:

1. PVC pipes for storm drains and tertiary treated recycled water ("purple pipe") that cross existing potable water mains and have a vertical clearance of less than 12 inches (305 mm), or more if indicated on the plans, shall have a PVC cell

classification of 12454 meeting AWWA C900 and CL200 and meeting the requirements of DR14. No joints are permitted within 4 feet (1.2 m) of the water line crossing.

207-17.3.2 Elastomeric Gasket Joints. DELETE in its entirety and SUBSTITUTE with the following:

1. Pipe with gasketed joints shall be manufactured with a socket configuration which shall prevent improper installation of the gasket and shall ensure that the gasket remains in place during the joint operation.
2. The gasket shall be polyurethane or synthetic rubber with equal or greater resistance to solvency, chemical, or biological attack and shall conform to the requirements of 208-1.2, "Installation Time Limit" and 208-4, "GASKETS FOR THERMOPLASTIC PIPE".

207-17.4.2 Acceptance. DELETE in its entirety and SUBSTITUTE with the following:

1. The basis for acceptance shall be the inspection of pipe, fittings, and couplings, the tests specified in 207-17.4, "Test Requirements", and compliance with the Specifications.
2. When the pipe is delivered to the Work site, the Engineer may require additional testing to determine conformance with the requirements of pipe flattening, impact resistance, pipe stiffness, and extrusion quality.
3. You shall provide information to the Engineer verifying that the quantity of pipe, the manufacturing and delivery date, and the pipe stored is the same material documented on the Certificate of Compliance.
4. You shall provide explanation of pipe markings and shall include manufacturing date and location.
5. If the pipe will not be installed within 6 months of manufacture date, you shall protect the pipe from environmental degradation (UV rays and sunlight) in accordance with the manufacturer's recommendations.
6. You shall insure that the PVC pipe is stored locally within 25 mile (40 km) radius and that the Engineer has reasonable access to the pipe at the storage location.
7. The stored pipe shall not be removed from storage for purposes other than for the Project without the Engineer's approval.
8. PVC pipe handled and stored in accordance with these specifications will be acceptable for installation for up to 2 years from the date of manufacture without repeat testing.
9. The Engineer may process payment for stored PVC pipes in accordance with 7-3.3.1, "Payment for Stored Materials on Site" and 7-3.3.1.2, "Payment for Stored Materials Offsite".

10. For PVC pipe older than 6 months from date of manufacture as evidenced by pipe markings:

    a. Prior to installation of PVC pipe, you shall submit to the Engineer a current (no older than 60 Calendar Days) complete set of third party independent test results for each separate lot of pipe consisting of:

        1) Flattening capability conforming to ASTM D2412.

        2) Extrusion quality by the acetone-immersion method as specified in ASTM D2152.

    b. Test results shall identify the pipe by its markings as provided by the manufacturer.

    c. PVC pipe installation may not proceed prior to your submittal of test results and prior to the written acceptance by the Engineer.

    d. PVC pipe tested as outlined above shall be accepted for installation for a maximum of 6 months from the date of testing unless it is stored and handled in accordance with these specifications immediately after testing.

    e. PVC pipe that is not stored locally within a 25 mile (40 km) radius of the Site or where the Engineer does not have reasonable access to verify storage and handling shall be retested in accordance with these specifications within 60 Calendar Days prior to installation in accordance with 207-15.6, “Installation Time Limit”.

ADD:

207-17.6 Fusible Non-pressure Polyvinylchloride (PVC) Pipe.

207-17.6.1 General.

1. This subsection specifies fusible polyvinylchloride (PVC) pipe for sewer mains and laterals when used for horizontal directional drilling and where shown on the Plans.

207-17.6.2 Material.

1. Fusible PVC plastic material for pipe shall conform to ASTM D3034 or ASTM F679, and ASTM D1784 cell classification 12454. Fusible PVC pipe shall be tested at the extrusion facility for properties required to meet all applicable parameters.

2. Fusible PVC pipe shall be extruded with plain ends. The ends shall be square to the pipe and free of any bevel or chamfer. There shall be no bell or gasket of any kind incorporated into the pipe.

3. Pipe shall be homogeneous throughout and be free of visible cracks, holes, foreign material, blisters, or other deleterious faults. Any length of pipe showing a crack or which has received a blow that may have caused an incident fracture, even though no such fracture can be seen, shall be marked as rejected and removed from the Site immediately. Damaged areas or possible areas of damage may be removed by cutting out and removing the suspected incident fracture area. Limits of the acceptable length of pipe shall be determined by the Engineer.

4. Any scratch or gouge greater than 10% of the wall thickness shall be considered significant and will be rejected unless determined acceptable by the Engineer.

5. Pipe segments shall be butt fused together in accordance with the manufacturer's requirements.

6. Fusible PVC pipe shall be manufactured with 100% virgin resin in a standard 20 feet (6.1 m), 30 feet (9.1 m), or 40 feet (12.2 m) nominal length with the following general characteristics:

    a. Color: Green (for wastewater applications).

    b. SDR: 18 minimum, unless otherwise shown on the plans.

207-17.6.2.1 Submittals.

1. You shall submit the following product data from the pipe supplier or fusion provider:

    a. Name of the pipe manufacturer and a list of the materials to be provided by manufacturer. This shall include:

        1) Pipe Size.

        2) Dimensionality.

        3) Pressure Class per applicable standard.

        4) Color.

        5) Recommended Minimum Bending Radius.

        6) Recommended Maximum Safe Pull Force.

    b. Written procedural documentation for piping products including proper handling and storage, installation, tapping, and testing.

    c. Couplings to be utilized in the installation.

207-17.6.3 Connections for Gravity Sanitary Sewer Applications.

1. The following connections shall be used in conjunction with tie-ins to existing gravity sewer piping as shown on the Plans.

207-17.6.3.1 PVC Gasketed Push-on Couplings.

1. Acceptable couplings for joining fusible PVC pipe to other sections of fusible PVC pipe or other sections of PVC pipe shall include gasketed PVC with push-on type couplings.

207-17.6.3.2 Sleeve-type Couplings.

1. Sleeve-type mechanical couplings shall be manufactured for use with PVC pipe, and may be restrained or unrestrained as indicated on the drawings and in these specifications.
2. Acceptable sleeve-type mechanical pipe couplings shall be from the Wastewater Approved Materials List or an approved equal.

207-17.6.3.3 Expansion and Flexible Couplings.

1. Expansion-type mechanical couplings shall be manufactured for use with PVC pipe and may be restrained or unrestrained as shown on the Plans or required in these specifications.
2. Acceptable expansion-type mechanical pipe couplings shall be from the Wastewater Approved Materials List or an approved equal.
3. Acceptable flexible couplings shall be from the Wastewater Approved Materials List or an approved equal.

207-17.6.3.4 Connection Hardware.

1. Bolts and nuts shall be made of non-corrosive, high-strength, low-alloy steel having the characteristics specified in ANSI/AWWA C111/A21 regardless of any other protective coating.

207-17.6.4 Pipe Markings.

1. Delivered pipe markings shall include, as a minimum, the following:
    a. Nominal size.
    b. PVC.
    c. Dimension Ratio, Standard Dimension Ratio or Schedule.
    d. Extrusion production-record code.
    e. Trademark or trade name.
    f. Cell Classification.
    g. ASTM D3034 or ASTM F679.

207-17.6.5 Handling and Storage.

1. The pipe shall be handled per manufacturer recommendations and stored at ambient temperature and protected from ultraviolet light degradation.

ADD:

207-17.7 Perforated PVC Pipe.

207-17.7.1 Materials of Underdrain Pipe.

1. Perforated plastic pipe shall be smooth-wall PVC plastic pipe or corrugated PVC plastic pipe with a smooth interior surface. All pipes shall comply with 207-17, "PVC GRAVITY PIPE".

207-17.7.2 Perforation Requirements.

Hole Size	3/8 inch (9 mm) min.
Center to Center Spacing	5 inches (125 mm) max.
Row of Holes	4 holes per each row and all on the lower half of the pipe. There shall be 2 holes on each side of the centerline of the pipe. 1 hole shall be at 45° from the centerline of the pipe and 1 hole shall be at 80° from the centerline of the pipe as indicated on the Drawings.

207-17.8 Underdrain Cleanout.

207-17.8.1 General.

1. All underdrain cleanout PVC Plastic Pipe shall conform to 207-17, "PVC GRAVITY PIPE".
2. Underdrain cleanouts shall have watertight, vandal-proof caps.

207-19 POLYETHYLENE (PE) SOLID WALL GRAVITY PIPE. ADD the following:

1. PE pipe used in pipe bursting and horizontal directional drilling applications shall conform to SDR 17, unless otherwise shown on the Plans.
2. Pipe segments shall be butt fused together.

207-19.2 Material Composition. ADD the following:

1. PE pipe used in pipe bursting and horizontal directional drilling applications shall have a PPI rating of PE3408, when compounded. The pipe shall have a minimum cell classification of 345464E. Inner wall shall be light in color.

207-19 POLYETHYLENE (PE) SOLID WALL GRAVITY PIPE. ADD the following:

1. PE pipe used in pipe bursting and horizontal directional drilling applications shall conform to SDR 17, unless otherwise shown on the Plans.
2. Pipe segments shall be butt fused together.

207-19.2 Material Composition. ADD the following:

2. PE pipe used in pipe bursting and horizontal directional drilling applications shall have a PPI rating of PE3408, when compounded. The pipe shall have a minimum cell classification of 345464E. Inner wall shall be light in color.

ADD:

207-26 POLYMER CONCRETE PIPE.

207-26.1 General.

1. This specification applies to microtunneling and jacking pipe for the construction of gravity sanitary sewers. See 307-1.8, "Jacking Polymer Concrete Pipe" and 308-7.1, "Microtunneling Polymer Concrete Pipe". Polymer concrete pipe shall be manufactured in accordance with the latest edition of ASTM D6783.
2. Pipe shall be designed to meet D-load requirements of external soil and hydrostatic loads. Design strength shall be tested in accordance with the three-edge bearing test method of ASTM D6783.
3. Pipe shall have a minimum unconfined compressive strength of 13,000 psi when measured in accordance with ASTM C579.
4. Packaging, handling, and shipping shall be performed in accordance with the Manufacturer's instructions.

207-26.2 Materials.

1. **Resin.** The manufacturer shall use only vinyl ester resin systems designed for the service intended. Pipe shall not contain Portland cement or other corrodible elements.
2. **Filler.** All aggregate, sand, and quartz powder shall meet the requirements of ASTM C 33, where applicable.
3. **Additives.** Resin additives, such as curing agents, pigments, dyes, fillers and thixotropic agents, when used, shall not be detrimental to the pipe.
4. **Elastomeric Gaskets.** Gaskets shall be Ethylene Propylene Diene Monomer (EPDM) or Styrene Butadiene Rubber (SBR) rubber and suitable for the service intended. All gaskets shall meet the requirement of ASTM F 477.
5. **Stainless Steel Sleeve Coupling.** Stainless steel joint sleeves/couplings shall meet the requirements of ASTM A276.

207-26.3 Manufacturing.

1. Pipe shall be manufactured by the vibratory vertical casting process resulting in a dense, non-porous, corrosion-resistant, homogeneous material.

207-26.4 Dimensions and Tolerances.

1. **Lengths.** Pipe shall be supplied in nominal lengths of 8 feet or 10 feet. Actual lay length shall be nominal ±1 inch. Special short lengths may be used where surface geography or installation conditions require shorter lengths.

2. **Wall Thickness.** The minimum wall thickness, measured at the narrowest point along the pipe, shall provide axial compressive strength to withstand anticipated loads with a minimum factor of safety against ultimate jacking load of 3:1.

3. **Straightness.** The pipe shall not deviate from straight by more than the values indicated in Table 207-26.4.3.

TABLE 207-26.4.3

Nominal Diameter, inches	Deviation from Straight, in/ft
39 and below	0.04
42 to 78	0.06
84 to 144	0.08

4. **Roundness.** The outside diameter shall not vary from a true circle by more than 1 percent.

5. **End Squareness.** Pipe ends shall be perpendicular to the pipe axis with the tolerances listed in Table 207-26.4.5.

TABLE 207-26.4.5

Nominal Diameter, inches	Perpendicular Tolerance, inches
39 and below	0.06
42 to 102	0.12
108 to 144	0.20

207-26.5 Joints.

1. The pipe shall be connected with a stainless steel sleeve/coupling utilizing an elastomeric sealing gasket as the sole means to maintain joint water-tightness.

2. The joint shall meet the performance requirements of ASTM D6783 at 35 psi when tested in accordance with ASTM D4161.

3. The joint shall have an outside diameter equal to or less than the outside diameter of the pipe.

4. When the pipe is assembled, the joints shall be flush with the outside diameter of the pipe. Joints at tie-ins may use couplings that extend beyond the outside diameter of the pipe.

5. The ends of the pipe shall be formed that, when the pipes are joints, they shall make a continuous and uniform line of pipe with a smooth and regular surface.

207-26.6 Fittings.

1. Elbows, reducers, tees, wyes, laterals and other fittings shall be of the same structural design as adjoining pipe.
2. Fittings shall be manufactured with mitered sections of pipe and joined by epoxy bonding or fiberglass overlay.

207-26.7 Causes for Rejection.

1. The pipe fails to meet any of the requirements specified in ASTM D6783
2. Any shattering or flaking of polymer concrete.
3. Air bubble voids (bugholes) on the interior and exterior surfaces of the pipe exceeding 1/4 inch (6 mm) in depth unless pointed with mortar or other approved material.
4. Unauthorized application of any wash coat of resin.
5. A piece broken from the end projections of the pipe which has circumferential length exceeding 60 degrees of the circle, or extends into the body of the pipe, or extends into the gasket contact surfaces of gasketed joint pipe for a circumferential length in excess of 6 inches (150 mm) measured at the midpoint of the gasket contact surface on the bell end, and at the inner shoulder of the gasket groove at the spigot end. If 2 or more pieces are broken from an end projection, the total length of such broken pieces on any end shall not exceed 90 degrees of the circle; and there shall be a distance of at least 9 inches (225 mm) of sound polymer concrete between breaks. The total length of broken pieces that extends into the gasket contact surfaces of gasketed joint pipe shall not exceed a circumferential length of 6 inches (150 mm).
6. If less than 9 inches (225 mm) of sound polymer concrete exists between two individual breaks, the 2 breaks shall be considered as one continuous break. Repair of such defects not exceeding above limits shall be made by Method III as described in 207-26.8.3, “Method III - Bonding Mortar Repairs with Epoxy Resin Adhesives”. Unsound portions of end projections shall be removed, and if pieces removed do not exceed the above limits, the pipe may be similarly repaired.
7. Defects that indicate imperfect molding of polymer concrete; or any surface defect indicating honeycomb or open-texture (rock pockets) greater in size than an area equal to a square with a side dimension of 2-1/2 times the wall thickness or deeper than 2 times the maximum graded aggregate size; or a local deficiency of cement resulting in loosely bonded concrete, the area of which exceeds in size the limits of area described in items 5 and 6 above when the defective polymer concrete is removed. Repair of such defects not exceeding these limits shall be made as provided in e) and f) above. Sand rings occurring at the ends of the pipe shall be repaired for the full circumference.
8. Delamination of polymer concrete.

9. Separation or “blisters.”

10. Slumped or sagged polymer concrete.

11. Any of the following cracks:

    a. A crack having a width of 0.01 inch (0.255 mm) or more throughout a continuous length of 12 inches (300 mm) or more.

    b. Any crack extending through the wall of the pipe and having a length in excess of the wall thickness.

    c. Any crack showing two visible lines of separation for a continuous length of 2 feet (0.6 m) or more, or an interrupted length of 3 feet (0.9 m) or more anywhere in evidence, both inside and outside, except where such cracks occur during the external loading test specified in ASTM D6783. When required by the Engineer, any crack which is 0.01 inch (0.255 mm) wide or wider and is not a cause for rejection shall be filled with vinyl ester resin.

207-26.8 Repair of Imperfections.

207-26.8.1 Method I - Repair by Hand-Placed Mortar.

1. **Preparation of Surfaces to be Repaired.** Unsound or imperfect polymer concrete shall be removed by chipping. Edges where polymer concrete has been chipped out shall be sharp and squared with the surface, leaving no feathered edges. The chipped area shall be washed with water to remove all loose material and concrete dust.

    a. Surfaces within the trimmed areas shall be kept wet for several hours, preferably overnight, before the repair replacement is made.

    b. All surfaces in areas to be repaired shall be damp, but not wet, when the material is applied.

2. **Placement of Mortar.** The mortar used for the repair shall contain the same proportions of resin and sand as the mix from which the pipe was made.

    a. This mortar shall be pre-shrunk by mixing it to a plastic consistency as far in advance of its use as possible. Trial mixes shall be made and aged to determine the longest period the mortar's use can be delayed while retaining sufficient plasticity to permit good workmanship.

    b. Immediately prior to the application of the mortar, the damp surface of the area to be repaired shall be scrubbed thoroughly with a small quantity of neat vinyl ester resin grout, using a wire brush. Remaining loose sand particles shall be swept away before application of the mortar.

c. In applying the mortar, it shall be compacted into the space to be filled, care being taken to eliminate air pockets and to secure bond at the edges. The surfaces shall be shaped and finished to correspond with the adjacent surface of the pipe.

3. **Curing.** The newly repaired surfaces shall be kept damp for 24 hours after the repair is completed. A membrane coating of an approved white-pigmented sealing compound shall then be applied.

207-26.8.2 Method II - Repair by Pneumatically Applied Mortar (PAM).

1. **Preparation of Surfaces to be Repaired.** Surfaces to which PAM is to be applied shall be prepared in the same manner as described in item 1, 207-26.8.1, "**Method I - Repair by Hand-Placed Mortar"** except that the edges of the area from which unsound or imperfect polymer concrete is removed shall be beveled so as not to entrap rebound.

2. **Placement of Mortar.** No rebound shall be included in the repair. The pipe shall be turned so that the area being repaired is at the side of the pipe in a near vertical position to permit rebound to fall clear.

   a. The mortar used for the repair shall contain the same properties of resin and sand as the mix from which the pipe was made.

   b. Before repairing grooved polymer concrete spigots, the snap ring shall be replaced and retained in position until the repair has attained sufficient strength to assure no damage to the gasket groove by its removal.

   c. Areas repaired with PAM shall be filled in excess of the dimension required and then carefully trimmed to correspond with adjacent surfaces.

3. **Curing.** Surfaces to which PAM has been applied shall be cured in the same manner as described in item 3, 207-26.8.1, "**Method I - Repair by Hand-Placed Mortar"**.

207-26.8.3 Method III - Bonding Mortar Repairs with Epoxy Resin Adhesives.

1. **Preparation of Surfaces to be Repaired.** Unsound or imperfect polymer concrete shall be removed by chipping.

   a. If hand placed mortar is to be used, the edges shall be left sharp and square with the surface.

   b. If PAM is to be used, the edges shall be beveled.

2. **Placement of Mortar.** The area to be repaired shall be kept dry. Loose material and concrete dust remaining after the chipping operation shall be removed by means of an air jet.

   a. Epoxy resins previously approved for such use by the Engineer shall be used in the manner prescribed by the Engineer.

b. The prepared area shall be primed with the epoxy resin compound, care being taken to ensure intimate contact with the base material.

Mortar shall be applied before the epoxy resin compound set in accordance with 207-26.8.1, “Method II - Repair by Pneumatically Applied Mortar (PAM)” and 207-26.8.2, “Method II - Repair by Pneumatically Applied Mortar (PAM)”.

SECTION 209 – PRESSURE PIPE

ADD:

1. Asbestos cement pipe shall not be acceptable.

209-1.1.2 **Materials.** ADD the following:

1. Fittings shall be mechanical joints. Bolt holes in the flanges of the mechanical joint fitting shall straddle the vertical centerline of the fitting.

2. Glands shall be made of ductile iron and shall be factory-stamped. The ductile iron used for the production of glands shall have a minimum elongation of 5%. Bolts shall be tee heads made of high-strength low-alloy steel or ductile iron in accordance with AWWA C111.

3. The pipe for threaded flange ductile-iron extension spools for above ground and vault shall be Class 53 minimum and cut to allow for ½ inch (12.5 mm) additional length for Flange x Flange and 0.25 inch (6 mm) additional length for Flange x Pipe End.

4. Machine tapered pipe thread (NPT) shall comply with ANSI B1.20.1 adapted to ductile-iron pipe outside diameters.

5. The threaded flange shall be dimensioned in accordance with USA Standard Taper Pipe and shall be attached to the machined pipe threads. The threaded flange shall be removed from the pipe and two-part epoxy thread sealant shall be applied to the pipe threads and the flange threads. Coal tar coating shall comply with AWWA C203 and epoxy coating shall comply with AWWA C213. The threaded flange shall be re-attached to the pipe threads and shall be machine tightened.

6. The threaded joint and spool assembly shall be hydrostatically tested 300 psi, stamped with the manufacturer's mark indicating length, weight, and customer, and stenciled with "Tested at 300 PSI".

7. Certification of Compliance with all specifications shall be furnished.

8. The outside surfaces of ductile iron pipe and fittings, including valves and appurtenances for buried service, shall be coated with one of the following:

    a. 24 mils minimum dry film thickness (MDFT) liquid epoxy coating in accordance with AWWA C210. Coal tar epoxies shall not be used.

b. 24 mils MDFT Fusion Bonded Epoxy coating in accordance with AWWA C213 and AWWA C116.

c. A cold applied three-part system, 80 mils petroleum Wax Tape coating in accordance with AWWA C217

d. 24 mils MDFT 100% solids Polyurethane coating in accordance with AWWA C222.

9. Prior to coating, the iron surfaces shall be blast cleaned in accordance with the applicable National Association of Pipe Fabricators (NAPF) standard 500-03, "Surface Preparation Standard for Ductile Iron Pipe and Fittings Receiving Special External Coatings and/or Special Internal Linings". The entire coated surface shall be inspected with a holiday detector in accordance with National Association of Corrosion Engineers (NACE International) standard SP0188-2006, "Discontinuity (Holiday) Testing of New Protective Coatings on Conductive Substrates".

10. For water facilities, fittings shall be lined with cement mortar and shall be seal-coated in accordance with AWWA C104/A21.4. Seal coat shall be NSF/ANSI 61 approved. The interior of bells shall be lined **as specified in the Special Provisions**. Cement lining shall be double thickness and shall use cement conforming to ASTM C150 Type II. For sewer facilities, internal epoxy linings may be required. The interior of bells shall be lined as specified.

11. Non-cement mortar linings and coatings shall be holiday free on all surfaces of the fittings, including bells.

12. For buried use, all bare iron and steel components associated with ductile iron fittings such as bolts, thrust rods, flanges, and restraining components shall be coated with a three-part wax tape coating system in accordance with AWWA C217 regardless of the coating system applied to the fitting.

13. When soils have been determined to be in excess of 10,000 ohms-cm through resistivity testing as specified in the City of San Diego Sewer and Water Design Guidelines and as approved by the Engineer, the external surfaces of ductile iron pipe and fittings for general use may be coated with bituminous coating 1 mil (25 um) thick in accordance with AWWA C151 or AWWA C110. Polyethylene encasement shall be provided in accordance with AWWA C105. In the absence of such testing, special coatings in accordance with item 8 of 209-1.1.2, "Materials" shall apply.

209-2.2.1 **Materials.** To Table 209-2.2.1, "Lining and Exterior Coating (Required on exposed steel surfaces and ring joints)", "Cement-Mortar Interior Lining and Exterior Coating", DELETE in its entirety and SUBSTITUTE with the following:

Cement-Mortar Interior Lining (AWWA C205)	**Pipe Size**	**Lining Thickness**
	4 inch - 10 inch (100 mm - 250 mm) pipe	¼ inch (6 mm)
	11 inch - 23 inch (275 mm - 575 mm) pipe	3/8 inch (9.5 mm)
	24 inch – 36 inch (600 mm - 900 mm) pipe	½ inch (12.5 mm)
	36 inch (900 mm) and Larger pipe	¾ inch (19.1 mm)
	Conform to AWWA C205 using Type II/V cement.	
	Trim lining as necessary to allow full operation of butterfly or check valves at connections to steel pipe.	
	Line exposed portions of pipe interior with hand-applied epoxy conforming to SECTION 212 - WATER AND SEWER SYSTEM VALVES AND APPURTENANCES.	
	1 inch (25.4 mm) minimum coating thickness unless otherwise specified or if soil is identified as corrosive.	
	Trim coating 6 inch to 12 inch (152.4 mm to 304.8 mm) above grade on spools penetrating to daylight or vault interiors.	

To Table 209-2.2.1, "Joints", "Flanged Joint",

DELETE in its entirety and SUBSTITUTE with the following:

Joints	Flanged Joint	Conform to AWWA C207. Flange joints identified on the plans to receive dielectric insulation kits shall have the flange bolt holes over-drilled per section 4.2.3 of AWWA C207. Faced and dimensioned in accordance with ASME/ANSI B16.5 for the pressure class shown on the Plans or **specified in the Special Provisions.**

ADD:

209-4.3 PVC Pressure Water Pipe 4 inch to 12 inch (100 mm to 305 mm).

1. Pipe shall conform to the requirements of AWWA C900. Milled over all (MOA) PVC pipe having asbestos cement pipe size 8 inch (203.2 mm) through 12 inch (304.8 mm) may be used only where a shorter than standard length is needed to make a connection to the existing water main.
2. Design and installation shall comply with AWWA Manual M-23, "PVC Pipe Design and Installation", with the following exceptions:
    a. Dimensions for PVC pipe shall comply with Table 2 of AWWA C900-07 for CI pipe equivalent OD.
    b. Pressure and SDR rating shall be class 235 and 18 respectively, unless a higher pressure class is specified on the Plans.
    c. Pipe ends shall be plain by elastomeric gasket bell or plain by plain. Couplings for plain pipes shall be furnished with 2 elastomeric gaskets. For pipe to pipe connections, solvent cement or mechanical joints shall not be accepted.
    d. Installation of mechanical joint shall conform to Appendix A of AWWA C111. Over stressing of bolts to compensate for poor installation shall be avoided. Bolts and nuts shall be coated with rust-preventive grease.
    e. Solvent cement joints or push-on joints shall not be accepted.

ADD:

209-4.4 PVC Pressure Water Pipe 16 inch to 36 inch (406 mm to 914 mm).

1. Pipe shall conform to the requirements of AWWA C905.
2. Design shall comply with accepted standards for PVC pipe and the following enhancements and exceptions:
    a. Pipes shall carry a safety factor of 2.5. Calculations and data from the pipe manufacturer showing that the pipe conforms to the design requirements of AWWA C900 shall be submitted to the Engineer for approval prior to ordering the pipes.
    b. Dimensions for PVC water pipe shall comply with Table 2 of AWWA C905 for CI pipe equivalent OD.
    c. Minimum acceptable Pressure Rating(s) (PR) and/or Dimension Ratio(s) (DR) for pressure water pipes shall be shown on the plans. Pipes shall have a minimum DR of 18.
    d. Fittings shall have mechanical joints in accordance with 209-4, "PVC Pressure Pipe" as revised herein. Solvent cement joints or push-on joints shall not be used.

ADD:

209-4.5 Chlorinated Polyvinyl Chloride (CPVC).

1. CPVC pipes in ½ inch to 2 inch (12.5 mm to 102 mm) diameters manufactured by Saudi Industries for Pipes Company Limited (SIP) between March 2007 and October 2007 shall not be used for potable water unless the piping material has been clearly certified by NSF International.

ADD:

209-4.6 Pipe (Sewer).

1. Pipes installed as sewer mains shall be Vitrified Clay Extra Strength (VCES) in accordance with 207-8, "VITRIFIED CLAY PIPE (VCP)" or PVC in accordance with 207-17, "PVC GRAVITY PIPE". PVC pipe shall be SDR-35 unless otherwise designated on the Plans.
2. Pipes and fittings for house connection sewer (laterals) shall be VCES, PVC, or Acrylonitrile-Butadiene-Styrene (ABS) solid wall pipe in accordance with 207-16, "ABS OR PVC COMPOSITE PIPE."

ADD:

209-4.7 Pipe (Water).

1. PVC pressure pipe shall be acceptable in accordance with 209-4.3, "PVC Pressure Water Pipe 4 inch to 12 inch (100 mm to 305 mm)" and 209-4.4, "PVC Pressure Water Pipe 16 inch to 36 inch (406 mm to 914 mm)".

209-7.2 Requirements. To Table 209-7.2 DELETE in its entirety and SUBSTITUTE with the following:

TABLE 209-7.2

Function	Type	Materials/Method
Pipe Contents Identification	Pipe Color (Plastic Pipe or Polywrap[1])	Blue for Potable Water. Purple for Recycled Water. Green for Sewage.
	AND	
	Stenciling	Stenciling marked on pipe in contrasting color to background color of pipe stating: "POTABLE WATER",

Function	Type	Materials/Method
		"CAUTION RECYCLED WATER - DO NOT DRINK" or "CAUTION SEWER" as appropriate.
		5/8" (16 mm) high letters.
		Repeated at 1 foot (300 mm) intervals.
	OR	
	Identification Tape	Polyethylene tape 6” (150 mm) wide and 4 mils (100 µm) minimum thickness with 2” (50 mm) high letters stating: "POTABLE WATER", "CAUTION RECYCLED WATER - DO NOT DRINK" or "CAUTION SEWER" as appropriate. For pipe > 12” (300 mm) diameter, use 12” (300 mm) wide tape.
		Color - Blue With white letters for potable water, Purple With white letters for recycled water, Green with white letters for sewage.
		Attached to top of pipe with adhesive tape.
Pipe Warning and Locating	Warning and Locating Tape	Polyethylene tape 6” (150 mm) Wide and 4 mils (100 µm) minimum thickness with 2"(50 mm) high letters stating: "CAUTION: WATERLINE BURIED BELOW", "CAUTION RECLAIMED WATERLINE BURIED BELOW - DO NOT DRINK", or "CAUTION: SEWER BURIED BELOW" as appropriate. For pipe > 12” (300 mm) diameter, use 12” (300 mm) wide tape.
		Color - blue with black or white letters for potable water, Purple With black or white letters for recycled water,

Function	Type	Materials/Method
		Green with black or white letters for sewage.
		Place in pipe trench 18" (450 mm) above pipe.
		Tape shall contain metallic strip that can be registered by magnetic field locating device.
	OR	
	Locating Wire	In lieu of installing metallic warning tape; non-metallic warning tape 18" (450 mm) above pipe and 10-gauge copper wire attached to top of pipe and accessibly terminated may be used.

[1]Polywrap shall not be used as pipe color identification for plastic pipe.

ADD:

209-8 FUSIBLE PRESSURE POLYVINYL CHLORIDE (PVC) PIPE.

209-8.1 General.

1. This subsection specifies fusible PVC pipe for water mains when used for horizontal directional drilling and where shown on the Plans.

209-8.2 Material.

1. Fusible PVC plastic material for pipe shall conform to AWWA C900, AWWA C905, ASTM D2241, or ASTM 1785 for standard dimensions, as applicable. Fusible PVC pipe shall be tested at the extrusion facility for properties required to meet all applicable parameters.
2. Fusible PVC pipe shall be extruded with plain ends. The ends shall be square to the pipe and free of any bevel or chamfer. There shall be no bell or gasket of any kind incorporated into the pipe.
3. Pipe shall be homogeneous throughout and shall be free of visible cracks, holes, foreign material, blisters, or other deleterious faults.
4. Fusible PVC pipe shall be manufactured in a standard 40 foot (12.2 m) nominal length or custom lengths as specified and DR 18 minimum unless otherwise shown on the plans.

209-8.2.1 Fusible PVC Pressure Pipe for Potable Water.

1. Fusible PVC pipe shall be blue in color for potable water use and shall be marked as follows:
   a. Nominal pipe size.

b. PVC.

c. Dimension Ratio, Standard Dimension Ratio, or Schedule.

d. AWWA pressure class or standard pressure rating for non-AWWA pipe, as applicable.

e. AWWA standard designation number or pipe type for non-AWWA pipe, as applicable.

f. NSF-61 mark verifying suitability for potable water service.

g. Extrusion production-record code.

h. Trademark or trade name.

i. Cell Classification 12454 and/or PVC material code 1120 may also be included.

209-8.2.2 Fusible Polyvinyl Chloride Pressure Pipe for Non-Potable Water.

1. Fusible PVC pipe shall be purple in color for reclaim, reuse, or other non-potable water distribution or conveyance and shall be marked as follows:

   a. Nominal pipe size.

   b. PVC.

   c. Dimension Ratio, Standard Dimension Ratio, or Schedule.

   d. AWWA pressure class or standard pressure rating for non-AWWA pipe, as applicable.

   e. AWWA standard designation number or pipe type for non-AWWA pipe, as applicable.

   f. Extrusion production-record code.

   g. Trademark or trade name.

   h. Cell Classification 12454 and/or PVC material code 1120 may also be included.

   i. For reclaim water service, the wording: “Reclaimed Water, NOT for Potable Use”.

209-8.3 Quality Assurance.

1. This section contains references to the following documents in Table 209-8.3 below. They shall be a part of this section as specified and modified herein.

2. Unless otherwise specified, references to documents shall mean the documents in effect at the time of design, bid, or construction, whichever is earliest. If referenced documents have been discontinued by the issuing organization, references to those documents shall mean the replacement documents issued or otherwise identified by that organization or, if there are

no replacement documents, the last version of the document before it was discontinued.

3. Where document dates are given in the following listing, references to those documents shall mean the specific document version associated with that date, regardless of whether the document has been superseded by a version with a later date, discontinued or replaced.

TABLE 209-8.3

REFERENCE	TITLE
ANSI/AWWA C110/A21.10	American National Standard for Ductile-Iron and Gray-Iron Fittings, 3-inch through 48-inch, for Water and Other Liquids
ANSI/AWWA C153/A21.53	AWWA Standard for Ductile-Iron Compact Fittings for Water Service
ANSI/AWWA C111/A21.11	American National Standard for Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
AWWA C605	Standard for Underground Installation of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings for Water
AWWA C651	Standard for Disinfecting Water Main
AWWA C900	Standard for Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 in. through 12 in. (100mm Through 300mm), for Water Distribution
AWWA C905	Standard for Polyvinyl Chloride (PVC Pressure Pipe and Fabricated Fittings, 14 in. through 48 in. (350mm Through 1200mm), for Water Distribution and Transmission
AWWA M23	AWWA Manual of Supply Practices PVC Pipe—Design and Installation, Second Edition
ASTM D1784	Rigid Polyvinyl Chloride (PVC) Compounds and Chlorinated Polyvinyl Chloride (CPVC) Compounds
ASTM D1785	Polyvinyl Chloride (PVC) Plastic Pipe, Schedules 40, 80, and 120

REFERENCE	TITLE
ASTM D2152	Test Method for Degree of Fusion of Extruded (Polyvinyl Chloride) (PVC) Pipe and Molded Fittings by Acetone Immersion
ASTM D2241	Polyvinyl Chloride (PVC) Plastic Pipe (SDR-PR)
ASTM D2665	Polyvinyl Chloride (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings
ASTM D3034	Standard Specification for Type PSM Polyvinyl Chloride (PVC) Sewer Pipe and Fittings
ASTM F477	Elastomeric Seals (Gaskets) for Joining Plastic Pipe
ASTM F1057	Standard Practice for Estimating the Quality of Extruded Polyvinyl Chloride (PVC) Pipe by the Heat Reversion Technique
UNI-PUB-08	Tapping Guide for PVC Pressure Pipe
NSF-14	Plastics Piping System Components and Related Materials
NSF-61	Drinking Water System Components--Health Effects
PPI TR-2	PVC Range Composition Listing of Qualified Ingredients

209-8.4 Submittals.

209-8.4.1 Pre-construction Submittals.

1. Name of the pipe manufacturer and a list of the materials to be provided by manufacturer. This shall include:
   a. Pipe Size.
   b. Dimensionality.
   c. Pressure Class per applicable standard.

d. Color.

e. Recommended Minimum Bending Radius.

f. Recommended Maximum Safe Pull Force.

g. Fusion technician qualification indicating conformance with this specification.

2. Written procedural documentation for piping products including proper handling and storage, installation, tapping, and testing.

3. Couplings to be utilized in the installation.

209-8.4.2 Post-construction Submittals.

1. The following AS-RECORDED DATA shall be required from you and/or the fusion provider to the Engineer or pipe supplier upon request:

a. Pipe Size and Thickness.

b. Machine Size.

c. Fusion Technician Identification.

d. Job Identification.

e. Fusion Joint Number.

f. Fusion, Heating, and Drag Pressure Settings.

g. Heat Plate Temperature.

h. Time Stamp.

i. Heating and Cool Down Time of Fusion.

j. Ambient Temperature.

209-8.5 Warranty.

1. The pipe shall be warranted for 1 year per the pipe supplier's standard terms.

2. In addition to the standard pipe warranty, the fusion services shall be warranted for 1 year per the fusion service provider's standard terms.

209-8.6 Connections and Fittings for Pressure Applications.

1. The connections in the following subsections shall be used in conjunction with tie-ins to existing potable water piping as shown on the Plans.

209-8.6.1 Ductile Iron Mechanical and Flange Fittings.

1. Acceptable fittings for use with fusible PVC pipe shall include standard ductile iron fittings conforming to AWWA/ANSI C110/A21.10, or AWWA/ANSI C153/A21.53 and AWWA/ANSI C111/A21.11.

a. Connections to fusible PVC pipe may be made using a restrained or non-restrained retainer gland product for PVC pipe as well as for mechanical joints or flanged fittings.

b. Bends, tees, and other ductile iron fittings shall be restrained with the use of thrust blocking or other means as indicated on the Plans.

c. Ductile iron fittings and glands shall be installed per the manufacturer's guidelines.

d. If required, linings for ductile iron fittings shall be the following:

1) Liquid Epoxy in accordance with AWWA C210.

2) Polyurethane in accordance with AWWA C222.

3) Fusion-Bonded Epoxy in accordance with AWWA C116.

e. If required, coatings for ductile iron fittings shall meet the following requirements for buried and/or immersion service duty:

1) Liquid Epoxy in accordance with AWWA C210.

2) Polyurethane in accordance with AWWA C222.

3) Fusion-Bonded Epoxy in accordance with AWWA C116.

4) Wax tape coating in accordance with AWWA C217.

209-8.6.2 PVC Gasketed Push-On Couplings.

1. Acceptable fittings for use with fusible PVC pipe shall include standard PVC pressure fittings conforming to AWWA C900 or AWWA C905.

a. Acceptable fittings for use joining fusible PVC pipe to bends, tees, other PVC fittings or sections of fusible PVC pipe shall include gasketed PVC push-on type couplings and fittings as shown in the Drawings.

b. Bends, tees, and other PVC fittings shall be restrained with the use of thrust blocking or other restraint products as indicated on the Plans.

c. PVC gasketed push-on fittings and mechanical restraints, if used, shall be installed per the manufacturer's guidelines.

209-8.6.3 Fusible PVC Sweeps or Bends.

1. Fusible PVC sweeps or bends shall conform to the same sizing convention, diameter, dimensional tolerances, and pressure class of the pipe being joined using the sweep or bend.

2. Fusible PVC sweeps or bends shall be manufactured from the same fusible PVC pipe being used for the installation and shall have at least 2 feet (0.6 m) of

straight section on either end of the sweep or bend to allow for fusion of the sweep to the pipe installation. There shall be no gasketed connections utilized with a fusible PVC sweep.

3. Standard fusible PVC sweep or bend angles shall not be greater than 22.5° and shall be used in nominal diameters ranging from 4 inch (101.6 mm) through 16 inch (406.4 mm).

209-8.6.4 Sleeve-Type Coupling.

1. Sleeve-type mechanical couplings shall be manufactured for use with PVC pressure pipe and shall be restrained or unrestrained as indicated on the Plans or as required in the Special Provisions.

2. Sleeve-type couplings shall be rated at the same or greater pressure carrying capacity as the pipe itself.

3. Acceptable sleeve-type mechanical pipe couplings shall be any of those listed on the Water Approved Materials List or approved equal.

209-8.6.5 Expansion and Flexible Coupling.

1. Expansion-type mechanical couplings shall be manufactured for use with PVC pipe and shall be restrained or unrestrained as indicated on the Plans or as required in the Special Provisions.

2. Expansion-type mechanical couplings shall be rated at the same or greater pressure carrying capacity as the pipe itself.

209-8.6.6 Connection Hardware.

1. Bolts and nuts for buried services shall be made of non-corrosive, high-strength, and low-alloy steel having the characteristics specified in ANSI/AWWA C111/A21.11 regardless of any other protective coating.

209-8.7 Handling and Storage.

1. The pipe shall be handled, stored, and stacked per the manufacturer's and supplier's recommendations, stored at ambient temperatures, and shall be protected from ultraviolet light degradation.

2. Any length of pipe showing a crack or which has received a blow that may have caused an incident fracture, even though no such fracture can be seen, shall be marked as rejected and removed at once from the Work. Damaged areas or possible areas of damage may be removed by cutting out and removing the suspected incident fracture area. Limits of the acceptable length of pipe shall be determined by Engineer.

3. Any scratch or gouge greater than 10% of the wall thickness shall be considered significant and shall be rejected unless determined otherwise by Engineer.

4. Pipe shall be handled and supported with the use of woven fiber pipe slings or approved equal. Care shall be exercised when handling the pipe to not cut, gouge, scratch, or otherwise abrade the piping in any way.

5. If pipe is to be stored for periods of 1 year or longer, the pipe shall be shaded or otherwise shielded from direct sunlight. Covering of the pipe that results in temperature build up shall be strictly prohibited. Pipe shall be covered with an opaque material while permitting adequate air circulation above and around the pipe as required to prevent excess heat accumulation.

209-8.7.1 Delivery and Off-Loading.

1. All pipes shall be bundled or packaged in such a manner as to provide adequate protection of the ends during transportation to the Site. Any pipe damaged in shipment shall be replaced as directed by Engineer.

2. Inspect each pipe shipment prior to unloading to see if the load has shifted or otherwise been damaged. Notify the Engineer immediately if more than immaterial damage is found. Check for quantity and proper pipe size, color, and type.

3. Pipe shall be loaded, off-loaded, and otherwise handled in accordance with AWWA M23 and all of the pipe supplier's guidelines.

4. Off-loading devices such as chains, wire ropes, chokers, or other pipe handling implements that may scratch, nick, cut, or gouge the pipe are strictly prohibited.

5. During removal and handling, be sure that the pipe does not strike anything. Significant impact could cause damage, particularly during cold weather.

6. If appropriate unloading of equipment is not available, pipe may be unloaded by removing individual pieces. Care should be taken to ensure that the pipe is not dropped or damaged. Pipe should be carefully lowered and not dropped from trucks.

ADD:

209-9 PRIVATE SEWER PUMPS

209-9.1 GENERAL.

1. When noted on the plans you shall furnish and install complete private sewer pumping systems including factory-built and tested grinder pump station(s). Each system shall be packaged into a single complete unit consisting of dual grinder pump(s) suitably mounted in a basin constructed of high density polyethylene (HDPE) and with a quick disconnect assembly (NEMA 6P), anti-siphon valve, check valve, ball valve, and wet well within the basin, an electrical

alarm and disconnect panel mounted on a wall or stainless steel pole and supplied with 240V electricity, 1.25 inch (31.8 mm) force main and all necessary internal wiring and controls at the locations shown on the approved Working Drawings. Private pumping systems shall be installed in compliance with the applicable state and local codes and manufacturer's recommendations.

209-9.1.1 Manufacturer.

1. The private sewer pump shall be as manufactured by E/ONE Sewer Systems or an approved equal product for use in low pressure sewage systems. You shall submit evidence of an established service program, complete parts and services manuals, and continuous inventory of grinder pump replacement parts from the manufacturer. You shall provide a reference and contact list from 3 of the manufacturer's grinder pump installations completed within the last 2 years. The private sewer pump manufacturer shall have local service personnel to replace or repair the private sewer pump during the warranty period **as specified in the Special Provisions**.
2. The warranty for the private sewer pump shall be extended to 3 years and shall be paid for in accordance with 306-17.2, "Payment".

209-9.1.2 Pump Model.

1. The private sewer pump model shall be a standard height model that is field adjustable, such as DH152-93, manufactured by E/ONE Sewer Systems or an approved equal **unless specified otherwise in the Special Provisions or shown on the Plans.** The private sewer pump model shall be sized to the expected discharge flow of the facility measured in gallons per minute and to the system's discharge invert elevation. The pump model shall also have a generator adaptor and load transfer switch to use generator power during power outages.

209-9.1.3 User Manual and Instructions.

1. Following installation, you shall review with the property owner the pump system and provide a detailed user manual to the property owner.

SECTION 210– PAINT AND PROTECTIVE COATINGS

ADD:

210-1.1.1 Anti-graffiti Coating.

1. Anti-graffiti coating shall be as manufactured by Monopole, Inc. or approved equal.

2. Materials shall be applied as specified:

First Coat	Aquaseal ME12 (Item 5200)
Second Coat	Permashield Base (Item 6100)
Third Coat	Permashield Premium (Item 5600 for matte finish or Item 5650 for gloss finish)
Fourth Coat	Permashield Premium (Item 5600 for matte finish or Item 5650 for gloss finish)

SECTION 211– MATERIAL TESTS

211-1.1 **Laboratory Maximum Density.** REVISE "ASTM D1557" to "ASTM D1557 or California Test Method No. 216".

211-1.2 **Field Density.** ADD the following:

1. California Test Methods 216 (Sand Cone) or 231 (Nuclear Gauge) may also be used.

SECTION 212– WATER AND SEWER SYSTEM VALVES AND APPURTENANCES

212-5 **VALVES.** ADD the following:

1. Valves shall have internal and external fusion bonded epoxy coating in accordance with AWWA C116 and C213 and shall be certified “Holiday Free” by the manufacturer.

2. Gate valves shall conform to the provisions of AWWA Specification C 500 as modified herein, except that valves 3 inches (75 mm) and under shall be all bronze and shall conforming to ASTM B62.

3. Valves shall have bottom or side wedging double discs, parallel seats, all bronze internal working parts, either "O" rings or stuffing box stem seals, and 2 inch (50 mm) square operating nut, and shall open by turning the stem counter-clockwise. Ends shall be as specified, designed for use with the connecting pipe. Components made from brass or bronze shall be of a grade containing not more than 16% zinc and not more than 2% aluminum in accordance with 5.5 of the AWWA Standard C 500 for waters with specific conductance exceeding 350 micro Mho per am.

4. Valves 16 inches (406.4 mm) and larger shall be designed for horizontal mounting with 3 inches (76.2 mm) by-passes and totally enclosed gear case. Integral or extended gear cases shall be acceptable.

5. External bolts and nuts for valve fittings shall be hexagonal head machine bolts and hexagonal nuts conforming to ASTM 307 Grade B or SAE Grade 2. Bolt threads shall be lubricated with graphite and oil prior to installation.

6. By-pass connections for all gate valves over 12 inches (304.8 mm) shall be cast into the valve and shall not obstruct the water way to the by-pass. Bronze by-pass valves shall be wheel operated.

7. Only gates, resilient-seated gates, and butterfly valves shall be allowed. Valves used with PVC pipe shall have mechanical joint ends.

8. 16 inch (406.4 mm) gate valves shall have a 3 inch (76.2 mm) bypass when the maximum operating pressure is 80 psi or greater. Larger gate valves shall have bypasses in accordance with AWWA C-5000.

9. The identification and painting of valve well caps shall be in accordance with SDW-152, “Gate Well Identification”.

10. Valve key extensions shall be installed for butterfly valves and gate valves when top of gate valve nut is 6 feet (1.8 m) or more below ground or pavement surface. Types of joints for fittings will be called out on the Plans in the following order: back, ahead, left, right.

212-5.2 Butterfly Valves. ADD the following:

1. Butterfly valves and operators shall conform to the provisions of AWWA C504, "Standard for Rubber-Seated Butterfly Valves", as modified and supplemented herein.
2. Butterfly valves and operators shall be Class 150B and shall be totally enclosed for direct burial in the ground without a vault. Butterfly valves and operators shall be designed for installation in a nearly horizontal pipeline with the disc shaft horizontal and the operating shaft vertical.
3. Butterfly valves shall be either short body or long body with ends as specified.
4. The operator shall be manual with a 2 inch (50.8 mm) square operating nut and shall open the valve when turned counter-clockwise.
5. The operator, and any other parts requiring lubrication, shall be fully lubricated at the factory and shall require no additional lubrication for the life of the valve.
6. The butterflty valve disc may be of cast iron, alloy cast iron, stainless steel, monel, bronze, or ductile iron. The metal seating surfaces which meet the rubber seat shall be of stainless steel or bronze.
7. Bolts and nuts for butterfly valve end flanges shall be hexagonal head bolts and hexagonal nuts conforming to ASTM 307 Grade B or SAE Grade 2. Bolt threads shall be lubricated with graphite or oil prior to installation.
8. Prior to the installation of working parts, all internal steel or cast iron surfaces of butterfly valves, except finish or bearing surfaces, shall be coated with approved epoxy in accordance with AWWA C550, "Protective Interim Coatings for Valve and Hydrants". The epoxy surface shall be tested with an approved holiday detector.

212-5.2.1 General. DELETE in its entirety and SUBSTITUTE with the following:

212-5.2.1 Class 250B Butterfly Valves.

1. This subsection applies to 16 inch (406.4 mm) through 54 inch (1371.6 mm) Class 250B butterfly valves.
2. Butterfly valves shall conform to the requirements of AWWA C504 for Class 250B service in terms of performance criteria. Class 250B butterfly valves shall have flanged ends, be manually operated, tight closing, and shall have rubber seats.
3. Butterfly valves shall be bubble-tight at the rated pressure with flow in either direction and shall be satisfactory for applications involving throttling service and/or frequent operation after long periods of inactivity. Butterfly valves and valve operators shall be suitable for buried services.

4. Butterfly valves and operators shall comply with these specifications, other accepted standards for butterfly valves, and the following enhancements and exceptions:

   a. Butterfly valve bodies shall be short and constructed of cast iron conforming to ASTM A126 Class B. Flanges shall be flat-faced and flange drilling shall be in accordance with ANSI B16.1 Class 125 or Class 250, as required for the design pressure. On butterfly valves 30 inches (762 mm) and larger the valve port diameter shall not reduce more than a 1.5 inches (38.1 mm) of nominal diameter. Flow direction shall be indicated on the butterfly valve body. The use of stops or lugs cast integrally with or mechanically secured to the body for limiting disc travel shall not be acceptable.

   b. Butterfly valve discs shall have no external ribs transverse to the flow of water through the valve. The disc shall not have any hollow chambers that can entrap water. The disc shall be made from cast iron ASTM A126 Class B or ductile iron ASTM A536. The disc shall be furnished with a nickel-chrome or stainless steel type 316 seating edge to mate with the rubber seat.

   c. The butterfly valve seat shall be attached to the valve body. Retaining rings, clamps, screws, and bolts attaching the rubber seat to the valve body shall be fabricated from stainless steel type 316. For butterfly valves 24 inches (609.6 mm) and larger, valve seats shall be field adjustable around the 360° circumference and replaceable without dismantling the operator, disc, or shaft and without removing the valve from the pipeline.

   d. The butterfly valve manufacturer shall certify the rubber seat is field replaceable as specified above. Spool-type rubber liners covering the entire surface of the valve body and extending over any portion of the flange faces shall not be acceptable. Butterfly valves using snap rings to retain the rubber seat shall not be acceptable.

   e. Rubber for butterfly valve seats shall conform to the applicable provisions of AWWA C504.

   f. Butterfly valve shafts shall be stainless steel ASTM A564 Type 630 Condition H-1100.

   g. The butterfly valve/disc connection shall be made through the use of on-center taper pins. The taper pins shall be of the same material as the valve shaft.

   h. Shaft Seals shall be standard split V packing and be provided where the shaft projects through the butterfly valve body. Shaft seals shall be of design allowing replacement without removing the valve shaft.

i. Butterfly valve bearings shall be sleeve type that is corrosion resistant and self-lubricating. Thrust bearings shall be provided in accordance with the governing standard. Thrust bearings which are exposed to water and consist of a metal bearing surface in rubbing contact with an opposing metal bearing surface shall not be acceptable.

j. Butterfly valve operators shall be fully grease packed and have stops in the open/closed position. The operator shall have a mechanical stop, which will withstand an input torque of 450 foot lbs (610.1 Newton-meter), against the stop. The traveling nut shall engage alignment grooves in the housing. The operator shall have a built in packing leak bypass to eliminate possible leakage into the operator housing. The operator shall be designed to hold the valve in any intermediate position between fully open and fully closed without creeping or fluttering. The operator shall be sized to provide adequate torque to operate the butterfly valve on which it is mounted at the full pressure rating of the valve. Operators shall meet minimum requirements for AWWA C504.

k. Butterfly valve operators shall be mounted on the valve at the valve manufacturer's facility. The valve manufacturer shall ensure proper operator sizing and satisfactorily testing the operator and valve assembly prior to shipment to the Site.

l. Butterfly valves shall be hydrostatic and leak tested. The leak test shall be performed in both directions at a differential pressure of 250 psi (1.7 Megapascal) with the disc in a closed position. In a slightly open position, internal hydrostatic pressure equal to 500 psi (3.4 Megapascal) shall be applied to the inside of the valve body for 5 minutes. Proof of a design cycle test in accordance with AWWA C 504 Section 5.2.4.3 shall be submitted before installation.

212-5.3.1 General. ADD the following:

1. Class 250 valves 16 inches (406.4 mm) or larger shall be plug valves. This grouping includes cone valves, ball valves, and eccentric plug valves.

212-6.1.1 General. ADD the following:

1. Fire hydrants furnished in accordance with these specifications shall conform to the provisions of AWWA C503 for "Wet Barrel Fire Hydrants", and to the modifications and supplements herein.

2. Valve seats and stem guides may be threaded into or cast into the hydrant body or may be secured to the body by means of a lock nut.

3. Unless otherwise specified, fire hydrants for residential areas shall have one 4 inch (101.6 mm) port and one 2.5 inch (63.5 mm) port and fire hydrants for

commercial and industrial areas shall have two 4 inch (101.6 mm) ports and one 2.5 inch (63.5 mm) port.

4. Hydrant valves shall open counter-clockwise.

5. Threads for pumper and hose nozzles shall conform to the American National Standard adopted by the American Insurance Association (formerly the National Board of Fire Underwriters) and the National Fire Protection Association published in pamphlet No. 194, Fire Hose Couplings, by N.F.P.A. in 1968.

6. Outer end of all hose coupling threads shall be terminated by the blunt start of "Higbee Cut" on full thread (to avoid crossing thread).

7. Hydrant body base flange shall be drilled in a 9.5 inch (237.5 mm) bolt circle with 6 bolt holes, 7/8 inch (22.2 mm) in diameter oriented to the center of the pumper connection.

8. Hydrant bodies shall be solid bronze. The cap materials shall be cast iron or bronze.

9. Valve stems shall have a pentagon end and shall have a short radius of 33/64 inch (13mm) to center of flat sides.

10. Hydrant components made from brass or bronze shall be of a grade containing not more than 16% zinc and not more than 2% aluminum in accordance with Section 2.6.4 of the AWWA Standard C 503 for waters with specific conductance exceeding 350 micro Mho per am.

11. Exterior surfaces shall be painted with a zinc chromate primer of the same color as the finished coat. The finished coat shall be of chrome yellow enamel meeting the requirement of Federal Specification TT-C-595, Color No. 13538.

212-10.1 Copper Tubing. ADD the following:

1. Copper tube shall be Seamless Copper Water Tube, Type K soft. It shall be of the size specified on the Plans or in the Special Provisions.

ADD:

212-10.1.1 Insulation.

1. Copper services which are attached to metallic water mains shall be insulated as follows: The corporation stop and the copper tube and fittings within a minimum distance of 3 feet (0.9 m) of the main shall be wrapped tightly with an approved PVC pipe coating tape combined with the application of a liquid adhesive primer or finish coating recommended for the purpose by the manufacturer of the tape.

2. The tape and adhesive or coating shall be applied in the manner and sequence recommended by the manufacturer. Prior to the application of insulation, the tubing, fittings, corporation stop and the surface of the main within 4 feet (1.2 m) of the stop shall be thoroughly cleaned of all dirt and grease, and dried.

Copper tube shall be wrapped with tape 2 inches (50.8 mm) or less in width lapped not less than 3/8 inch (9.5 mm).

3. The tape shall not be less than 0.25 mm (10 mils) in thickness and shall have the following characteristics:

Tensile Strength	3,500 psi to 4,200 psi (24.1 to 29 megapascal)
Tear Resistance	High
Elongation at Break	300% to 350%
Moisture Absorption	0.03%
Dielectric Strength	750 volts/mil - 1,000 volts/mil
Insulation Resistance	200,000

ADD:

212-10.3.1 Corporation Stops, Curb Stops, and Other Bronze Water Service Fittings.

1. Bronze water service fittings including stops shall be cast of high grade bronze conforming to the requirements of ASTM B62. The Engineer shall have the right to take 1 or more from each lot of stops and/or fittings and have it analyzed. Fittings shall be of makes and models from the Water Approved Materials List or approved equal.

212-10.6.1 General. ADD the following:

1. Concrete water meter boxes shall be in accordance with the Water Approved Materials List or approved equal.

ADD:

212-10.6.3 Polymer Concrete Water Meter Boxes.

1. Boxes and covers shall be in accordance with the Water Approved Materials List or approved equal.

2. Boxes and covers to be installed in traffic areas shall have a reinforced polymer concrete frame and cover designed for AASHTO H-20 traffic loading. Boxes and covers to be installed in non-traffic areas shall have reinforced polymer concrete reader lids designed for A-10 traffic loading in accordance with ASTM-C857. Traffic areas are defined as any location in which vehicular traffic is evident or highly likely under normal conditions. Non-traffic areas are locations with no vehicular traffic.

3. Covers shall have a logo reading “CITY SD” as well as the manufacturer’s name or logo cast in the polymer concrete surface. A cover and lid selected at random shall be tested.

212-12.2 **Color Scheme.** To Sentence (1), DELETE in its entirety and SUBSTITUTE with the following:

The color of valves and appurtenances, excluding polyethylene encasements, shall be in accordance with Table 212-12.2.

SECTION 213 – ENGINEERING GEOSYNTHETICS

213-1 GENERAL. ADD the following:

1. Paving fabric material shall have a proven record that it can be recycled and milled. Submit written documentation from you and/or the recycling facilities within the jurisdiction of Work.

213-4 PAVING FABRIC. DELETE in its entirety and SUBSTITUTE with the following:

1. This subsection applies to paving fabric material intended for curb-to-curb repaving of bituminous or concrete pavements with hot mix asphaltic concrete.

2. The paving fabric material shall be a fiberglass or a fiberglass and polyester, single layer, non-woven paving fabric material, shall meet the requirements of ASTM D7239 Classification Type I, and shall conform to Table 213-4.1.

TABLE 213-4.1

Property	Test Method	Requirements	Units
Breaking Strength	ASTM D 5035	200	N/50 mm
Ultimate Elongation	ASTM D 5035	≤ 5	%
Mass per Unit Area	ASTM D 5261	125	g/m^2
Melting Point	ASTM D 276	205	°C

213-5 GEOTEXTILES AND GEOGRIDS. REVISE "Table 213-5.2 (A)", "Table 213-5.2 (B)", "Table 213-5.2 (C)", "Table 213-5.2 (D)", and "Table 213-5.2 (E)" as follows:

ORIGINAL TABLE NUMBER	REVISED TABLE NUMBER
Table 213-5.2 (A)	Table 213-5 (A)
Table 213-5.2 (B)	Table 213-5 (B)
Table 213-5.2 (C)	Table 213-5 (C)
Table 213-5.2 (D)	Table 213-5 (D)
Table 213-5.2 (E)	Table 213-5 (E)

To Table 213-5 (A): NONWOVEN, DELETE in its entirety and SUBSTITUTE with the following:

TABLE 213-5 (A): NONWOVEN

Property	Test Reference	Type[1,2]			
		90 N	**180 N**	**250 N**	**90 N–Modified "Media Barrier"**
Grab Strength[2] lbs (N), Min.	ASTM D4632	90 (400)	180 (800)	250 (1110)	90 (400)
Elongation, Minimum (at peak load) %, Max.	ASTM D4632	50	50	50	50
Puncture Strength, lbs (N), Min.	ASTM D3787	45 (200)	80 (355)	115 (510)	65 (290)
Permitivity, Sec.[1], Min.	ASTM D4491	0.7	0.7	0.7	2.5
Burst Strength psi (kPa), Min.	ASTM D3786	180 (1240)	320 (2205)	360 (2485)	225 (1550)
Toughness, lbs (N), Min.	% Elongation x Grab Strength	5,500 (24,500)	10,000 (44,500)	14,000 (62,500)	5500 (24500)
Ultraviolet Resistance % Strength Retained @ 500 Weatherometer Hours	ASTM D4355	70	70	70	70
Apparent Opening Size, US Sieve # (mm)	ASTM D4751	-	-	-	70 (0.210)
Flow Rate, Gal/min/ft^2 (L/min/m^2)	ASTM D4491	-	-	-	175 (7130)
Trapezoid Tear, lbs (N)	ASTM D4533	-	-	-	45 (200)

1. N - Nonwoven.
2. For application and placement, refer to 300-8 or 300-10.
3. Minimum roll average in the weakest principal direction.

SECTION 217 – BEDDING AND BACKFILL MATERIALS

217-2.1 **General.** ADD the following:

1. The Resident Engineer will indicate anticipated areas where native material may be unsuitable for use as trench backfill and may have you install Imported Trench Backfill as directed.

217-2.2 **Imported Trench Backfill.** To paragraph (2), DELETE in its entirety and SUBSTITUTE with following:

You shall identify the source of the proposed material to the Resident Engineer no less than 10 Working Days prior its intended use. The proposed Imported Trench Backfill material shall be clearly described with descriptive soil properties, plant or location, street address, and community of origin. The ticket shall include the date, time and volume of backfill and a copy shall be provided to the Resident Engineer while onsite.

ADD:

SECTION 220 – DETECTABLE WARNING TILES (DWT)

220-1 GENERAL.

1. This section includes specifications for DWT embedded in an inline dome pattern on all curb ramps and walking surfaces at locations and to the dimensions shown on the Plans, in accordance with 220-2 MATERIALS, 220-3 MANUFACTURERS, and the following references:

   a. Americans with Disabilities Act, Section 705, "Detectable Warnings".

   b. California Code of Regulations (CCR) Title 24, Part 2, Section 11B-247.1 and 11B-705.1 "Detectable Warnings" and Sections 11B-247.1.2 and 11B-705.1.2.2 "Curb Ramps."

220-2 MATERIALS.

1. Materials for DWT specified herein shall be per the City's Approved Materials List (AML).

   a. The tiles shall have the manufacturer's logo stamped permanently on the product with identifying information such as model number and type.

   b. The Stainless Steel Cast in Place DWT shall be of 16 gauge Type 304L with an integral micro-texture non-slip surface stamped into the stainless steel plate on the top of the domes and in the field surface between the domes. It shall have an ultraviolet stabilized coating.

   c. Vitrified Polymer Composite (VPC) Cast in Place DWT shall be an epoxy polymer composition with an ultraviolet stabilized coating employing aluminum oxide particles in the truncated domes. VPC Product shall be provided with a 5-year manufacturer written warranty for materials and installation.

   d. For other materials and a complete listing of material physical property requirements refer to the City's AML.

220-3 MANUFACTURERS.

1. Materials from the manufacturers listed in the City's AML do not require a submittal. In lieu of the submittal, you shall be required to certify in writing that the material incorporated in the Work complies with the Contract Documents.

2. Refer to the City's AML for DWT for any substitutions.

END OF PART 2 - CONSTRUCTION MATERIALS

PART 3
CONSTRUCTION METHODS

SECTION 300 – EARTHWORK

300-1 CLEARING AND GRUBBING

300-1.1 **General.** ADD the following:

1. Clearing and grubbing activities shall comply with the CEQA document, and/or resource agency permits, if applicable, in accordance with SECTION 802 - NATIVE HABITAT PROTECTION, INSTALLATION, MAINTENANCE, AND MONITORING.

2. Tree trimming permits shall be obtained from the City.

3. To avoid any direct impacts to raptors and/or any native or migratory birds, clearing, grubbing, or removal of habitat that supports active nests in the proposed area of disturbance should occur outside of the breeding season for these species (February 1 to September 15).

4. If removal of habitat in the proposed area of disturbance must occur during the breeding season, a Qualified Biologist or City representative shall conduct a pre-construction survey to determine the presence or absence of nesting birds on the proposed area of disturbance. The pre-construction (precon) survey shall be conducted within 10 Working Days prior to the start of construction activities (including removal of vegetation). The applicant shall submit the results of the precon survey to City DSD for review and approval prior to initiating any construction activities. If nesting birds are detected, a letter report or mitigation plan in conformance with the City's Biology Guidelines and applicable State and Federal Law (appropriate follow up surveys, monitoring schedules, construction and noise barriers/buffers, and etc.) shall be prepared and include proposed measures to be implemented to ensure that take of birds or eggs or disturbance of breeding activities is avoided.

5. The report or mitigation plan shall be submitted to the City DSD for review and approval and implemented to the satisfaction of the City. The City's MMC Section or RE, and Biologist shall verify and approve that all measures identified in the report or mitigation plan are in place prior to and/or during construction. If nesting birds are not detected during the precon survey, no further mitigation is required.

6. It is unlawful to injure or destroy any trees known as the "Pinus Torreyana" growing upon Pueblo Lots Nos. 1332, 1337, and 1338 or any other public lots or lands, belonging to and within the corporate limits of the City of San Diego.

7. After the removal of parkway trees, remaining tree roots shall be removed to a depth of 4 inches (101.6 mm) below the new 4 inch (101.6 mm) thick walk in

all areas between the curb and the property line. New, non-expansive soil shall be used for backfill and compaction as needed to establish proper grade and compaction. The new walk and parkway area shall meet existing grade and provide a positive slope away from the property.

8. Where parkway trees have been left in place, the roots may be partially cut to allow you to remove the damaged concrete and the underlying roots.

9. Concrete shall not be removed around parkway trees to be removed unless approved by the Engineer.

300-1.4 **Payment.** DELETE in its entirety and SUBSTITUTE with the following:

1. The lump sum or unit acre Bid item for "Clearing and Grubbing" shall include full compensation for the removal and disposal of all the resulting materials.

2. If a Bid item for "Clearing and Grubbing" is not provided in the Bid, the payment shall be included in the associated items of Work which require clearing and grubbing.

300-2 UNCLASSIFIED EXCAVATION

300-2.5 **Slopes.** To paragraph (2), DELETE in its entirety and SUBSTITUTE with the following:
The tops of excavation slopes and the ends of excavations shall be rounded where shown on the Plans.

300-2.7 **Selected Material.** DELETE in its entirety and SUBSTITUTE with the following:

1. Selected material encountered in excavation within the right-of-way shall be used as shown on the Plans, in the Specifications, or as directed by the Engineer. Topsoil excavated to a depth **specified in the Special Provisions** or as directed by the Engineer within the limits of the project may be considered as selected material only for the purpose of backfilling areas to be planted.

300-3 STRUCTURE EXCAVATION AND BACKFILL

ADD
300-3.5.1 **Requirements.**

1. Waterproofing and drainage shall be inspected and approved prior to backfill.

2. Backfill for bridge abutments and box culverts shall have a relative compaction of not less than 95%. The thickness of each layer of backfill shall not exceed 0.67 feet (204.2 mm) before compaction except when compaction is done by pounding and jetting.

300-4 UNCLASSIFIED FILL

300-4.4 **Benching.** To sentence (3), DELETE in its entirety and SUBSTITUTE with the following:
A minimum 6 feet (1.8 m) horizontal bench shall be constructed to ensure that the new Work is constructed on a firm foundation free of loose or disturbed material.

300-5 BORROW EXCAVATION.

300-5.2 **Imported Borrow.** DELETE in its entirety and SUBSTITUTE with the following:

1. Imported borrow shall consist of material required for construction of fills, and **unless otherwise specified in the Special Provisions**. You shall make arrangements for obtaining imported borrow and shall pay all costs involved.
2. Notify the Engineer sufficiently in advance of opening any borrow site so that adequate time will be allowed for testing the material and establishing cross section elevations and measurements of the ground surface.

300-6 EARTHWORK FOR DEBRIS DAMS AND BASINS.

300-6.3 **Stripping.** To sentence (3), DELETE in its entirety and SUBSTITUTE with the following:
Soil loosened below the stripping depth specified shall be compacted to not less than 90% relative compaction.

300-8 GEOTEXTILES FOR DRAINAGE

300-8.1 **Trench Drains.** ADD the following:

1. Geotextile fabric for use with rock slope protection shall be either woven or non-woven and conform to 213-5, "Geotextiles and Geogrids". In addition, fabric weight shall be not less than 6 oz/yd^2 (0.2 kg/ m^2) in accordance with ASTM Designation D1910.

300-9 GEOTEXTILES FOR EROSION CONTROL.

300-9.1 **Bank and Shore Protection.** ADD the following:

1. Geotextile fabric for use with rock slope protection shall be either woven or non-woven and conform to 213-5, "Geotextiles and Geogrids". In addition, fabric weight shall be not less than 6 oz/yd^2 (0.2 kg/ m^2) in accordance with ASTM Designation D1910.

SECTION 301 - SUBGRADE PREPARATION, TREATED MATERIALS, AND PLACEMENT OF BASE MATERIALS

301-1 SUBGRADE PREPARATION.

301-1.2 Preparation of Subgrade. ADD the following:

1. Subgrade soil shall be tested for expansive potential in accordance with ASTM Test Method D4829. If expansive soil is encountered within the roadway improvements and extends beyond the limit of paved sidewalks, curb and gutter, or edge of pavement, then expansive soil subgrade shall be removed and replaced with a non-expansive material having an expansion index of less than 20 (ASTM D4829). The "R" value shall be determined on the imported soil for pavement design and shall be approved by the Engineer. The depth of subgrade removal shall be based on the Expansive Index of the native soil in accordance with the following table:

Expansive Index of Native Subgrade Soil	Minimum Depth of Subgrade to be Removed and Replaced (in inches)
0 - 50	None
51 - 90	18 (450 mm)
91 - 130	24 (600 mm)
Above 130	36 (900 mm)

2. Removal shall extend beyond edge of sidewalk a horizontal distance equivalent to the minimum depth of removal.

3. You may submit an optional plan for soil treatment to the Engineer for review and approval.

4. Pavement design shall be based on the resulting combination of "R" values within the top 36 inches (914.4 mm) of soil.

5. Disintegrated Granite (DG) shall be used as backfill material in the parkway at commercial locations or high pedestrian traffic access, as directed by the Engineer at 5% grade or lower.

6. The existing native subgrade material under all permeable pavement installations shall be minimally compacted and not subject to excessive construction equipment traffic prior to stone reservoir placement. Compaction shall be acceptable if an impermeable liner is used over the subgrade.

301-1.3 Relative Compaction. DELETE in its entirety and SUBSTITUTE with the following:

1. When pavement, base, subbase, or cross gutter is to be placed directly on subgrade material, the top 12 inches (304.8 mm) of subgrade material in streets and the top 6 inches (152.4 mm) of subgrade material in alleys shall be compacted to a minimum density of 95% relative compaction. When curb, gutter, driveways, or sidewalks are to be placed on the subgrade material, the top 6 inches (152.4 mm) of such subgrade material shall be compacted to a relative compaction of 90%.

2. When permeable pavements are to be placed on the subgrade material, the top 12 inches (304.8 mm) of such subgrade material shall be compacted to a relative compaction of 95% in road travel lanes and 90% in all other applications (curb, gutter, alley, driveway, sidewalk, parking lane, and parking lot) unless otherwise specified.

3. After compaction and trimming, the subgrade shall be firm, hard, and unyielding.

4. The subgrade shall be tested with a load truck possessing a 10 ton capacity load or greater. The tire contact area shall have a load capacity of 75 pounds or more per square inch (≥ 75 psi) (≥ 517 kPa). The subgrade shall support this load without perceptible indentation or movement. The base, surfacing, or pavement shall not be scheduled for construction until the subgrade has been tested as described above and approved by the Engineer.

301-1.6 **NOT USED**. DELETE in its entirety and SUBSTITUTE with the following

301-1.6 **Preparatory Repair Work.**

1. Prior to the placement of any asphalt concrete or application of slurry, you shall complete all necessary preparation and repair Work and shall obtain approval by the Engineer.

2. No preparatory asphalt Work shall be done when the atmospheric temperature is below 50° F (10° C) or during unsuitable weather.

3. Preparatory Work shall include tree trimming, weed spray, weed abatement, crack sealing, asphalt repair, cold milling, hump removal, lump removal, subgrade preparation and subgrade or base repair, removal of raised pavement markers, removal of pavement markings, location of public and private utilities and appurtenances, all Concrete works, and all other necessary works as specified in the Special Provisions and Contract Documents or as directed by the Engineer.

4. After the completion of the preparatory work, you shall install compacted asphalt concrete pavement according to the thickness specified in the Special Provisions and Contract Documents or a minimum of 2 inches (50.8 mm) for residential streets and a minimum of 3 inches (76.2 mm) for all other streets or as directed by the Engineer.

5. You shall identify the location of all utilities vaults, valves, and other appurtenances not included in the project scope requiring relocation or adjustment to grade by other agencies/companies by marking the face of the curb closest to the utility appurtenance as follows:

   a. Offset distance of the appurtenance from the curb face

   b. The limits of the appurtenance or corners of the vault/box

6. The quantities shown in the Contract Documents are based on a street assessment survey and may vary. The Engineer will designate the limits to be

removed and prepared and these designated areas shall be considered to take precedence over the areas shown in the Contract Documents.

7. You shall repair areas of distressed asphalt concrete pavement by milling or removing damaged areas of pavement to a minimum depth of 2 inches (50.8 mm) for residential streets and a minimum depth of 3 inches (76.2 mm) for all others except where specified otherwise in the Special Provisions and Contract Documents or as directed by the Engineer to expose firm and unyielding pavement as specified.

8. If, in order to achieve the minimum specified depth, the base material or native subgrade is exposed, you shall notify the Engineer. The existing base material as well as additional base material shall be compacted to 95% relative compaction.

9. Compaction tests shall be made to ensure compliance with the specifications.

10. The QCP shall establish location and timing of compaction testing and shall be subject to approval by the Engineer. You shall reimburse the City for the cost of retesting failing compaction tests conducted as part of the City of San Diego Quality Assurance testing.

11. If additional base material is required, you shall use Crushed Miscellaneous Base in accordance with 200-2.4, "Crushed Miscellaneous Base (Scheduled, 5 Inch)" and "Crushed Miscellaneous Base (Unscheduled, 5 Inch)" or as directed by the Engineer.

12. Prior to placement of compacted asphalt concrete pavement, you shall prepare the subgrade as needed and install a minimum of 5 inches or as specified in the contract documents and Special Provisions, of compacted asphalt concrete pavement over native material as directed by the Engineer.

13. Areas of damaged asphalt requiring base repair work including excavation, placement of asphalt concrete, asphalt concrete base, and Crushed Miscellaneous Base, have been identified in the Contract Documents as "DO", Dig Out, also called Base Repairs.

14. When applicable, the areas and quantities shown in the Contract Documents are given only for the Contractor's aid in planning the Work and preparing Bids. You shall identify any new areas that require repair prior to paving in order to construct a smooth and stable pavement surface. Upon approval by the engineer, the repair locations shall be incorporated into scope of work and shall not be considered extra work. You shall mark the pavement area as "DO" or as directed by the Engineer.

15. Prior to replacing asphalt, the area shall be cleaned by removing all loose and damaged material, moisture, dirt, and other foreign matter and shall be tack coated in accordance with 302-5.2.3, "Tack Coat".

16. When milling and/or grinding asphalt pavement for base repair and the contractor encounters level and unyielding PCC trench caps or appurtenance collars before reaching the minimum depth of 2 inches, then You shall place

enough asphalt concrete pavement to bring the surface to be level with the adjacent roadway.

17. Asphalt Concrete Base shall be Type III-B3-PG 64-10 and Asphalt Concrete Pavement shall be Type III-C2-PG 64-10 in compliance with 203-6, "ASPHALT CONCRETE and as directed by the Engineer.

18. You shall install new asphalt within the repair area or for patches in accordance with 302-5, "ASPHALT CONCRETE PAVEMENT". Asphalt concrete shall be Type III-C2-PG 64-10 in compliance with 203-6.3.1 "General".

19. Recycled base material shall conform to Class 2 aggregate base material in accordance with 200-2.9, "Class 2 Aggregate Base (Scheduled, 5 Inch)" and "Class 2 Aggregate Base (Unscheduled, 5 Inch)".

20. Following the asphalt placement, you shall roll the entire area of new asphalt in both directions at least twice. The finished patch shall be level and smooth in compliance with 302-5.12, "Smoothness". After placement and compaction of the asphalt patch, you shall seal all finished edges with a 4 inch (101.6 mm) wide continuous band of SS-1H.

21. Materials removed, regardless of removal method, shall be disposed of at a legal site.

22. The minimum dimensions for each individual repair shall be 4 feet by 4 feet (1.2 m by 1.2 m) and shall be subject to the following conditions:

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

    b. Base repairs shall have a minimum depth of 10".

    c. You shall repair the areas shown in the Contract Documents of distressed asphalt concrete to remove damaged areas of pavement in accordance with 404-1, to expose firm and unyielding pavement, base, or native soils, regardless of materials encountered. Unyielding pavement will have no visible cracks and unyielding base, or native soils will be properly compacted, as determined by the Engineer. If cracks are visible, then pavement is not unyielding and shall require additional depth be removed as directed by the Engineer. The Contractor shall prepare subgrade as needed and install a maximum of 5" compacted asphalt concrete pavement over the compacted base material to be level with the adjacent roadway surface.

    d. When additional base material is required, then you shall use Class 2 aggregate base in accordance with 200-2.4, "Crushed Miscellaneous Base (Scheduled)" and Crushed Miscellaneous Base (Unscheduled,)" or as directed by the Engineer.

    e. Recycled base material shall conform to Crushed Miscellaneous Base material in accordance with 200-2.4, "Crushed Miscellaneous Base (Scheduled)" and ""Crushed Miscellaneous Base (Unscheduled)".

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

g. For both scheduled and unscheduled base repairs, failed areas may be removed by milling or by excavation provided that the edges are cut cleanly with a saw. The areas shall be cleaned, and tack coated in accordance with 302-5.2.3, "Tack Coat" before replacing the asphalt pavement. Please refer to Contract Documents.

h. Base repair areas where failed pavement is removed either by cold milling or by excavation shall be restored to existing pavement grade with "Crushed Miscellaneous Base (Scheduled, 5 Inch)" and "Crushed Miscellaneous Base (Unscheduled, 5 Inch)" at 5 inches, and 5 inches of "Asphalt Concrete Base" shall be placed atop the layer of "Crushed Miscellaneous Base (Scheduled, 5 Inch)" and "Crushed Miscellaneous Base (Unscheduled, 5 Inch)" unless otherwise directed by the Engineer. These areas have been identified in the Contract Documents as "DO". The Crushed Miscellaneous Base shall be in accordance with 200-2.4, "Crushed Miscellaneous Base (Scheduled, 5 Inch)" and "Crushed Miscellaneous Base (Unscheduled, 5 Inch)". The Asphalt Concrete Base shall be Type III-B3-PG 64-10 as specified in 203-6, "ASPHALT CONCRETE". "General" Preliminary quantities are identified in the Contract Documents but may need to be increased and approved by the Engineer at the time of construction. Base Repairs shall not exceed 25% RAP in content.

i. Base repair with asphalt concrete base areas where failed pavement is removed either by cold milling or by excavation shall be restored to existing pavement grade with Asphalt Concrete Base at 8 inch (203.2mm) and a minimum of 2 or 3 inches of asphalt concrete shall be placed atop the layer of Asphalt Concrete Base unless otherwise directed by the Engineer. The asphalt concrete base shall be Type III-B3-PG 64-10 as specified in 203-6, "ASPHALT CONCRETE". The asphalt concrete shall be Type III-C2-PG 64-10 as specified in 203-6.1, "General". Base Repairs shall not exceed 25% RAP in content. Base Repairs with Asphalt Concrete Base shall not be performed except where directed by the Engineer.

j. A Base repair identified prior to initiation of the preparatory work shall be considered scheduled.

k. A Base repair is considered unscheduled when it is not identified in the Contract Documents as "DO" prior to initiation of preparatory work or when you are directed by the Engineer to perform an unscheduled base repair for the proper placement of an asphalt overlay.

l. At the end of each day the Contractor shall submit to the Engineer an itemized list of the asphalt pavement and base repair work completed.

The list shall include but not be limited to the location of the work, the exact square footage of the repair, cubic yards of excavation, tons of asphalt concrete base placed, and tons of Crushed Miscellaneous Base and Class 2 Aggregate Base material placed or as directed by the Engineer.

301-1.6.1 Asphalt Patching.

1. Miscellaneous asphalt patching shall consist of patching potholes and skin patching other low spots in the pavement that are deeper than ¼" per 302-5.12, "Smoothness." These areas are generally smaller and more isolated than those areas in need of mill and pave.
2. The areas requiring patching have not been identified in the Contract Documents, nor in the field. The Contractor and/or Engineer shall identify areas that may require patching prior to slurry work to ensure the smoothness and quality of the finished product.
3. You shall identify and repair any areas that may require patching prior to the placement of slurry seal for a smooth and finished product.
4. Asphalt overlay shall not be applied over deteriorating pavement. Preparatory asphalt Work shall be completed and approved by the Engineer before proceeding with asphalt overlay.
5. You shall remove distressed asphalt pavement either by saw cutting or milling to expose firm and unyielding pavement, prepare subgrade (as needed), and install compacted asphalt concrete pavement over prepared subgrade per 301-1, "Subgrade Preparation."
6. Prior to replacing asphalt, the area shall be cleaned and tack coated in accordance with 302-5.2.3, "Tack Coat" both steps shall be performed the same day as the paving occurs
7. Following the asphalt placement, you shall roll the entire patch in both directions and shall cover the patch at least twice.
8. After placement and compaction of the asphalt patch, you shall seal all finished edges with a 4 inch (101.6 mm) wide continuous band of SS-1H.
9. Base repairs shall not exceed 15% RAP in content.

301-1.7 Payment. DELETE in its entirety and SUBSTITUTE with the following:

1. The demolition, removal, and disposal of various types of existing hardscape in parkway areas, such as colored concrete, bricks, flagstone in the parkway or right-of-way, shall be included under the lump sum Bid items or for the Contract Unit Prices for which hardscape removal is required. When required, hardscape in parkways shall be replaced with Class A Top Soil or as directed by the Engineer.

2. The payment for the preparatory works shall be included in the lump sum Bid Items and Contract Unit Prices for which preparation works are performed, unless it is specified as a separate Bid Item.

3. The areas and quantities shown in the Contract Documents are given only for the Contractor's aid in planning the Work and preparing Bids. The Engineer will designate the limits to be removed and prepared and these designated areas shall be considered to take precedence over the areas shown in the Contract Documents. The quantities shown in the Contract Documents are based on a street assessment survey and may vary. No payment shall be made for areas of over excavation as determined by the Engineer.

4. Asphalt pavement subgrade repair, and base repair dig-outs, shall be paid at the Contract unit price for **"Excavate and Export (Scheduled)"** and **"Excavate and Export (Unscheduled)", "Asphalt Concrete Base (Scheduled)"** and **"Asphalt Concrete Base (Unscheduled)"**, **"Crushed Miscellaneous Base (Scheduled)"** and **"Crushed Miscellaneous Base (Unscheduled)".**.Payment shall include milling, grinding, excavating, hauling, disposal, or saw cutting of existing pavement and all other necessary work related to asphalt pavement subgrade repair and base repair dig-outs. No Payment shall be made for areas of over excavation as determined by the Engineer.

5. When Cold Milling is used as a method for excavation for subgrade or base repair for pavement, Cold Milling shall be included in the Contract Unit Price for **"Excavate and Export (Scheduled)"** or **"Excavate and Export (Unscheduled)"**.

6. The payment for Excavation shall be paid at the Contract Unit Price for **"Excavate and Export (Scheduled)"** or **"Excavate and Export (Unscheduled)"** for each bank cubic yard of material removed. Proof of proper disposal and/or recycling at a legal site for quantities excavated shall be required in advance of payment as directed by the Engineer and shall be subject to approval by the Engineer for payment. No additional payment shall be made for milling, grinding, saw cutting, hauling, disposal of concrete, pavement fabric, rubberized material, steel reinforcement, or any other material.

7. No additional payment shall be made for milling, grinding, saw cutting, stockpiling, hauling, disposal of concrete, pavement fabric, rubberized material, steel reinforcement, or any other material.

8. Payment for Class 2 aggregate base material installed shall be made at the Contract Unit Price for **"Class 2 Aggregate Base (Scheduled)"** and **"Class 2 Aggregate Base (Unscheduled)** per ton and includes all necessary works such as hauling, placement, and compaction as directed by the Engineer.

301-2 UNTREATED BASE.

301-2.4 Measurement and Payment., ADD the following:

1. Payment shall be included in 301-1.7 payment items

301-3 PORTLAND CEMENT TREATED MATERIALS

301-3.2.5.2 Central Plant Mixing. ADD the following:

1. The cement feeder shall be equipped with a device by which the rate of cement feed can be determined while the plant is in full operation.

301-3.2.5.4 Off-Road Mixing DELETE in its entirety and SUBSTITUTE with the following:

1. **If specified in the Special Provisions** or approved by the Engineer, mixing may be performed off the roadway. Off-road mixing shall conform to 301-3.2.6, "Placement and Spreading of Central Mixing Plant and Off-Road Produced Mixtures".

301-3.2.7 Compaction and Finishing. To paragraph (4), DELETE in its entirety and SUBSTITUTE with the following:

Vibratory rollers shall not be used for finish rolling of cement treated base.

301-3.3.6 Mixing. ADD the following:

1. The cement feeder shall be equipped with a device by which the rate of cement feed can be determined while the plant is in full operation.

301-3.3.12.2 Finishing. ADD the following:

1. Asphalt concrete paving on Cement-Treated Base shall be permitted in accordance with the table below:

Compaction	Day of CTB Placement	After 5 - 7 Days	After 7 Days
90% - 95%	Paving Not Permitted	Paving Not Permitted	Paving Permitted
95% or Greater	Upon Approval of the Engineer	Paving Permitted	Paving Permitted

301-3.3.14 Payment. To paragraph (3), sentence (1), DELETE in its entirety and SUBSTITUTE with the following:
Cement-treated base shall be paid for by the ton, complete in place as shown on the Plans, or as directed by the Engineer and shall be paid for under the Bid item for "**Cement Treated Base**".

SECTION 302·ROADWAY SURFACING

302-1 **NOT USED.** DELETE in its entirety and SUBSTITUTE with the following:

302-1 **Scheduling, Public Convenience and Traffic Control.**

1. In addition to the requirements of SECTION 601 - TEMPORARY TRAFFIC CONTROL FOR CONSTRUCTION AND MAINTENANCE WORK ZONES, you shall comply with the following:

   a. At least 5 Working Days prior to commencing the Work, you shall submit your proposed Schedule to the Engineer for approval.

   b. Based upon the approved schedule, you shall notify residents and businesses of the Work and post temporary “No Parking" signs 72 hours in advance.

   c. Requests for changes in the approved Schedule shall be submitted to the Engineer for approval at least 3 Working Days before the street is scheduled to be sealed.

   d. Rock dust or sand shall be spread, as directed by the Engineer, to eliminate tracking or damage and to provide vehicular or pedestrian crossings. Rock dust or sand used for this purpose shall conform to 200-1.2 and 200-1.5, respectively.

302-2 CHIP SEAL

302-2.2.1 **Emulsified Asphalt.** ADD the following:

1. Emulsified asphalt for scrub seal applications shall be a polymer modified rejuvenating emulsion (PMRE) conforming to 203-3.4.7.

302-2.2.3 **Screenings.**, ADD the following:

1. The size of screenings used shall be medium fine 5/16” x No. 8 and conform to the requirements shown in Table 200-1.2.2,2 unless otherwise specified.

2. The contractor shall ensure that the selected bituminous material is compatible with the aggregate to be used. This may require conducting electrostatic testing of aggregate source before chip design to ensure that the binder selected is compatible with the potential sources of aggregate.

302-2.2.4 **Sand.** ADD the following:

1. Sand shall not be applied for Scrub Seals or Cape Seals.

302-2.3.6 **Sweepers.** ADD the following:

1. Brooms shall not be steel-tined brooms on emulsion chip seals. Sweepers shall be capable of removing loose screenings adjacent to barriers that prevent aggregate from being swept off the roadway, including curbs, gutters, dikes, berms, and railings.

302-2.4 **Roadway Surface Preparation.** ADD the following:

1. Remove any extraneous material affecting adhesion of the chip seal with the existing surface and drying.

ADD:

302-2.4.1 **Testing.** Testing shall conform to the requirements of 203-3.4.5.

302-2.5 **Temporary Traffic Control.** To sentence (1), DELETE in its entirety and SUBSTITUTE with the following:

Scheduling, public convenience, and temporary traffic control shall conform to **302-1 "Scheduling, Public Convenience and Traffic Control"** and requirements of subsections a through h below.

To subsections "d", "e", and "f", REVISE as follows:

OLD TITLE	REVISED TITLE
C6	W8-7
W6	G20-5aP with R2-1

302-2.6.1 **General.** , ADD the following:

1. Schedule the operations so that chip seals are placed on both lanes of the travel way each work shift. At the end of the work shift, the end of the chip seals on both lanes must generally match.

302-2.6.2 **Polymer Modified Emulsified Asphalt.** ADD the following:

1. The initial application rate for each road shall be 0.30 gal/sq yd and any adjustments to this rate shall be determined by the Contractor.
2. Do not apply polymer modified asphaltic emulsions when weather forecasts predict the ambient air temperature will fall below 39 degrees F within 24 hours after application.
3. Emulsion shall not be applied a greater distance than can be immediately covered by screenings, and, in no case, shall the distributor truck advance more than 200' ahead of the screening spreader.

302-2.6.4.1 **General.** ADD the following:

1. Do not allow vehicles to drive on asphaltic emulsion or asphalt binder before spreading aggregate. Operate the spreader at speeds slow enough to prevent aggregate from rolling over after dropping.
2. If the spreader is not moving, aggregate must not drop. If you stop spreading and aggregate drops, remove the excess aggregate before resuming activities.

302-2.6.4.2 Spreading on Polymer Modified Emulsified Asphalt. ADD the following:

1. You may stockpile aggregate for the polymer modified emulsified asphalt chip seals if you prevent contamination. Aggregate must have a damp surface at spreading. If water visibly separates from the aggregate, do not spread. You may re-dampen aggregate in the delivery vehicle. Operating the chip spreader at speeds which cause the chips to roll over after striking the bituminous covered surface will not be permitted.
2. Spread aggregate before the polymer modified emulsified asphalt sets or breaks.
3. Do not spread aggregate more than 500 feet ahead of the completed initial rolling.

302-2.7.1 General. ADD the following:

d. Remove covers from the facilities

302-2.8.1 General. To paragraph 1, DELETE in its entirety and SUBSTITUTE with the following:

Flush coat shall consist of the application of an emulsified asphalt fog seal to the surface of the chip seal. Flush coat application shall begin immediately after initial sweeping and removal of excess screenings and prior to opening the lane to uncontrolled (not controlled with pilot cars) traffic.

302-2.8.3 Sand Cover. DELETE in its entirety.

302-2.11 Payment. DELETE in its entirety and SUBSTITUTE with the following:

1. The payment for chip seals will be made at the Contract Unit Price for "PME Chip Seal" per square foot for each combination of size of screenings and grade of emulsified asphalt or modified paving asphalt used in the Work. The basis of the payment shall be as specified in the Bid.
2. Unless otherwise specified, the Contract Unit Price shall include:
   a. public notification,
   b. surface preparation,
   c. materials,
   d. application and spreading,
   e. finishing,
   f. sweeping,
   g. disposal, and
   h. maintenance of the completed chip seal

302-3 MICROSURFACING.

302-3.7 Aggregate Stockpile. ADD the following:

1. Aggregate may be stockpiled on public property sites if approved by the Engineer.
2. You shall make all arrangements for and shall assume full responsibility of the rental, preparation, and maintenance of private property at your discretion and shall obtain the appropriate permits for its usage.
3. You shall clean public and/or private property in a manner satisfactory to the City and the property owner. Precautions shall be taken to ensure that stockpiles do not become contaminated with oversized rock, clay, silt, or excessive amounts of moisture. Segregation of the aggregate shall not be permitted. Aggregate samples shall be taken from field stockpile locations prior to any addition of mineral fillers such as cement or lime to determine the sand equivalent value in accordance with 203-5.4.2, "Materials". The addition of mineral fillers such as cement, lime, or sulphates may be added during the application of the slurry mixture to the City streets.
4. You shall provide suitable storage facilities for the asphalt emulsion. Suitable heat shall be provided as necessary.
5. Immediately prior to slurry sealing operations, all utilities covers and monuments shall be covered by heavy plastic material or other means approved by the Engineer. Covers and voids around frames shall be cleaned of slurry material by the end of the same Workday. If the utility covers are not cleaned by the following Day, no additional slurry seal shall be placed until the covers are cleaned.
6. Prior to the application of slurry to any road segment, you shall complete all necessary preparatory repair Work in accordance with 301-1.6, "PREPARATORY REPAIR WORK".
7. No preparatory asphalt Work shall be done when the atmospheric temperature is below 50° F (10° C) or during inclement weather (rain or heavy fog).
8. Decorative and tile walkway crossings shall be protected from slurry seal operations.
9. Care shall be exercised to ensure the maximum rate of application with no excess emulsion and leaving no unsightly appearance. You shall be responsible for the removal of all excess emulsion spread beyond street limits, on driveways, on sidewalks, and etc.
10. No less than 5 Working Days or more than 30 Working Days following the placement of slurry seal, the street shall be re-swept to remove the gravel rebound from vehicular traffic.

302-3.8 **Scheduling, Public Convenience and Traffic Control.** To sentence (1), DELETE in its entirety and SUBSTITUTE with the following:

Scheduling, public convenience, and temporary traffic control shall conform to **302-1 "Scheduling, Public Convenience and Traffic Control"** and requirements of subsections a and b below.

302-4 SLURRY SEAL SURFACING.

302-4.1 **General.** ADD the following:

2. Due to construction conflicts or community needs that may arise, the City reserves the right to add, /delete, or substitute similar road segments to those listed in the Contract Documents. The City reserves the right to select exact locations to be substituted. If substantial changes to the Contract Bid quantities occur, this may allow individual Bid prices to be renegotiated in accordance with 2-7, "CHANGES INITIATED BY THE AGENCY".

302-4.2 **Mix Design.** ADD the following:

1. The completed slurry shall have a minimum skid resistance of 40 when tested per the State of California Department of Transportation California Test 342.
2. If the source of any aggregate or emulsified asphalt is changed, or the mix design or supporting laboratory reports are over one year old, a new mix design shall be submitted to the Engineer in accordance with 3-8.4, "Supporting Information".

302-4.3.1 **General.** ADD the following:

1. All metering devices shall be calibrated and certified within the past 12 months. Calibration certificates shall be submitted to the Engineer for approval prior to commencing work.

ADD:

302-4.3.2.5 **Latex.**

1. The addition and exact percentage of latex to be added shall be **as specified in the Special Provisions** or shown on the Plans. Latex for cationic emulsified asphalt shall conform to 203-5.6.2, "Materials" except contain 65±5 percent rubber solids.

302-4.7 **Aggregate Stockpile.** ADD the following

1. Aggregate Stockpile shall conform to 302-3.7 requirements.

302-4.8 **Scheduling, Public Convenience and Traffic Control.** DELETE in its entirety and SUBSTITUTE the following:

Scheduling, public convenience, and temporary traffic control shall conform to **302-1 "Scheduling, Public Convenience and Traffic Control."**

ADD:

302-4.9.1.1 Slurry Consistency (Slurry Slump Test).

1. Consistency of the mixed slurry shall be measured using a machined-surface brass cone (per ISSA test 106/ASTM C-128).

2. The cone shall be a hollow 0.03-inch (0.8 mm) minimum metal frustrum, 3 inches (76.2 mm) high, with 1.6 inches (40.6 mm) top inside diameter, and 3.6 inches (91.4 mm) inside base diameter. The flow scale shall consist of 7 concentric circles in 0.4 inch (10.2 mm) increasing radii from the circle formed by the outside larger end of the slump cone. The material on which the 7 concentric rings appear shall be 8½ inch by 11-inch (215.9 mm x 279.4 mm) Xerox paper, "Simpson # 7 ID 13351 10 M" or approved equal.

3. The test shall consist of sampling the mixed slurry then immediately pouring the sample into the top of the cone. Strike the slurry off even with the top of the cone and then raise the cone immediately. The flow shall be measured at 4 points 194° F (90° C) apart and then averaged. The average shall be between 0.8 inch and 1.2 inches (20.3 mm and 30.5 mm). If the slurry mix is not within these specifications, the water content of the slurry shall immediately be corrected to meet these specifications.

302-4.11.1 General. ADD the following:

1. If the results of the aggregate grading, the sand equivalent, or both do not meet the requirements specified, the slurry represented by such tests shall be removed and shall be reapplied with an acceptable batch.

ADD:

302-4.13 Rubber Polymer Modified Slurry (RPMS).

302-4.13.1 Mixing.

1. Proportioning equipment of equal capacity to that described herein will be considered by the City prior to time of Award.

2. The slurry surfacing shall be mixed in a continuous, twin shaft, multi-paddle pugmill mixer. The pugmill shall be equipped with a hydraulically controlled steel pugmill gate for positive discharge operations. No dripping of slurry shall be allowed.

3. Each slurry surfacing unit shall be equipped with independent storage capabilities for the aggregate, emulsion, crumb rubber, polymer, set-control additives, and the carbon black.

4. Each slurry surfacing unit shall be equipped with a unit designed to store and deliver the various required materials to a twin-shafted, multi-paddle pugmill with a computer-controlled automatic sequencing system that initiates each material delivery at the precise moment necessary to ensure proper proportioning.

5. Aggregates, asphaltic emulsion, water, polymers, additives, including set-control agent, if used, and crumb rubber shall be proportioned by volume utilizing the mix design approved by the Engineer. If more than one kind of

aggregate is used, the correct amount of each kind of aggregate to produce the required grading shall be proportioned separately, prior to the other materials of the mixture, in a manner that will result in a uniform and homogenous blend.

6. Asphaltic emulsion shall be added at a rate within the ranges identified in Table 302-4.12.1.1 of percent by weight of the dry aggregate. The exact weight shall be determined by the mix design and the asphalt solids content of the asphaltic emulsion furnished.

TABLE 302-4.12.1.1

Type of Aggregate	Range
Type I	17% - 20%
Type II	14% - 17%
Type III	11% - 14%

7. The aggregate shall be proportioned by a belt feeder operated with an adjustable cutoff gate. The height of the gate opening shall be readily determinable. The emulsion shall be introduced into the mixer by a positive displacement pump. Water shall be introduced into the mixer through an adjustable multi-spray pugmill bar. Water volume shall be displayed by an electric digital meter registering in gallons delivered.

8. The aggregate belt feeder shall deliver aggregate to the pugmill mixed with such volumetric consistency that the deviation for any individual aggregate delivery rate check-run shall be within 2% of the mathematical average of 3 runs of at least 300 gallons (1135.6 L) each in duration.

9. The bitumen ratio (pounds of asphalt per 100 pounds (45.4 kg) of dry aggregates) shall not vary more than 1.5 pound (0.7 kg) of asphalt above or 0.6 pound (0.3 kg) asphalt below the amount designated by the mix design and approved by the Engineer.

10. The polymer additive and the carbon black shall be delivered to the mixer in the relative proportions required by means of a common shaft dual pump system. The polymer additive and the carbon black flow rates shall be independently adjustable by means of diaphragm valves and shall be sequenced through the computer controlled auto-sequencing system. The polymer additive and the carbon black shall be blended and mixed prior to their introduction into the pugmill. Introduction into the twin-shafted pugmill shall be done through an injection system which delivers the blended material to the apex of each mixing shaft immediately prior to the introduction of the asphalt emulsion. The polymer additive and the carbon black delivery system shall each be equipped with digital electronic flow metering devices that can read in gallons per minute.

11. The crumb rubber delivery system shall be equipped with an air suspension unit designed to prevent clumping or bridging of the rubber material. The air discharges shall be sequenced to avoid over-suspension of the rubber. The rubber shall be delivered to the pugmill by a hydraulically driven auger and shall be initiated through the computer controlled auto-sequencing system.

12. The emulsion shall be introduced into the mixer by a positive displacement pump. The emulsion storage shall be equipped with a device which will automatically shut down the power to the emulsion pump and aggregate belt feeder when the level of stored emulsion is lowered to within 2 inches (50.8 mm) of the suction line.

13. A temperature-indicating device shall be installed in the emulsion storage tank at the pump suction level.

14. The aggregate shall be proportioned using a belt feeder operated with an adjustable cutoff gate. The height of the gate opening shall be readily determinable.

15. The aggregate feeder shall be directly connected to the drive on the emulsion pump. The drive shaft of the aggregate feeder shall be equipped with an electronic digital belt. The belt delivering the aggregate to the pugmill shall be equipped with a device to monitor the depth of the aggregate being delivered to the pugmill. The device for monitoring the depth of aggregate shall automatically shut down the power to the aggregate belt feeder whenever the depth of aggregate is less than 70% of the target depth of flow. An additional device shall monitor movement of the aggregate belt by detecting revolutions of the belt feeder. The devices for monitoring no flow or belt movement shall automatically shut down the power to the aggregate belt when the aggregate belt movement is interrupted. To avoid shutdown caused by normal fluctuations in delivery rates, a delay of 3 seconds between sensing less than desirable storage levels of aggregate or emulsion shall be permitted.

16. Water delivery shall be adjusted through a diaphragm valve. Water flow rate shall be electronically displayed through a digital meter.

17. Set control additive flow rate shall be electronically displayed through a digital meter.

18. The mixer unit shall not be operated unless all electronic display and revolution counters are in good working condition and functioning and all metal guards are in place. All indicators required by these specifications shall be operational at all times.

19. You shall have 2 fully operational mixers and 1 standby mixer for use at the Project Site at all times for each working crew.

302-4.13.2 Application.

1. **General.**

a. The Work shall consist of mixing asphaltic emulsions, aggregates, set-control additives, specially produced and graded crumb rubbers, and watering and spreading the mixture on the pavement where shown marked out in the field, as specified in the Special Provisions, and as directed by the Engineer. Type II RPMS shall be applied to all streets unless otherwise specified in the proposed Work Appendix of the Contract or as directed by the Engineer.

b. RPMS application rates shall be as follows:

TYPE	APPLICATION RATE[1] lb/yd^2 (lb/sq.m)
I	9 (10.76)
II	13.33 (15.92)
III	15 – 22 (17.97 - 26.25)

1. Based on dry aggregate weight.

c. RPMS shall only be placed when the ambient temperature is at least 50° F and rising. Do not place slurry seal if rain is imminent or the ambient temperature is expected to be below 32° within 24 hours after placement.

d. The weather and temperature requirements listed in subsection c shall supersede those listed in section 37-3.01 C(5)(b) of the Caltrans Standard Specifications.

2. **Sequential Slurry Treatment.**

a. When slurry treatment is required by the Contract Documents, notify the Engineer at least 10 Working Days prior to the first application of slurry. The Engineer, upon assessment of street condition and classification, will verify the slurry type to be applied.

b. Application of sequential layers of slurry shall not commence until approved by the Engineer and until the following have been completed:

1) Mix design and wet track abrasion testing for the first-step slurry application has been approved by the Engineer. Unless otherwise directed by the Engineer, this testing may require 4 Working Days from field sampling to reporting of test results to the Engineer.

2) Corrective actions have been executed in accordance with 302-4.11.1.2, "Reduction in Payment Based on WTAT" such as

reductions in payment, non-payment, or removal of material not meeting specifications, as directed by the Engineer.

3) Where multiple layers of RPMS are specified, the first layer, regardless of Type, shall be placed 1' from concrete gutters.

3. **Spreading.**

a. Pre-wetting of streets shall not be required unless streets are subject to high temperatures and/or dust.

b. The complete mixture, after the addition of water and any set-control agent used, shall be such that the mixture:

1) Has proper workability.

2) Shall permit a traffic flow without the occurrence of bleeding separation or other distress at 78° F (25.6° C) and without pilot-car-assisted traffic on the slurry seal within one hour after placement.

3) Shall prevent the development of bleeding, excessive raveling, separation, and/or other distress within 7 Calendar Days after placing the rubberized asphalt surfacing.

c. The slurry mixture shall be spread by means of a controlled spreader box. The spreader box shall be capable of spreading the slurry to the width of the traffic lane and shall have strips of flexible rubber belting or similar material on each side of the spreader that shall be in contact with the pavement to positively prevent loss of slurry from the ends of the box. Spreader boxes shall be equipped with reversible motor-driven augers when placing slurry. Rear flexible strike-off blades (rubbers) shall make close contact with the pavement and shall be adjustable to the various crown shapes so as to apply a uniform surfacing coat. Flexible drags to be attached to the rear of the spreader box shall be provided as directed by the Engineer. Drags and rubbers shall be cleaned daily if problems with cleanliness and longitudinal scouring occur. The spreader box shall be clean and shall be free of all slurry and emulsion at the start of each Work shift.

302-4.13.3 Rolling.

1. Pneumatic rolling shall be required on all streets.

2. Rolling shall commence as soon as the RPMS has set sufficiently to prevent any material from adhering to the tires.

3. The RPMS surface shall be rolled 2 to 5 times or as directed by the Engineer.

4. Pneumatic rollers shall be operated at a minimum tire pressure of 60 psi (413.7 kPa).

302-4.13.4 Measurement and Payment.

1. RPMS shall be paid on the square footage of RPMS applied. The measurement of RPMS applied shall be calculated by dividing the weight obtained from Certified Weighmaster Certificates by the spread rate for the type specified. You shall present Weighmaster Certificates for unused material remaining at the completion of the Work at no cost to the City. The payment shall be determined by deducting the amount of unused material from the total amount of material delivered.

2. The payment for RPMS shall be the total square footage used on the project calculated using the method described and shall be paid under the following:

BID DESCRIPTION	UNIT
Rubber Polymer Modified Slurry (RPMS) Type I	SF
Rubber Polymer Modified Slurry (RPMS) Type II	SF
Rubber Polymer Modified Slurry (RPMS) Type III	SF

3. The Bid items for RPMS shall include full compensation for the specified surface preparation not included in other Bid items and shall include the work necessary to construct the RPMS as specified on the Plans. Sweeping, removals, and furnishing the aggregate required for the mix design shall also be included in this Bid item.

4. The payment for sampling and testing of RPMS shall be included in the 3 bid items of the Rubber Polymer Slurry listed in the table of item 2.

302-4.12.5 Field Sampling and Testing.

1. The contractor shall be responsible for sampling and testing of the RPMS mix.

2. During the performance of the work, the Contractor shall provide at least 2 field samples, from separate loads, of mixed slurry seal per mixer per day.

3. WTAT specimens shall be cast and struck off within 60 seconds of obtaining the sample. WTAT specimens shall not be transported until the slurry seal has set as defined by ASTM D3910.

4. RPMS field samples shall be tested to conform to the requirements below and section 302-4.10.1 Field Sampling Table 302-4.10.1.

TEST	FREQUENCY OF TESTING
Wet Track Abrasion Test	Minimum 2 per day per type per mixer
Consistency Test	Minimum 1 per day per type per mixer
Extraction Test	Minimum 1 per day per type per mixer
Water Content	Minimum 1 per day per type per mixer

302-5 ASPHALT CONCRETE PAVEMENT

ADD:

302-5.1.1 Pavement Restoration Adjacent to Trench Influence Zone.

1. The Work for pavement restoration shall include the replacement of existing pavement outside of the trench influence zone in accordance with Section 302 – ROADWAY SURFACING, and as shown on the Plans.
2. Prior to the commencement of the Work, you shall meet with the Engineer and determine the limits of the pavement to be replaced. If you do not meet with the Engineer before removing the pavement, all replacement outside the limits of the proposed trench resurfacing shall be at your expense.
3. Existing pavement shall be removed in accordance with Section 401 REMOVAL, Section 404 – COLD MILLING, and as shown on the Plans.
4. Areas of damaged pavement requiring base repair Work shall be restored in accordance with Section 301-1, "SUBGRADE PREPARATION," Section 301-1.6, "Preparatory Repair Work," and as shown on the Plans.

ADD:

302-5.1.2 Manholes and Other Structures.

1. Manhole and other structures shall conform to SECTION 403 – MANHOLE, SURVEY MONUMENT, AND GATE VALVE FRAMES AND COVERS ADJUSTMENT AND RECONSTRUCTION.

302-5.2.3 Tack Coat. ADD the following:

1. A 'cold pavement joint' shall be defined as asphalt concrete pavement which has cooled below the lower limits of the spreading temperature prescribed in 302-5.9,1 "Placement".
2. The tack coat shall be applied the same day of placement of asphalt concrete.
3. Prior to applying the tack coat, submit calculations for the minimum spray rate required to achieve the minimum residual rate.

302-5.9.1 General. ADD the following:

1. Resurfacing shall be continuous throughout all intersections between the limits of the Work segment, unless otherwise shown on the Plans or directed by the Engineer.
2. If the street intersection has no parallel concrete cross gutters, resurfacing shall extend to the prolongation of curb or property line as directed by the Engineer. Where asphalt cross gutters are to be surfaced, furnish and have available a straight-edge and level the asphalt cross gutters. The drainage flow of the cross gutter shall be maintained under the direction of the Engineer.
3. Asphalt concrete shall be hand-raked to remove coarse aggregate and feathered to allow the fine materials to cover the existing street surface adjacent to concrete gutters and concrete cross gutters. Streets that have had previous overlays shall be cold planed.
4. If the street intersection has parallel cross gutters, resurfacing shall extend only to the near edge of the concrete where it shall be feathered.
5. If the street has intersecting concrete cross gutters, the street shall not be resurfaced. Asphalt shall be feathered at both edges of the concrete.
6. In all cases, extreme care shall be taken to prevent blocking drainage.
7. You shall unplug roof drains plugged by paving operations and shall rake asphalt into or away from existing driveways to provide smooth access and proper drainage to the gutter of the resurfaced street.
8. Asphalt alley aprons abutting streets to be resurfaced shall be resurfaced to the property line.
9. Do not tack coat more surface than can be overlaid on the same day, for areas that were not overlaid that day an additional tack coat must be applied the day of the placement of asphalt
10. On streets with grades higher than 5%, the asphalt concrete laydown shall be placed uphill or as determined by the Engineer.
11. City owned manholes, valve caps, vaults, or monuments within the resurfacing area shall be exposed for identification.
12. You shall apply systemic herbicide to vegetation growing in pavement cracks in advance of resurfacing operations. Existing vegetation and growth in pavement cracks shall not be present at the time of resurfacing.
13. You shall treat any new weed growth with water-soluble contact herbicides and remove all vegetation matter from the area to be resurfaced a minimum of 24 hours before applying the tack coat or as directed by the Engineer.
14. A paving ski shall be required on all streets except for residential streets.
15. Where the pavement slopes towards a concrete gutter, asphalt concrete shall be placed such that the pavement surface is ¼ inch ± 1/8 inch (6.4 mm ± 3.2 mm) above the lip of gutter elevation. Where the pavement slopes away from a

concrete gutter, asphaltic concrete shall be placed such that the pavement surface is flush with the lip of gutter elevation unless otherwise directed by the Engineer.

16. The resurfacing shall be done as specified in the resurfacing schedule included in the Contract Documents, unless otherwise directed by the Engineer.

17. No Resurfacing work shall be performed during unsuitable weather. Unsuitable weather includes rain and heavy fog.

302-5.9.2 Joints. ADD the following:

1. Joints between longitudinal (parallel) passes shall be tack coated if the temperature of the preceding pass has cooled below 180° F (82.2° C).

2. The pinched joint method of rolling shall be used for rolling all asphalt concrete joints. The roller shall be employed in a longitudinal direction on the first pass of the breakdown roll with the roller entirely on fresh asphalt and 4 inches (101.6 mm) to 6 inches (152.4 mm) from the existing asphalt or concrete.

3. The second pass shall be made with the roller centered longitudinally on the 4 inches to 6 inches (101.6 mm to 152.4 mm) wide strip. With the approval of the Engineer, the 4 inches to 6 inches (101.6 mm to 152.4 mm) wide strip may be compacted on the return trip of the first pass of the roller.

302-5.13 Measurement. DELETE in its entirety and SUBSTITUTE with the following:

302-5.13 Sand and Seal Coat.

1. Asphalt concrete surfaces shall not be sand, and seal coated **unless otherwise specified**. The sand and seal coat shall consist of a coat of asphaltic emulsion and a cover coat of sand. The asphaltic emulsion shall be mixing type conforming to 203-3, “EMULSIFIED ASPHALT”. Sand shall be clean and dry.

2. Immediately before applying asphaltic emulsion, the surface to be sand and seal coated shall be thoroughly cleaned of all dirt and loose material. Asphaltic emulsion shall not be applied when the street is overly wet or when the atmospheric temperature is below 50° F (10° C).

3. The asphaltic emulsion shall be applied by use of a power-spraying device that uniformly applies the emulsion to the surfacing at a rate of 0.1 gallon per square yard to 0.15 gallon per square yard (0.5 L/m² to 0.7 L/m²). The distributor spray bar shall be equipped with asphaltic emulsion type spray jets. Curbs, gutters, and other adjoining improvements shall be carefully protected from the emulsion. Any such improvements spattered or touched with emulsion shall be carefully cleaned.

4. Immediately after the application of asphaltic emulsion, a cover coat of sand shall be spread at the rate of 6 lbs/yd2 to 12 lbs/yd2 (3.2 kg/m2 to 6.4 kg/m2). After the sand has been spread, any piles, ridges, or uneven distributions shall be broomed to maintain an even layer over the surface.

5. 24 hours after the seal coat has been applied, the surface shall again be broomed and any excess sand shall be picked up and removed from the Site.

302-5.14 Payment. DELETE in its entirety and SUBSTITUTE with the following:

302-5.14 Measurement and Payment.

1. Asphalt concrete pavement will be paid for at the Contract Unit Price per square foot (m2), or at the Contract Unit Price per ton as shown in the Bid. Such price shall constitute full compensation for the preparation of subgrade and applying tack coat if required. Resetting, reconstructing, or adjusting manhole or vault frames and covers to grade will be paid for as provided in 301-1.7.

2. The asphalt concrete Bid item which utilizes the latex modifier shall be identified as latex modified asphalt concrete or asphalt concrete with latex. The Contract Unit Price paid for latex modified asphalt concrete or asphalt concrete with latex shall include all costs for furnishing, mixing, and placement.

3. When payment is to be made on a tonnage basis, the Contractor shall furnish to the Engineer at the time of delivery of the material to the Work site a legible copy of a licensed weighmaster's certificate showing gross, tare, and net weights of each truckload of asphalt concrete mixture. When an automatic batching system is used, the licensed weighmaster's certificate may show only the net weight of material in the truck load. Failure of the Contractor to provide a certificate to the Engineer by the end of the day on which the material represented by such certificate is delivered to the Work site may, at the discretion of the Engineer, result in the forfeiture of all payment for such material, including any labor and equipment costs included in the price for furnishing and placing the asphalt concrete.

4. Payment for installing headers, where required, will be made at the Contract Unit Price per linear foot (m) for headers.

5. The payment for pavement restoration outside of the trench influence area shall be made on a square foot or tonnage basis as shown in the Bid.. The following shall be included in the payment for **"Additional Paving",** or **"Asphalt Concrete Overlay"**, unless separate Bid items have been provided:

   a. Saw-cutting existing edges.

   b. Removal and disposal of existing pavement including cold mill.

   c. Subgrade repair and preparation including imported backfill material. Imported subgrade material shall be included in the Bid item for "Subgrade Imported Backfill".

   d. Applying tack coat.

   e. Form Work

   f. Placement, curing, and protection of new pavement.

6. The payment for removal of existing asphalt concrete pavement shall be made on square foot basis in accordance with Section 404-12, "Payment", and paid for under Bid Item **"Cold Milling"**.

7. The payment for base repair Work shall be made in accordance with Section 301-1.7, "Payment".

8. Small quantities of asphalt concrete placed on pavement reinforcing fabric to prevent the fabric from being displaced by construction equipment or to allow traffic to cross over the fabric shall be considered as part of the layer of asphalt concrete to be placed over the fabric and shall be measured and paid for by the ton under the Bid item for "**Asphalt Concrete**".

9. Payment for sand and seal coat for asphalt concrete shall be included in the payment for the asphalt concrete Work unless a Bid item has been provided. When a Bid item is provided for "**Sand and Seal Coat**", the unit of measurement shall be per square foot.

302-6 PORTLAND CEMENT CONCRETE PAVEMENT.

302-6.1 General. ADD the following:

1. Existing PCC pavement that is broken, displaced, and is outside the trench limits as shown on the Plans shall be replaced by you in accordance with this subsection or as designated by the Engineer. After the necessary traffic control is in place and before any saw cutting or equipment mobilizations, you shall meet with the Engineer and determine the limits of the existing pavement to be replaced. If you do not meet with the Engineer before removing the displaced concrete, all replacements shall be at your expense.

2. The edges of existing pavement for concrete replacement shall be saw cut to neat trimmed lines.

3. The thickness of the new concrete pavement shall be in accordance with Standard Drawing SDG-108, "Pavement Restoration for Concrete Surfaced Streets and Alleys - Major Excavation".

4. Prior to placing concrete, existing subgrade shall be prepared in accordance with 301-1, "SUBGRADE PREPARATION".

5. If any existing unsuitable subgrade, as determined by the Engineer, is encountered, it shall be replaced in accordance with 300-2.2, "Unsuitable Material".

302-7 PAVEMENT FABRIC.

302-7.1 General. ADD the following:

1. Paving fabric material shall have a proven record that it can be recycled and milled. Submit written documentation from you and/or the recycling facilities within the jurisdiction of Work.

302-7.2.1 General. ADD the following:

1. Pavement fabric shall be installed per manufacturer's recommendations while the asphalt tack is still liquid. Surface cracks over ¼ inch (6.4 mm) shall be filled and brought to the level of the existing pavement surface. At the direction of the Engineer, irregular surface conditions shall be leveled by the use of a bituminous wedge or scratch course installed by hand or with the use of a mechanically powered asphalt-paving machine.

2. Pavement fabric shall be installed on the surface using mechanically powered installation equipment or per the manufacturer's recommendation. Mechanical equipment shall be capable of installing full width rolls of up to 12.5 feet (3.8 m) in width. Installation by hand may also be used in situations where areas require specially cut sections, where mechanically installed methods cannot be accomplished, or both. Brooms or squeegees shall be used to remove any air bubbles and to ensure that the paving fabric is completely in contact with the tack-coated surface. If wrinkles occur, any wrinkle greater than 1 inch (25.4 mm) shall be slit and lapped in the direction of paving and seated into the tack coat to ensure adhesion.

3. Pavement fabric shall be overlapped to provide a minimum of 2 inches (50.8 mm) overlap longitudinally and a minimum of 4 inches (101.6 mm) transversely. Overlaps on the transverse roll ends shall be in the direction of the paving operation to avoid paving fabric pick-up during asphalt installation. All overlapping of the pavement fabric shall be tack-coated to ensure proper adhesion.

4. The surface on which the pavement fabric is to be placed shall receive a minimum ½ inch (12.7 mm) leveling course.

5. All areas which the pavement fabric has been placed shall be paved during the same day, unless approved otherwise by the Engineer.

302-7.2.2.1 General. DELETE in its entirety and SUBSTITUTE with the following:

1. Tack coat material and application rate shall be per the manufacturer's recommendations. Tack coat shall be applied uniformly prior to placing pavement fabric on the same day. The application rate may be adjusted as directed by the Engineer. Hand spraying shall be kept to a minimum.

2. Blotting the sealant, spreading sand, or broadcasting bituminous asphalt mix over the pavement fabric shall be utilized to minimize and prevent construction and/or paving tires/tracks from adhering to the tack coat and pulling up the pavement fabric. If the pavement fabric has been displaced from the surface, additional rolling and/or hand-brushing shall be required to restore the bond between the surface and pavement fabric. An additional application of tack may be required to ensure adhesion. Additional tack coat or labor shall not be paid for as Extra Work and shall be considered incidental to the installation of the pavement fabric.

3. The width of the sprayer application shall be no more than 6 inches (152.4 mm) and no less than 2 inches (50.8 mm) wider than the fabric width.

4. The temperature of the tack coat shall not exceed 325° F (162.8° C) when the fabric is placed.

302-7.4 Payment. DELETE in its entirety and SUBSTITUTE with the following:

1. The payment for pavement fabric shall be made at the Contract Unit Price per square yard for the actual area covered and no additional payment shall be made for overlapped areas. The Bid item for "Pavement Fabric" shall include the cleaning of the existing pavement, tack coat, calibration of the truck mounted spray unit, and the furnishing and placing of the Non-woven Fiberglass/Polyester Interlayer Paving Mat. Payment shall not be made for additional fabric for overlapped areas.
2. The payment for the spreading of asphalt concrete over the pavement fabric shall be included in the Bid item for the asphalt concrete Work.
3. The payment for the AC asphalt leveling course shall be included in the Bid item for "Asphalt Concrete ½ Inch Leveling Course". If no Bid item is provided, the payment shall be included in the Contract Price.

302-10 ASPHALT RUBBER AND AGGREGATE MEMBRANE (ARAM).

302-10.2 Screenings. To the sentence (1), DELETE in its entirety and SUBSTITUTE with the following:

Following the application of asphalt rubber, screenings conforming to 203-12.3, "Pre-Coated, Pre-Heated Screenings" shall be placed over all areas receiving asphalt rubber.

302-13 POROUS ASPHALT CONCRETE PAVEMENT.

302-13.2 Placement. ADD the following:

1. Distribution and spreading shall conform to 302-5.9 Placement" with the following exceptions:
   a. Distribution and spreading shall be placed in 2 courses (lifts) with course depths not exceeding 2 inches (50.8 mm) to ensure proper compaction

302-17 CRACK SEAL WORK

ADD:
302-17 CRACK SEAL WORK.

302-17.1 General.

1. All cracks in asphalt 1/8 inch or wider but no greater than 1 inch wide shall be sealed prior to the application of slurry. You shall seal only transverse, longitudinal, block, or reflective cracks. You shall not seal alligator (fatigue) cracked areas or cracks in PCC.

302-17.2 Materials.

1. Crack sealant material used shall be Road Works 306, CRAFCO Polyflex Type 3, or an approved equal. Sealant shall be prepared and applied to the pavement cracks in conformance with all manufacturers' instructions except where noted otherwise in these specifications.

302-17.3 Equipment.

1. Cracks shall be cleaned using a hot compressed air lance (HCL) apparatus. Air exiting the HCL shall be heated to a temperature sufficient to remove the oxidized surface from the crack walls.

2. The HCL shall meet the following specifications:

Compressed Air Capacity	75 psi to 150 psi (40 cfm to 100 cfm)
Heated Air Temperatures	600° F to 2,200° F (315.6° C to 1204.4° C)
Exit Heated Air	1,000 ft/second
Propane	5 psi to 20 psi

3. Prior to beginning Work, submit documentation to the Engineer certifying that each HCL apparatus to be used on the project meets the above specifications. If a delay in the start of Work exceeds 7 Working Days, re-certification is required, and documentation shall be resubmitted.

302-17.4 Application.

1. Cracks to be sealed shall be completely clean, dry, and free of all loose material, weeds, vegetation, and any other foreign substances which may cause the sealant to not adhere to the crack wall. You shall clean and dry all cracks with the HCL immediately before sealing.

2. Sealant shall be applied from the bottom of the crack up to the surface in a manner which does not result in sealant bridging or pockets of entrapped air forming. The sealant shall be applied to a slightly overfilled condition and then leveled with a squeegee. The width of sealant remaining on the surface shall not exceed 1.5 inches (38.1 mm) on either side of the crack. Any debris blown onto adjacent gutters, sidewalks, parkways, medians, intersections, or other areas shall be removed prior to the end of the Working Day.

302-17.5 Payment.

1. The payment for crack sealing shall be included in the Contract Price unless a Bid item in pounds has been provided for "**Crack Sea**l".

302-18 SCRUB SEAL

ADD:

302-18 SCRUB SEAL.

302-18.1 General.

1. Scrub seal shall consist of furnishing all labor, materials, tools, equipment, transportation, and incidentals necessary for scrub seal resurfacing.

2. A scrub seal consists of applying a seal coat using a polymer modified rejuvenating asphaltic emulsion (PMRE), scrubbing the emulsion to fill cracks and voids in the pavement, applying and rolling screenings, and applying a flush coat.

3. The contractor shall prepare a submittal detailing the scrub seal order of operations including but not limited to the following: weed abatement, asphalt pavement repairs and/or base repairs, edge grinding, micro-milling, application of the PMRE and scrubbing the applied emulsion with a scrub broom as specified, application of screenings, brooming the screenings with a secondary broom when specified, rolling the screenings, and application of a flush coat.

302-18.2 Materials.

302-18.2.1 Chip Seal. Chip seal shall conform to 302-2.

302-18.2.1.1 Emulsified Asphalt. Emulsified asphalt for the flush coat shall conform to 302-2.2.1.

302-18.2.1.2 Modified Paving Asphalt. Modified paving asphalt shall conform to 302-2.2.2.

302-18.2.1.3 Screenings.

1. The size of screenings used shall be medium fine 5/16” x No. 8 and conform to 200-1.2.2.2 unless otherwise specified.

2. The screening gradation for a PMRE scrub seal must comply with the requirements of 200-1.2.2.2.

3. The contractor shall ensure that the selected bituminous material is compatible with the aggregate to be used. This may require conducting electrostatic testing of aggregate source before chip design to ensure that the binder selected is compatible with the potential sources of aggregate.

302-18.3 Equipment.

1. Equipment shall conform to 302-2.3 with the addition of a scrub broom. The scrub broom shall be a broom sled of angled nylon-bristled street brooms.

2. The broom sled shall be attached to and pulled by the distributor truck. The broom sled must be equipped with the means to mechanically raise and lower the scrub broom off and onto the road surface at designated points of

completion and start up. It shall be towable in an elevated position to the next area of construction.

3. The weight of the broom assembly shall be such that it does not squeegee the emulsion sealer off the roadway surface. Sandbags may be used to ensure contact is maintained.

302-18.4 Roadway Surface Preparation.

1. Roadway surface preparation shall conform to 302-2.4.

2. Prior to the Scrub Seal operation on city streets, the Contractor shall remove any and all vegetation within the limits of the scrub seal by applying an approved herbicide.

3. The herbicide shall be applied at least 10 days prior to the chip seal operation, or as directed by the manufacturer of the approved herbicide. Herbicides shall be submitted by the contractor for approval by the Agency and shall be certified for use in the State of California for the specific use intended. The application of the herbicide shall be performed in accordance with all applicable regulations. Any and all fines or clean-up costs for unlawful misuse or discarding of herbicides shall be the sole responsibility of the Contractor. Mixtures and spread rates for the herbicides shall be determined by the manufacturer's specifications. Washing down of equipment or discarding of herbicides shall not enter the catch basins or positive drainage facilities.

4. Prior to the Scrub Seal operation, the Contractor shall remove all existing thermoplastic striping, thermoplastic legends and raised pavement markers within the scrub seal limits. When removing the raised pavement markers, the Contractor shall remove excessive adhesive left on pavement caused from the removal of raised pavement markers. Removal shall be done to the satisfaction of the Engineer.

5. Prior to the Scrub Seal operation, all personnel covers, drain inlet covers, monument covers, and all other utility covers shall be protected from the Contractor's scrub seal operations by applying a sheet of plastic, cut to fit, or placing a plastic bag over the exposed facilities or other methods approved by the Engineer. All traces of plastic, residual emulsion and chips shall be removed from all personnel covers, drain inlet covers, monument covers, and all other utility covers as quickly as possible, after the application of the scrub seal and/or prior to the final acceptance of the project.

6. Immediately prior to the Scrub Seal operations, the Contractor shall thoroughly clean the surface to receive scrub seal. The Contractor shall sweep the entire surface with power brooms to the satisfaction of the Engineer.

7. All cracks 1.5" in width or less shall be blown out with compressed air immediately prior to applying the PMRE so that it is allowed to penetrate and fill these cracks.

8. The Contractor shall furnish a computer generated schedule for the work, listing the dates on which individual streets or locations are to be closed to traffic for surfacing. The schedule shall detail the dates each street is to be

micro-milled, scrub sealed, and when the final flush coat layer shall be applied. The Contractor shall adhere diligently to the work schedule in the prosecution of the work.

302-18.5 Temporary Traffic Control. Temporary traffic control to conform to 302-2.5.

302-18.6 Application and Spreading.

1. Chip seal and flush coat shall be applied to the specified roadways where Scrub Seal is identified. Application and spreading shall conform to 302-2.6 and the following:

2. PMRE shall not be applied:

   a. when the atmospheric temperature is below 50°F or above 105°F

   b. until sufficient screenings are on hand to immediately cover the PMRE,

   c. more than 500 feet ahead of the completed initial rolling

3. In no case, shall the distributor truck advance more than 200 feet ahead of the screening spreader.

4. The contractor shall schedule PMRE application such that the PMRE breaks (turns from brown to black) before

   a. the atmospheric temperature falls below 50°F,

   b. the pavement temperature falls below 60°F, and

   c. the time the lane is to be opened to traffic

5. PMRE must be heated to a temperature above 130°F but not exceed 180°F at the time of application.

6. The initial application rate shall be 0.32 gallon per square yard. The contractor may propose a different initial rate. If so requested by the Engineer, the Contractor shall apply PMRE to 100-foot test strips to assist in determination. The initial rate of application, and any adjustments thereto during application, shall be subject to approval by the Engineer.

7. Immediately following application, PMRE shall be scrubbed into the existing pavement surface with a scrub broom. Scrubbing shall fill cracks and voids, force the PMRE into the existing pavement surface, and distribute the PMRE uniformly over the roadway cross section.

8. Screenings shall be spread immediately after application and brooming of PMRE. Spreading of screenings shall conform to 302-2.6.4. The spread rate for screenings shall be between 16 to 25 lbs per square yard. The exact rate will be determined by the contractor. The rate shall be adjusted up or down as necessary to provide complete and uniform coverage over the PMRE and ensure that no bleeding occurs during rolling. The initial rate, and any

adjustments thereto during spreading, shall be subject to approval by the Engineer.

9. Finishing including initial and final rolling, sweeping, and application of a flush coat shall conform to 302-2.7.

10. Allow at least three calendar days for cure time on the chip seal prior to applying flush coat.

11. The Contractor shall exercise care to prevent spillage of resurfacing material on concrete surfaces. All surfaces not designated to be resurfaced shall be cleaned immediately before resurfacing any more streets. All streets are to be resurfaced from edge of pavement to edge of pavement and no overlap on concrete shall be permitted.

302-18.7 **Finishing.** Finishing shall conform to 302-2.7. The Contractor shall assume full liability and pay all costs associated with any claims made for cracked/broken windshields, damage to paint, etc. on roads scheduled for scrub seal at no cost to the City.

302-18.8 **Flush Coat.** Flush coat shall conform to 302-2.8.

Flush coat is not required on roads receiving a cape seal.

302-18.9 **Maintenance.** Maintenance shall conform to 302-2.9.

302-18.10 **Measurement.**

1. Scrub seal will be measured by the square foot. The quantity of Scrub Seal to be paid will be determined by measuring the total area where Scrub Seal was placed. No payment will be made for materials not used or material placed outside of the limits specified in these contract documents unless directed by the Engineer.

2. Application rates of PMRE and screening will be verified utilizing calibration information from the distributor and spreader trucks used.

302-18.11 **Payment.** The payment for scrub seal will be made at the Contract Unit Price for **"Polymer Modified Rejuvenating Emulsion (PMRE) Scrub Seal"** per square foot and shall include full compensation for furnishing all labor, materials, equipment and incidentals for the following items:

1. public notification
2. surface preparation,
3. materials, including the rejuvenating emulsion, screenings, and flush coat
4. application and spreading,
5. finishing
6. sweeping,
7. disposal, and
8. maintenance of the completed scrub seal

302-19 CAPE SEAL

ADD:

302-19 CAPE SEAL.

302-19.1 General.

1. Cape seal shall consist of furnishing all labor, materials, tools, equipment, transportation, and incidentals necessary for constructing cape seal resurfacing.

2. Cape seal resurfacing includes an initial scrub seal conforming to 302-16 followed by Type II slurry seal surfacing conforming to 302-4.

302-19.2 Materials.

302-19.2.1 Scrub Seal. Scrub seal shall conform to 302-16.

302-19.2.1.1 Emulsified Asphalt. Emulsified Asphalt shall conform to 203-3.4.7.

302-19.2.1.2 Modified Paving Asphalt. Modified paving asphalt shall conform to 302-2.2.2.

302-19.2.1.3 Screenings. Screenings shall be medium fine 5/16" x No. 8 and conform to 200-1.2.2.2.

302-19.2.2 Slurry Seal Surfacing. Slurry seal surfacing methods shall be Type II and conform to 302-4.13 and 203-5.6.

302-19.3 Equipment. Equipment shall conform to 302-18.3 and 302-4.8.

302-19.4 Roadway Surface Preparation. Roadway surface preparation shall conform to 302-16.4.

302-19.5 Temporary Traffic Control. Temporary traffic control shall conform to 302-2.5 and 302-1

302-19.6 Application and Spreading.

1. Scrub seal and Type II RPMS slurry seal shall be applied to the specified roadways where Cape Seal is identified.

2. Allow at least three calendar days for cure time on the chip seal prior to applying slurry seal surfacing.

3. The Contractor shall exercise care to prevent spillage of resurfacing material on concrete surfaces. All surfaces not designated to be resurfaced shall be cleaned immediately before resurfacing any more streets. All streets are to be resurfaced from edge of pavement to edge of pavement and no overlap on concrete shall be permitted.

302-19.7 Finishing.

1. Finishing shall conform to the Standard Specifications and as specified in the Special Provisions.

2. The Contractor shall assume full liability and pay all costs associated with any claims made for cracked/broken windshields, damage to paint, etc. on roads scheduled for cape seal at no cost to the City.

302-19.9 Maintenance. Maintenance shall conform to the Standard Specifications and the Special Provisions.

302-19.10 Measurement.

1. Cape Seal will be measured by the square foot. The quantity of Cape Seal to be paid will be determined by measuring the total area where Cape Seal was placed. No payment will be made for materials not used or material placed outside of the limits specified in these contract documents unless directed by the Engineer.

2. Application rates of PRME and screening we be verified utilizing calibration information from the distributor and spreader trucks used.

302-19.11 Payment. The payment for cape seal will be made at the Contract Unit Price **for "Cape Seal (PMRE Scrub Seal with Type II Slurry)"** per square foot and shall include full compensation for furnishing all labor, materials, equipment, and incidentals for the following items:

1. public notification
2. surface preparation
3. materials, including the rejuvenating emulsion, screenings, and Type II RPMS Slurry Seal
4. application and spreading
5. finishing
6. sweeping
7. disposal and
8. maintenance of the completed scrub seal

SECTION 303 - CONCRETE AND MASONRY CONSTRUCTION

303-1 CONCRETE STRUCTURES.

303-1.3 **Forms.** To paragraph (11), DELETE in its entirety and SUBSTITUTE with the following:

Exterior forms are required for structures unless otherwise specified on the Plans or in the Specifications.

303-1.8.4 **Consolidating.** ADD the following:

1. As determined by the Engineer, when rock pockets are detrimental to the steel reinforcement, the Engineer may allow you to repair in accordance with 303-1.9.2, "Ordinary Surface Finish".

303-5 CONCRETE CURBS, WALKS, GUTTERS, CROSS GUTTERS, ALLEY INTERSECTIONS, ACCESS RAMPS, AND DRIVEWAYS.

303-5.1.1 **General.** To paragraph (2), sentence (1), DELETE in its entirety and SUBSTITUTE with the following:

Unless otherwise shown on the Plans, and except as otherwise specified in 303-5.1.3, "Driveway Entrances" the minimum thickness of walks shall be 4 inches (101.6 mm).

ADD the following:

1. In areas where field adjustments to the curb and gutters may be required due to the existing conditions to maintain positive drainage, you shall contact the Engineer prior to the construction.
2. You shall exercise due caution when working around trees not to damage either the trunk or any of its limbs. If damage to a tree occurs, you shall notify the Engineer. Once excavation has occurred, all efforts shall be made to mitigate the exposure of the tree roots to the air.
3. You shall complete the Work within 5 Working Days after demolition.
4. You shall restore the asphalt along the gutter line only between 7 Days to 14 Days after the placement of the curb and gutter.
5. Unless specified otherwise, the depressed curb and gutter shall be replaced monolithically with the driveway when the driveway is to be removed and replaced.
6. If curbs, gutters, or sidewalks are replaced, you shall duplicate the existing surrounding score pattern and color. The score pattern and color shall be approved in advance by the Engineer.
7. For the purposes of this section, the terms "walk" and "access ramp" shall be synonymous with "sidewalk" and "curb ramp and pedestrian ramp", respectively.

ADD:

303-5.1.4 Historical and Contractor Stamps and Impressions.

1. You shall remove and relocate the existing historical and contractor date stamps, impressions, and street name stamps outside the pedestrian travel way to the parkway area or face of sidewalk. The stamp's position shall be such that it can be read from the street and as close as practical to the stamp's original location.

2. If it is determined that the date stamps or impressions cannot be relocated or they are damaged and the Plans designate the stamps or impressions to be removed, you shall saw cut them to full depth at a minimum distance 2 inches (50.8 mm) away from the edge of the stamp. Carefully remove, bag, label, and set the date stamps or impressions aside on Site in a location designated by the Engineer for pickup by others. You shall stamp the current Contractor's name and date in concrete.

303-5.3 Placing Concrete. ADD the following:

1. The top and face of the finished concrete surfaces shall be true and straight, of uniform width, and free of humps, sags, or other irregularities. The finished concrete surface shall not vary more than 0.02 feet (6.1 mm) from 10 feet (3 m) straight edge, except at grade changes or curves. No freestanding water will be permitted on slopes over 1%. No freestanding water deeper than 1/16 inch (1.6 mm) shall be permitted on slopes of less than 1%.

2. Concrete placed immediately before rain shall be protected to prevent contact with rainwater. Protective covering shall be kept on hand at all times for this purpose.

303-5.5.3 Walk. ADD the following:

1. If the continuous sidewalk length equals a block or more, your name and the year in which the improvements is constructed shall be stamped therein to a depth of ¼ inch (6.4 mm) in letters not less than ¾ inch (19.1 mm) high, at a location determined by the Engineer.

2. You shall coordinate the root pruning activities in accordance with 801-6, "MAINTENANCE AND PLANT ESTABLISHMENT".

303-5.5.5 Alley Intersections, Access Ramps, and Driveways. REVISE "wood float" to "steel trowel followed with a medium coarse broom".

303-5.6 Curing. To paragraph (3), sentence (2), DELETE in its entirety and SUBSTITUTE with the following:

The placement of bituminous pavement or cement treated base adjacent to concrete curb, gutter, or alley intersections shall not be permitted until the 7th Calendar Day following the placement of concrete nor shall concrete paving operations be permitted until 7th Calendar Day where placing or finishing equipment will ride on the previously placed concrete.

303-5.9 Measurement and Payment. ADD the following:

1. The payment for the preservation of date stamps and impressions shall be included in the Bid item for "Historical and Contractor Date Stamps and Impressions".
2. The payment for removing tree roots, cutting, excavation, disposal, import and backfilling to grade, and pavement construction shall be included in the items of Work for which the subgrade is prepared.
3. At locations where the width of the walk is being reduced, the payment for removing the existing walk shall be included in the Bid item for "Remove and Replace Existing Sidewalk".
4. Additional curb and gutter removal, disposal, and replacement adjacent to the Work on a proposed curb ramp shall be required as directed by the Engineer. The payment for the additional removal, disposal, and replacement of the curb and gutter shall be included in the Bid item for "Additional Curb and Gutter Removal and Replacement".
5. The payment for the additional removal, disposal, and replacement of sidewalk shall be included in the Bid item for "Additional Sidewalk Removal and Replacement".
6. The measurement shall be made of actual areas and depths authorized by the Engineer and shall be calculated as cubic yards in place. Excavation, grading, and backfilling shall be included in the Bid items for the Work of sidewalks, curb ramps, or curb and gutters.

ADD:

303-5.10 Curb Ramp Construction.

303-5.10.1 Installation.

1. Prior to Bid, you shall evaluate the Site to determine existing conditions and actual limits of Work to ensure if the installation of compliant curb ramps is possible. You shall obtain the Engineer's approval of the layout of the curb ramp prior to demolition of the existing sidewalk/curb ramp.
2. To allow for proper drainage, the slope of the landing to the street shall not be less than 1.0% and the drainage pattern of the gutter shall not be altered in a manner that creates ponding at the approach. The slope of the ramp shall not exceed 1 unit vertical to 12 units horizontal or 8.33%. The slope of the sides and flares shall not exceed 1 unit vertical to 10 units horizontal or 10.0%.
3. The Detectable Warning Tile (DWT) shall be installed in accordance with the manufacturer's specifications by installer certified in writing by the Supplier.
4. The DWT shall be oriented such that the rows of domes are parallel with the direction of the ramp. When multiple tiles (regardless of size) are used, the domes shall be aligned between the tiles and throughout the entire detectable surface

installation. The edge of the tile(s) nearest the street shall be between 6 inches and 8 inches (152.4 mm and 203.2 mm) from the gutter flow line. You shall trim and refinish the edges of the DWT in accordance with the manufacturer's recommendations. Field trimming of stainless-steel DWT shall not be allowed.

5. The DWT shall be used as shown on the Plans. You shall not change the material specified without the written approval of the Engineer.

6. You shall submit an approved TCP, including an accessible pedestrian access plan, through the construction zone with approved signage. You shall not replace more than 2 curb ramps in one intersection at the same time and shall only demolish those curb ramps that can be replaced within 2 consecutive Working Days in the same week. You shall provide approved temporary accessible curb ramps if necessary to provide access to the designated alternate route areas.

7. Modified curb ramps shall be constructed as shown on the Plans.

8. Where it is infeasible for a curb ramp run to intersect the street grade at the maximum allowable slope, a slope steeper than 8.33% may be used to limit the ramp run length to 15 ft. The 15-foot measurement excludes landings and shall measure the inside back edge of a sidewalk radius.

303-5.10.2 Payment.

1. The payment for each curb ramp shall include:

   a. Ramp runs & transition areas (up to 15 ft),

   b. Landings,

   c. DWTs,

   d. Demolition and disposal,

   e. Forming,

   f. Relocating or raising items in conflict to grade,

   g. Protecting and preserving existing survey monuments and improvements,

   h. Restoring pavement.

2. Additional concrete sidewalk and curb quantities beyond 15 feet (4.6 m), measured from the inside back edge of the sidewalk radius where it intersects with the landing, shall be included in the Bid items for "**Additional Sidewalk" and "Additional Curb**".

3. **Unless otherwise specified in the Special Provisions**, the payment for each modified curb ramp shall include transition areas, landings, DWTs, demolition and disposal, forming, relocating or raising items in conflict to grade,

protecting and preserving existing survey monuments and improvements, and restoring pavement.

4. The payment for completely removing and replacing the existing concrete spandrel of a cross gutter associated with curb ramp installations, in accordance with SDG-131 - General Curb Ramp Notes, and as identified on the Plans, shall be included in the payment for the curb ramp. No additional costs shall be incurred when separate Bid items for cross gutters has been provided.

5. The payment for completely removing and replacing the existing concrete alley apron associated with curb ramp installations, in accordance with SDG-131 - General Curb Ramp Notes, and as identified on the Plans, shall be included in the payment for the Curb Ramp installation. No additional costs shall be incurred when separate Bid items for alley aprons has been provided.

303-6 STAMPED CONCRETE.

ADD:

303-6.1.1 Stamped Concrete Pavement.

1. Stamped concrete pavement shall be constructed in accordance with the following conditions:

   a. Prior to construction, a test section at least 5 feet by 5 feet (1.5 m by 1.5 m) shall have approval of the test section it will be designated as the standard for that particular pattern on the subject Project.

   b. When required by the Engineer, skid resistance shall have a minimum acceptance value of 0.35 for either ASTM E-274 or California Test Method No. 342.

   c. Visual inspection of the Work shall be performed to determine that the surface texture is as rough as the approved test section and the surface flatness is as flat as the approved test section.

   d. Concrete color and method of application shall conform to 303-7, “COLORED CONCRETE”.

   e. Coloring and curing compounds used in the Work shall be from the same manufacturer and batch lot.

   f. The thickness of the concrete paving shall be increased by ½ inch (12.7 mm) over what is required on the Plans.

   g. The pavement section shall be PCC, Class 560-C-3250, placed in accordance with 302-6, “PORTLAND CEMENT CONCRETE PAVEMENT”.

h. There shall be no cold joint between the structural PCC pavement section and the stamped surface layer. The stamped surface layer shall not be less than 4 inches (101.6 mm) thick.

i. The final finishing for textured, stamped, or colored concrete paving shall be in accordance with 302-6.4.4, "Final Finishing" subject to the following conditions:

1) Stamping shall be performed before the initial set of the concrete. No water shall be added to the surface.

2) A flat surface shall be maintained. Rounding shall not be allowed.

3) Limited to a running bond pattern.

4) ¼ inch (6.4 mm) wide maximum groove with ¼ inch (6.4 mm) deep maximum imprint.

5) Portland cement concrete shall not be placed in air temperatures exceeding 85º F (29.4º C).

6) A heavy broom finish, perpendicular to the traveled way, shall be used.

7) Wax curing or wax sealing shall not be permitted.

303-6.1.2 Measurement and Payment.

1. The Work for stamped concrete pavement shall be included in the square foot Bid item for "Stamped Concrete Pavement".

2. Stamped Concrete Pavement that is colored in accordance with 303-7, "COLORED CONCRETE" shall be included under the square foot Bid item for "Stamped Colored Concrete".

303-8 PERVIOUS CONCRETE

303-8.1 General. ADD the following:

1. Work shall be performed by a qualified installer meeting the following requirements:

a. The installer shall have successfully completed pervious concrete installation similar in design material and the extent indicated in the Work.

b. Utilize a supervisor holding a current certificate from the National Ready Mixed Concrete Association Pervious Concrete Installer Certification program.

c. At least 1 in 3 installers shall hold a current certificate from the National Ready Mixed Concrete Association Pervious Concrete Technician Certification program.

2. Proof of installation qualifications shall be submitted prior to pervious concrete installation.

3. A mandatory pre-placement conference shall take place and shall include, at a minimum, you, the engineer, the pervious concrete contractor, the concrete Supplier, and the field-testing agency. All materials and personnel qualifications, concrete production, preparation, placing, curing, and testing procedures will be reviewed to ensure specification compliance.

303-8.3 **Subgrade.** DELETE in its entirety and SUBSTITUTE with the following:

1. The subgrade preparation shall follow the requirements of 301-1, "SUBGRADE PREPARATION". The subgrade shall not be treated or stabilized with Portland cement or lime. If the pervious concrete is being installed directly on the subgrade, the subgrade shall be moistened to prevent it from absorbing moisture from the concrete.

303-8.5 **Placement.** To paragraph (2), DELETE in its entirety and SUBSTITUTE with the following:

Pervious concrete shall be uniformly deposited over the entire formed area. Strike off and spreading shall be performed using a self-propelled or manual vibratory roller screed or a laser screed. Hand-rodding may be used in areas inaccessible to the roller-screed if so approved by the Engineer. Strike off shall be no greater than ¾ inch (19.1 mm) above the forms to allow for compaction. Compaction shall be performed using a self-propelled roller screed or a minimum 10 inches (254 mm) steel roller that exerts at least 10 psi (68.9 kPa) on the concrete surface. Adjacent to the edge of each form, hand tampers shall be used for compaction.

To paragraph (4), DELETE in its entirety and SUBSTITUTE with the following:

After compaction, the surface shall be protected from rapid evaporation by water fogging, covering with 6 mil (150 µm) polyethylene sheeting, or the application of a chemical evaporation retardant approved by the Engineer.

303-8.7 **Curing.** DELETE in its entirety and SUBSTITUTE with the following:

1. Curing shall consist of covering the surface and, as necessary, the application of water. Curing shall begin within 20 minutes of placement or within 15 minutes when the wind is in excess of 5 miles per hour (8 kilometers per hour). The surface shall be securely covered with polyethylene sheeting having a minimum thickness of 6 mils (150 µm).

2. Sheeting shall be secured using lumber, rebar, stakes, or by other approved methods by the Engineer. Sand or dirt shall not be used to secure the sheeting.

3. The cover shall be checked daily to verify that it has not been displaced or damaged, and that condensation is evident underneath the sheeting. Damaged sheeting shall be repaired. Displaced sheeting shall be replaced. When there is no observable condensation, 1.5 gallons of water per square yard (5.7 L/m^2) shall be applied to the surface. The cover shall remain securely in place for a minimum of 7 Calendar Days.

SECTION 304 - METAL FABRICATION AND CONSTRUCTION

ADD:

304-6 PAYMENT.

1. The payment for signs shall include footing, post, sign, all required hardware, and installation in accordance with the Contract Documents and shall be included in the Contract Price unless a Bid item has been provided.

SECTION 306 - OPEN TRENCH CONDUIT CONSTRUCTION

306-1 **GENERAL**. ADD the following:

1. All Work under this section shall be subject to the applicable permanent resurfacing restoration requirements in accordance with the following City of San Diego Standard Drawings.
    a. SDG-105, "Pavement Restoration General Notes"
    b. SDG-107, "Pavement Restoration for Asphalt Concrete Surfaced Streets - Major Excavation"
    c. SDG-108, "Pavement Restoration for Concrete Surfaced Streets and Alleys - Major Excavation"
    d. SDG-117, "Narrow Trench Excavation and Pavement Restoration for Asphalt Concrete Surface Streets Minor Excavation"
    e. SDG-118, "Narrow Trench Excavation and Pavement Restoration for Concrete Surfaced Streets and Alleys - Minor Excavation"

~~**ADD:**~~

306-1.1 **High-line Phasing.**

1. Build the Project in accordance with the water high-lining phasing shown on the Plans and in phases.
2. When installing pipelines within the City's streets, for the following streets, the total time allowed for the completion of Work shall not exceed **10 Working Days** per 500 feet of pipeline installation:

ADD:

306-1.2 **Phased Paving.**

1. You shall implement phased paving, when directed and approved by the Engineer.
2. The Engineer will notify you when you can proceed with phased paving Work. Each phase shall be completed within **90 Calendar Days** after the Engineer's notification. Plan and schedule your Work accordingly to ensure each phase is complete.
3. When Phased Paving is initiated, the following Work shall be completed within the determined areas:
    a. Installation of mains and appurtenances.
    b. Operational checks and testing.
    c. Mains are in service.

d. Trench restoration.

e. Road surface preparatory Work.

f. Installation of concrete sidewalks and curb ramps.

g. Adjustments of gate valves and manholes, survey monuments and utility boxes.

h. Community Outreach including door hangers and no parking signs

4. You may propose to change the limits of the determined phasing, in writing, for the Engineer's review and approval. If approved, there shall be no additional costs to the City. No additional Working Days will be granted for delays due to the City's review and approval of your proposed change and due to the implementation of that proposed change.

5. You may use multiple crews to complete each phase of paving.

ADD:

306-1.2.1 Payment.

1. The payment for all Work associated with Phased Paving shall be included in the Bid item for each "Phased Paving" area. This payment shall include the costs for all mobilization and demobilization for resurfacing and striping associated with each paving phase regardless of the paving operation. No additional payment shall be made regardless of the number of mobilizations and demobilizations required to complete that phase.

306-3 TRENCH EXCAVATION

306-3.3 Removal and Abandonment of Existing Conduits and Structures. ADD the following:

1. For 6 inch (152.4mm) and larger conduits, abandoned pipe shall be filled with sand or CLSM in accordance with 201-6, "CONTROLLED LOW STRENGTH MATERIAL (CLSM)".

ADD:

306-3.3.1 Removal and Abandonment of Existing Water Facilities.

1. Existing facilities shall be abandoned unless indicated otherwise in the Contract Documents. Any gate valve to be removed shall be removed entirely with the valve casing and cover. Any gate valve to be abandoned shall be abandoned in place by removing the cover and casing to subgrade, filling the remaining valve casing with sand or Controlled Low Strength Material (CLSM) in accordance with 201-6, "CONTROLLED LOW STRENGTH MATERIAL (CLSM)", and restoring the pavement. Gate valves abandoned prior to construction, with a lid and casing found within the Project limits, shall be properly abandoned as stated above and paid for as Extra Work, as approved by the Engineer.

2. Any existing fire hydrant which is served by a main to be abandoned shall be abandoned with its services, unless otherwise shown on the Plans. Fire hydrant services to be abandoned shall be blind flange or cut and plugged at least 12 inches (304.8 mm) below finish grade or below the top of curb, whichever is lower.

3. Where portions of the old main, services, or both are abandoned and left in place, the exposed ends of the abandoned main shall be tightly plugged with concrete and service ends shall be crimped, unless otherwise shown on the plans. Abandoned water services shall be located and shut off at the main.

4. Existing meter boxes previously abandoned within the Project limits shall be removed as specified.

5. Voids resulting from abandoned or removed water services and meter boxes shall be filled with suitable material compacted to a relative compaction of 90% and concrete capped.

6. For all water mains, the abandoned pipe shall be filled with sand or CLSM in accordance with 201-6, "CONTROLLED LOW STRENGTH MATERIAL (CLSM)".

7. Salvaged material from the abandoned water mains and its appurtenances, except fire hydrant bodies, shall become your property at the time of removal from the trench, unless otherwise specified or shown on the Plans. Such material shall not be allowed to accumulate along the line of Work, but shall be removed from the area at the earliest practical time.

8. You shall notify the Public Utilities Department 48 hours in advance of abandonment to obtain the delivery location for salvaged fire hydrant bodies.

ADD:

306-3.3.2 Abandonment of Sewer Facilities.

1. You shall plug existing sewer mains to be abandoned at downstream locations identified on the Plans and as approved by the Engineer. You shall monitor the abandonment for a 48-hour period to ensure that there is no flow in the existing main or laterals. If there is flow in the existing main, you shall perform a dye pack test to confirm that the abandonment has been successfully completed.

2. Sewer mains to be abandoned in place shall be completely filled with CLSM in accordance with 201-6, "CONTROLLED LOW STRENGTH MATERIAL (CLSM)". Plug both ends of each pipe segment with concrete plugs. You shall demonstrate to the Engineer that conduits being abandoned are completely filled as evidenced by the filler material flowing through ventilation holes and through the ends of pipe segments. You shall submit the method of abandonment, the materials to be used, and the locations and sizes of the ventilation holes to the Engineer.

3. You shall notify the Public Utilities Department 48 hours in advance of abandonment to obtain the delivery location for salvaged manhole lids and frames.

4. You shall ensure that the proposed sewer laterals have been successfully connected to the proposed sewer mains and that watertight capping or plugging has been completed before abandoning any existing sewer main and laterals. Sewer laterals to be abandoned shall be plugged with concrete at the property line or as located in the Site by the Engineer in the vicinity of the property unless otherwise shown on the Plans.

5. Any existing sewer cleanout accessing a main to be abandoned shall be abandoned. Cleanouts and risers to be abandoned shall be cut and plugged at least 3 feet (0.9 m) below finish grade or below the top of curb, whichever is lower.

    a. In non-paved areas, the remaining voids shall be filled with suitable material compacted to a relative compaction of 90% and concrete plugged.

    b. For paved areas, the remaining voids shall be filled with CLSM and shall be concrete plugged. Pavement shall be restored.

    c. You shall reconstruct concrete sidewalk, curb, and gutter to match existing.

ADD:

306-3.3.3 Abandonment of Storm Drain Facilities.

1. You shall plug existing storm drain mains to be abandoned at downstream locations identified on the Plans and as approved by the Resident Engineer.

2. Storm drains to be abandoned in place shall be completely filled with CLSM in accordance with 201-6, "CONTROLLED LOW STRENGTH MATERIAL (CLSM)". Plug both ends of each pipe segment with concrete plugs. You shall demonstrate to the Resident Engineer that conduits being abandoned are completely filled as evidenced by the filler material flowing through ventilation holes and through the ends of pipe segments. You shall submit the method of abandonment, the materials to be used, and the locations and sizes of the ventilation holes to the Engineer.

3. You shall notify the Storm Water Department 48 hours in advance of abandonment to obtain the delivery location for salvaged manhole lids and frames.

4. Any existing storm drain cleanouts and inlets accessing a main to be abandoned shall also be abandoned. Cleanouts and risers to be abandoned shall be cut and plugged at least 3 feet (0.9 m) below finish grade or below the top of curb, whichever is lower.

    a. In non-paved areas, the remaining voids shall be filled with suitable material compacted to a relative compaction of 90% and then concrete plugged.

b. For paved areas, the remaining voids shall be filled with CLSM and shall be concrete plugged. Pavement shall be restored.

c. You shall reconstruct concrete sidewalk, curb, and gutter to match existing.

ADD:

306-3.3.4 Payment.

1. The payment for removing, plugging, and abandoning existing water facilities and appurtenances within the proposed trench zone shall be included in the Bid items for the new water facilities Work.
2. The payment for removing, plugging, and abandoning existing water facilities and appurtenances outside the proposed trench limits as shown on the Plans shall be included in the Bid item for "Removal or Abandonment of Existing Water Facilities".
3. The payment for water mains and appurtenances to be filled and abandoned outside of the trench limits shall be included in the Bid item for "Abandon and Fill Existing Water Main Outside of the Trench Limit".
4. The payment for removing meter boxes previously abandoned within the Project limits shall be included in the Bid item for "Removal of Abandoned Water Meter Box".
5. The payment for service laterals to be plugged and abandoned in place shall be included in the Bid item for the sewer main Work.
6. The payment for sewer mains to be filled and abandoned outside of the trench limits shall be included in the Bid item for "Abandon and Fill Existing Sewer Main Outside of the Trench Limit".
7. The payment for the abandonment of existing manholes outside the trench limits, including the concrete plugs, shall be included in the Bid item for "Abandon Existing Manhole Outside of the Trench Limit".
8. The payment for the abandonment of sewer cleanouts outside of the trench limits shall be included in the Bid item for "Abandon and Fill Sewer Cleanout Outside of Trench Limit".
9. The payment for removing, plugging, and abandoning existing storm drain facilities and appurtenances within the proposed trench limits shall be included in the Bid items for the new storm drain facility Work.
10. The payment for storm drain pipes to be filled and abandoned outside of the trench limits shall be included in the Bid item for "Abandon and Fill Existing Storm Drain Pipes Outside of the Trench Limit".
11. The payment for the abandonment of existing storm drain cleanouts and inlets outside the trench limits, including concrete plug Work, shall be included in the Bid item for "Abandon Existing Storm Drain Cleanouts and Inlets Outside of Trench Limit".

12. The payment for pavement restoration including influence area shall be included in the Bid items for the associated abandonment Work.

ADD:

306-3.3.5 Asbestos Materials.

1. If building materials are to be disturbed, regardless of the buildings age, the contract documents must include a survey that complies with San Diego Air Pollution Control District Rule 1206 and indicates the presence or absence of asbestos in the materials to be disturbed. When asbestos containing materials will be disturbed an asbestos abatement specification must also be included in the contract documents and adhered to.

2. If you identify suspect asbestos containing materials (ACM) at the Work Site, that have potential for impact as part of the scope of work, you shall immediately stop Work in the affected area and notify the Engineer unless the Contract Documents show the presence of such materials and indicate they are non-asbestos containing.

3. If suspect ACM is disturbed during work and the Contract Documents do not indicate they are non-asbestos containing, you shall immediately stop work in the affected area and notify the Engineer.

306-3.3.5.1 Non-Friable Asbestos Cement Pipe (ACP).

1. You shall take adequate care to maintain the materials in a non-friable state. You shall be responsible for the ACM removal. Any associated contamination clean-up resulting from improper handling shall be conducted by a California Department of Occupational Safety and Health (DOSH) asbestos abatement contractor.

2. Removal of ACP shall be in whole sections where possible. You shall comply with the following requirements for cutting ACP using a hydraulic snap cutting method:

    a. Evacuate the area of unauthorized personnel, post warning signs, and provide adequate barriers to keep unauthorized personnel out of the area.

    b. Provide the workers performing the hydraulic snap cutting of asbestos material with all required personal protective equipment and comply with all applicable respiratory protection requirements of Title 8, §5144 as applicable to the Work.

    c. Hydraulic Snap Cutting of asbestos material to facilitate removal shall be in compliance with California Regulations, Title 8, §1529. You shall only perform cutting of ACP using a hydraulic snap cutting method. Areas to be hydraulicly snap cut shall be adequately wetted with amended water to reduce fiber emission. All powered and hand

operated saws shall not be allowed.

d. If a collar needs to be detached for removal of whole ACP sections, the pipe on either side of the collar is to be cut using a hydraulic snap cutter. Areas to be hydraulically snap cut shall be adequately wetted with amended water to reduce fiber emission. The cutting removal method shall minimize fiber release. Any related debris generated from the hydraulic snap cutting of asbestos material shall be considered friable and disposed of accordingly.

e. Immediately upon removal, ACP shall be wrapped in two layers of 6 mil (150µm) polyethylene sheeting or bags, sealed with appropriate tape, and properly labeled and removed away from the construction area to prevent damage.

f. You shall transport the wrapped and sealed ACP to a designated secure disposal bin on the Site no later than the end of each Working Day. The bin shall be secured and locked or located within a secure construction area in a manner to prevent unauthorized access.

g. You shall comply with City of San Diego Miramar Landfill Acceptance Criteria for the Disposal of Non-Friable Asbestos Waste requirements. A copy of the requirements is available by calling (858) 573-1415 or online at:

https://www.sandiego.gov/environmental-services/ep/special-waste

h. You shall be responsible for providing your own certification of non-friability.

i. A minimum of 5 Working Days prior to the transportation of the ACP disposal bins or friable asbestos waste, you shall provide notice to and assist the Resident Engineer in completing the Inspection Work Request Form for the Asbestos, Lead, and Mold Program. You shall also provide notification to the Asbestos Lead and Mood Program via-email to ALMP@sandiego.gov. The Special Waste Disposal Request Form is available online at:

https://www.sandiego.gov/environmental-services/ep/special-waste

j. Only a representative of the City's Asbestos and Lead Program shall sign the manifests as the generator.

k. Friable asbestos wastes are regulated as hazardous waste (California Code of Regulations, Title 22, Division 4.5, Chapter 11, Article 3, §66261.24) and shall be transported by a licensed hazardous waste hauler and disposed of at an appropriate landfill.

306-3.3.5.2 Asbestos Cement Pipe Training.

1. You shall comply with the provisions of California Title 8, §5208 and §1529, and Title 40 CFR Part 61. Your workers handling ACP shall be trained in accordance

with Title 8 CCR §1529 regarding the dangers inherent in handling asbestos materials and breathing asbestos dust, proper Work procedures, and personal and area protective measures. Topics covered in a state accredited course for ACP shall include the following:

a. Methods of recognizing asbestos.

b. Health effects associated with asbestos.

c. Relationship between smoking and asbestos in producing lung cancer.

d. Nature of operations that could result in exposure to asbestos.

e. Importance of and instruction in the use of necessary protective controls, practices, and procedures to minimize exposure including:

1) Purpose, proper use, fitting, instructions and limitations of respirators as required by Title 8 CCR § 5144.

2) Appropriate Work practices for the ACP Work. Work practices shall include hands-on training.

306-3.3.5.3 Asbestos Cement Pipe Submittals.

1. You shall submit the following information to the Engineer prior to the start of the Work:

a. A Work plan showing the means and methods of performing the Work, disposal bin locations and details on how they will be secured, information about the disposal transporter and disposal locations, and information on how you will handle friable asbestos waste if any is generated.

b. Copies of notifications made to regulatory agencies, if required.

c. Evidence that workers handling ACP have been trained, certified, and accredited as required by law.

d. All workers engaged in ACP work shall wear appropriate respiratory protection as required by 29 CFR 1910.1001(e)(4). For each worker engaged in the non-friable Work, submit a doctor's report from medical examinations conducted within the last 12 months as part of compliance with OSHA medical surveillance requirements for each worker who is to enter the work area. You shall submit, at a minimum, the following for each worker:

1) Name and Employee Identification Number.

2) A Current fit test completed within the prior 12 months.

3) Physician's written opinion from the examining physician including the following:

a) Whether the worker has any detected medical conditions that would place the worker at an increased risk of material health impairment from exposure to asbestos.

b) Any recommended limitations on the worker.

c) Recommendations on the use of personal protective equipment including respirators.

d) A statement that the worker has been informed by the physician of the results of the medical examination and of any medical conditions that may result from asbestos exposure.

e. You shall not start Work until the submittals are returned with the City's Asbestos and Lead Management Program's written approval.

2. You shall submit the following information to the Engineer immediately following the removal and disposal of ACP:

a. Copies of all waste shipment records.

b. Copies of all air monitoring results taken during the removal in compliance with OSHA. Air sample results shall be submitted to the Engineer within 24 hours.

306-3.3.5.4 Friable Asbestos.

1. Any friable asbestos (material that can be crumbled, pulverized, or reduced to powder by hand pressure) or soil that is contaminated with friable asbestos are regulated as hazardous waste (California Code of Regulations, Title 22, Division 4.5, Chapter 11, Article 3, §66261.24). The City reserves the right to select another qualified Contractor to perform the Work related to friable asbestos materials.

306-3.3.5.5 Payment.

1. The payment for the handling and disposal of asbestos-containing materials shall be paid for as Extra Work unless a Bid item has been provided for "Handling and Disposal of Non-friable Asbestos Material".

ADD:

306-3.7 Imported Backfill.

1. If you elect to import material from a source outside the project limits for use as backfill, the backfill material, delivery of samples, suitability, and placement method shall be in accordance with 217-2.2, "Imported Trench Backfill".

2. Should the imported material not be substantially the same as the approved sample, it shall not be used for backfill and shall be removed from the Work site at your expense.

3. The densification method for imported material authorized by the Engineer shall be dependent upon its composition, the composition of the in-place soil at the point of placement, and the relative compaction to be obtained.

306-4 SHORING AND BRACING

306-4 SHORING AND BRACING. ADD the following:

1. Shoring is considered to be the adequate sheeting, shoring, bracing, or equivalent method for the following:
   a. The protection of life and limb which shall conform to applicable safety orders.
   b. The protection of existing underground and above-ground private and public improvements.
   c. The remedy of any and all conditions encountered, regardless of depth, during the construction of the Project.
2. You shall take appropriate measures when trenching adjacent to the existing utilities to prevent the existing utility trench from sloughing into the new trench excavation. The wall of the new trench may be adjacent to the edge of the existing trench and therefore may contain loose material. You are required to use adequate shoring or other protective construction measures as required by field conditions to prevent damage to pavement outside the trench width and to prevent sloughing of the trench wall.
3. You shall be responsible for any sloughing and damage to the road surface or other utilities that may occur. It shall be your responsibility to repair any damaged pavement or utilities as a result of the sloughing.

306-6 BEDDING

306-6.3 Bedding for Plastic Pipe and Fittings. ADD the following:

1. CLSM shall be used for bedding and backfilling when HDPE pipe is installed in paved areas, where pipe crosses utility easement, and at locations where pipe is to be backfilled with concrete as shown on the Plans. CLSM shall conform to 201-6, "CONTROLLED LOW STRENGTH MATERIAL (CLSM)" and the following concrete classes or as designated in the Contract Bid item or shown on the Plans:
   a. 190-E-400 in residential and local streets.
   b. 380-E-800 in major and arterial streets.
2. The concrete backfill shall be placed in the trench against undisturbed material at the sides and bottom of the trench and in a manner that shall prevent floating or shifting of the pipe and that shall prevent voids in or segregation of the concrete. Foreign material which falls into the trench prior to or during the

placement of concrete shall be immediately removed. Where necessary, earth plugs shall be constructed and compacted at the ends of the planned concrete backfill to contain the concrete within the trench.

3. The surface of the concrete backfill shall be finished with a heavy broom to produce a uniform rough surface if asphalt concrete is to be placed directly.

4. No material shall be placed on top of the concrete backfill until 24 hours after placing the concrete backfill.

5. Bedding material for irrigation pipe, direct burial control wire, and electrical conduit shall be SE 50, plaster, or mortar sand in accordance with 200-1.5, "Sand".

306-6.5.1 General. DELETE in its entirety and SUBSTITUTE with the following:

1. For PVC water pipes:

   a. Bedding material shall:

      1) Either be sand, crushed aggregate, or native free-draining granular material.

      2) 100% of the bedding material shall pass the no. 4 sieve and shall have an expansion when saturated with water of not more than 0.5%.

      3) Have a sand equivalent of SE 50. SE 30 or higher may be substituted for SE 50 as bedding material if all of the following requirements are met:

      4) The top of the pipe and haunch areas are mechanically compacted by means of tamping, vibrating roller, or other mechanical tamper.

      5) Equipment is of size and type approved by the Engineer.

      6) 90% relative compaction or better is achieved.

   b. When jetting, care shall be exercised to avoid floating of the pipe.

2. PVC sewer pipes shall be bedded in 3/8 inch (9.5 mm) or 1/2 inch (12.5 mm) crushed rock in accordance with 200-1.2, "Crushed Rock and Rock Dust". Crushed rock for PVC sewer pipes may contain recycled Portland Cement Concrete and shall conform to gradation requirements for 3/8 inch or1/2 inch nominal size as shown in Table 200-1.2.1 (A).

3. Storm drains and all types of non-PVC sewer mains shall be bedded in 3/4 inch (19 mm) crushed rock in accordance with 200-1.2, "Crushed Rock and Rock Dust". Crushed rock for storm drains may contain recycled Portland Cement Concrete and shall conform to gradation requirements for 3/4 inch nominal size as shown in Table 200-1.2.1 (A). Bedding shall be placed to a depth of 4 inches (101.6 mm) below the outside diameter of the pipe or 1 inch (25.4 mm) below the bell of the pipe, whichever is greater.

306-7 PREFABRICATED GRAVITY PIPE

306-7.1 **General.** To Table 306-7.1, ADD the following:

Gravity Pipe Material	Material Specification	Installation Specification
Perforated PVC Pipe	207-17.7	1102-4.2

306-7.7.1 **General.** To paragraph (1), ADD the following:

a. Perforated PVC Plastic Pipe conforming to 207-17.7, "Perforated PVC Pipe".

ADD:

306-7.7.2.4 **Fiberglass Reinforced Polymer Mortar (FRPM) Pipe.**

1. Each section of pipe shall be moved or installed using approved non-metallic slings. The slings shall support each pipe section at a minimum of 2 locations in such a way that the pipe is not damaged by flexure or abrasion. Submit detailed drawings of slings proposed for the handling of the pipe during production, loading, unloading, and installation.

2. The installation depth of CCFRPM pipe shall be limited to a minimum cover of 5 feet (1.5 m) to a maximum of 15 feet (4.6 m) including cover, unless a special design is approved by the Engineer.

306-7.8.2.1 **General. ADD the following:**

1. Testing of the completed pipeline shall be performed in sections between test bulkheads after all anchors and appurtenances have been installed and after backfilling has been completed. Install the test bulkheads at locations approved by the Engineer. Pressure testing against closed valves shall not be allowed.

2. Pressure testing of pipe and fittings at the lowest elevation shall be performed at 150% of the specified test pressure and no less than 100% of the specified test pressure at the highest elevation.

    a. Specified test pressure for Class 235 pipe shall be 150 psi and is tested at 225 psi.

    b. Specified test pressure for Class 305 pipe shall be 200 psi and is tested at 300 psi.

3. Side outlet valves to be furnished with blind flanges shall be tested while uncovered to allow visual inspection for valve leakage during the required field hydrostatic test.

4. An optional field hydrostatic test may be permitted by the Engineer. The duration of the test shall be 1 hour with pumping discontinued at the specified pressure.

5. In the event that the rate of loss of water during the test method exceeds the acceptable rate, you shall locate the leaks and perform the required repairs. Regardless of the outcome of the test, all detectable leaks shall be repaired by you at your expense. Additional testing shall be performed until satisfactory results have been completed. The connections to existing pipelines shall be tested at line pressure after refilling the existing pipelines. Repair all leaks in the connections which occur as a result of testing operations.

6. Leakage shall not be allowed for steel (flanged or welded) and ductile iron (flanged) pipe. You shall provide accurate means for measuring the quantity of water lost. The allowable leakage for all other pipe shall be 15 gallons per inch (2.3 L/mm) of diameter per mile of pipeline within 24 hours.

306-7.8.2.4 Air Pressure Test. ADD the following:

1. For PVC sewer mains, minimum gauge pressures, test durations, acceptance requirements, and gauge certifications shall be in accordance with 306-7.8.2.4.1, "Air Pressure Test for PVC Sewer Mainlines".

ADD:

306-7.8.2.4.1 Air Pressure Test for PVC Sewer Mainlines.

1. Air pressure test sewer lines after laying, backfilling, and compaction. Air pressure testing shall not be required for sewer main replacements where live laterals are connected to the new main.

2. The test section shall be pressurized to 3.5 psi (24.1 kPa) and shall be held above 3.0 psi (20.7 kPa) for not less than 5 minutes. Air shall be added if necessary to keep the pressure above 3.0 psi (20.7 kPa).

3. When the prevailing groundwater is above the pipe being tested, air pressure shall be increased 0.43 psi (3 kPa) for each foot the water table is above the invert of the pipe.

4. The pressure gauge used shall be supplied by you, shall have minimum divisions of 0.1 psi (0.7 kPa), and shall have an accuracy of 0.04 psi (0.3 kPa). Certified testing shall verify the accuracy and the calibration of the gauge firm annually or when requested by the Engineer.

5. At the end of the 5 minute saturation period, note that the pressure shall be at a 3.0 psi (20.7 kPa) minimum and begin the same lapse required for the air pressure drop. If the pressure drops more than 0.5 psi (3.4 kPa) in less than

the time shown in Table 306-7.8.2.4.1, the section of that pipe shall be deemed to have failed the test.

6. For larger diameter pipe use the following formula:

Minimum time in seconds = 1.2 x diameter in mm.

TABLE 306-7.8.2.4.1

1 Pipe Dia (in/cm)	2 Min Time (sec)	3 L for Min Time (ft/m)	4 Time For ADD'l L (sec)	Specification Time for Length (L) Shown (min sec)							
				100 ft. 30.5 m	150 ft. 45.7 m	200 ft. 61.0 m	250 ft. 76.2 m	300 ft. 91.4 m	350 ft. 106.7 m	400 ft. 121.9 m	450 ft. 137.2 m
4/10.16	1.53	597/181.97	0.190 x L	1:53	1:53	1:53	1:53	1:53	1:53	1:53	1:53
6/15.24	2.50	398/121.31	0.427 x L	2:50	2:50	2:50	2:50	2:50	2:50	2:51	3:12
8/20.32	3.47	298/90.83	0.760 x L	3:47	3:47	3:47	3:47	3:48	4:26	5:04	5:42
10/25.40	4.43	239/72.85	1.187 x L	4:43	4:43	4:43	4:57	5:56	6:55	7:54	8:54
12/30.48	5.4	199/60.66	1.709 x L	5:40	5:40	5.42	7:08	8:33	9:58	11:24	12:50
15/38.10	7.05	159/48.46	2.671 x L	7:05	7:05	8:54	11:08	13:21	15:35	17:48	20:02
18/45.72	8.30	133/40.54	3.846 x L	8:30	9:37	12:49	16:01	19:14	22:26	25:38	28:51
21/53.34	9.55	114/34.75	5.235 x L	9:55	13:05	17:27	21:49	26:11	30:32	34:54	39:16
24/60.96	11.20	99/30.18	6.837 x L	11:24	17:57	22:48	28:30	34:11	39:53	45:35	51:17
27/68.58	12.45	88/26.82	8.653 x L	14:25	21:38	28:51	36:04	43:16	50:30	57:42	46:54
30/76.20	14.10	80/24.38	10.683 x L	17:48	26:43	35:37	44:31	53:25	62:19	71:13	80:07
33/83.82	15.35	72/21.95	12.926 x L	21:33	32:19	43:56	53:52	64:38	75:24	86:10	96:57
36/91.44	17.00	66/20.12	15.384 x L	25:39	38:28	51:17	64:06	76:55	89:44	102:34	115:23

306-7.8.3.1 **General.** To Table 306-7.8.3.1, REVISE "Percentage Barrel Deflection Allowed[1,2]" to "Percentage Barrel Deflection Allowed[1, 2, 3, 4]"

To the Table notes, ADD the following:

3. Deflections of up to 6.5% of the in-field measured diameter are acceptable for storm drain applications.

4. Inward bell shaped deflection in the pipe barrel shall not be allowed.

306-8 PREFABRICATED PRESSURE PIPE.

306-8.2.2.2 Mechanical Joints. ADD the following:

1. Joints and mechanical couplings and nuts and bolts shall be field wrapped with a 3-part wax-tape coating system per AWWA C217.

306-8.2.2.3 Installation of Polyethylene (PE) Film Wrap on Iron Fittings. ADD the following:

1. The requirements of this section shall only apply when special coatings are not required or specified for corrosion protection.

ADD:

306-8.5.4 High Deflection Coupling.

1. High deflection couplings shall be constructed in accordance with the Plans and Reference Specifications. Working Drawings prepared by a Civil or Structural Engineer registered in the State of California shall be submitted in accordance with 3-8.2, "Working Drawings" for any proposed additional high deflection couplings not indicated on the Plans and Reference Specifications.

306-8.8 Valves, Hydrants, and Appurtenances. ADD the following:

1. Water valve bypasses for mainlines 16-inch and larger shall be constructed in accordance with the Plans, Reference Specifications, and SDW-154, "Water Valve Bypass Details For Mainlines 16-Inch And Larger".

306-8.8.3 Thrust Blocks. DELETE in its entirety and SUBSTITUTE with the following:

306-8.8.3 Thrust Blocks and Anchor Blocks.

1. Thrust blocks shall be installed at all bends, tees, dead-ends and reducers. The use of restrained joints requires approval from the Engineer. The thrust blocks shall be constructed as follows:

    a. Thrust blocks shall be constructed of concrete conforming to 201-1, "PORTLAND CEMENT CONCRETE".

    b. Unless otherwise shown on the Plans, concrete thrust blocks shall be constructed in accordance with SECTION 303 - CONCRETE AND MASONRY CONSTRUCTION and the Standard Drawings.

c. Concrete blocks shall be constructed between undisturbed ground and fittings to be anchored.

d. Unless otherwise shown on the Plans, the quantity of concrete and the bearing area of the pipe against undisturbed soil shall be as shown on the Standard Drawings.

e. Unless otherwise shown on the Plans, concrete shall be placed so pipe joints and fittings remain accessible to repairs.

2. At least 10 Working Days prior to the construction of thrust blocks and anchor blocks for 16 inch (406.4 mm) and larger water mains, you shall excavate via potholing and expose the soil to the depth of the proposed water main at locations approved by the Engineer. The Engineer will confirm the design when shown on the Plans or will provide the design details within 10 Working Days after the Engineer has observed the exposed Site.

3. If there are conflicts with adjacent utilities that prohibit the installation of the concrete blocks, you shall immediately notify the Engineer.

ADD:

306-8.8.4.1 Water Services.

1. Each service shall have its own meter unless specified otherwise on the Plans. Water Services shall conform to 209-4, "PVC PRESSURE PIPE" and SECTION 212 - WATER AND SEWER SYSTEM VALVES AND APPURTENANCES.

ADD:

306-8.8.4.2 Trenchless Method for Water Services.

1. **General.**

a. Trenchless methods for the installation of water services shall be used at your discretion or when noted on the Plans.

2. **Submittals.**

a. You shall submit the following information:

1) Address and schedule of water services.

2) Method for trenchless construction.

3) Launch and receiving pit and shaft dimensions.

4) Proposed drill path alignment (both horizontal and vertical).

5) Tunnel diameter.

6) Minimum depth of cover.

7) Construction procedure and operation sequence.

8) Tunneling equipment.

b. You shall obtain the Engineer's approval prior to the start of any boring operations.

3. **Water Service Construction.**

a. Copper pipe shall be placed in a perforated sleeve and shall not be pushed or pulled against soil during the installation of water services. The sleeve shall be installed between meter and main launching pits. The sleeve shall be cut flush with walls of meter and main launching pits.

b. The inside diameter of sleeve shall be at least 1 inch (25.4 mm) greater than the outside diameter of the water service. The sleeve tunnel diameter shall not exceed the sleeve diameter by more than 2 inches (50.8 mm) and shall align horizontally within 3 inches (76.2 mm) of meter inlet location. The sleeve material shall be PVC SDR 35 (or higher class). HDPE SDR 21 (or higher class) may be used in lieu of PVC.

c. The construction for each service shall be scheduled to minimize water disruption to the property being served.

306-8.8.5 Acceptance. DELETE in its entirety and SUBSTITUTE with the following:

306-8.8.5 Water Meter Boxes.

1. Water meter boxes that are called out as a Bid items only shall be installed at locations determined by the Engineer.

ADD:

306-8.8.6 Temporary Blow-offs.

1. Caps and plugs installed by you to temporarily close the ends of new mains adjacent to points of connection shall contain 2 inches (50.8 mm) outlets with corporation stops. Corporation stops shall protrude free from thrust blocks and shall be available for use in relieving pressure in the mains prior to connecting. Caps and outlets are your property and shall be removed from the Site after main connections are made.

ADD:

306-8.8.7 Blowoff Valve Assemblies.

1. You shall field verify, with the approval of the Engineer, the final location of each assembly.

ADD:

306-8.8.8 Air and Vacuum Valve Assemblies.

1. You shall field verify, with the approval of the Engineer, the final location of each enclosure.

ADD:

306-8.8.9 Out-of-Service Fire Hydrant Discs.

1. The out-of-service hydrant discs shall conform to the following:
   a. Constructed of heavy-duty plastic and shall have an inside diameter large enough to easily slide over the large port of a fire hydrant and a minimum outside diameter of 11¼ inch (287.8 mm). Refer to Standard Drawing SDW-104 for "Fire Hydrant Installation"
   b. Minimum of 1/16 inch (1.6 mm) thick.
   c. Resistant to tearing, ripping, extreme changes in temperature, and vandalism.
   d. Of a highly visible color of red.
2. **Unless specified otherwise in the Special Provisions**, you shall maintain City provided out-of-service hydrant discs on the large port of every newly installed fire hydrant immediately after it has been bolted in place and existing assemblies that have been taken out of service. You shall unscrew the cap on the large port, place the disc on the port, and securely replace the cap.
3. You shall ensure that the out-of-service hydrant discs remain on the fire hydrants until the new main has been connected to the existing main and accepted.
4. Once in service, City Forces will remove and retain the out-of-service hydrant discs.

ADD:

306-8.8.10 Acceptance.

1. Acceptance testing for valves and appurtenances shall conform to 306-8.9.3, "Testing of Valves and Appurtenances". Valves and appurtenances shall be pressure tested at the same time connecting pipelines are pressure tested. Valves, operators, or control and instrumentation elements whose pressure rating is less than the test pressure shall be protected or isolated during pressure testing.

306-8.9.2.3 Allowable Leakage. DELETE in its entirety and SUBSTITUTE with the following:

1. For prefabricated pressure pipe testing requirements, refer to prefabricated gravity pipe pressure testing requirements in 306-7.8.2, "Pressure Testing and Leakage Inspection".

306-8.9.4.1 General. ADD the following:

1. New water mains shall be disinfected and tested in accordance with AWWA C651 and State Health Department requirements. The City will perform a

chlorine residual test prior to flushing and a bacteriological test after flushing. No main shall be placed in service until the results of the bacteriological tests are announced as satisfactory and until a shutdown has been scheduled.

306-8.9.4.5 Dechlorination and Flushing. ADD the following:

1. When you are required to flush water mains using a 4-inch or larger meter, you shall provide a submittal to the Engineer for review of the proposed connection point of the meter and a plan demonstrating how flushed water will be captured or delivered down the storm drain or sewer system.
2. Once the submittal has been approved, you shall be responsible for coordinating the payment for this meter at Development Services Department by filling out the DSD form for the need for a construction meter for flushing purposes. Once paid by you, call Public Utilities Department Coordination Number at 619-527-7424 to coordinate the delivery and use of the meter in accordance to the approved submittal.
3. You shall return the meter to the City at the completion of work.
4. The payment for the meter cost shall be reimbursed under the allowance Bid item for "**4-Inch or Larger Meter for Construction Flushing**". All other costs associated with the purchase of the meter shall be included in the contract price. Costs associated with flushing operations shall be included under the costs for the pipeline installation.

306-9 CAST-IN-PLACE NON-REINFORCED CONCRETE PIPE (CIPCP)

306-9.1 General. ADD the following:

1. Cast-in-place non-reinforced concrete pipe shall not be allowed for use in San Diego.

306-12 BACKFILL

306-12.1 General. ADD the following:

1. The Engineer shall have the authority to require further testing when, in the opinion of the Engineer, the nature of the native backfill material or maximum dry density of Imported Trench Backfill has changed.

306-12.4.1 General. To paragraph (3), subsection "c", DELETE in its entirety and SUBSTITUTE with the following:

c. The lift of backfill shall not exceed that which can be readily densified by jetting, but in no case shall the undensified lift exceed 10 feet (3 m).

306-12.4.2 Compaction Requirements. ADD the following:

1. All trench backfill shall be compacted to a minimum 90% relative compaction except where 95% relative compaction shall be required by 301-1.3, "Relative Compaction".

306-13 TRENCH RESURFACING

306-13.2 Permanent Resurfacing. ADD the following:

1. A paving machine or spreader box shall be used to place the Class "F" asphalt concrete wearing surface followed immediately by a roller. Resurfacing shall be completed within a maximum of 30 Days after traffic is restored.
2. You shall be responsible for removal and replacement of all permanent paving damaged due to exposition, repair, and replacement of the pipe which has failed testing. You shall not be entitled to any additional Working Days due to delays resulting from removal and replacement of permanent paving due to test failure.

306-14 MEASUREMENT

ADD:

306-14.10 Dewatering.

1. The measurement for dewatering shall be in accordance with to 3-12.8.8, "Payment".

306-14.11 Perforated PVC Pipe.

1. Perforated PVC Pipes are measured along the longitudinal axis between the ends as laid and shall include the actual pipe in place and shall not include the inside dimensions of junction structures.

306-15 PAYMENT

306-15.1 General. DELETE in its entirety and SUBSTITUTE with the following:

1. The payment for pipe and conduit Work shall be included under the linear foot Bid items and shall include the payment for the following:
    a. All wyes, tees, bends, couplings, monolithic catch basin connections, and specials as shown on the Plans
    b. Removal of interfering portions of existing pipelines, sewers, storm drains, and improvements
    c. Closing or removing of abandoned conduit and structures
    d. Trench excavation
    e. Disposal of excess excavation
    f. Control of surface waters

g. Preparation of subgrade

h. Placing and joining pipe

i. Erection and removal of forms

j. Reinforcing steel

k. Pressure testing

l. Disinfection sample collection and delivery

m. Backfilling the trench

n. Permanent resurfacing. See **306-1 GENERAL** for permanent pavement restoration requirements.

o. Trench shoring and plans, excluding engineered shoring, and engineered shoring plans

p. All other Work (excluding temporary resurfacing) necessary to install the pipe or conduit, complete in-place.

2. No separate or additional payment shall be made for additional bedding or a higher strength of pipe necessitated by you exceeding the maximum trench width, unless a bid item has been provided.

3. Payment for pavement restoration, including influence area, shall be included in the associated Bid items pertinent to the Work.

306-15.2 Shoring and Bracing. ADD the following:

1. The payment for furnishing, installing, maintaining, and removing all sheeting, shoring, or bracing for conditions encountered that require shoring, excluding engineered Shoring Plan requirements, shall be included with the Bid items for the pipe and conduit Work in 306-15.1, "General".

2. When provided, the Bid item for "Engineered Trench Shoring" shall include full compensation for furnishing, installing, maintaining, and removing all sheeting, shoring, or bracing for any conditions encountered that require shoring including the preparation of engineered Shoring Plans in accordance with 5-7.2.2, "Shoring Plan". No additional payment shall be made.

306-15.3 Dewatering. ADD the following:

1. The payment for dewatering shall be in accordance with 3-12.8.8, "Payment.

306-15.5 Valves. ADD the following:

1. The payment for water valve bypasses shall be included under the Bid items for the following:

a. "Water Valve Bypass for T-Mainline 16 Inch and Larger"

b. "Water Valve Bypass for Straight Mainline 16 Inch and Larger"

306-15.6 Hydrants. ADD the following:

1. The payment for fire hydrant assembly and marker, fire service connection, assembly and backflow preventer, and fire service connection and assembly, shall be included in the Bid items for the following:

    a. Fire Hydrant Assembly and Marker

    b. Fire Service Connection, Assembly, and Backflow Preventer for City Property

    c. Fire Service Connection and Assembly

2. Removal of existing fire hydrants within the trench limits and all appurtenant Work shall be included in the Bid item for "Fire Hydrant Assembly and Marker".

3. Removal of existing fire hydrants outside of the trench limits and all appurtenant Work shall be included in the Bid item for "Removal or Abandonment of Existing Water Facilities" in accordance with 306-3.3.4, "Payment".

4. Payment for fire hydrant discs shall be included in the Bid item for "Fire Hydrant Assembly and Marker"

5. Payment for pavement restoration, including influence area, shall be included in the associated Bid items pertinent to the Work.

6. See **306-1 GENERAL** for permanent resurfacing requirements.

306-15.7 Buried Structures. To sentence (3), DELETE in its entirety and SUBSTITUTE with the following:

The Contract Unit Price shall include excavation, backfill, disposal of all excess excavation, constructing inverts, furnishing and installing castings, restoration of the street surface (See **306-1 GENERAL** for permanent resurfacing requirements) and improvements including but not limited to sidewalk panel, and all other Work, excluding temporary resurfacing, necessary to construct the buried structure, complete in-place.

306-15.8 Pipeline Appurtenances. To paragraphs (3) and (4), DELETE in their entirety.

ADD the following:

1. The payment for meter assembly shall be included in the Contract Price unless a Bid item for each "Meter Assembly" has been provided. Payment for the meter, unless otherwise furnished by the City, concrete pads, appurtenant piping and couplings, meter boxes or vaults, and meter box lids shall be included in this payment.

2. The payment for water services shall be included in the Bid item for each "Water Service" and includes service tap, corporation stop, lateral, riser, angle meter valve, service saddle, meter installation, meter box, meter box lid,

sidewalk panel, and all other service material shown on the Plans **or specified in the Special Provisions**.

3. Payment for water meter boxes and meter box lids shall be included in the Bid item for "Water Services" unless a Bid item for each "Meter Box" has been provided. Payment shall include any additional adjustment to place the box around the meter to ensure the valve is accessible and operating properly (including adjusting the water service pipe beyond the meter box).

4. The payment for trenchless construction of water services shall be included in the Bid item for each "Trenchless Water Service". If your proposed trenchless installation becomes infeasible or does not comply with these specifications, the water services shall be installed by open trench methods and shall be paid by the Bid item for "Water Service".

5. The payment for water service transfers shall be included in the Bid item for each "Water Service Transfer" and shall include extensions, corporation stops, and connections to the existing services.

6. The payment for temporary blow-off valves shall be included in the Bid item for the water main.

7. The payment for permanent blow-off valves shall be included in the Contract Price unless a Bid item has been provided for "Blow-Off Valve Assembly".

8. The payment for air and vacuum (air release) valves shall be included in the Contract Price unless a Bid item has been provided for "Air and Vacuum (Air Release) Valve Assembly".

9. The payment for installing each water quality sampling station shall be included in the Bid item for "Water Quality Sampling Station" and shall include all labor, materials, removal of existing station, and other necessary Work required in order to replace or install the station complete in place in accordance with SDW-163.

10. Payment for pipeline appurtenances will be mate at the contract unit price for each appurtenance of the size including permanent resurfacing requirements. See **306-1 GENERAL** for permanent resurfacing requirements.

ADD:

306-15.10 Thrust Blocks and Anchor Blocks.

1. Thrust blocks and anchor blocks, and all appurtenant Work, for water mains 12 inches (304.8 mm) and smaller shall be included in the Bid items for the water main Work.

2. Thrust blocks and anchor blocks for water mains 16 inches (406.4 mm) and larger shall be included in the Bid item for "Thrust and Anchor Blocks for 16 Inch and Larger Water Mains".

3. The payment for potholing for thrust blocks and anchor blocks for water mains 16 inches and larger shall be included in the Bid item for the water main Work.

ADD:

306-15.11 Imported Backfill.

1. The Bid item payment for "Imported Trench Backfill" shall be made at the Contract Unit Price per ton and shall include payment for suitable backfill material, delivery, installation, and compaction completed in-place. This Bid item shall also include excavation, removal, and legal disposal of native material determined to be unsuitable for use as trench backfill. This bid item will be verified by a printed ticket from the material vendor with a date, time, volume in tons, and with a description of the material.

306-16 MANHOLES

ADD:

306-16 MANHOLES.

1. Manholes located outside of public right-of-way or in an unpaved area shall have covers locked to the frame as shown on SDM-113, "Manhole Cover – Locking Device".
2. Where a manhole is to be constructed on unstable native material, a stable base shall first be constructed with additional bedding material in accordance with 306-6, "BEDDING" to the dimensions specified in writing by the Engineer.
3. Precast manholes shall not have ladder holes.

306-16.1 Polymer Mortar.

1. Polymer mortar shall be used at the riser joints on all manholes to create water-tight joints to resist infiltration.
2. The mortar shall be mixed in accordance with manufacturers specifications, but shall not exceed 5 parts sand to 1 part polymer.
3. Materials shall be in accordance with 201-10.2, "Polymer Mortar".
4. The concrete or other surfaces that are to adhere to the polymer mortar shall be free from dust, loose aggregates, oil, grease, or other contaminants.

306-16.2 Plastic Liner.

1. When noted on the Plans, in the Bid Proposal, or both, pre-cast manhole risers including the cone shall be lined with white polyvinyl chloride sheets. Material shall be in accordance with 210-2, "Plastic Liner". Manholes connecting to mains 15 inches (381 mm) or larger in diameter shall be Plastic lined.

306-16.3 Polyurethane Lining.

1. When Plastic lined manholes and existing manhole reconstruction are noted on the Plans, in the Bid Proposal, or both bases and exposed concrete mortar surfaces, including any remaining risers, shall be protected with a polyurethane coating.

2. Except as otherwise indicated in this subsection, manhole reconstruction shall conform to 502-6, "CLEANING, INSPECTION, TESTING, AND REPAIR OF INSTALLED LINER SYSTEMS".

3. The lining application shall be performed only by workers certified by the manufacturers as trained and experienced with the specified material in accordance with 201-10.3, "Polyurethane Coating" method and equipment of application.

4. You shall demonstrate the material on a sample area, which is representative of a Site application. When approved, the sample area shall serve as a standard for further work.

306-16.4 Exterior Waterproofing.

1. The Exterior surface of all manholes located below plus 7 feet (2.1m) M.S.L. or below ground water level shall be coated with a waterproofing agent consisting of a coal tar epoxy. The coal tar epoxy shall be applied as specified by the manufacturer.

306-16.5 Connection to Existing Manholes.

1. Where connections to existing sewer manholes are required, the manholes shall be broken out as necessary to accommodate the new sewer pipe and the base shall be rechanneled, as required, to allow a smooth transition between the inlet and outlet pipe. The manhole reinforcing steel shall be cut only as required to allow the connection of the new pipe.

2. The existing concrete surface shall be cleaned and prepared with an approved concrete epoxy adhesive prior to the connection of the new pipe and placement of concrete dry pack.

306-16.6 Payment.

1. The payment for manholes shall be included in the Bid item for "Manholes" and shall include polymer mortar, liner, and/or coatings. The cost of the locking device when required shall be included in this payment.

2. The payment for connecting to and rechanneling existing manholes shall be included in the Bid item for "Connection to Existing Manhole and Rechanneling".

3. Where sewer drop manholes are shown on the Plans the payment shall be included in the Contract Price unless a Bid item for "Sewer Drop Manhole" is provided.

4. The abandonment of manholes outside of the trench limits shall be paid in accordance with 306-3.3.4, "Payment".

5. The payment for water proofing and PVC lined manholes shall be included in the Bid item for “Manholes” unless a Bid item for “Manholes PVC Lined” has been provided.

6. All Work under this section shall be subject to the applicable permanent resurfacing restoration requirements in accordance with the City of San Diego Standard Drawings. Payment for pavement restoration, including influence area, shall be included in the associated Bid items pertinent to the Work.

306-17 HOUSE CONNECTION SEWER (LATERALS) AND CLEANOUTS

ADD:

306-17 HOUSE CONNECTION SEWER (LATERALS) AND CLEANOUTS.

1. A connecting sewer is commonly known as a sewer lateral and may be so identified.

2. Laterals shall be replaced and shall include a cleanout at the property line. The Plans show the approximate location of the laterals. Connections shall be made using a “wye” cut-in. Saddle connections shall not be permitted.

3. Lateral connections at the property line shall be made with stainless steel shielded couplings. The Plans show the approximate location of the laterals.

4. If the "wye" is in the public right-of-way, each lot shall be reconnected to a new and separate lateral and shall include separate cleanouts. If the "wye" is out of the public right-of-way, the lots shall be reconnected to a new lateral with a cleanout. A stub-out with a cleanout shall be provided to the property line for future reconnection.

5. Lateral records are available to you for inspection at Public Utilities Department, Maps & Records, (619) 527-7482.

6. If the proposed sewer main alignment is in a different location than the existing main or the proposed laterals are at a different angle than the existing laterals, you shall locate the laterals by using a remote locating device, potholing existing laterals to be connected to the new sewer main, or both.

7. New laterals shall be perpendicular from the new sewer main. You shall determine the exact location of the lateral at the property line prior to the installation of the new main and shall install the corresponding wyes at these locations.

8. Replacement laterals shall be the same size as the existing. The minimum diameter for a lateral and cleanout shall be 4 inches (100 mm).

9. Concrete base shall be required only for a Vitrified Clay Pipe lateral if the vertical drop is 6 feet (1.8 m) or greater. Concrete base shall not be required for PVC or ABS laterals.

10. You shall ensure that sewer laterals have been successfully connected to the new sewer mains and that water tight capping or plugging has been completed

before abandoning any existing sewer mains. You shall plug the existing sewer main that is identified on the Plans to be abandoned at a downstream location approved by the Engineer.

11. You shall monitor it for a 48-hour period to ensure that there is no flow in the existing main. If there is flow in the existing main, you shall perform dye pack testing to determine which lateral remains connected and repeat the 48-hour test once it is replumbed.

12. All Work under this section shall be subject to the applicable permanent resurfacing restoration requirements in accordance with the following City of San Diego Standard Drawings. Payment for pavement restoration, including influence area, shall be included in the associated Bid items pertinent to the Work.

306-17.1 Sewer Lateral with Private Replumbing.

1. Where sewer laterals with private replumbing are shown on the Plans, you shall install a new sewer lateral and new private sewer pipes and connect the new pipe to the private house plumbing. The Work shall be performed by a qualified licensed contractor in accordance with current building and plumbing codes.

306-17.1.1 Location.

1. The location and details of replumbing Work shown on the Plans are approximate. You shall locate sewer laterals by using a remote locating device, potholing existing sewer laterals, or both for the connection to the new sewer main. The alignment for each new connection shall be selected such that the required length of pipe and disturbance to the private property are minimized.

2. Prior to any sewer lateral replumbing construction activity, you shall coordinate with the property owner and arrange for a video recording of existing conditions of the property in accordance with 400-1.1, "Video Recording of Existing Conditions".

306-17.1.2 Permits.

1. It shall be your responsibility to pay for, obtain, and get approval for any required permits for the Work to be done on private property. Submittal of the approved permits shall be a condition of Final Payment for each location.

2. The City has obtained the executed replumbing agreements with the property owners for this project. A copy of the agreements may be obtained from the City's Project Manager. You shall meet with the property owner and the Engineer prior to any Work and coordinate the details of the installation at each location. You shall notify the property owner a minimum of 10 Working Days before beginning Work on private property.

306-17.1.3 Submittals.

1. Prior to any sewer lateral replumbing construction activity, you shall submit a separate Working Drawing of the new connection for each property to the Engineer. Working Drawings shall include a Plan and profile showing existing size and type of material to be used and point of connection to the existing property plumbing. Each Working Drawing submittal shall include a written approval by the property owner including an acknowledgement that the property owner has been provided a copy of the Working Drawings by you including any As-Built conditions.

306-17.1.4 Trenchless Construction.

1. Trenchless methods shall be used for installation if the sewer lateral location intersects existing structures or as noted on the Plans. The following requirements shall apply:

    a. Pipes used for private replumbing shall be a minimum of 4 inches (101.6 mm) in diameter and shall conform to SECTION 207 - GRAVITY PIPE and SECTION 209 - PRESSURE PIPE.

    b. Sewer lateral cleanouts shall be constructed at the connections to the house plumbing and at every bend on private property.

    c. The construction schedule for each replumb shall be arranged to minimize the disruption to the property owner.

    d. You shall ensure 2% fall, avoid existing utilities and foundation, and maintain alignment within the property boundary while meeting the end connection. The borehole diameter shall not exceed the pipe diameter by more than 2 inches (50.8 mm).

    e. Submittal Requirements:

        1) The proposed method shall be submitted for approval.

        2) Address and schedule of sewer lateral replumbs to be tunneled.

        3) Launch and receiving pit locations for each sewer lateral replumbs to be tunneled and shaft dimensions.

        4) Proposed drill path alignment (both horizontal and vertical) for each sewer lateral replumbs to be tunneled.

        5) Pipe physical properties and specifications. Calculations indicating that the method/process used does not exceed the allowable tensile and compression limits of the pipe.

        6) Jacking forces and factor of safety.

        7) Tunnel diameter.

        8) Minimum depth of cover for each sewer lateral replumbs to be tunneled.

        9) Construction procedure and operation sequence.

10) A list of the completed projects and staff experience shall be included in the submittal.

11) Tunneling equipment and grade control methods.

12) Certification that the tunneling method shall be able to achieve the tolerances; if listed in these specifications.

13) If drilling fluid is used, viscosity, density, and composition of drilling fluid.

14) If drilling fluid is used, method of slurry containment and disposal.

306-17.1.5 Private Pump Installation.

1. Private Pumps shall be installed when:

   a. Connection points for replumbs have been verified as stated on the Plans.

   b. The Engineer has determined the elevation of the main in the street cannot be lowered and sufficient slope is unavailable to replumb a house by gravity means.

   c. When shown on the Plans.

2. You shall notify the Engineer a minimum of 10 Working Days before beginning Work on the private pump.

3. The electrical wiring from the private pump shall be connected to the property's electrical panel, in accordance with all applicable governing codes, and the City's electrical standards.

4. Prior to any private sewer pump system construction, you shall submit Working Drawings and detailed installation instructions for equipment to be furnished including dimensional data and materials of construction. The Working Drawings shall include a plan and profile showing location of the private pump, alarm panel, private force main, and point of connection to the existing building plumbing. Each Working Drawing shall include written approval by the property owner.

306-17.2 Payment.

1. The payment for constructing each new sewer lateral and cleanout and for connecting to the main shall be included in the Bid item for "Sewer Lateral and Cleanout" and shall include the removal and replacement of concrete curb and gutter, sidewalk panels, and existing surface improvements as required by the Engineer.

2. The payment for the plugging, monitoring, and testing of the new sewer main shall be included in the Bid item for the new sewer main.

3. The payment for sewer lateral cleanouts, including the removal and replacement of concrete curb and gutter, sidewalk panels, and existing surface

improvements as required by the Engineer, shall be included in the Bid item for "Sewer Lateral and Cleanout" unless a bid item has been provided for each "Sewer Lateral Cleanout".

4. The payment for each cleanout at the end of the sewer main shall be included in the Bid item for "Sewer Main Cleanout" and shall include the removal and replacement of concrete curb and gutter, sidewalk panels, and existing surface improvements as required by the Engineer.

5. The payment for sewer lateral connections shall be included in the Bid item for "Sewer Lateral and Cleanout" unless a bid item has been provided for each "Sewer Lateral Connection".

6. The Bid unit price for the "Sewer Lateral with Private Replumbing" shall include the installation of new pipes connecting to each existing property, plumbing to the new sewer main, installation of clean outs, and locating, capping, or plugging the existing sewer piping. It shall include removal and reinstallation of fences, irrigation, landscaping, ground cover, excavation, backfill and compaction, fittings, and permits necessary to install the new sewer lateral system, in place, and to restore private improvements to pre-Bid condition. Potholing performed for the replumbs shall be included in the unit Bid price for the replumbing Work.

7. When required, the payment for the trenchless construction of sewer laterals with private replumbing shall be included in the Bid item for "Sewer Lateral with Private Replumbing (Trenchless Method)".

8. The payment for each sewer lateral with backwater device assembly shall be included in the Bid item for "Sewer Lateral with Backwater Device Assembly" and shall include the connection to the main.

9. The payment for the private pump system Work shall be included in the Bid item for "Private Pump System". The payment for the private pump system shall include the pumps and appurtenances, electrical hook ups, pump well, discharge line to the main, installation of clean outs, locating, capping, or plugging the existing sewer piping, excavation, backfill and compaction, fittings, inspection Work, and permits necessary to install the new sewer lateral system, in place, and to restore private and public improvements such as the removal and reinstallation of fences, irrigation, landscaping, and ground cover to pre-Bid condition.

10. Within 10 Working Days after the activation of a pump system, you shall make a private pump compensation payment of $6,080 for each pump to the property owner. You shall provide to the City the proof of payment by submitting a copy of the canceled check and a receipt with the property owner's signature. You shall not be entitled to compensation unless this proof is provided. The private pump compensation payment and all related costs shall be included in the Bid item for "Private Pump Compensation".

11. The payment for the extended 3-year warranty and the manufacturer's inspections for the private pump shall be included in the Bid item for "Private Pump Extended Warranty".

12. All Work under this section shall be subject to the applicable permanent resurfacing restoration requirements in accordance with the City of San Diego Standard Drawings. Payment for pavement restoration, including influence area, shall be included in the associated Bid items pertinent to the Work.

306-18 VIDEO INSPECTION

ADD:

306-18 VIDEO INSPECTION.

306-18.1 General.

1. Work under this section, when required, shall consist of investigation of pipelines by use of digital closed-circuit color video recording to determine condition of lines following cleaning, rehabilitation, and installation of gravity pipelines and water lines.
2. In coordination with the Engineer, you shall video record pipelines to:
    a. Locate existing laterals.
    b. Confirm no flow in existing mains prior to abandonment.
    c. Assess the conditions of the existing pipe segments and laterals after the cleaning process and prior to commencing rehab Work.
    d. Accept the newly installed or rehabilitated pipelines.

306-18.2 Video Inspection Camera.

1. The camera source image shall provide a high-resolution video with a minimum 30 frames per second producing a continuously-monitored high-quality picture. All major and minor operational and structural defects in the pipelines shall be discernible from the source image.
2. The minimum video bit rate shall be 4.7 Mega bits per second (Mbps) and minimum audio bit rate shall be 128 Kilo bits per second (Kbps).
3. Video equipment shall include a multi-angle camera capable of spanning 360° circumference and 270° on horizontal axis.
4. Video inspection shall be performed utilizing one of the following video camera systems:
    a. Remote-focus stationary lens cameras.
    b. Rotating-lens cameras.
    c. Pan-and-tilt cameras.
5. The video camera shall be mounted on a skid, floatable raft system, or transporter based on the conditions of the pipeline to be recorded. The radial view camera shall be solid-state color and have remote control of the rotational lens. The camera shall be capable of viewing the complete circumference of the pipe and junction structure as applicable. Cameras using mirrors or exposed rotating heads shall not be acceptable.
6. The camera shall be operative in 100% humidity conditions.
7. Camera lens shall not have less than a 140° viewing angle.

8. Focal distance shall be remotely adjustable through range of 6 inches (152.4 mm) to infinity.

9. The remote-reading footage counter shall be accurate to less than 1% error over the length of the particular section of pipeline being inspected. This distance shall be measured from the centerline of the junctions such as a manhole to the centerline of the next manhole.

10. The camera height shall be adjusted such that the camera lens is always centered in the pipe being inspected. The equipment shall display on the monitor the distance of the camera from the centerline of the starting manhole. Unless otherwise approved by the Engineer, footage measurements shall begin at the centerline of the upstream manhole.

11. Lighting and camera quality shall produce a clear, in-focus picture of the entire periphery of the pipe for a minimum distance of 6 feet (1.8 m). Lighting shall be remote-controlled and adjusted to minimize reflective glare and to avoid any dark or shadowy regions appearing on the video file.

12. The video camera and monitor shall be capable of registering a minimum of 400 vertical lines and 460 horizontal lines resolution and be a clear, stable image with no interference.

13. The video portion of the digital recording shall be free of electrical interference and shall produce a clear and stable image. The audio portion shall be sufficiently free of background and electrical noise providing an oral report that is clear and discernible.

14. For pipes smaller than 6 inches (152.4 mm) in diameter, you shall use portable long-range pan and tilt push cameras with a motorized wheel to push the probe for 180 feet (54.9 m) or more down pipes such as laterals.

15. You shall provide a camera capable of extended video recording lengths and operation in remotely accessed areas without direct vehicular access.

306-18.3 Inspection Procedure.

1. Video inspection shall show with high resolution operational and structural defects such as inflows, sags, offset joints, cracks, roughness, and “fins” or folds in the pipelines. This shall include an audio commentary and inspection log.

2. The Engineer shall be notified a minimum of 2 Working Days in advance of the video inspecting.

3. Video inspection shall be performed one pipe reach (such as manhole to manhole) at a time.

4. You shall video inspect the pipeline with the maximum flow diverted from the pipeline. The pipe reach being inspected shall be isolated from the remainder of the pipelines with the upstream sewage flow bypassed. In the event that the existing flow is interfering with the video operation, a bypass shall be performed by you to lower the flow volume sufficiently to allow for a clear video picture.

Sufficient water shall be supplied to the isolated section to cause drainage reaching the downstream manhole prior to video inspecting. If existing flows are high, Pre-construction video inspection can be done with partial flow.

The depth of the flow shall not exceed the following:

a. For pipes 6 inches to 10 inches (152.4 mm to 254 mm) - 20% of the pipe diameter.

b. For pipes 12 inches to 24 inches (304.8 mm to 609.6 mm) - 25% of the pipe diameter.

c. For pipes 27 inches (685.8 mm) and up - 30% of the pipe diameter.

5. The camera shall be moved through the pipeline in a downstream direction at a uniform rate by means of power cable winches or self-propelled tractors at each manhole and shall stop and rotate the camera head at each lateral connection, defect, or both to allow for adequate evaluation. When necessary, stop to ensure proper documentation of the pipe condition has been recorded but in no case shall the camera be pulled at a speed greater than 30 feet (9.1 m) per minute. A clear picture looking into each service connection shall be provided. Both pre and post video inspections shall be submitted to the Engineer.

6. Measurements for the location of defects shall be above ground by means of a measuring device. Footages shown in the digital files shall coincide with horizontal lengths from the stationing shown on the Plans. Footage measurements shall begin at the centerline of the upstream manhole or storm drain access point unless permission is given by the Engineer to do otherwise.

7. You shall clean the sewer mains or storm drains prior to video inspecting as necessary to adequately perform the video recording operations. If the camera will not pass through the entire pipeline section, you shall reset the equipment at the downstream manhole and attempt to inspect the section of pipe from the opposite direction. If the camera fails to pass through the entire section, it shall be assumed that an obstruction exists. Efforts to video record that section of pipe shall be temporarily suspended and you shall notify the Engineer. Upon removal of the obstruction, you shall complete the inspection.

8. If an obstruction is encountered during the post-construction video inspection, you shall remove the obstruction by excavation, repair, or other means approved by the Engineer at your expense so that video inspection may continue.

9. The system used to move the camera through the pipe shall not obstruct the camera's view. You shall calibrate the measuring device each day with a known distance to the satisfaction of the Engineer prior to starting the inspection and video recording process.

10. You shall obtain the Engineer's approval for any additional point repairs.

11. See the Contract appendices for additional requirements for video inspection deliverables.

306-18.4 Reports and Documentation.

1. You shall provide a sample submittal at the start of the video inspection Work demonstrating the typical video with audio quality and the database to be provided for approval by the Engineer. This submittal shall note any proposed changes to these specifications such as video format, data bases, compression, or other conditions for review and approval by the Engineer.
2. Pre-inspection and post-inspection digital files, log sheets, and reports shall be submitted to the Engineer and shall become City's property.
3. Subsequent to recording, use a dual recording system and submit post video inspection files to the Engineer.
4. You shall use the City's standard inspection introduction, abbreviations, log sheet forms, and severity code with legend when recording the line segment information.
5. The inspection reports shall incorporate and utilize the National Association of Sewer Service Companies (NASSCO) Pipeline Assessment Certification Program (PACP), Manhole Assessment Certification Program (MACP), and Lateral Assessment Certification Program (LACP) to be provided for comprehensive evaluation of pipeline, manhole, and/or lateral conditions such as a standardized listing of facility conditions and defect codes. Pipe conditions and faults information tied to pipe locations shall also be recorded in the Report.
6. Documentation shall consist of color digital video files, log sheets, and a written report detailing the condition of the pipeline and lateral connections and openings. Video files shall be provided on external hard drive or on DVD.
7. The video files shall be highly compressed, resulting in an anticipated average file size of 10 MB per minute of video. The compression shall be in accordance with Windows Media Video (WMV) or mp4 format. The compression shall not significantly degrade the still frame quality of the video or audio signal from the original source video, as judged in a side by side viewing under normal viewing conditions.
8. The report shall note the time and date of video inspection, street name, upstream and downstream manholes, direction of view, direction of flow, surface materials, pipeline lengths, pipe section lengths, pipe sizes, pipe materials, lateral connections, DVD numbers, counter numbers, and a detailed logging of defects encountered in tabular form.

9. Each submittal shall include the following:

   a. Visuals.

      1) Adequate view of the upstream and downstream manholes or storm drain access points and the direction of the survey upstream or downstream.

      2) A pause at and zoom in on the lateral connections for at least 15 seconds for identification of the condition of the connection.

      3) A pause at and zoom in on the identified defects sufficient for identification of the type of problem.

      4) Identified fault conditions or defects, refer to the appendices for NASSCO PACP, MACP, and LACP.

      5) Each pipe section shall be identified by FSN (for sewers) or Drain Conveyance ID (for storm drains), manhole numbers and the street name. If shown on the Plans, station numbers and sheet numbers shall also be identified.

      6) A continuous read-out of the camera distance from the starting manhole to the end point at all times.

      7) Pipe size.

      8) Pipe or liner material refer to the appendices for Material Description and Code.

   b. Audio.

      1) Date of CCTV inspection.

      2) Confirmation of each section to be CCTV inspected such as narratives of manholes, storm access points or station numbers, or FSN's or Drain Conveyance ID's, and direction upstream or downstream.

      3) Description of pipe size lined on post and final videos, material liner type for post and final videos and pipe joint length.

      4) Description and location of each defect.

      5) Description and location of each service connection.

      6) Include brief but informative comments on any data of significance, including, but not limited to, the locations of unusual conditions, type and size of connection, collapsed section, the presence of scale and corrosion, and other discernible features.

      7) A continuous read-out of the camera distance from the starting manhole.

c. Written Documentation.

1) Date of CCTV inspection.

2) Printed labels on DVD or storage device number, location information, date of inspection, and other descriptive information.

3) Location, size, material, and length of pipe.

4) Direction of flow and measurement "From" manhole or storm drain access point or station number "To" manhole or storm drain access point or station number or FSN or Drain Conveyance ID.

5) File numbers itemizing individual segments.

6) Sketch showing the street and cross streets where the CCTV inspection was made.

7) Description and location of each defect or deficiency and a list of all proposed repairs.

8) Description and location of each connection.

9) A menu which lists files for each pipe section to be inspected and the date of the inspection.

10. The reporting software shall be compatible with the City's format requirements. The reporting software shall utilize Microsoft Access database. Only the final database without Facility Sequence Number (FSN) or Drain Conveyance ID duplicates shall be submitted. The reports shall also show all service lateral connection locations.

11. The FSN shall be compatible with the data input features of the reporting software (such as the number of available input digits and/or fields). The file naming convention for final sewer video files consists of the following:

    a. "[Upstream MH FSN]-[Downstream MH FSN]-["U/D" for upstream or downstream run]-[Date code in yyMMdd_HHmmss]" where the date code is for year, month, day, hours, minutes, and seconds.

       Example: 12345-12346-U-210617_154830

12. The FSN or Drain Conveyance ID shall be compatible with the data input features of the reporting software (such as the number of available input digits and/or fields). The file naming convention for final video files consists of 18 for storm drains, including the extension. The structure for storm drains includes the following:

    a. "(First Drain Structure ID)-(Second Drain Structure ID)-(Direction (US or DS).wmv"

       Example: 12504-12505-US.wmv

13. Video files will be reviewed by the Engineer for focus, lighting, sound, clarity of view, and technical quality. Videos recorded while a camera has flipped over in the process of traveling and the viewing of laterals, obstructions or defects that are blocked by cables, skids or other equipment shall not be accepted. Sharp focus, proper lighting, and clear distortion-free viewing during the camera operations shall be maintained. Failure to maintain these conditions shall result in the rejection of the submittal.

14. One file shall be provided for each manhole to manhole pipe segment (or for each manhole to manhole inspection video).

306-18.5 Video Inspection Submittals.

1. You shall make submittals during construction as applicable to the Project. Each video submittal shall be limited to 20 segments. In the event that any deficiencies are discovered by the Engineer, either by your video inspection or the Engineer's inspection, 5 Working Days shall be allowed for the Engineer to judge whether the deficiencies or sags are repairable, in place. If the judgment is made that the deficiencies are non-repairable in place, the affected portion(s) shall be reconstructed at no cost to the City.

    a. Existing Sewer Mains Proposed To Be Replaced - When video inspecting existing mains proposed to be replaced, you shall provide the video files and a red-lined set of Plans showing the location of the existing laterals to the Engineer before constructing the new sewer mains. Sewer lateral video inspection shall be submitted separately.

    b. Post Cleaning Videos Prior To The Rehabilitation Of Mains - You shall video record the pipe segments after the cleaning process has been completed and prior to commencing the rehabilitation Work. If point repairs are necessary, you shall identify the location of the proposed point repairs and submit the post cleaning video within 5 Working Days of completion of the segment cleaning and at least 5 Working Days prior to commencing the rehab Work to obtain prior approval by the Engineer. The Engineer will review each video submittal within 10 Working Days of receiving the submittal. The post cleaning video for the remainder of the mainline segments shall also be submitted.

    c. Post Cleaning Videos Prior to the Rehabilitation of Laterals (Lateral Launch Videos) - You shall video record the lateral segments after the cleaning process has been completed and prior to commencing any Work on laterals. The post cleaning video for lateral launch shall be submitted within 5 Working Days of segment cleaning. The Engineer will review each video submittal within 10 Working Days of receiving each submittal. Each submittal shall be limited to 20 segments. The video inspection shall include the inspection of service laterals a minimum of 30 feet (9 m) in length from the mainline or up to the property line unless an obstruction is encountered.

d. Service Lateral Video - If the property line cleanouts are not known to exist, the service lateral video may be obtained with camera equipment designed to launch into the service lateral from the mainline or access from the private property with the homeowner's permission. Each service lateral shall be identified by the FSN of the mainline, when included in the Contract Documents, and the address of the property which it serves.

e. Final Video Inspection - New sewer mains or storm drains shall be video inspected and recorded not less than 22 Working Days after the completion of permanent trench restoration and finished grading, but prior to final resurfacing. You shall review the digital file for any discrepancies or deficiencies in the installation of the pipe or liner. You shall notify the Engineer at least 30 Working Days in advance of the anticipated date that Acceptance will be requested. If the specified advance notice is not given, Acceptance and bond release may be delayed.

f. For sewer mains only: You shall first clean the line with high pressure water jetting equipment and a sewer ball and then perform tests as specified by the Engineer. You shall provide for the collection of debris from the leaning operation. You shall dispose the water into an existing sanitary sewer system.

g. For sewer mains only: The camera shall stop at each lateral connection, focus on the bottom of the opening, and then shall make one slow clockwise observation around the perimeter of the lateral which clearly shows the quality of the connection. The camera shall then focus on the center of the lateral opening for a minimum of 15 seconds before moving on to also adequately show and document that the saddle has been installed properly for new installations and that the lateral opening has been reestablished for rehabilitation. Each lateral shall be identified by the address of the property which it serves. If you fail to properly show and document within the database any of the lateral openings, you shall be required to repeat the video recording of that section of pipeline at no additional cost to the City.

h. Post-rehabilitation Videos - Post-rehabilitation videos shall be submitted within 30 Calendar Days of the completion of the Work in phases not to exceed 2 mile increments. The final video recording shall clearly show the condition of the liner with ends sealed at the manholes, service laterals, and connection seals. The submittal of this final video recording shall also include MS Access database and marked up Field Book pages or Plans as attachments.

i. Failure to comply with these specifications, including the failure to deliver the submittal(s) within the time identified or if a total of more than 20 segments are submitted in a single video, may result in one or more of the following:

1) A delay of the review and approval of the submittal(s).

2) A delay in progress payments.

3) A requirement for you to repeat video recording at no cost to the City.

306-18.6 Tolerances.

1. Tolerances encountered following inspection shall be addressed as follows:

a. For new underground sewer or storm drain conduit installations, the maximum operational tolerance for sag shall be ½ inch (12.7 mm). When video recorded inspection is used to check for sag, a calibrated ¼ inch (6.4 mm) diameter steel bar mounted in front of the camera shall be used to measure the depth of sag.

b. If the Engineer determines that the deficiencies or sags are non-repairable in place, the affected portion(s) shall be reconstructed in accordance with 6-8, "Completion, Acceptance, and Warranty".

306-18.7 Payment.

1. The payment for the cleaning and video inspection of existing pipelines and culverts shall be included in the Contract Price unless a Bid item has been provided for "Cleaning and Video Inspection of Existing Pipelines and Culverts".

2. The payment for the video inspection of pipelines, culverts, and laterals for acceptance shall be included in the Contract Price unless a Bid item has been provided for "Video Inspection for Pipelines and Culverts for Acceptance".

3. The payment for the cleaning and video inspection of laterals to be rehabilitated (Lateral Launch Videos) shall be included in the Bid item for "Cleaning and Video Inspection of Existing Pipelines and Culverts" unless a Bid item has been provided for "Cleaning and Video Inspection of Existing Laterals".

4. The payment for the video inspection of rehabilitated laterals for acceptance shall be included in the Bid item for "Video Inspection for Pipelines and Culverts for Acceptance".

5. The payment for post-rehabilitation videos shall be included in the associated Bid items provided, regardless of the number of phased videos required at 2-mile increments.

SECTION 307 – JACKING AND TUNNELING

307-1 JACKING OPERATIONS. ADD the following:

1. All Work under this section shall be subject to the applicable permanent resurfacing restoration requirements in accordance with the following City of San Diego Standard Drawings. Payment for pavement restoration, including influence area, shall be included in the associated Bid Items pertinent to the Work.

    a. SDG-105, "Pavement Restoration General Notes"

    b. SDG-107, "Pavement Restoration for Asphalt Concrete Surfaced Streets - Major Excavation"

    c. SDG-108, "Pavement Restoration for Concrete Surfaced Streets and Alleys - Major Excavation"

    d. SDG-117, "Narrow Trench Excavation and Pavement Restoration for Asphalt Concrete Surface Streets Minor Excavation"

    e. SDG-118, "Narrow Trench Excavation and Pavement Restoration for Concrete Surfaced Streets and Alleys - Minor Excavation"

307-1.7 Payment. ADD the following:

1. The payment for jacking operations shall include the casing and the carrier pipes and shall be included in the Bid item for "Sewer Main by Jacking Operation with Steel Casing".

2. All Work under this section shall be subject to the applicable permanent resurfacing restoration requirements in accordance with the City of San Diego Standard Drawings. Payment for pavement restoration, including influence area, shall be included in the associated Bid items pertinent to the Work.

ADD:

307-1.8 Jacking Polymer Concrete Pipe.

307-1.8.1 Material. Polymer Concrete Pipe material shall be in accordance with 207-26, "**POLYMER CONCRETE PIPE".**

307-1.8.2 Installation. The installation of pipe and fittings shall be in accordance with the project plans and specifications and the manufacturer's recommended practices.

307-1.8.3 Pipe Handling. Textile slings, union anchor lifting devices or other suitable materials and/or a forklift are recommended.

307-1.8.4 Jointing.

1. Pipe end, gasket and sealing surfaces shall be inspected for damage and cleaned of all debris.
2. Apply joint lubricant to the sleeve coupling interior and the elastomeric gasket. Use only lubricants approved by the pipe manufacturer.
3. Use suitable equipment and end protection to push the pipes together.
4. Do not exceed joining or pushing forces recommended by the manufacturer.

307-1.8.5 Field Tests.

1. **Pressure Testing and Leakage Testing.** Testing shall conform to 306-7.8.2, "PRESSURE TESTING AN LEAKAGE INSPECTION".

307-1.8.6 Tolerances. Tolerances shall be in accordance with 307-1.5, "Tolerances".

307-1.8.7 Measurement and Payment. The measurement and payment for Polymer Concrete Pipe shall be in accordance with 307-1.6, "Measurement" and 307-1.7, "Payment".

SECTION 308 – MICROTUNNELING

308-1 GENERAL.. ADD the following:

1. All Work under this section shall be subject to the applicable permanent resurfacing restoration requirements in accordance with the following City of San Diego Standard Drawings. Payment for pavement restoration, including influence area, shall be included in the associated Bid Items pertinent to the Work.

    a. SDG-105, "Pavement Restoration General Notes"

    b. SDG-107, "Pavement Restoration for Asphalt Concrete Surfaced Streets - Major Excavation"

    c. SDG-108, "Pavement Restoration for Concrete Surfaced Streets and Alleys - Major Excavation"

    d. SDG-117, "Narrow Trench Excavation and Pavement Restoration for Asphalt Concrete Surface Streets Minor Excavation"

    e. SDG-118, "Narrow Trench Excavation and Pavement Restoration for Concrete Surfaced Streets and Alleys - Minor Excavation"

308-7 PIPE. ADD the following:

1. When required, the carrier pipe shall be constructed **as specified on the Plans and Special Provisions**.

ADD:

308-7.1 Microtunneling Polymer Concrete Pipe.

Microtunneling with Polymer Concrete Pipe shall conform to the material, installation, pipe handling, jointing, and field test requirements in 307-1.8, "Jacking Polymer Concrete Pipe".

308-10 RESTORATION OF SURFACE IMPROVEMENTS. DELETE in its entirety and SUBSTITUTE with the following:

See Section **308-1 GENERA**L for permanent resurfacing requirements.

308-12 PAYMENT. ADD the following:

1. The payment for microtunneling, including casing, carrier pipes, and surface improvement restoration, shall be included in the Bid item for "Sewer Main by Microtunneling with Steel Casing".

SECTION 309 – MONUMENTS

309-2 **MATERIALS.** DELETE in its entirety and SUBSTITUTE with the following:

1. The concrete portion of monuments shall be constructed in accordance with 201-1, "PORTLAND CEMENT CONCRETE" and SECTION 303 - CONCRETE AND MASONRY CONSTRUCTION.

2. Monument markers shall be as approved by the City and furnished by you.

309-3 **CONSTRUCTION.** ADD the following:

1. Adjustment of Survey Monuments shall be in accordance with 403-4, "SURVEY MONUMENTS".

SECTION 314 – TRAFFIC STRIPING, CURB AND PAVEMENT MARKINGS, AND PAVEMENT MARKERS

314-1 **GENERAL.** ADD the following:

The Contractor shall install all traffic striping, pavement markings, pavement markers and devices within 15 calendar days, and no less than 7 calendar days after the last coat of slurry has been applied in accordance with current standards regardless of the existing conditions and installation will include the proposed striping modifications as identified in the Contract Document. All striping modifications shall be coordinated by the Engineer.

Any traffic signage installation as required by the striping plans shall be installed concurrently or prior to the striping installation.

Pedestrian crosswalks, limit lines, pavement arrows, pavement legends, diagonal markings, chevron markings and all bikeway markings shall be installed utilizing 125 mil thickness thermoplastic marking material. All markings noted as green should be skid/slip resistant and comply with the Federal Highway Administration's Interim Approval for Optional Use of Green Colored Pavement for Bike Lanes (IA-14).

314-4.3.7 **Payment.** ADD the following:

1. The payment for the removal and replacement of existing traffic striping, pavement markings, and pavement markers shall be included in the lump sum Bid item for "Removal and Replacement of Existing Paint Striping".
2. The payment for the new installations of traffic striping, pavement markings, and pavement markers, shall be included in the lump sum Bid item for "Paint Striping".

314-4.4.5 **Measurement.** ADD the following:

1. Thermoplastic traffic striping for continental crosswalks shall be measured by the square foot for the actual area covered with thermoplastic.

314-4.4.6 **Payment.** DELETE in its entirety and SUBSTITUTE with the following:

1. No separate payment shall be made for establishing alignment for stripes and layout Work.
2. The payment for the removal and replacement of existing thermoplastic traffic striping, pavement markings, and pavement markers shall be included in the Bid item for "Removal and Replacement of Existing Thermoplastic Striping and Markings".
3. The payment for the installation of proposed thermoplastic striping as shown on the Plans shall be included in the Bid item for "Thermoplastic Traffic

Striping" and shall include the payment for the installation of pavement markers.

4. The payment for the installation of proposed thermoplastic pavement markings as shown on the Plans shall be included in the Bid item for "Thermoplastic Pavement Markings".

5. The payment for the thermoplastic traffic striping of continental crosswalks shall be included in the Bid item for "Continental Crosswalks" and shall include the payment for the removal of existing striping, pavement markers, and paving markings.

314-5.7 Payment. DELETE in its entirety and SUBSTITUTE with the following:

1. All work, materials, labor, costs, and time associated with removing traffic striping, pavement markings and thermoplastics, removal of pavement markers and devices, installing painted traffic striping and markings, installing thermoplastics, installing continental crosswalks, replacement and installation of new pavement markers and devices shall be included in the lump sum bid item for **"Remove, Replace and Install Traffic Striping, Markers, Markings and Devices"** regardless of amount installed.

   This Bid Item also includes payment for the removal of existing traffic striping, pavement markings, and pavement markers for streets requiring striping modifications as indicated in the contract documents

2. All work, material, labor, costs, and time associated with installing painted traffic striping and markings, installing thermoplastics, installing continental crosswalks, removing and installing traffic signage, installing pavement markers and devices, installing channelizers, and installing other markings in accordance with the Striping Plans

ADD:

SECTION 315 – HORIZONTAL DIRECTIONAL DRILLING

315-1 GENERAL.

1. Horizontal Directional Drilling (HDD) is a multiple pass trenchless construction technique for installing underground conduits utilizing specialty equipment, driller's mud, and directional locating system(s) along a predetermined path. **When specified** or as approved by the Engineer, HDD shall be subject to the specifications in this section.

2. All Work under this section shall be subject to the applicable permanent resurfacing restoration requirements in accordance with the following City of San Diego Standard Drawings. Payment for pavement restoration, including influence area, shall be included in the associated Bid Items pertinent to the Work.

    a. SDG-105, "Pavement Restoration General Notes"

    b. SDG-107, "Pavement Restoration for Asphalt Concrete Surfaced Streets - Major Excavation"

    c. SDG-108, "Pavement Restoration for Concrete Surfaced Streets and Alleys - Major Excavation"

    d. SDG-117, "Narrow Trench Excavation and Pavement Restoration for Asphalt Concrete Surface Streets Minor Excavation"

    e. SDG-118, "Narrow Trench Excavation and Pavement Restoration for Concrete Surfaced Streets and Alleys - Minor Excavation"

315-2 CONTRACTOR'S QUALIFICATIONS AND SUBMITTALS.

1. You shall be a certified installer trained and experienced in the use of the HDD method.

2. You shall submit the following items for the Engineer's approval prior to ordering pipe materials and the start of the Work:

    a. List of past HDD projects successfully completed by the personnel leading the Work, including at least 5 miles in the last 5 years, and a current reference for each project.

    b. Certification that you are currently licensed by the HDD system manufacturer as an installer of their system.

    c. Pipe fusion or welding operator current certification by the fusion or welding equipment manufacturers.

    d. Pre-printed machine specifications or a letter from the HDD machine manufacturer demonstrating that the selected machine(s) is capable of progressing through the anticipated soil conditions suitable for the

size and scope of the Project. Calculations showing drill rig shall exceed maximum anticipated pull-back of pushing forces, as measured by the worst case, by at least 25%.

e. Construction procedure for pipe installation including:

1) Proposed dimensions, locations, methods of excavation, shoring, bracing and ventilation of insertion and receiving pits. Pits shall be of the smallest size practical for construction and shall have a sump to remove incidental construction water.

2) Pilot hole bore diameter and bore hole diameter.

3) Equipment technical data and operating procedures.

4) Method of construction, reconnection and restoration of existing sewer laterals, if applicable.

5) Sewer bypass plans as required.

f. Contingency plans for approval for the following potential conditions:

1) Monitoring for loss of ground or heaving.

2) Encountering an unforeseen obstruction.

3) Loss of, and return to, line and grade.

g. Manufacturer recommendations for handling, storage, and repair of pipe and fittings. Pipe physical properties and specifications. Calculations indicating that the method or process used does not exceed the allowable tensile and compression limits of the pipe and the pipe can withstand the final in place loading.

h. Proposed tracking method to be used during construction.

i. Layout of HDD equipment and above ground equipment at each shaft location. For projects with limited Work area, the HDD machine shall be a pit launched machine.

j. Driller's mud mixing and recycling system details. Information about the drilling fluid to be used (including product information, material specifications, and handling procedures), material safety data sheet and special precautions required, methods of mixing and application, and disposal plan. Circulating pumping capacity as measured by volume, density, and psi shall exceed maximum anticipated requirements by 20%.

k. Method of spoil removal, spoil disposal, disposal location.

l. Electrical system, lighting system, and onsite power generation.

m. Grade and alignment control system details including direction of drive.

n. Compressed air plant details if a pneumatic hammer system is used. Air compressor capacity as measured by volume and psi shall exceed maximum anticipated requirements by approximately 20%.

315-3 DRILLING SYSTEM EQUIPMENT.

1. The directional drilling equipment shall consist of a directional drilling rig of sufficient capacity to perform the bore(s) and pull-back of the pipe(s), a drilling fluid mixing and delivery system of sufficient capacity to successfully complete the Work, and a guidance system to accurately guide boring operations.

315-3.1 Drilling Rig.

1. The directional drilling machine shall consist of a hydraulically powered system to rotate, push, and pull drill pipe while delivering a pressurized fluid mixture to a steer-able drill head. The drill rig may include drill steel handling equipment and grippers for the adding or removal of additional lengths of drill steel. The machine shall be anchored to withstand the pulling, pushing, and rotating forces required to complete the project. The drilling rig hydraulic system shall be self-contained with sufficient pressure and volume to power drilling operations. The hydraulic system shall be free of leaks. The drilling rig shall have a system to monitor and record maximum pull-back hydraulic pressure during pull-back operations.

315-3.2 Drill Head.

1. The horizontal directional drilling equipment shall produce a stable fluid lined tunnel with the use of a steerable drill head. The system shall be able to control the depth and direction of the pipe. Drill head shall contain all necessary cutters and fluid jets for the operation and shall be of the appropriate design for the medium being drilled.

315-3.3 Drilling Fluid System.

315-3.3.1 Drilling Fluid.

1. Drilling fluid shall be composed of clean water and the appropriate additive(s) for the fluid to be used. Water shall be from a clean source and shall meet the mixing requirements of the manufacturer. The water and additives shall be mixed thoroughly to assure the absence of any clumps or clods. No hazardous additives may be used.

2. Drilling fluid shall be maintained at a viscosity sufficient to suspend cuttings and maintain the integrity of bore wall(s). Drilling fluid shall be disposed of offsite in accordance with local, state, and federal requirements and permit conditions. No additional chemicals or polymer surfactants shall be allowed to be added to the drilling fluid as submitted for this project without written consent of the Engineer.

315-3.3.2 Mixing System.

1. A self-contained, closed, drilling fluid mixing system shall be of sufficient size to mix and deliver drilling fluid for the Project. The mixing system shall be able to ensure thorough mixing of the drilling fluid. The drilling fluid reservoir tank shall be sized for adequate storage of the fluid. The mixing system shall continually agitate the drilling fluid during drilling operations.

315-3.3.3 Drilling Fluid Delivery and Recovery System.

1. The drilling fluid pumping system shall have a minimum capacity to supply drilling fluid in accordance with the drilling equipment pull-back rating at a constant required pressure. The delivery system shall have filters or other appropriate in-line equipment to prevent solids from being pumped into the drill pipe.
2. Used drilling fluid and drilling fluid spilled during drilling operations shall be contained and properly disposed of. The use of spill containment measures shall be maintained around drill rigs, drilling fluid mixing system, entry and exit pits and drilling fluid recycling system, if used, to prevent spills into the surrounding environment. Pumps, vacuum truck(s), and storage of sufficient size shall be in place to contain excess drilling fluid.
3. A closed-loop drilling fluid system and a drilling fluid cleaning system shall be used to whatever extent practical depending upon project size and conditions. Under no circumstances shall drilling fluid that has escaped containment be reused in the drilling system.
4. In the event of a drilling fluid fracture, returns loss, or other loss of drilling fluid, operations shall immediately cease and you shall be responsible for restoring any damaged property to original condition and cleaning up the area in the vicinity of the damage or loss. You shall immediately inform the Engineer.

315-3.4 Pipe Pull Heads.

1. Pipe pull heads shall be utilized that employ a positive through-bolt design assuring a smooth wall against the pipe cross-section at all times. Pipe pull heads shall be specifically designed for use with fusible pipe and shall be as recommended by the pipe supplier.

315-4 INSERTION OR ACCESS PITS (SHAFT).

1. The pits shall be located such that their total number shall be minimized and the length of replacement pipe installed in a single pull shall be maximized. Locations of manholes shall be used for insertion or access pits when feasible.
2. Excavation shall be between the easements or right-of-way lines to the lines and grades designated on the Drawings. You shall size and locate pits so that they minimize interferences with vehicular and pedestrian traffic. If the traffic plans cannot accommodate the location or size of the proposed access pits,

you shall be responsible for the changes or for new plans required in accordance with 5-7, "SAFETY".

3. Entry and exit areas shall be excavated so as not to exceed the bending limitations of the pipe as recommended by the manufacturer. The pit(s) and related excavations shall be shored to prevent any movement or slippage of earth. You shall take the necessary precautions, such as chain link fencing or plating, to prevent unauthorized persons from accidentally entering the pits.

315-5 DRILLING LAYOUT.

1. The drill path shall be accurately surveyed with entry and exit areas placed in the appropriate locations within the areas indicated on Plans. If using a magnetic guidance system, drill path will be surveyed for any surface geomagnetic variations or anomalies. Instrumentation shall be provided and maintained at all times that accurately locates the pilot hole, measures drill-string axial and torsional loads and measures drilling fluid discharge rate and pressure. Entry and exit areas shall be drilled without exceeding the bending limitations of the pipe as recommended by the manufacturer.

315-6 SITE LOCATION PREPARATION.

1. The Site as indicated on the Plans shall be graded or filled to provide a level working area. No alterations beyond what is required for operations shall be made. You shall confine all activities to designated Work areas.

315-7 DRILLING CONTROL SYSTEM.

1. The system shall be able to control the depth and direction of the pipe. Calibration of the electronic detection and control system shall be verified prior to the start of the bore. The drilling head shall be remotely steerable by means of an electronic or magnetic detection system. The drilling head location shall be monitored in the three following dimensions:

   a. Offset from the baseline.

   b. Distance along the baseline.

   c. Depth of cover.

315-8 HOLE BORING.

315-8.1 Pilot Hole Bore.

1. Pilot hole shall be drilled along bore path. In the event that the pilot bore does deviate from the bore path, you shall notify the Engineer and the Engineer may require you to pull-back and re-drill from the location along bore path before the deviation.

2. You shall limit curvature in any direction to reduce force on the pipe during pull-back. The minimum radius of curvature shall be no less than that specified

by the pipe manufacturer and as indicated on the Plans. In the event that a drilling fluid fracture, inadvertent returns, or returns loss occurs during pilot hole drilling operations, you shall cease drilling and contact the Engineer.

3. The pilot hole bore alignment shall be approved by the Engineer prior to the back reaming phase and pipe installation.

315-8.2 Reaming.

1. After successfully completing the pilot hole, the bore hole shall be reamed. A swivel shall be used between the reaming head and the fusible pipe to minimize torsion stress on the assembly.

315-9 CARRIER PIPE.

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

315-10 GROUND MONITORING.

1. You shall monitor for ground movement associated with the Work and shall maintain no ground settlement or heave. The pipe shall be installed in a manner that does not cause upheaval, settlement, cracking, or movement and distortion of surface features. You shall monitor for ground movement associated with the Work and make all efforts to maintain no settlement or heave. Monitoring points shall include the centerline of the designed installation with points on the adjacent foundations, unless otherwise approved by the Engineer.

2. You shall be responsible for any damage to existing utilities, structures, and adjacent properties due to settlement or heave and shall repair or replace them in kind at no cost to the City.

315-11 VIDEO INSPECTION AND CLEANING.

1. You shall inspect the sewer pipe immediately after the pipe installation in accordance with 500-3.4, “Video Inspection”. Prior to pipeline CCTV inspection, you shall perform sewer cleaning in accordance with 500-3, “CLEANING AND PRELIMINARY INSPECTION”.

315-12 QUALITY CONTROL.

1. Pipe not meeting the requirements of the Contract Documents shall be abandoned and full pressure grouted in place in accordance with 306-3.3, “Removal and Abandonment of Existing Conduits and Structures” and an

alternate installation shall be done at no cost to the City. The abandoned pipe shall be properly shown on the Red-lines.

2. Line shall not vary from designed centerline by more than 1 inch (25.4 mm) horizontally and shall always be within the confined right of way. Grade shall always intersect the tie-in, provide a properly functioning gravity sewer, shall be ± 1% of design grade at all times, and never less than 1% for sewer mains and 2% for sewer laterals, unless otherwise shown on the plans.

3. If misalignment is encountered during installation due to voids surrounding the existing pipe, you shall replace the defective section by making point repairs that shall be acceptable to the Engineer. You shall be compensated for such corrective measures if the Engineer determines that such difficulties are due to existing voids. If you do not inform and demonstrate this to the Engineer, the misalignment shall be considered to be caused by your failure to follow correct installation procedures and corrective measures shall be done at your expense.

4. If pre-installation CCTV inspection reveals sag, offset joints, or obstructions in the existing sewer, you shall install the replacement pipe for an acceptable finished product. You shall take the necessary measures to eliminate the unacceptable conditions described in these specifications by making point repairs in accordance with 500-4, "PIPELINE POINT REPAIR AND/OR REPLACEMENT", or by other measures acceptable to the Engineer.

5. You shall re-drill another line at no additional cost to the City if gouges or excessive surface damage of more than 10% of the wall thickness occur.

6. The tolerance for the annular space shall be 1 inch (25.4 mm) unless you demonstrate that a proposed higher tolerance is the minimum possible without affecting the main pipeline.

7. Testing of materials shall be in accordance with 500-5.1.1, "Sampling, Testing, and Installation". Testing of the finished pipe shall be performed in accordance with 306-7.8, "Gravity Pipeline Testing".

8. During installation, you shall install a rock trap in the downstream manhole. Install the trap daily prior to the commencement of Work and monitor it during Working hours. The trap shall be removed at the end of each Working Day.

315-13 SEWER LATERAL CONNECTIONS.

1. You shall locate and expose sewer lateral connections prior to pipe installation. Reconnections shall be performed immediately after mainline horizontal directional drilling. Sewer laterals shall be reconnected to the pipe by using heat or electro-fusion tee or wye (Y) or strap saddles. Heat or electro-fusion tees and wye saddles shall be made of a polyethylene pipe compound that meets the requirements of ASTM D1248, Class C, suitable for fusion welding to polyethylene pipe. Once saddles are secured in place, a hole shall

be drilled to the size of the full inside diameter of the saddle outlet. Edges shall be smooth and free of abraded and loose material.

315-14 MEASUREMENT AND PAYMENT.

1. The payment for horizontal directional drilling Work shall include the pipe material and shall be included in the linear foot Bid item for "Horizontal Directional Drilling and Pipe".

2. The payment for each sewer lateral connection associated with Horizontal Direction Drilling shall be included in the bid item for "Sewer Lateral Connection to HDD Pipe".

3. Payment for pavement restoration, including influence area, shall be included in the associated Bid Items pertinent to the Work.

ADD:

SECTION 316 – PIPE BURSTING

316-1 GENERAL.

1. Pipe bursting is the process of bursting the existing pipe and compressing the old pipe sections into the surrounding soil while simultaneously installing a new pipe of the same or larger size inside the annulus created followed by sewer lateral reconnections. When specified or as approved by the Engineer, pipe bursting shall be subject to these specifications.

2. All Work under this section shall be subject to the applicable permanent resurfacing restoration requirements in accordance with the following City of San Diego Standard Drawings. Payment for pavement restoration, including influence area, shall be included in the associated Bid Items pertinent to the Work.

    a. SDG-105, “Pavement Restoration General Notes”

    b. SDG-107, “Pavement Restoration for Asphalt Concrete Surfaced Streets - Major Excavation”

    c. SDG-108, “Pavement Restoration for Concrete Surfaced Streets and Alleys - Major Excavation"

    d. SDG-117, “Narrow Trench Excavation and Pavement Restoration for Asphalt Concrete Surface Streets Minor Excavation”

    e. SDG-118, “Narrow Trench Excavation and Pavement Restoration for Concrete Surfaced Streets and Alleys - Minor Excavation”

316-2 CONTRACTOR’S QUALIFICATIONS AND SUBMITTALS.

1. You shall be a certified installer trained and experienced in the use of the pipe bursting method. The pipe welding shall be performed by personnel trained, experienced, and certified in the use of the welding equipment.

2. You shall submit the following items for the Engineer’s approval prior to ordering pipe materials and the start of the Work:

    a. List of past projects successfully completed by the personnel leading the Work, including at least 5 miles in the last 5 years, and current reference for each project.

    b. Certification that you are licensed by the trenchless pipe replacement system manufacturer as an installer of their system.

    c. Pipe fusion or welding operator certification by the fusion or welding equipment manufacturers.

d. Construction procedure for pipe installation:

1) Proposed dimensions, locations, methods of excavation, shoring, and bracing of insertion and receiving pits.

2) Equipment technical data and operating procedures.

3) Manufacturer recommendations for handling, storage, and repair of pipe and fittings.

4) CCTV inspection performed to locate live services, sags, offset joints, obstructions, and all other necessary information in accordance with 500-3.4, "Video Inspection".

5) Proposed point repair locations and methods.

6) Method of construction, reconnection, and restoration of existing sewer laterals.

7) Sewer bypass plans as required. Provide contingency plans for approval for the following potential conditions:

a) Monitoring for loss of ground or heaving

b) Encountering an unforeseen obstruction

c) Loss of, and return to, line and grade

e. Pipe physical properties and specifications. Calculations indicating that the method or process used does not exceed the allowable tensile and compression limits of the pipe. Provide the proposed tracking method to be used during construction (such as pulling logs).

316-3 HIGH DENSITY POLYETHYLENE (HDPE) PIPE INSTALLATION.

1. Sections of polyethylene replacement pipe shall be assembled and joined on the Site above the ground. The replacement pipe shall be joined in appropriate working lengths near the insertion pit. Jointing shall be accomplished by the heating and butt-fusion system in strict conformance with the manufacturer's printed instructions. The joints shall have a smooth, uniform, double rolled back bead between 1/8 inch and 3/16 inch (3.2 mm and 4.8 mm) made while applying the proper melt, pressure, and alignment. The beads shall be removed prior to pipe installation. The final pipe surfaces shall be smooth after bead removal. Joints shall be made available for inspection by the Engineer before insertion.

2. Pipes shall be capable of withstanding all forces imposed in the process of installation and the final in-place loading conditions. The pipe, including the ends and joints, shall be protected against damage. Any pipe damaged during installation shall be replaced by you. The replacement of damaged pipe or installation of a new pipe shall be at no additional cost to the City.

3. The installed replacement pipe shall be continuous over the entire length of each pipe segment from manhole to manhole. Replacement pipe with gashes, nicks, abrasions, or any such physical damage which may have occurred during storage or handling shall not be used and shall be removed from the Site. You shall exercise care in handling the pipe and shall not drag the pipe on pavement.

316-4 INSERTION OR ACCESS PITS (SHAFT).

1. See 315-4, "INSERTION OR ACCESS PITS (SHAFT)".

316-5 SEWER LATERAL CONNECTIONS.

1. You shall locate and expose sewer lateral connections prior to the pipe installation. Reconnections shall be performed immediately after mainline pipe bursting. Sewer laterals shall be reconnected to the pipe by using heat or electro-fusion tee or wye or strap saddles. Heat or electro-fusion tees and wye saddles shall be made of a polyethylene pipe compound that meets the requirements of ASTM D1248, Class C, suitable for fusion welding to polyethylene pipe. Once saddles are secured in place, a hole shall be drilled to the size of the full inside diameter of the saddle outlet. Edges shall be smooth and free of abraded and loose material.

316-6 GROUND MONITORING.

1. See 315-10, "GROUND MONITORING".

316-7 VIDEO INSPECTION AND CLEANING.

1. See 315-11, "VIDEO INSPECTION AND CLEANING**".**

316-8 QUALITY CONTROL.

1. SEE 315-12, "QUALITY CONTROL".

316-9 PAYMENT.

1. The payment for pipe bursting Work shall include the pipe material and shall be included in the linear foot Bid item for "Pipe Bursting".
2. The payment for each sewer lateral connection associated with Pipe Bursting shall be included in the Bid item for "Sewer Lateral Connection to Pipe Bursting".
3. Payment for pavement restoration, including influence area, shall be included in the associated Bid Items pertinent to the Work.

ADD:

SECTION 317 - PIPE FUSION

317-1 PIPE FUSION FOR SEWER MAINS.

1. All Work under this section shall be subject to the applicable permanent resurfacing restoration requirements in accordance with the following City of San Diego Standard Drawings. Payment for pavement restoration, including influence area, shall be included in the associated Bid Items pertinent to the Work.

    a. SDG-105, "Pavement Restoration General Notes"

    b. SDG-107, "Pavement Restoration for Asphalt Concrete Surfaced Streets - Major Excavation"

    c. SDG-108, "Pavement Restoration for Concrete Surfaced Streets and Alleys - Major Excavation"

    d. SDG-117, "Narrow Trench Excavation and Pavement Restoration for Asphalt Concrete Surface Streets Minor Excavation"

    e. SDG-118, "Narrow Trench Excavation and Pavement Restoration for Concrete Surfaced Streets and Alleys - Minor Excavation"

317-1.1 Fusion Technician Requirements.

1. Fusible HDPE pipe shall be fused by qualified fusion technicians, as documented by the pipe supplier. Training records for qualified fusion technicians shall be available to the Engineer upon request. The fusion technician shall be fully qualified by the pipe supplier to install fusible HDPE pipe of the type(s) and size(s) being used.

317-1.2 Fusion Process.

1. Fusible pipe shall be handled in a safe and non-destructive manner before, during, and after the fusion process and in accordance with these specifications and pipe supplier's recommendations.

2. The fusible pipe shall be installed without exceeding the recommended bending radius.

3. Where fusible pipe is installed by pulling in tension, the recommended safe pulling force, according to the pipe supplier, shall not be exceeded.

4. Only appropriately sized and outfitted fusion machines that have been approved by the pipe supplier shall be used for the fusion process.

5. Fusion machines shall incorporate the following properties and elements:

    a. HEAT PLATE – Heat plates shall be in good condition with no deep gouges or scratches within the pipe circle being fused. Plates shall be clean and free of any contamination. Heater controls shall properly

function and cords and plugs shall be in good condition. The appropriately sized heat plate shall be capable of maintaining a uniform and consistent heat profile and temperature for the size of pipe being fused per the pipe supplier's recommendations.

b. CARRIAGE – Carriage shall travel smoothly with no binding at less than 50 psi. Jaws shall be in good condition with proper inserts for the pipe size being fused. Insert pins shall be installed with no interference to carriage travel.

c. GENERAL MACHINE – Overview of machine body shall yield no obvious defects, missing parts, or potential safety issues during fusion.

d. DATALOGGER – The current version of the pipe supplier's recommended and compatible software shall be used. Protective cases shall be utilized for the hand held wireless portion of the unit. Datalogger operations and maintenance manuals shall be with the unit at all times. If fusing for extended periods of time, an independent 110V power source shall be available to extend battery life.

6. Other equipment specifically required for the fusion process shall include the following:

a. Pipe rollers shall be used for support of pipe to either side of the machine.

b. A weather protection canopy that allows full machine motion of the heat plate, fusion assembly, and carriage shall be provided for fusion in inclement and/or windy weather.

c. Fusion machine operations and maintenance manuals shall be kept with the fusion machine at all times.

d. Facing blades specifically designed for cutting fusible PVC pipe.

7. Each fusion joint shall be recorded and logged by an electronic monitoring device (Datalogger) connected to the fusion machine. The fusion data logging and joint report shall be generated by software developed specifically for the fusion of fusible PVC pipe. The software shall include fusible HDPE pipe based dimensional data and fusible PVC pipe based interfacial pressure relationships. Data not logged by the Datalogger shall be logged manually and be included in the Fusion Technician's joint report.

317-1.3 Fusion Joints.

1. Unless otherwise specified, fusible HDPE pipe lengths shall be assembled in the field with butt-fused joints. You shall follow the pipe supplier's written instructions for this procedure. Joint strength shall be equal to the pipe as demonstrated by the testing requirements. Fusion joints shall be completed as described in these specifications.

2. All internal and external beads shall be removed prior to installation in accordance with the manufacturer's recommendation. The final pipe surfaces shall be smooth after bead removal. Joints shall be made available for inspection by the Engineer before insertion.

3. PVC gasketed and push-on fittings and retainer glands shall be installed per the manufacturer's recommendations.

317-1.4 Pipe Installation.

1. The pipe, including the ends and joints, shall be protected against damage. Any pipe damaged during the installation shall be replaced by you. Pipe shall be fused prior to insertion. The installed replacement pipe shall be continuous over the entire length from manhole to manhole. Replacement pipe with gashes, nicks, abrasions, or any such physical damage which may have occurred during storage or handling shall not be used and shall be removed from the Site. You shall exercise care in handling the pipe and shall not drag the pipe on pavement.

317-1.5 Pipe Pull-Back and Insertion.

1. You shall handle the pipe in a manner that will not over-stress the pipe prior to insertion. Vertical and horizontal curves shall be limited so that the pipe does not over-deflect, buckle, or otherwise become damaged. Damaged portions of the pipe shall be removed and replaced.

2. The pipe entry area shall be graded if needed to provide support for the pipe and to allow free movement into the bore hole. The pipe shall be guided into the bore hole to avoid deformation of or damage to the pipe.

3. The fusible pipe may be continuously or partially supported on rollers or by other Engineer-approved and friction-decreasing supports during joining and insertion if the pipe is not overstressed or critically abraded prior to or during installation.

4. Buoyancy modification shall be at your sole discretion and shall not exceed the pipe supplier's recommendations. Damage caused by buoyancy modifications shall be your responsibility.

5. Once pull-back operations have commenced, the operation shall continue without interruption until the pipe is completely pulled through the bore hole. Except for drill rod removal, pull-back operations shall not cease until the pipe has been completely installed to final position. During the pull-back operations, excessive pull-back force shall be reported to the Engineer.

317-1.6 Connection to Sanitary Sewer Manholes and Structures.

1. Fusible HDPE pipe shall be connected to manholes and other structures to provide a leak-free and properly graded flow into or out of the manhole or structure.

2. For a cored or drilled opening, provide a flexible and watertight connection that meets or exceeds ASTM C923.

3. For a knockout opening, provide a watertight connection meeting the material requirements of ASTM C923 that is securely attached to the pipe with stainless steel bands or other means.

4. For grout openings in manhole walls with non-shrink grout, pour a concrete collar around the pipe and outside the manhole opening. Provide flexible pipe joints or flexible connectors within 2 feet (0.6 m) of collar.

5. A flexible and watertight gasket per ASTM C923 shall be cast integrally with riser section(s) for all precast manhole and structures.

6. Grout internal joint space with non-shrink grout.

317-1.7 Ground Monitoring.

1. See 315-10, "GROUND MONITORING".

317-1.8 Video Inspection and Cleaning.

1. See 315-11, "VIDEO INSPECTION AND CLEANING".

317-1.9 Quality Control.

1. See 315-12, "QUALITY CONTROL".

317-1.10 Payment.

1. The payment for pipe fusion Work shall be included in the linear foot Bid item for "Fusible HDPE Pipe".

2. The payment for each sewer lateral connection associated with fusible HDPE pipe shall be included in the Bid item for "Sewer Lateral Connection" in accordance with 306-17.2, "Payment".

3. Payment for pavement restoration, including influence area, shall be included in the associated Bid Items pertinent to the Work.

317-2 PIPE FUSION FOR WATER MAINS.

317-2.1 Fusion Technician Requirements.

1. Fusible Pressure PVC Pipe shall be butt-fused by qualified fusion technicians, as certified by the pipe supplier. Training records for qualified fusion technicians shall be available to the Engineer upon request. The fusion technician shall be fully qualified by the pipe supplier to install fusible Pressure PVC pipe of the type(s) and size(s) being used.

317-2.2 Fusion Process.

1. Fusible pipe shall be handled in a safe and non-destructive manner before, during, and after the fusion process and in accordance with these specifications and pipe supplier's recommendations.

2. Fusible PVC pipe shall be butt-fused by qualified fusion technicians, as certified by the pipe supplier.

3. Each fusion joint shall be recorded and logged by an electronic monitoring device (data logger) connected to the fusion machine.

4. The fusible pipe shall be installed without exceeding the recommended bending radius.

5. Where fusible pipe is installed by pulling in tension, the recommended safe pulling force, according to the pipe supplier, shall not be exceeded.

6. Only appropriately sized and outfitted fusion machines that have been approved by the pipe supplier shall be used for the fusion process.

7. Fusion machines shall incorporate the following properties and elements:

    a. HEAT PLATE – Heat plates shall be in good condition with no deep gouges or scratches within the pipe circle being fused. Plates shall be clean and free of any contamination. Heater controls shall properly function and cords and plugs shall be in good condition. The appropriately sized heat plate shall be capable of maintaining a uniform and consistent heat profile and temperature for the size of pipe being fused per the pipe supplier's recommendations.

    b. CARRIAGE – Carriage shall travel smoothly with no binding at less than 50 psi. Jaws shall be in good condition with proper inserts for the pipe size being fused. Insert pins shall be installed with no interference to carriage travel.

    c. GENERAL MACHINE – Overview of machine body shall yield no obvious defects, missing parts, or potential safety issues during fusion.

    d. DATALOGGER – The current version of the pipe supplier's recommended and compatible software shall be used. Protective cases shall be utilized for the hand held wireless portion of the unit. Datalogger operations and maintenance manual shall be with the unit at all times. If fusing for extended periods of time, an independent 110 V power source shall be available to extend battery life.

8. Other equipment specifically required for the fusion process shall include the following:

    a. Pipe rollers shall be used for support of pipe to either side of the machine.

    b. A weather protection canopy that allows full machine motion of the heat plate, fusion assembly, and carriage shall be provided for fusion in inclement and /or windy weather.

    c. An infrared (IR) pyrometer for checking pipe and heat plate temperatures.

d. Fusion machine operations and maintenance manual shall be kept with the fusion machine at all times.

e. Facing blades specifically designed for cutting fusible PVC pipe.

9. Each fusion joint shall be recorded and logged by an electronic monitoring device (Datalogger) connected to the fusion machine. The fusion data logging and joint report shall be generated by software developed specifically for the fusion of fusible PVC pipe. The software shall include fusible HDPE pipe based dimensional data and fusible PVC pipe based interfacial pressure relationships. Data not logged by the Datalogger shall be logged manually and be included in the Fusion Technician's joint report.

317-2.3 Fusion Joints.

1. Unless otherwise specified, fusible pressure PVC pipe lengths shall be assembled in the field with butt-fused joints. You shall follow the pipe supplier's written instructions for this procedure. Joint strength shall be equal to the pipe as demonstrated by testing requirements. Fusion joints shall be completed as described in these specifications.

2. All external beads shall be removed prior to installation in accordance with the manufacturer's recommendation. The final pipe surfaces shall be smooth after bead removal. Internal beads need not be removed. Joints shall be made available for inspection by the Engineer before insertion.

3. PVC gasketed and push-on fittings and retainer glands shall be installed per the manufacturer's recommendations.

317-2.4 Pipe Installation.

1. The pipe, including the ends and joints, shall be protected against damage. Any pipe damaged during installation shall be replaced by you. Pipe shall be fused prior to insertion. Replacement pipe with gashes, nicks, abrasions, or any such physical damage which may have occurred during storage or handling shall not be used and shall be removed from the Site. You shall exercise care in handling the pipe and shall not drag the pipe on pavement.

2. During installation, comply with the following:

   a. Installation guidelines from the pipe supplier shall be followed for all installations.

   b. The fusible PVC pipe shall be installed in a manner so as not to exceed the recommended bending radius.

   c. Where fusible PVC pipe is installed by pulling in tension, the recommended safe pulling force established by the pipe supplier shall not be exceeded.

317-2.5 Pipe Pull-back and Insertion.

1. You shall handle the pipe in a manner that will not over-stress the pipe prior to insertion. Vertical and horizontal curves shall be limited so that the pipe

does not over-deflect, buckle, or otherwise become damaged. Damaged portions of the pipe shall be removed and replaced.

2. The pipe entry area shall be graded if needed to provide support for the pipe and to allow free movement into the bore hole. The pipe shall be guided into the bore hole to avoid deformation of or damage to the pipe.

3. The fusible pipe may be continuously or partially supported on rollers or other Engineer approved friction decreasing implement during joining and insertion, if the pipe is not over-stressed or critically abraded prior to or during installation.

4. Buoyancy modification shall be at your sole discretion and shall not exceed the pipe supplier's recommendations. Damage caused by buoyancy modifications shall be your responsibility.

5. Once pull-back operations have commenced, the operation shall continue without interruption until the pipe is completely pulled through the bore hole. Except for drill rod removal, pull-back operations shall not cease until the pipe has been completely installed to final position. During the pull-back operations, excessive pull-back force shall be reported to the Engineer.

317-2.6 Preparation Prior to Connections to Existing Pipe System.

1. Approximate locations of existing piping systems are shown on the Plans. Prior to making connections into existing piping systems, you shall:

   a. Field verify locations, sizes, piping materials, and piping systems of the existing pipe.

   b. Obtain all required fittings, which may include saddles, sleeve type couplings, flanges, tees, or others as shown on the Plans.

   c. Have installed all temporary pumps and/or pipes.

2. Unless otherwise approved, new piping systems shall be completely installed and successfully tested prior to making connections into existing pipe systems.

317-2.7 Pipe System Connections.

1. Pipe connections shall be installed per the applicable standards and regulations as well as per the connection manufacturer's guidelines and as indicated on the Plans.

2. Pipe connections to structures shall be installed per applicable standards and regulations as well as per the connection manufacturer's guidelines.

317-2.8 Tapping for Potable and Non-potable Water.

1. Tapping shall be performed using standard tapping saddles designed for use on PVC piping in accordance with AWWA C605. Tapping shall be performed only with use of tap saddles or sleeves. Direct tapping shall not be permitted. Tapping shall be performed in accordance with the applicable sections for saddle tapping per Uni-Pub-8.

2. All connections requiring a larger diameter than that recommended by the pipe supplier shall be made with a pipe connection as specified and indicated on the Drawings.

3. Equipment used for tapping shall be made specifically for tapping PVC pipe.

   a. Tapping bits shall be slotted "shell" style cutters specifically made for PVC pipe. "Hole saws" made for cutting wood, steel, ductile iron, or other materials shall be strictly prohibited.

   b. Manually operated or power operated drilling machines may be used.

   c. Taps may be performed while the pipeline is filled with water and under pressure (wet tap) or when the pipeline is not filled with water and not under pressure (dry tap).

317-2.9 Hydrostatic Test for Pressure Pipe.

1. Testing shall comply with 306-8.9.2, "Hydrostatic Pressure Test" and all applicable jurisdictional building codes, statutes, standards, regulations, and laws.

   a. Hydrostatic and leakage testing for piping systems that contain mechanical jointing as well as fused PVC jointing shall comply with AWWA C605.

   b. A simultaneous hydrostatic and leakage test following installation with a pressure equal to 150% of the working pressure at point of test but not less than 100% of the normal working pressure at highest elevation shall be applied, unless otherwise approved by the engineer. The duration of the pressure test shall be for 2 hours.

   c. If hydrostatic testing and leakage testing are performed at separate times, follow procedures as outlined in AWWA C605.

   d. In preparation for pressure testing, the following parameters shall be followed:

      1) All air shall be vented from the pipeline prior to pressurization. This may be accomplished with the use of the air relief valves or corporation stop valves, vent piping in the testing hardware or end caps, or any other method which adequately allows air to escape the pipeline at all high points. Venting may also be accomplished by "flushing" the pipeline in accordance with the parameters and procedures as described in AWWA C605.

317-2.10 Disinfection of the Potable Water Pipe.

1. After installation and after passing all required testing, the pipeline shall be disinfected prior to being put into service.

2. Unless otherwise directed by the Engineer, the pipeline shall be disinfected in accordance with 306-8.9.4, "Disinfection" and in accordance with AWWA C651.

317-2.11 Ground Monitoring.

1. See 315-10, “GROUND MONITORING”.

317-2.12 Payment.

1. The payment for pipe fusion Work shall be included in the linear foot Bid item for “Fusible Pressure PVC Pipe”.
2. The payment for water service connections associated with fusible pressure PVC Pipe shall be paid for in accordance with 306-15.8 “Pipeline Appurtenance”
3. Payment for pavement restoration, including influence area, shall be included in the associated Bid Items pertinent to the Work.

END OF PART 3 - CONSTRUCTION METHODS

PART 4
EXISTING IMPROVEMENTS (A)

SECTION 400 - PROTECTION AND RESTORATION

400-1 **GENERAL.** Paragraph (2), DELETE in its entirety.

ADD the following:

1. You shall repair or replace all existing improvements within the project area which are not designated for removal (curbs, sidewalks, driveways, fences, walls, signs, utility installations, pavement, structures, and etc.) that have been damaged or removed as a result of your operations. When a portion of a sprinkler system within the project area must be removed, the remaining lines shall be capped. Repairs and replacements shall be at least equal to the existing improvements and shall match them in finish and dimension.

2. The City reserves the right to repair damages to the City's facilities caused by your operations at your expense.

3. You are responsible for coordinating with property owners for access to be provided to Work on the private property.

4. Underground Work disturbing and requiring the restoration of loop detectors and/or other detection systems shall be replaced within 3 Working Days of the completion of that Work and trench cap. When street overlay Work is required, replace loop detectors and/or other detection systems in accordance with 404-9, "TRAFFIC SIGNAL LOOP DETECTORS".

5. In any emergency affecting the safety of persons or property, you shall act, at your discretion, to prevent threatened damage, injury, or loss. Any change in Contract Price or Contract Time resulting from emergency Work shall be determined as provided in SECTION 2 – SCOPE OF THE WORK.

6. All Work under this section shall be subject to the applicable permanent resurfacing restoration requirements in accordance with the City of San Diego Standard Drawings. Payment for pavement restoration, including influence area, shall be included in the associated Bid Items pertinent to the Work.

ADD:

400-1.1 **Video Recording of Existing Conditions.**

1. To document the Site deficiencies for which you are not responsible for, you shall video record the existing conditions of the Site in advance of the Work. Examples of the items to be recorded may include, but not be limited to:

   a. Property markers.
   b. Right-of-Way and easement conditions.
   c. Utility markings.
   d. Survey conditions.
   e. Pavement conditions.

f. Location and conditions of the existing pavement markers and striping.
g. Adjacent property conditions.
h. Sidewalk, walk, median, curb, and gutter conditions.
i. Safety conditions.
j. Unusual conditions or equipment.
k. Existing canyon conditions (including vegetation) along the pipe corridor.
l. Existing vegetation.
m. Existing turf grass conditions.
n. Existing site improvements.
o. Existing fencing, walls and gates.
p. Any defacing, including graffiti.

2. Submit the DVD recordings to the Engineer prior to the mobilization of each project phase.

400-1.1.1 Payment.

1. The payment for video recording services shall be included in the Bid item for "Video Recording of Existing Conditions".

ADD:

400-1.2 Placement and Removal of Markouts.

1. Markouts refer to the temporary marking or painting of the ground, pavement, or sidewalk by the facility or utility owner or its representative for your convenience.

2. Do not place Markouts in the public right-of-way more than 30 Days prior to the commencement of excavation.

3. Remove Markouts from all surfaces in the public right-of-way, including decorative surfaces, within 30 Calendar Days of the completion of the Work.

400-1.2.1 Payment.

1. **The payment for the placement and removal of Markouts shall be included in the Contract Price.**

ADD:

400-1.3 Construction Maintenance and Temporary Improvements.

1. Where construction fencing and other construction appurtenances impact existing irrigation systems you shall install temporary irrigation improvements outside of the project boundary to ensure adequate irrigation coverage is maintained. You shall be responsible for the design of temporary irrigation improvements.

2. You shall be responsible for the maintenance of existing landscaping within five feet of the construction boundary. At a minimum, maintenance shall include weed abatement, litter pick-up, mowing and trimming.

3. You shall ensure your operations do not impact City maintenance crews from completing their work outside the boundaries of the project.

400-2 **PERMANENT SURVEY MARKERS.** DELETE in its entirety and SUBSTITUTE with the following:

1. Pursuant to Division 3, Chapter 15 of the Business and Professions Code, you shall not disturb survey monuments that "control the location of subdivisions, tracts, boundaries, roads, streets, or highways, or provide horizontal or vertical survey control" until they have been tied out by a Registered Land Surveyor or Registered Civil Engineer authorized to practice land surveying within the State of California.
2. Monument Preservation shall be performed by the City's Construction Management and Field Services (CMFS) Division on all Projects, unless permission is obtained for these services in writing by CMFS.
3. You shall submit to the Engineer a minimum of 7 Calendar Days prior to the start of the Work a list of controlling survey monuments which may be disturbed. CMFS (or the private owner for Permit Work) shall perform the following:
    a. Set survey points outside the affected Work area that reference and locate each controlling survey monument that may be disturbed.
    b. File a Corner Record or Record of Survey with the County Surveyor after setting the survey points to be used for re-establishment of the disturbed controlling survey monuments.
    c. File a Corner Record or Record of Survey with the County Surveyor after re-establishment of the disturbed controlling survey monuments.

400-3 **PAYMENT.** DELETE in its entirety and SUBSTITUTE with the following:

400-3 **TREE PROTECTION DURING CONSTRUCTION.**

400-3.1 **General.** You shall prevent or minimize the following:

1. Root cutting or damage – root systems of trees are extensive and often asymmetric. Roots are damaged by:
    a. Excavation equipment cutting roots during grade change or other activities.
    b. Trenching equipment used for gas, water, sewer, electrical, communication, irrigation, and other utility installations.
    c. Coring or boring during discovery.
    d. Burial of debris.
    e. Adding fill soil over roots.
    f. Altering water tables, water movement, and drainage patterns.
2. Soil compaction – most soil compaction results from vehicle and equipment traffic, although foot traffic and rainwater impact may also contribute to a

lesser extent. The severity of compaction depends on the force per area unit applied to the soil, frequency of application, surface cover, soil texture, and soil moisture. Soils with a clay or loam texture, high moisture content, or low levels of organic matter are more susceptible to compaction than are dry, coarse-textured soils, and those high in organic matter.

3. Injury to the trunk, major roots, and crown – mechanical injury can be caused by equipment used for land clearing, grading, construction, material delivery and landscaping. When injury occurs on bark or other conductive and protective tissues, the capacity of the tree to transport water, nutrients, carbohydrates and signaling compounds is reduced. Insects are attracted to wounds and barriers to pathogen entry are compromised in trees with this type of damage, making them susceptible to future structural and health concerns.

4. Heat damage – foliage, branches, trunks, and some roots can be injured by hot equipment exhaust.

5. Chemical damage – certain chemicals, such as cleaning solvents, paint thinners, oils, and fuels may be lethal to the foliage and roots of trees. These types of injuries are rarely correctable, and place added stress on the tree. Contaminated water runoff from concrete trucks or other equipment can alter soil chemistry and cause root damage or disruption of nutrient uptake.

6. Trunk flare or root collar damage – soil or debris placed against the trunk or over the buttress roots favor the development of certain root disease pathogens, insect pests and encourage stem girdling roots.

400-3.2 Defining the Tree Protection Zone.

1. A tree's Critical Root Zone (CRZ) is the area immediately adjacent to the trunk where roots essential for the tree's health and stability are located. A Tree Protection Zone (TPZ) is an arborist-defined area surrounding the trunk, intended to protect roots and soil within the CRZ and beyond. When defining the TPZ the Trunk Diameter Method will be used to calculate the appropriate TPZ. The trunk diameter method is based on the trunk diameter measured at DBH (4.5 feet above grade); this measurement is multiplied by a factor of 15 to determine the radius of the TPZ. The unit of measure used to calculate the DBH (inches) will be the same unit as the radius of the TPZ. For example, a tree with a 30-inch trunk diameter would have a TPZ radius of 450 inches (37.5 feet).

2. Even when the TPZ is placed at a location defined by the Trunk Diameter Method, large portions of the root system may be lost. The arborist will inspect the tree and site and alter the TPZ as needed to provide adequate tree protection. Trees on adjacent properties may also need to have TPZs established if they are close to construction activities. Compromising the TPZ and damaging roots within the CRZ will reduce likelihood of long-term tree survival and increase the risk of tree failure.

400-3.3 Pre-Construction Consultation with Project Arborist.

1. Prior to construction, tree removals, TPZ establishment, or staging of construction materials and equipment, a pre-construction consultation with the assigned project Arborist shall take place on site to ensure understanding of the scope of tree conservation and removal activities. The project managers, construction contractors, engineers, architects, project arborists and utility representatives may be included in this meeting.

400-3.4 Tree Protection Zone Fencing and Signage.

1. TPZ barriers shall be erected around the zone's perimeter before any site work begins. Fencing shall be sturdy and highly visible to discourage entry into and disturbance of the area. Fencing shall be 4 to 6 feet tall and solidly anchored onto the ground. TPZ barriers shall be clearly marked with signs stating that the area within is a Tree Protection Zone and that entry is prohibited without prior authorization from the project arborist. Signs shall contain contact information for the contractor and project arborist.

400-3.5 Soil and Root Protection within the Tree Protection Zone.

1. If foot or vehicular traffic or construction activities cannot be kept outside of the TPZ for the entire duration of construction, you shall disperse the load and minimize soil compaction and mechanical root damage using the following methods:
    a. Applying 6 to 12-inch-thick layer of 4-inch mulch to the area.
    b. Laying 3/4 -inch minimum thickness plywood or road mats over a 4 inch thick layer of 4-inch mulch.
    c. Applying 4 to 6 inches of gravel over a taut, staked, geotextile fabric.
2. Stone, geotextile, and mulch exceeding 4 inches thick shall be removed from the TPZ once the threat of soil or root damage has passed. Any removal of vegetation or spreading of mulch materials within the TPZ shall be performed manually, and all efforts shall be made to protect the soil.
3. Small power equipment or hand tools shall be used any time work is done within the TPZ to reduce potential for tree damage. Excavations within the TPZ shall be done using specialized tools designed for root pruning or gentle excavation methods, including air excavation tools, pressurized water, or hand tools, as described in the 400-3.6, "Root Pruning within the Tree Protection Zone".

400-3.6 Root Pruning within the Tree Protection Zone.

1. Root pruning shall be done when existing tree roots are damaged as a result of construction activities. The two acceptable methods of root pruning are:
    a. Soil excavation using air excavation tools, pressurized water, or hand tools, followed by selective root cutting using a sharp and sanitary blade.

b. Cutting through the soil along a predetermined line on the surface using a tool specifically designed to cut roots. Blades shall be sharp and sanitary.

2. Damaged roots shall be pruned to result in a flat surface with the adjacent bark firmly attached. Exposed roots shall be pruned with sharp and sanitary tools, such as loppers, hand saws, or small chain saws. Pruning paints or wound dressings shall not be used.

3. You shall not prune roots near the trunk or within the dripline of the tree unless directed to do so by the Arborist.

400-3.7 Grade Changes and Fill within the Tree Protection Zone.

1. When adding fill soil over an existing tree root system, you shall keep the fill soil as far from the trunk and in as think a layer as possible. Coarse-textured fill soils shall be used Compaction of the original site soil and the fill soil shall be minimized to the greatest extent possible.

2. Place the fill soil in direct contact with the original grade with no geotextile or gravel layer.

3. If fill is installed over the tree roots, ensure the original root zone soil remains hydrated. Soil moisture in the fill and native soil shall be monitored and irrigation provided when needed.

400-3.8 Irrigation and Mulch.

1. Irrigation shall be provided within the TPZ when irrigation was previously present or when the hydrology of the site has been altered. Ensure irrigation water penetrates the soil to the depth of the tree roots, generally within the upper 6 to 18 inches of the original soil surface. Monitor soil moisture with soil moisture sensors as directed by the Engineer.

400-3.9 Pruning.

1. Removal of dead, diseased, or dying branches before construction is recommended to reduce the risk of branch failures impacting people, structures, or equipment in the construction area. Crown raising or reduction may be required to allow trucks, cranes, and other equipment to access the site. The assigned Park Arborist will determine what pruning should take place prior to the start of construction activities. Unless otherwise directed by the project arborist, you shall not remove live interior branches or reduce the crown to compensate for root loss.

400-3.10 Landscape Installation

1. Soil beneath tree canopies shall not be roto tilled, compacted with a lawn roller, or planted to turf. Alternative methods of seeding shall be used to avoid root disturbance.

400-4 PAYMENT.

1. No separate or additional payment will be made for 1) protection of existing improvements, and 2) restoration of existing improvements. Damaged permanent survey markers will be restored by the Agency at your expense.

2. Where there is a difference in value between the tree lost and the replacement tree due to your operation, the difference will be deducted from the Contract payment. The value of the tree lost shall be determined by the Engineer and approved Arborist, using the latest International Society of Arboriculture (ISA) guidelines for value determination

SECTION 401 - REMOVAL

401-2 **ASPHALT CONCRETE PAVEMENT.** DELETE in its entirety and SUBSTITUTE with the following:

1. Bituminous pavement shall be cut and removed in such a manner so as not to tear, bulge, or displace adjacent paving by use of saw cutting, rockwheel, jackhammer, or milling machine.

2. Wheel-type pressure cutters and drop hammer cutters shall not be permitted for final edge cut. Saw cutting of edges to be joined is optional.

3. Where only the surface of existing bituminous pavement is to be removed, the method of removal shall be approved by the Engineer and a minimum laying depth of 1 inch (25.4 mm) of new pavement material shall be provided at the join line.

4. Where bituminous pavement adjoins a trench, the edges adjacent to the trench shall be trimmed to neat straight lines before resurfacing to ensure that all areas to be resurfaced are accessible to the rollers used to compact the subgrade or paving materials.

401-3.1 **Concrete Pavement.** DELETE in its entirety and SUBSTITUTE with the following**:**

1. Concrete pavement shall be removed to neatly sawed edges.

2. Saw cuts shall be made to a minimum depth of 1½ inches (38.1 mm).

3. The edges of existing concrete pavement adjacent to trenches, where damaged subsequent to saw cutting of the pavement, shall again be saw cut to neat, straight lines for the purpose of removing the damaged pavement areas. Such saw cuts shall be either parallel to the original saw cuts or shall be cut on an angle which departs from the original saw cut not more than 1 inch (25.4 mm) in each 6 inches (152.4 mm).

4. See Section **400-1 GENERAL** for permanent resurfacing requirements.

401-3.2 **Concrete Curb, Walks, Sidewalks, Gutters, Cross Gutters, Curb Ramps, Driveway, and Alley Intersections**. DELETE in its entirety and SUBSTITUTE with the following:

1. Concrete shall be removed to neatly sawed edges with saw cuts made to a minimum depth of 1½ inches (38.1 mm).

2. Concrete walk, sidewalk, or driveway to be removed shall be neatly sawed in straight lines either parallel to the curb or at right angles to the alignment of the sidewalk. No section to be replaced shall be smaller than 30 inches (760 mm) in either length or width. If the saw cut in sidewalk or driveway would fall within 3 feet (0.9 m) of a construction joint, expansion joint, or edge, the concrete shall be removed to the joint or edge, except that where the saw cut would fall within 12 inches (304.8 mm) of a score mark, the saw cut shall be made in and along the score mark.

3. Curb and gutter shall be sawed to a minimum depth of 1½ inches (38.1 mm) on a neat line at right angles to the curb face.

4. You shall expect to encounter a large amount of tree roots to be removed in accordance with 401-5.1, "Trees, Stumps, Roots, and Other Landscape". If you encounter tree roots larger than 16 inches (406.4 mm) in diameter, you shall notify the Engineer before the roots are removed. Work at a specific location shall not commence until your measurements have been accepted by the Engineer.

5. You shall expect to encounter pavement up to a depth of 12 inches.

6. You shall expect to encounter reinforcing steel in concrete pavement.

7. See Section **400-1 GENERAL** for permanent resurfacing requirements.

ADD:

401-5.1 Trees, Stumps, Roots, and Other Landscape.

1. The removal of a tree shall include removing from the site at the end of each Working Day all trimmings, wood stumps, roots, surface roots, other vegetation, debris, and litter resulting from your operation. Cut trees shall not be stacked for future pick-up, chipping, or both. Roots having a diameter of 4 inches (101.6 mm) or more shall be traced out and removed to a minimum of 2 feet (0.6 m) from finish grade. Roots 4 inches (101.6 mm) or more in diameter, the tops of which are 6 inches (152.4 mm) or less below the existing soil level, shall be considered a part of the stump and shall be removed except where such removal is prevented by existing walks, curbs, buildings, or other improvements.

2. Stumps shall be removed to a minimum of 15 inches (380 mm) below existing finish grade. Where the stump removal operation intercepts an in-service utility line, removal of the stump shall be made to the top of said utility line with the remaining portion of the stump removed to the required 15 inches (381 mm) minimum depth. No stump shall be left for more than 1 Working Day following removal and shall be secured with barricades and mounted flashers. You shall remove and properly dispose of all non-millable material generated by the removal operation, including stump grinding, as required above.

3. Where holes or depressions resulting from the removal of trees, stumps, shrubs, or palms occur, you shall supply standard clean topsoil to backfill and firmly compact the holes or depressions to finish grade and shall make a smooth transition to the adjacent ground or pavement level as applicable. The cavities shall be backfilled the same day following the removal, unless otherwise directed by the Engineer. The topsoil shall be Class A or as specified otherwise in the Special Provisions. Backfill under paved areas shall comply with the specifications for paving.

4. If a tower truck will be required in medians, rights-of-way, and at other sites where the trees can be reached, it shall not be placed on the lawns. Spikes shall not be used except when approved by the Engineer.

5. Tree root removal shall include cutting, excavation, disposal, and backfill. Some locations involve the prior removal of an existing tree in the parkway area and will affect the final Work product. Other locations involve working around a tree that has been root pruned. You shall exercise due caution when working around the remaining trees and shall prevent damage to the trunk or any of its limbs. If damage to a limb occurs, you shall immediately notify the Engineer. Once excavation has occurred, all efforts shall be made to minimize the exposure of the tree roots to the air by expediting the forming and pouring of concrete at that location.

6. Ornamental landscape shall be disposed of or relocated at locations approved by the Engineer for the property owner's use.

ADD:

401-5.2 Railroad Tracks and Facilities.

1. Notify the Engineer of any location where abandoned railroad tracks or appurtenances are found to exist within the excavation.

2. When directed, you shall remove and properly dispose of railroad facilities. The removal shall include rails, ties, and any other associated facilities found within the excavation.

3. Where the rail line lies only partially within the trench area, the entire width of the track shall be removed, including the entire length of each affected tie and both rails.

401-7 PAYMENT. ADD the following:

1. The payment for existing pavement removal and disposal of up to 12 inches (304.8 mm) thick, within the excavation, shall be included in the Bid item for the installation of the mains or the Work that requires pavement removal.

2. The payment for the removal and disposal of existing pavement beyond 12 inches (304.8 mm) thick within the excavation shall be included in the Bid item for "Additional Pavement Removal and Disposal" and no additional payment shall be made regardless of the total thickness and composition of existing pavement removed and disposed.

3. The removal and disposal of railroad tracks and associated facilities within the excavation shall be measured along the centerline of each pair of rails to be removed. The payment for "Removal and Disposal of Railroad Tracks" shall include all Work necessary to remove and dispose of the tracks and associated facilities.

4. The demolition, removal, and disposal of various types of existing hardscape in parkway areas, such as colored concrete, bricks, flagstone in the parkway or right-of-way, shall be included in the Bid item for "Remove and Replace Miscellaneous Hardscape with Topsoil" and shall include the payment for Decomposed Granite (DG) when required unless a separate Bid item has been provided.

5. The payment for the removal and disposal of tree roots shall be included in the Bid item for "Root Removal and Disposal".

6. Work related to tree removal and disposal shall be included in the Bid item for "Tree Removal and Disposal".

SECTION 402 - UTILITIES

402-1.1 **General.** To paragraph 5, DELETE in its entirety and SUBSTITUTE with the following:

The Contractor shall complete excavation, backfill, and placement of temporary resurfacing on the same Day. Backfill shall conform to 306-12. Temporary resurfacing shall conform to 306-13.1. Permanent resurfacing shall be placed within 10 Working Days unless otherwise specified in the Special Provisions or directed by the Engineer. See Section **400-1 GENERAL** for permanent resurfacing requirements.

ADD the following:

1. The City does not warrant the accuracy or completeness of the location and type of existing utilities and substructures shown on the Plans. You are responsible to accurately locate, by potholing or other suitable methods, all existing utilities such as service connections and substructures, as shown on the Plans and marked out by Underground Service Alert (USA) to prevent damage to such facilities and to identify any conflicts with the proposed Work.

2. You shall fill all potholes on the same day of potholing if no trenching is to be performed within 10 Working Days of the excavation. Fully restore all potholes and any damaged surrounding areas to their original condition unless otherwise specified by the Engineer. Permanent resurfacing shall conform to SDG-123, "36-Inch and Smaller Pothole and Exploratory Excavation".

3. Potholing at any specific location as required by the Plans shall be included in the Contract Price. Neither shall showing some specific locations on the Plans relieve you of the responsibility to pothole as previously mentioned in this subsection.

4. You shall notify the Engineer in writing of any conflicts between existing utilities and the proposed Work a minimum of 5 Working Days and 300 feet (91.4 m) in advance of the Work to provide adequate time and space for any changes to the Work needed to avoid unforeseen conflicts.

5. You shall locate and reconnect all House Connection Sewers (laterals). Sewer lateral locations of the existing buildings as shown on the Plans are approximate. House Connections Sewer records are available at the Public Utilities Department, 2797 Caminito Chollas.

6. Elevations shown on the Plans for existing utilities are based on a search of record information available during design. Actual elevations will need to be confirmed by potholing.

7. If an underground utility is uncovered, revealed at, or is contiguous to the Site which was not indicated in the Contract Documents and which you could not reasonably have been expected to be aware of, identify and notify the utility owner of such underground utility and inform the Engineer.

8. When the Construction Documents require that you alter, relocate, or reconstruct a utility, temporary or permanent relocation or alteration of the indicated utilities shall be your responsibility to coordinate with the utility owner.

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.

402-2 PROTECTION. ADD the following:

1. You shall repair or replace traffic signal and lighting system equipment within 72 hours after notification of defects by the Engineer.

2. While working in or around meter boxes, you shall protect in place all Advanced Metering Infrastructure (AMI) devices attached to the water meter or located in or near water meter boxes, coffins, or vaults in accordance with the Contract Documents. This includes any antenna installed through the meter box lid.

    a. Avoid damaging the antenna, cable, and endpoints when removing the meter box lid and when disconnecting AMI endpoints from the register on top of the water meter.

    b. If meters or AMI devices need to be removed or relocated, the AMI endpoints shall be reinstalled with the Encoder/Receiver/Transmitter (ERT) pointing upwards.

    c. Because the AMI equipment is uniquely matched to each service location and to specific meter serial numbers, any AMI devices that are removed or disconnected shall be reinstalled on the same service lateral as well as to the same meter serial number it was attached to originally.

    d. Do not change or modify the lid if the lid has an antenna drilled through it.

    e. If you encounter damaged, disconnected, buried, or broken AMI endpoints, cables between the registers, antennae, lids, or ERTs, notify the Engineer within 24 hours.

    f. Any AMI equipment damaged by you shall be repaired or replaced by City Forces at your expense.

402-3 REMOVAL. ADD the following:

1. Refer to 306-3.3 for abandonment of utilities.

402-6 COOPERATION. ADD the following:

1. Unless otherwise specified, notify SDG&E at least 10 Working Days prior to excavating within 10 feet of SDG&E Underground High Voltage Transmission Power Lines (69 KV and higher).

ADD:

402-7 EXISTING UTILITIES.

1. Where existing underground utilities are undercut, particular care shall be exercised in selecting, placing, and compacting backfill material under and around such utility to assure firm support. For at least 12 inches (304.8 mm) all around the undercut utility, the backfill material shall conform to 306-6, "BEDDING".

2. You shall be responsible for the altering, relocating, or reconstructing of portions of existing water or sewer connections which may or may not have been shown on the Plans or not accurately shown on the Plans, but which are found to interfere with the Work. You shall contact and coordinate the alteration, relocation, or reconstruction of gas, electric, cable or telephone service connections with the owners of the utilities.

3. Abandoned water services (stiffs) not shown on the Plans, but found to interfere with the progress of Work shall be shut off and cut 6 inches (152.4 mm) from the main.

402-7.1 Support for Existing Water Mains.

1. Existing water mains which are not high-lined shall remain in service during construction. Water mains shall require vertical and horizontal support at tees, crosses, bends, and etc.

402-7.2 Pipe Separations.

1. Pipe installation shall be in compliance with the State's health standards for separation and the following:

    a. You shall notify the Engineer immediately if:

        1) 1 foot (0.3 m) vertical separation as measured from the outside of pipe wall to the outside of pipe wall between sewer mains, water mains, and/or storm drains cannot be maintained.

        2) 10 feet (3.0 m) horizontal separation as measured from the outside of pipe wall to the outside of pipe wall between sewer and water mains cannot be maintained.

        3) 5 foot (1.5 m) horizontal separation as measured from the outside of pipe wall to the outside of pipe wall between storm drains and water mains cannot be maintained.

        4) 6 inches (152.4 mm) vertical separation and 12" horizontal as measured from the outside of pipe wall to the outside of pipe wall between utilities other than sewer mains, water mains, and/or storm drains cannot be maintained.

        5) 3 feet (0.9 m) or more of cover over the top of a distribution water main (8" to 16" diameter) cannot be maintained.

        6) 5 feet (1.5 m) or more of cover over the top of a transmission water main (16" and larger) cannot be maintained.

7) 5 feet (1.5 m) or more of cover over the top of a recycled water main cannot be maintained.

8) 2 feet (0.6 m) of cover over the top OR 1 foot (0.3m) of cover below a pavement subgrade of a storm drain, whichever is greater, cannot be maintained.

9) 1 foot (0.3 m) horizontal separation as measured from the outside of pipe wall to the outside pipe wall between storm drains and dry utilities cannot be maintained.

10) The storm drain is located above the water main and below the sewer main in the same street or easement.

b. If 1 foot (0.3 m) vertical separation cannot be maintained between the proposed and existing utilities, 6 inches to 11 inches (152.4 mm to 279.4 mm) sand cushions in accordance with 200-1.5, "Sand" and 1 inch (25.4 mm) neoprene pads shall be installed as shown on Plans. The neoprene pad shall be 1 inch (25.4 mm) thick and wide enough to extend a minimum of 6 inches (152.4 mm) horizontally beyond the outside pipe wall. Neoprene pads shall have a hardness between 50-70 durometers, as manufactured by Hoffmeyer Company, Industrial Rubber Supply, or approved equal. The neoprene pad shall be installed immediately below or on top of the existing utility. The sand cushion shall be placed between the neoprene pad and the proposed pipe.

c. Dimensions shall be measured from the outside of pipe wall to the outside of pipe wall.

ADD:

402-8 PAYMENT.

1. The payment for items of Work related to SECTION 402 - UTILITIES and utility location shall be included in the Contract Price.

2. Potholing of existing utilities as shown in the Contract Documents for the purpose of replumbing Work shall be included in the payment for the replumbing Work.

3. With the Resident Engineer's approval, compensation for each existing utility pothole that is not shown on the Plans but marked out by USA shall be included in the Bid item for "Potholing Existing Utilities Not Shown on Plans (Depth up to 7 feet)". Potholing for existing utilities that have been shown on the Plans shall be included in the Contract Price.

4. The payment for previously abandoned water services shall be included in the Contract Price unless a Bid item has been provided for "Abandon Water Services (Stiffs)".

5. The payment for supporting existing water mains shall be included in the Contract Price and no additional payment shall be made.

6. Payment for pavement restoration, including influence area, shall be included in the associated Bid items pertinent to the Work**.**

SECTION 403 - MANHOLE ADJUSTMENT AND RECONSTRUCTION

DELETE in its entirety and SUBSTITUTE with the following:

SECTION 403 – MANHOLE, SURVEY MONUMENT, AND GATE VALVE FRAMES AND COVERS ADJUSTMENT AND RECONSTRUCTION

403-1 GENERAL.

1. You shall set water, sewer, and storm drain manhole, vault frames, and covers within areas to be paved or graded to finish grade before paving.
2. You shall remove all debris from the interior of manholes, vaults, and gate valve covers and shall clean all foreign material from the top of the frames and covers.
3. Non-City Utility manhole, vault frames, and covers within an area to be paved or graded will be set to finish grade by their owners.

403-2 MANHOLES IN CONCRETE PAVEMENT.

1. You shall set manholes in concrete pavement to finish grade prior to paving.

403-3 MANHOLES AND GATE VALVES IN ASPHALT CONCRETE PAVEMENT.

1. Utility structures projecting less than 2 inches (50 mm) above the subgrade may be paved over and later adjusted to grade.
2. The top of reset manholes and other utility structures shall conform to the smoothness requirement specified in 302-5.6.2, “Density and Smoothness”.
3. You shall temporarily cover all utility structures from which manhole frames and covers have been removed to facilitate paving with a steel plate.
    a. When this procedure is impractical, such as for large vaults, or special structures, remodeling or reconstruction shall be completed to finish permanent surface prior to paving operations.
4. You shall coordinate your Work in accordance with 3-15, “SITE ACTIVITIES BY THE CITY OR SEPARATE CONTRACTORS” and SECTION 402 – UTILITIES.
5. Castings, pre-fabricated risers, and frames or covers of existing City manholes or gate valves shall be adjusted to conform to the new grade.
6. Water, sewer, and storm drain manhole covers shall be raised by installing pre-fabricated risers manufactured in 1 inch (25.4 mm) increments. Minor adjustments necessary to match existing finish pavement grade may be made with broken brick as described below. Manhole frames and covers shall be reset in concrete collar as follows:
    a. The pavement shall be cut to a width of no less than 8 inches (203.2 mm) or more than 12 inches (304.8 mm) and a depth of no less than 6 inches (152.4 mm) around the circumference of the manhole frame.

The outside cut shall be as neat and clean as possible to insure a smooth joint between asphalt and concrete collar.

b. Once the frame has been broken loose and the debris is cleared away, the frame shall be shimmed to match the new grade. Only broken brick shall be used for shimming as it will remain a permanent part of the frame base. Once the concrete collar is placed, the space between frame and riser ring or casting shall then be grouted to ensure total and complete support of the manhole frame.

c. The concrete collar shall be placed with 560-C-3250 concrete and be finished to ensure a level and smooth connection between the asphalt pavement and manhole. Grout used under manhole frames shall be Class "C" mortar.

7. Gate valve caps, casings, and leveling shall be done after resurfacing. Measurements shall be made from the top of the new grade to the top of the gate cap to determine the length requirement for the extension of the valve riser casing. This extension shall be cut from 8 inches (203.2 mm) O.D. by 1/8 inch (3.2 mm) steel casing only. The gate valve cap shall be removed. The extension shall be placed on the existing riser casing. The gate valve cap shall be replaced and checked for assurance as to height and levelness. The extension shall be circumferentially welded to the old casing.

8. In the event that an old style casing of a different size is found, a Cast Iron Riser Ring to match overlay thickness is not available, or two Cast Iron Riser rings have already been used, the following procedures shall be followed:

a. Pavement around the gate valves shall be cut to a width within 6 inches to 8 inches (152.4 mm to 203.2 mm) and to a minimum depth of 8 inches (203.2 mm) around the circumference of the valve casing. The new casing shall then be placed around or inside the old casing.

b. A concrete collar shall be poured and finished to ensure a level and smooth connection between the asphalt and gate valve cover. The City will furnish 8 inch (203.2 mm) gate caps to replace old and oddly sized caps.

c. Gate valve caps and sewer manholes covered by resurfacing will be located and marked out by City Forces and shall be raised by you in the same manner described in these specifications.

d. Except for those areas which have been identified for cold milling in accordance with 404 - COLD MILLING, you shall be responsible for locating all metal objects in the area that shall be milled.

403-4 SURVEY MONUMENTS.

1. The casing and cover for survey monuments shall be adjusted to the finish grade in accordance with M-10A, “Street Survey Monument” and M-10B, “Street Survey Monument Overlay Adjustment”, and M-10C “Street Survey Monument Notes”.

2. Construction of new survey monuments shall be in accordance with SECTION 309 – MONUMENTS.

403-5 MEASUREMENT AND PAYMENT.

1. The payment for adjusting each existing manhole frame and cover to grade, preparation of subgrade, removal and replacement of DG and other improvements, raising sewer and storm drain Manholes to grade, including casings, rings, extensions, concrete collars, asphalt, and all necessary items to complete the Work and shall be included in the Bid item for **"Adjust Existing Manhole Frame and Cover to Grade"** for each manhole adjusted.

2. The payment for adjusting each existing gate valve frame and cover to grade, preparation of subgrade, removal and replacement of DG and other improvements, and all other necessary items to complete the Work shall be included in the Bid item for "**Adjust Existing Gate Valve Frame and Cover to Grade**".

3. The payment for adjusting each existing survey monument to grade, preparation of subgrade, removal and replacement of DG and other improvements, casing, frame, ring, covers, extensions, grout, brick support, sand base and any other material to grade and all other necessary items to complete the Work shall be included in the Bid item for "**Adjust Existing Survey Monument to Grade**" for each the Survey Monument raised.

4. The payment for reconstructing the Survey Monument Precast Concrete Pipe Box, monument casing, frame, ring, covers, extensions, grout, brick support, sand base, and any other material required to reconstruct the survey monument precast concrete pipe box shall be included in the Contract Bid Unit Price for **"Reconstruct Survey Monument Box"** for each the Survey Monument Precast Concrete Pipe box reconstructed.

5. The payment for replacing Survey Monument Lids shall be made at the Bid unit price "**Survey Monument Lids**" for each lid replacement.

SECTION 404 – COLD MILLING

404-1 **GENERAL.** ADD the following:

1. Excessive asphalt concrete pavement adjacent to Type “G” and “H” curb and gutter lines and concrete cross gutters shall be milled in accordance with the City of San Diego Standard Drawing SDG-107, “Pavement Restoration for Asphalt Concrete Surfaced Streets - Major Excavation", or as shown on the Plans.

2. Cross gutters shall be cold milled 1 inch ± ¼ inch (25.4 mm ± 6.35 mm) within 24 hours or less of the time the resurfacing is placed. In areas where the curb height has been diminished by multiple overlays, the milling depth shall equal the proposed overlay thickness. Cross gutters shall be cold milled a minimum of 1.5 inches (38.1 mm) within 5 Working Days of the time the resurfacing is placed.

3. Milled widths of pavement shall be continuous except for intersections at cross streets where the milling shall be carried around corners and daylighting at the point of curb return. The header cuts shall daylight at the point of curb return or as directed by the Engineer.

4. Milled widths of pavement shall be continuous except for intersection at cross streets where header cuts shall daylight at the point of curb return or as directed by the engineer. Header cuts shall be 12 feet (3.7 m) in width at intersections, cross gutters, and paving limits or as directed by the Engineer.

5. You shall cold mill the existing street pavement to the depths specified in the Contract Documents or as directed by the Engineer. Cold milled full width locations shall be paved within 3 Working Days unless directed by the Engineer.

6. Existing traffic striping and thermoplastic markings located within the limits of the area to receive asphalt overlay or slurry seal shall be removed a maximum of 10 Working Days prior to the application of asphalt overlay or slurry seal by wet sandblasting or other approved methods. Dry sandblasting may be used in selected areas only with the permission of the Engineer and with approval of the air pollution control authority having jurisdiction over the area in which the Work will be performed. Temporary striping for thermoplastic markings and temporary tabs shall be applied to any pavement exceeding the 10 Working Day requirement.

7. Transitions from walks, sidewalks, ramps, and curb ramp gutters shall be flush at the same level. Pavement at the street level shall be milled to achieve a flush condition in accordance with SDG-131–139.

8. Edges of milled areas shall be cut cleanly. The outside edges of the milled pavement may have a radius transition on the sides parallel to the cutting drum.

9. The presence of roots, pavement fabric, concrete, rubberized material or steel reinforcement within the depth to be cold milled have not been noted, marked out in the field, or quantified.

10. All milling shall be performed in such manner as to improve drainage, eliminate ponding, and re-establish gravity flow across intersections.

11. Material removed, regardless of removal method, shall be disposed of at a legal site.

12. Areas where excess asphalt resulting from successive overlay and or surface treatment, should be milled 6 foot wide, tapering from the lower edge at the edge of gutter to existing pavement surface.

13. Where specified in the contract documents and as specified by the Engineer, edge grind shall be tapered, 6 feet wide, along the edge of the street and along raised medians with gutters.

14. The edge grind shall remove variable depth from 0" to 2" of asphalt concrete. Additional edge cold milling may be required at various locations as determined by the Engineer.

15. Where edge milling and micro milling is specified for the same location, edge milling shall be performed in advance of micro milling and/or as directed by the Engineer.

    a. Edge milling shall mill the surface ½ inch above the lip of gutter.

    b. Micro milling shall be used to bring the milled surface flush with the lip of gutter in preparation for surface treatment.

16. The Cold Milling shall be in accordance to SDG-106 Sheet 1 Cold Milling & Asphalt Concrete Overlay – Type A (6' Edge Cold Mill) or SDG-106 Sheet 2 Cold Milling & Asphalt Concrete Overlay – Type B (Full Width Cold Mill) as specified in the Contract Documents and as specified by the Engineer.

ADD:

404-1.1 Removal of Irregularities.

1. Removal of humps, lumps, and pavement irregularities include areas 1 inch (25.4 mm) or more above the finish grade of the existing pavement surface as marked in the street or as directed by the Engineer. The removal of the hump, lumps, or irregularities may be done either by milling or other means. The required hot mix asphalt concrete patching shall be C2 PG 64-10 in accordance with 203-6, "ASPHALT CONCRETE".

2. At the end of each Working Day, you shall submit to the Engineer an itemized list of the areas where the removal of humps, lumps, and irregularities has been completed. The list shall include the location of the Work and the exact length in linear feet.

ADD:

404-1.2 Buried Metal Objects.

1. The City acknowledges that certain unidentified utility facilities (buried metal objects such as magnetic traffic pads, sewer and storm drain manhole covers, water valve covers, survey monuments, and etc.) have been inadvertently paved over on some streets in past projects. These facilities may not be readily apparent from a visual inspection of the project or from an examination of As-Built records. You shall be responsible for locating and protecting these facilities in accordance with SECTION 402 - UTILITIES.

2. You shall locate buried metal objects. You shall examine any available As-Built records, properly notify "UNDERGROUND SERVICE ALERT" (USA), and request that all utility lines, covers, and facilities within 6 inches (152.4 mm) of the surface be identified and marked. If requested by the Engineer, provide documentation that this service was completed.

3. You shall sweep all street locations with a metal detector ahead of the milling operation. Suspected buried metal objects shall be identified by a painted cross within an outlined area in a manner allowing the milling operation to see the questionable area and take corrective action. Any damage incurred by the milling machine striking a buried metal object within a 3 foot (0.9 m) radius of such a marking shall be at your expense.

4. At each street location screened with a metal detector, you shall note that the street has been checked by painting a checkmark at a location that is approved by the Engineer. This mark should be visible to the Engineer and the milling operator but shall not be placed to divert or confuse public traffic.

5. The Engineer shall be notified a minimum of 24 hours in advance of any street that is to be swept for buried metal objects. Proper traffic control shall be erected and maintained for all metal detection operations. If, after any given street has been checked with the metal detector, the milling operation hits more than 2 buried objects, then you shall revise your methods and re-check street locations at your expense.

404-2 MILLING MACHINES. ADD the following:

1. If approved by the Engineer, equipment other than milling machines may be utilized to achieve the removal of distressed asphalt pavement.

404-6 COLD MILLING OF COMPOSITE PAVEMENTS. ADD the following:

1. You shall account for concrete trench caps up to 12 inches (304.8 mm) of concrete with ¼ inch (6.4 mm) of asphalt.

2. Composite Pavements not shown on the plans shall be measured in accordance with 404-11, "Measurement".

3. Any pavement fabric encountered within the depth to be cold milled shall be disposed of at an approved facility within the jurisdiction of work.

ADD:

404-6.1 Cold Milling of Asphalt Concrete with Pavement Fabric Material.

1. Pavement fabric material includes fabrics which conform to Table 213-4.1**.** Fiberglass or fiberglass composite fabrics conforming to Table 213-4.1 are not included. The area of pavement containing pavement fabric material shall be measured in accordance with 404-11, "Measurement".

404-9 TRAFFIC SIGNAL LOOP DETECTORS. ADD the following:

1. The Engineer will determine which traffic detector loops and/or other detection systems shall be replaced unless specified otherwise in the Contract Documents.
2. Traffic detector loops shall be reinstalled within 15 Working Days after the completion of all preparatory work (including milling, cutting, and grinding) and the resurfacing and striping of the associated street.
3. Contact the Engineer (or designee) to lay out the locations and sizes of new loops and to inspect the installation. The Contractor is responsible for all field connections.
4. Contact the City of San Diego Transportation Department to request existing loop layout information and/or details on other detection systems within the pavement at the following numbers:

   Superintendent of Streetlights and Traffic Signals / Loop Detectors
   Office: 619-527-3107 | Cell: 619-851-0642

   Traffic Signals / Loop Detectors – North of Interstate 8
   Office: 619-527-8053 | Cell: 619-955-0567

   Traffic Signals / Loop Detectors – South of Interstate 8
   Office: 619-527-3103 | Cell: 619-980-2638

   Traffic Signals / Loop Detectors – Projects
   Office: 619-527-7698 | Cell: 619-623-9023

   Streetlights – North of Interstate 8
   Office: 619-527-8056 | Cell: 619-318-5319

   Streetlights – South of Interstate 8
   Office: 619-527-8054 | Cell: 619-458-5528

   After-hours requests (3:30 p.m. to 7:00 a.m.)
   Standby supervisor: 619-723-1925.

5. Prior approval from the Engineer is required for each traffic loop stub-out replacement.

6. Traffic detector loops installed on either new or existing street surfaces (after grinding or repair) shall conform to Caltrans Type "E" loops as detailed in Caltrans Standard Plan ES-5B. The front loop at the stop line shall have four turns (in lieu of three per Caltrans standards). Asphaltic emulsion loop sealants shall not be used when installing loops on the street surface.

7. If existing traffic detector loops are damaged, disabled, or rendered ineffective due to construction activities for five (5) or more calendar days, notify the Engineer and install a City-approved temporary video or radar detection system in accordance with Section 601-1, "GENERAL."

8. Refer to Standard Drawing SDE-104 for additional information.

9. All damaged traffic detector loop and/or other detection systems located within or adjacent to the limits of work shall be replaced after resurfacing and striping. "Q" loops may be required at bike lanes. "E Modified" loops are required at stop bars. You shall install as many loops as necessary to meet current standards.

404-10 PAVEMENT TRANSITIONS. ADD the following:

1. Where transverse joints are milled in the pavement, no drop-off shall remain between the existing pavement and the milled area when the pavement is opened to public traffic.

2. If asphalt concrete has not been placed to the level of the existing pavement before the pavement is to be opened to public traffic, a temporary asphalt concrete taper shall be constructed. Asphalt concrete for temporary tapers shall be placed to the level of the existing pavement and tapered on a slope of 15: 1 or flatter to the level of the planed area. Asphalt concrete for temporary tapers shall be commercial quality and may be spread and compacted by any method that will produce a smooth riding surface. Temporary asphalt concrete tapers shall be completely removed, including the removal of all loose material from the underlying surface, before placing the permanent surface.

404-11 MEASUREMENT. ADD the following:

1. Measurement for the removal of humps, lumps, and pavement irregularities prior to the placement of asphalt concrete shall be of actual areas and depths authorized by the Engineer based on your submitted itemized list and shall be calculated in lineal feet based on a 1 foot by 6 foot (0.3 m by 1.8 m) drum width.

404-12 PAYMENT. ADD the following:

1. The payment for installation of traffic detector loops shall be included in the Bid item "**Traffic Signal Loop and Appurtenance Replacement**" for each loop installed or each conduit and stub out. No additional payment shall be made for loop, detector type.

No additional payment shall be made for milling, grinding, saw cutting, hauling, disposal, of concrete, and asphalt concrete and any other material.

2. The correction of irregularities in the pavement surface including humps, lumps, and other pavement irregularities as specified in the Contract Documents, or as directed by the Engineer shall be included in the Contract Price unless a Bid item for "**Removal of Humps, Lumps, and Pavement Irregularities**" is provided. No additional payment shall be made for incidental asphalt patching required after hump, lump, and pavement irregularity removal.

3. The payment for the removal and installation of Speed Humps shall be included in the linear foot Contract Bid Item for "**Remove and Replace Speed Hump**". No additional payment shall be made for milling, grinding, saw cutting, hauling, disposal of concrete, rubberized material, steel reinforcement, or any other material, unless specified by the Engineer.

4. The payment for the milling, transporting, hauling and disposing of any Composite Pavements shall be included in the square foot Bid Item for "**Cold Mill and Disposal of Composite Pavements**". Prior to paving over the milled areas, the Contractor must notify the Engineer when Composite Pavement is encountered and shall provide all tickets and documentation for the disposal of the material.

5. The payment for the milling, transporting, hauling and disposing of any pavement fabric material shall be included in the square foot Bid Item for "**Cold Mill and Disposal of Pavement Fabric**". Prior to paving over the milled areas, the Contractor must notify the Engineer when pavement fabric material is encountered and shall provide all tickets and documentation for the disposal of the material.

6. The payment for cold milling asphalt concrete, including hauling and disposal of milled material, milling of roots, tree trimming, grinding, saw cutting concrete, saw cutting asphalt concrete, shall be included in the Contract Price unless Bid items, as applicable, have been provided as follows:

BID DESCRIPTION	**UNIT**
Cold Mill Type B Full Width AC Pavement (2 Inch)	SF
Cold Mill Type B Full Width AC Pavement (3 Inch)	SF
Cold Mill Type A 6 FT Edge AC Pavement (≤ 2 Inch)	SF
Cold Mill Type A 6 FT Edge AC Pavement (> 2 Inch)	SF
Cold Mill 12 FT Edge AC Pavement (2 Inch)	SF
Cold Mill Header Cuts	LF

No additional payment shall be made for milling, grinding, saw cutting, hauling, disposal of concrete, rubberized material, steel reinforcement, or any other material that may be encountered during cold milling.

PART 4
EXISTING IMPROVEMENTS (B)
DESIGN-BUILD (DB) AND MULTIPLE AWARD CONSTRUCTION CONTRACT (MACC) CONTRACTING ONLY

To Part 4 - EXISTING IMPROVEMENTS (A), REVISE with the following:

SECTION 402 - UTILITIES

ADD:

402-1 **LOCATION.** ADD the following:

1. Coordinate the review of the Project design drawings by the utility agencies at every design phase submittal.
2. Determine locations and elevations of all active and abandoned underground utilities in the Project area that may affect Project construction activities.
3. Provide all required information for the construction or relocation of all public or private utilities that shall be constructed or relocated as a result of this Project.
4. Provide designs for wet utility crossings.
5. Coordinate utility facility and equipment shutdown requirements with the Engineer.

ADD:

402-4 **RELOCATION.** To the paragraph (2), DELETE in its entirety and SUBSTITUTE with the following:

Alter, relocate, and reconstruct all utilities, including water and sewer connections, as necessary to construct the Project. Utilities not indicated on your Plans that are found to interfere with the Work shall be relocated, altered, or reconstructed by the utility owner or by you at no additional cost to the City. You shall contact and coordinate alteration, relocation, or reconstruction of gas, electric, cable, and telephone service connections with the owner of those utilities.

ADD:

402-5 **DELAYS DUE TO UTILITY CONFLICTS.** ADD the following:

1. You shall not be entitled to an extension of the Contract Time or for compensation for Extra Work or delays attributable to utility or substructure relocations or alterations when the existing utilities or substructures were identified in the Contract Documents, utility records, As-Built and record drawings, or other relevant records and archives pertaining to utility locations that you could reasonably have been expected to be aware of and when they were marked out by USA.

END OF PART 4 - EXISTING IMPROVEMENTS

PART 5
PIPELINE SYSTEM REHABILITATION
SECTION 500 – PIPELINE REHABILITATION

500-1 GENERAL. ADD the following:

1. You shall furnish and install a tight-fitting sewer rehabilitation liner between the limits shown on the Plans or in the Contract Documents. The allowed rehabilitation methods shall be in accordance with the latest Approved Material List (AML).
    a. Cured-in-Place Pipe Liner (CIPP) shall conform to 500-5.5, "Cured-In-Place Pipe (CIPP) Liner".
    b. Deformed/Re-formed HDPE Pipe Liner shall conform to 500-5.7, "Deformed/Re-formed HDPE Pipe Liner".
    c. Folded and Re-formed PVC Pipe Liner shall conform to 500-5.10, "Folded and Re-formed PVC Pipe Liner".
    d. Spiral Wound Polyvinyl Chloride (PVC) Pipe Liner shall conform to 500-5.13, "Spiral Wound Polyvinyl Chloride (PVC) Pipe Liner".
2. Structural requirements as they pertain to each specific material installation shall be approved by the Engineer prior to installation.
3. If the rehabilitation system Work discussed in Part 5 – PIPELINE SYSTEM REHABILITATION results in failures, the Resident Engineer will provide direction on repairs and additional Work after consultation with the Public Utilities Department.
4. Any Cured-in-Place Pipe (CIPP) lining Work within a 1000 foot radius from school areas shall first be coordinated with the school and shall be performed outside of school hours at no expense to the City.
5. All Work under this section shall be subject to the applicable permanent resurfacing restoration requirements in accordance with City of San Diego Standard Drawings. Payment for pavement restoration, including influence area, shall be included in the associated Bid Items pertinent to the Work.

ADD:

500-1.1 Design Criteria and Testing Requirements.

1. Table 500-1.1 (A) lists the minimum finished pipe liner wall thicknesses and minimum long-term flexural modulus for the pipeline rehabilitation. The thickness installed shall be increased as necessary to accommodate the existing conditions. This accommodation shall result in the minimum thickness specified for all locations. The felt and resin system shall be selected from those listed in the City's AML.

2. The volume of resin used shall be sufficient to fully saturate all the voids of the fabric tube material and to allow for change in resin volume due to polymerization and any migration of resin into cracks and pipe joints.

3. Structural and chemical tests shall be in accordance with Table 500-1.1 (B) Test Methods.

TABLE 500-1.1 (A) Minimum Pipe Liner Thickness (Inches)

Material	**C.I.P.P**	**H.D.P.E.**	**PVC Type A**	**PVC Type B**	**PVC SPIRAL WOUND**
Minimum Long Term Flexural Modulus (psi)[1]	150,000	110,000	280,000	155,000	155,000
Nominal I.D. (inches)	**Thickness**	**Thickness**	**Thickness**	**Thickness**	**Stiffness[2]**
6	0.18	0.20	0.18	0.18	71
8	0.24	0.25	0.19	0.24	151
10	0.30	0.31	0.23	0.30	287
12	0.34	0.38	0.28	0.37	493
15	0.45	0.47	0.34	0.46	953
18	0.51	0.56	0.41	0.50	1,640

1. Modulus of Elasticity is the minimum in accordance with ASTM D790.
2. Minimum pipe stiffness (EI) in accordance with ASTM D2412.

TABLE 500-1.1 (B) Test Methods

Item	**Description**	**ASTM Method**
1(a)	ID Wall Thickness	ASTM D2122
1(b)	Flattening	ASTM D3034
1(c)	Pipe Stiffness	ASTM D2412
2	Impact Strength	ASTM D2444
3	Extrusion Quality (PVC only)	ASTM D2152 or ASTM F1057
4	Hardness	ASTM D2240
5	Tensile Strength/Tensile Modulus	ASTM D638
6	Flexural Strength	ASTM D790 (Procedure B)
7	Flexural Modulus	ASTM D790 (Procedure A) & D2990

500-2 SUBMITTALS. ADD the following:

1. You shall submit certified test results from an independent lab for each item in Table 500-1.1 (B) on the specified structural characteristics of the rehabilitation systems for the Engineer's approval.

2. You shall submit bypass locations, bypass system sizing, a proposed equipment list to ensure that the Work can be accomplished without a sewage spill, and all other documents in accordance with 3-12.5.2**,** "Sewage Bypass and Pumping Plan" and 3-12.5.3**,** "Spill Prevention and Emergency Response Plan".

ADD:

500-2.1 Initial Submittals.

1. **Unless specified otherwise,** prior to the Pre-construction Meeting, you shall submit the following required information:

   a. Contractor's Experience and Past Project Documentation.

      1) You shall submit documentation that you have performed similar main rehabilitation projects (of scope and size) successfully within the last 10 years in the United States. The scope shall include the same product, installation, and curing. The proposed product shall have at least 5 years or more of documented performance records.

      2) You shall identify the employees who will be assigned to this project and provide references in the format presented in the Contract Documents. See the Contract attachments for the required format for the submittal.

      3) Your superintendent shall be assigned full time to this project and shall be present at the Site while Work is being performed. If CIPP is used, the superintendent shall have documentation conveying experience with the proposed resin and felt combination used and the installation of the proposed lateral sealing system with the pipe lining system.

   b. Authorized Installer - The installation of the lining system shall be performed by a contractor authorized, certified, or both by the manufacture or owner of the process. You shall submit a copy of the authorization from all manufacturers for which they are authorized, certified, or both and a letter from the manufacturer(s) stating the name, address, point of contact, and telephone number. The Engineer will verify these authorizations.

ADD:

500-2.2 Pre-construction Submittals.

1. Within 15 Working Days after Notice to proceed, you shall submit to the City, design calculations signed and sealed by a California Licensed Engineer for the pipe liner for approval.

2. The design calculations shall be in accordance with the systems applicable ASTM requirements for fully deteriorated pipe. The pipe liner shall be designed to support hydraulic, soil, and live loads based on a minimum 10 feet burial depth to top of pipe and highway loading accordance with AASHTO (HS 20). If local conditions impose greater loads, the greater loads shall be used. Local conditions may include depth greater than 10 feet, railroad loading, groundwater or other loadings.

ADD:

500-2.3 Construction Submittals.

1. You shall submit the following during construction:

   a. Daily reports with required attachments - The daily report shall include the wet-out data sheet, boiler operator cooking worksheet, and temperature strip charts.

   b. Redlines, post cleaning videos (for sewer pipe segments and service lateral launch), and final videos.

   c. Samples - Required samples shall be submitted to the Engineer immediately following the lining operation.

500-3.1 General. ADD the following:

1. The pipe diameters are nominal dimensions. You shall verify the actual internal pipe diameters and length of each reach prior to ordering lining materials.

500-3.4 Closed Circuit Television (CCTV) Inspection. DELETE in its entirety and SUBSTITUTE with the following:

500-3.4 Video Inspection.

1. **An initial** video inspection shall be required prior to rehabilitation. A final video inspection shall be performed to determine if the Work was completed in accordance with the Contract Documents and that all service connections have been reinstated, as required. Video inspections shall be performed in accordance with 306-18, "VIDEO INSPECTION".

2. During the post-cleaning video, you shall identify all existing protruding materials within the existing main and trim them flush to the main prior to rehabilitation.

500-4.7 Payment.

1. The point repair Work shall be measured and paid for in the Bid Item for each "**Point Repair for Existing Sewer Main**". Measurement shall be made at the pipe and shall be based on the length of pipe repaired. You shall be paid for 1 point repair for each repair 8 ft (2.43 m) or less in length. Any continuous point repair greater than 8 ft (2.43 m), shall be paid linearly proportioned to bid item "**Point Repair for Existing Sewer Main".** This payment shall include all necessary labor, materials, and equipment to clean, repair, excavate, inspect the Point Repair, backfill and restore pavement. See **500-1 GENERAL** for permanent pavement restoration requirements.

ADD:

500-5.1.1 Sampling, Testing, and Installation.

1. For pipeline rehabilitation systems, you shall take an 18 inch long sample from every other rehabilitated pipeline segment (FSN).
2. For rehabilitated service laterals, an 18 inch long sample shall be taken for every ten service laterals rehabilitated or any part thereof.
3. You shall cut each sample longitudinally in half, create a chain of custody document for both sample halves, and test one of the sample halves by a certified third party laboratory in accordance with Table 500-1.1 (B).
4. You shall submit the other sample half for the monthly review and approval of the Engineer, along with its minimum thickness test results specified by Table 500-1.1 (A), and structural properties as required in each subsection corresponding to the liner material type.
5. CIPP samples shall be tested for structural properties in accordance with Table 500-5.5.2.

ADD:

500-5.1.2 Order of Work for Rehabilitation Installation.

1. Rehabilitation shall be performed in the following order of Work:
   a. First: Rehabilitation of Sewer Main, including sampling and testing.
   b. Second: Installation of Sewer Lateral Connections and End Seals.
   c. Third: Rehabilitation of Sewer Laterals, including sampling and testing.
2. You shall plan and schedule Work accordingly. Additional payment for demobilization or mobilization and additional Working Days shall not be granted for delays due to the order of rehabilitation Work.

500-5.5.1 General. ADD the following:

1. CIPP Liner and resin system shall be selected from the AML.
2. The CIPP Liner shall extend the full length of the pipe reach to be rehabilitated and shall provide a structurally sound, impermeable, seamless, joint-less, close-fitting pipe that, when cured, is bonded to the host pipe.

500-5.5.2 Material Composition and Testing. ADD the following:

1. Tube:
   a. The tube shall be in accordance with ASTM F1216 or ASTM F1743.
   b. The side of the liner exposed to the sewer flow after inversion or pull-in is completed shall have a layer of polyurethane bonded to it and shall be pinhole free. Seams and patches in the polyurethane coating shall be inspected under a black light.
   c. The tube shall be placed under a vacuum at the factory and submerged in a dye bath to verify that it is pinhole free. You shall provide proof to that effect. No joints or laps shall be permitted between manholes.

2. Resin:

   a. You shall furnish an approved resin and liner system in accordance with the AML. A compatible catalyst system shall be specified by the resin manufacturer. The resin manufacturer shall provide you with the recommended curing cycle and shall submit the same to the Engineer for approval.

   b. Certified copies of all test reports performed by the independent testing laboratory on the properties of the selected resin and on the properties of the field liner coupons, in accordance with 4-4, "TESTING" and these specifications shall be submitted to the Engineer.

500-5.5.5 Installation. ADD the following:

1. The installation procedures may vary with the methods of rehabilitation techniques and processes approved for the Project.

2. You shall submit in the same format as in 500-5.5.5.1, "The Wet Out"; 500-5.5.5.2, "Insertion"; 500-5.5.10.1, "Cool Down"; and 500-5.5.10.2, "Finished Pipe" or give detailed instructions, procedures, and the steps to be followed for the installation of the CIPP even if the process is named in the specification. Such instructions and procedures shall be submitted for approval by the Engineer.

3. Material delivered to the Site shall be accompanied by appropriate individual documentation listing physical properties, curing or reforming temperatures, and pressures.

ADD:

500-5.5.5.1 The Wet Out.

1. You shall designate a location where the felt tube shall be impregnated ("wetted out") with resin. The quantity of resin used for tube impregnation shall be sufficient to fill the volume of air voids in the tube with additional allowances for polymerization shrinkage and stretching during installation, and for the loss of resin through cracks and irregularities in the host pipe according to these specifications.

2. The calculations for the quantity of resin required shall be submitted and approved by the Engineer prior to wetting out the liner.

3. A roller system and vacuum shall be used to uniformly distribute the resin throughout the tube to thoroughly saturate the felt tube prior to its dispatch for installation. The gap in the roller shall be verified every 50 ft (15.2 m). You shall inform the Engineer at least 4 Working Days in advance to inspect the materials and the wet out procedure.

4. A catalyst system or additive(s) compatible with the resin and tube may be used in accordance with the manufacturer's recommendation. They shall not impair or reduce the resin's quality to withstand the minimum chemical resistance criteria.

ADD:

500-5.5.5.2 Insertion.

1. The wetted out tube shall be transported and kept in a refrigerated truck until it is inserted through an existing manhole or sewer main cleanout by the approved technique or process of the installer or you. You shall use either an end-stop or hold-back mechanism to prevent the felt tube from extending into conduits which are not to be rehabilitated. You shall protect the Site in accordance with 3-12, "WORK SITE MAINTENANCE" and SECTION 400 - PROTECTION AND RESTORATION and shall be responsible for repairing or replacing all existing improvements within the Site which are damaged, removed, or both as a result of your operations at no cost to the City.

500-5.5.6 Curing. DELETE in its entirety.

500-5.5.8 Service Connections. ADD the following:

1. After the service has been completely established, you shall proceed with sealing the lateral connection or lateral lining or both as called for in these specifications.
2. If you cannot reestablish a service connection as specified above within the specified Normal Working Hours, the following shall apply: You shall open all live laterals with preliminary cuts to relieve the flow the same day as the installation. The preliminary cut shall be a smooth round cut, with a minimum diameter of 1 inch (25.4 mm) less than the lateral's diameter. Final cuts shall be completed during Normal Working Hours within 1 week from the date of the liner installation, unless otherwise approved by the Engineer.

ADD:

500-5.5.10 Curing.

1. After tube placement is completed, you shall provide a suitable heat source and distribution equipment to distribute or recirculate hot water throughout the installed CIPP liner tube. Temperature shall be maintained during the curing period as recommended by the resin manufacturer and approved by the Engineer.
2. After the tube is cured, a cool-down period shall be used prior to opening the downstream end, reconnection of services, and returning normal flow back into the system. Heat curing of the resin shall occur within the manufacturer's approved recommended time frame (pot life). The water in the CIPP shall be cooled to below 100°F (38°C) before discharge.
3. All City water used shall be from a metered supply and paid for by you in accordance with 2-5.2.1, "Water for Construction Purposes".
4. The heat source shall be fitted with suitable monitors to gauge the temperature of the incoming and outgoing heat source. It is required that thermocouples be placed on the top and bottom of the impregnated tube and the host pipe at the upstream and downstream manholes as well as in any intermediate manhole to determine the temperatures during the resin curing process.

5. Thermocouples shall be connected to a recording device at the heater truck to have a continuous measurement of the thermocouples on the tube as well as the intake and output water temperatures at the water heater. The recording device used to measure all temperatures shall be calibrated prior to use on the Site. You shall provide all calibration records for all equipment used on the job upon request by the Engineer.

6. Remotely located thermocouple readings and the temperature of the circulating water at the downstream end of the liner away from the heater truck shall be recorded every 3 to 5 minutes until the resin begins and sustains a thermal reaction and then the interval for recording temperatures shall be every 10 minutes.

7. The initial cure may be considered completed when the exposed portions of the felt tube appear to be hard and the remote sensing device indicates the temperatures to be adequate, as recommended by the resin and catalyst system manufacturer, and approved by the Engineer. You shall be fully responsible for the accuracy of its Work and for determining when curing has been completed to meet the specified properties. Care shall be taken during the elevated curing temperatures so as not to over stress the fiber liner. Curing temperatures and duration shall comply with data and information previously submitted and approved by the Engineer.

8. The cured liner shall have a smooth finish inside. Any roughness that may affect the hydraulic conditions shall be removed by sanding or trimming the "fins" or folds. Such trimming shall not change the required thickness or structural strength of the liner. You shall apply an approved sealant compatible with the material to areas where sanding has taken place or replace the pipe liner from manhole to manhole as determined and directed by the Engineer at no additional cost to the City.

ADD:

500-5.5.10.1 Cool Down.

1. You shall cool the hardened pipe to a temperature below 100°F (38°C), before relieving the water column. Cool water may be added to the water column while draining hot water from a small hole at the opposite end of the CIPP so that a constant water column height is maintained until cool-down is completed. Care shall be taken in the release of the water column so that a vacuum will not develop that would damage the newly installed pipe. Coupon samples shall be obtained for testing in accordance with 500-5.1.1, "Sampling, Testing, and Installation" and these specifications. The cool down process may vary depending on the installation technique.

ADD:

500-5.5.10.2 Finished Pipe.

1. The finished CIPP shall be continuous over the entire length from manhole to manhole and shall be free from visual defects such as foreign matters, dry spots, pinholes, wrinkles and other deformities. The liner passing through or terminating in a manhole shall be carefully cut out. The cut shall be smooth

and parallel to the manhole wall. The finished liner shall not protrude into the manhole over 2 inch (50.8 mm).

2. If the manhole has been lined through, the top half of the liner pipe shall be cut off even with the top of the shelf leaving the channel lined unless otherwise approved by the Engineer. The invert and benches shall be lined for smooth flow. The area or annular space between the host pipe and the CIPP liner shall be sealed with the approved epoxy or other material that is compatible with the CIPP liner and shall provide a watertight seal.

3. The sealant system and materials shall conform to 210-2.6.3, "Chemical Resistance Test (Pickle Jar Test)" and shall be pre-approved by the Engineer.

4. During the warranty period, any defect specified by the Engineer which will affect the integrity or strength of the pipe liner shall be repaired at your expense.

5. Installations shall not be considered complete until the lining is installed, all final cuts are finished, all channels and benches in the manholes are installed or refinished, all miscellaneous Work described in the Contract documents are complete, the final video inspection is performed and As-Built information is submitted to the City.

ADD:

500-5.5.10.3 Process Limitations.

1. You shall not change any material, thickness, design values or procedural matters stated or approved in the submittals, without the Engineer's prior knowledge and preapproval. You shall submit, in writing, full details about component materials, their properties, method and procedure of installation and comply with them fully during the entire course of the Project.

2. The City shall require a continuous, uniform liner 300 feet (91.4 meters) or greater between maintenance holes, unless otherwise specified. The City shall not allow intermediate excavations for additional manholes unless otherwise specified.

500-5.7.1 General. ADD the following:

1. Deformed or reformed HDPE pipe liner shall extend the full length of the pipe reach to be rehabilitated and shall provide a structurally sound, impermeable, seamless, joint-less, close-fitting pipe which is tightly adhered to the host pipe.

500-5.7.2 Material Composition. ADD the following:

1. Before installation, you shall provide to the Engineer appropriate individual test documentation with the physical properties and information as specified by the manufacturer for each coil of pipe. The information shall consist of: Factory test results to show compliance with ASTM D3350 Cell Classification 345434 C, D, or E and the requirements of 207-19.2, "Material Composition" reforming temperatures and pressures, a production date for each coil, and all other appurtenant information which is necessary to conform to the applicable requirements.

500-5.7.6 **Installation.** To subsection "f", ADD the following:

1. 2 (two) 18-inch (457.2 mm) long restrained samples shall be taken by you from the downstream and intermediate manholes. You shall test one of the samples in accordance with ASTM D2122 methods to verify the minimum wall thickness as specified by Table 500-1.1 (A). The HDPE shall have the minimum values per Table 500-5.7.6 when tested in accordance with ASTM standards by an independent testing laboratory approved by the Engineer. The other sample shall be provided to the Engineer.

TABLE 500-5.7.6 HDPE Testing Minimum Values per ASTM Standards

	Flexural Strength	Flexural Modulus	Tensile Strength	Tensile Modulus	Impact Resistance
ASTM Test	D 790	D 790	D 638	D 638	D 2444
U-Liner	-	110,000 psi - 160,000 psi	3,000 psi - 3,500 psi	-	Pass/Fail

2. Certified copies of all test reports performed by the independent testing laboratory, in accordance with 4-4, "TESTING" and these specifications, shall be submitted to the Engineer.

3. The finish of the end seals shall comply with 500-5.5.10.2, "Finished Pipe". The area or annular space between the host pipe and the HDPE liner shall be sealed with the approved epoxy that is compatible with the HDPE liner. During the warranty period, any defect which will affect the integrity or strength of the liner pipe or cause a problem with service connections, due to improper finishing of channels or benches, shall be repaired at your expense.

500-5.10.1 **General.** ADD the following:

1. The minimum thickness of the pipe liner shall be in accordance with 500-1, "GENERAL".

2. The factory test results shall show compliance with ASTM D 1784 Cell Classification 13223-B and the requirements of 500-5.10.2, "Type A" for Type A, or 500-5.10.3, "Type B" for Type B. The test results for each coil of pipe shall be submitted to the Engineer before installation.

3. PVC pipe liner when installed and cooled shall have the required minimum values for the corresponding liner type when tested in accordance with ASTM standards by an independent testing laboratory approved by the Engineer.

	Flexural Strength	Flexural Modulus	Tensile Strength	Impact Resistance
ASTM Test	D 790	D 790	D 638	D 2444
Type A	2,200 psi	280,000 psi - 320,000 psi	5,000 psi 6,000 psi	Pass/Fail
Type B	1,930 psi	155,000 psi - 280,000 psi	3,500 psi 5,000 psi	Pass/Fail

4. Certified copies of all test reports performed by an independent testing laboratory, in accordance with 4-4, "TESTING" and these specifications shall be submitted to the Engineer.

500-5.10.2 **Type A.** To subsection "f", item "1", ADD the following:

1. You shall furnish and maintain all equipment necessary for the proper execution of the Work as specified. The method of installation shall be compatible with the manufacturer's recommended practices. Before installation, the pipe coils shall be tested by you in accordance with ASTM D2122 to verify compliance with the minimum wall thickness.

2. The liner pipe shall be inserted into the existing sewer through existing manholes, without modification of the manholes.

To subsection f", item "5", ADD the following:

1. If the liner fails to form, you shall remove the failed liner and replace it with a new liner. This Work shall be performed without additional costs to the City. After the line has been formed, the ends of the liner shall be cut away at both manholes.

2. The finished liner shall comply with 500-5.5.10.2, "Finished Pipe". Any defect which will affect the integrity or strength of the liner pipe or cause a problem with the service connections, due to improper finishing of channels or benches, shall be repaired at your expense.

500-5.10.3 **Type B.** To subsection "f", ADD the following:

6. You shall submit factory test results and the date the PVC liner was manufactured for each coil of pipe prior to installation for approval. No pipe liner shall be installed later than 6 months from date of manufacture.

7. You shall furnish and maintain all equipment necessary for the proper execution of the Work as specified. The method of installation shall be compatible with the manufacturer's recommended practices. Before installation, the pipe coils shall be tested by you in accordance with ASTM D2122 to verify compliance with the minimum wall thickness.

500-5.13.1 **General.** ADD the following:

1. The lining process shall use a continuous PVC profile strip which is machine-wound directly into the existing pipeline from an existing manhole. The process shall be continued until the complete length of the existing pipe has been lined. PVC profile strip for machine spiral-wound liner pipe rehabilitation of existing sewers shall comply with ASTM F1697 except as modified herein.

500-5.13.6 **Installation.** ADD the following:

1. Installation of machine spiral-wound PVC liner pipe rehabilitation of existing sewers shall comply with ASTM F1741 except as modified herein.

2. The existing pipeline shall be cleaned of any obstructions and televised in accordance with 500-3, "CLEANING AND PRELIMINARY INSPECTION". Existing live service connections shall be precisely located longitudinally, radially, and in accordance with 500-8, "SERVICE CONNECTION RE-ESTABLISHMENT" and 500-6, "END SEALS" and logged for subsequent reinstatement following insertion of the PVC strip pipe liner.

3. Coincident with lining forming into a spiral by the winding machine, a bead of Vulkem 116 Urethane Caulk or equal shall be injected during the winding process into the double locking elements in a sufficient amount such that upon cure it will create a watertight seal as tested on a deflected segment of fully expanded pipe.

4. You shall submit for the Engineer's approval the method and material composition for the end sealing and service lateral sealing material.

ADD:

500-5.15 Sewer Main Rehabilitation Identification.

1. Whenever pipes are lined upstream, downstream, or both, a 3 inch x 8 inch (76.2 mm x 203.2 mm) reflective yellow delineator shall be installed above the inlet and outlet which were lined and shall also be installed 36 inches (0.9 m) below the manhole cover.

2. For rehabilitated manholes, the delineator shall be installed using a 2-part epoxy, in accordance with the manufacturer's specifications, compatible with polyurethane, PVC, epoxy, or any other liner material. Concrete manholes that are not lined shall have the mounting surface scuffed to sound substrate prior to installing delineator.

ADD:

500-5.15.1 Payment.

1. The payment for identification tags shall be included in the Contract Price.

500-8 SERVICE CONNECTION RE-ESTABLISHMENT. ADD the following:

1. After curing is complete, you shall reestablish all live service connections in accordance with this section. After the service has been completely established, you shall proceed with sealing the lateral connection or lateral lining or both as called for in these specifications.

2. If you cannot reestablish a service connection as specified above within the specified Normal Working Hours, the following shall apply: you shall open all live laterals with preliminary cuts to relieve the flow the same day as the installation. The preliminary cut shall be a smooth round cut, with a minimum diameter of 1 inch (25.4 mm) less than the lateral's diameter. Final cuts shall be completed during Normal Working Hours within 1 week from the date of the liner installation, unless otherwise approved by the Engineer.

500-11 MEASUREMENT. DELETE in its entirety.

500-12 PAYMENT. DELETE in its entirety and SUBSTITUTE with the following:

500-12 MEASUREMENT AND PAYMENT.

1. The unit price for rehabilitating the sewer main in the manner described shall be for the length of the liner installed in the field and shall be measured between the manholes from the wall, next to the insertion invert, to the invert wall of the downstream manhole, unless you line through the manhole at the City's request. Payment for the liner shall also include trimming all other protruding materials including existing, the cost of end seals, and the re-

establishment of active service connections by a remote control device in accordance with 500-8 “SERVICE CONNECTION RE-ESTABLISHMENT” and SECTION 501 - SERVICE LATERAL CONNECTION SEALING.

2. **Unless specified otherwise**, no separate compensation shall be paid for testing. The testing costs shall be included in the linear foot price of the pipe rehabilitation Work. At the Resident Engineer’s discretion, 10% of the price of the pipe rehabilitation Work shall be withheld until you submit certified third party laboratory test results and chain of custody documents for each sample taken, along with the corresponding sample halves, for quality assurance verification testing by City Lab Staff.

3. Video inspections, before and after rehabilitation, shall be paid for in accordance with 306-18.7, “Payment”. As-Built information and all other relevant submittals shall be considered incidental to the Project for payment purposes. This shall include the cost of the video inspection of the Service Connection.

4. You shall be responsible for making adequate and suitable arrangements for any bypass pumping that may become necessary to prevent any backflow onto private or public property, between the time the liner is inserted, and the service re-connections have been made, tested, and approved by the Engineer. Unless provided for, bypass pumping shall be incidental to the cost of the sewer rehabilitation.

5. No separate or additional payment will be made for the removal of obstructions encountered during post-installation CCTV inspection nor for any re-televising necessary due to the digital recording being unacceptable to the Engineer.

SECTION 501 – SERVICE LATERAL CONNECTION SEALING

DELETE in its entirety and SUBSTITUTE with the following:

501-1 GENERAL.

1. Service Lateral Connection (SLC) is the interface of the house sewer lateral with the main sewer. SLC to rehabilitated sanitary sewer lines shall be sealed, normally without excavation, by the installation of a resin-impregnated, flexible, felt tube or fiberglass tube installed into the existing service lateral. The tube shall form a "tee" section with a full lap inside the main pipe and shall extend continuously from the sewer main into the lateral for a minimum of 4 inch (101.6 mm). SLC may be a combination of "tees" or "wyes" of varying angle. The resin shall be cured to form the tube into a hard impermeable pipe-within-a-pipe. When cured, the SLC sealing shall seal the connection of the lateral to the mainline in a continuous tight-fitting, watertight pipe-within-a-pipe to eliminate any visible leakage between the lateral and mainline and shall provide a leak-proof seal designed for a minimum 50-year life to prevent root intrusion, infiltration, and exfiltration between a liner and a host pipe.

2. Prior to cleaning, you shall submit a detailed operational plan for the proposed cleaning of all roots inside the pipe and around the service connection for the Engineer's approval. After cleaning, you shall proceed with lining of the pipe and reinstating all live service connections. The service connection openings shall conform to the shape and the size of the inside diameter of the existing service connection. You shall use a wire brush or other methods and equipment as recommended by other lining system providers or other approved means and methods to provide a smooth opening for connecting the lateral to the newly lined pipeline.

3. You shall trim all existing protruding materials which interfere with the lining installation as flush with the pipe interior as practicable.

501-2 REFERENCE SPECIFICATIONS.

1. This specification references ASTM test methods which are made a part hereof by such reference and shall be the latest edition and revision thereof and shall meet the chemical resistance requirements of 210-2.6.3, "Chemical Resistance Test (Pickle Jar Test)".

501-3 GENERAL CORROSION REQUIREMENTS.

1. The finished SLC sealing product shall be fabricated from materials which when cured shall be chemically resistant to withstand internal exposure to domestic sewage and shall meet the chemical resistance requirements of 210-2.6.3, "Chemical Resistance Test (Pickle Jar Test)" and Table 211-2.

2. The SLC sealing product shall be compatible with the lining system materials utilized in the main sewer line.

501-4 SLC MATERIALS.

1. A flexible felt tube shall be fabricated to neatly fit the internal circumference of the conduit specified by the City. Allowance shall be made for circumferential stretching during insertion.
2. The SLC sealing shall extend a minimum of 4 inches (101.6 mm) from the mainline into the lateral.
3. You shall furnish a specially designed, unsaturated polyester or vinyl ester resin and catalyst system compatible with the SLC sealing process that provides cured physical strengths specified herein.

501-5 PHYSICAL PROPERTIES.

1. The cured SLC sealing shall conform to the minimum structural standards as listed in Table 500-5.5.2.
2. No cured-in-place pipe rehabilitation technology shall be allowed that requires bonding to the existing pipe for any part of its structural strength.
3. Design methods are to be derived for various loading parameters and modes of failure. Equations shall be modified to include deformation in the shape of an oval as a design parameter. The design method shall be submitted to the Engineer for approval prior to the Pre-construction Meeting.

501-6 INSTALLATION PREPARATION.

1. You shall remove internal debris out of the sewer line.
2. Inspection of pipelines shall be performed by experienced personnel trained in locating breaks and obstacles by closed circuit television. The interior of the pipeline shall be carefully inspected to determine the location of any conditions which may prevent proper installation of the SLC sealing into the pipelines and it shall be noted so that these conditions can be corrected. A color video and suitable log shall be kept for later reference by the City.
3. When required, provide for the flow of sewage around the section or sections of mainline pipe where the service lateral designated for SLC sealing is located. The bypass shall be made by plugging the line at an existing upstream manhole and pumping the flow into a downstream manhole or adjacent system. The pump and bypass lines shall be of adequate capacity and size to handle the flow without service interruption. The bypass systems shall be approved in advance by the City.
4. The service lateral shall be inactive during the time of installation.
5. You shall clear the line of obstructions that prevent the insertion of the SLC sealing material. If inspection reveals an obstruction that cannot be removed by conventional sewer cleaning equipment, you shall make an external point repair excavation to uncover and remove the obstruction. You shall inform the Engineer prior to the commencement of the Work.
6. The mainline pipe opening shall be prepared to accept the SLC sealing and the mainline rehabilitated pipe shall be maximized to obtain the best possible connection.

7. The transition from the mainline pipe to the service lateral shall be smooth and continuous to provide adequate support for the SLC sealing during installation and cure.

501-7 SLC SEALING INSTALLATION.

1. The resin impregnated tube shall be loaded inside a pressure apparatus. The pressure apparatus, attached to a robotic device, shall be positioned in the mainline pipe at the service connection. The robotic device, together with a television camera, shall be used to align the SLC repair with the service connection opening. Air pressure, supplied to the pressure apparatus through an air hose, shall be used to invert the resin impregnated SLC sealing into the lateral pipe. The inversion pressure shall be adjusted to fully invert the SLC sealing into the lateral pipe and hold the tube tight to the pipe wall. Care shall be taken during the curing process not to over-stress the tube.
2. The pressure apparatus shall include a bladder which shall inflate in the mainline pipe, effectively seating the SLC repair against the service connection.
3. After inversion or pull-in is completed, the recommended pressure shall be maintained on the impregnated tube for the duration of the curing process. Curing method shall be compatible with the resin selected. An ultraviolet (UV) light cured, heat cured, or ambient cured resin system is typically used.
4. The initial cure shall be deemed to be completed when the SLC sealing has been exposed to the UV light or heat source or held in place for the time period specified by the manufacturer.
5. You shall cool the hardened SLC sealing before relieving the pressure in the pressure apparatus. Cool-down may be accomplished by the introduction of cool air into the pressure apparatus. Care shall be taken to maintain proper pressure throughout the cure and cool-down period.
6. The finished SLC shall be free of dry spots, lifts, and delamination. The lateral SLC shall not inhibit the final video of the mainline or service lateral pipes. Frayed ends of the SLC repair shall be removed prior to acceptance.
7. During the warranty period, any defects which shall affect the integrity of strength of the SLC shall be repaired at your expense in a manner mutually agreed upon by the manufacturer, City, and you.
8. After the Work is completed, you shall provide the City with a video recording showing the completed Work including the restored conditions.

501-8 CLEAN-UP.

1. Upon acceptance of the installation Work, you shall reinstate the Site affected by its operations.

501-9 PAYMENT.

1. The payment for Service Lateral Connection Work shall be made at the Contract Unit Price or lump sum price in the Bid for each Service Lateral Connection. The Contract Unit Price or lump sum price in the Bid shall include the furnishing and the installation of the Service Lateral Connection sealing system, surface preparation and repairs, preparation and tape submittal of all post cleaning videos and final videos in accordance with 306-18, "Video Inspection", bypassing if required, and testing, unless otherwise **specified in the Special Provisions.**

502-5.1.3 **Installation.** DELETE in its entirety and SUBSTITUTE with the following:

All steps shall be removed flush with the inside wall of the host structure. For the removal of manhole steps for manholes not being lined, the contractor shall remove the steps flush with the inside wall of the host structure (the manhole riser or wall) and to seal the holes up with grout approved by the City. Formwork for the lining system shall be installed in a manner that fits the existing walls and creates an equal and approximate 3-inch (75 mm) annular space. Portland cement concrete shall be used to fill the annular space. The installation of the liner shall conform to 311-1.

Prior to placement of the Portland cement concrete, the existing mainline pipe shall be connected to the host structure as shown on the Plans and/or **as specified in the Special Provisions**. Exposed Portland cement concrete surfaces within the host structure shall be protected **as specified in the Special Provisions**.

ADD:

502-5.6 **Cured-In-Place Manhole (CIPM) Liner.**

1. **General.**

   a. CIPM liner for the rehabilitation of a manhole shall include the furnishing of all labor, materials, and equipment for the rehabilitation of an existing manhole with the installation of tailored fabric liner system covering the inside surface of manhole wall and shelf. The fabric shall be impregnated with epoxy resin and placed tight against the manhole wall and shelf and cured with pressurized steam.

2. **Material Composition and Testing.**

   a. The fabric liner shall contain a PVC membrane and one or more layers of polyester fleece and fiberglass reinforcement.

   b. The material shall be compatible with and capable of carrying epoxy or epoxy-vinyl-ester resin, be able to withstand installation pressure and curing temperature between 160° F and 200 °F (71.1 °C and 93.3 °C).

   c. The approved epoxy shall be compatible with the application and be able to cure in the presence of hot steam. The initiation temperature for cure shall be as recommended by the resin manufacturer and approved by the Engineer.

   d. The CIPM liner shall comply with ASTM D695, ASTM D790, and ASTM C857 and shall have, as minimum, the structural properties in accordance with Table 500-5.5.2.

   e. You shall provide Field-cured samples as directed by the Engineer.

3. **Resin and Fabric Acceptance.**

   a. Resin and fabric shall comply with 500-5.5.3, “Resin and Tube Acceptance”. The fabric shall be custom tailored to fit any shape

manhole wall including base, cone, and risers. The fabric shall be tailored such that, after curing, the maximum allowed pliable wrinkles do not exceed ½ inch (12.7 mm) ply. Excessive wrinkles or plies may be grounds for rejecting the rehab Work. You shall assure maximum resin coverage where plies are anticipated.

b. The minimum design thickness of the fabric shall be 20 mils PVC membrane, 10 oz/yd^2 of polyester fleece backing, and 18 oz/yd^2 of fiberglass backing. The minimum total composite thickness shall be 88 mils.

c. The fabric shall be completely submerged in resin to allow for maximum absorption. Resin containment shall be your responsibility.

4. **Chemical Resistance.**

a. The CIPM liner system shall comply with 500-5.5.4, "Chemical Resistance Testing".

5. **Installation.**

a. Prior to placing the liner, the manhole shall be cleaned in accordance with 502-6.2, "Spark Test". You shall repair spalled or deteriorated concrete in accordance with 502-6.3, "Mil Gauge Test"; 502-6.4, "Adhesion Testing"; and 502-6.5, "Liner Repairs".

b. Installation shall be by an installer that is qualified by the liner manufacturer. You shall include the furnishing of all materials, equipment, tools, and labor as required for the rehabilitation of the manholes selected, including the installation of the interior liner. The installation of the approved liner system shall be in strict accordance with the manufacturer's instructions. This shall include the preparation, installation, inflation, curing, and finishing operation required for the completion of the manhole rehabilitation process. Safety rules and regulations applicable laws and insurance requirements shall be observed in storing, handling, use and application of the liner materials, resins, and any solvents. Ventilation shall be provided to the workers at all times.

c. The liner shall be installed and cured in place via controlled curing by heat and pressurization (2 psi to 5 psi) in the manhole to complete the curing process in less than 2 hours.

d. The lining of the manhole shall result in a monolithic structure to the shape and contour of the existing manhole. The liner shall be installed and bond to the interior manhole substrate and completely watertight, free of any joints or openings.

502-5.6.1 Payment.

1. The payment for manhole rehabilitation Work shall be included in the vertical foot Bid item for "Rehabilitate Existing Manhole with Cured-In-Place Manhole Liner" and shall include all necessary labor, material, and equipment to clean,

repair, and line the manhole as specified herein. The vertical foot liner measurement shall be defined as the distance between the top of shelf to the manhole cover seat.

ADD:

502-6.6 Chemical Resistance Test (Pickle Jar Test).

1. Epoxy Lining Systems, Polyurethane and Epoxy Protective Lining Systems shall meet the requirements of 211-2, "CHEMICAL RESISTANCE TEST (PICKLE JAR) TEST". Proof of meeting these requirements shall be provided to the Engineer for approval at least 15 Working Days prior to commencement of Work.
2. The epoxy primer materials for the polyurethane lining system shall be 100% solids.
3. The epoxy materials for the epoxy lining system shall be 100% solids.

ADD:

502-6.7 Repair Methods.

1. Defects in the APC shall be repaired in accordance with manufacturer's instructions or 303-1.10, "Curing" and 200-1, "ROCK PRODUCTS".
2. Pinholes in the protective lining shall be marked off on surface areas containing pinholes to a point 6 inch (152.4 mm) beyond all pinholes and recoated with the epoxy lining or primed with epoxy primer and recoated with polyurethane to a minimum additional thickness of 30 mils (762 µm).
3. Blisters, uncured lining, and surface imperfections shall be completely removed and the areas recoated with the epoxy lining or epoxy primer and polyurethane lining to a point 6 inch (152.4 mm) beyond the repair areas at a minimum thickness of 100 mils (2540 µm).

ADD:

SECTION 503 – SERVICE LATERAL REHABILITATION

503-1 GENERAL.

1. The rehabilitation shall be accomplished using a fabric or fiberglass tube of particular length and a thermoset resin with physical and chemical properties appropriate for the application without excavation and disturbing surface improvements. The tube is vacuum impregnated with the resin. Access to an upstream end of the service lateral is made by excavation in the public right of way. Installation of the resin-impregnated tube into the service lateral may be performed either by Type A inversion in accordance with ASTM F1216 or by Type B pull-in in accordance with ASTM F1743 and may be performed from either the mainline or the excavated end of the lateral.

2. The cured-in-place liner shall extend the entire length of the lateral from the access point at the property line to the mainline. The location of the cleanout shall not be modified unless approved in writing by the Engineer. Once the tube or resin composite is cured, the installation equipment shall be removed and the protruding end in the sewer main shall be cut using a robotic cutting device. A sewer cleanout in accordance with Standard Drawing SDS-102, "Sewer Lateral Cleanout (In Paved Alley, Sidewalk, or Other Areas Subject to Traffic)" or SDS-103, "Sewer Lateral Cleanout" shall be installed at the access point and properly backfilled.

3. A lateral rehabilitation including the installation of lateral cleanout and backfill process shall be completed within 15 Working Days.

4. The liner shall be extended sufficiently to create a water tight seal at the main and the liner interface.

5. If there is a Service Lateral Connection (SLC) in place, then the cured-in-place lateral liner shall have a minimum overlap of 2 inches (50.8 mm) over the previously installed SLC -.

6. Existing ABS and PVC sewer laterals shall not be rehabilitated. These laterals shall be replaced or shall have point repairs performed on them as directed by the Engineer.

7. All Work under this section shall be subject to the applicable permanent resurfacing restoration requirements in accordance with the City of San Diego Standard Drawings. Payment for pavement restoration, including influence area, shall be included in the associated Bid items pertinent to the Work.

503-2 MATERIAL.

1. The tube shall consist of one or more layers of flexible needled felt or an equivalent material. Where the tube is fabricated from non-woven felt, the

longitudinal and circumferential joints are made up by seal bonding. The tube shall be capable of conforming to bends, off-set joints, bells, and disfigured pipe sections. The resin and catalyst system as designed for the specific application shall meet the chemical resistance requirements of 210-2.6.3, "Chemical Resistance Test (Pickle Jar Test)".

2. The composite of the materials above shall, upon installation inside the host pipe, exceed the minimum test standards specified in Table 500-5.5.2.

3. The thickness of the lateral lining shall be no less than 0.12 inch (36.6 mm) and not more than 0.18 inch (54.9 mm) for laterals up to and including 8 inches (203.2 mm) in diameter. The thickness of the lateral lining shall be in accordance with Table 500-1.1 (A) for laterals larger than 8 inch (203.22 mm) in diameter.

503-3 INSTALLATION PROCEDURES (ASTM F1216 AND ASTM F1743).

1. The property owner of the lateral being reconstructed shall be informed and the flow stopped for the period of reconstruction Work.

2. You shall excavate an access pit at the property line cleanout location. The excavation pit shall be located entirely within the public right-of-way, and shall not encroach into the private property. You shall replace in kind all existing improvements impacted by the installation process.

3. You shall clean, video, and determine the structural condition of the lateral line prior to installation. Roots, debris, and protruding service connections shall be removed prior to installation.

4. The tube shall be inspected for torn or frayed sections. The tube in good condition shall then be vacuum impregnated with the thermoset resin.

5. No open pans or uncontrolled open-air pouring of resin shall be allowed during tube saturation. Resin shall be contained within the inflation bladder during vacuum impregnation and insertion. You shall ensure that no property is exposed to contamination by liquid resin compounds or components.

6. The saturated tube along with the inflation bladder shall be inserted into the installation equipment and the end closed. The entire installation equipment shall be placed in the pipe access pit and aligned with the exposed end of the pipe.

7. The resin and tube shall be completely protected during the placement. The resin shall not be contaminated or diluted by exposure to dirt, debris, or water during the placement.

8. The tube shall be installed from the installation equipment by controlled air, water, or steam pressure in accordance with manufacturer instructions. The tube shall extend the entire reconstruction length and shall be held tightly in place against the wall of the host pipe until the cure is complete.

9. When the curing process is complete, the pressure is released and the inflation bladder reverted back into the installation equipment and removed from the access point.

10. No barriers, coatings, or any material other than the cured tube or resin composite specifically designed for desirable physical and chemical resistance properties shall be left in the host pipe. Any materials used in the installation other than the cured tube or resin composite shall be removed.

11. Any cured tube or resin composite pipe left protruding from the service connection into the sewer main shall be trimmed back using a hydraulic-powered robotic cutting device specifically designed for cutting cured-in-place pipe made from these materials.

12. A second video inspection shall be performed to verify the proper cure of the material, the proper trim of service connection, and the integrity of the seamless pipe.

13. The bypass pumping system shall be removed and the sewer flows restored to normal flow conditions. The excavation shall be properly backfilled and compacted. The property owner of the service connection shall be informed before and after the Work is complete.

503-4 DEVIATIONS.

1. If pre-installation inspection reveals conditions in the service lateral to be substantially different than those used in the design of wall thickness, tube construction, tube length, or resin system, then you shall correct the situation as approved by the Engineer.

503-5 ACCEPTANCE.

1. Upon completion, you shall deliver the video records and written reports to the Engineer. The Engineer shall review the documentation and the Site to determine if the Work is complete and if the Work may be accepted.

503-6 PAYMENT.

1. The payment for the service lateral rehabilitation Work of existing sewer laterals shall include the removal and replacement of sidewalk panels and restoration of existing surface public/private improvements as required by the Engineer and excavations are included in the Bid Item “Service Lateral Rehabilitation with Cleanout”, regardless of sewer lateral material or depth of cleanout.

2. The Bid items for service lateral rehabilitation Work shall include all necessary labor, materials, and equipment in order to clean, repair, and line the Sewer Lateral.

3. The point repair Work for sewer laterals shall be in accordance with 500-4, “PIPELINE POINT REPAIR AND/OR REPLACEMENT” and shall be included in the Bid Item for each “**Point Repair for Existing Sewer Lateral**”. Measurement shall be made at the pipe and shall be based on the length of pipe repaired. You shall be paid for 1 point repair for each repair 8 ft (2.43 m) or less in length. Any continuous point repair greater than 8 ft (2.43 m), shall be paid linearly proportioned to bid item “**Point Repair for Existing Sewer Main**”**.** This payment shall include all necessary labor, materials, and equipment to clean, repair, excavate, inspect the Point Repair, backfill, pavement restoration (and influence area) including sidewalks, driveways and any other above ground improvements.

4. The payment for the cleaning of and video inspection for rehabilitated laterals shall be paid in accordance with 306-18.7, “Payment”.

END OF PART 5 - PIPELINE SYSTEM REHABILITATION

PART 6

TEMPORARY TRAFFIC CONTROL

SECTION 600 – ACCESS

DELETE in its entirety and SUBSTITUTE with the following:

SECTION 600 – ACCESS

600-1 GENERAL.

1. Your Work shall cause no unnecessary inconvenience to the public or businesses in the vicinity of the Work. You shall have no greater length or quantity of Work under construction than can be prosecuted with a minimum of inconvenience to the public and other contractors engaged in adjacent or related Work.

2. You shall notify property owners and tenants in accordance with 5-10.2, "Community Outreach Services" and shall post signs notifying the public a minimum of 5 Working Days prior to the closure or detour of streets.

3. You shall provide continuous and unobstructed vehicular and pedestrian access to the adjacent properties **unless otherwise specified in the Special Provisions**, Traffic Control Plans, or Traffic Control Permit as approved by the City.

4. You shall cooperate with the various parties involved in the delivery of mail and the collection of trash, recycling, and yard waste to maintain existing schedules for these services.

5. You shall notify Environmental Services Department via email (trash@sandiego.gov) of street closures affecting the regular scheduled solid waste collection at least 3 Working Days prior to the street closure. Include your business name and phone number, days of closure, time of scheduled closure, and date of anticipated street reopening in the notification.

   a. You shall verify waste collection schedules via the Environmental Services website at:

      http://www.sandiego.gov/environmental-services/collection/index.shtml

   b. You shall comply with the following requirements for trash, recycling, and yard waste collection:

      1) Provide advance written notice to every property affected by blocked public right of way.

      2) Coordinate the relocation of trash, recycling, and yard waste containers to an accessible public street for the City's waste collection crews on collection day.

3) When necessary, relocate the containers from the blocked streets to the accessible public right of way before the City's collection vehicles arrive to assist with collection on existing schedules. Return the containers to their point of origin to ensure the accuracy of inventory assignment by address.

c. 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.

6. You shall obtain a Right of Entry Permit from Railroad prior to entering or constructing on property owned, operated, occupied, or controlled by the Railroad. You shall abide by the terms of the Right of Entry Permit and shall arrange and pay for inspection as required by the Railroad. The terms of the Right of Entry Permit control over the Plans and Specifications. Your right to enter right-of-way owned, operated, occupied, or controlled by Railroad is subject to the absolute right of Railroad to cause your Work to cease if, in the opinion of Railroad, your activities create a hazard to Railroad's patrons, employees, and operations.

a. The term "Railroad" means an owner, operator, inhabitant or controller of rail facilities. These include San Diego Metropolitan Transit System (MTS), San Diego Trolley, Inc. (SDTI), San Diego Association of Governments (SANDAG), Port of San Diego, San Diego & Arizona Eastern Railroad (SD&AE), American Track - National Railroad Passenger Corporation (AMTRACK), Transit America, Union Pacific Rail Road Company (UPRR), Burlington Northern Santa Fe Railway (BNSF), and North County Transit District (NCTD).

b. Information on obtaining a Right of Entry Permit and regarding policies can be obtained at:

1) MTS Right of Way Services at 619-557-4501 or

http://www.sdmts. com/Business/Permits.asp

2) NCTD Customer Service at (760) 996-6500 or

http://www.gonctd.com/working-around-the-rails

3) BNSF Permit Management Office (817) 230-2628

http://www.bnsf.com/about-bnsf/faqs.html

4) UPRR Customer Service at (402) 501-4941 or

http://www.up.com/real_estate/tempuse/index.htm

7. Notify and coordinate with Metropolitan Transit System (MTS) and the San Diego County Regional Airport Authority (Airport Authority) a minimum of 5 Working Days prior to excavation, construction, or temporary traffic control affecting airport operation and transit stops.

   a. MTS (Street Closure and Bus Stops)
   (619) 238-0100 Ext 6451

   b. MTS (Taxi Zones) / (Trolley Lines)
   (619) 235-2644 / (619) 595-4960

   c. San Diego County Regional Airport Authority
   (619)-400-2880

8. Notify the remaining agencies a minimum of 2 Working Days prior to construction activities affecting the agencies.

   a. Fire Department Dispatch (Street or alley closure)
   sdfd_premise@sandiego.gov / (858) 573-1300

   b. Police Department Traffic (Street or alley closure)
   (619) 531-2000

   c. Street Division/Electrical (Traffic signals)
   (619) 527-7500

   d. U.S. Navy (32nd Street Naval Station)
   (619) 556-1319

   e. Underground Service Alert (Any excavation)
   (800) 422-4133

9. Where Work occurs on Harbor Drive or impacts traffic flow to San Diego International Airport (Airport) from adjacent and contiguous streets such as Pacific Highway, Laurel Street, Grape Street, Hawthorn Street, and Nimitz Blvd., you shall adjust the Schedule to take advantage of the reduced Airport operations and low vehicular traffic on Harbor Drive and surrounding streets between the hours of 11:00 PM and 5:00 AM, Monday through Saturday, or **as stipulated by your Traffic Control Permit**. Do not interrupt access to the Airport.

10. If Work is located within the flight path of aircrafts landing or taking off at San Diego airports, you shall obtain a construction permit for tall equipment (such as cranes) through Federal Aviation Administration (FAA).

11. If weather condition is suitable, complete each street segment within 15 Working Days from the day of the resurfacing in accordance with 6-3.1, "General".

600-2 VEHICULAR ACCESS.

1. Vehicular access to private properties and businesses shall be maintained to the property line except when necessary construction precludes such access.

2. Maintain cross traffic and turning moves at the intersections.

3. If backfill has been completed to the extent that safe access may be provided and the street is opened to local traffic, you shall immediately clear the street and driveways and provide and maintain access.

4. Maintain full width of all traffic lanes of the existing roadway during non-working hours and on Saturday, Sunday, designated Holidays, and when construction operations are not actively in progress on Working Days.

600-3 PEDESTRIAN ACCESS.

1. See CA MUTCD Chapter 6D for requirements and guidelines.

2. Pedestrian zones and public transportation stops, as well as pedestrian crossings of the Work site at intervals not exceeding 300 foot (91.4 m) shall be maintained unless otherwise approved by the City. When sidewalks are closed, an alternate walkway shall be provided. Pedestrians shall not be directed into direct conflict with vehicles operating within the Work site or other traffic. Where it is necessary to divert pedestrians into the parking lane or a street, barricades or temporary traffic barriers shall be provided to separate the pedestrian walkway from the adjacent traffic lane.

    a. If crosswalk closures are necessary, you shall close only one crosswalk at a time at intersections having 4 crosswalks. If 2 or more crosswalk closures at an intersection are necessary, you shall submit a pedestrian detour plan and obtain approval from the City before implementation of the closure. Approval from the City shall be obtained before closing any crosswalks at intersections having fewer than 4 crosswalks.

3. Vertical changes of surface elevations in areas subject to pedestrian traffic of 1/2 inch (12.5 mm) or greater shall have a beveled edge of 12 horizontal to 1 vertical.

4. Walkways within the Work site shall be a minimum of 4 foot (1.2 m) in width and 6 foot (1.8 m) in width in high volume pedestrian area with passing spaces at least 60 inches (1524 mm) by 60 inches (1524 mm) every 200 feet (61.0 m). Obstructions within walkways shall be illuminated during hours of darkness. The minimum vertical clearance to any obstruction larger than 4 inches (101.6 mm) within a walkway shall be 7 feet (2.1 m).

5. The minimum horizontal clearance (buffer space) between walkways within the Work site and Work areas or operating equipment shall be a minimum of 5 feet (1.5 m).

600-3.1 ADA Requirements.

1. Temporary facilities shall be detectable by a person with a visual disability traveling with the aid of a long cane and include accessibility features consistent with the features present in the existing pedestrian facility. A detectable barrier shall be placed across the full width of the closed sidewalk.
2. Channelized pedestrian routes shall be clear of obstacles and shall have a continuous detectable edging. The accessible route shall have the following:
    a. Clear headroom of at least 80 inches (2032 mm).
    b. A surface that is firm, stable, and slip resistant.
    c. No level changes in excess of 1/4 inch (6.4 mm) vertically (in the absence of a curb ramp, ramp, elevator, or platform lift).
    d. A curb ramp slope of less than 8.3% (1:12).
    e. A path of travel slope of less than 5% (1:20) and a cross slope of less than 2% (1:50).
    f. Routes that are under scaffolding conforming to ADA requirements.
    g. Audible information devices (when shown on Plans or Traffic Control Permit).

600-4 BICYCLE ACCESS.

1. Bikeway systems interrupted by Temporary Traffic Control (TTC) shall have signage through or around the TTC back to the bikeway in accordance with SECTION 601 - TEMPORARY TRAFFIC CONTROL FOR CONSTRUCTION AND MAINTENANCE WORK ZONES. Roadways adjacent to the Work site shall be kept free of obstructions or other hazards to bicyclists.

600-5 PAYMENT.

1. The payment for access Work as specified in SECTION 600 – ACCESS shall be included in the Contract Price.
2. The payment for MTS Right of Entry Permit procurement Work including railroad liability insurance, plan reviews, inspections, flagging, and fees shall be included in the allowance Bid item for “MTS Right of Entry Permit”.

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

DELETE in entirety and SUBSTITUTE with the following:

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

601-1 GENERAL.

1. Temporary traffic control (TTC) for construction and Work zones shall conform to Part 6 of the California MUTCD, the specifications, and the Traffic Control Plan (TCP) if so included with the Plans or if required to be prepared by you and submitted as a Working Drawing.

2. Working hours are the Normal Working Hours **unless otherwise specified**. Work requiring traffic lane closures shall only be performed between the hours **specified in the Special provisions** or shown on the TCP.

3. Traffic shall be permitted to pass though the Work site, **unless otherwise specified in the Special Provisions** or shown on the TCP.

4. If construction is to be performed in phases, complete the Work in each phase prior to beginning the Work in the next phase. Approval of temporary Traffic Control Plans or Working Drawings for hours outside of the Normal Working Hours does not constitute a guarantee that the City will be available to inspect the Work.

5. TTC activities and milestones shall be shown as activities on your construction schedule in accordance with 6-1, **"**CONSTRUCTION SCHEDULE AND COMMENCEMENT OF THE WORK".

6. The term "hours of darkness" used in the specifications shall mean the hours of darkness as defined in Division 1, Section 280, of the California Vehicle Code.

7. Roadways adjacent to the Work site shall be kept clean and free of obstructions or other hazards. Do not store or allow equipment, material, or debris to remain in the public right-of-way without prior approval by the City. Refer to 3-12, "WORK SITE MAINTENANCE".

8. You shall conduct roadway construction operations in a manner that provides a surface safe for vehicular traffic. Vertical changes of pavement elevations 3/8 inches (9.5 mm) or greater parallel to travel or ¾ inches (19 mm) or greater perpendicular to travel shall have a beveled edge of 4 horizontal to 1 vertical.

9. Pavement surface disruptions in marked bike lanes or routes of ½ inch (12.5 mm) or more shall have a beveled edge of 8 horizontal to 1 vertical. Signs indicating the condition of the surface of the pavement shall be posted as shown on the TCP or **as specified in the Special Provisions**. If the pavement surface elevation changes are not beveled and signs are not posted, the bicycle lane or route shall be closed.

10. When a bicycle lane or route is closed, signing shall be installed to terminate the bike lane or route. Signs shall be posted to advise motorists and bicyclists that the previously separated bicycle traffic will be in the vehicular traveled way. Barricades used at the terminus or the closure shall be spaced to prevent physical passage by bicyclists into the closed bicycle lane or route.

11. Lane restrictions, flagging, or other operations shall not cause traffic to stop on railroad tracks. Whenever the Work causes traffic to back up across an active railroad track, a flagger shall be provided.

12. Backfill or cover trenches with steel trench plates at the end of each Workday. "STEEL PLATE AHEAD" (W8-24) signs shall be present whenever steel plates are present. Place an asphalt ramp around each trench plate. Upon completion of excavation backfill, provide a satisfactory surface for traffic. Portable concrete barriers, additional noticing, and other items may be required when trenching cannot be secured overnight by backfilling or trench-plating.

13. You shall furnish, install, program, and maintain a City approved temporary video or radar detection system to provide vehicle detection for intersection approaches that existing detection systems are damaged, disabled, or become ineffective due to construction activities for a period of 5 or more Calendar Days. At the completion of the construction phase, you shall be responsible for the complete removal of all temporary detection equipment and restorations or installation of the permanent vehicle detection system.

14. Additional TTC requirements shall be **as specified in the Special Provisions**.

601-2 TRAFFIC CONTROL PLAN (TCP).

601-2.1 General.

1. **If specified in the Contract Documents**, you shall submit a TCP in accordance with 3-8, "SUBMITTALS".

2. Traffic Control Plans shall have the project title, phase identification, name of the firm preparing the TCP, name and stamp of the Registered Civil Engineer (for engineered TCP), approval block for each jurisdictional agency, north arrow, sheet number, and number of sheets comprising the TCP. General notes and symbol definitions shall be included when required.

3. The TCP shall be drawn to a 1 inch = 40 feet (1:500) scale on common size sheets, either 8½ inches (215.9 mm) x 11 inches (279.4 mm), 8½ inches (215.9

mm) x 14 inches (355.6 mm), or 11 inches (279.4 mm) x 17 inches (431.8 mm) Plan sheets as dictated by the length of Work. Engineered TCP shall be 2 feet (609.6 mm) x 3 feet (914.4 mm) in accordance with 601-2.1.2, "Engineered Traffic Control Plans (TCP)".

4. The requirements in the Special Provisions shall govern the design of the proposed TCP. Working Drawings may be approved by the City.

5. The TCP shall clearly show all necessary details and shall be Site-specific. The City will not accept typical Plans and sections.

6. Prepare TCP in accordance with the City's Computer Aided Design and Drafting (CADD) standards. You may use any standard engineering CADD program (MicroStation or AutoCAD) to prepare the TCP.

7. Allow at least 20 Working Days for the City's review of each submitted TCP.

8. You are not entitled to Contract Time extensions if you fail to properly produce the Engineered TCP or Traffic Control Working Drawings to schedule the Work.

601-2.1.1 Traffic Control Permit.

1. Do not begin the Work in the public roadway without the approved temporary traffic control permit. The TCP is not valid until Work dates are approved and a temporary traffic control permit is issued by the City.

2. For City Projects, coordinate the traffic control permit application submittal with the Work so that no items of Work will be delayed. To obtain a temporary traffic control permit, call the Engineering and Capital Projects' (ECP) Construction Management & Field Engineering (CMFE) Division's Traffic Control Section, (858) 495-4742 for an appointment a minimum of 2 Working Days prior to starting the Work and a minimum of 5 Working Days when the Work will affect a traffic signal. Provide 1 copy of the temporary traffic control drawings specified in the Contract Documents at the time of the appointment. Upon approval of your TCP, the Traffic Control Section of CMFE will issue the permit.

3. For Private Development Projects, the Developer/Contractor shall submit a Traffic Control Plan (TCP) to Development Services Department (DSD) for approval prior to starting Work. The Developer/Contractor shall also obtain a Temporary Traffic Control Permit for the approved TCP from DSD for any Work in the public right-of-way prior to start of Work. Temporary Traffic Control Permits can be obtained online on the DSD traffic control permitting website (https://www.sandiego.gov/development-services/permits/traffic-control-permit). Traffic Control Virtual Counter appointments can be scheduled at https://www.sandiego.gov/development-services/virtual-appointments. The Developer/Contractor shall obtain a Temporary Traffic Control Permit a minimum of 5 Working Days prior to starting the Work and a notification to

agencies 5 Working Days in advance if the Work will affect a bus stop or an existing traffic signal or will require a road or alley closure.

4. Submit proposed changes and deviations from the traffic control plan permit for the City's approval. Prior to implementation, the City will observe the implementation of Traffic Control Plans and reserves the right to require you to make changes as field conditions warrant. The City may approve the changes to the Traffic Control Plan Permit or if directed in writing by the City.

5. Any Work impacting traffic to and from the San Diego International Airport shall be coordinated with the San Diego County Regional Airport Authority and Working Hours shall be approved by the San Diego County Regional Airport Authority prior to obtaining a Traffic Control Permit from the City. Refer to 600-1, "GENERAL".

601-2.1.2 Engineered Traffic Control Plans (TCP).

1. Engineered TCP shall be 2 feet (609.6 mm) x 3 feet (914.4 mm). The engineered TCP shall be signed and stamped by a Professional Civil Engineer registered in the State of California (per CA MUTCD 1A.09).

2. Coordinate with the City's Traffic Control Section of CMFE for the development and approval of the engineered TCP. Submit a Traffic Control Approach to the Engineer prior to preparing the engineered TCP. A list of traffic control items is available upon request from the CMFE Division as a guideline. Prepare the engineered TCP in accordance with the approved Traffic Control Approach. You may obtain a copy of the Project area base map through the City. If extensive additions or corrections are required, the CMFE Traffic Control Section will return the marked-up print for corrections and re-submission.

3. If no changes or corrections are required, the Traffic Control Section will retain the original engineered TCP and return 1 copy with the TCP Permit to you.

4. You shall obtain or require your Subcontractor to obtain Architects and Engineers Professional Insurance (Errors and Omissions Insurance) in accordance with 5-4, "INSURANCE" **as specified in the Special Provisions** for the Work of the engineered TCP.

601-2.1.3 Traffic Control Working Drawings.

1. For those portions of the Work where Engineered TCP are not provided nor required, prepare and submit traffic control Working Drawings as part of your Traffic Control Permit package.

2. If extensive additions or corrections are required, the Traffic Control Section will return the marked-up print for corrections and re-submission.

3. If no change or correction is required, the original Working Drawings will be retained by the City. One copy, with the TCP Permit attached, will be returned to you.

4. When required by the City, Traffic Control Working Drawings shall be prepared and stamped by a Licensed Professional Civil Engineer.

601-2.1.4 Traffic Control for Resurfacing and Slurry Sealing.

1. Prepare TCP for Resurfacing and Slurry Sealing in accordance with 601-2.1.3, "Traffic Control Working Drawings".

2. Place temporary reflective pavement markers on all roadways with painted centerline immediately upon completion of the resurfacing or slurry sealing. Remove temporary reflective pavement markers only for new permanent pavement striping.

3. The City will provide you, at the Pre-construction Meeting, with the standard format for "NO PARKING - TOW-AWAY ZONE" signs for the resurfacing or slurry seal portion of the Work. You shall furnish the "NO PARKING - TOW-AWAY ZONE" signs and pedestals for posting on sidewalks and streets.

   a. Mount the "NO PARKING - TOW-AWAY ZONE" signs on suitable pedestals, such as tripods and barricades. Post signs every 50 feet (15.2 m) on both sides of the block affected by the proposed resurfacing, slurry sealing, or both.

   b. Affix to each "NO PARKING - TOW-AWAY ZONE" sign cards with 2-inch (50.8 mm) high letters stating the day(s) of the week parking is prohibited, as well as your company name and telephone number. Remove the "NO PARKING - TOW-AWAY ZONE" signs immediately following the completion of the resurfacing, slurry sealing, or both.

   c. For each street block segment scheduled for slurry sealing or resurfacing, the "NO PARKING - TOW-AWAY ZONE" signs shall be posted for 2 consecutive Working Days. Schedule the slurry sealing on the first posted Working Day, unless approved by the City. The second posted Working Day shall be reserved for emergency Work, and may be used only with the approval of the City. Reschedule street block segments which are not completed by the second posted Working Day.

   d. Place "NO PARKING - TOW-AWAY ZONE" signs 72 hours in advance of the scheduled slurry sealing. Reschedule street block segments which are not completed by the last posted Working Day. If a Work delay of 48 hours or more occurs from the originally scheduled Work date, remove the "NO PARKING - TOW-AWAY ZONE" signs for a minimum of 24 hours, then reset and re-post for the appropriate Work date.

4. Furnish and distribute door hanger notices in sufficient quantities to advise the general public of the scheduled parking prohibitions in accordance with 5-10.2, "Community Outreach Services".

601-2.1.5 Traffic Control for Street Closures and Detours.

1. You shall comply with all applicable State, County, and City requirements for the closure of streets, including pre-approval from Department overseeing the Work.

2. When approved, street closures, detours, barricades lights, other safety devices shall conform to current requirements covering "signs" as set forth by Caltrans.

3. You shall provide barriers, guards, lights, signs, temporary bridges, flag persons, and watch persons. You shall be responsible for complying with additional public safety requirements which may arise. You shall furnish and install signs and warning devices and promptly remove them upon completion of the Work.

4. At least 5 Working Days in advance of closing, partially closing or reopening, any street, alley, or other public thoroughfare, you shall notify the Police, Fire, Traffic and Engineering Departments, and comply with their requirements. Deviations shall first be approved in writing by the City. Refer to 600-1, "GENERAL".

5. You shall secure approval, in advance, from authorities concerned for the use of any bridges proposed by it for public use. Temporary bridges shall be clearly posted as to load limit, with signs and posting conforming to current requirements covering "signs" as set forth in the Traffic Manual published by the California Department of Transportation. This manual shall also apply to the street closures, barricades, detours, lights, and other safety devices required.

6. Maintain, whether shown on the Plan or not, existing traffic control signs or signals in their proper location on temporary mounting supports until permanent signs or signals are restored.

7. When constructing a new roadway, install and maintain Type 3 barricades with flashing yellow lights and "Road Closed" signs, chain link fences, or both until the new or improved roadway is accepted by the City.

8. For the Work in the vicinity of the Airport as specified in 600-1, "GENERAL", perform the following:

    a. Perform the Work necessitating closure of 1 or 2 more lanes on Harbor Drive outside Normal Working Hours **unless otherwise specified** in the Contract Documents.

    b. When sufficient width is available, maintain a minimum of 2 travel lanes (per 601-5(2)(a)) in each direction at all times **unless otherwise specified** in the Contract Documents or agreed upon by Airport representatives.

c. Construct and maintain detours at the proper time. The City will close down the Work if you fail or refuse to construct and maintain detours as required.

d. Do not interrupt the operation of the existing traffic signals and lighting **unless otherwise specified**.

e. Whenever a portion of the roadway is completed, make that section of the road available to traffic immediately if it does not conflict with the rest of the traffic control devises and if it does not compromise public safety.

f. Furnish flag persons, when required, to give adequate warning to traffic or to the public of any dangerous conditions to be encountered.

601-3 TEMPORARY TRAFFIC CONTROL (TTC) ZONE DEVICES.

601-3.1 General.

1. TTC zone devices shall conform to NCHRP Report 350 criteria and/or be Manual for Assessing Safety Hardware Implementation (MASH) certified for TTC crashworthy devices and the California MUTCD. Retro-reflective sheeting used on TTC devices shall conform to ASTM D4956.

2. Furnish, install, and maintain the traffic control devices as shown on the traffic control permit and approved TCP's and any additional traffic control devices as may be required to ensure the safe movement of vehicles and pedestrians and to provide for the safety of construction workers.

3. Maintain existing traffic control signs and traffic signals in their proper location on temporary mounting supports until permanent signs or signals are restored.

4. Your name or the Supplier's name who owns the traffic control devices shall be clearly noted on each device.

5. All traffic control devices shall be removed from the work area immediately following the completion of the Work.

601-3.2 Categories.

1. **Category 1.** Category 1 TTC zone devices shall be defined as small, lightweight devices weighing less than 100 pounds (45.4 Kg) certified as crashworthy by crash testing or crash testing of similar devices. Category 1 temporary traffic control zone devices include, but are not limited to, traffic cones, plastic traffic drums, portable delineators, and channelizers.

2. **Category 2.** Category 2 TTC zone devices shall be defined as small, lightweight devices weighing less than 100 pounds (45.4 Kg) that are not expected to produce significant changes in vehicular velocity but could cause harm to impacting vehicles. Category 2 temporary traffic control zone devices include, but are not limited to, barricades and portable sign supports.

3. **Category 3.** Category 3 TTC zone devices shall be defined as temporary traffic-handling equipment and devices weighing 100 pounds (45.4 Kg) or more that are expected to produce significant changes in the vehicular velocity of impacting vehicles. Category 3 temporary traffic-handling equipment and devices include, but are not limited to, crash cushions, impact attenuator vehicles, temporary railing, temporary barrier, and end treatments for temporary railings and barriers.

601-3.3 Crashworthiness.

1. Category 1 devices purchased after October 1, 1998 shall be self-certified by the vendor. Self-certification shall be based on crash testing, crash testing of similar devices, or years of demonstrable safe performance. The certification shall be submitted to the City prior to the start of the Work.

2. Category 2 devices shall be those listed on the FHWA's "Accepted Crashworthy Category 2 Hardware for Work Zones" that meets NCHRP Report 350 criteria for crashworthiness. Category 2 devices shall have FHWA acceptance and have been purchased after October 1, 2000. FHWA acceptance shall be labeled with the FHWA acceptance letter number and the name of the manufacturer prior to the start of the Work. The label shall be legible and permanently affixed by the manufacturer. Category 2 devices without a label shall not be used on the Work.

3. Category 3 devices shall be those that have been tested in accordance with NCHRP criteria. Category 3 devices shall be **as specified in the Special Provisions** or shown on the Plans or Standard Plans.

601-3.4 Operation and Maintenance.

601-3.4.1 General.

1. You shall be responsible for the operation and maintenance of the TTC zone devices and services.

2. You shall patrol and monitor the Work site to ensure that the TTC devices are in-place, properly positioned, and operational.

3. You shall ensure that TTC devices are repaired, replaced, and cleaned as necessary to preserve their appearance and visibility in accordance with American Traffic Safety Services Association (ATSSA) Quality Guidelines for TTC Devices. TTC devices that are damaged shall be repaired or replaced.

601-3.5.1 General.

1. **Unless otherwise specified**, signs shall conform to the California MUTCD. Each sign shall consist of a base, standard or framework, and a sign panel. Sign units shall be capable of being delivered to the Work site and placed into immediate operation.

2. Signage shall include all temporary signs required for the direction of traffic through or around the Work site. Sign placement shall conform to the California MUTCD and the TCP.

3. **Unless otherwise specified,** temporary "No Parking" and "No Stopping" signs shall be installed 72 hours before enforcement. . Signs shall indicate company name, contact number, and specific days, dates, and times of restrictions. If violations occur, call Police Dispatch 619-531-2000 to enforce the Tow-Away notice.

601-3.6 Channelizing Devices.

1. **General.** Channelizing devices shall include cones, tubular markers (delineators), channelizers, drums, barricades, and temporary barriers. Channelizing devices shall be placed as shown on the Plans or the TCP.

2. **Cones.** Tubular Markers and Channelizers. Cones, tubular markers or channelizers shall be used on short-duration and short-term stationary temporary traffic control zones. Tubular markers or channelizers shall be used on intermediate-term stationary temporary traffic control zones and when additional visibility and stability is required.

3. **Drums.** Drums shall be used in lieu of cones or tubular markers for long-term stationary temporary traffic control zones or as shown on the TCP.

4. **Barricades.**

   a. Barricades shall not be placed in a merging lane of traffic without advance warning. Advance warning shall consist of a "High Level Warning Device", arrow panel and other appropriate delineation. Barricades used at night shall be equipped with flashing lights.

   b. Type 1 and 2 barricades shall be used on local streets and sidewalks. Barricades shall be Type 1, Type 2, or Type 3.

   c. Type 1 barricades shall not be used where they may be encountered by the visually impaired unless horizontal tie bars are provided not more than 6 inches (150 mm) from the bottom of the barricade.

   d. Type 2 barricades shall be used in major, secondary, and collector streets.

   e. Type 3 barricades shall be used for closing streets to through traffic and for other major operations where the barricades shall remain in place for extended periods.

   f. Barricades shall be placed such that there is no gap large enough to for a vehicle and bicycle to pass through, except where necessary to provide access for local traffic or emergency vehicles. Ballasting of barricades shall be by means of sand filled bags placed on the lower

parts of the barricade frame or stays. Ballasting shall not be placed over any retroreflectorized rail face facing traffic.

g. Barricades displaced or not in an upright position shall immediately be replaced or restored to their original location, in an upright position.

h. You shall place "OPEN TRENCH" signs (C27(CA)) on Type 3 Barricade within the construction Work zone, ahead of any Work areas with open trenches that are greater than 3 inches in depth, in accordance with California MUTCD SECTION 6F.103 (CA). The barricades shall be placed in a continuous manner and shall prevent pedestrian, vehicular, and biker access to the open trench area.

5. **Temporary Traffic Barriers.**

a. Temporary traffic barriers and end treatments shall be Type III crash-worth, have a crash cushion, NCHRP Report 350 and/or MASH certified, and placed as shown on the TCP. Water-filled plastic barriers shall be used within sidewalks and bike paths. Concrete barriers shall be used within the vehicular way and bike lanes and routes.

b. Temporary traffic barriers shall be placed on a firm and stable foundation. The foundation shall be paved or graded to provide uniform bearing throughout the entire length of the barrier.

c. Abutting ends of adjoining segments shall be placed and maintained in alignment without offset to each other. Segments shall be positioned straight on a tangent alignment and on a true arc on a curved alignment. Segments shall be pinned to each adjacent segment. An impact attenuating device shall be provided on the approach end.

d. If it is necessary to leave a gap between barrier segments due to equipment or special drainage features, the gap shall be closed at all times when the Work is not actively in progress at the location of the gap.

e. Drilling of holes for concrete barriers shall be as shown on the Standard Plans or **as specified in the Special Provisions**. Threaded rods of dowels shall be bonded in holes drilled in the existing pavement.

601-3.7 Warning Lights.

1. **General.**

a. Warning lights shall be portable, powered, lens-directed, enclosed lights with a yellow lens. Warning lights shall consist of a lighting unit, a flasher unit, visor, backplate, standard, battery power source, and base. The components shall be assembled to form a complete self-

contained warning light that can be delivered to the Work site and placed in immediate operation. Warning lights may be mounted on channelizing devices or on a standard and base.

b. The type of warning light to be used shall be **as specified in the Special Provisions** or shown on the TCP, consistent with CAMUTCD.

2. **Standards and Bases.**

a. Standards shall be adjustable to provide a variable mounting height between 6 feet (1.8 m) to 10 feet (3.1 m) measured from the bottom of the base to the center of the lens. Standards shall be securely attached to the base. Power cables shall be multi-conductor and jacketed with neoprene and shall be of sufficient length to accommodate the full-vertical height of the standard.

b. Bases shall be large enough to accommodate a minimum of 2, 12V automotive-type storage batteries, and shall be of such shape and mass that the warning light will not roll in the event it is struck by a vehicle or pushed over.

c. Standards and bases shall be finished with 2 applications of orange enamel conforming to color No. 12473 of Federal Standard 595B.

3. **Assemblies.**

a. Warning light assemblies shall be weatherproof and capable of operating a minimum of 150 hours between battery recharges or other routine maintenance.

b. Warning lights shall be capable of use in either a steady burn or flashing mode.

c. Lamps shall be rated at 25W for operation with a 12V battery current.

d. The color of the light emitted shall be yellow.

e. Lens shall glass or plastic and conform to the requirements of ANSI D.10.1.

4. **Visors and Backplates.**

a. Warning lights shall be equipped with an 8 inch (203.2 mm) minimum length visor and a backplate. Visors are not required during the hours of darkness.

b. The interior of the visor and the front face of the backplate shall be finished with 2 applications of flat black enamel conforming to 210-1, “Paint”.

5. **Installation.**

a. Warning lights shall only be used outside of the Work site to provide advance warning **unless otherwise specified in the Special Provisions** or shown on the TCP. Warning lights used for advance warning shall be clearly distinguishable from the primary delineation and shall be positioned above the normal reflectorized barricades. Warning lights shall be mounted a minimum height of 3 foot (0.9 m) high measured from the bottom of the lens to the underlying surface.

b. Warning lights shall be used in either a steady burn or flashing mode. Visors will not be required during the hours of darkness. Torches and flares shall be used only in patrolled emergency situations.

601-3.7.1 Portable Changeable Message Signs (PCMS).

1. PCMS shall be furnished, placed, operated and maintained at the locations shown on the Plans, TCP, **as specified in the Special Provisions**, or as designated by the City.
2. Remove PCMS after initial placement, from location to location, as directed by the Resident Engineer.
3. Make PCMS available for use 24 hours per day as required, without any additional payment for time or number of locations unless otherwise required for changed conditions.
4. PCMS shall not be used for advertising or as a substitute for temporary traffic control signs and devices.
5. PCMS messages shall be approved by the City, with content consistent with Caltrans Changeable Message Sign Guidelines.
6. PCMS shall be installed per CA MUTCD Part 2 Chapter 2L, Part 6 Chapters 6C, 6D, 6F, and 6G.
7. PCMS used during nighttime operations shall be 50% dimmed to limit glare.

601-3.7.2 Flashing Arrow Boards.

1. Flashing arrow boards shall be mounted to provide a minimum of 7 foot (2.1 m) clearance between the bottom of the panel and the roadway surface. Flashing arrow boards shall be used when the posted speed is 40 mph or more, or when curvature of the roadway limits visibility.
2. Flashing arrow board size shall be as shown on the TCP, per CAMUTCD.
3. Flashing arrow board "caution mode" may be used for shifts, but not for traffic merges. "Caution mode" used during nighttime operations shall be 50% dimmed to limit glare.

601-3.7.3 Flashing Directional Bars.

1. Flashing directional bars shall be vehicle mounted. Flashing directional bars shall be used to provide traffic control for lane closures **as specified in the Special Provisions** or as shown on the TCP.
2. Flashing direction bars size shall be as shown on the TCP, per CAMUTCD.
3. Flashing directional bars used during nighttime operations shall be 50% dimmed to limit glare.

601-4 TEMPORARY TRAFFIC STRIPING AND PAVEMENT MARKINGS.

1. **General.**
   a. **Unless otherwise specified in the Special Provisions** or as shown on the TCP, temporary traffic striping and pavement markings shall consist of one coat of paint and glass beads (except black stripes).
   b. Glass beads shall conform to 214-3, "GLASS BEADS". Paint shall conform to 214-4, "PAINT FOR STRIPING AND MARKING".
2. **Application.**
   a. **Unless otherwise specified**, application shall conform to 314-4, "APPLICATION OF TRAFFIC STRIPING AND CURB AND PAVEMENT MARKINGS" and the following:
      1) Yellow lines shall separate traffic flow in opposing directions.
      2) White lines shall separate traffic flow in the same direction.
      3) Broken lines shall be permissive.
      4) Solid lines shall be restrictive.
      5) Line widths indicate degree of emphasis.
      6) Double lines indicate maximum restriction.
      7) Centerlines shall be used to separate opposing traffic.
      8) Traffic striping shall not project into or across a street intersection.
3. **Removal.**
   a. Removal shall conform to 314-2, "REMOVAL OF TRAFFIC STRIPING AND CURB AND PAVEMENT MARKINGS".

601-5 TRAFFIC LANE WIDTHS AND CLEARANCES.

1. **General.**
   a. Traffic lanes and clearances shall conform to the requirements **specified in the Special Provisions** or shown on the TCP.

2. **Lane Widths.**

a. **Unless otherwise specified** or shown on the TCP, temporary traffic lanes shall be at least 12 foot (3.7 m) wide. A minimum 14 foot (4.3 m) wide traffic lane shall be provided next to a curb or vertical drop off, or to share the lane with bicycles when bicycle facilities are closed. When only one lane is provided in each direction, wider lanes shall be provided to separate opposing traffic and to accommodate turning movements. A minimum 18 foot (5.5 m) wide lane shall be provided if parking is to be allowed.

b. Bicycle lanes shall have a clear width of not less than 5 foot (1.5 m). Bicycle lanes less than 5 foot (1.5 m) wide shall be closed. If the Work site is in a bike path and requires the bike path to be closed, a detour bike path, lane or route, with appropriate signage, shall be provided.

3. **Clearances.**

a. **Unless otherwise specified** or shown on the TCP, clearances to obstructions shall be as follows:

1) Two (2) feet (609.6 mm) from vertical obstructions including, but not limited to, longitudinal curbs, guardrails, or temporary traffic barriers.

2) Ten (10) feet (3.0 m) from the edge of the traveled way to fixed objects unprotected by barriers. When the minimum clearance to fixed objects cannot be provided, temporary barriers shall be placed to protect the fixed object. On local streets with speed limits of 40 miles per hour (70 km/hour) or less, temporary asphalt concrete curb may be used in lieu of temporary traffic barriers.

3) Five (5) feet (1.5 m) from any excavation or drop off of 2 inches (50.8 mm) or greater to allow placement of temporary barriers to keep traffic out of the Work site and minimize traffic surcharge on the excavation. When the 5-foot (1.5 m) clearance to an excavation or drop off cannot be maintained, temporary traffic barriers shall be placed to separate vehicles, bicycles, and pedestrians from the excavation or drop off.

b. If the City determines that it is necessary to decrease the minimum distances specified to allow for the prosecution of the Work, you shall provide such temporary traffic control devices as required by the City.

601-6 COVERING OF EXISTING TRAFFIC SIGNS AND SIGNAL FACES.

1. **General.**
   a. Existing traffic signs and signal faces shall be covered **as specified in the Special Provisions** or as shown on the Plans or TCP.
   b. Covers shall be designed to be installed by hand without the use of tools. The size of the cover shall closely fit and encapsulate the traffic control device.
2. **Cover Material.**
   a. Covers shall be made from outdoor grade, weather-resistant cloth, plastic, or metallic material and be specially fabricated for the intended purpose.
   b. Cover material shall be of sufficient density to block out the sign face or message so that the sign face or message is not visible to oncoming traffic.
   c. Signal head covers shall be a matte tan color or a contrasting color to the signal head. Covers for pedestrian indications shall be a matte black color.
3. **Installation.**
   a. **General.** Covers shall be secured in place with bolt snaps attached to elastic straps. Adhesive tape shall not be used. The straps shall be permanently attached to the cover.
   b. **Vehicle Heads.** You shall cover all non-functioning vehicle heads utilizing signal head covers. No holes shall be drilled in any indications to attach the covers. A minimum of 2 vehicle heads for each phase shall be in operation while Work is being performed at an intersection except for approved shutdowns.
   c. **Pedestrian Indications.** Pedestrian indications shall be covered. If audible pedestrian signals are in place, the audible warning device shall be temporarily disabled for the crossing taken out of service.
   d. **Pedestrian Push Buttons.** Pedestrian push button message signs shall be removed, reversed, and remounted on the pedestrian push button assembly. Pedestrian push button assembly covers may be used instead of reversing and remounting pedestrian push button message signs.
   e. **Audible Pedestrian Signals.** Audible pedestrian signals shall be disabled by temporarily removing the load switches for the pedestrian indications within the traffic signal controller cabinet. The pedestrian indications shall then be covered.
   f. **Signs.** Sign covers shall be securely fastened to the sign.

601-7 PAYMENT

1. The payment for traffic control Working Drawings, permits, traffic control Work including any traffic control devices that may be required by the City, shall be included in Bid item for "Traffic Control and Working Drawings".

2. The payment for Engineered Traffic Control Plans, traffic control Work, and permits shall be included in the Bid item for "Traffic Control and Engineered Traffic Control Plans".

3. No separate or additional payment shall be made for the operation, maintenance, repair, or replacement of TTC zone devices.

4. **When included in the Bid proposal**, the Bid item for "Traffic Control" shall include the payment for all traffic control devices, permits, required signs, notices, and detours as shown in the provided Engineered Traffic Control Plans.

5. **When included in the Bid proposal**, the following traffic control devices shall be measured and paid for separately:

    a. K-rails shall be measured and paid for per linear foot along the top of the rail per location. Maintaining, repairing, replacing, and removing the K-rail; excavating and backfilling; drilling holes and grouting threaded rods or dowels when required; removing threaded rods or dowels and filling drilled holes with mortar; and moving and replacing removable panels as required, complete in place, as shown on the Plans and in accordance with these specifications and the **Special Provisions**, shall be included in the Bid item for "K-rail".

    b. Crash cushion modules shall be measured per each individual module (barrel), on a one-time basis, for each location shown on the Plans. Maintaining, repairing, replacing, and removing the modules, complete in place, as shown on the Plans and in accordance with these specifications and the **Special Provisions**, shall be included in the Bid item for "Crash Cushion Module".

    c. Flashing arrow boards and electronic message signs shall be available for use 24 hours per day as required, without any additional payment for time or number of locations unless otherwise required for changed conditions. Maintaining, repairing, replacing, and removing the flashing arrow boards, complete in place, as shown on the Plans, and in accordance with these specifications and the **Special Provisions,** shall be included in the Bid item for "Flashing Arrow Boards".

d. PCMS shall be measured by the unit from actual count. The allowance Bid item for "Portable Changeable Message Signs (PCMS)" shall include full compensation for furnishing, placing, operating, maintaining, repairing, replacing, transporting from location to location, and removing the PCMS as shown on the Plans, in accordance with these specifications and the **Special Provisions**, and as directed by the City.

e. The payment for furnishing, installing, programming, maintaining, and removing City approved temporary video or radar detection systems as specified in 601-1, "GENERAL" shall be included in the Bid item for each "Temporary Detection System" required at each intersection.

END OF PART 6 - TEMPORARY TRAFFIC CONTROL

PART 7

STREET LIGHTING AND TRAFFIC SIGNAL SYSTEMS

SECTION 700 – MATERIALS

DELETE all sections and subsections in its entirety and SUBSTITUTE with the following:

1. All material shall be in accordance with Sections 86 and 87 of the Caltrans Standard Specifications edition identified in the Contract Documents.
2. Sections that start with "86" or "87" in the following specifications correspond to the same subsections in and are additional provisions to Section 86 or 87 of the Standard Specifications of Caltrans.
3. Signal, lighting, and electrical system materials and installation Work shall be done in accordance with Caltrans Standard Plans, except as herein amended.
4. References to Sections 10 through 96 of the Standard Specifications of the State of California shall apply where shown in Sections 86 and 87.
5. References in the State Standard Specifications to the State of California, its agencies, or agents shall be construed to refer to the City, its corresponding agencies, or agents.
6. Traffic signal construction (new and/ or modifications) shall meet the City's Design Standard requirements to the satisfaction of the City Engineer.
7. These specifications shall be used in conjunction with SECTION 701 - CONSTRUCTION.

700-1 GENERAL

700-1.1 (86.1.01C) Submittals

86-1.01C (1) General [Replace with the following]

1. Within 15 days of Contract execution, Contractor shall submit the City's project manager a list of all equipment that the contractor proposes to install. Submittals shall include manufacturer name, make and model numbers.
2. Contractor shall submit a schedule of values within 15 days after Contract approval.
3. Once the submittals have been approved, the contractor shall submit confirmation of the vendor's acceptance of the orders for the electrical equipment and materials as an informational submittal.
4. Delays in the delivery of equipment that are due to the Contractor not ordering the equipment in a manner to accommodate the progress of the construction schedule, shall not be justification for a Time Extension to the Contract Working Days.

5. The City must be made aware of any manufacturer delays by way of a letter from the supplier/manufacturer.

700-2 COMMON COMPONENTS

700-2.1 (86-1.02J) Standards

700-2.1.1 General.

1. Standards, regardless of diameter, shall be round unless otherwise noted. Steel standards shall be galvanized (whether or not they are painted). Aluminum 1-A poles, where indicated on the Plans, shall be fabricated of seamless tubing conforming to 6063-T6 wrought aluminum alloy specifications of the Aluminum Association. The base of the post shall be a minimum of 6 inches (152.4 mm) O.D. tapering to 4½ inches (114.3 mm) O.D. at the top. The wall thickness of the shaft shall be a minimum of 1/4 inch (6.4 mm). Ornamental anchor bolt nut covers shall be provided for all traffic signals and/or lighting standards and posts. Edges shall have minimum 1 inch (25.4 mm) radius.

2. Standards shall have an aluminum identification plate attached with stainless steel rivets or screws, as specified on the Plans. Each Standard shall have a handhole in the base and a handhole cover. The handholes shall conform to the details shown on the Plans or Standard Plans. The handhole cover shall be securely attached to the Standard with tamper-resistant hardware or as detailed on the Plans or **specified in the Special Provisions**.

700-2.1.2 Foundations.

1. Spacers shall be inserted between the reinforcing steel cage and the form to ensure that the specified clearance is maintained.

2. Foundation for CIDH pole shall be constructed in accordance with latest Caltrans standard drawings and specifications.

700-2.1.3 Straightness.

1. For street lighting and pedestrian Standards, the maximum deviation shall not exceed the tolerance specified in Table 700-2.1.3 when measured with the Standard in the vertical position. For traffic signal standards the maximum deviation shall not exceed the tolerance specified in Table 700-2.1.3 when measured with the Standard in the horizontal position.

TABLE 700-2.1.3

Length of Standard – Excluding Base		**Maximum Allowable Deviation From String Line***
Over	Equal to or Less	
---	21 feet (6.4 m)	½ inch (12.7 mm)

Length of Standard – Excluding Base		Maximum Allowable Deviation From String Line*
Over	Equal to or Less	
21 feet (6.4 m)	25 feet (7.6 m)	¾ inch (19.1 mm)
25 feet (7.6 m)	35 feet (10.7 m)	1 inch (25.4 mm)
35 feet (10.7 m)	40 feet (12.2 m)	1¼ inch (31.8 mm)
40 feet (12.2 m)	---	**As specified in the Special Provisions**.

* The maximum deviation shall be measured from a string line on the face of the Standard, in a plane passing through the longitudinal axis.

2. Short deviations in the Standard shall not exceed 1/4 inch (6.4 mm) deviation from the centerline of the Standard for each 5 feet (1.5 m) of length.

3. Offsets or jogs due to mold extensions or joints shall not exceed 1/16 inch (1.6 mm) in thickness along the surface of the Standard.

700-2.1.4 Mast Arms

700-2.1.4.1 Mast Arm Replacement or Modification.

1. The welding of mast arms and qualification of welders shall conform to AWS D1.1, "Structural Welding Code". Tenon shall be mechanically held in relation to the mast arm before welding tenon. The Welds and damaged galvanized surfaces of modified mast arms shall be painted with 2 applications of zinc-rich primer as provided in Section 75-1.02B, "Galvanizing", of Caltrans Standard Specifications. The second application shall be applied at the installation site.

2. At each mast arm replacement location, a new or completely modified mast arm shall be on hand and ready for installation before closing traffic lanes or ramps. Luminaires installed on modified mast arms shall be horizontal, with no tilt, or as directed by the Engineer.

700-2.1.5 Metal Standards.

700-2.1.5.1 General.

1. The top of each Standard shall be equipped with an ornamental cap which shall be securely held in place by a 3/4 inch (19.1 mm) diameter hex head machine bolt. Provisions shall be made for substituting 3/4 inch (19.1 mm) diameter steel insulator pin. The cap and cap support surface shall have sufficient strength to transfer to the Standard, from a point 5 inches (127 mm) above the top of the cap, a 950 lbs (4,250 N) horizontal loading.

2. Metal standards shall withstand, without permanent deformation, a maximum horizontal load of 950 lbs (4,250 N) applied to the center of the cap that is attached to the Standard. In addition, metal standards shall withstand, without exceeding a deflection of 2-5/16 inches (58.7 mm) a normal horizontal load of 370 lbs (1,650 N) applied to the cap that is attached to the top of the Standard.

3. Exposed edges of plates that comprise the base assembly shall be finished smooth. Exposed corners shall be rounded unless otherwise shown on the Plans. Slots or drilled holes shall have a tolerance of 0 to + 1/8 inch (3.1 mm).

4. Metal standards shall be equipped with anchor bolt covers made of metal of the same type as that used for the shafts or as specified on the Plans or Standard Plans. Anchor bolt covers shall be equipped with all necessary fittings and hardware for securing the bolt covers to the Standard.

700-2.1.5.2 Steel Standards.

1. **Unless otherwise specified in the Special Provisions**, steel standards shall be fabricated from sheet steel of weldable grade having minimum yield strength, after fabrication, of 40,200 psi (276 MPa). When a single-ply 5/16 inch (7.9 mm) thick steel standard is specified, a 2-ply steel standard with an equivalent section modulus may be substituted **unless otherwise specified in the Special Provisions**. Certified test reports that verify conformance to this minimum yield strength shall be submitted to the Engineer in accordance with 3-8, "SUBMITTALS".

2. Steel standards may be fabricated from full length sheets or shorter sections. Each section shall be fabricated from not more than 2 pieces of sheet steel. Where 2 pieces are used, the longitudinal welded seams shall be directly opposite each other. When the sections are butt welded together, the longitudinal welded seams on adjacent sections shall be placed to form continuous straight seams from the base to the top. In addition, butt welded sections shall be strengthened by inserting a welded sleeve at each joint. The sleeve shall be fabricated from steel 1/8 inch (3.1 mm) nominal thickness or thicker of the same composition as the steel used in the Standard. The sleeve shall have a minimum length of 1 inch (25.4 mm). The sleeve shall be centered at the joint and have the same taper as the Standard such that the outside of the sleeve is in full contact throughout its length and circumference. The weld metal at the transverse joint shall extend to the sleeve. No transverse joint shall occur within 3 inches (76.2 mm) of mast arm fittings.

3. All welds shall be continuous and conform to the requirements of America Welding Standards D1.1. The welds joining the shafts of Standards to their base plates shall be as shown on the Plans or Standard Plans. However, alternative weld joint details may be approved by the Engineer. Approval of alternative weld joint details will be contingent upon the proposed weld joint passing both weld procedure and nondestructive testing as deemed

necessary by the Engineer. All costs of the weld procedure and nondestructive testing shall be borne by you.

4. Longitudinal welds in steel tubular sections will be tested by the Agency in conformance with the requirements in California Test 664. The sampling frequency shall be as directed by the Engineer. The welds may be made by the electric resistance welding process. Exposed welds shall be ground flush with the base metal.

5. Steel standards shall be galvanized by the hot-dip process conforming to 210-3, "GALVANIZING", or cadmium plated with Type NS coating conforming to ASTM B766. **If specified in the Special Provisions** or shown on the Plans, steel standards shall be painted in accordance with 210-1, "PAINT". Painting shall conform to SECTION 310 - PAINTING.

700-2.1.5.3 Aluminum Standards.

1. Aluminum standards shall be fabricated from seamless tubing conforming to "6063-T6 wrought aluminum alloy of the Specifications of the Aluminum Association" or the specifications in Table 700-2.1.5.3.

TABLE 700-2.1.5.3

ITEM	ASTM SPECIFICATION NO.
Castings	B26/B26M
Luminaire Arm	B490-90a
Spun Shaft	B241/B241M
Square Extruded Shaft	B429

The wall thickness of the shaft shall be a minimum of 1/4 inch (6.4 mm). Aluminum standards shall be supplied with a mill finish and be uniform and commercially sound in conformance with ASTM B209M.

700-2.1.5.4 Fiberglass Standards.

1. Fiberglass standards shall not replace steel standards unless approved by City Engineer.

2. Fiberglass standards shall consist of fiberglass-reinforced thermosetting plastic poles. Fiberglass standards shall be hollow, tapered or with tapered sections, be non-conductive and chemically inert. Fiberglass standards shall be in conformance with current AASHTO manual titled "Standard Specifications for Structural Supports for Signs, Luminaires, and Traffic Signals" (2013) and ANSI requirements. You shall submit to the Engineer a Certificate of Compliance from the manufacturer in accordance with 3-8, "SUBMITTALS". The certificate shall include a copy of all applicable test reports.

The test reports shall be signed and stamped by the licensed engineer who supervised the tests. The certificate shall also comply with 4-5, "CERTIFICATE OF COMPLIANCE", and certify that the Standards were manufactured in accordance with an Agency-approved testing and quality control program.

3. Fiberglass standards shall be constructed of continuous fiberglass filaments combined with thermosetting polyester and ultraviolet-resistant resin. The fiberglass and resin ratio shall contain at least 65% glass and 35% resin by weight. The resin shall be pigmented as required by the Standard Plans or Special Provisions and be of uniform color throughout the entire body of the Standard. The glass filament shall be helically wound under tension at angles to provide axial strength. The finish shall be smooth.

4. Fiberglass standards shall be flame resistant in accordance with ASTM D635. In addition, fiberglass standards shall be reinforced in areas of handholes, conduit entrance openings, and mast arm connections.

5. Fiberglass standards shall be direct burial or have an anchor base as shown on the Plans or the Standard Plans. The base shall be bonded to the pole with an adhesive recommended by the manufacturer and coated with an aliphatic-type acrylic-modified polyurethane finish. Each Fiberglass standard shall be equipped with a removable aluminum or galvanized steel pole top cap.

6. An aliphatic-type acrylic-modified polyurethane coating shall be applied to the exterior of each fiberglass standard. The coating shall be semi-gloss, weather resistant, and shall match the color of the resin **specified in the Special Provisions**. The coating shall have a minimum of 3 mils (75 µm) dry film thickness. A 1 quart (1 liter) can of the coating that matches the specified color shall be furnished **as specified in the Special Provisions**. The polyurethane coating shall be tested by the manufacturer for adhesion in accordance with the requirements of ASTM D3359, Method A and shall have a scale rating of 5A. The adhesion testing shall be conducted before and after the accelerated weathering evaluation by the manufacturer. You shall provide the Engineer with a copy of the test results from the manufacturer in accordance with 3-8, "SUBMITTALS". The test reports shall be signed and stamped by the licensed engineer who supervised the tests.

7. Finished surfaces shall be capable of withstanding a minimum of 2,500 hours of accelerated weathering when tested by the Agency, in accordance with the requirements of ASTM G154. Testing lamps shall be UV-B (313 nm wavelength). The testing cycle shall consist of 4 hours of ultraviolet (UV) exposure at 140° F (60° C), followed by 4 hours of condensate exposure at 100° F (40° C). After testing, the finished surface of fiberglass standards shall exhibit the following:

    a. Fiber Exposure - None
    b. Crazing - None

c. Checking - None
d. Chalking - Very slight
e. Change in color - May dull slightly.

8. Each fiberglass standard shall be spiral-wrapped in its entirety with a weatherproof wrap for protection during shipping and storage.

700-2.1.5.4.1 Fiberglass Lighting Standards.

1. Where indicated on the Plans, standards utilizing fiberglass-reinforced thermosetting plastic (FRP) poles may be substituted for steel lighting standards as provided below:

TABLE 700-2.1.5.4.1 (A)

Steel Standard	FRP Equivalent
Type 15	Type 15F
Type 15 with Slip Base	Type 15F (Breakaway)
Type 21	Type 21F
Type 30	Type 21F
Type 30 with Slip Base	Type 21F (Breakaway)

2. Fiberglass lighting standards shall consist of round, fiberglass-reinforced thermosetting plastic poles with aluminum mast arms. FRP poles shall be hollow, tapered or with tapered sections, non-conductive and chemically inert.

3. FRP lighting standards shall conform to the details shown on the plans, and shall comply with requirements in the AASHTO manual titled “Standard Specifications for Structural Supports for Signs, Luminaires, and Traffic Signals” (2013) and ANSI Roadway Lighting Document C136.20, “Fiber-Reinforced Plastic (FRP) Lighting Poles”.

4. FRP lighting standards specified as “Breakaway” types shall also comply with the requirements in the National Cooperative Highway Research Program Report 230, “Recommended Procedures for the Safety Performance Evaluation of Highway Appurtenances”. Design wind velocity for lighting standard systems shall be 100 mph (160.9 Km/hr).

5. You shall provide the Engineer a Certificate of Compliance from the manufacturer in accordance with 4-5, “CERTIFICATE OF COMPLIANCE”, of the Standard Specifications. The certificate shall also include a copy of all applicable test reports on the lighting standards. The test reports shall be signed by the manufacturer's management person responsible for the tests. The certificate shall also certify that the lighting standards comply with the

requirements of the specifications and were manufactured in accordance with the approved testing and quality control program.

6. Each standard shall have an identification plate conforming to the provisions in the second paragraph of Section 86-1.02J, "Standards, Poles, Steel Pedestals, and Posts", of Caltrans Standard Specifications. The identification plate shall show the standard type, manufacturer's name, manufacturer's part number and the year of fabrication. If the lighting standard is a breakaway type, the identification plate shall include the word "BREAKAWAY". The plate shall be located either on the anchor base or just above the handhole.

7. The pole shall be constructed of continuous fiberglass filaments combined with thermosetting polyester, ultraviolet-resistant resin. The fiberglass and resin ratio shall contain at least 65% glass and 35% resin by weight. The glass filament shall be helically wound under tension at angles to provide axial strength. The pole shall be flame resistant in accordance with ASTM D635. The resin shall be pigmented light gray and be of uniform color throughout the entire body of the pole. The finish of the pole shall be smooth.

8. Each pole shall have a handhole and handhole cover, bearing the name of the manufacturer. The handhole cover shall be securely attached to the pole with tamper-resistant hardware. The handhole shall be located on the side away from the mast arm. The pole shall be reinforced in areas of handholes, conduit entrance opening, and mast arm connection.

9. The pole shall be smooth, round and uniformly tapered above ground and anti-rotation shaped below ground. The pole shall be direct burial or anchor base as specified on the plans. Each standard shall be provided with a removable aluminum or galvanized steel pole top cap.

10. The base shall be bonded to the pole with a suitable adhesive, and coated with an aliphatic-type acrylic-modified polyurethane finish. For new installations, adaptor plates shall not be used to attach the standard to the foundation.

11. FRP lighting standards that are not specified as "Breakaway" types shall not have the machined groove inside the anchor base casting as shown in the "Aluminum Anchor Base Elevation" detail shown on the plans.

12. Direct burial poles shall have a 2-inch x 6-inch (50.8 mm x 152.4 mm), nominal size, grommetted conduit/conductor entrance located 2 feet ± 1 inch (609.6 mm ± 25.4 mm) below finished grade after installation. The entrance shall be located directly below the handhole. The butt end of the direct-burial pole shall be flared or modified by some other acceptable means to increase the resistance to rotation and pullout and provide additional ground bearing resistance.

13. The pole, with specified luminaire and mast arm installed, shall withstand the bending strength test load shown in the following table. The pole shall withstand this load with the handhole in compression. The pole shall not exceed a maximum deflection of 13% of the length of the pole above the ground line when subjected to the deflection test load shown in the following table:

TABLE 700-2.1.5.4.1 (B)

Standard Type	Bending Strength Test Load	Deflection Test Load
Type 15F, Type 15F (Breakaway)	2406 N (540 pounds)	1606 N (360 pounds)
Type 21F, Type 21F (Breakaway)	2562 N (575 pounds)	1708 N (385 pounds)

14. Test loads shall be applied according to Section 12, "Pole Deflection Measurements", of ANSI C136.20. Poles shall be loaded 12 inches (304.8 mm) below the tip.

15. In addition to the requirements stated above, aluminum mast arms shall comply with requirements in the Aluminum Association's Publication 30, "Specifications for Aluminum Structures". Length of mast arm shall be as shown. Outer end of the mast arm shall be provided with a 2-3/4 inch (69.9 mm) O.D. slipfitter, 6 inches (152.4 mm) long.

16. An aliphatic-type acrylic-modified polyurethane coating shall be applied to the exterior of the fiberglass pole. The coating shall be semi-gloss, highly weather resistant and light gray in color matching the color of the resin and shall have a minimum 0.075 mm (3 mils) dry film thickness. A 1.1 quart (1 liter) can of the coating to match the poles shall be supplied with each order of poles. The polyurethane coating shall be tested for adhesion to the pole surface in accordance with the requirements of ASTM D 3359, Method A and shall have a scale rating of 5A. The adhesion testing shall be conducted before and after the accelerated weathering evaluation.

17. The finished surface of the pole shall be capable of withstanding a minimum of 2,500 hours of accelerated weathering when tested in accordance with the requirements of ASTM G 154. Lamps shall be UV-B (313 nm wavelength). The testing cycle shall be 4 hours of ultraviolet (UV) exposure at 140° F (60° C) and then 4 hours of condensate exposure at 40° C (100° F).

18. After testing, the finished surface of the pole shall exhibit the following:

TABLE 700-2.1.5.4.1 (C)

Fiber exposure:	None
Crazing:	None
Checking:	None
Chalking:	Very slight
Change in color:	May dull slightly

19. Each pole shall be spiral wrapped in its entirety with a weatherproof wrap for protection during shipping and storage.

20. Installation and backfilling for direct burial poles shall be as provided for wood poles in Section 56-3.06, "Wood Poles", of Caltrans Standard Specifications. The pole butt end shall be embedded into the ground 5 feet (1.5 m) deep.

21. Each FRP lighting standard shall have its luminaire, mast arm, and anchor bolts effectively grounded as provided in Section 86-1.02F(2)(c)(ii), "Bonding Jumpers and Equipment Grounding Conductors", of the Standard Specifications. A separate bonding connection to the mast arm will not be required provided there is non-insulated contact between the luminaire and the mast arm.

700-2.1.5.4.2 Fiberglass Type 1-A Traffic Signal Standards.

1. Fiberglass Type 1-A standards shall conform to dimensions shown on Caltrans Standard Plan ES-7B.

2. The design of the pole assembly shall use latest edition of AASHTO "Standard Specification for Structural Supports for Highway Signs, Luminaires and Traffic Signals" when calculating maximum expected wind loading. The pole shall be designed to not deflect more than 5% when loads are applied.

3. The pole shall be smooth, round and uniformly tapered. The pole shall be constructed of continuous fiberglass filaments combined with thermosetting polyester resin. The fiberglass and resin ratio shall contain at least 65% glass and 35% resin by weight. The glass filament shall be helically wound under tension at angles to provide axial strength. The pole shall be reinforced in areas of hand holes. A coating shall be applied to the pole surface to maintain surface integrity against the effects of sunlight and extremes in the weather. The pole resin and surface coating shall be gray unless otherwise noted. The pole shall be flame-resistant in accordance with ASTM D635. A 2½-inch by 5-inch (6.35 cm x 12.7 cm) oval handhole with cover plate shall be located in the pole a minimum of 12 inches (304.8 mm) above the base plate.

700-3 STREET LIGHTING SYSTEM MATERIALS.

700-3.1 Reinforced Concrete Standards.

1. Under working load (including wind loading) the pole shall not be stressed beyond the cracking strength. Wind loads shall be as specified in the latest edition of the AASHTO Standards. The ultimate moment of the poles is calculated using the PCI "Guide to the Design of Concrete Poles" and validated through testing. AASHTO (Sections 7 and 3) are used to develop allowable loads for overturn, shear, and torsion as well as load application.
2. Poles shall be tapered, centrifugally cast, and pre-stressed. They may be round or octagonal, black and white marble aggregate or natural exposed aggregate, and direct burial or anchor base type. The minimum outside diameter or dimension of direct-burial poles shall be 5 inches (127 mm) at the top and uniformly tapered to the bottom. Pole shape and color shall be uniform for any one project. Replacement poles shall match existing. Aggregates shall conform to current requirements of ASTM C33 as required by ASTM C1089, and be free of Iron particles that could oxidize. No dye or sealer shall be used without approval of the City.
3. The centrifugal casting process shall produce a center duct throughout the length of the pole. The duct shall be free from sharp projections or edges which might injure the wire or cable. It shall have a minimum diameter of 1-inch in 5-inch (25.4 mm in 127 mm) top diameter poles and 1½ inches in 6-inch (38.1 mm in 152.4 mm) top diameter poles. All reinforcing steel shall have a minimum cover of 5/8 inch (15.9 mm).
4. Four galvanized bar studs shall extend approximately 1 inch (25.4 mm) above top of standard for attachment of bracket arm. These studs shall be sufficiently embedded so as to provide sound anchorage for the mast arm and luminaire under working loads. Other methods of attachment may be used, with the Engineer's approval.
5. After curing, the surface of the standard shall be treated to remove cement laitance and develop the surface texture. When finished, poles shall be without cracks or brazing and shall have a uniform surface (without objectionable mold marks) and texture throughout the entire length. Maximum deviation from string line at any point shall not exceed 0.03-inch per foot (2.5 mm per meter) of length.
6. Direct burial poles furnished with sand and gravel aggregate shall have a concrete finish free from fins or other imperfections and shall have a finish equal to Class 1, see 303-1.9.3, "Class 1 Surface Finish" at the base of the concrete standard, the pre-stressing steel shall be cut flush to the bottom surface. The exposed ends of the pre-stressing steel and the base of the light standard shall be heavily coated with roofing asphalt or coal tar enamel.
7. Grounding contacts shall not be bonded to the neutral except as allowed by the NEC.

700-3.2 (86-1.02B) Conduit.

1. When approved by the Engineer, conduit runs shown on the plans to be located behind curbs may be installed in the street, within 4 feet of and parallel to the curb, by narrow trenching. All pull boxes shall be located behind the curb or at locations shown on the plans. Narrow trenching shall be performed in accordance with the latest City Standards. Any changes in conduit location shall be approved in advance by the Engineer. All narrow trenching shall conform to the City of San Diego Standard Drawings SDG-117, "Pavement Restoration for Asphalt Concrete Surface Streets - Minor Excavation", SDG-118, "Pavement Restoration for Concrete Surface Streets and Alleys - Minor Excavation" and be inspected prior to backfill. Trenches behind sidewalks shall be compacted using compaction tools to ensure no sinking of trench will occur. Trenches wider than 6 inch (15.2 cm) shall conform to the City of San Diego Standard Drawings SDG-107, "Pavement Restoration for Asphalt Concrete Surfaced Streets - Major Excavation", SDG-108, "Pavement Restoration for Concrete Surfaced Streets and Alleys - Major Excavation", and SDG–119, "Trench Types G, H & I Backfill for Dry Utility". A 3-inch (7.6 mm) bed of fine soil or sand shall be placed in the trench.

2. Conduit to be installed underground shall be Type 3 Polyvinyl Chloride (PVC) Schedule 80 unless otherwise specified.

3. Detector termination conduits shall be Type 3.

4. The conduit in a foundation and between a foundation and the nearest pull box shall be Type 3.

5. After conductors have been installed, the ends of conduits terminating in pull boxes and in service and controller cabinets shall be sealed with an approved type of sealing compound.

6. Conduit end bells shall be installed where applicable.

7. Pull tape for use when installing cables in conduit shall consist of a flat, woven, lubricated, soft-fiber polyester tape with a minimum tensile strength of 8,000 N (1,800 pounds) and shall have printed sequential measurement markings at least every 3 feet (0.9 m).

8. Pull tape shall be installed in conduit and fastened to conduit exterior termination locations for future use.

9. If you judge it appropriate, the final 2 feet (0.6 m) of conduit entering a pull box in a reinforced concrete structure may be Type 4.

10. Orange colored conduit shall be used for communication lines and gray colored conduit shall be used for power lines.

700-3.3 (86-1.02C) Pull Boxes.

1. Pull box shall only be used where specifically shown on the plans. Pull boxes shall not be installed in surfaces subject to vehicular traffic unless approved by the Engineer.

2. A No. 3½ pull box shall be installed immediately adjacent to each street light pole. A No. 3½ pull box shall be installed at each end of a street lighting conduit run crossing a street. Unless otherwise shown, ¾-inch crushed rock shall be placed 6 inches around the box and shall also be placed, with a minimum of 6 inches, at bottom of pull box edges. The top of the conduit shall be 6 inches below the lid and 2 inches above crushed rocks

3. A No. 6 pull box shall be installed immediately adjacent to each signal pole or as otherwise indicated on the Plans. Unless otherwise shown, ¾-inch crushed rock shall be placed 6 inches around the box and shall also be placed, with a minimum of 6 inches, at bottom of pull box edges. The top of the conduit shall be 6 inches below the lid and 2 inches above crushed rocks.

4. The cover of the pull box shall be stamped with the words “TRAFFIC SIGNAL”, “STREET LIGHT”, or “COMMUNICATIONS”, as appropriate.

5. A 4-inch (10.2 cm) diameter white ceramic raised pavement marker (Type A Marker) shall be installed on the face of the curb or asphalt dike adjacent to every pull box installed in landscaped area.

700-3.3.1 Tier 15 Pull Boxes.

1. Tier 15 pull boxes and extensions shall conform to the Western Underground Committee Recommended Guide No. 3.6, “Non-Concrete Enclosures”. Tier 15 pull boxes shall be 30 inch (0.8 m) wide x 48 inch (1.2 m) long x 18 inch (0.5 m) deep (nominal inside dimensions). Each pull box shall have one 8 inch (20.3 cm) or 16 inch (40.6 cm) extension.

2. Hold down bolts or cap screws and nuts shall be of brass, stainless steel or other non-corroding metal material. Cover marking shall be “COMMUNICATION”. Enclosures, covers and extensions shall be concrete gray color.

3. Tier 15 pull boxes shall be installed where shown on the Plans for communication system.

700-3.4 Services.

1. Install Type III service equipment enclosure for combined 120 V metered traffic signals and 120 V unmetered street lighting as noted on the plans. Maximum base size of service equipment enclosure shall not exceed 16 inches x 16 inches (406.4 mm x 406.4 mm) and service equipment shall meet all SDG&E requirements. Traffic signal service shall have 50 A, 1P, 120 V main circuit breaker, and street lighting service shall have 30 A, 1P, 120 V main circuit breaker, unless noted otherwise on the plans.

2. Continuous welding of exterior seams in service equipment enclosures is not required.

3. Type III service equipment enclosures shall be the aluminum type.

4. Circuit breakers shall be the cable-in/cable-out type, mounted on non-energized clips. All circuit breakers shall be mounted vertically with the up position of the handle being the "ON" position.

5. Dead front panel or panels, and corresponding exterior door, shall be hinged on one side and shall be openable without the use of tools.

6. A barrier-type terminal block rated for 40 A, minimum, shall be provided in each service equipment enclosure. The terminal block shall have a minimum of 12 positions with terminals rated at Size No. 8 or larger, to accept the field wires indicated on the plans. Field wires shall be terminated using crimped, insulated loop connectors.

700-3.5 Electrical Splice.

700-3.5.1 General.

1. Where specified on the plans or at the direction of the Engineer, conductors shall be spliced by the use of "C" shaped compression connectors as shown on ES-13. A jumper wire with clips shall be provided for continuity of shielded cables. The completed splice shall be rated for direct burial application and capable of normal continuous operation at 600 V. Splices shall be insulated with heat-shrink tubing of the appropriate size.

2. Splices shall be insulated by "Method B" or, if you judge it appropriate, splices of conductors shall be insulated with heat-shrink tubing of the appropriate size after thoroughly painting the spliced conductors with electrical insulating coating.

3. The open end of cable jackets or tubing shall be sealed in a manner similar to the splicing requirements to prevent the entrance of water.

700-3.5.2 Fused Splice Connectors.

a. A fused splice disconnect shall be installed in the pull box adjacent to the service point for a street light. Each street light shall have a fuse and fuse holder.

700-3.6 Solar Electric Power System.

1. Where shown on the plans, a solar electric power system shall be provided. The system shall consist of solar modules, batteries, a charge regulator, mounting hardware, and the necessary wiring.

700-3.6.1 Solar Electric Modules.

1. Solar electric modules for school zone flashers shall use triple junction thin film technology. Twenty-four-hour systems may use the thin film or polycrystalline modules. Thin film module electrical characteristics shall be 16.5 V DC maximum power voltage and 23.8 V DC open circuit voltage under

standard test conditions of 1000 W/m² at 77° F (25° C). Polycrystalline module electrical characteristics shall be 16.9 V DC maximum and 21.5 V DC open circuit voltage under standard test conditions of 1000 W/m² at 77° F (25° C). The cell shall be fabricated on a stainless steel back sheet. Cells shall include an integral bypass diode. Cells shall provide the required module wattage and be encapsulated under low-iron glass.

700-3.6.2 Batteries.

1. Systems shall consist of nickel-zinc batteries. Sizing of battery depends on autonomy and load requirements (minimum of 1000W). Battery rating shall be 120 V AC. System shall be ethernet capable.

700-3.6.3 Charge Regulator.

1. The unit shall be an integrated system control unit with the capability to control power and load management functions. Basic features shall include charging of the system batteries based on voltage and temperature, low voltage disconnect to protect the batteries from over-discharge, and operation of the flasher circuit.

2. The unit shall have an external trigger input for system activation by external sources such as timers, detectors, and devices incorporating a switch/contact closure and shall include a select switch for this. The controller shall include a series switch-configured charge controller which controls the flow of array current to the battery.

3. The charging algorithm shall be a pulse type that features temperature-compensated charging. On-board short circuit protection shall be standard. The controller shall have two lamp outputs set for a 50% duty cycle each and normally calibrated for 50-60 flashes per minute to meet ITE and MUTCD standards.

4. Outputs shall be complimentary-one on and the other off. Automatic intensity adjustment of the lamps shall be made by the controller for variance in light conditions. Dimming circuitry shall be integral to the controller. Electronics shall be potted or coated to protect against environmental damage.

5. The unit shall feature an integral heat sink and an 8-position terminal strip with all positions labeled for ease of servicing. Manual switches shall be provided on the controller to select the lamp activation source (on continuous or external activation) and the dimming circuit activation. Dimming shall be capable of being defeated for school zone systems.

700-3.6.4 Mounting Hardware.

1. Solar modules shall include an aluminum frame to allow for ease of mounting and rigidity. Solar modules shall be mounted to a fixed tilt mounting structure set to an angle of 45E-50E. The mount shall be constructed of galvanized steel (ASTM A-153 Class A) or clear anodized aluminum. The mount shall be suitable

for use with a Type 1-A pole. The mount will include appropriate stainless steel hardware to secure the modules to the mounting structures.

2. The system shall be housed in a gasketed enclosure, constructed of 1/4 inch (6.4 mm) aluminum, and designed for mounting on a 14 feet (4.2 m) Type 1-A pole. The enclosure shall have room for a vertical aluminum mounting plate capable of holding the system controller and the timer module (school zone systems).

3. The battery section of the enclosure shall feature a minimum of 1/2 inch (12.7 mm) styrofoam insulation material around the battery compartment sides to minimize transfer of heat from the enclosure wall to the battery. Screen-covered louvered vents shall be included on each side of the enclosure to allow circulation of air in the enclosure.

4. The enclosure shall feature one or more PELCO police locks to secure the contents from unauthorized access. Enclosures shall be capable of holding either two or four batteries, depending on system requirements. The door shall have a lock cover plate attached to the door with a rivet. The door shall be attached to the main enclosure with hinges that are welded or sufficiently riveted to each piece. Enclosures for four batteries shall feature a continuous hinge. A mechanical stop shall be included to prevent the door from opening more than 115°.

700-3.6.5 Wiring.

1. The system shall be provided complete with wiring necessary for installation on a Type 1-A pole. Cabinet and lamp wiring shall be color coded and include a seven-pin cannon plug in the harness to allow disconnect of the system. The plug shall be keyed with a locking mechanism to ensure proper connection. Array wiring shall be coated in UV resistant sheathing and come with cord grips for exiting the module and entry to the pole. Conductors shall be terminated with either a forked terminal or a spade terminal. Sealing lock rings or O-rings shall be used to minimize the entry of water or dust into the junction box. Module interconnect cables, if used, shall be constructed of #10 AWG with a UV resistant sheath. Cord grips shall be provided at entry and exit points to the module junction box. Conductors shall be terminated with forked terminals.

700-3.7 Testing.

1. Testing of control equipment and cabinet wiring, complete, will be accomplished at a facility by the City of San Diego. Testing of street lighting equipment shall include a 3-day burn, by you, with the use of shorting caps.

700-3.8 Painting.

1. **Where shown on the Plans or specified in the Special Provisions**, all light standards, mast arms, luminaire arms, signal heads, luminaires, and electrical service cabinets shall be painted the specified color. In the Centre City

Community, the specified color is known as CCDC dark blue (Sherwin Williams F63TXL-1075-4365, Tnemec 75-J6179, or equal).

2. Steel surfaces shall be prepared either by Power Tool Cleaning per 310-2.4, "Power Tool Cleaning" or Commercial Blast Cleaning conforming to 310-2.5.1, "General", subsection "d". New ungalvanized ferrous and non-ferrous metal surfaces shall be prepared in accordance with SECTION 310 - PAINTING. Coating system shall be Sherwin Williams (as listed below), Tnemec 75-J6179, or approved equal:

    a. Wash Prime Coat: Sherwin Williams, Industrial Wash Primer, P60g2, 0.2-0.4 mil dry film thickness

    b. Prime Coat: Sherwin Williams Tile-Clad II Hi-Build Primer, B62N 71/B60V 70, 4mils dry film thickness

    c. First Finish Coat: Specified color, or Sherwin Williams F63TXL-1075-4365, 2 mils dry film thickness

    d. Second Finish Coat: Specified color, or Sherwin Williams F63TXL-1075-4365, 2 mils dry film thickness

3. You shall touch up marred or abraded areas with a matching paint.

700-3.9 LED Cobra Head Luminaire.

700-3.9.1 General.

1. Each luminaire shall consist of an assembly that utilizes LED components as the light source subject to the following requirements:

    a. Operating Temperature: The luminaire shall be designed to operate at an average nighttime temperature of 70° F (20° C). The ambient operating temperature range shall be 30° F to 130° F (-5° C to 55° C).

    b. UL Listing: The fixtures shall be UL Listed and shall include UL label. The UL listing shall include the pole mounting assembly.

    c. Components: LED components shall be interchangeable amongst similar wattages for common fixtures without requiring use of special tools. Troubleshooting components shall not require special diagnostic tools or individual energy usage metering system.

700-3.9.2 Electrical Requirements.

1. Operating Voltage: The luminaire shall operate within one of two voltage categories (95 to 305 and 480) Volts AC (VAC). The fixtures shall be capable of operating in the range of voltages listed. Fluctuations of line voltage within these categories shall have no visible effect on the luminous output. External Transformers are not permissible as components for the luminaire input voltage.

2. Power Factor: Power supply should have a minimum Power Factor of 0.90.

3. Harmonic Distortion: The total harmonic distortion shall not exceed 20%. An integral factory installed standard driver is required that includes inherent thermal protection.

4. Surge Suppression: The luminaire on-board circuitry shall include Surge Suppression Devices (SSD) to withstand high repetition noise transients as a result of utility transients, and other interference. SSD shall conform to UL 1449 or UL 1283, depending on the components used in the design.

700-3.9.3 Cooling System.

1. Thermal management of the heat generated by the components shall be of sufficient capacity to assure proper operation of the luminaire over the expected useful life of more than 100,000 hours at specified operating temperature range and climate zone.

2. The light output variation shall not deviate greater than 15% over 40° F to 130°F (0° C to 55° C) operating temperature variation.

3. Thermal management shall be passive by design and shall consist of a heat sink with no moving mechanical parts or liquids.

700-3.9.4 Roadway Application Requirements and Optical Assembly.

1. Correlated Color Temperature (CCT): CCT shall be 3000 Kelvin depending on location and as indicated on the Plans.

2. Color Rendering Index (CRI): Luminaires shall have a minimum CRI of 70.

3. Optics: The luminaire shall conform to the Illuminating Engineering Society (IES) definition of "cut-off", with no illumination above an angle of 90 degrees above the nadir. The fixtures shall be International Dark-Sky Association (IDA) compliant. Submittal documentation shall include "Dark Sky" compliance.

700-3.9.5 Physical/Mechanical Requirements.

1. Luminaire Fixture: The luminaire shall be a single, self-contained device, not requiring on-Site assembly for installation. The power supply for the luminaire shall be integral to the unit.

2. Maximum Dimensions: 40 inch long by 16 inch wide by 8 inch tall (101.6 cm long by 40.6 cm wide by 20.3 cm tall).

3. Luminaire shall not weigh more than 40 pounds (18 Kg).

4. Assembly Housing: The housing shall be primarily constructed of dye cast aluminum or steel corrosion resistant paint. Finish shall be gray in color, powder coated and rust resistant. The fixture openings and doors shall be sealed and gasketed. The components within the fixture assembly shall be easily accessible with a two-piece hinged door separable from the upper assembly. The lower door shall be removable. All screws shall be stainless steel. Captive screws are required on accessible components that require maintenance after installation. Lens discoloration shall be considered a failure under warranty.

5. Access: Provide easy access to internal components. Include an external latch capable of being operated with one hand. No internal components shall fall out when the lower door assembly is opened. Seams shall be CNC formed and TIG welded.

6. Lens Requirements: The lens shall be tempered glass 1/4 inch (6.4 mm) thick lens, or approved equal with gasketed door.

7. Mast Arm Mounting Connection Requirements: Luminaires shall mount on min 1-5/8 inch (4.13 cm) OD to max 2-3/8 inch (6.03 cm) OD horizontal tenon with no more than four 9/16 inch (1.43 cm) hex bolts and a 2-piece clamp(s). Luminaire leveling capability shall be integral to the fixture. Multiple mounting angle adjustments shall be provided to adjust the level of the fixture ± 4° from the horizontal.

8. Mechanical Requirements: The assembly and manufacturing process for the induction luminaire shall be designed to assure all internal components are adequately supported to withstand mechanical shock and vibration from winds.

9. Ingress Protection (IP) Rating: Optical assembly shall have a minimum rating of IP-65, the exterior shell shall have a minimum IP rating of 54.

10. Terminal Block: Field wires connected to the luminaire shall terminate on a barrier type terminal block secured to the housing. The terminal screws shall be captive and equipped with wire grips (serrated strips on the terminal for conductors up to #6 AWG wire size). Each terminal position and conductor phase designation shall be clearly identified.

11. Components: All components, including circuit boards, shall conform to Chapter 1, Section 6 of the "Transportation Electrical Equipment Specifications" (TEES) UL 1598, and ANSI C 136 requirements. Fixture components shall be modular in design and recyclable.

12. Replumbing Painting: Powder coat painting of the housing shall conform to the requirements of the Caltrans Standard Specifications and the Contract Documents. Applied coating shall be free of lead and mercury.

13. House Side Shield: The manufacturer shall offer a field installable house side shield.

14. Luminaire model shall be constructed in accordance with the latest City Standard or as noted in the Plans.

700-3.9.6 Luminaire Identification.

1. Identification: Each luminaire shall have the manufacturer's name, trademark, model number, serial number, date of manufacture including month and year, and lot number as identification permanently marked inside each unit and the outside of each packaging box.

2. Identification: The wattage and CCT rating of the luminaire shall be able to be detected visibly from an observer standing at ground elevation at the base of the pole.

3. Identification of Operating Characteristics: The following operating characteristics shall be permanently marked inside each unit: rated voltage and rated power in Watts and Volt-Ampere, and Luminaire Efficiency Rating (LER).

700-3.9.7 Photometric Documentation.

b. IES Files: Submittals shall include IES files for each fixture type. Submittals shall include photometric iso-foot candle diagram for a 30 feet (9.14 m) mounting height for each fixture type, and a point to point diagram with uniformity calculations that identify maximum to minimum illumination ratio. Photometric diagrams shall be in a scale of 1:20.

700-3.9.8 Quality Assurance.

1. Luminaires shall be manufactured in accordance with ISO9001. The Manufacturer's Warranty Certificate shall be in accordance with 3-13.3, "Warranty" and submitted in accordance with 3-8, "SUBMITTALS".

700-3.10 Photoelectric Controls.

1. Photocell Receptacle: Each luminaire shall have a rotatable (so the window can be adjusted to the north) prewired 7-conductor (twist-lock) ANSI C136.41-2013 photocell receptacle.

2. The photoelectric control unit (PCU) shall be Type "IV".

3. Furnish an individual, stand-alone PCU with each fixture. The PCU shall have a silicon light sensor that complies with ANSI 136.10 – 2010, and have MOV surge protection. The PCU shall have a minimum ten year warranty. The PCU shall fail in the "on" control. It shall be capable of inverse ratio controls. It shall be suitable for roadway applications.

4. The PCU shall be American Electric Lighting model number DLL127-1.5 or approved equal.

5. Photoelectric units for illuminated signs shall have a "turn-on" level of between 215 lux and 323 lux (20 footcandles and 30 footcandles) corresponding to a switching level of approximately 430 lux to 646 lux (40 footcandles to 60 footcandles) measured in the horizontal plane. The "turn-off" level shall not exceed 3 times the "turn-on" level.

6. All components shall be long life with UV inhibitors.

700-4 TRAFFIC SIGNAL MATERIALS.

700-4.1 Conductors and Cable.

700-4.1.1 General.

1. Conductors of size #8 AWG and larger shall be stranded. Ends of cables entering the controller shall be marked the same as in the pull boxes adjacent to the pole the cables serve and shall include the pole served. The cables shall be identified with one or more wraps of ½ inch (12.7 mm) 7 mil vinyl electrical tape, conforming to the following color coding:

A	B	C	D	E	F	G	H	I
Blue	Orange	Green	Brown	Grey	White	Red	Yellow	Violet

700-4.1.2 Twisted-pair Copper Interconnect.

1. The interconnect cable shall contain the amount of twisted, #22 AWG solid, copper pairs as specified in the Plans. A 6-Pair #22 AWG (6PR#22) cable shall be defaulted to if pair count is not specified on plans. interconnect cable This cable shall be constructed for installation in an underground conduit environment with a sheath consisting of a double coated aluminum shield over which a medium density polyethylene jacket is extruded, in accordance with REA Standard PE39. This cable shall be filled with a gel compound to resist water penetration and migration.

700-4.1.2.1 Cable Performance. The copper twisted-pair cable shall meet or exceed the following specifications:

1. 22 AWG, solid copper conductor, twisted pair.
2. Insulation: Dual, semi-rigid PVC skin over foamed PE.
3. Core wrap: Polypropylene film.
4. Mutual capacitance of 94 nanofarads per mile, measured at 1 KHz.
5. DC Resistance = 92 ohms per mile.
6. Attenuation = 2.2 dB/1,000 ft. @ 150 KHz.

700-4.1.2.2 Cable Terminations.

1. Method for termination or interconnecting twisted pair cabling shall be in based on application and in accordance with these provisions unless otherwise specified.

700-4.1.2.2.1 Copper Cable Termination Blocks.

1. A proper sized termination block (12-pair minimum) shall be installed in each cabinet where twisted-pair interconnect cabling exists. Termination blocks

shall be capable of accepting #22 AWG insulated solid conductors and be rack mountable on a standard 19inch (482.6 mm) rack. Termination blocks shall be designed to operate in unheated outdoor cabinets, capable of resisting corrosion and oxidation, and capable of preventing open circuits caused by poor metal-to-metal contact.

2. Each quick connect terminal block and barrier terminal block shall be sprayed with a PIC restoration spray to retard corrosion. Three coats shall be applied prior to connecting the wires and three coats shall be applied after all the wire connectors have been completed. Each coat shall be allowed to dry thoroughly, as specified by the manufacturer, before the next coat is applied. You shall terminate all SIC cable on termination blocks in each cabinet where twisted-pair cable is installed.

700-4.1.2.2.2 Connectors / Splicing

1. Scotchlok type connectors shall be used in lieu of termination blocks for pairs transmitting/ receiving ethernet based communications. Scotchlok connectors shall be type UR2 two-wires spicing or UR3 for three-wire.
2. The insulation from individual wires shall not be stripped. The connectors are insulation displacement connectors (IDC), meaning they splice wires without the need to strip the insulation.
3. Cabling shall be clean and undamaged before splicing.
4. The appropriate crimping tool designed for the connector shall be used. Use of pliers or other general-purpose tools is not allowed.
5. After crimping, the connection shall be inspected to ensure the wires are securely locked into the connector.
6. A cable tester shall be used to verify the integrity of the splice and confirm that there is no signal loss or misalignment in the twisted pair.

700-4.2 Controllers Assemblies.

1. Controller assemblies shall consist of a controller unit (Model 2070LX), a fully-wired cabinet (Model Type 332L), power distribution unit assembly (PDA #2), conflict monitor unit (Model 2010ECLip), inductive loop sensor detectors (Model 222), DC isolator cards (Model 242L), load switches (Model 200), flasher unit (Model 204), and all auxiliary equipment required to control the system as shown on the Plans, and as specified in these Specifications.

700-4.2.1 Controller.

1. Traffic signal controller shall be model 2070LX with 2070-1C CPU Module. Traffic signal controllers shall be furnished with the latest Q-Free MAXTIME software and all necessary hardware components such as additional 2070 modules for the intended intersection operations. Ancillary equipment for intended intersection operations shall be included. The controllers, modules,

software, and all ancillary equipment shall be compliant with the City's existing Kinetics ATMS system and shall be NTCIP compliant.

2. Controller assemblies shall conform to the requirements in “Transportation Electrical Equipment Specifications” (TEES) and “Traffic Signal Control Equipment Specifications” (TSCES), issued by the State of California, Department of Transportation, and to latest addendums. Controller assemblies shall be on the current State of California Authorized Material List (AML). The 2070LX controller shall be supplied with in the following configuration:

    a. Model 2070LX Unit Chassis

    b. 2070-1C CPU with Q-Free MAXTIME software

    c. 2070-2E+ 2070-style FI/O Module

    d. 2070-3B Front Panel Display

    e. 2070 - 4A Power Supply Module

    f. 8MB Data Key (Blank)

3. Front panel character display modules shall be socket mounted for easy replacement in the front panel assembly.

700-4.2.2 (86-1.026) Cabinets.

1. Type 332L controller cabinets shall conform to the requirements in "Transportation Electrical Equipment Specifications," (TEES), and "Traffic Signal Control Equipment Specifications" (TSCES), issued by the State of California, Department of Transportation, and to all addendums.
2. Use of cabinets other than type 332L is considered not acceptable and must be approved by City Transportation Department.
3. Type 350i and 352i ATC controller cabinets may be considered for locations with unique operations.
4. Type 336L cabinets may be considered for locations with access and/or right-of-way constraints.

700-4.2.2.1 332L Controller Cabinet

1. Traffic signal controller cabinets shall be Type 332L unless otherwise specified.
2. Type 332L cabinets shall have the following specifications:

    a. <u>Standard Features:</u>

        1) 8-phase, 4-pedestrian operation
        2) 36 detector channel capability (3 - left turn, 6 - through movement)
        3) 2-channel or 4-channel industry-standard detection modules
        4) Railroad (2) and emergency vehicle (4) preemption inputs

5) Solid-state relay (SSR) (Mercury Contactor replacement)
6) SSR Fault Indicator Light
7) Relay safety feature interrupts 24 VDC if the SSR fails during flash
8) Programmable Yellow/Red or All Red flashes (flash plugs)
9) DC isolation inputs for pedestrian push buttons and special functions
10) 210 Signal Monitor slot
11) Main power circuit breaker (30A) on the service panel
12) Transient voltage & surge suppression filter
13) Drawer/shelf combination
14) Lights, LED
15) Load Switches (Model 200)
16) Flasher Unit (Model 204)

b. Assemblies & Components:

1) 14-position input files (2)
2) 12-position output file
3) Model PDA-2L Power Distribution Assembly
4) Model 206L power-saving, high-efficiency power supply
5) Flash transfer relay sockets (4)
6) Dual-circuit flasher sockets (2)
7) Input panel
8) Service panel
9) Police panel with signal On/Off and Auto/Flash switches

c. General Specifications:

1) Dimensions: 67" H x 24" W x 30" D (rounded to the nearest inch)
2) Material: 5052-H32 aluminum, 0.125" thick
3) Finishes: Anodized with clear anti-graffiti coating
4) Doors: Front (1), back (1), all full size
5) Latching System: 3-point, choice of Corbin or Best locks
6) Handles: 3/4" round, stainless steel with padlock hasp
7) Doorstops: 90° and 180° (±10°), each door, top
8) Rack Assembly: Removable 19" EIA racks (2)
9) Ventilation: Thermostat 100CFM fans (2), louvered air intake, filter
10) Mounting: Base mounted
11) Shipping Weight: 258 lbs without plug-ins or controller(s)

3. New type 332L cabinet shall come equipped with the following minimum quantity of plug-in modules listed below:

Module Description:	Qnty

Conflict Monitor Unit (CMU)	1
DC Isolator Card (2-Channel)	4
Load Switches	12
Detector Loop Sensor Units (2-Channel)	16

700-4.2.2.2 336L Controller Cabinet

1. A type 336L cabinet may be considered for locations with access and/or right-of-way constraints. Type 336L Cabinets shall have the following specifications:

   a. Standard Features:

      1) 8-phase, 4-pedestrian operation
      2) 16 detector channels
      3) 2-channel or 4-channel industry-standard detection modules
      4) Railroad (2) and emergency vehicle (4) preemption inputs
      5) Solid-state relay (SSR) (Mercury Contactor replacement)
      6) SSR Fault Indicator Light
      7) Relay safety feature interrupts 24 VDC if the SSR fails during flash
      8) Programmable Yellow/Red or All Red flashes (flash plugs)
      9) DC isolation inputs for pedestrian push buttons and special functions
      10) 210 Signal Monitor slot
      11) Main power circuit breaker (30A) on the service panel
      12) Transient voltage & surge suppression filter
      13) Drawer/shelf combination
      14) Lights, LED
      15) Load Switches (Model 200)
      16) Flasher Unit (Model 204)

   b. Assemblies & Components:

      1) 14-position input file
      2) 12-position output file
      3) Model PDA-2L Power Distribution Assembly
      4) Model 206L power-saving, high-efficiency power supply
      5) Flash transfer relay sockets (4)
      6) Dual-circuit flasher sockets (2)
      7) Input panel
      8) Service panel
      9) Police panel with signal On/Off and Auto/Flash switches

   c. General Specifications:

      1) Dimensions: 46” H x 24” W x 30” D (rounded to the nearest inch)
      2) Material: 5052-H32 aluminum, 0.125” thick

3) Finishes: Anodized with clear anti-graffiti coating
4) Doors: Front (1), back (1), all full size
5) Latching System: 3-point, choice of Corbin or Best locks
6) Handles: 3/4" round, stainless steel with padlock hasp
7) Doorstops: 90° and 180° (±10°), each door, top
8) Rack Assembly: Removable 19" EIA racks (2)
9) Ventilation: Thermostat 100CFM fans (2), louvered air intake, filter
10) Mounting: Base mounted
11) Shipping Weight: 165 lbs without plug-ins or controller(s)

2. New type 336L cabinet shall come equipped with the following minimum quantity of plug-in modules listed below:

Module Description:	Qnty
Conflict Monitor Unit (CMU)	1
DC Isolator Card (2-Channel)	2
Load Switches	12
Detector Loop Sensor Units (2-Channel)	8

700-4.2.2.3 Cabinet Accessories

1. Each cabinet shall be equipped with a single fluorescent fixture with front and rear door activating switches, and slide-out document drawer. The fixture shall be provided with an F15T8, cool white lamp operated from a normal power factor UL or ETL listed ballast.

700-4.2.3 Components

700-4.2.3.1 Conflict Monitor Unit (CMU). CMUs for type 332, 336, and 337 controller cabinets shall be manufactured by Ederle Design Inc (EDI) product number 2010ECLip, or approved equivalent.

1. Contractor shall be responsible for diode board configuration and installation unless otherwise shown on plans.

2. Intended configuration for CMU diode board shall be submitted to the City for review and approval prior to installation. Submittal shall clearly depict the phases and concurrent channels, and the diodes to be removed.

700-4.2.3.2 DC Isolator Card (2-Channel). Isolator Cards shall be manufactured by Ederle Design Inc (EDI) model number 242L, or approved equivalent. Isolator cards shall be on the current State of California Authorized Material List (AML).

700-4.2.3.3 Loop Detector Sensor Unit (2-Channel). Loop detector units shall be model type 222 and listed current State of California Authorized Material List (AML).

700-4.2.3.4 Load Switches. Load switches shall be model type 200 and meet the following minimum requirements:

1. Capable of operating Type "G" pedestrian signals without exceeding Model 2010ECLip Conflict Monitor threshold limits.

2. Capable of switching a single L.E.D. head.

3. Listed on the current State of California Authorized Material List (AML).

700-4.3 Traffic Signal Faces And Fittings.

700-4.3.1 Vehicle Signal Faces.

1. Vehicle signal faces shall be metal and black in color. Bicycle signal faces shall be metal and yellow in color.

700-4.3.2 Vehicle Signal Sections

1. Vehicle signal sections shall be provided with 12-inch (305 mm) sections unless shown otherwise on the plans. Bicycle signal sections shall be provided with 8-inch (203 mm) sections unless shown otherwise on plans. Lenses shall interchange with Econolite, Traffic Control Technologies, Automatic Signal, and McCain manufactured vehicle heads.

700-4.3.3 Visors.

1. Vehicle signal visors shall be metal and black in color. Bicycle signal visors shall be metal and yellow in color.

2. Visors shall be tunnel-type, have ears and be attached to the signal heads with screws. Visors shall interchange with Econolite, Traffic Control Technologies, McCain, and Automatic Signal manufactured vehicle heads.

700-4.3.4 Backplates.

1. Vehicle signal backplates shall be metal and black in color unless shown otherwise on plans. Black Backplates with 2-inch retroreflective strip on the face around the border may be considered. Backplates with yellow retroreflective border must be manufactured as such. Installation of a retroreflective border outside of manufacturing is prohibited.

2. Bicycle signal backplates shall be metal and yellow in color.

700-4.3.5 Circular Light Emitting Diode (LED) Signal Modules.

1. Except for programmed visibility heads, the red, yellow, and green indications shall be Type 1 Light Emitting Diode (LED) signal modules conforming to the latest Caltrans specifications and shall have the "Incandescent Look" LED. All lenses shall be tinted. A maintenance period is not required. Replacement modules shall be provided promptly after receipt of modules that have failed at no cost to the City except cost of shipping of the failed modules. All warranty documentation shall be given to the Engineer prior to installation. The replacement modules shall be delivered to the City's Street Division-Electrical Section at Chollas Operations Station, 2781 Caminito Chollas, San Diego, CA 92105 within 5 Working Days after notification.

2. Where solar electric power is provided for a flashing beacon, the indication(s) shall be yellow or red Light Emitting Diode (LED) signal modules conforming to the latest Institute of Transportation Engineers specifications. A maintenance period is not required. Replacement modules shall be provided promptly after receipt of modules that have failed at no cost to the City except cost of shipping of the failed modules. All warranty documentation shall be given to the Engineer prior to installation. The replacement modules shall be delivered to the City's Street Division/Electrical Section at Chollas Operations Station, 2781 Caminito Chollas, San Diego, CA 92105 within 5 Working Days after notification.

700-4.3.6 Programmed Visibility Vehicle Signal Faces. Installation shall be performed by a signal technician qualified to program the programmed visibility signal heads present at the time the signal heads are placed in operation. Lamps for the signal units shall be 150 W, 120 V, incandescent lamps with a minimum average rated life of 6,000 hours. The lamp and socket shall be the 3-prong type.

700-4.3.7 Flashing Beacons. Flashing beacons installed at school locations shall be equipped with a solid-state programmable timer with digital display as specified in 700-6, "School Zone Flashing Beacon System Timer Module".

700-4.4 Pedestrian Signal Sections.

1. Pedestrian signals shall be Type "G".

2. Each pedestrian signal shall consist of a housing with front screen, a message plate, and two Light Emitting Diode (LED) modules, Pedestrian signal housings shall be metal with metal visors and shall conform to provision in Section 86-1.02S. All pedestrian signals shall incorporate a pedestrian countdown timer indication.

3. The message plate shall be 1/8 inch (3.2 mm) nominal thickness ultra-violet-stabilized, prismatic-patterned polycarbonate plastic; 3/16 inch (4.8 mm) nominal thickness hammered wire glass; or 3/16 inch (4.8 mm) nominal thickness ultraviolet-stabilized, prismatic-patterned acrylic plastic. The message plates shall have a flat-black surface over the entire projected area except where the symbols are located. The material used to mask the message plate shall be hard and durable and shall bond in such a manner that it will not flake or peel when the message plate is in use or is washed. The symbols shall be the only illuminated portion of the message plate. The message plate shall be sealed to a polycarbonate case to form a dust-tight and weather-proof module.

4. For crossings where the distance from the near curb to the pedestrian signal indication is 60 feet (18.3 m) or less, the luminance of the UPRAISED HAND symbol shall be 960 cd/m^2 (280 footlamberts), minimum, and the luminance of the WALKING PERSON symbol shall be 3,400 cd/m^2 (990 footlamberts) minimum.

700-4.4.1 Accessible Pedestrian Signals.

1. Accessible pedestrian signal shall consist of the Control Unit and a weather-

proof integrated push button station assembly with vibrotactile arrow button, audible programmable verbal message, locator tone with automatic volume adjustment to ambient noise, and sunlight-visible red LED latches "ON" along with a tactile feedback "bounce" to confirm the button has been pushed. When used, accessible pedestrian signals shall be used in combination with pedestrian signal timing. The audible signal device shall operate continuously during the protected walk interval of the corresponding visual pedestrian signal when actuated by the corresponding pedestrian push button. The information provided by an accessible pedestrian signal shall clearly indicate which pedestrian crossing is served by each device. The audible pedestrian system should be either a 2-wire system for actuated pedestrian signal and 3-wire system for pedestrian recalled signal.

700-4.4.2 Signal Mounting Assemblies.

1. Type SV-1-T mountings with 5 sections and SV-2-TD mountings shall be strapped to the standard using 1/2-inch (12.7 mm) stainless steel strapping material and a stainless-steel standoff.

2. Signal faces installed prior to signal operation shall be covered with shade cloth, canvas, or similar. Cardboard is not an acceptable cover material. Mast arm slip-fitters, post top slip-fitters, and terminal compartments shall be cast bronze.

700-4.5 Detectors.

700-4.5.1 Inductive Loop Detectors.

700-4.5.1.1 General.

1. Loop wire shall be Type 2. Loop detector lead-in cable shall be Type "B". Slots shall be filled with elastomeric sealant, epoxy sealant, or hot-melt rubberized asphalt sealant, except asphaltic emulsion loop sealant and cold tar loop sealant are acceptable if the pavement surface will receive an asphaltic concrete overlay.

2. Vehicle detector loops shall be Type E per Caltrans Standard Plan ES-5B or Type E Modified per City Standard Drawing SDE-104 as shown on the plans. Refer to the latest Caltrans Standard Plans and Specifications and latest City of San Diego Standards. Bicycle detector loops within bicycle lanes shall be Type Q. For Type E detector loops, sides of the slot shall be vertical and the minimum radius of the slot entering and leaving the circular part of the loop shall be 1½ inches (38.1 mm). Slot width shall be a maximum of 5/8 inch (15.875 mm). Type E detector loops shall have three turns of conductor. Limit line vehicle detector loops (front loops) shall be Type E Modified loops. Type E Modified loops shall have four turns of conductor.

3. The sand mixed with the epoxy loop sealant shall be clean and dry silica sand and shall be smaller than 1,520 µm (pass a No. 12 sieve) and be no smaller than 860µm (retained on a No. 20 sieve). The adhesive shall be a black, low viscosity

material consisting of equal parts of modified coal tar epoxy resin and modified amine-bitumen hardening agent, equal to Epocast H-1136A and 1136B. Adhesive shall be mixed together mechanically on the Site and shall have 30 to 45 minute pot life.

700-4.5.1.2 Preformed Inductive Loops.

1. Preformed inductive loops shall be the type shown on the plans. The loop shall be 6 feet (1.8 m) square unless otherwise shown. The loop shall consist of 4 turns of No. 16, or larger, wire with Type THWN or TFFN insulation. The loop wires shall be encased in Size 10, minimum size, Schedule 40 or Schedule 80 PVC or polypropylene conduit. The conduit shall be sealed to prevent the entrance of water and the movement of wires within the conduit. The loop wires from the preformed loop to the adjacent pull box shall be twisted together into a pair (at least 7 turns per meter (2 turns per foot)) and encased in Schedule 40 or Schedule 80 PVC or polypropylene conduit between the preformed loop and the adjacent pull box or detector handhole. The lead-in conduit shall be sealed to prevent the entrance of water at the pull box or handhole end.

2. In new roadways, the preformed loops and lead-in conduits shall be placed in the base course, with top of conduit flush with top of base, and then covered with the asphalt concrete or PCC pavement. Preformed loops and lead-in conduits shall be protected from damage prior to and during pavement placement.

3. In new reinforced concrete structure decks the preformed loops shall be secured to the top of the uppermost layer of reinforcing steel using nylon wire ties. The loop shall be held parallel to the structure deck by using PVC or polypropylene spacers where necessary. Conduit for lead-in conductors shall be placed between the uppermost 2 layers of reinforcing steel.

4. In existing pavement, preformed loop installation shall conform to the following:

    a. The preformed loops and lead-in conduits shall be placed in slots, 1/4 inch (6.4 mm) minimum width, cut into the existing pavement. The top of the conduit shall be 1 inch (25.4 mm), minimum, below the top of pavement.

    b. Slots in asphalt concrete pavement shall be filled with elastomeric sealant, epoxy sealant, or hot-melt rubberized asphalt sealant.

    c. Slots in portland cement concrete shall be filled with elastomeric sealant or hot-melt rubberized asphalt sealant, or shall be filled with epoxy sealant conforming to the requirements in Section 95-2.09, “Epoxy Sealant for Inductive Loops” of the Standard Specifications.

5. The input (or start) wire shall be tagged with an odd number, the output (or finish) wire with the next higher number. A plastic tag ½-inch by 2-inch shall be tie wrapped around each loop pair to identify each pair by phase and numbers of individual conductors.

6. A permanent mark (engraved arrow) shall be installed on the edge of the gutter or face of the curb to indicate stub-out for loop wires.

700-4.6 Pedestrian Push Button Assemblies.

1. Pedestrian push buttons actuator shall have a minimum diameter of 2 inches (50.8 mm) and have a raised tactile arrow and an operating force of 2.5 N to 3.6 N (9 ounces to 13 ounces) and a release force of 1 N (3.5 ounces).

2. Pedestrian push button housing shall be mounted with the actuator button at 3 feet 3 inches ± 1 inch (1 m ± 25.4 mm) above the adjacent finished grade.

3. Pedestrian push button signs shall be MUTCD type R10-3, 5-inch (W) x 7-inch (H).

700-4.6.1 Accessible Pedestrian Signal (APS) System:

1. Pedestrian signal system shall be manufactured by Polara model iNavigator iNS2/iNS3 APS System or approved equal including push button assemblies, placards, Central Control Unit and all other peripherals necessary for a working system.

2. The pedestrian push button housing shall be made of die cast aluminum and painted a Federal Standard color yellow.

3. Polara iNS2 systems push button systems be interfaced with a central control unit installed within the controller cabinet which can accommodate up to 16 push buttons (4 maximum per channel).

4. Polara iNS3 systems: Push buttons shall interface with a pedestrian head control units, Polara model number iPHCU3s. One control unit per push button.

5. Push buttons shall me the following requirements:

    a. Cues pedestrians by both a vibrating button and audible sounds.

    b. All sounds shall emanate from the back of the push button unit.

    c. Push button assembly shall have a sunlight-visible red LED to confirm the button has been pushed.

    d. Have a total of 10 walk sound options with an additional 2 locations for custom voice messages / walk sounds.

    e. A standard locating tone during “Don’t Walk”.

f. All sounds shall automatically adjust to ambient over 60dB range.

g. Ability for extended button push to turn on, boost volumes, and/or mute all sounds except those on the activated crosswalk.

h. Must possess the option to provide pre-configured special messages played throughout the entire intersection upon a central system activated signal (preemption).

i. Ability to have custom audio messages easily changed by USB.

j. Ability to update firmware through USB port.

700-4.7 Emergency Vehicle Preemption Equipment (EVPE).

700-4.7.1 General.

1. Each traffic signal, where shown on the Plans, shall have a modulated light signal detection system which shall conform to the details shown on the plans and the special provisions. Each modulated light signal detection system shall consist of an optical detector/discriminator assembly or assemblies located at the traffic signal. Emitter assemblies are not required for this project.

2. Each system shall permit detection of two classes of authorized vehicles. Class I (mass transit) vehicles shall be capable of being detected at any range of up to 1,800 feet (548.6 m)from the optical detector. Class II (emergency) vehicles shall be capable of being detected at any range up to 2,500 feet (762 m) from the optical detector.

3. Class I signals (those emitted by Class I vehicles) shall be distinguished from Class II signals (those emitted by Class II vehicles) on the basis of the modulation frequency of the light from the respective emitter. The modulation frequency for Class I signal emitters shall be 9.63855 Hz.

4. A system shall establish a priority of Class II vehicle signals over Class I vehicle signals, and shall conform to the requirements in Section 25352, of the California Vehicle Code. Standard emitters for both classes of signals shall be available from the manufacturer of the system. Range measurements shall be taken with all range adjustments on the discriminator module set to “Maximum”.

700-4.7.2 Optical Detection/Discriminator Assembly.

700-4.7.2.1 General.

1. Each optical detection/discriminator assembly shall consist of one or more optical detectors, connecting cable(s), and discriminator module.

2. Each such assembly, when used with standard emitters, shall have a range of at least 1,800 feet (548.6 m) for Class I signals and 2,500 feet (762 m) for Class II signals. Standard emitters for both classes of signals shall be available from the manufacturer of the system. Range measurements shall be taken with all range adjustments on the discriminator module set to "maximum".

700-4.7.2.2 Optical Detector.

1. Each optical detector shall be a weatherproof unit capable of receiving optical energy from two separately aimable directions. The horizontal angle between the two directions shall be variable from 180° to 5°. The reception angle for each photocell assembly shall be a maximum of 8 degrees in all directions about the aiming axis of the assembly. Measurements of reception angle will be taken at a range of 1,800 feet (548.6 m) for a Type I emitter and at a range of 2,500 feet (762 m) for a Type II emitter. Each optical detector shall be installed, wired, and aimed as specified by the manufacturer. Mast-arm mounted optical detectors shall utilize clamping hardware shown in the attached, "E.V.P.E. Detector Mounting Details".

2. Internal circuitry shall be solid state and electrical power shall be provided by the associated discriminator module. Each optical detector shall be contained in a housing which shall include two rotatable photocell assemblies, an electronic assembly, and a base. The base shall have an opening to permit its mounting on a mast arm or a vertical pipe nipple, or suspension from a span wire. The mounting opening shall have female threads for 3/4 inch (19.1 mm) conduit. A cable entrance shall be provided which shall have male threads and gasketing to permit a water-proof cable connection. Each detector shall have mass of less than 2 pounds (1.1 kg) and shall present a maximum wind load area of 36 in^2 (230 cm^2). The housing shall be provided with weep holes to permit drainage of condensed moisture.

700-4.7.2.3 Cable. Optical detector cable shall meet the requirements of IPCEA-S-61-492/NEMA WC 5, Section 7.4, 600 volt control cable, 75° C (165° F), Type B, and the following:

1. The cable shall contain 3 conductors, each of which shall be No. 20 (7 x 28) stranded, tinned copper with low-density polyethylene insulation. Minimum average insulation thickness shall be 25 mil (0.63 mm). Insulation of individual conductors shall be color-coded: 1-yellow, 1-blue, 1-orange.

2. The shield shall be either tinned copper braid or aluminized polyester film with a nominal 20% overlap. Where the film is used, a No. 20 (7 x 28) stranded, tinned, bare drain wire shall be placed between the insulated conductors and the shield and in contact with the conductive surface of the shield.

3. The jacket shall be black polyvinyl chloride with minimum ratings of 600 V and 80 EC (175 EF) and a minimum average thickness of 45 mils (1.1 mm). The jacket shall be marked as required by IPCEA/NEMA.

4. The finished outside diameter of the cable shall not exceed 0.35 inch (8.9 mm).

5. The capacitance, as measured between any conductor and the other conductors and the shield, shall not exceed 157 pf per meter (48 picofarads per foot) at 1,000 Hz.

6. The cable run between each detector and the controller cabinet shall be continuous without splices or shall be spliced only as directed by the detector manufacturer. Provide 20 feet (6.1 m) of slack lead-in cable for each detector. Coil cable in pull box adjacent to pole on which detector is installed.

700-4.7.2.4 Discriminator Module.

1. Each discriminator module shall be designed to be compatible and usable with a Model 2070LX controller unit and Q-Free MAXTIME software, and to be mounted in the input file of a Model 332L or Model 336L controller cabinet, and shall conform to the requirements of Chapter I of the State of California, Department of Transportation, "Traffic Signal Control Equipment Specifications", dated April, 1978, and all addenda thereto, current at the time of project advertising.

2. Each discriminator module shall be capable of operating 4 channels, each of which shall provide an independent output for each separate unit. Each discriminator module, when used with its associated detectors, shall be capable of:

   a) Receiving Class I signals at a range of up to 1,000 feet (304.8 m) and Class II signals at a range of up to 1,800 feet (548.6 m).

   b) Decoding the signals, on the basis of frequency, at 9.639 Hz ± 0.119 Hz for Class I signals and 14.035 Hz ± 0.255 Hz for Class II signals.

   c) Establishing the validity of received signals on the basis of frequency and length of time received. A signal shall be considered valid only when received for more than 0.50 second. No combination of Class I signals shall be recognized as a Class II signal regardless of the number of signals being received, up to a minimum of ten signals. Once a valid signal has been recognized, its effect shall be held by the module in the event of temporary loss of the signal for a period adjustable from 4.5 seconds to 11 seconds in at least 2 steps at 5 seconds ± 0.5 second and 10 seconds ± 0.5 seconds.

   d) Providing an output for each channel that will result in a "low" or grounded condition of the appropriate input of a Model 2070LX controller unit with Q-Free MAXTIME software. For Class I signals, the output shall be a 6.25 Hz ± 0.1 % rectangular waveform with a 50 % duty cycle. For Class II signals, the output shall be steady.

3. Each discriminator module shall receive electric power from the controller cabinet at either 24 V DC or 120 V AC.

4. Each channel, together with its associated detectors, shall draw not more than 100 mA at 24 V DC nor more than 100 mA at 120 V AC. Electric power, one detector input for each channel and one output for each channel, shall terminate at the printed circuit board edge connector pins listed in TABLE 700-4.7.2.4.

TABLE 700-4.7.2.4

BOARD EDGE CONNECTOR PIN ASSIGNMENT

A	DC ground		
B	+24 V DC	P	(NC)
C	(NC)		
D	Detector input, Channel A	R	(NC)
E	+24 V DC to detectors	S	(NC)
F	Channel A output (C)	T	(NC)
		U	(NC)
H	Channel A output (E)	V	(NC)
J	Detector input, Channel B	W	Channel B Output (C)
K	DC Ground to detectors	X	Channel B Output (E)
L	Chassis ground	Y	(NC)
M	AC-	Z	(NC)
N	AC+		

(C) Collector, Slotted for Keying
(E) Emitter, Slotted for Keying
(NC) Not connected, cannot be used by manufacturer for any purpose.

5. Two auxiliary inputs for each channel shall enter each module through the front panel connector. Pin assignment for the connector shall be as follows:

   a) Auxiliary detector 1 input, Channel A

   b) Auxiliary detector 2 input, Channel A

   c) Auxiliary detector 1 input, Channel B

   d) Auxiliary detector 2 input, Channel B

6. Each channel output shall be an optically isolated NPN open collector transistor capable of sinking 50 mA at 30 V and shall be compatible with the Model 2070LX controller unit inputs with Q-Free MAXTIME software.

7. Each discriminator module shall be provided with means of preventing transients received by the detector from affecting the Model 2070LX controller assembly.

8. Each discriminator module shall have a single connector board and shall occupy 2 slot widths of the input file. The front panel of the module shall have a handle to facilitate withdrawal and the following controls and indicators for each channel:

    a. Three separate range adjustments each for both Class I and Class II signals.

    b. A 3-position, center-off, momentary contact switch, one position (down) labeled for test operation of Class I signals, and one position (up) labeled for test operation of Class II signals.

    c. A "signal" indication and a "call" indication each for Class I and for Class II signals. The "signal" indication denotes that a signal above the threshold level has been received. A "call" indication denotes that a steady, validly coded signal has been received. These two indications may be accomplished with a single indication lamp; "signal" being denoted by a flashing indication and "call" with a steady indication.

9. In addition, the front panel shall be provided with a single circular, bayonet-captured, multi-pin connector for two auxiliary detector inputs for each channel. Connector shall be a mechanical configuration equivalent to a MIL-C-26482 with 10-4 inserts arrangement, such as Burndy Trim Trio Bantamate Series, consisting of:

    a. Wall mounting receptacle, G0B10-4PNE with SM 20M-1S6 gold-plated pins.

    b. Plug, G6L10-4NE with SC20M-1S6 gold-plated sockets, cable clamp, and strainer relief that shall provide for a right-angle turn with 2½ inch (63.5 mm) maximum from the front panel surface of the discriminator module.

10. Each discriminator module shall be ethernet capable.

700-4.7.2.5 Cabinet Wiring.

1. The Model 332L cabinet has provisions for connections between the optical detectors, the discriminator module, and the Model 2070LX controller unit with Q-Free MAXTIME software.

2. Wiring the Model 332L cabinet shall conform to the following:

    a. Slots 12 and 13 of input file "J" have each been wired to accept a 2-channel module.

    b. Field wiring for the primary detectors, except 24 V DC power, shall terminate on either terminal board TB-9 in the controller cabinet or on

the rear of input file "J", depending on cabinet configuration. Where TB-9 is used, position assignments shall be as follows:

Position	Assignment
4	Channel A detector input, 1st module (Slot J-12)
5	Channel B detector input, 1st module (Slot J-12)
7	Channel A detector input, 2nd module (Slot J-13)
8	Channel B detector input, 2nd module (Slot J-13)

c. The 24 V DC cabinet power will be available at Position 1 of terminal board TB-1 in the controller cabinet.

d. Field wiring for the auxiliary detectors shall terminate on terminal board TB-0 in the controller cabinet. Position assignments are as follows:

FOR MODULE 1 (J-12)		FOR MODULE 2 (J-13)	
Position	**Assignment**	**Position**	**Assignment**
1	+24 V DC from (J-12E)	7	+24 V DC from (J-13E)
2	Detector ground from (J-12K)	8	Detector ground from (J-13K)
3	Channel A auxiliary detector input 1	9	Channel A auxiliary detector input 1
4	Channel A auxiliary detector input 2	10	Channel A auxiliary detector input 2
5	Channel B auxiliary detector input 1	11	Channel B auxiliary detector input 1
6	Channel B auxiliary detector input 2	12	Channel B auxiliary detector input 2

700-4.7.2.6 System Operation. You shall demonstrate that all of the components of each system are compatible and will perform satisfactorily as a system.

700-4.8 (87-19) Fiber Optic Cable Systems.

700-4.8.1 Trenching.

700-4.8.1.1 Warning Tape.

1. Warning tape shall be provided and placed in the trench over conduits containing fiber optic cable as shown on the plans. The warning tape shall be 4 inches (101.6 mm) wide with bold printed black letters of approximately 3/4 inch (19.1 mm) on bright orange color background, and contain the printed warning "CAUTION - BURIED FIBER OPTIC CABLE" repeated at approximately 30 inch (76.2 cm) intervals. The printed warning shall be non-erasable and shall be rated to last with the tape for a minimum of 40 years. The construction of the warning tape shall be such that it will not delaminate when it is wet. It shall be resistant to insects, acid, alkaline and other corrosive elements in the soil. It shall have a minimum of 120 pounds (530 N) tensile strength and shall have a minimum of 700% elongation before breakage.

2. The warning tape shall be the detectable type with a contiguous conductor in the form of a copper wire or aluminized foil, encased in a protective plastic jacket. The aluminized foil shall be 0.35 mils thick. Separate rolls of the warning tape shall be electrically connected by corrosion resistant clips or by soldering. The ends of warning tape shall extend into pull boxes and splice vaults a minimum of 24 inches (609.6 mm) for future connection to a warning signal device. The continuity and detectability of the warning tape, for the entire conduit run, shall be demonstrated prior to, and again after backfilling each trench, to the satisfaction of the Engineer.

3. Warning tape shall be Condux International, Inc.; Allen System, Inc.; Reff Industries, Inc.; or approved equal.

700-4.8.1.2 Colored Concrete Backfill.

1. The concrete backfill for the trenches with conduits that will contain fiber optic cable shall be a medium-to-dark red or orange color 2 pounds (1 kg) of color pigment per sack of cement) to clearly distinguish the concrete backfill from other concrete and soil. The concrete shall be pigmented by the addition of commercial quality cement pigment to the concrete mix. The red or orange concrete pigment shall be LM Scofield Company; Orange Chromix Colorant; Davis Colors, or approved equal.

2. For trenches in pavement areas, only the top 4 inches (101.6 mm) of concrete backfill will be required to be pigmented concrete. If you judge it appropriate, the full depth may have the pigment.

700-4.8.2 (19.02B) Vaults.

1. Splice vaults shall be fabricated of polymer concrete, conforming to at minimum ANSI Tier 22, provide conduit access ports on each of the four sides, for cable entry, and skid resistant cover inscribed with "CITY TRAFFIC FIBER OPTICS" marking.

2. Certificate of Compliance, in accordance with Caltrans Standard Specifications shall be supplied for structural capabilities and materials used in manufacture of Communications splice vault.

3. Vaults shall be installed at the approximate locations shown on the plans depending on the location of existing utilities.

4. The bottom of the vault shall rest firmly on a twenty four (24) inch-thick bed and shall extend six (6) inches beyond the outside edges of the vault. Vaults shown in the vicinity of curbs shall be placed adjacent to the back of the curb, and where practical, shall be installed with the short side parallel to the curb unless shown otherwise on the plans.

5. Vaults shall not be installed in any part of a driveway or other traveled way unless approved by the Public Works Inspector. A steel "traffic-rated" cover shall be provided on any pull box installed in a travel way or driveway.

6. Vaults shall be field located, and approved by the Engineer, to avoid drainage swales, maintenance vehicle pathways or repeating wheel loads.

7. The contractor shall be responsible for restoring the surrounding surface conditions back to their original condition. Any existing sidewalk or roadway elements (including curb and gutter and landscaped areas) damaged by the installation of vaults shall by replaced by the Contractor to its original condition. No additional payment will be made for reconstruction work and it is considered incidental to the installation of the splice vault.

8. When installing a splice vault, the contractor shall only lift using the lifting hardware installed for that purpose. The lid shall be oriented such that the lid hinge lies along the side of the pull box farthest from the roadway. 700-5.11.3 Fiber Optic Cable.

700-4.8.3 Cable

700-4.8.3.1 General.

700-4.8.3.1.1 Cable Certification.

1. The cable manufacturer shall certify that the cable is suitable for direct installation in 1-1/4 inch to 3-inch (31.8 mm to 76.2 mm) conduit in an underground environment. You shall submit a sample and its certification submittal prior to installation. You shall submit laboratory test reports on representative samples of similar cable design to demonstrate compliance with the following requirements prior to cable installation:

    a. Tensile Strength per EIA -455-33A and EIA-RS-455-28A

    b. Jacket Shrinkage per EIA -455-86

    c. Cable Twist per EIA -455-85

    d. Environmental Temperature Cycling per EIA -455-3A

e. Flexing per EIA -455-104

f. Impact Resistance per EIA -455-25

g. Compressive Strength per EIA -455-41

h. Freezing Test per EIA -455-98A

i. Mechanical Bend Test per EIA -455-37

2. You shall provide the manufacturer's certification that the offered cable shall comply with all optical and mechanical requirements set forth in this specification. The cable manufacturer shall be ISO 9001 registered.

700-4.8.3.1.2 Applicable Documents.

1. The cable shall conform to the latest issue of the following standards documents which are incorporated by reference into this specification:

   a. EIA-455: Standard Test Procedures for Fiber Optic Fibers, Cables, Transducers, Connecting and Terminating Devices.

   b. EIA-359: Standard Colors for Color Identification and Coding.

   c. MIL-202: Test Methods for Electronic and Electrical Component Parts.

   d. MIL-454: Standard General Requirements for Electronic Equipment.

   e. MIL-810: Environmental Test Methods and Engineering Guidelines.

   f. EIA-598: Color Coding of Fiber Optic Cables

2. Fiber optical cables shall be constructed in accordance with EIA-455 and 100% of all optical fibers and jacketing shall meet or exceed the requirements contained in this specification.

700-4.8.3.2 Single-Mode Outside Plant

1. Fiber optic cable shall be Corning Cable Systems ALTOS Single-Mode, Loose Tube, Gel-Free, ALL-Dielectric, with FastAccess Technology, or approved equal. Each optical fiber shall be glass and consist of a doped silica core surrounded by concentric silica cladding. The cable shall be fully water blocked using water-swellable materials or approved equal.

2. All fibers shall be useable and shall be sufficiently free of surface imperfections and inclusions. The coating shall be a dual layered, UV cured acrylate.

700-4.8.3.2.1 Geometry Requirements.

1. <u>Cladding:</u>

   a. Diameter: 125.0 ± 0.4 µm

   b. Non-Circularity: No more than 0.7 percent.

2. Mode Field Diameter:

   a. 9.2±0.4 µm at 1310 nm.

   b. 10.4±0.5 µm at 1550 nm.

3. Core-to-Cladding Concentricity: No more than 0.5 µm.

4. Coating Diameter: 245±5 µm.

5. Fiber Curl: Radius of curvature no less than 4.0 m.

700-4.8.3.2.2 Optical Requirements.

1. Cable Fiber Attenuation:

   a. Between .35 and 0.40 dB/km at 1310 nm.

   b. Between .35 and 0.40 dB/km at 1383 nm.

   c. Between .22 and 0.30 dB/km at 1550 nm.

2. Point Discontinuity: No more than 0.05 dB at 1310 nm and 1550 nm.

3. GbE Distance: Up to 5000 m at 1300 nm.

700-4.8.3.2.3 Mechanical Performance.

1. Minimum Tensile Strength. The fiber optic cable shall be rated to withstand a maximum tensile load of 2,700 N (608 pounds force) during installation (short term) with no damage and 890 N (200 pounds force) installed (long term). While these are rated tensile loads, you shall exercise every precaution in minimizing cable tension during installation.

2. Compression Load. The fiber optic cable shall withstand a compressive load of 220 N/cm applied uniformly over the length of the cable. The average increase in attenuation for the fibers shall be < 0.10 dB/km at 1550 nm for a cable subjected to this load, and the cable shall not exhibit any measurable increase in attenuation after load removal. Testing shall be in accordance with EIA455-41, Compressive Loading Resistance of Fiber Optic Cable.

3. Fiber Proof Test. Fibers shall be 100% subjected to a minimum proof stress of 100 ksi prior to being drawn into fiber sub-cables.

4. Minimum Bend Radius. The cable shall be able to withstand bending to a minimum radius of 10 times the cable outer diameter without tensile load applied and 20 times the cable outer diameter with maximum load applied (during installation only) without damaging the cable components or degrading the optical fiber performance. The fiber optic cables shall withstand at least 20 cycles at a minimum bend radius without damaging the fiber optic cable components or degrading the optical performance. The cyclic flexing test shall be in accordance with EIA-455.

5. Cyclic Flex Resistance. The cable shall withstand cyclic flexing 2,000 times per the requirements of EIA-455-104.

700-4.8.3.2.4 Environmental Performance.

1. Temperature. Cable shall comply with the optical and mechanical performance requirements specified herein up to 95% relative humidity (non-condensing) when subjected to moisture resistance conditioning according to Method 106B of MIL-202 except that the specimen shall not be vibrated. Temperature ranges:

   a. Shipping and Storage: -40° F to 158° F (-40° C to 70° C).

   b. Installation: -22° F to 158° F (-30° C to 70° C).

   c. Operations:-40° F to 158° F (-40° C to 70° C).

2. Moisture Resistance. Optical and mechanical performance shall not be degraded, and the cable shall not be damaged in any way by immersion in ground water.

3. Fungus Resistance. The outer jacket material used in construction of this cable shall be fungus inert as described in requirement 4 of MIL-454.

4. Sunlight/UV Resistance. The outer jacket material shall be suitable for long-term exposure to sunlight and weather with a life expectancy in excess of 20 years. Suitability shall be determined in accordance with MIL-810, method 505.

700-4.8.3.2.5 Loose Tube Cables.

1. Optical fibers shall be placed inside loose buffer tubes. Each buffer tube shall contain twelve single mode fibers. Each fiber and buffer tube shall be numbered and color coded.

2. Each fiber shall be distinguishable from other fibers in the same tube by means of color coding. Each tube shall be distinguishable from other tubes in the same cable by means of color coding. The colors shall be targeted in accordance with the Munsell color shades and shall meet EIA-598 “Color Coding of Fiber Optic Cables”. The color formulation shall be compatible with the fiber coating and the buffer tube filling compound, and be heat stable. The colors shall not fade or smear or be susceptible to migration and it shall not affect the transmission characteristics of the optical fibers and shall not cause fibers to stick together.

1.	Blue (BL)	5.	Slate (SL)	9.	Yellow (YL)
2.	Orange (OR)	6.	White (WT)	10.	Violet (VL)
3.	Green (GR)	7.	Red (RD)	11.	Rose (RS)
4.	Brown (BR)	8.	Black (BK)	12.	Aqua (AQ)

700-4.8.3.2.6 Cable Components

1. Buffer Tubes:

   a. Clearance shall be provided in the loose buffer tubes 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. The fibers shall not adhere to the inside of the buffer tube.

b. The loose buffer tubes shall be extruded from a material having a coefficient of friction sufficiently low to allow free movement of the fibers. Buffer tubes shall be made of a tough abrasion resistant material to provide mechanical and environmental protection of the fibers, and designed to permit safe intentional "scoring" and breakout, without damaging or degrading the internal fibers.

c. Buffer tubes shall be stranded around a central member by a method that will prevent stress on the fibers when the cable jacket is placed under strain, such as the reverse oscillation stranding process.

2. Central Member: The central member shall be a glass reinforced plastic rod 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 central member.

3. Filler Rods: Fillers shall be included in the cable, where needed, to lend symmetry to the cable cross-section. The sum of buffer tubes and filler rods shall be equal to six. Filler rods shall be solid medium or high density polyethylene. The diameter of filler rods shall be the same as the outer diameter of the buffer tubes.

4. Stranding: Completed buffer tubes shall be stranded around the overcoat central 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 (or rendered so by the flooding compound), and dielectric with low shrinkage.

5. Core and Cable Flooding: The cable core interstices shall be filled with a polyolefin-based flooding compound to prevent water ingress and migration. The flooding compound shall be homogeneous, non-hygroscopic, electrically non-conductive, and non-nutritive to fungus. The flooding compound shall also be nontoxic, safe, and compatible with all other cable components.

6. Tensile Strength Member: Tensile strength shall be provided by high tensile strength aramid yarns and fiberglass which shall be helically stranded evenly around the cable core.

7. Outer Jacket:

a. The jacket shall be smooth, free of holes, splits, blisters, and other surface flaws, and shall be medium density cross-linked polyethylene (PE) with minimum nominal jacket thickness of 1/16 inch (1.6 mm). Jacketing material shall be applied directly over the tensile strength

members and flooding compound. The polyethylene shall not promote the growth of fungus.

b. The jacket or sheath shall be marked with the manufacturer's name, the date of manufacture, a cable code to identify the number and type of fibers, and sequential measurement markings every meter. Additionally, the following shall be printed on the jacket at regular intervals: “CAUTION Fiber Optic Cables”.

c. The actual length of the cable shall be within -0/+1 % of the length marking. The color of the markings on the cable jacket shall be black. The height of the marking shall be approximately 1/8 inch (3.2 mm) and shall be permanent and weatherproof. The markings shall be repeated at 39-inch (1 m) intervals.

d. The cable standard jacket shall have an embedded sheath tear features.

700-4.8.4 Trace Wire.

1. A separate #8 AWG XHHW-2 solid copper tracer wire shall be installed within fiber conduit.

2. The trace wire shall be terminated by connecting to the ground rods at the pull boxes as noted in the Plans.

700-4.8.5 (87-19.02D) Fiber Optic Splice Closure

1. Fiber optic splice closures shall be Corning product number SCF-6C22-01-72 or approved equal. Fiber optic splice closures shall be capable of housing a minimum of 144 splices.

2. The enclosure shall be not more than 22 inches in length and not more than 6 inches in diameter. Fiber optic cable field splices shall be enclosed in splice closures which shall be waterproof, rodent proof and re-enterable. The fiber optic splice closure shall be suitable for a temperature range of 0°C to 50°C.

3. All materials in the enclosures shall be nonreactive and shall not support galvanic cell action.

4. The fiber optic splice closure shall consist of an outer closure, an inner closure and complete with splice organizer trays, brackets, plugs, clips, cable ties, etc. and shall conform to the following:

   a. The outer closure shall be compatible with the other closure components, protect the splices from mechanical damage, shall provide strain relief for the cable, and shall be resistant to salt corrosion. The outer closure shall be waterproof, re-enterable and shall be sealed with a gasket.

b. The inner closure shall be of metallic construction. The inner closure shall be compatible with the outer closure and the splice trays and shall allow access to and removal of individual splice trays.

5. The Contractor shall install the fiber splice closure as shown on plans and splicing is required.

700-5.8.5.1 Splice Tray.

1. Splice trays shall be produced by the same manufacturer as splice closure. Closure splice trays shall be Corning product number SCF-ST-099 or approved equal.

2. The splice trays shall be compatible with the inner closure and shall be constructed of rigid plastic or metal. Adequate splice trays shall be provided to splice all fibers of the largest communication cable. Each splice shall be individually mounted and mechanically protected in the splice tray.

3. Splice trays shall be securely attached and provide sufficient storage for the fiber cable. Ensure splice trays provide access to individual fibers without disrupting other fibers in the tray. Splice trays shall accommodate the minimum bend radius of the fiber, hold the buffer tubes rigidly in place and provide protection for fusion splices.

4. Splice trays shall be equipped with a cover with a locking mechanism to hold it in place.

700-4.8.6 Fiber Distribution Unit. New Fiber Distribution Units (FDU) shall be comprised of two parts, 1) Closet Connector Housing (CCH) and 2) CCH Pigtailed Splice Cassette(s).

700-4.8.6.1 Closet Connector Housings (CCH). Housing units shall be Corning product number CCH-04U, CCH-01U, or approved equivalent. Unit shall be suitable for intended application and required termination capacity.

1. CCH-04U housing typical for communication hub locations.

   a. Dimensions: Four EIA rack panel height (4U), (7” x 19” x 17”)

   b. Capacity: Up to (12) connector panels/ splice cassettes

2. CCH-01U: Typical FDU housing at traffic signal cabinet.

   a. Typical FDU housing at traffic signal cabinet.(No comm aggregation)

   b. Dimensions: One EIA rack panel height (1U), (1.75” x 19” x 17”)

   c. Capacity: Up to (2) connector panels/ splice cassettes

2. General housing characteristics required include:

   a. Provide necessary protection from incidental contact, dust and debris.

   b. Rack-mount installation.

   c. Removable top covers, front and rear doors, and slide-out tray.

d. Management and administration of optical fiber, fiber optic connectors, splices, cable-subunits, transition kits and other related components.

e. Support cross-connection, interconnection and/or splicing applications and routing schemes in the same housing.

f. Connector panels and modules shall be held in place via interchangeable panel retention clips that snap into position independent of one another onto panel clip retention blocks or components that attach to a slide-out tray or into the tray itself.

g. The housing shall accommodate pigtail splicing via interchangeable splice cassettes with pigtailed connector panels, while maintaining the capability to accommodate pigtailed connector modules and/or pigtailed connector panels outside of the splice cassettes.

h. The splice cassettes shall load into the housing between rails. Rail orientation dependent on housing product number.

700-4.8.6.2 CCH Pigtailed Splice Cassette. Shall be produced by the same manufacturer as the CCH housing. Splice cassettes shall be Corning product number CCH-CS12-A9-P00RE or approved equivalent.

1. Splice cassette design specifications unless otherwise specified:

   a. Fiber Category: Single-Mode (OS2)

   b. Cable Type: Single-Fiber (250 µm)

   c. Fiber Count: 12

   d. Connector Configuration: LC Duplex

   e. Connector Polish: UPC

2. A splice cassette is defined as a removable module that is capable of holding a connector panel and splice organizer for pigtail and through splicing applications. The splice cassette shall have the following characteristics:

   a. Unit shall consist of a base constructed from injection-molded black plastic and a removable hinged lid or cover constructed from injection-molded tinted translucent plastic.

3. The splice cassette shall be available with pre-installed connector pigtails and panels.

4. Shall contain a pivoting (and removable) splice tray above the base in a horizontal position that rotates up into a vertical position at least 90 degrees relative to the base allowing access to the base.

5. The splice tray shall contain one interchangeable splice organizer capable of holding up to (24) splice heat-shrinks.

6. The splice tray shall contain routing tabs and provisions for holding a total of two meters of 250 µm fiber slack (includes both incoming and outgoing fiber slack).

7. Shall contain slots and provisions for installing cable ties for securing incoming and outgoing buffer tubes and/or jacketed optical fibers.

8. The splice cassette shall contain integral slots on both sides of the cassette to hold and guide the cassette along tracks in the main connector housings.

700-4.9 Communication Equipment.

700-4.9.1 Network Switches and Routers

1. Communication equipment and network devices shall be field hardened and capable of operating in a temperature range between -40ºC to 75ºC (-40ºF to 167ºF) unless otherwise specified.
2. New equipment shall be compatible with existing network devices which its intended to integrate with.
3. New communication equipment shall be furnished with appropriate ethernet interface configuration for intended operation.

700-4.9.1.1 Fiber Ethernet Switch (Layer 2).

1. Layer 2 Fiber Ethernet Switch shall be Etherwan Systems model number EX73924E-0VB unless otherwise specified on plans or City approved equivalent.
2. Switch shall be furnished with Etherwan Systems power supply, model number, EPOW-24-60 or City approved equal.
3. Small Form-Factor Pluggable (SFP) shall be Etherwan Systems model number SFPGIS10M unless otherwise specified on plans or approved equivalent.
   a. SFP shall be produced by the same manufacturer as the switch manufacturer.
   b. Switch shall be furnished with the required amount of SFPs for intended network connectivity. No less than two SFPs shall be furnished with the switch.

700-4.9.1.2 Fiber Ethernet Hub Switch (Layer 3).

1. Layer 3 Fiber Ethernet Hub Switch shall be Moxa model number ICS-G7828A-8GSFP-4XG-HV-HV-T unless otherwise specified on plans or City approved equivalent.
2. Layer 3 switch shall be furnished with appropriate model and quantity of SFPs for the intended operation.

700-4.9.1.3 Twisted-Pair Copper Ethernet Switch/ Extender.

1. Copper Ethernet Switch/ Extender shall be Etherwan Systems model number ED3575 unless otherwise specified on plans or City approved equivalent.
2. Copper switch shall be used for to provide ethernet communications over twisted-pair copper cabling.
3. Switch shall be compatible with existing network devices which its intended to communicate and integrate with.

700-4.9.2 Communication Hub / Termination Cabinet.

1. A Model 332L cabinet shall be installed at each location shown on the plans. You shall submit for review detailed drawings showing the proposed cabinet layout.
2. The cabinet shall be equipped with a standard ventilation fan and filter, shelves, rack for mounting the fiber optic and Ethernet network layer 3 switch and the fiber optic termination equipment, 120 V AC power for operating equipment, and terminal blocks for copper cable termination.

700-4.10 Battery Backup System (BBS).

700-4.10.1 General.

1. A battery backup system includes the cabinet, batteries, and electronic assembly.
2. The electronic assembly includes the inverter/ charger unit, manual bypass, and the battery harness.
3. This specification establishes the minimum requirements for a complete emergency battery backup system. The BBS shall be designed for outdoor applications in accordance with the Caltrans Transportation Electrical Equipment Specifications (TEES), dated November 5, 2020.
4. The BBS shall provide reliable emergency power to a traffic signal system (Vehicle and Pedestrian Traffic) in the event of a power failure or interruption. The BBS shall be capable of providing power for full runtime operation for an “LED-only” intersection (all colors: red, yellow, green and pedestrian heads) or flashing mode operation for an intersection using Red LED’s.

700-4.10.2 Operational Requirements

1. The BBS shall be compatible with the City of San Diego Controllers and cabinet components for full time operation.
2. The BBS shall provide a minimum of four (4) hours of full run-time operation for an “LED-only” intersection.
3. The BBS shall be able to provide a minimum of 1000W @ +25ºC, continuous active output capacity, with 80% minimum inverter efficiency while running in Backup Mode (on batteries).

4. When operating in Backup mode, the BBS output shall be 120 VAC ± 5 VAC, pure sine wave output, ≤ 3% THD, 60 Hz ± 0.05 Hz.

5. The BBS DC system voltage shall be either 24 VDC or 48 VDC.

6. The maximum transfer time allowed, from disruption of normal utility line voltage to stabilized Backup Mode line voltage, shall be no greater than 40 milliseconds. The same maximum allowable transfer time shall also apply when switching from Backup Mode line voltage back to utility line voltage.

7. The operating temperature for the inverter/charger, power transfer relay and manual bypass switch shall be –37 °C to +74 °C. Additionally, all components and parts used shall, at the very least, be rated for that temperature range.

8. The BBS shall be equipped to prevent a malfunction feedback to the cabinet or from feeding back to the utility service.

9. In the event that the AC service feeding the BBS is severed, or there is a utility black-out, the AC voltage measured at the AC inputs to the BBS (Line to Neutral), shall be less than 1 VAC.

10. The BBS shall have lightning surge protection compliant with IEEE/ANSI C.62.41 and must be able to withstand 2000-volt surges applied 50 times across line and neutral. These surges shall not cause the BBS to transfer to Backup mode.

11. The BBS shall be easily installed, replaced, or removed by using easily removable cables for AC input, AC output, DC input, external transfer relay control and battery temperature sense.

12. The AC input and output shall be quick disconnect plug / receptacles that allow no possibility of accidental exposure to dangerous voltages (male receptacle for AC Input and female receptacle for AC Output). The receptacles shall utilize some form of locking mechanism or hold down clamps to in order to prevent any accidental disconnects.

13. The DC connection shall be a recessed one or two piece Anderson style receptacle. Relay / Temperature Probe Connections. The external power transfer relay control and the battery temperature sense inputs shall be heavy duty panel-mounted style connectors.

14. All connections shall provide mechanically and electrically secure connections without the use of a screwdriver. The only exception will be the 18-position Relay Terminal Block which shall require a small screwdriver for holding down the relay wires.

15. The Power Transfer Relay and Manual Bypass Switches shall be rated at 240VAC/30 amps, minimum.

16. In the event of inverter/charger failure, battery failure or complete battery discharge, the power transfer relay shall revert to the NC (and de-energized) state, where utility line power is connected to the cabinet.

17. The BBS must be able to shut down in order to protect against internal damage in the event of an overload at the output.

18. Placing the Manual Bypass Switch into "Bypass" shall cut AC Utility power to the Inverter/Charger and route it directly to the 332L Cabinet. In this condition, if the inverter is then disabled and the batteries disconnected from the system, the Inverter/Charger unit shall be completely de-energized and shall be safe to remove from the intersection system, while still allowing the intersection to function normally.

700-4.10.3 Communications

1. The BBS shall have Serial and Ethernet communications interfaces for user configuration and management. The user serial port shall be an EIA-232 (DB9-Female) connector. The Ethernet Port shall be an RJ45, EIA 568B Pin Out connector.

2. All BBS Configuration and System menus shall be accessible and programmable from the RS-232 port and from the Ethernet port as listed in 4.6.3. Additionally, all log files shall be available through these ports.

3. The BBS shall support the following features network configurations:

   a. Provide TCP and UDP over IP protocol communications and support the following applications layer protocols FTP, Telnet, and HTTP. The BBS shall be SNMP compliant.

   b. The BBS shall be provided with Web-Based-Interface (WBI). The WBI shall allow the user to set Network Configuration Parameters and all system configurations using a Web Browser.

   c. As a minimum a user shall be able to do the following via the Web Browser:

      1) View Logs

      2) Change Modes of Operation

      3) Configure Email Alarms

      4) Adjust Line Qualify Time

      5) Program Relay Contacts

      6) Configure Network Parameters

4. The BBS shall support the ability to monitor the health of the systems batteries remotely through the network interface

700-4.10.4 Warranty

1. Manufacturers shall provide a five (5) year warranty. The first three (3) years shall be termed the "Advanced Replacement Program". Under this program, the manufacturer will send out a replacement within two business days of the call notifying them of an issue. The replacement unit may be either a new

Traffic Signal Battery Backup Program BBS Technical Specifications and Priority Locations 19 unit or a re-manufactured unit that is up to the latest revision. The last two years of the warranty will be factory-repair warranty for parts and labor on the BBS.

700-5 **School Zone Flashing Beacon System Timer Module.** The system timer module shall have the following minimum standard features:

1. Alphanumeric LCD display.
2. 48-hour capacitive backup.
3. 15 A SPDT relay output.
4. 16-key input keypad.
5. Auto-leap year compensation.
6. Auto-prompt for programming.
7. Crystal clock source.
8. Operating temperature range of -22° F to 165.2° F (-30° C to 74° C).
9. Solid-state construction except for the relay.
10. Auto-daylight savings time adjustment.
11. Compatible with nominal 12 V DC operation.

The unit shall be capable of exception periods when operation can be suspended or optional programs can be run for periods such as holidays or special events. Program steps shall allow the programming of a single day, weekend, or week days.

700-6 **RELATED CONSTRUCTION.**

700-6.1 **Pedestrian Barricade.**

1. Protective railings shall be constructed in accordance with SDG-140, “Protective Railing at Curb Ramps”.
2. Pedestrian Barricades shall be constructed in accordance with SDG-141, “Pedestrian Barricade - Type A”.
3. Assembly shall be commercial quality galvanized material.

700-6.2 **Traffic Signs and Components.** Traffic signing shall conform to latest version of the California Manual on Uniform Traffic Control Devices (CA MUTCD). Sign panels shall be 0.080 inch (2 mm) aluminum alloy 5052 mill-produced stable H38 hardness. All aluminum shall be anodized. The sheeting on the signs shall be 3M™ Scotchlite™ High Intensity Grade Reflective Sheeting Series 2870/3870, Stimsonite Series 6200, or approved equal.

700-6.3 Traffic Striping and Marking Removal.

1. Removal of traffic striping and marking shall conform to Section 15, "Existing Facilities" of the California Standard Specifications.

2. You shall neatly and thoroughly remove all striping and marking from pavement surfaces at those locations shown. Where conflicting striping and markings are removed and no overlay will occur, removal shall be by hydro blasting (water blasting technology) cleaning methods only. You shall furnish all materials, labor, tools, equipment and incidentals as required for completing the removal of traffic striping and marking. The use of abrasives other than those specified herein will not be permitted unless approved, in writing, by the Engineer.

3. When hydro blast cleaning is being performed in areas adjacent to traffic, people, or property, you shall provide suitable devices and take appropriate actions to prevent damage or injury. Prior to starting Work, you shall furnish for approval of the Engineer, a description of all equipment which is to be utilized in the performance of the Work. Traffic striping and marking shall be removed regardless of the condition and thickness of the paint per measurements made by the Engineer prior to removal. The pavement shall be restored by slurry seal or asphaltic concrete patch.

700-6.4 Traffic Striping and Pavement Markings.

1. Traffic striping and pavement markings shall conform to Section 84 of the Caltrans Standard Specifications and to the Standard Plans, State of California, Drawing No. A20A, B, C and D; and to A24A, B, C, D, and E except that longitudinal traffic lines in City ROW and City assets in CALTRANS ROW shall remain 4-inches wide as defined in the California Manual on Uniform Traffic Control Devices (CA MUTCD).

2. The paint shall be rapid dry water-borne (State Spec. No. 8010-91D-30). Pedestrian crosswalks, limit lines, pavement arrows, buffer area hatch markings and pavement legends, including bikeways, shall be installed utilizing 125 mil thermoplastic marking material.

3. You shall contact Construction Management and Field Services Division for approval prior to striping installation.

4. Continental Crosswalks shall be installed no earlier than 48 hours in advance of Signal Turn-on.

5. All median noses separating traffic moving in opposite directions shall be painted yellow. All median noses separating traffic moving in the same direction shall be painted white.

700-6.5 Raised Reflective Pavement Markers.

1. Raised Reflective pavement markers shall conform to Section 81 of the Caltrans Standard Specifications.

2. Pavement markers shall be installed on all lane lines and centerline striping on all new streets, as well as on existing streets where replacement of pavement markers is necessary. The minimum height of the pavement markers shall be 0.70 inch (18 mm).

SECTION 701 - CONSTRUCTION

DELETE all sections and subsections in its entirety and SUBSTITUTE with the following:

1. This section shall be used in conjunction with Sections 86 and 87 of the Caltrans Standard Specifications edition identified in the Contract Documents and SECTION 700 - MATERIALS of these specifications.

701-1 INSTALLATION.

701-1.1 General.

1. You shall determine the quantities required to complete the Work. The quantities and values shall be included in the Schedule of Values in accordance with 7-2.1, "Schedule of Values (SOV)" submitted to the Engineer for approval in accordance with 3-8, "SUBMITTALS" within 10 Working Days after Award of the Contract.
2. No adjustment in compensation will be made in the Contract lump sum prices paid for the various electrical Work items due to differences between the quantities shown in the SOV and the quantities required to complete the Work.
3. The SOV shall include the following items:
   a. Foundations - Each Type
   b. Standards And Poles - List By Each Type
   c. Conduit - List By Each Size And Installation Method
   d. Pull Boxes - Each Type
   e. Conductors - Each Size And Type
   f. Service Equipment Enclosures
   g. Signal Heads And Hardware - Each Type
   h. Pedestrian Signal Heads And Hardware - Each Type
   i. Pedestrian Push Buttons
   j. Loop Detectors - Each Type
   k. Luminaires - Each Type
4. Service Point shall be located less than 10 feet from the SDG&E source and shall have 30A single/double in-line fuse, ¾-inch x 8-foot copper ground rod, and neutral-ground bonding (for both 120v and 240v circuits).

701-1.2 **Maintaining Existing and Temporary Electrical Systems.** Traffic signal system shutdowns shall be limited to periods allowed for lane closures in accordance with Part 6 - TEMPORARY TRAFFIC CONTROL.

701-1.2.1 **Signal Shutdown.** When a signal shutdown is approved by City, it shall be two (2) hours maximum, unless approved for a longer period, and may occur only between the hours of 9A.M. to 3P.M. Monday-Thursday on non-holiday weekdays. The Traffic

Signal Inspector may authorize work necessitating longer periods of time. Preliminary work associated with the signal shutdown shall be done prior to the actual shutdown in order to minimize the amount of time necessary for the completion of the work. Sufficient staffing and equipment shall be employed by the contractor to minimize the shutdown period. Once a shutdown is affected, all work shall be diligently pursued without interruption until the signals are back in normal operation.

701-1.3 Ordering and Obtaining Equipment

701-1.3.1 Ordering Materials. The Contractor shall submit a letter to the Engineer stating that the Contractor-furnished street lighting and/or traffic signal system materials have been ordered. The letter shall contain the names and addresses of the suppliers and the estimated delivery dates. The letter shall be submitted to the Engineer within 5 Working Days after acceptance of the submittal for the materials specified in 3-8.4.

701-1.3.2 San Diego Supplied Material

Arrangement for obtaining materials being supplied by the City shall be made five (5) working days in advance and coordinated through City inspector.

Arrangements for obtaining materials, except traffic signal controller assemblies, to be supplied by City as indicated on traffic signal design plans, shall be made ten (10) working days in advance and coordinated through the City Inspector.

701-1.4 Mast Arm Modifications

All Modifications temporary or permanent shall be submitted to City for approval prior to installation. Contractor shall provide advance notification (2-week minimum) to City inspector prior to scheduling and/ or performing work.

701-1.5 Scheduling of Work. No material or equipment shall be stored at the Site until receipt of notification by the Engineer. Signal poles shall not be installed more than 3 weeks prior to the scheduled traffic Signal Turn-On date without prior approval of the electrical inspector. Obtain Electrical Service Orders (ESO) from the Street Lighting coordinator at 619-527-8088 to validate plan locations of all poles and the total quantity required. This document shall be attached to a copy of the Street Lighting As-Built Drawings for requesting street lights to be energized.

701-1.6 As-Builts. For Street Light energizing purposes, As-Built drawings shall be attached to the ESO and shall show all lights numbered accordingly. Feeder system shall be clearly marked on an SDGE plat map or may be hand drawn on an 11”x 17” sheet. As-Builts shall show the title of project, work order number, drawing number, and types of luminaires and poles. You shall also provide contractor’s name, address, and phone number. Provide 3 legible hard copies of signed and dated As-Built and mail to 9573 Chesapeake Dr, San Diego, CA 92123. You may also send a digital copy to the Resident Engineer.

701-1.7 SERVICES.

701-1.7.1 General. ADD:

1. Service conductors shall be continuous without splices from the service pull box to the controller service connection. b. A voltage measurement shall be made between the service hot and neutral terminals before the main circuit breaker in the controller assembly. If the voltage is less than 110 volts AC notify the City traffic signal inspector. c. A resistance measurement shall be made between the service neutral terminal and the chassis ground terminal. If the resistance is more than 4.0 ohms notify the City traffic signal inspector.

701–1.8 TRAFFIC SIGNAL CONSTRUCTION

701-1.8.1 Signal Activation Turn-on

1. Contractor shall submit a traffic signal turn-on / cutover work plan for city approval. Contractor shall have approved work plan prior to scheduling turn-on. Minimum information includes:
   a. Project Name.
   b. Intended date and time of turn-on.
   c. Scope of work.
   d. Prerequisite activities leading up to turn-on.
   e. Pre-testing and City inspection pre-check.
   f. Anticipated time duration for turn-on day efforts.
   g. Description of signal status prior to turn-on.
   h. Traffic control.
   i. Parties involved (required, notified, etc.).
   j. Responsibilities.
   k. Other relevant information.

701-1.8.2 Controllers.

1. The Contractor shall provide a qualified technician from the manufacturer to assist on the day of the signal turn-on. Signal turn-on shall be coordinated with City representatives during approved times only. Controller operation and preliminary timing shall be set by the Contractor and the equipment manufacturer, subject to field adjustment instructions by the Engineer. Flasher units shall be set "red" on the intersections specified in the project.

2. The Contractor shall provide all Traffic Signal Timing requested by the City to accommodate the new 2070LX ATC controllers and all installed traffic signal equipment that would require Traffic Signal Timing Conversions.

3. At each intersection, the Contractor shall only install traffic signal controllers between 9:00 a.m. and 3:00 p.m. on Monday through Thursday unless prior approval in writing is obtained from the Engineer. The controllers shall be programmed before the installation to limit the amount of time that the intersection will be in four (4) way flash.

4. Include with each controller, manuals that document the programming, operation, and maintenance of the unit. Include schematic drawings and pin assignment charts in the manuals for maintenance. Documentation shall include all components, including communications modules.

5. The doors of the cabinets shall be hinged so that the doors swing away from the curb or street.

700-1.8.3 Interconnect.

700-1.8.3.1 Direct Wire/ Conductor.

1. You shall install cables and the combination connector/protector block. The same pair assignment shall be maintained. Cables shall be installed at each location per the Master Interconnect Conductor Assignments shown on the plans. Cables shall be installed in continuous lengths from terminal block to terminal block. There shall be no splicing between terminal blocks.

2. You shall determine a suitable cable installation method to ensure that all cable installation requirements shall be met in all conduit sections. All Work shall be carried out in accordance and consistent with the highest standards of quality and craftsmanship in the communication industry with regard to the electrical and mechanical integrity of the connections; the finished appearance of the installation; as well as the accuracy and completeness of the documentation.

3. You shall make a physical survey of the project site for the purpose of establishing the exact cable routing and cutting lengths prior to the commencement of any Work or committing any materials.

4. When ordering cable, you shall ensure that the cable shall be of sufficient length to pull from terminal block of one traffic signal controller cabinet to the terminal block of the next traffic signal controller cabinet. A minimum of 3 feet (0.9 m) of cable shall be provided in each pull box.

5. The cable shall be carefully inspected for jacket defects as it is removed from the reel. If defects are noticed, the pulling operation shall be terminated immediately, and the Engineer notified. Precautions shall be taken during installation to prevent the cable from being kinked or crushed. Crushed or kinked cable shall be replaced with new cable. As the cable is pulled into the conduit system, it shall be sufficiently lubricated with a lubricant that shall be the water-based type and approved by the cable manufacturer. The mechanical stress placed upon the cable during installation shall not be such that the cable is twisted and stretched or exceeds manufacturer's specifications.

6. The pulling of the cable shall be hand assisted at each handhole or pull box. When pulling through intermediate pull boxes, the cable shall be placed on the ground near the pull box and care taken to prevent damage by vehicles or other objects. The cable shall not be crushed, kinked or forced around a sharp corner.

A minimum of 3 feet (0.9 m) slack shall be left in each pull box and enough left at each end of the cable to allow proper cable termination. All cable pairs shall be terminated on terminal block.

701-1.8.3.2 Cable Testing.

1. You shall perform field acceptance tests on the installed copper cable. The City shall observe the tests, and the test results shall be documented as prescribed elsewhere in this specification. You shall replace any cable failing these tests at no additional expense to the City. You shall provide all test equipment necessary to perform the tests. All pairs of each copper cable shall be tested for continuity, polarity, shorts, grounds, longitudinal balance, and resistive loss consistent with the manufacturer's specifications and standard telecommunication industry requirements.

2. After installation each pair within the cable shall be tested with a Time Domain Reflectometer (TDR). TDR testing shall be for end-to-end transmission quality, splices, improper terminal termination, no bridge taps, or pairs that have no termination, open or shorted pairs. You shall certify that all individual wires have been terminated consistent with the wire insulation color to termination pin requirements.

3. You shall document the test results and provide a certification for each cable that the cable meets or exceeds the manufacturer's published specifications and otherwise complies with the requirements set forth in this specification. You shall provide the City with information regarding what type of test equipment will be utilized (manufacturer and model number) plus the equipment calibration procedures that will be utilized by you prior to conducting all test routines.

4. Each underground cable shall be tested end-to-end from the termination block to the terminal block at each cabinet. You shall provide test readings for each of the following items to verify the cable performance:

    a. DC Resistance - The resistance of any conductor in any cable shall not exceed 92 ohms per mile.

    b. DC Resistance Unbalance - The resistance unbalance between the two conductors of any pair shall not exceed 5%.

    c. Mutual Capacitance - The mutual capacitance of any pair shall not exceed 94 nano-farads per mile at 1 KHz.

    Capacitance Unbalance: Pair to Ground - The capacitance unbalance to ground at 1 KHz of any pair shall not exceed 800 picofarads per 1,000 feet (304.8 m).

    d. Ambient Noise Measurements - You shall measure the ambient noise level in dBrn0 to determine the level of noise on each cable being tested. The distant end of the pair being tested shall be terminated with a 600-ohm resistor. At the near end, a HP3551 or equivalent

transmission measuring set shall be configured for conducting a noise reading test. Cable pairs being sampled shall provide an ambient noise figure of 30 dBrn0 (-60 dBm) or better. You shall record all readings.

e. Attenuation - You shall test the attenuation of all twisted pairs in each cable at various frequencies. Attenuation shall not exceed 2.2 db per 1,000 feet (304.8 m), measured at 150 KHz.

f. Near-end Crosstalk - The near-end crosstalk (NEXT) coupling loss between worst pairs within a cable shall be equal to or less than 53 dB per 1,000 feet, (304.8 m), measured at 150 KHz.

g. Bit Error Rate - You shall conduct a dynamic data transmission test of each pair in each cable whose application is intended for data communication applications. The dynamic test shall verify that the transmission quality of each cable shall support a bit error rate of 1 x 10-6 or better at 1 Mb/s. The results of this test shall be documented for one pair on each cable.

h. Ground Resistance Measurements - Ground resistance of the single point ground system shall be measured before and after it is bonded to the electrical service ground or building earth ground. Resistance after the bond has been made to the electrical service ground (or building earth ground) shall not exceed 3 ohms. If the measured ground resistance exceeds 3 ohms, you shall provide additional grounding points until this maximum differential has been achieved.

5. TDR traces shall be generated into a hard copy and software file in electronic format for the purpose of developing historical As-Built documentation regarding the cable's condition after it was installed. The hard-copy and electronic documentation shall be provided to the City.

701-1.8.4 Detectors.

701-1.8.4.1 Inductive Loop Detectors.

701-1.8.4.1.1 General.

1. The contractor shall replace and restore operation of any damaged detectors (inductive loop, video or other type) within two (2) working days after the completion of construction on the portion of the roadway where the detectors were damaged.

701-1.8.4.1.2 Installation

1. Fill the slot with sand. Soak the sand with adhesive overflow. Cover the slot with additional sand. Before the adhesive sets, strike off excess material flush with pavement and remove from adjacent road surfaces.

2. You shall perform loop drag tests to verify functionality of loops after installation and splicing and shall be responsible for validating any loops that are installed or spliced to ensure that they are fully functional prior to leaving

the site. You shall also verify locations of DLC's.

3. You shall follow the “backfill stub out” method as follows:

   a. Install duct seal to cover the conduit.

   b. Place a small layer of sand bedding and compacted permanent asphalt patch.

4. Detector lead-in cables shall be installed where new Type ‘Q’ Detector loops are specified per the provided plan set.

701-1.8.5 Signal Heads.

701–1.8.5.1 General.

1. A minimum of two vehicle heads for each phase shall be in operation while work is being performed at the intersection. Non-functioning vehicle heads shall be covered or turned away from the intersection.

701-1.8.6 (87-19) Fiber Optic Cable.

701-1.8.6.1 General

701-1.8.6.1.1 Submittals

1. Project submittals shall be in in accordance with 3-8, “SUBMITTALS”. Contractor shall submit the manufacturing data, pre-shipment test results, and a sample. Representative samples manufactured to the above specifications shall be submitted.

2. Submittals required by this item shall include, but not be limited to, the following:

   a. A material staging plan, if you propose City-owned property as a staging area.

   b. Manufacturer's complete specifications for all communication system cables, connectors, patch panels, fiber optic multiplexers, video encoders, and associated electronics and hardware components.

   c. Manufacturer's complete specifications for optical fiber cable patch panels.

   d. A detailed fiber optic cable and twisted-pair cable installation procedure including the following:

      1) Fiber optic cable cutting lengths reflecting the cable order and reel allocations.

      2) Detailed installation procedures (cable pulling plan) which shall contain the staffing and equipment to be used, locations of the staffing and equipment for each pull, location of figure eights, and the estimated pulling tensions and which also identify the physical locations for equipment placement, proposed equipment setup at each location, and the pulling

methodology for each type of cable. The cable pulling plan shall be submitted for approval 10 Working Days prior to pulling in each fiber optic segment.

3) Staffing proposed for all equipment, safety, and manual assistance operations.

700-1.8.6.1.2 Quality Assurance.

1. The contractor shall seek the assistance and technical support of the supplier of the fiber optic cable in preparation for and during installation.

700-1.8.6.2 Cable Protection.

1. The cable shall be inspected for jacket defects as it is removed from the reel. If defects are found, the pulling operation shall be terminated immediately, and the Engineer notified. Repair of the cable jacket will not be permitted. To reduce the possibility of damage to the outer jacket of the fiber optic cable, the following protective measures are recommended.

2. A cable feeder guide shall be used between the cable reel and the face of the duct and conduit to protect the cable and guide it off the reel and into the duct. A pulling eye shall be attached to the cable end and be used to pull the cable through the duct and conduit system. As the cable is pulled off the reel and into the cable feeder guide, it shall be lubricated with a water-based lubricant approved by the cable manufacturer. Dynamometers or breakaway pulling swings shall be used to ensure the pulling line tension does not exceed the installation tension values specified by the cable manufacturer. Maximum allowable cable strain during installation shall be 0.75%. The pulling of the cable shall be hand assisted at each handhole or pull box. The cable shall not be crushed, kinked, or forced around a sharp corner.

700-1.8.6.3 Installation Procedures.

1. Cables shall be installed in continuous lengths without intermediate splices throughout the project. Cable installation personnel shall be familiar with the cable manufacturer's recommended procedures including, but not limited to the following:

    a. Proper attachment to the cable strength elements for pulling during installation. Depending on cable design this will involve direct attachment to internal strength members or attaching an external “Kellums” or split mesh grip.

    b. Cable tensile limitations and tension monitoring procedures.

    c. Cable bending radius limitations.

    d. Cable twisting limitations.

2. You shall comply with the cable manufacturer's specifications at all times.

3. Cable installation procedures shall conform to Bellcore guidelines.

4. To accommodate long continuous installation lengths, bi-directional “center pull” techniques for pulling of the cable is acceptable and shall be implemented as follows:

    a. From the midpoint, pull the cable into the conduit from the shipping reel in accordance with the manufacturer's specifications.

    b. When this portion of the pull is complete, the remainder of the cable shall be removed from the reel to make the inside end available for pulling in the opposite direction.

    c. This is accomplished by hand pulling the cable from the reel and laying into large "figure eight" loops on the ground. The purpose of the figure eight pattern is to avoid cable tangling and kinking. The loops shall be laid carefully one upon the other (to prevent subsequent tangling) and shall be in a protected area. The inside reel end of the cable is then available for installation.

    d. In some cases, it may be necessary to set up a winch at an intermediate cable vault. The required length of cable shall be pulled to that point, and brought out of the cable vault and coiled into a figure eight. The figure eight is then turned over to gain access to the free cable end. This can then be reinserted into the duct system for installation into the next section.

5. At locations noted on the plans, you shall provide 30 feet (9.1 m) of cable slack. The cable shall be coiled and secured with cable ties. You shall ensure that the minimum bending radius of the cable is not compromised when preparing this stored cable slack.

6. The pulling eye/sheath termination hardware on the cables shall not be pulled over any sheave blocks.

7. When power equipment is used to install cabling, the pulling speed shall not exceed 100 feet per minute (30 meters per minute). The pulling tension, bending radius and twist limitation for cable shall not be exceeded under any circumstances.

8. Large diameter wheels, pulling sheaves, and cable guides shall be used to maintain the appropriate bending radius. Tension monitoring shall be accomplished using commercial dynamometers or load cell instruments.

9. Sufficient slack shall be left at each end of the cable to allow proper cable termination.

701-1.8.6.4 Splicing

1. Splicing of the Fiber Optic Cable shall be done by the fusion technique. All cables shall be carefully prepared and spliced in accordance with the cable manufacturer’s recommendations. Either heat shrinkable tubing shall protect the finished splices, metal protective sleeves or by some other method

approved by the Engineer. All splices must be tested and documented after encasement. No splice shall exceed a 0.05 decibel loss.

2. The completed splices shall be enclosed in re-enterable splice enclosures that seal to form moisture resistant protection. The splice case or enclosure shall contain a removable splice organizer or crib that shall secure the individual fibers and protect the splices. The splice organizer shall be attached to the strength members in the fiber optic cable. There shall be adequate space inside the enclosure to hold at least three feet of buffer tubes from each cable. Fiber optic interconnect cables may only be spliced at special fiber optics splice boxes as shown on the plans

700-1.8.6.5 Optical Fiber Termination.

1. Termination components shall meet or exceed the applicable provisions of EIA-455-5. Cables shall have all optical fibers terminated directly at the patch panel via connectors. All cables shall be routed in each equipment cabinet in a manner that prevents damage during regular operation and maintenance functions. All exposed cable and fiber sub-cables shall be secured every 12 inches (304.8 mm) to 18 inches (460 mm) to the equipment frame or cable tray with nylon ties, hand tighten only.

2. Connectors shall be field-installable and perfectly matched to the cable used. Optical fiber connectors shall satisfy all of the interface parameters of equipment components as may be defined by the transmission equipment specifications.

3. The connectors shall provide tight fitting termination to the cladding/buffer tubing and to the outer jacket. Epoxy-based or “hot melt” adhesives shall be used to bond the fiber and buffer to the connector ferrule and body prior to polishing the end face. No dry-termination or “quick crimp” connectors are allowed. When termination is authorized by the Engineer, termination shall be by trained, qualified persons only.

4. After termination with connectors, the fiber ends must be visually inspected at a magnification of not less than 100 power to check for cracks or pits in the end face of the fiber. If any irregularities found cannot be removed by further polishing, the entire process must be redone by cutting off and disposing the connector body.

5. Connectors shall have a maximum allowable connection loss of 0.3 dB per mated pair, as measured per EIA-455-34. No index-matching gel is to be used, dry interfaces only. Single-mode connectors shall be capable of field installation on 9/125 µm fibers with 900 µm buffers (OD) and 1/8 inch (3.2 mm) outer jackets.

6. Each connector shall be of the industry standard LC™ type compatible, designed for single-mode tolerances, and shall meet or exceed the applicable provisions of EIA-455-5, 455-2A, and 455-34, and shall be capable of 100

repeated matings with a maximum loss increase of 0.1 dB. Connectors shall incorporate a key-way design and shall have a zirconia ceramic ferrule. Connector bodies and couplings shall be made of corrosion-resistant and oxidation-resistant materials, such as nickel plated zinc, designed to operate in humid environments without degradation of surface finishes.

7. Each connector shall be labeled for ease of subsequent identification and testing. Each connector label shall be attached next to the connector strain relief boot in a manner that will ensure that the label remains permanently intact. The optical test diagram details the numbering system to be used. The system employs two numbers, separated by a decimal point. The first number refers to the sub-cable number. The second number refers to the relative connector position in the backbone ring.

8. Splicing of fiber optic cable shall not be permitted **unless otherwise specified in the Special Provisions or shown on the Plans**. When splicing is authorized by the Engineer, splicing shall be by trained, qualified persons only. Any allowed splicing of fiber optic cable shall be by fusion splice only, no mechanical splices are permitted.

9. Fusion splicing equipment shall be in good working order, properly calibrated, and meeting all industry standards and safety regulations. Cable preparation, closure installation and splicing shall be accomplished in accordance with accepted and approved industry standards.

10. The average splice loss shall be 0.1dB or less per splice. The average splice loss is defined as one-half the summation of the losses as measured in each direction using an OTDR through the fusion splice. No individual splice loss measured in a single direction shall exceed 0.15dB.

11. Upon completion of the splicing operation, all waste material shall be deposited in suitable containers, removed from the Work Site, and disposed of in an environmentally acceptable manner.

700-1.8.6.6 Cable Testing. You shall notify the Engineer in writing 10 Working Days prior to commencing tests. You shall provide information regarding what type test equipment will be utilized (manufacturer and model number) plus the equipment calibration procedures that will be utilized.

700-1.8.6.6.1 Test Equipment.

1. An Optical Time Domain Reflectometer (OTDR) with recording capability shall be utilized to test for the end-to-end transmission quality of each optical fiber. Quality tests shall consider both attenuation and localized loss discontinuities. The OTDR shall be equipped with a switchable, dual-wavelength module with 1300 nm and 1550 nm light sources compatible with single-mode test fibers. The OTDR shall be capable of writing to a hard drive and configured with an X-Y plotter to provide a hard copy record of each test measurement. 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 sufficient length to display the required cable section, or by using an OTDR with sufficient normalization to display the required cable section. A hard copy X-Y plot shall be provided to the City for all OTDR tests. The OTDR shall be calibrated for correct index of refraction to provide proper length measurement from a known length of reference fiber.

2. Testing light source: A laser diode (LD) light source with a 1300 nm wavelength shall be used. The LD shall be stable within 0.1 dB in output power over a time period sufficiently long to perform the measurement.

3. Power Meter: The detector in the power meter shall have an effective numerical aperture (NA) and active area that is larger than the fiber under test. The power meter shall have a sufficient measurement range to measure the insertion loss of the cable and connectors in the link. The power meter shall be linear over the range of losses to be measured in the system and have sufficient resolution for the proposed measurements (0.05 dB). The power meter shall be able to measure both absolute power in units of dBm and relative loss in units of dB. The power meter shall also be able to change its calibration wavelength to match the system operation wavelength (1300 nm).

4. Launch Reference Cable: The patchcord used to connect the fiber optic cable to the multiplexer shall be used as the launch reference cable for the particular link under test.

700-1.8.6.6.2 Test Documentation. The results of insertion loss testing shall be recorded along with the test date, test wavelength, name of person performing the test, and the brand name, model number and serial number of the equipment used during the test. The measurements shall be recorded on a form identical to the test table provided in this specification. OTDR traces shall be generated into a hard copy and in electronic format for the purpose of developing historical "As-Built" documentation regarding the cable's condition before and after it was installed. The hard-copy and electronic copy documentation, along with associated software to reproduce on paper via personal computer, shall be provided to the Engineer.

700-1.8.6.6.3 OTDR Tests. You shall use OTDR testing to ensure that each fiber is one continuous length (contains no splices within the cable structure) and meets the attenuation (dB/km) specifications of the manufacturer and cognizant industry standards. In addition, OTDR tests shall be performed to measure connector and fiber loss on all terminated fiber links. OTDR measurements shall be made before the cable installation to provide baseline data for comparison to post-installation OTDR tests.

700-1.8.6.6.4 Required OTDR Trace Information.

1. Traces shall display the entire length of cable under test, highlighting any localized loss discontinuities (installation-induced losses, connector losses, or both). 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 the 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 the fiber under test.

2. 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). Connector losses shall be measured using the Least Squares Approximation (LSA) or 5-point splice loss measurement technique.

3. 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

700-1.8.6.6.5 Pre-installation OTDR.

1. Prior to removal of each cable from the delivery reel, all optical fiber sub-cables within the cables shall be tested by you 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. Cable sections failing this test shall be disqualified from subsequent use for installation.

2. 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 you and the manufacturer.

700-1.8.6.6.6 Post-Installation OTDR.

1. You shall conduct insertion loss testing on all installed and terminated optical fiber elements. Insertion loss test measurements for each terminated fiber on each cable shall be documented by you and the results provided to the Engineer. Testing shall be conducted at 1300 nm for all terminated sub-cables.

Total node-to-node insertion loss for each terminated sub-cable in each cable shall be within the fiber optic multiplexer manufacturer's allowable loss budget specifications. The total node-to-node insertion loss, between adjacent multiplexers, for the single-mode fiber links shall be less than 6dB at 1300 nm. If it is not, you shall take corrective measures to bring the insertion loss into compliance with the manufacturer's specifications, including re-mating and re-termination of the connectors, and/or replacement of the cable.

2. Fiber links shall be measured in both directions in order to measure patch panel connector and link insertion losses accurately. The Insertion Loss Test Table shall be used to conduct the insertion loss measurements. The table calls for inserting light at various insertion points and measuring power out at other points. Once all of the powers have been measured, the insertion losses are then calculated and recorded in the table.

701-1.8.7 TESTING.

701-1.8.7.1 General.

1. Field Testing Prior to the start of functional testing, the Contractor shall perform the following tests on all circuits, in the presence of the City Inspector and/or Engineer.

2. Continuity: Each circuit shall be tested for continuity. When 120V AC is used to conduct a “dynamic, non-destructive” test of the circuit(s), then suitable circuit protection shall be used. Suitable circuit protection shall be in the form of a low amperage fuse or circuit breaker with a design curve that reacts fast enough to trip and protect the circuit under test without interrupting any of the cabinet circuit breakers.

3. Ground: Each circuit shall be tested for grounds.

4. Insulation Resistance: An insulation resistance test at 500 Volts DC shall be made on each circuit between the circuit and the ground. The insulation resistance shall not be less than 10 Megohms on all circuits, except for inductive loop detector circuits, which shall have an insulation resistance value of not less than 100 Megohms.

701-1.8.7.2 Communication System.

1. The City or its representative will provide all IP network related parameters to the contractor. It is the responsibility of the contractor to configure field devices unless otherwise specified.

2. The contractor shall be responsible for installing, configuring and system integrating all the items and devices to achieve a fully functional system.

3. Contractor shall provide comprehensive System Acceptance Test (SAT) documentation for all of the individual electronic devices installed in this contract for the City’s approval.

4. The City or its representative will approve or disapprove the SAT document

within one week. If disapproved the City or its representative will inform the contractor of the deficiencies of the SAT for the contractor to fix. The contractor will have one week to provide the corrected final SAT document.

5. Once the SAT document is approved by the City or its representative, the contractor shall perform the SAT for all of the individual devices installed in this contract for the purpose of confirming the system is fully compliant with the contract requirements and is functioning as a fully configured, implemented and integrated system.

6. The City Engineer or its representative will be present during all the phases of the SAT. The SAT results will have the time and date information along with the signatures of the contractor's representative and City Engineer's or its representative's signatures.

701-1.8.8 SALVAGE.

1. Salvaged equipment not reused on the Project shall be delivered to the Transportation Department, Street Division, Electrical Section at Chollas Operations Station, 2781 Caminito Chollas, San Diego, CA, and stockpiled. Delivery time and location shall be coordinated with the City at Telephone No. (619) 527-8031.

2. All arrangements for traffic signal equipment specified to be returned to the City shall be made five (5) working days prior to the desired delivery date. You shall provide equipment, as necessary, to safely unload and stockpile the material. You shall obtain an appropriate receipt upon delivery. You shall tag each pole and mast arm with the size and type using an indelible ink marker.

3. Controller cabinets and equipment shall remain the property of the City unless indicated otherwise on the project plans or by the City Traffic Signal Inspector.

4. The contractor shall exercise due care in the removal of traffic signal equipment, including signs and sign posts, that have been specified to be reused or salvaged, so that the equipment will remain in the same condition as that prior to removal. The contractor will be required to replace any traffic signal equipment that was damaged or destroyed while in the contractor's care. The contractor shall be responsible for cleaning traffic signal equipment prior to delivery.

701-1.8.8.1 Reinstalling Removed Electrical Equipment. When removed electrical equipment is to be reinstalled on a new or different size pole, you shall furnish and install all new mounting equipment including all necessary signal mounting assemblies, anchor bolts, nuts, washers and concrete as required for completing the installation.

701-2 PAYMENT. Unless otherwise specified in the Contract Documents, the payment for the street lighting and traffic signal systems Work shall be as follows:

1. If a separate Bid item has not been provided for an item of the Work related to street lighting and traffic signal systems as described or shown in the Contract Documents, the payment shall be included in the Contract Price.

2. Street Lighting and Traffic Signal System components, which are required by the City, not included as separate Bid items, are included in the Contract Price.

3. The payment for the trenching and pavement restoration, including influence areas, is included in the payment for the associated Work.

4. The payment for warning tape, trace wire, and the cement pigment to achieve the color required shall be included in the Bid item for the conduit.

5. **When included in the Bid proposal**, the following traffic control devices shall be measured and paid for separately:

    a. The payment for electrical equipment pedestals shall be included in the Bid item for "Pedestal for Electrical Equipment".

    b. The payment for Type III meter pedestals and wiring shall be included in the Bid item for "Type III Meter Pedestal".

    c. The payment for costs associated with SDG&E service orders shall be paid as a lump sum in the Bid item for "SDG&E Service Orders" or "SDG&E Fee Allowance".

    d. The payment for the 2 inch (50.8 mm) electrical service conduit to SDG&E service connections and wires shall be included in the Bid item for "2 Inch PVC Conduit Per SDG&E Standards".

    e. The payment for the 2 inch (50.8 mm) PVC conduit and wires shall be included in the Bid item for "2 Inch PVC Conduit Per City Standards".

    f. The payment for grounding shall be included in the following Bid items:

        i. "30 AMP Fuses, Cartridges, and Grounding Rod"

        ii. "10 AMP Fuses and Cartridges at Street Light"

    g. The payment for the installation of the electrical conduits and wires shall be included in the Bid item for "Electrical Conduit".

    h. The payment for pull boxes and lids shall be included in the following Bid items:

        i. "Pull Box"

        ii. "#3 Pull Box"

        iii. "#6 Pull box"

    i. When provided in the Bid proposal, the payment for pull box lids shall be included in the Bid item for "Electrical Pull Box Lid".

    j. The payment for pole base foundations shall be paid for as part of the pole Work unless a Bid item for "Pole Base Foundation" is provided.

k. The payment for the removal of existing poles and metal structures shall be paid for as part of the Work for the new pole unless a Bid item for removal has been provided:

1) "Remove Existing Wood Pool"

2) "Remove Existing Wayfinding Pole"

3) "Remove Existing Metal Structure"

4) "Remove Existing Street Light"

l. The payment for removing equipment or removing and reinstalling equipment shall include surface restoration, pole base foundation, and wiring and shall be paid for in the following Bid items:

1) "Remove Existing Street Light"

2) "Remove and Reinstall Traffic Signs"

3) "Remove and Reinstall Existing Post Top Street Light Pole"

4) "Remove and Reinstall Existing Light Pole"

m. The payment for the pole foundation base, pole, mounting hardware, the sign, and any electrical wiring components for traffic signs on posts shall be included in the following Bid items:

1) "Install Traffic Sign on Post"

2) "Install Type K Traffic Sign on Post"

n. The payment for new or modified street lighting systems shall include all components and Work to provide a functioning system and shall be included in the following Bid items:

1) "Street Lighting"

2) "Street Lighting Electrical System"

3) "Standard Light Pole (Type A)"

4) "Standard Light Pole (Type C)"

5) "Type 15 Fixture with Pole"

6) "Ameron #21CT13 #37 Pole or Equal"

7) "Remove and Replace Capital Assembly and Luminaire"

o. The payment for new or modified traffic signal systems shall include all components and Work to provide a functioning system and shall be included in the following Bid items:

1) "Traffic Signal"

2) "Traffic Signal Modification"

3) "Type 15 Pole with Mast Arm"

4) "Wiring Existing Traffic Signal to New Service"

5) "Upgrade Street Light on Traffic Signal Pole"

6) "Traffic Signal Street Light Circuit Wire and Connecting to New Service"

p. The payment for traffic signal system restoration shall be included in the Bid item for "Traffic Signal System Restoration".

q. The payment for street light system restoration shall be included in the Bid item for "Street Light System Restoration".

r. The payment for cobra head luminaires shall be included in the Work for street lights unless a Bid item for "Cobra Head Luminaire" has been provided.

s. The payment for protective railing Work shall be included in the Bid item for each "Protective Railing at Curb Ramps".

t. The payment for Type A pedestrian barricade Work in accordance with 700-9.1, "Pedestrian Barricade" shall be included in the Bid item for each "Pedestrian Barricade (Type A)".

u. The payment for furnishing and installing detector lead-in cable connecting new or existing traffic signal loops to controller shall be included in the Bid item **"Detector Lead-in Cable"** per LF installed.

END OF PART 7 - STREET LIGHTING AND TRAFFIC SIGNAL SYSTEMS

PART 8
LANDSCAPING AND IRRIGATION

SECTION 800 – MATERIALS

800-1.1.2 **Class "A" Topsoil.** DELETE in its entirety and SUBSTITUTE with the following:

1. Class "A" topsoil shall be from a selected source outside the limits of the Work.

2. Class "A" topsoil shall have the same relative composition and structure, a friable sandy loam character, and be free of roots, clods, pockets of coarse sand, noxious weeds, sticks, brush, and other litter. Class "A" topsoil shall not be infested with nematodes or other undesirable insects and plant-disease organisms. All non-organic components of imported Class "A" topsoil shall pass the 4.75mm (No. 4) sieve. Organic components shall conform to Table 800-1.2.4.

3. Class "C" topsoil being corrected to meet Class "A" topsoil shall be free of stones larger than ½ inch (12.5mm) in their greatest dimension.

4. The Agronomic Topsoil Test procedure shall be as follows:

    a. For Class "A" topsoil, submit the source and location of the soil, a physical sample, and current test results by a third party independent agronomic laboratory reflecting compliance with the Contract Documents to the Engineer within 15 Working Days of the NTP.

    b. For Class "A" topsoil a second series of independent third party agronomic soil tests shall be required 15 Working Days before soil placement to verify conformance with these specifications. Topsoil that fails to meet these specifications shall not be shipped to the project site. Under no circumstances shall the Engineer accept topsoil knowing that additional amendment is required.

    c. For Class "A" and Class "C" topsoils, a series of tests by a third party independent agronomic laboratory shall be required after soil placement to verify conformance with this section.

        1) The On-site Soil Collection Protocol shall be as follows: You and the Resident Engineer shall walk the site and collect soil on site. Once 3 composite samples from different locations from the field are collected and kept, separate samples shall be identified and labeled specific to the Project with your contact information., You shall provide soil samples to the Resident Engineer with a prepaid and preaddressed shipping bag, box or

envelope addressed to the testing company. The bag, box or envelope shall be dropped off to the shipping source by the Engineer to ensure that the material shipped to the testing company is the actual on-site material tested. Sample locations shall be approved by the Engineer. Samples shall be taken from a depth of six to twelve inches.

d. No planting shall begin until test results confirm the agricultural suitability of the topsoil. You are responsible for all third party independent laboratory testing and shipping expenses. Testing shall continue until soil passes testing requirements. Final testing shall be completed within 2 weeks of sod installation to confirm conditions at time of planting.

e. The test results shall provide the following information:

1) Date of Testing
2) Project Name
3) The Contractor's Name
4) Source of Material and Supplier's Name
5) Estimate of Quantity Needed in Cubic Yards
6) Soil Gradation
7) Fertility
8) Heavy Metals
9) Soil Permeability in Inches per Hour
10) Toxic Elements
11) Chloride Content
12) pH
13) EcE (electrical conductivity)
14) SAR (Sodium Absorption Ratio)
15) Organic Content by Dry Weight
16) Carbon : Nitrogen Ratio
17) Water-soluble Nutrient Levels
18) Recommendations for adding amendments, chemical corrections, or both.

f. Physical Testing:

1) Soil Texture: Soil-particle, size-distribution analysis by the following method according to Soil Science Society of America (SSSA) "Methods of Soil Analysis – Part 1 - Physical and Mineralogical Methods":

a) Hydrometer Method: Report percentages of sand, silt, and clay. Report percentage of gravel, if present.

2) Total Porosity: Calculate using particle density and bulk density according to SSSA's "Methods of Soil Analysis – Part 1-Physical and Mineralogical Methods."

3) Water Retention: According to SSSA's "Methods of Soil Analysis – Part 1-Physical and Mineralogical Methods."

4) Saturated Hydraulic Conductivity: According to SSSA's "Methods of Soil Analysis – Part 1-Physical and Mineralogical Methods"; at 85% compaction according to ASTM D 698 (Standard Proctor).

g. Chemical Testing:

1) CEC: Analysis by sodium saturation at pH 7 according to SSSA's "Methods of Soil Analysis – Part 3- Chemical Methods."

2) Clay Mineralogy: Analysis and estimated percentage of expandable clay minerals using CEC by ammonium saturation at pH 7 according to SSSA's "Methods of Soil Analysis – Part 1- Physical and Mineralogical Methods."

3) Metals Hazardous to Human Health: Test for presence and quantities of RCRA metals including aluminum, arsenic, barium, copper, cadmium, chromium, cobalt, lead, lithium, and vanadium. If RCRA metals are present, include recommendations for corrective action.

4) Phytotoxicity: Test for plant-available concentrations of phytotoxic minerals including aluminum, arsenic, barium, cadmium, chlorides, chromium, cobalt, copper, lead, lithium, mercury, nickel, selenium, silver, sodium, strontium, tin, titanium, vanadium, and zinc.

h. Fertility Testing: Soil-fertility analysis according to standard laboratory protocol of SSSA, including the following:

1) Revise required items for analysis in subparagraphs below to suit Project; insert additional subparagraphs if required.

2) Percentage of water in saturation extract.

3) Electrical conductivity (ECe).

4) Soil reaction (acidity/alkalinity pH value).

5) Buffered acidity or alkalinity.

6) Nitrogen ppm.

7) Phosphorous ppm.

8) Potassium ppm.

9) Manganese ppm.

10) Manganese-availability ppm.

11) Molybdenum ppm.

12) Iron ppm.

13) Sulfur ppm.

14) Boron ppm.

15) Zinc ppm.

16) Zinc availability ppm.

17) Copper ppm.

18) Chloride ppm.

19) Sodium ppm and sodium absorption ratio (SAR).

20) Soluble-salts ppm.

21) Presence and quantities of problem materials including salts and metals cited in the Standard protocol. If such problem materials are present, provide additional recommendations for corrective action.

22) Other deleterious materials, including their characteristics and content of each.

i. Organic-Matter Content: Analysis using loss-by-ignition method according to SSSA's "Methods of Soil Analysis - Part 3- Chemical Methods."

j. Recommendations: Based on the test results, testing agency shall provide interpretation of data and written recommendations for soil treatments, soil amendments to be incorporated, and required leaching, to produce satisfactory planting soil suitable for healthy, viable plants as indicated on the Plans. Include, at a minimum, recommendations for nitrogen, phosphorous, and potassium fertilization, and for micronutrients. Include results of the soil texture and percent by dry weight of soil organic matter. Include recommendations for remediation of phytotoxicity elements and deleterious

materials. Include amount and length of time to perform leaching operations, if required.

1) Fertilizers and Soil Amendment Rates: State recommendations in weight or volume per 1,000 sq. ft. for 6-inch depth of soil and in weight or volume per cu. yd. of backfill mix.

2) Soil Reaction: State the recommended liming rates for raising pH or sulfur for lowering pH according to the buffered acidity or buffered alkalinity in weight or volume per 1,000 sq. ft. for 6-inch depth of soil and in weight or volume per cu. yd. of backfill mix.

5. The topsoil shall conform to the following agricultural suitability requirements:

pH	6.0 – 7.5
ECe (electrical conductivity)	0.0 – 3.0
SAR (Sodium Absorption Ratio)	0.0 – 5.0
Chloride Content	Less than 300 ppm
Boron Content	Less than 1 ppm
Organic Content	5% to 6% by dry weight
Carbon : Nitrogen Ratio	20:1 maximum
Sandy Loam Gradation Limit*	Gravel over 2mm: Less than 10% by weight Sand: 75% to 85% Sand finer than 100 mesh (0.15 mm): Less than 15% Sand finer that 60 mesh (0.25 mm): Less than 40% Sand larger than 32 mesh (0.5 mm): Minimum 15% Silt: 20% maximum Clay: 15% maximum
Permeability Rate**	2 inches to 5 inches per hour at 80% compaction
Aluminum	Available aluminum measured with the Ammonium Bicarbonate/DTPA Extraction shall be less than 5 parts per million
Calcium Carbonate Content	Free calcium carbonate (limestone) shall not be present
Phytotoxic Constituent, Herbicides, Hydrocarbons	Germination and growth of monocots and dicots shall not be restricted more than 10 percent compared to

	the reference soil. Total petroleum hydrocarbons shall not exceed 50 mg/kg dry soil measured per the modified EPA Method No. 8015. Total aromatic volatile organic hydrocarbons (benzene, toluene, xylene and ethylbenzene) shall not exceed 0.5 mg/kg dry soil measured per EPA Methods No. 8020
Heavy Metals	The maximum permissible elemental concentration in the soil shall not exceed the following: 1. Total Threshold Concentration Limit (Ammonium Bicarbonate/DTPA Extraction TTLC Level) parts per million (mg/kilogram) dry weight basis: a) Antimony: 150 ppm. b) Arsenic: 50 ppm. c) Barium: 1,000 ppm. d) Beryllium: 7.5 ppm. e) Cadmium: 10 ppm. f) Chromium: 50 ppm. g) Cobalt: 800 ppm h) Copper: 250 ppm i) Lead: 50 ppm. j) Mercury: 2 ppm. k) Molybdenum: 3,500 l) Nickel: 200 ppm. m) Selenium: 10 ppm. n) Silver: 50 ppm. o) Thallium: 70 ppm. p) Vanadium: 240 ppm. q) Zinc: 2,500 ppm.
* Per USDA Classification Scheme. ** Tested in accordance with USDA Handbook Number 60, method 34b or other approved method.	

800-1.1.3 Class "B" Topsoil. ADD the following:

1. Topsoil shall be weed free upon delivery or treated as specified for weed eradication, prior to placement.

2. Prior to placement, Class "B" topsoil shall meet and shall be tested for the agricultural suitability requirements stated in item 5 of 800-1.1.2, "Class 'A' Topsoil". The soils shall be amended in accordance with 801-2.2, "Topsoil Preparation and Conditioning" based on recommendations included in the test results and as approved by the Engineer.

800-1.1.4 Class "C" Topsoil. ADD the following:

1. Prior to placement, the Class "C" topsoil shall meet and shall be tested for the agricultural suitability requirements stated in item 5 of 800-1.1.2, "Class 'A' Topsoil". The soils shall be amended in accordance with 801-2.2, "Topsoil Preparation and Conditioning" based on recommendations included in the test results and as approved by the Engineer.

800-1.2.1 General. To paragraph (2), DELETE in its entirety and SUBSTITUTE with the following:

1. Furnish a certificate of compliance stating that the material meets the specifications.

800-1.2.2 Manure. DELETE in its entirety.

ADD:

800-1.2.3.1 Pre-plant Fertilizer and Tablets.

1. Pre-plant fertilizer shall be granular commercial fertilizer 12-12-12 unless otherwise recommended by the soil test results.

2. Fertilizer tablets shall be compressed slow release tablets, 20-10-5, and shall be installed as follows:

Quantity	Weight	Application
One Tablet	5 grams	Per Each Flatted Plant or Cutting
One Tablet	21 grams	1-Gallon Container
Two Tablets	21 grams	5-Gallon Container
Four Tablets	21 grams	15-Gallon Container
One Tablet	21 grams	Per Each 2 Inches of Box-Sized Container

ADD:

800-1.2.3.2 Post-plant Fertilizer.

1. Post-plant fertilizer shall be slow release 15-15-15 unless otherwise recommended by the soil test results.

800-1.2.4 Organic Soil Amendment. DELETE in its entirety and SUBSTITUTE with the following:

1. Compost shall be well decomposed, stable, and weed-free organic matter produced by composting feedstock and shall bear United States Composting Council's "Seal of Testing Assurance" and shall comply with the following:

    a. Compost shall be produced at a facility inspected and regulated by the Local Enforcement Agency for CalRecycle.

    b. Comply with Title14 requirements of the Process to Further Reduce Pathogens (PFRP), Fecal coliform and Salmonella testing and pathogen and EPA, 40 CFR 503 regulations

    c. Feedstock limited to leaves and plant parts only; includes straw and alfalfa.

    d. Mushroom, manures, peat mosses, green waste and food waste composts are acceptable.

    e. Composted wood products are conditionally acceptable (stable humus must be present). Wood products based on redwood or cedar are not acceptable. Wood derivatives, including sawdust and chipped construction waste are not acceptable.

    f. Sewage sludge and animal waste are not acceptable.

    g. Compost shall have a dark brown color and a soil like odor.

    h. Compost exhibiting a sour or putrid smell, containing recognizable grass or leaves, or is hot (120° F) upon delivery or rewetting is not acceptable.

    i. Comply with Title14 requirements of the Process to Further Reduce Pathogens (PFRP), Fecal coliform and Salmonella testing and pathogen and EPA, 40 CFR 503 regulations.

    j. Particle Size: The maximum particle size shall be 0.5-inch

    k. Calcium carbonate shall not be present if to be applied on alkaline soils.

    l. The salt content shall be less than 6 millimho/cm @ 25° C. (ECe less than 6) in a saturated paste extract.

    m. Additional Properties:

Property	Method	Requirement
pH, Units	Saturation Paste	5.5 to 8
Soluble-Salt Concentration		Less than 5 dS/m
SAR		Less than 5
Chloride	Method 3a, USDA	Less than 1000 mg/l
EC, dS/m	Saturation Extract	0 to 10
Boron, ppm	Saturation Extract	less than 1
Silicone Content (Acid insoluble ash)		Less than 50%
Moisture content by weight, %	Gravimetric	35-55%
Bulk Density, lbs/cubic yard		500 to 1100
Organic Matter, % of Dry Weight	Loss on Ignition	50-65%
Carbon to Nitrogen Ratio		Less than 20:1
Maturity	Solvita	5 or above
Stability	Solvita	5 or above
Particle Size	Sieve Analysis	
Pass 3/4 inch sieve		98%
Pass 1/2-inch sieve		90%-100%
Pass #4 screen		80% or more
CA Title 22 Metals	Title 22	
Antimony (Sb)		Less than 150 ppm
Arsenic (As)		Less than 50 ppm
Barium (Ba)		Less than 1,000 ppm
Beryllium (Be)		Less than 7.5 ppm
Cadmium (Cd)		Less than 10 ppm
Chromium (Cr)		Less than 50 ppm
Cobalt (Co)		Less than 800 ppm

Property	Method	Requirement
Copper (Cu)		Less than 250 ppm
Lead (Pb)		Less than 50 ppm
Mercury (Hg)		Less than 2 ppm
Molybdenum (Mo)		Less than 3,500 ppm
Nickel (Ni)		Less than 200 ppm
Selenium (Se)		Less than 10 ppm
Silver (AG)		Less than 50 ppm
Thallium (TI)		Less than 70 ppm
Vanadium (V)		Less than 240 ppm
Zinc (Zn)		Less than 2,500 ppm
Pathogen		
Salmonella	Title 14	< 3 MPN per 4 gms
Fecal Coliform		<1000 MPN per 1 gm
Physical contaminants		
Plastic Metal and Glass, %> 4mm	% by Weight	< 1
Sharps, % > 4mm	% by Weight	0

800-1.2.5 Mulch. DELETE in its entirety and SUBSTITUTE with the following:

1. Mulch shall be designated by Type in accordance with the requirements herein.
2. Unless otherwise approved, mulch shall be packaged in bulk.
3. Mulch materials shall be free of seed, debris, and deleterious materials as certified by the Supplier and shall be as follows:
    a. **Type 1 Mulch** (ground wood product) shall conform to Type 1 organic soil amendment.
    b. **Type 2 Mulch** (sewage sludge product) shall conform to Type 2 organic soil amendment.
    c. **Type 3 Mulch** (mushroom compost) shall conform to Type 3 organic soil amendment.

d. **Type 4 Mulch** (peat) shall be brown compressed sphagnum or hypnum.

e. **Type 5 Mulch** (fir or redwood bark chips) shall be fir or redwood bark chips in the gradation specified.

f. **Type 6 Mulch** (straw) shall be either threshed new straw or stable bedding material derived from rice, oats or barley. Straw in an advanced state of decomposition shall not be acceptable.

g. **Type 7 Mulch** (wood chips) shall be wood chips in the size and type specified.

h. **Type 8 Mulch** (shredded redwood or cedar bark) shall be either redwood or incense cedar bark which knits in a manner to minimize sloughing, floating, or being kicked away.

i. **Type 9 Mulch** (recycled) shall be recycled and clean green material processed in accordance with California Code of Regulations, Title 14, Chapter 3, Article 7, §17868.3. Clean green material shall be tree and landscape materials that have never been mixed with other waste materials and have been processed by a permitted compost facility. Type 9 Mulch size shall be **as specified in the Special Provisions.**

j. **Type 10 Mulch** (rock, gravel, or cobble) shall be rock, gravel, or cobble in the size specified in the Contract Documents.

k. **Type 11 Hydro-mulch** (wood fiber) shall be of clean and natural non-recycled wood fibers processed to contain no germination or growth inhibiting factors using non-toxic dye to facilitate the metering of materials. Type 11 Hydro-Mulch shall be manufactured in such a manner that, after its addition to and agitation in slurry tanks with fertilizer, seed, water, stabilizing emulsion, and other approved additives, fibers in the material shall be uniformly suspended and shall form a homogeneous slurry. When hydraulically sprayed on the ground, the homogeneous slurry shall form a blotter-like ground cover impregnated uniformly with seed which shall allow moisture and rainfall to percolate to the underlying soil after application. Suppliers shall certify that their product meets all foregoing requirements based on testing.

l. **Type 12 Hydro-mulch** (stabilizing emulsion) shall be a concentrated liquid chemical that forms a plastic film upon drying and allows water and air to penetrate. The films shall be non-flammable and shall have an effective life of at least 1 year. Stabilizing emulsion shall be non-toxic to plant or animal life and non-staining to concrete or painted surfaces. In its cured state, the stabilizing emulsion shall not be

re-emulsifiable. The material shall be registered with and licensed by the State of California, Department of Food and Agriculture, as an "Auxiliary Soil Chemical".

m. **Type 13 Hydro-mulch** (bonded fiber matrix) shall be wood fiber, long strand, and whole wood fiber thermo-mechanically processed from clean whole wood chips. The fibers shall:

1) Disperse into a uniform slurry when mixed with water.

2) Contain ¾ inch (19.1 mm) fiber strands for at least 25% by total volume.

3) Be retained 100% when passed through a No. 25 sieve.

4) Have an initial moisture content of no more than 15% of its dry weight when tested under CA Test 226. The moisture content shall be marked on the packaging.

5) Have a water holding capacity by weight of at least 1,200% when tested under the procedure designated in the Department's Final Report, CA-DOT-TL-2176-1-76-36, "Water Holding Capacity for Hydromulch", available from METS.

6) Be non-toxic to plant and animal life.

7) Be free of synthetic or plastic materials, lead paint, printing ink, varnish, petroleum products, seed germination inhibitors, and chlorine bleach.

8) Contain less than 250 ppm of boron.

9) Contain less than 7% ash when tested under Technical Association of the Pulp and Paper Industry, TAPPI Standard T 413.

10) Be colored to contrast with the area on which the fiber is to be applied. The coloring agent shall be biodegradable, nontoxic, free from copper, mercury, and arsenic, and shall not stain concrete or painted surfaces.

11) The bonding agent for the fiber material shall be a liquid formulation with polyacrylamide as the primary active ingredient with the following requirements:

a) Linear, anionic copolymer of acrylamide and sodium acrylate.

b) Anionic with a residual monomer content that is at most 0.05% by weight.

c) Formulated and labeled as one of the following:

i. Water-in-oil emulsion containing at least 2.6 pounds of pure polyacrylamide per gallon (0.3 kg/L). Pure polyacrylamide shall be at least 30% active.

ii. Liquid dispersed polyacrylamide containing at least 4.4 pounds pure polyacrylamide per gallon (0.5 kg/L). Pure polyacrylamide shall be at least 35% active.

ADD:

800-1.2.6 Inorganic Soil Amendments.

1. Iron sulfate shall be ferric or ferrous sulfate in pelleted or granular forms containing not less than 18% metallic iron. It shall conform to the Agricultural Code of the State of California.

2. Gypsum shall be commercially processed and packaged $CaSo_4$ - $2H_2O$ with a minimum 80% grade containing 14% minimum combined sulfur.

800-1.3 Seed. DELETE in its entirety and SUBSTITUTE with the following:

1. Seed shall be fresh, clean, new crop seed, and mechanically premixed to the specified proportions.

2. Seed shall be delivered to the Work site in original unopened containers bearing the dealer's "Guaranteed Analysis", germination percentage, and a certificate, stamp, or release by a County Agricultural Commissioner. Any seed tagged "Warning, Hold for Inspection" shall be inspected and released by the Agricultural Commissioner of the County within which the seeds are to be planted.

3. All seed used for lawn, erosion control, or other planting specified on the Plans or listed in the specifications shall be furnished in labeled and sealed standard containers with duplicate signed copies of a statement from the vendor certifying that each container of seed delivered is fully labeled in accordance with the California State Agricultural Code stating the certified percent of purity and germination.

4. Seed which has become wet, moldy, or otherwise damaged in transit or storage shall not be accepted.

5. Custom seed blends shall have the Project name printed on the seed tag. Prior to the start of any seeding operation, custom seed blends shall be inspected and approved by the Engineer once delivered to the Site.

6. **Unless otherwise specified**, turf seed shall be one of the following or approved equal:

a. 20% Common Bermuda, 10% Hybrid Bermuda, 10% “Barclay” Perennial Rye, and 60% “Turfstar” Perennial Rye.

1) Seeds shall be hulled when applied from April to September.

2) Seeds shall be unhulled when applied from October through March.

b. Agrono-tec Ballfield Mix 2A.

c. OreGro Sports Mix #2.

800-1.4.1 General. DELETE in its entirety and SUBSTITUTE with the following:

1. Plants shall be inspected and approved by the Engineer prior to planting at the time of arrival to the job site. Prior to 15 Working Days before installation, you shall submit photos of all proposed plants to be used in accordance with 3-8.4, “Supporting Information”.
2. Plants shall have a growth habit normal to the species and shall be sound, healthy, vigorous, and free from insect pests, plant diseases, sun scalds, fresh bark abrasions, excessive abrasions, or other objectionable disfigurements.
3. Tree trunks shall be sturdy and well “hardened off”.
4. Plants shall have normal well-developed branch systems and vigorous and fibrous roots systems which are neither root nor pot bound and are free of kinked or girdling roots.
5. Other than the normal side pruning during the growth period, pruning shall not be done prior to inspection at the nursery.
6. The scientific and common names of plants specified shall conform to the approved names given in the “Western Garden Book” published by Sunset Publishing, Menlo Park, CA.
7. When delivered on site, each group of plant materials shall be labeled clearly from the nursery source as to species and variety. Patented plants (cultivars) required by the plant list shall be delivered with a proper plant patent attached. Any plants which are not labeled or are not as indicated on the Plans and Specifications shall be rejected and shall be removed from the site immediately.

800-1.4.2 Trees. ADD the following:

1. Trees shall have a uniform trunk taper from the base of the tree, continuing up the main leader. Palms shall be un-skinned unless specified otherwise.
2. Trees with naturally occurring central leaders shall remain un-pruned or unaltered from the nursery.

3. Trees Planted In Turf Areas.

   a. Trees shall be spaced to permit the most effective use of mechanized maintenance equipment and operation of the irrigation system.

   b. Trees shall have a minimum of 12 horizontal feet between other trees and vertical objects.

   c. Provide a 4 foot diameter mulched area around the base of the tree; there shall be no mulch within four inches (100 mm) of the tree trunk.

800-1.4.5 Sod and Stolons (Turf Grass). ADD the following:

1. Sod and stolons species shall be as **specified on the Plans or in the Special Provisions**. Material shall be delivered and installed within 24 hours of harvesting with shipping documentation to verify the origin, harvest date, stolon preparation date, and shipment date. All material shall be from the same growing ground.

2. Turfgrass Sod: Turfgrass sod shall be Certified Number 1 Quality/Premium, including limitations on thatch, weeds, diseases, nematodes, and insects. Turfgrass sod shall comply with the "Specifications for Turfgrass Sod Materials" as found in the Turfgrass Producers International (TPI) "Guideline Specifications to Turfgrass Sodding." Furnish viable sod of uniform density, color, and texture that is strongly rooted and capable of vigorous growth and development when planted.

3. Turfgrass Species: Turfgrass sod species shall be as indicated on the Plans.

ADD:

800-1.4.7 Vines.

1. Vines shall be of the specified type and size.

800-1.5.3 Tree Stakes. DELETE in its entirety and SUBSTITUTE with the following:

1. The tree support stakes shall be 10 feet (3 m) minimum length by two-inch (50 mm) diameter lodgepole stakes.

ADD:

800-1.5.4 Tree Ties.

1. Tree ties shall be manufactured of virgin flexible vinyl meeting ASTM-D412 standards for tensile and elongation strength. Material shall be black or ultraviolet resistance.

2. Tree ties shall be manufactured with a double back locking configuration and secured with one galvanized nail to prevent slippage.

3. Tree ties shall elongate with the tree growth and shall prevent damage to the tree.

ADD:

800-1.6 Erosion Control Matting.

1. **Jute.**

   a. Jute matting shall be of open weave with approximately 1 in^2 (1 inch x 1 inch) (25.4 mm x 25.4 mm) mesh. It shall be manufactured from loosely twisted jute yarn varying in thickness no more than half its normal diameter.

   b. Matting shall be made smolder resistant by treatment with chemicals which are non-leaching and non-toxic to vegetation. An identification mark to differentiate it from untreated jute cloth shall be present.

2. **Excelsior.**

   a. Excelsior blanket shall consist of a cured wood excelsior mat.

   b. Fibers shall be evenly distributed over the entire area of matting. 80% of fibers shall be at least 6 inches (152.4 mm) long with consistent thickness.

   c. The topside of the matting shall be covered with 2 inch by 1 inch (50.8 mm x 25.4 mm) biodegradable extruded plastic mesh.

   d. The blanket shall be made smolder resistant without chemical additives.

3. **Staples.**

   a. Staples for erosion control matting shall be 11 gage steel wire bent in a "U" shape with 6 inches (152.4 mm) minimum length.

4. **Root Barriers.**

   a. Root barriers shall be equivalent to the following:

      1) Type LB 12-2 or UB 18-2 for installations at existing trees or approved equal.

      2) UB 24-2 for installations at new construction, as manufactured by DeepRoot or approved equal.

      3) 19.5 inch (495.3 mm) root control fabric as manufactured by Biobarrier, or approved equal.

800-2.1.3 Plastic Pipe for Use with Solvent Weld Socket or Threaded Fittings. ADD the following:

1. Schedule 40 and Class 315 pipe shall be used for continuously pressurized pipe on the supply side of control valves as shown on the

Plans. Use Schedule 40 pipe for 1-1/2" (38 mm) main line and Class 315 pipe for main line sizes two inch (50 mm) and larger.

2. Schedule 40 pipe shall be used for installation on the discharge side of control valve (lateral lines).

3. Fittings and couplings for plastic pipe shall be threaded or slip-fitted tapered socket solvent weld type. Threaded female adapters shall be provided with socket pipe for connections to threaded pipe. Plastic pipefitting and coupling shall be PVC I or PVC I/II material. The type of plastic material and schedule size shall be indicated on each fitting or coupling.

   a. All fittings on pressurized main lines shall be Schedule 80.

   b. All threaded fittings shall be Schedule 80.

   c. Slip fittings for non-pressure lateral lines shall be Schedule 40.

4. Fittings and couplings shall comply with Table 800-2.1.3.

ADD:

800-2.1.3.1 Pipe Primer and Glue.

1. Refer to 207-17.3.3, "Solvent Cement Joints".

ADD:

800-2.1.3.2 Pipe Sleeves.

1. Pipe sleeves shall be Schedule 40 pipe and shall be 2 times the diameter of the pipe or wire bundle being sleeved with a minimum size of 2 inches (50.8 mm). Pipe sleeves shall extend 12 inches (304.8 mm) beyond the edge of hardscape and shall be required when wires and pipes cross under streets, driveways, walkways, and access paths. Pull boxes shall be located over the terminus of the sleeve. At the end of the sleeve, wires shall extend up into the pull box and shall provide a 2 foot (0.6 m) expansion loop.

ADD:

800-2.1.6 Concrete Thrust Blocks.

1. Refer to 201-1.1.2, "Concrete Specified by Class and Alternate Class".

800-2.2.3 Manual Control Valves. DELETE in its entirety and SUBSTITUTE with the following:

800-2.2.3 Manual Control Globe Valves.

1. Manual control globe valves shall be brass or bronze and shall be straight pattern globe valves. Valves shall be full-opening, key-operated with a replaceable compression disc, and shall have ground joint unions on the discharge end. Valves shall have a brass or bronze cross handle.

800-2.2.4 **Remote Control Valves.** DELETE in its entirety and SUBSTITUTE with the following:

1. Remote control valves shall be:
    a. Electrically operated.
    b. Brass or bronze with accurately machined valve seat surfaces.
    c. Equipped with flow control adjustment and capability for manual operation.
    d. Made so that they may be readily disassembled for servicing.
2. Plastic remote control valves shall be electrically operated and may be used only when specified or with prior approval from the Engineer. **Unless otherwise specified**, the valve body shall be constructed of heavy-duty glass-filled UV-resistant nylon and have stainless steel studs and flange nuts. Diaphragms shall be of nylon reinforced nitrile rubber with accurately machined valve seat surfaces equipped with flow control adjustments and shall be capable of manual operation. All internal parts shall be removable from the top of the valve without disturbing the valve installation.

800-2.2.6 **Quick-Coupling Valves and Assemblies.** DELETE in its entirety and SUBSTITUTE with the following:

1. Quick coupling valves shall be brass or bronze with self-closing valves and shall be supplied in 1 inch (25 mm) sizes, unless otherwise specified.
2. When a quick-coupler assembly is specified, it shall consist of the valve, quick-coupler key and hose swivel.
3. Quick coupling valves shall have a locking rubber cap.

800-2.2.7 **Valve Boxes.** DELETE in its entirety and SUBSTITUTE with the following:

1. Valve boxes shall be constructed of precast concrete.
2. Covers shall be cast iron with a non-corrosive metal self-locking device connected with stainless steel bolts and self-locking nuts. Covers shall be permanently and legibly labeled with 100% acrylic epoxy white or yellow waterproof paint on the top of the box indicating the component contained in the box. The Contractor shall replace the clevis pin with a marine grade stainless steel nut and bolt. The assembly shall be greased to prevent corrosion.

ADD:

800-2.2.8 Master Control Valve.

1. The master control valve shall be of a normally open design of solid brass construction with a waterproof 24 VAC 3-way solenoid coil, self-cleaning orifice, and one-piece molded construction diaphragm with an integral
   O-ring seal reinforced with 600 lb (272.2 kg) test fabric.

2. The master control valve shall be slow closing to prevent water hammer and surge and shall operate on pressures by valve size in accordance with the table below:

Operating Pressure (psi)	Valve Size (Inch)
Up to 200 (1379 kPa)	¾ - 2 (19.1 mm – 50.8 mm)
150 (1034.2 kPa)	2½ - 3 (63.5 mm – 76.2 mm)

ADD:

800-2.2.9 Flow Sensing Device.

1. The flow sensing device shall be an in-line type with a non-magnetic, spinning impeller as the only moving part. The electronics housing shall be glass-filled. The impeller shall be glass-filled nylon or Tefzel with a UHMWPE or Tefzel sleeve bearing. The shaft material shall be tungsten carbide. The electronics housing shall have two ethylene-propylene O-rings and shall be easily removed from the meter body.

2. The sensor electronics shall be potted in an epoxy compound designed for prolonged immersion. Electrical connections shall be 2 single conductor 18AWG leads. Insulation shall be direct burial "UF" type colored red for positive lead and black for the negative lead. The flow sensing device shall operate in line pressures up to 100 psi (689.5 kPa) and shall operate in flows of 1 foot per second (30.5 cm/sec) to 20 feet per second (609.6 cm/sec) with linearity of ±1% and repeatability of ±1%. The meter body shall be fabricated from Schedule 80 PVC tees with socket end connections.

ADD:

800-2.2.10 Flow Sensor Cable.

1. The flow sensor cable shall be 2 conductor 18 AWG shielded U.L. type PTLC wire rated to 105° C (221° F), per manufacturer's specification. Maximum Wire run shall not exceed 2,000 linear feet (609.6 m) from flow sensor to the irrigation controller.

2. Flow sensor data cable shall be installed in ¾ inch (19.1 mm) PVC electrical conduit from the controller to the flow sensor.

ADD:

800-2.2.11 Rain Sensing Device.

1. The rain sensing device shall be constructed of high impact thermoplastic which shall withstand extreme weather conditions. The enclosure shall be stainless steel and vandal resistant. It shall contain hygroscopic discs which absorb water and expand proportionally to the amount of rain collected. **Unless otherwise specified**, the rain sensing device shall be connected to the controller and shall operate by interrupting the electrical circuit from the irrigation controller to the irrigation remote control valves and by restoring the electrical circuit upon sufficient drying of the hygroscopic discs.

ADD:

800-2.2.12 Locking Manual Valve Cap.

1. The locking manual valve cap shall be molded high-impact plastic body with locking brass hinged covers as manufactured by Weathermatic or approved equal.

ADD:

800-2.2.13 Pressure Regulating Valve.

1. The pressure regulating valve shall consist of a bronze body and bell housing, a separate access cover for the plunger and a bolt to adjust the downstream pressure. The bronze bell housing and access cap shall be threaded to the body and shall not require the use of screws. The assembly shall be of the balanced piston design and shall reduce pressure in both flow and no-flow conditions. The assembly shall be accessible for maintenance without having to remove the body from the water line.

ADD:

800-2.2.14 Wye Strainer.

1. The Wye Strainer shall be cast bronze per ASTM B584. The strainer screen shall be 20 mesh 300 series stainless steel and shall be accessible for cleaning without removing the device from the water line.

ADD:

800-2.2.15 Backflow Preventer Enclosure.

1. The backflow preventer enclosure frame shall be constructed of 1¼ inch (31.8 mm) tubular stainless steel with formed stainless steel tubing and rod or ½ inch (12.7 mm) #13 flattened mesh expanded stainless steel cage. The enclosure shall be smooth with no sharp edges or burrs. The enclosure shall be equipped with stainless steel mounting hardware and locking mechanism capable of being embedded into a concrete pad. The enclosure shall be of sufficient size to contain the backflow preventer and any ancillary equipment such that the inlet and outlet pipes shall be fully within the enclosure.

ADD:

800-2.2.16 Anti-drain Check Valve.

1. Anti-drain check valves shall be capable to compensate for elevation changes up to 32 feet (9.8 m) and shall meet Schedule 80 pipe specifications. The anti-drain check valves shall be capable of being adjusted through the top of the valve.

2. Anti-drain check valves shall be installed within the swing joint below the irrigation head unless the irrigation head specified has an integral anti-drain check valve or site conditions warrant additional protection as determined by the Engineer.

ADD:

800-2.2.17 Booster Pump.

1. The water pressure booster pump system shall be designed and fabricated by Barrett Engineered Pumps or approved equal. The system shall be a completely prefabricated system with pump, piping, and electrical and structural elements fully contained within a marine grade aluminum alloy enclosure with a hinged top. The enclosure shall be secured to the concrete pad with stainless steel hardware.

2. The pump shall be single stage end suction close-coupled centrifugal brass or bronze fitted construction equipped with mechanical shaft seal and back pullout design. Impeller shall either be keyed or locked to the shaft with a hex head impeller nut and washer or shall be threaded directly to the end of the shaft. Pump shaft shall either be high strength S.A.E. 1045 carbon steel protected in the stuffing box area by a replaceable bronze shaft sleeve or shall be stainless steel with no sleeve. Pump shall be directly coupled to a C-face electric motor.

3. The electric motor shall be of the squirrel cage induction type suitable for full voltage starting. Motor shall be ODP to aid in cooling. Electric motor shall be rated for continuous service. The motor bearings shall be

of such size that the average life rating is no less than 3 years (10,000 hours) of B10 life. The motor shall have horsepower ratings such that the motor shall carry the maximum possible load to be developed under the designed pumping conditions and not overload the motor beyond the nameplate rating of the motor. Motor shall have a 1.15 service factor. The motor shall conform to the latest NEMA Standards for motor design and construction.

4. The pump control panel shall have a NEMA 4X plain front non-metallic enclosure with padlock latches and shall include power and control resettable thermal circuit breakers, heavy duty magnetic starter with adjustable overload protection, Hand-Off-Auto switch to select mode of operation, and heavy duty numbered terminal strips for power and control wiring lead terminations.

5. The metal oxide varistor protected pump start relay(s) shall be incorporated in the panel to start the pump with a signal from each irrigation controller.

6. All system piping shall be type "L" copper. All fittings shall be copper or brass with unions or flanges to allow for system disassembly or major component removal. The system shall incorporate an integral full pipe size bypass line with a check valve to allow for pump removal and repair without disrupting water supply to system.

7. Isolation valves shall be all brass quarter turn ball valves with hard chrome ball on lines 2 inches (50.8 mm) and less. Isolation valves shall be lug style butterfly valves with Buna-N elastomeric seats, ductile iron nickel coated disc, and stainless steel stem with handle and 10 position galvanized memory plate on lines 2½ inches (63.5 mm) and greater.

8. Check valves shall be all brass spring-loaded disc style with metal-backed Teflon wafer disc, stainless steel stem, and spring on lines 2 inches (50.8 mm) and less. Check valves shall be cast iron bronze fitted wafer style silent check with spring loaded bronze disc, bronze guide shaft, stainless steel spring, and replaceable bronze seat on lines 2½ inches (63.5 mm) and greater.

9. Gauges shall be 2½ inches (63.5 mm) diameter face, glycerin filled with stainless casing, and brass internals. Gauges shall be equipped with brass isolation petcocks.

10. The pump system shall have a flow activated paddle style magnetically coupled flow switch, sensitive to flows as low as 1 fps, mounted on piping and interconnected to time delay relay to shut down pump on no-flow conditions. The time delay relay shall be adjustable from 0 to 5 minutes.

11. Pump system shall be mounted on a structural aluminum skid with mounting flanges on front and back to allow for mounting of skid to

concrete pad. The skid shall be equipped with pipe support on suction and discharge piping. All nuts, bolts, and washers shall be heavy zinc coated steel on skid and piping. Skid shall include mounting hardware for integral aluminum enclosure.

12. The enclosure shall be constructed of marine grade aluminum alloy 5052-H32 or minimum 14 gauge #304 stainless steel including the mounting base and fastening hardware with #4 polished finish. The system enclosure shall be vandal and weather resistant. The enclosure shall be low profile hinged top design with padlock provision. The cover shall be secured to the concrete pad with stainless steel hardware.

13. Power, low voltage, and plumbing connections shall be contained within the enclosure and shall be fully grounded (with grounding rod).

14. **Unless specified otherwise,** pump assembly shall include the following options**:**

    a. Top of Form.

    b. Hydraulically controlled, diaphragm actuated pressure-regulating valve, cast iron bronze trim with epoxy coated body, equipped with flow clean strainer option. Valve shall provide constant downstream pressure regardless of pump discharge pressure.

    c. Low suction pressure switch mounted on suction manifold and interconnected to time delay relay adjustable from 0 to 5 minutes to shut down pump on low suction pressure.

    d. High temperature non-adjustable thermostat mounted on pump discharge to shut down pump on heat buildup in pump casing due to no-flow situations. Set for 130° F (54.4° C).

    e. Electrical current measurement control sensor switch mounted in control panel to shut down pump on loss of suction fluid or loss of prime.

15. A factory trained service professional shall be required on the site to certify proper installation, perform the startup, and instruct operating personnel. A startup report containing voltage and amperage readings, suction and discharge pressure readings, estimated flow conditions, and general operating characteristics shall be submitted to the Engineer.

16. Four (4) physical copies and 1 electronic copy of the operating and maintenance manuals shall be provided to the Engineer after startup and shall include parts manuals for components, performance curves for pumps, general sequences of operations, and electrical schematics for control panels.

800-2.3 Backflow Preventer Assemblies. ADD the following:

1. Include the installation of backflow preventer enclosures in accordance with 800-2.2.15, "Backflow Preventer Enclosure".

800-2.4 Sprinkler Equipment. DELETE in its entirety and SUBSTITUTE with the following:

1. Sprinkler heads, bubbler heads, and spray nozzles shall be of the types and sizes shown on the Plans. Equipment of one type and flow characteristics shall be from the same manufacturer and all equipment shall bear the manufacturer's name and identification code in a position where they can be identified in the installed position.

2. Fixed heads, shrubbery heads, and bubbler heads shall have adjustable radius control.

ADD:

800-2.4.1 Low Flow Irrigation Equipment.

800-2.4.1.1 Pressure Regulator/Filter Combination Unit.

1. Pressure regulator/filter combination units shall be as indicated on the Plans. The pressure regulator shall be pre-set to the manufacturer's specifications. The filter shall be a basket type or "wye" type with a stainless steel screen. The unit shall be serviceable without removal of the unit from the drip valve assembly. The inlet size shall be 1 inch (25 mm) IPT. The pressure regulator/filter combination unit along with the remote control valve shall fit within a standard concrete valve box.

800-2.4.1.2 Pressure Regulator.

1. Pressure regulators shall be preset in line regulators set not to exceed the manufacturer's pressure rating of the emitter head or drip tubing. Pressure regulators shall be constructed of high-impact thermoplastic with fixed stainless steel compression spring housed in separate chamber from the normal water flow. The size shall be as specified on the Plans.

800-2.4.1.3 Filter.

1. Filters shall be provided in each valve servicing low flow irrigation systems. The filter shall be line-size with 2 piece threaded housing with O-ring seal molded from high heat. The filter shall be chemical resistant ABS plastic and shall have a ball flush valve connected. The filter screen shall be stainless steel with 150 mesh size (100 Micron) with the collar molded from vinyl.

800-2.4.1.4 Air Relief Valve.

1. The air relief valve shall be located at the highest end of each lateral for low flow irrigation systems. Air relief valve shall be manufactured from

non-corrosive material with ½ inch (12.7 mm) male pipe thread. Maximum operating pressure shall be 100 psi (690 kPa).

800-2.4.1.5 Flush Valve.

1. Flush valve shall automatically operate at the start of each irrigation cycle. The flushing water volume shall be 1 gallon (3.8 L) per cycle.

800-2.4.1.6 Drip Emitter.

1. The emitters shall uniformly regulate the water discharged from each port at the rate specified on the plans. The emitter shall be multi-outlet made of UV resistant polymer and resistant to impact and high temperature. **Unless otherwise specified**, the emitter shall have a minimum of 6 independent barbed outlet ports that are mounted on the bottom of the device and that securely retain ¼ inch (6.4 mm) distribution tubing. The body shall have a ½ inch (12.7 mm) female pipe thread connection.

800-2.4.1.7 Drip Tubing.

1. The distribution drip tubing shall be constructed from UV resistant polyethylene materials. The drip tubing shall be secured with 4 inch (101.6 mm) minimum length tubing stake and constructed of UV-resistant plastic material sized to accommodate the drip tubing. Tubing shall be installed with protective distribution cap (Bug Cap). Bug Cap shall have a barb inlet and a flanged shield. The barb inlet shall fit into ¼ inch (6.4 mm) distribution tubing with ID of 0.16 inches (4.1 mm). The flanged shield of the Bug Cap shall diffuse water to minimize soil erosion at emission point. The Bug Cap shall be made of polyethylene.
2. Drip tubing shall conform to the following:
    a. ¼ inch (6.4 mm) tubing designed for use with all drip systems.
    b. 60 psi (413.7 kPa) rating.
    c. Compatible with all ¼ inch (6.4 mm) transfer fittings and all barbed outlet ports.

ADD:

800-2.5 Extra Equipment to Be Furnished.

1. You shall provide the following to the City prior to the final Acceptance, **unless otherwise specified on the Plans or Special Provisions**:
    a. Five (5) irrigation heads with nozzles of each type used for every 100 irrigation heads or portions thereof.
    b. Two (2) sets of special tools required for removing, disassembling, and adjusting each type of sprinkler and valve supplied on the project.

c. Two (2) sets of 5 foot (1.5 m) valve keys for every 20 gate valves installed or portions thereof.

d. Two (2) sets of keys for each automatic controller, locking valve box, and locking quick coupler.

e. Two (2) sets of keys for each pump.

f. Two (2) sets of valve keys for every 20 quick coupler assemblies installed or portions thereof.

800-3.2.1 Conduit. DELETE in its entirety and SUBSTITUTE with the following:

1. Rigid non-metallic conduit shall conform to the requirements of the UL Standard for Rigid Non-Metallic Conduit, Publication UL 651 (PVC Schedule 80) and UL 651A (HDPE). Rigid non-metallic conduit connections shall be of the solvent weld type. For underground installation, conduit shall be UL approved heavy wall polyvinyl chloride (PVC Schedule 40) **unless specified otherwise on the Plans or Special Provisions**.

800-3.2.2 Conductors. ADD the following:

1. #14 AWG control wires shall be color coded per station as follows:

a. 1 Yellow

b. 2 Orange

c. 3 Blue

d. 4 Black

e. 5 Brown

f. 6 Purple

g. 7 Yellow w/ Black stripe

h. 8 Orange w/ Black stripe

i. 9 Red w/ Black stripe

j. 10 White w/ Red stripe

k. 11 Yellow w/ Red stripe

l. 12 Blue w/ Red stripe

m. 13 Orange w/ Red stripe

n. 14 Purple w/ White stripe

o. 15 Brown w/ White stripe

p. 16 Yellow w/ White stripe

q. 17 Blue w/ White stripe

r. 18 Red w/ White stripe

Repeat the color pattern for valves 19 through 36 and valves 37 through 54.

2. Spare Wires: Spare wires shall be color coded Red, 14 AWG. Provide two spare wires from the irrigation controller to the furthest valve manifold on each main line branch. Loop the spare wires into at least one valve box on each valve manifold. Provide a two-foot loop.

3. A manufactured weatherproof plastic identification tag showing the irrigation controller and station shall be affixed to the colored conductor wire in each valve and pull box.

4. Common Wires: Common wires shall be color coded White, #12 AWG.

5. Wire Bundles: Tape wire bundles with colored vinyl electrical tape 10 feet (3 m) OC. Use different color tape for each controller.

ADD:

800-3.2.2.1 Wire Connectors.

1. Wire connectors for direct burial irrigation control wires of 30 volts or less shall be capable to accommodate #18, #14, #12 and #10 gauge wire sizes and shall be designed to ensure waterproof connections. The wire connector kit shall contain a UL and CSA listed copper crimp sleeve, polyethylene connector body, and polyethylene connector plug. The connector plug shall be filled with blue color self-curing epoxy resin sealant immediately prior to assembly of the wire connector to fully waterproof the connection.

2. Wire connectors shall be installed in accordance with the manufacturer's recommendations. Wires shall be crimped and soldered together and inspected by the Engineer prior to placement into the wire connector plug and sealant.

3. Wire in pull boxes shall be loose and shall not come within 3 inches (76.2 mm) from the lid. Boxes shall be sized accordingly to accommodate this requirement.

ADD:

800-3.2.2.2 Wire Solder.

1. Wire solder shall be 60% tin and 40% lead alloy wire with internal flux capable of quickly turning from a solid state to a liquid state when heated and capable of quickly returning to a solid state upon cooling.

ADD:

800-3.2.2.3 Trench Marker Tape.

1. Trench marker tape for irrigation systems (for water lines and electrical wiring) shall be 3 inches wide and consist of a minimum 5.0 mil overall thickness with a 0.35 mil solid aluminum foil core. Marker tape shall be acid, alkaline and corrosion resistant. Lettering shall be 1 inch (25.4 mm) height minimum. Marker tape shall be installed in accordance with Standard Drawing SDM-105, "Warning/Identification Tape Installation,"SDI-110, "Irrigation Trench PVC or Copper Pipe," and SDI-119, "Control Wire Installation.

ADD:

800-3.4 Pull Boxes Materials.

1. Pull boxes shall be constructed of precast concrete.
2. Covers shall be cast iron with a non-corrosive metal self-locking device connected with stainless steel bolts and self-locking nuts. Covers shall be permanently and legibly labeled with 100% acrylic epoxy white or yellow waterproof paint on the top of the box indicating the component contained in the box. The Contractor shall replace the clevis pin with a marine grade stainless steel nut and bolt. The assembly shall be greased to prevent corrosion.

SECTION 801 – INSTALLATION

801-1 **GENERAL**. DELETE in its entirety and SUBSTITUTE with the following:

1. This section includes specifications for the preparation, planting, and irrigation system construction for landscape areas shown on the Plans.
2. Unless otherwise specified, walls, curbs, planter boxes, walks, irrigation systems, and similar improvements shall be constructed following rough grading and before landscaping and irrigation work.
3. Work on the irrigation system including hydrostatic tests, backfill and densification of trenches, and other excavations shall be performed before topsoil placement. Preliminary operational tests of the automatic control system and coverage tests shall be performed after topsoil placement.
4. Trees or shrubs which have been identified to remain as shown on the Plans shall be protected in accordance with Section 400-3, "Tree Protection During Construction".

801-2.2.1 **General.** DELETE in its entirety and SUBSTITUTE with the following:

1. **Unless otherwise specified on the Plans or Special Provisions**, the topsoil shall be Class A and shall be 15 inches (381 mm) thick.
2. Planting areas shall be free of weeds and other extraneous materials to a depth of 12 inches (304.8 mm) below finish grade before topsoil Work.
3. Soil shall not be worked when it is so wet or so dry as to cause excessive compaction or the forming of hard clods or dust.
4. The existing soil below subgrade for Class "A" and Class "B" topsoils shall be scarified in a cross pattern to a depth of 6 inches (152.4 mm) prior to placement of topsoil. Stones over 1 inch (25.4 mm) in greatest dimension shall be removed from the scarified area. The subgrade depth shall be verified by the Engineer prior to topsoil import.
5. Class "C" topsoil shall be scarified and cultivated to a finely divided condition to a depth of 8 inches (203.2 mm) minimum below finish grade. During this operation, all stones over 1 inch (25.4 mm) in greatest dimension shall be removed.
6. The soil shall be prepared in accordance with the recommendations of the soil analysis results stated in 800-1.1.2, "Class 'A' Topsoil".

801-2.2.2 Fertilizing and Conditioning Procedures. DELETE in its entirety and SUBSTITUTE with the following:

1. The planting area shall be brought to finish grade before spreading the fertilizers or soil conditioning materials specified in the soil test recommendations.
2. If leeching is required per the recommendations of the soil test recommendations, amendments shall be blended into the soil prior to leeching. Leeching shall be performed until analysis results are in compliance with agriculture suitability standards. Soil amendment materials shall be uniformly spread at the prescribed rate as recommended in the soil test recommendations.
3. The quantities of materials necessary for the planting areas shall be at the Work site and verified by delivery tickets furnished to the Engineer before spreading.
4. After spreading, the soil amendments shall be cultivated into the upper 15 inches (381 mm) of soil by suitable equipment operated in at least 2 directions at right angles.
5. The resulting soil shall be in a friable condition.
6. All planting areas shall be fertilized in a uniform manner at the application rate identified in the soil analysis recommendations.
7. Fertilization of turf areas shall be accomplished by uniformly spreading 50% of the specified quantity in one direction. The remaining 50% of the fertilizer quantity shall be spread perpendicular to the previous direction, immediately after the initial application. Each of the applications shall be spread uniformly in parallel, overlapping passes, to provide uniform results.

801-2.3 Finish Grading. DELETE in its entirety and SUBSTITUTE with the following:

1. Finish Grading shall provide a smooth, uniform surface plane with loose, uniformly fine texture. Roll, drag and rake to remove ridges, and fill depressions to meet finish grades. Rake out and remove all rocks and material 1/2-inch size and larger. Prior to approval, remove ridges greater than 1/2 inch and fill depressions greater than 1/2 inch within a 100 sq. ft. (10-foot x 10-foot) area.
2. Finish grades shall be as indicated on the Plans.
3. Finish grades shall be measured at the top surface of surface materials.
4. Molding and rounding of the grades shall be provided at all changes of slope.

5. Take every precaution to protect and avoid damage to new and existing sprinkler heads, irrigation lines, and other underground utilities during grading and conditioning operations.

6. Finish grades shall be acceptable to Engineer before planting operations begin.

7. Finish grade shall ensure positive drainage of the site with all surface drainage away from buildings, other structures, and walls with flow towards storm drains and catch basins.

8. General planting areas shall be graded with no less than 2 percent surface slope for positive drainage.

9. Sports Field turf areas (softball fields, baseball fields and multi-purpose fields) shall be graded with a 1.5% minimum and 2% maximum surface slope for positive drainage unless indicated otherwise on the drawings. Sports Fields shall be laser graded in accordance with the Sports Turf Managers Association pamphlet "Laser Grading Sports Fields" available at www.STMA.org.

10. Compact blended planting soil to 80 percent minimum to 85 percent maximum of maximum Standard Proctor density according to ASTM D 698 unless otherwise shown on Plans.

11. The finish grade adjacent to paving, curbs, or headers shall be ½ inch (12.7 mm) in lawn areas and 3 inches (76.2 mm) in shrub and groundcover areas.

801-3 **HEADER INSTALLATION.** To paragraph (2), DELETE in its entirety.

801-4.1 **General.** DELETE in its entirety and SUBSTITUTE with the following:

1. The types, sizes, and quantities of plant materials shall be **as specified in the Special Provisions** or shown on the Plans.

2. All plants shall be reviewed and approved prior to planting, including plants previously approved at the nursery. You shall be responsible for the condition of all plants, planted or otherwise, until the completion of the Work.

3. Planting shall be performed with materials, equipment, and procedures favorable to the optimum growth of the plants and in compliance with these procedures.

4. Except as noted for specimen planting, all planting shall follow the completion of the irrigation system.

5. Soil shall be fertilized prior to planting per the recommendations of the soil analysis results.

6. Application of the herbicides shall be **as specified in the Special Provisions**.

801-4.2 Protection and Storage. ADD the following:

1. Sun sensitive plants shall be stored in the shade or screened from the sun.

2. Stolons and sod shall not be delivered to the site until the site is ready for immediate installation.

801-4.3 Layout and Plant Location. DELETE in its entirety and SUBSTITUTE with the following:

1. Prior to planting, perform a detailed layout within the planting areas to be approved by the Engineer.

2. The first row of plants in areas designated for center-to-center spacing of plants shall be located at one-half of designated spacing form the edge of the area **unless specified otherwise on the Plans or Special Provisions**.

3. Plants shall be located to prevent Irrigation Blockage.

801-4.5 Tree and Shrub Planting. DELETE in its entirety and SUBSTITUTE with the following:

1. Planting holes shall be the depth of and twice the width of the plant container or ball and shall be larger, if necessary, to permit handling and planting without injury or breakage of the root ball or root system. Any plant with a broken or cracked root ball before or during planting shall not be planted.

2. Plant holes shall not be augured. This produces a smooth wall that deters lateral root growth. Smooth edges shall be scarified prior to planting.

3. Containers shall be removed in such a manner that the roots are not injured. Balled plant wrappings shall be loosened or cut back after the plant is positioned in the planting hole.

4. The native soil at the bottom and sides of planting holes shall be scarified.

5. Prepared backfill mix for shrub planting shall consist of 20% to 40% by volume of Type 1, 2, or 3 organic soil amendments mixed with native soil, depending on soil conditions at each site, as approved by the Engineer. On projects requiring soil analysis of native soil, backfill mix shall be determined by the recommendation of the soil analysis results and as approved by the Engineer.

6. Planting installation shall conform to the following requirements:

   a. The bottom of the planting pit shall be compacted.

   b. The plant shall be set at the approximate center of the hole and plumb so that the crown of the plant is 1 inch (25.4 mm) above finish grade.

   c. Backfill shall be added in 6-inch (152.4 mm) lifts and shall be hand tamped to finish grade.

   d. The backfill shall be thoroughly water-settled and additional backfill added to fill any remaining void below finish grade.

   e. After the water has drained, the specified number of fertilizer tablets shall be placed in the planting hole in the presence of the Engineer.

   f. A circular watering basin shall be constructed at the edge of the tree planting pit. The basin berm shall be 4 inches (101.6 mm) high. The bottom of the basin shall be at approximate finish grade or slightly lower. The specified mulch shall be spread at least 3 inches (76.2 mm) thick in the basin leaving 3 inches (76.2 mm) of clearance around the base of shrubs and 4 inches (101.6 mm) at tree trunks.

7. Basins of planted container material shall not be planted or seeded.

8. After planting, the plant shall be plumb, with the root crown 1 inch (25.4 mm) above finish grade.

801-4.6.1 Method "A" Tree Staking. DELETE in its entirety and SUBSTITUTE with the following:

801-4.6.1 Tree Staking.

1. Trees shall be staked with the type and length of stake in accordance with 800-1.5.3, "Tree Stakes". Tree ties shall be in accordance with 800-1.5.4, "Tree Ties".

801-4.6.2 Method "B" Tree Staking. DELETE in its entirety.

801-4.6.3 Guying. DELETE in its entirety and SUBSTITUTE with the following:

1. Guying shall be done as **specified on the Plans or in the Special Provisions**.

801-4.7 Ground Cover and Vine Planting. DELETE in its entirety and SUBSTITUTE with the following:

1. Soil preparation and fine grading shall be completed prior to ground cover planting.

2. Ground cover and vines shall be planted in moist soil and spaced as indicated on the Plans. Soil shall be moist within the total root zone of the material being planted.

3. Each plant shall be planted with its proportionate amount of container soil to minimize root disturbance. Soil moisture shall be such that the soil does not crumble when removing plants.

4. Following planting, ground cover and vine areas shall be regarded to restore smooth finish grade and to ensure proper surface drainage. A 3-inch (76.2 mm) layer of the specified mulch shall be spread over the planted areas **unless specified otherwise**.

5. When necessary to prevent plant damage from pedestrian traffic during the initial growing stage, erect temporary protective fencing to be removed at the end of the Plant Establishment Period (PEP).

6. Vines shall be tied to walls, fences, etc., in the manner prescribed in the plans.

801-4.8.2 **Seed.** To paragraph (2), subsection "a", "Method A", ADD the following:
The soil shall be moist for a depth of 6 inches (152.4 mm) before planting. If not, prior to planting the soil shall be watered to a depth of 8 inches (203.2 mm) and allowed to dry out to the point soil is moist and shall support labor and equipment without damage or undue compaction to soil and finish grade.

To paragraph (5), subsection "b", "Method B", DELETE in its entirety and SUBSTITUTE with the following:

b. **Method B.** The seed, fertilizer, fiber, and other materials in the slurry mixture shall be **as specified in the Special Provisions** or shown on the Plans. All materials shall be of such character that they shall disperse into a uniform slurry when mixed with water. The mixture shall be such that an absorbent and porous mat shall be formed. All materials shall be available for inspection prior to application. Weights and contents of containers shall be clearly identified. A green coloring additive shall be used in the slurry for visual inspection purposes. The slurry shall be applied under pressure at the specified rates. Areas to be planted by this method shall be moistened to a depth of 6 inches (152.4 mm). The slurry planted areas shall be kept moist during the germination period, but ponding shall be avoided.

1) **Application Rates for Type 11 (Wood Fiber) Mulch.** When specified, Apply Type 11 (Wood Fiber) Mulch in the locations, rates, and number of applications shown in the Contract Documents and as follows:

a) Apply in successive passes as necessary to achieve the required application rate. Form a continuous uniform mat with no gaps between the mat and the soil surface.

b) Apply in two or more directions.

c) Mulch application rate shall be 2,000 lbs. per acre.

d) Binder application rate shall be 150 lbs. per acre.

e) Fertilizer application rate shall be in accordance with the soil analysis recommendations unless otherwise specified.

f) Seed application rate and type shall be specified in the Contract Documents and/or as specified by the Project Biologist, when applicable.

2) **Application Rates for Type 13 Hydro-mulch (bonded fiber matrix).** When specified, Apply Type 13 Hydro-mulch (bonded fiber matrix) in the locations, rates, and number of applications shown in the Contract Documents and as follows:

a) Apply in successive passes as necessary to achieve the required application rate. Form a continuous uniform mat with no gaps between the mat and the soil surface.

b) Apply in two or more directions.

c) Mulch application rate shall be 3,500 lbs. (including the binder) per acre unless specified otherwise.

d) Fertilizer application rate shall be in accordance with the soil analysis recommendations unless otherwise specified.

e) Seed application rate and type shall be specified in the Contract Documents and/or as specified by the Project Biologist, when applicable.

ADD the following:

1. Lawn Seed application rate shall be 10 lbs. per 1,000 square feet.

2. Mow lawn areas planted from seed in accordance with the schedule listed below. Cross cut mow if required to achieve a uniformly smooth lawn surface. After mowing at 60 Calendar Days the Engineer will determine if lawn areas need to be re-rolled to achieve a smooth lawn surface. Re-roll as directed by the Engineer between 60 and 75 Calendar Days after seed installation. Roll as required with a one-ton ride-on double drum roller to provide a uniformly smooth lawn surface.

    a. First mowing at 60 Calendar Days after installation of seed at a height of 3 inches (76.2 mm) using a rotary mower.

    b. Second mowing at 75 Calendar Days after installation of sod at a height of 2 inches (50.8 mm) using a reel mower.

    c. Third mowing at 90 Calendar Days after installation of sod at a height of 2 inches (50.8 mm) using a reel mower.

    d. Weekly for the remainder of the PEP at a height of 1.5 inches (38.1 mm) using a reel mower.

801-4.8.3 **Sod.** DELETE in its entirety and SUBSTITUTE with the following:

1. The type of sod and the areas to be sodded shall be shown on the Plans or **specified in the Special Provisions**.

2. Subgrade for sod (topsoil elevation) shall be the specified thickness of the sod below finish grade. Soil preparation and fine grading shall be completed before sodding. Prepare planting area for soil placement and mix planting soil according to Agricultural Soil Testing Lab Recommendations. Remove existing turfgrass, vegetation, surplus soil and waste material, and legally dispose of them. Do not mix into surface soil.

3. Adjust elevation of planting soil to allow for thickness of sod. Pay special attention to soil height at irrigation valve boxes, irrigation heads, quick couplers and mow curbs. Ensure soil is sufficiently compacted and at the correct elevation.

4. With the exception of equipment required to install rolled sod, no heavy equipment shall operate over the subgrade after grading is completed.

5. Sod shall be installed within 24 hours after cutting.

6. Soil surface shall be uniformly smooth and shall have a consistent slope or elevation with no more than 1/2-inch (12.7 mm) deviation within a 100 sq. ft. (10 ft. x 10 ft.) area. Soil surface shall be free of depressions, pits, and high spots.

7. Before planting, obtain Engineer acceptance of finish grading to a uniform smooth soil surface and soil moisture content. Restore planting areas if eroded or otherwise disturbed after finish grading.

8. The subgrade shall be moist but not wet when sod is laid. Sod shall be laid with closely fitted joints and the ends of the strips shall be staggered. Gaps between sod pieces will not be accepted. Openings shall be plugged with sod or topsoil.

9. Avoid damage to soil or sod during installation.

10. Anchor sod on slopes exceeding 6:1 with steel staples spaced as recommended by sod manufacturer but not less than two anchors per sod strip to prevent slippage. Lay sod parallel to contours in sloped areas.

11. Within 2 hours after installing sod and before rolling, the sod shall be lightly irrigated. All seams and joints shall then be rolled until the sod is bonded to the subgrade.

12. Lawn Surface shall be uniformly smooth and shall have a consistent slope or elevation with no more than 1/2-inch deviation within a 100 sq. ft. (10 ft. x 10 ft.) area. Lawn surface shall be free of depressions, pits, and high spots. Level of installed sod shall be flush with adjacent surfaces.

13. The areas shall then be watered thoroughly to penetrate the subgrade at least 6 inches (152.4 mm). Watering shall be repeated as necessary to keep the sod moist until rooted into the subgrade.

14. Apply fertilizer at installation per sod supplier recommendations.

15. Sodded areas shall be protected against foot traffic through the Plant Establishment Period.

16. Within 1 week after laying sod, work fine sand into minor cracks between pieces of sod or minor depressions that were not otherwise identified and remove excess to avoid smothering sod and adjacent grass. Sand depth shall not exceed ¼ inch (6.35 mm). Continue to incrementally sand any low areas weekly during plant establishment and maintenance periods.

17. If, upon installation, it is identified that areas of sod were installed too high or too low adjacent to mow curbs, valve boxes, irrigation heads, quick couplers, catch basins or other items, immediately rectify condition by pulling up sod and adding or removing approved topsoil to achieve desired elevations. Assure topsoil at adjusted areas is sufficiently compacted.

18. Mow lawn areas planted from sod in accordance with the schedule listed below. Cross cut mow if required to achieve a uniformly smooth lawn

surface. After mowing at 30 Calendar Days the Engineer will determine if lawn areas need to be re-rolled to achieve a smooth lawn surface. Re-roll as directed by the Engineer between 30 and 45 Calendar Days after sod installation. Roll as required with a one-ton ride-on double drum roller to provide a uniformly smooth turf surface.

a. First mowing at 30 Calendar Days after installation of sod at a height of 2.5 inches (63.5 mm) using a rotary mower.

b. Second mowing at 45 Calendar Days after installation of sod at a height of 2 inches (50.8 mm) using a reel mower.

c. Third mowing at 60 Calendar Days after installation of sod at a height of 2 inches (50.8 mm) using a reel mower.

d. Weekly for the remainder of the PEP at a height of 1.5 inches (38.1 mm) using a reel mower.

19. Lay sod across slopes exceeding 3:1.

20. Contractor shall water new turf areas per the sod manufacturer's recommendations for proper turf establishment.

801-4.8.4 Stolon Planting. DELETE in its entirety and SUBSTITUTE with the following:

1. Topsoil preparation and finish grading shall be completed before stolon planting.

2. The area to be planted in stolons shall be thoroughly irrigated to a depth of at least 6 inches (152.4 mm) before planting.

3. At the time of planting, the top 2 inches (50.8 mm) of soil shall be friable and shall contain enough moisture to prevent stolons from drying out during the planting operation. The stolons shall be worked into the soil to a depth of ½ inch to 1½ inches (12.7 mm to 38.1 mm) by a mechanical or hand planter, or broadcast by hand and covered with ¼ inch (6.4 mm) of topdressing mulch.

4. When the area to be planted exceeds 10,000 ft^2 (929 m^2), a mechanical spreader shall be used. When less than 10,000 ft^2 (929 m^2) and more than 2,000 ft^2 (185.8 m^2), the use of a hand planter or mechanical planter is optional. When less than 2,000 ft^2 (185.8 m^2), hand planting or broadcasting with mulch is optional.

   a. Hydrostolon Application Rate.

      1) Stolons shall be of the variety specified in the Contract Documents and shall be applied at a rate of 5 US bushels per 1,000 square feet.

      2) Mulch shall be applied at a rate of 2,000 lbs. per acre.

3) Fertilization application rate shall be as recommended in the soil analysis recommendations, unless specified otherwise.

5. The planted stolons shall not be allowed to dry out. Watering shall begin immediately after planting and the stolons shall be kept moist at all times throughout the Plant Establishment Period.

6. When overseeding is required, the seed shall be spread as shown on the Plans.

7. Mow lawn areas planted from stolons in accordance with the schedule listed below. Cross cut mow if required to achieve a uniformly smooth lawn surface. After mowing at 60 Calendar Days the Engineer will determined if lawn areas need to be re-rolled to achieve a smooth lawn surface. Re-roll as directed by the Engineer between 60 and 75 Calendar Days after stolon installation. Roll as required with a one-ton ride-on double drum roller to provide a uniformly smooth lawn surface.

   a. First mowing at 60 Calendar Days after installation of seed at a height of 3 inches (76.2 mm) using a rotary mower.

   b. Second mowing at 75 Calendar Days after installation of sod at a height of 2 inches (50.8 mm) using a reel mower.

   c. Third mowing at 90 Calendar Days after installation of sod at a height of 2 inches (50.8 mm) using a reel mower.

   d. Weekly for the remainder of the PEP at a height of 1.5 inches (38.1 mm) using a reel mower.

801-5.1 **General.** To paragraph (2), DELETE in its entirety and SUBSTITUTE with the following:

You shall be responsible for furnishing the labor and materials for the utility connections. Utility connections shall be as shown on the Plan or designated by the utility company.

ADD the following:

1. The installation of the irrigation system shall be in accordance with the manufacturer's instructions **unless specified otherwise.**

801-5.2 **Trench Excavation and Backfill.** DELETE in its entirety and SUBSTITUTE with the following:

1. Trenches and other excavations shall be sized to accommodate the irrigation system components, conduit, and other required facilities. Additional space shall be provided to assure proper installation and access for inspection.

2. The minimum depth for conduits containing low voltage control wire or communications wire shall be 21 inches (533.4 mm). Conduit shall be located with irrigation pressure mains wherever possible.

3. The bottom of trenches shall be true to grade and free of protruding stones, roots, or other matter which would prevent proper bedding of pipe or other facilities.

4. Trenches and excavations shall be backfilled so that the specified thickness of topsoil is restored to the upper part of the trench. Backfill shall be jetted in accordance with 306-12.4, "Jetted Trench Backfill". Other methods of compacting backfill may be approved by the Engineer.

5. Trenches through paved areas shall be resurfaced in accordance with 306-13, "TRENCH RESURFACING".

801-5.3.1 **General.** To paragraph (2), sentence (2), DELETE in its entirety and SUBSTITUTE with the following:

The pipe shall be surrounded with SE 50 plaster or mortar sand material per 200-1.5.5, "Sand Gradations".

To Paragraph (3), ADD the following:
Irrigation mainlines, valves, and supporting equipment shall be located in the planting areas. **Unless otherwise specified** no parallel pressure pipelines shall be installed within 1 foot (0.3 m) of each other.

801-5.3.2 **Steel Pipeline.** To paragraph (3), DELETE in its entirety and SUBSTITUTE with the following:
Joints shall be made with a non-toxic and non-hardening joint compound or Teflon tape and applied to the male threads only.

801-5.3.3 **Plastic Pipeline.** ADD the following:

1. Tees shall be installed horizontally at the connection with the main line.

801-5.3.4 **Copper Pipeline.** ADD the following:

1. Copper pipe shall have a straight butt square edge with all burrs and fins removed.

801-5.4 **Installation of Valves, Valve boxes, and Special Equipment.** DELETE in its entirety and SUBSTITUTE with the following:

1. All irrigation equipment, except sprinkler heads and bubblers, shall be located a minimum of 10 feet (3 m) away from all tree locations. All irrigation equipment, except sprinkler heads and bubblers, shall be placed in shrub beds **unless otherwise specified**.
2. Valves and other equipment shall be installed in a normal upright position unless otherwise recommended by the manufacturer, and shall be readily accessible for operation, maintenance, and replacement.
3. Valves shall be the same size as the pipeline in which they are to serve unless otherwise shown on the Plans.
4. Isolation valves shall be installed at line depth and shall be equipped with a sleeve centered on the valve stem. 2 inch (50 mm) and smaller globe valves shall be in 2-inch (50.8 mm) diameter PVC Schedule 40 sleeves with locking metal lids in accordance with the Standard Drawings. Isolation valves 2½ (63.5 mm) inch and larger shall be in a 6-inch (152.4 mm) PVC sleeve-centered in a locking valve box in accordance with the Standard Drawings and 800-2.2.7, "Valve Boxes".
5. Quick coupler valves projecting above grade shall be 12 inch (304.8 mm) from curbs, pavement, and walks. In ground cover and shrubbery areas, quick coupler valves shall be set 3 inches (76.2 mm) above finish grade. Quick couplers in lawn areas shall be installed flush with finish grade.
6. Valve boxes and pipe sleeves with caps shall be set to finish grade.
7. Backflow preventers shall be provided with pipe supports and the accessories necessary to properly secure the assembly.

801-5.5.1 **General.** DELETE in its entirety and SUBSTITUTE with the following:

1. Mains and laterals, including risers, shall be flushed and pressure tested before installing swing joints and sprinkler heads, after which a water coverage test shall be performed.

801-5.5.2 **Location, Elevation, and Spacing.** DELETE in its entirety and SUBSTITUTE with the following:

1. Sprinkler head spacing shall not exceed the maximum shown on the Plans or recommended by the manufacturer.
2. Lawn sprinklers shall be installed 3 inches (76.2 mm) clear of adjacent walks, curbs, paving, headers, and similar improvements, unless otherwise specified.

3. Sprinkler heads shall be installed 24 inches (609.6 mm) from adjacent vertical elements projecting above grade such as walls, planter boxes, and fences.

4. Sprinkler heads and nozzles on risers shall be installed 12 inches (304.8 mm) above finish grade, unless otherwise specified.

5. Nozzle lines projecting above finish grade shall be at least 6 inches (152.4 mm) from adjacent curbs, walk, paving, and similar improvements.

6. Sprinkler heads located adjacent to pavement that do not drain into the landscaping shall be located a minimum of 24 inches (609.6 mm) away from the edge of pavement.

801-5.5.3 Riser and Nozzle Line Installation. DELETE in its entirety and SUBSTITUTE with the following:

801-5.5.3 Riser Installation.

1. Risers shall be oriented perpendicular to finish grade.

2. Sprinkler head risers shall be installed as shown on the Plans.

801-5.5.4 Sprinkler Head Adjustment. DELETE in its entirety and SUBSTITUTE with the following:

1. When all sprinkler heads are installed and the irrigation system is operating, each irrigation station shall be adjusted, with control valves fully open, to obtain "head-to-head" irrigation coverage.

2. Sprinkler heads having adjustable pin nozzles or orifices shall have the pins adjusted to a maximum 25% radius reduction to provide uniform distribution of water over the coverage area. Non-adjustable sprinkler nozzles may require substitutions of smaller or larger nozzle cores as directed by the Engineer.

3. A water audit of the irrigation system shall be required **as specified in the Special Provisions**.

801-5.6 Automatic Control System Installation. DELETE in its entirety and SUBSTITUTE with the following:

1. You shall install a complete automatic irrigation control system including the automatic controller, remote control valves and wiring, and all necessary accessories and utility service connection.

2. Stand-Alone Irrigation Controller: The installation of the automatic controller shall be certified by the manufacturer upon the completion of installation. The automatic controller shall be installed outside of the

coverage pattern of the irrigation system at the location shown on the Plans. Each controller shall have a power ON/OFF switch, with lock-out and tag-out capability and shall have a separate circuit breaker. The foundation for the controller shall be concrete, as specified in 201-1, "PORTLAND CEMENT CONCRETE", of the size shown on the Plans or recommended by the manufacturer. The control components in the controller shall be fused and the chassis shall be grounded. Remote control valves shall be compatible with the automatic controller.

3. Irrigation Controller inside Structure: When specified on the plans the irrigation controller assembly shall be wall-mounted within a maintenance, storage or electrical room as indicated. The irrigation controller assembly shall be on a stainless steel backboard panel securely anchored to the building wall. The installation of the automatic controller shall be certified by the manufacturer upon the completion of installation. Each controller shall have a power ON/OFF switch, with lock-out and tag-out capability and shall have a separate circuit breaker. The control components in the controller shall be fused and the chassis shall be grounded. Remote control valves shall be compatible with the automatic controller.

4. For the purpose of these specifications, service shall include all material and equipment necessary to complete the electrical connection between the terminating point of the serving utility and the irrigation controller. A separate disconnect switch and circuit breaker shall be installed between the source of power and the controller. The minimum service wire shall be No. 12 AWG copper 600 volt type TW, TWH or TWHH or larger as required by the Contract Documents or controller manufacturer. Wire splices shall be located only in specified pull boxes and shall be made with a packaged waterproof kit approved for underground use. Pull boxes shall be set on an un-mortared brick foundation to finish grade in lawn areas and 3 inches (76.2 mm) above finished grade in mulch areas.

5. Control wiring shall be color coded in accordance with 800-3.2.2, "Conductors". Unless otherwise specified, all control wiring shall be direct burial, Type UF, No. 14 AWG copper. At least 2 feet (0.6 m) of slack shall be left at each splice and point of connection in pull boxes and valve boxes. Wire splices shall be located in specified pull boxes spaced at maximums of 300 feet (91.4 m).

6. All wiring shall be tested for continuity, open circuits, and unintentional grounds prior to connecting to equipment. The minimum insulation resistance to the ground shall be 50 megaohms. In multiple controller installations, the common control wires shall be separate for each controller. Multiple controller enclosures shall be sized accordingly. 110 volt wire runs shall not pass from controller to controller. Each controller

shall have a separate electrical service and circuit breaker through an individual raceway.

7. Upon completion of the Work, a legible reduced copy of the As-Built irrigation Plans provided by the Engineer shall be color coded by irrigation station, laminated in plastic, and placed on the inside of each controller enclosure. The outside of each controller enclosure shall be identified per the Plans with a black, permanent 2 inch (50.8 mm) stencil. The location of the controller identification shall be as approved by the Engineer. The color-coded operational chart shall include the location of the circuit breaker and water meter feeding the controller. Each installed remote control valve shall be color coded to its parent controller.

801-5.7.2.1 General. DELETE in its entirety and SUBSTITUTE with the following:

1. Pressure testing for leakage shall be performed on newly installed supply lines, pressure mains, and laterals, except for non-ridged pipelines and pipelines with spray nozzles installed into the pipe.

2. Pressure testing shall be done with all in-line isolation valves, manifold isolation valves, quick coupling valves and remote-control valves installed. All gate valves and globe valves shall be completely open. Remote-control valves shall be completely open with the outlet side capped off.

3. Irrigation lateral line testing (downstream of the control valve) shall be done with all solvent weld fittings in place. Connections for sprinkler head assemblies (swing joint assemblies) shall be capped.

4. Pipelines installed by trenching and backfilling and pipelines which are completely visible after installation shall be tested in accordance with 801-5.7.2.2, "Pipeline Pressure Test Method."

5. Backfilling of trenches shall not occur prior to pressure testing. Center loading of the pipes is allowed provided all joints are completely exposed for observation.

801-5.7.2.2 Method A. DELETE in its entirety and SUBSTITUTE with the following:

801-5.7.2.2 Pipeline Pressure Test Method.

1. Pressure testing for leakage shall conform to the following procedure:

   a. Notify the Engineer at least 24 hours prior to performing a pressure test. Pressure tests shall be performed such that the test periods are within the working hours **specified in the Special Provisions**. The Engineer shall observe each pressure test.

   b. Before any portion of the pipeline on the supply side of a control valve is backfilled, water shall be turned on into that portion of

the line and maintained at full pressure as described in the table below from the water source for a period of not less than 4 consecutive hours after air has been expelled from the line.

c. Before any portion of the pipeline on the discharge side of control valve is backfilled, a similar test shall be performed, except the test shall be for a period of 2 hours as described in the table below. Leaks that develop in a tested portion of the system shall be repaired. After the leaks have been repaired, the pressure test shall be repeated. Additional repairs shall be made until no leaks occur.

d. The constant test pressure shall be as follows:

Pressurized Mains	125 psi (861.8 kPa)	4 hours
Non-pressurized Laterals	100 psi (689.5 kPa)	2 hours

801-5.7.2.3 Method B. DELETE in its entirety.

801-5.7.3 Sprinkler Coverage Test. DELETE in its entirety and SUBSTITUTE with the following:

1. Prior to requesting the sprinkler coverage test, you shall:
   a. Verify that all irrigation system components such as pumps, controllers, and electrical connections are connected and automated.
   b. Verify that sprinkler heads have been installed and head-to-head coverage has been achieved.
   c. Make adjustments to achieve head-to-head coverage and eliminate overspray from hardscape elements.
2. Each section or unit in the irrigation system shall be balanced to provide uniform and adequate coverage of the areas serviced. Correct any deficiencies in the system in accordance with 801-5.5.4, “Sprinkler Head Adjustment”.

ADD:

801-5.8 Flow Sensing Devices Installation.

1. The flow sensing device shall be installed downstream of the backflow preventer using the flow sensing cable in accordance with 800-2.2.10, “Flow Sensor Cable”.

ADD:

801-5.9 Rain Sensing Devices Installation.

1. The rain sensing device shall be mounted in an approved location with open skies and away from other water sources such as the drip line of buildings or within the spray patterns of the irrigation system. Submit Working Drawings showing the installation in accordance with 3-8, “SUBMITTALS”.

ADD:

801-5.10 Pressure Regulating Valve Installation.

1. The pressure regulating valve shall be installed downstream of the backflow preventer and shall be set to the design pressure of the system.

ADD:

801-5.11 Backflow Preventer Enclosure Installation.

1. A backflow preventer enclosure shall be required for each backflow prevention device and shall be installed level and plumb. Backflow preventer stall be installed on a level concrete pad with a minimum of four inches of clearance between the enclosure and the edge of the concrete pad. The enclosure shall open completely for access without any obstructions.

ADD:

801-5.12 Booster Pumps.

1. Booster pump installations shall be certified by the manufacturer once installed.

801-6 MAINTENANCE AND PLANT ESTABLISHMENT. DELETE in its entirety and SUBSTITUTE with the following:

1. Maintain all planted areas on the continuous basis as they are completed during the progress of the Work and during the Plant Establishment Period (PEP).
2. Mowing of lawn areas shall be as specified in 801-4.8, "Lawn Planting".
3. Any required pruning of plants shall be designated by the Engineer at the start of the PEP. Perform the pruning as part of the plant establishment Work.
4. After all planting and related Work has been completed in accordance with the Contract Documents, request a pre-maintenance inspection from the Engineer. All Punchlist items shall be completed prior to the start of the PEP.
5. After planting is completed, a field notification shall be issued to establish the effective beginning date of the PEP.
6. The PEP shall be as specified in the table below unless otherwise specified in the Contract Documents.

90 Calendar Days	Per Permanently Irrigated Plants and Sod Installations
120 Calendar Days	Seed or Stolonized Lawn Areas

7. Unless otherwise specified, the Resident Engineer and Project Biologist will determine that the PEP has been successfully completed when the following conditions have been met:
   a. Site is erosion free.
   b. 100-percent container plant survival.

c. Zero-percent weed and invasive plant cover.

d. Best Management Practices (BMPs) are in good condition as determined by the Resident Engineer.

8. The PEP shall be extended by the Resident Engineer if additional planting is necessary to achieve the required success criteria above or if other corrective Work becomes necessary.

9. Unhealthy plant materials shall be replaced within 2 weeks from the Engineer's notification.

10. Upon completion of the PEP, a final inspection shall be performed by the Engineer. If the PEP is satisfactorily completed ahead of other Work included in the Contract, the maintenance of planted areas shall be continued until all other Work has been completed.

11. When specified in the Contract Documents, the acceptance of the PEP by the Engineer shall begin the Long-Term Maintenance and Monitoring period in accordance with SECTION 802 - NATIVE HABITAT PROTECTION, INSTALLATION, MAINTENANCE, AND MONITORING.

12. Maintenance shall be performed weekly or as directed by the Engineer and shall include irrigation inspection and repair, Site cleanup, pruning of groundcover, shrubs, and trees, mowing, weed control, fertilization every 4 weeks in accordance with 801-2.2.2, "Fertilizing and Conditioning Procedures", pest and fungi control, plant replacement, and mulch replenishment.

13. You are responsible for the scheduling of Work throughout the duration of the Contract. Early installation of landscape planting does not relieve you of planting and irrigation maintenance responsibilities prior to the completion of construction and Final Acceptance by the City. Should the PEP lapse prior to Final Acceptance, you shall maintain planting until completion and Final Acceptance.

801-7 MEASUREMENT. DELETE in its entirety and SUBSTITUTE with the following:

801-7 MAINTENANCE OF EXISTING TREES.

1. You shall immediately notify the Engineer if a tree appears to be or may be unstable as a result of trimming or root pruning activities.

2. All measures will be taken to minimize the removal of tree roots in order to maintain the health and stability of the tree. Those measures include but are not limited to ramping over roots, meandering around roots, and reinforcing sidewalk with rebar to strengthen sidewalk. Removal of tree roots shall be the last option when the hardscape is being replaced or newly constructed.

ADD:

801-7.1 Tree Trimming.

1. Trees shall be trimmed per ANSI A300 Standards for Tree Care Operations 1 week prior to root pruning or as directed by the Engineer. Tree trimming shall include:
    a. Removal of low branches overhanging residential streets to a height above the street grade of 14 feet (4.3 m) unless otherwise directed.
    b. Removal of low branches overhanging sidewalks shall be trimmed to a height of 8 feet (2.4 m) unless otherwise directed.
    c. Removal of the dead, broken, diseased, and insect-infested branches and stubs larger than ½ inch (12.7 mm) in diameter.
    d. Pruning end branches to lighten end weights where such overburden appears likely to cause breakage of limbs based upon a certified arborist report and under their supervision of this Work.
    e. Removal of cross limbs and water sprouts (suckers).
2. Final pruning cuts shall be made without leaving a stub. Final pruning cuts shall be made in a manner to favor the earliest covering of the wound with callous growth. The wound shall be as small as practicable. The cambium tissues at the edge of the cut shall be alive and healthy. Extremely flush cuts which produce large wounds and weaken the tree at the cut shall not be made.
3. Pruning and cutting tools shall be kept sharpened to a condition that shall not permit leaving a scraped cambium edge on final cuts. Such tools shall also be kept clean and free from infectious materials.
4. The use of climbing spurs or spike shoes shall not be permitted.
5. Trimming of the trees shall provide adequate clearance from obstructed street standard, globe, or sign. Trim tree limbs shall clear all adjacent structures by 5 feet (1.5 m).
6. In the event that high voltage aerial utility wires present a hazard to your personnel or others near the Work Site, the Work shall immediately cease and you shall notify San Diego Gas & Electric. The Work shall then commence in accordance with the instructions from the utility company.

ADD:

801-7.2 Root Pruning for Re-configured Sidewalk.

1. At locations where the width of the walk will be reduced or moved over to enlarge the tree well, the Resident Engineer and certified arborist may arrange for root pruning after the existing walk has been demolished and removed and prior to installation of new walk. Coordinate the scheduling of root pruning within 1 week of the concrete repair Work to start. Roots shall be cut at the locations established by the Engineer based upon a report from a certified arborist.

ADD:

801-7.3 Root Pruning for Sidewalk Replacement.

1. Prune the trees roots in accordance with the Contract Documents. You shall coordinate the scheduling of root pruning within 1 week of the concrete repair Work to start. The Work includes cutting all roots necessary for satisfactory forming for replacement sidewalk to a depth of 12 inches (304.8 mm), 21 inches (533.4 mm) on the curb side, along the edge of the new walk or curb for a distance of 10 feet (3 m) in each direction from the center of the trunk, unless otherwise directed by the Engineer based upon a report from a certified arborist. If the walk will not be replaced, roots shall be cut in straight lines parallel to the walk or the curb. The root cut shall not be more than 3 inches (76.2 mm) from edge of existing walk or curb for a length of 10 feet (3 m) in each direction from the center of the trunk.
2. Roots more than 2 inches (50.8 mm) in diameter shall be preapproved for removal by the Engineer based upon a report from a certified arborist. Roots shall be cut at the nearest node to encourage roots to grow away from the walk. Root cutting shall not impact the trunk flare. Roots shall be cleanly cut from the new walk edge. Backfill excavated areas with Class A topsoil or decomposed granite as directed by the Engineer to existing grade and compact sufficiently to not settle when walked upon.
3. In order to protect existing trees, surface roots in the parkway area or planter strip shall not be damaged or removed outside of the pruning area and no construction equipment or supplies including spoils shall be placed in or upon this area.

ADD:

801-7.4 Root Pruning on Curb Side.

1. Prune the tree roots as noted in the Contract Documents based upon a report from a certified arborist. You shall coordinate the schedule of this Work within 1 week of the concrete repair Work scheduled. Roots shall be cut following the removal of the existing curb and prior to the installation of the new curb when practical.
2. The Work includes cutting all roots necessary to a depth of 21 inches (533.4 mm) only along the edge of the new curb line adjacent to the tree, in order to provide forming area for new curb. This shall be done for a minimum distance of 10 feet (3 m) on the curb side of tree. In cases where the curb will not be replaced, roots shall be linear cut no further than 3 inches (76.2 mm) from edge of existing curb for a minimum length of 10 feet (3 m) from the tree trunk.

ADD:

801-7.5 Equipment.

1. Cuts shall be made with a root cutting machine such as Vermeer, Doskocil Inc., or approved equal as approved by the Engineer. Any shredded roots shall be cut clean to the nearest root node. Use of a tree stump grinder for root pruning shall not be acceptable.

ADD:

801-7.6 Root Barrier.

1. Install root barriers for trees within 10 feet (3 m) of hardscape for new construction, where the root pruning and walk construction has been completed, or as directed by the Engineer. Root barriers installed on either the curb side or walk side shall be continuous, 20 feet (6.1 m) in length, and centered on the tree or as directed by the Engineer. The Engineer may allow for alterations to the root barrier in order to accommodate necessary root locations based upon an arborist report.

2. Where trees requiring root barriers are 18 feet (5.5 m) or less apart, the barrier shall be installed continuously between trees. The barrier shall be placed 1 inch (25.4 mm) above finish grade against the back of the curb or the front edge of the walk. Vertical raised ribs on barrier shall be faced toward the tree(s). The barrier shall be installed vertically, or if conditions allow, with the top inclined towards the tree.

3. The barrier shall not be installed with the top inclined away from the tree. The root pruning trench shall be backfilled to the top of the barrier. The tree shall be inspected by the Engineer for stability prior to the backfilling of the root pruning trench.

801-8 PAYMENT. DELETE in its entirety and SUBSTITUTE with the following:

801-8 MEASUREMENT.

1. Landscaping and irrigation Work shall be measured as specified in the Contract Documents and as shown in the Bid.

2. Tree maintenance Work shall be measured by the tree trimming, root pruning, or root barrier required for each tree.

ADD:

801-9 PAYMENT.

1. The payment for landscaping and irrigation Work shall be included under the lump sum Bid items or for the Contract Unit Prices shown in the Bid and shall also include the payment for the Plant Establishment Period Work.

2. The payment for tree maintenance Work shall be included in the following Bid items:

   a. Tree Trimming

   b. Root Pruning

   c. Root Barrier

3. When used, Decomposed Granite (DG) shall be included in the Bid item for "Remove and Replace Miscellaneous Hardscape with Topsoil" unless a separate Bid item has been provided.

ADD:
SECTION 802 – NATIVE HABITAT PROTECTION, INSTALLATION, MAINTENANCE, AND MONITORING

802-1 GENERAL.

1. This section is specific to any habitat protection, native species plantings for erosion control, re-vegetation, restoration, or creation of native habitat for mitigation purposes.
2. The provisions of 1-6.2, "Subcontractor Listing" shall not apply to the independent supplemental agreement.
3. You shall limit staging and stockpiling areas and access routes to areas identified in the Contract Documents.
4. Materials shall be non-toxic, biodegradable, and wildlife-friendly to the maximum extent possible. For example, recycled wood chips shall be used rather than decomposed granite, erosion control blankets, and wattles shall not have tight plastic netting, and pest removal shall be non-lethal.
5. You shall comply with any and all applicable environmental regulations including but not limited to those in the Contract Documents as well as the latest City Landscape Standards, Biology Guidelines, Sewer Design Guidelines, and Environmentally Sensitive Lands Guidelines and Municipal Code Landscape Sections §142.0401. You are responsible for adhering to local, state, and federal laws including but not limited the Clean Water Act, the Clean Air Act, and the Migratory Bird Treaty Act.

802-1.1 **Terms and Responsibilities.** For the purpose of these specifications the following definitions and descriptions of the responsibilities shall apply:

1. **Biological Resources Protection During Construction** – Areas on site and in adjacent locations to be protected during Work activities. These may include but are not limited to: native plants, sensitive or rare plants, habitat, jurisdictional areas, preserved areas, or formerly mitigated areas. The Contract Documents shall specify requirements for Biological Resources Protection During Construction such as a Biological Monitoring Exhibit, pre-construction meetings, pre-construction surveys, construction monitoring, construction limits fencing, flagging, or signage and post-impact reports.
2. **City Representative** – City staff qualified to perform duties described.
3. **Communication** – The Resident Engineer shall be the single point of contact and shall be included in all communication. All directions from the Project Biologist to you shall come through the Resident Engineer. The Project Biologist shall have the authority to temporarily stop the Work until the

Resident Engineer can provide further direction to you. The Re-vegetation Contractor shall contact the Resident Engineer at certain phases detailed in the Contract Documents to perform inspections. The Project Biologist shall submit reports to the Resident Engineer at certain phases detailed in the Contract Documents. The Resident Engineer or City representative shall contact MMC staff and Resource Agencies for site inspections at certain phases detailed in the Contract Documents.

4. **Environmentally Sensitive Lands (ESL) –** Environmentally Sensitive Lands administered by the Development Services Department through the ESL regulations and the City's Biological Guidelines. ESL, for the purposes of this section, can be steep slopes, coastal bluffs, jurisdictional waters, and native habitat. Work conducted within ESL typically requires monitoring by the Project Biologist and may require additional special studies or impact avoidance measures. Refer to the Contract Documents for more information.

5. **Installation –** Installation of all erosion control, seed, container plants, and irrigation as specified in the Contract Documents. Unless otherwise directed by the Project Biologist via the Resident Engineer, installation shall be completed within 90 Calendar Days of the completion of grading or disturbance. Written acceptance of installation by MMC staff or City Representative shall commence the PEP.

6. **Invasive Plants –** Plants listed in the latest Cal-Invasive Plant Council website (Cal-IPC) with a rating of "Moderate" or "High" and/or perennial non-native species regardless of Cal-IPC rating.

7. **Maintenance and Monitoring (M&M) Period –** The period of time required to ensure long-term establishment and health of re-vegetation. The M&M Period shall be 25 months for re-vegetation or erosion control projects and shall be 60 months for mitigation projects, **unless otherwise specified**. The M&M period shall start after the 120 Calendar Day PEP has been considered complete by MMC staff or City Representative. The M&M Period may be extended by the Engineer. Written acceptance of the M&M Period by MMC staff or City Representative and Resource Agencies specified in the Contract Documents shall close the project.

8. **Mitigation and Monitoring Coordination (MMC) Section –** A section in the City's Development Services Department responsible for the compliance of the CEQA document and any City environmental permits, the approval of Re-vegetation Plan changes and for the approval of the completion of success criteria for installation, the 120 Day Plant Establishment Period, and the 25-month Maintenance and Monitoring Period. MMC staff or a City representative shall issue internal City memos or punchlists to the Engineer regarding the Project.

9. **Multiple Habitat Planning Area (MHPA) –** A mapped system of environmentally sensitive areas given special protections and administered by the City's Multiple Species Conservation Program (MSCP).

10. **Plant Establishment Period (PEP) –** The specified period of time required to ensure successful initial establishment of plants. The PEP shall be 120 Calendar Days for erosion control, re-vegetation, and restoration projects. The PEP may be extended by the Engineer. Written acceptance of the PEP by MMC staff or City Representative shall commence the Maintenance and Monitoring Period.

11. **Plant Supplier** – Plant Suppliers shall have at least 2 years of experience in the propagation of native plants in Southern California and shall be responsible for providing containerized plant materials and required documentation. The Plant Supplier shall hold a valid Department of Agriculture Inspection Certificate.

12. **Project Biologist** – The Project Biologist shall be responsible for overseeing the Biological Resources Protection During Construction requirements and the entire re-vegetation program. The Project Biologist shall not be the same person and shall not be from the same company or organization as the Re-vegetation Contractor. The Project Biologist shall review and become familiar with the Contract Documents and shall function under the direction of the Engineer. The Project Biologist shall be an individual or team of individuals with 4-year degree(s) in botany, ecology, landscape architecture, or a related field with demonstrated experience in at least 1 habitat restoration project of similar type, size, and complexity in Southern California. If required by the contract documents, the Project Biologist or a sub-consultant shall also be qualified to perform United States Fish and Wildlife Service protocol focused sensitive species surveys. The Project Biologist may be hired by you, the City, or be a City representative **as specified in the Special Provisions.**

13. **Resource Agencies –** Local, state, and federal government agencies that approve Work in and around natural habitat areas.

14. **Re-vegetation or Restoration Contractor –** The planting and plant establishment Work shall be performed by a qualified contractor (you or your Subcontractor) with a Class C-27 license. Under the direction of the Project Biologist via the Resident Engineer, the Re-vegetation Contractor shall implement the Re-vegetation Plan in accordance with the Contract Documents. The Re-vegetation or Restoration Contractor shall install and maintain the planting site for the specified Plant Establishment Period. **When included in the Contract Documents,** you shall execute the 25-month or 60-month Long-Term Maintenance and Monitoring Agreement. The Re-vegetation or Restoration Contractor shall demonstrate knowledge of native vegetation and weed identification associated with upland and wetland vegetation communities. The Re-vegetation or Restoration Contractor and the personnel working in the re-vegetation sites shall be familiar with re-vegetation site boundaries, the

requirements of the re-vegetation effort as it pertains to them, and any other information that the Project Biologist determines is necessary for the success of the re-vegetation or restoration program (such as the protection of existing adjacent upland and wetland areas). In the event that the application of pesticides, insecticides, or herbicides is required, it shall be done by an individual or firm possessing a valid license.

15. **Re-vegetation or Restoration Plan –** Plan sheets or documents containing important details on procedures, materials, and methods applicable to Biological Resources Protection During Construction, re-vegetation or restoration, and maintenance and monitoring of installed vegetation. It shall include all elements in the latest City Landscape Standards, including but not limited to irrigation methods and timing, success criteria, and maintenance and monitoring schedules. If available, the document will be included in the Contract Documents. When you are required to prepare the Re-vegetation or Restoration Plans, they shall be prepared by your Project Biologist and approved by the City (Development Services Department or City representative).

16. **Seed Supplier –** Seed Suppliers shall have at least 2 years of experience in collecting native seeds in Southern California. The Seed Supplier shall hold a valid Department of Agriculture Inspection Certificate. The Seed Supplier shall be responsible for providing necessary quantities of specified plant species and required documentation.

17. **Weeds –** Plants listed on the latest Cal-IPC with a rating of "Limited", "Alert", "Watch", or do not have a rating, non-native annual species, and/or non-native grasses. In certain circumstances and if approved by the Project Biologist, non-native species that are not listed may be used to achieve coverage goals.

802-2 BIOLOGICAL RESOURCES PROTECTION DURING CONSTRUCTION.

802-2.1 Project Biologist.

1. **Unless otherwise specified in the special provisions**, you shall retain the Project Biologist to perform Biological Monitoring Work. You shall submit copies of the Project Biologist qualifications as noted in 802-1.1, "Terms and Responsibilities" and shall obtain the City's approval prior to the pre-construction meeting. If the proposed Project Biologist is not approved, you shall submit and obtain approval of an alternate Project Biologist at no additional cost to the City prior to the start of the construction Work subject to the process under Public Contract Code Section 4107.

2. If the City provides a qualified Project Biologist to perform biological monitoring Work for the Contract, you shall coordinate your activities and Schedule with the activities and schedules of the Project Biologist.

3. The Project Biologist shall have the authority to issue Stop Work notices and shall report directly to the Resident Engineer any Site conditions, Work activities, or Work products that do not comply with the Contract Documents.

4. The Project Biologist shall be responsible for interpreting and communicating via the Resident Engineer the intent of all Environmental Constraints detailed in the Contract Documents and all other applicable regulations and laws.

802-2.2 Environmental Constraints.

1. All responsible parties under your control shall have a pre-construction meeting at the Site with the Engineer, the Project Biologist, and MMC staff before Work commences to discuss environmental constraints. Environmental Constraints may include limits of construction, access, stockpiling, and staging; constraints on methods detailed in Contract Documents; seasonal noise restrictions, drainage, and lighting constraints; and/or Biological Resources Protection During Construction. The Project Biologist shall provide recommendations for ongoing protection throughout the Project to the Engineer.

2. If you impact areas outside the identified limits of construction, cause direct or indirect impacts to Biological Resources Protection During Construction, or violate Environmental Constraints detailed in the Construction Documents, you shall mitigate, in accordance with the direction of the Project Biologist and Resident Engineer, the areas at your own expense.

802-2.3 Construction Fencing.

1. If detailed in the Construction Documents and approved by the Project Biologist via the Resident Engineer, construction fencing shall be installed at a minimum of 3 feet (0.9 m) high and shall be staked at no less than 10 feet (3 m) on center with metal fence stakes. The material shall be fastened with a minimum of two nylon ties at each stake.

802-2.4 Working in Unpaved Areas.

1. In compliance with federal, state, and local regulations, to avoid any direct impacts to raptors and/or any native or migratory birds, removal of habitat that supports active nests in the proposed area of disturbance should occur outside of the breeding season for these species (February 1 to September 15).

2. If the removal of habitat in the proposed area of disturbance occurs during the breeding season, the Project Biologist shall conduct a pre-construction survey to determine the presence or absence of nesting birds within the proposed area of disturbance. The pre-construction survey shall be conducted within 10 Calendar Days prior to grading soils and/or clearing, grubbing, trimming, or crushing vegetation. The applicant shall submit the results of the pre-construction survey to the Engineer for review and approval prior to initiating any construction activities. If nesting birds are detected, a letter report or mitigation plan in conformance with the City's Biology Guidelines and applicable State and Federal Laws (appropriate follow up surveys, monitoring

schedules, construction, and noise barriers/buffers, etc.) shall be prepared by the Project Biologist.

3. Litter, including tobacco debris, from construction or food packaging shall be prohibited on construction sites.

4. Equipment maintenance and pollution control shall be in accordance with 3-12, "WORK SITE MAINTENANCE" and Part 11 – STORM WATER.

5. Smoking shall not be allowed within vegetated areas.

6. Additional restrictions may be listed in the Construction Documents.

802-2.5 Construction Access Routes.

1. Pedestrian, vehicle, and equipment traffic shall be limited to areas identified in the Contract Documents.

2. Any vegetation in the access route shall be trimmed, pruned, crushed, or mowed instead of being removed.

3. All temporary areas shall be re-vegetated according to the Contract Documents.

4. You are advised to investigate Site conditions prior to Bid.

802-3 RE-VEGETATION AND RESTORATION.

1. Materials selected by you shall be subject to inspection and approval of the Project Biologist via the Engineer.

2. For all erosion control or re-vegetation projects, when the PEP is completed to the satisfaction of the Engineer, the 25-Month Long-Term Maintenance and Monitoring Agreement shall commence in accordance with the Contract Documents.

3. Some projects constitute mitigation. For those projects, when the PEP is completed to the satisfaction of the Engineer, the 60-Month Long-Term Maintenance and Monitoring Agreement shall commence in accordance with the Contract Documents.

4. All requirements in 802-3.10, "Maintenance, Monitoring, and Reporting" shall apply to this section.

802-3.1 Project Biologist.

1. All specifications in 802-2.1, "Project Biologist" are applicable.

802-3.2 Licensed Re-vegetation or Restoration Contractor.

1. **When required in the Contract Documents**, you shall retain a licensed Re-vegetation Contractor or Restoration Contractor. You shall submit copies of the qualifications as noted in 802-1.1, "Terms and Responsibilities" and shall obtain the Resident Engineer's approval prior to the pre-construction meeting.

2. If the proposed licensed Re-vegetation or Restoration Contractor is not approved, you shall re-submit and obtain approval of an alternate licensed Re-vegetation or Restoration Contractor at no additional cost to the City prior to the start of the Construction Work and subject to the process outlined under Public Contract Code §4107. The selected Re-vegetation or Restoration Contractor may be requested to attend the pre-construction meeting.

802-3.3 Mulch.

1. Unless specified otherwise or directed by the Project Biologist, cleared native vegetation shall be salvaged during construction activities. Vegetation shall be ground to a coarse grade of mulch for re-application. Weeds shall not be included in the mulch and shall be disposed of legally.
2. The salvaged mulch shall be stored at a location on Site that is approved by the Resident Engineer or Project Biologist. The mulch shall be stored separately, protected, and covered by means of an impermeable tarp and appropriate Best Management Practices (BMPs).
3. If additional mulch is required, it shall conform to the latest City Landscape Standards and, if applicable, to the Sewer Design Guidelines and shall be approved by the Project Biologist via the Engineer.
4. Avoid the creation of brush piles from cut and brushed vegetation. Vegetation not to be salvaged shall be chipped, cut, or both to pieces of 12 inches (304.8 mm) or less and then shall be removed, buried, or adequately spread out as directed by the Project Biologist.

802-3.4 Topsoil. For the purpose of this part, ADD the following to 801-2.1, "General".

1. Prior to any excavation that may occur, vegetation shall be removed and the top 8 inches (203.2 mm) of topsoil shall be removed and stored.
2. The salvaged topsoil shall be stored at a location on Site that is approved by the Project Biologist via the Resident Engineer. The topsoil shall be stored separately, protected, and covered by means of an impermeable tarp and appropriate BMPs.
3. You shall not use subsurface soils from the deepest parts of the excavation unless specifically approved by the Resident Engineer and Project Biologist.
4. You shall perform minor ground contouring (grading) at the direction of the Resident Engineer in accordance with the Project Biologist's recommendations and in accordance with the Contract Documents.
5. If import of topsoil is determined to be necessary, Class B topsoil in accordance with 800-1.1.3, "Class 'B' Topsoil" from a comparable Site shall be provided and tested, as specified. Topsoil quantity, source, and quality shall be approved by the Project Biologist via the Resident Engineer prior to delivery.

6. Topsoil shall be free of Weeds upon delivery or treated as specified for Weed eradication.

802-3.4.1 Soils Testing.

1. The Project Biologist shall be responsible for determining the suitability of topsoil material prior to Installation.
2. If directed by the Project Biologist via the Resident Engineer, the following specifications shall apply:
    a. Soils in areas to be re-vegetated, including sub-soils and existing topsoil, shall be tested for soil fertility and agricultural suitability in accordance with 800-1.1.3, "Class 'B' Topsoil". Sample locations shall be approved by the Project Biologist and Resident Engineer.
    b. Tests shall be conducted and evaluated by a qualified soils scientist from an approved soils laboratory approved by the Project Biologist via the Resident Engineer.
    c. The Project Biologist shall evaluate the soils lab recommendations to determine if additional soil preparation requirements shall be necessary prior to seeding.

802-3.4.2 Topsoil Preparation and Conditioning Procedures.

1. Topsoil shall be reapplied to the disturbed areas prior to planting and seeding.
2. The topsoil shall be free of rocks and all clods greater than 1 inch (25.4 mm) in diameter.
3. You shall match existing elevations of adjacent untouched native soils and shall provide natural drainage to the maximum extent possible.
4. Unless directed otherwise by the Project Biologist and the Resident Engineer, compaction within re-vegetation areas shall not exceed 70% standard proctor within the top 8 inches (203.2 mm) of soil. Compaction testing may be required to verify that these specifications have been achieved. Overly compacted soils shall be de-compacted by ripping or tilling as directed by the Project Biologist.
5. If soils analysis indicates soil amendments are necessary, specified amendment materials shall be evenly spread over designated planting areas and shall be thoroughly incorporated to a uniform soil depth of 8 inches (203.2 mm) by rototilling a minimum of 2 passes, with the second pass perpendicular to the first pass. Soil amendment application rates shall be determined by Project Biologist via the Resident Engineer.
6. Soil Fertilizing and Conditioning Materials shall only be used if specified in the Contract Documents and under the direction of the Project Biologist.

802-3.4.3 Weed and Invasive Plant Eradication.

1. The Project Biologist shall inspect the re-vegetation or restoration site for Weed and Invasive Plant coverage prior to planting and throughout the Project duration.
2. All Weeds and Invasive Plants shall be treated and removed from the Site prior to the installation of native plant material.
3. All Weeds and Invasive Plants shall be treated and removed from the Site before attaining a height of 6 inches and/or producing seed, throughout the Project duration.
4. All areas where Weed and Invasive Plant removal creates bare areas in excess of 25 feet x 25 feet (7.6 m x 7.6 m) shall be replanted at the direction of the Project Biologist via the Resident Engineer.
5. Pulled Weeds, Invasive plants, and debris shall be transported and disposed of legally offsite immediately to prevent any seed dispersal on the Site.
6. Herbicides shall be applied under the direction of the Biologist and shall contain green dye.

802-3.5 Seed.

1. You shall arrange for seed to be delivered to the Site in accordance with the Contract Documents.
2. The Project Biologist shall inspect the seed and the required documentation regarding the quantity, quality, and origin before Installation to ensure compliance with the Contract Documents. Unless otherwise specified in the Contract Documents or directed by the Project Biologist, seed shall be collected from coastal San Diego County. Seed shall be ordered, delivered, separated, and containerized by species.
3. All seed application rates (lb/acre) stated on the Plans or in the Contract Documents shall be for pure-live-seed, unless otherwise specified.

802-3.6 Container Stock.

1. You shall arrange for container stock plants to be delivered to the site in accordance with the Contract Documents.
2. You shall notify the Project Biologist and Resident Engineer at least 48 hours before the delivery of the container stock plants.
3. The Project Biologist shall inspect the container stock plants and the required documentation regarding the quantity, quality, and origin before Installation to ensure compliance with the Contract Documents. Unless otherwise specified in the Contract Documents or directed by the Project Biologist, container stock plants shall originate from coastal San Diego County.

Container plants shall be ordered, delivered, separated, labeled, and containerized by species.

4. The quality and size of the container stock plants shall be vigorous, healthy, and well-proportioned as verified by the Project Biologist via the Engineer. Plants which are even moderately "overgrown", or are showing signs of disease, infestation, fungus, frost damage, root girdling, decline, lack of vigor, or stunted growth shall be subject to rejection. Plants showing pruning may be rejected. Plants larger than the sizes specified may be used with the approval of the Engineer and the Project Biologist. The use of larger plants shall not cause any change in Contract Price.

5. Plants not approved by the Project Biologist may be rejected by the Engineer. Replacements shall be furnished by you at your own expense.

802-3.7 Temporary Irrigation.

1. The Re-vegetation or Restoration Contractor shall be responsible for providing temporary irrigation to plant and/or seed material to ensure successful establishment and to ensure vegetative cover meets success criteria.

2. Temporary irrigation via irrigation lines and appurtenances (or alternate method approved by the Resident Engineer and Project Biologist) shall be provided by the Re-vegetation or Restoration Contractor.

3. The Re-vegetation or Restoration Contractor shall responsible for the design, installation, operation, maintenance, and removal of the temporary irrigation.

4. Irrigation shall deliver water sufficiently and uniformly and shall be appropriate to the needs of the plant materials.

5. The amount of irrigation shall be adjusted when warranted by site conditions.

802-3.8 Installation.

1. You shall arrange for Installation of seed, erosion control, container stock, and irrigation in accordance with the Contract Documents.

2. Installation shall occur under the direction of the Project Biologist and shall comply with the Contract Documents. Spotting of container stock plants before planting may be required. Plants shall be planted and watered as herein specified immediately after the removal from the containers. Containers shall not be cut prior to placing the plants in the planting area.

3. Planting pits for container plants shall be approximately 1.5 times as deep and 3 times as wide as the container size. All planting pits shall be filled with water and allowed to completely drain prior to plant installation. After the planting pits have been presoaked, Re-vegetation or Restoration Contractor shall backfill the hole to the appropriate planting depth and set plants in the center of the hole, then backfill the hole and thoroughly apply more water.

4. A watering basin, approximately twice the size of the plant canopy shall be created. Re-vegetation or Restoration Contractor shall apply 3 inches (76.2 mm) of weed free mulch inside the watering basin.

5. Stakes shall be installed on all trees for stabilization.

6. Planting shall not be performed if plant pits contain standing water or if pits are over saturated to a condition which may result in an unhealthful condition for the plant.

7. Installation of seed or container plants on Public Utility access paths or over sewer lines shall follow the latest City Sewer Design Guidelines.

8. Irrigation lines shall not be placed in areas where they can be driven over.

9. Unless specified otherwise or directed by the Project biologist, Installation of plant and seed material shall occur during the rainy season (Oct 1 - Feb 15).

10. Changes to the Contract Documents regarding the Re-vegetation or Restoration Plan (installation timing, species, irrigation, and schedules) shall be first approved by the Project Biologist, Engineer, and MMC staff as necessary.

802-3.9 Hydro Seeding.

1. Hydro seeding materials **specified in the Special Provisions** or as shown on the Plans shall conform to the Contract Documents, the latest City Landscape Standards, and shall be inspected and approved by the Project Biologist via the Engineer.

2. Slurry spilled into areas outside the limits of Work shall be cleaned up at your expense to the satisfaction of the Project Biologist and the Engineer.

3. You shall schedule an inspection of the installation phase with the Engineer.

4. You shall receive written notification of any deficiencies before the start of the PEP.

802-3.10 Maintenance, Monitoring, and Reporting.

802-3.10.1 General.

1. You shall notify the Engineer to schedule inspections in accordance with the schedule in the Contract Documents.

2. If you have hired the Project Biologist, that person shall submit required reports to the Resident Engineer in accordance with the Contract Documents. The Project Biologist shall prepare the reports in accordance with the Contract Documents in a format acceptable to all applicable Resource Agencies.

3. You shall immediately contact the Resident Engineer and shall be responsible for, under the direction of the Project Biologist, controlling any insect infestations, herbivore activity, and/or diseases that may spread throughout

the re-vegetated or restored areas. Remedial action, such as fencing and protective cages, shall be provided at your expense.

4. Native vegetation and branch drops shall be retained in place unless removal is required by the Project Biologist.

5. You shall remove and dispose offsite all non-organic debris. Removal of trash and litter shall continue on a regular basis during the project.

6. You shall maintain signage, BMPs, silt, and construction area fences on a continual basis throughout the project.

7. At any time during the life of the Contract, where insufficient seed germination occurs or re-vegetation areas show signs of failure to grow, or where plants are so injured, damaged, dead, or diseased as to render them unsuitable for the intended purpose, you shall re-vegetate these areas within 2 weeks of receipt of written notice by the Resident Engineer at no additional cost to the City. If you fail to replace plants within the time limit, the Resident Engineer may issue an additional written notice and will replace them at your expense after 5 Working Days of receipt of the written notice.

8. Seed species used for reseeding or container plants shall be the same species and quantity in accordance with the original Re-vegetation or Restoration Plan or be a substitute approved by the Project Biologist and the City.

9. You shall monitor for erosion within re-vegetation areas and shall prohibit gullies, ruts, rill and sheet erosion, bare soil areas, and silt deposition from occurring in the project footprint or from run-off from the project. Erosion control shall emphasize prevention. Repair of eroded areas shall be directed by the Project Biologist via the Engineer and may include redirection or dissipation of the water sources and re-contouring of soil followed by seeding, mulching, and planting.

802-3.10.2 120 Calendar Day PEP.

1. The PEP Work of this section shall also be performed in accordance with 801-6, “MAINTENANCE AND PLANT ESTABLISHMENT”.

2. After all planting and related Work has been completed in accordance with the Contract Documents, request a pre-maintenance inspection from the Engineer.

3. All Punchlist items shall be completed prior to the start of the PEP.

4. When all deficiencies have been corrected to the satisfaction of the Resident Engineer and Project Biologist, the 120 Calendar Day PEP shall begin and a field notification will be issued to establish the effective beginning date of the PEP.

5. Unless otherwise specified, the Project Biologist will determine that the 120 Calendar Day PEP has been successfully completed when the following conditions have been met:

   a. Site is erosion free.

   b. 100-percent container plant survival.

   c. Zero-percent weed and invasive plant cover.

   d. BMPs are in good condition as determined by the Resident Engineer.

6. The PEP shall be extended by the Resident Engineer if additional planting is necessary to achieve the required success criteria above or if other corrective Work becomes necessary.

7. You shall receive written notification of any deficiencies before executing the 25-month or 60-month Long-Term Maintenance and Monitoring Agreement (LTMMA) in accordance with the Contract Documents.

802-3.10.3 Long-Term Maintenance and Monitoring Period.

1. In addition to 802-3.10.1, "General", refer to the Long-term Maintenance and Monitoring Agreement (LTMMA) included in the Contract Documents for additional M&M period requirements.

802-4 PAYMENT.

1. The payment for items of Work described in 802, "NATIVE HABITAT PROTECTION, INSTALLATION, MAINTENANCE, AND MONITORING", shall be included in the following Bid items as applicable **unless specified otherwise in the Special Provisions**, Long-Term Maintenance and Monitoring Agreement (LTMMA), or both:

   a. The payment for the removal and disposal of the existing vegetation, weeds, trash, and other objects shall be included in the associated Bid items requiring the Work.

   b. The payment for the construction of temporary facilities, such as access routes and fencing, shall be included in the Bid item for "Construction Fencing and Access Route".

   c. The payment to complete the soil testing, topsoil preparation, conditioning, preparation of the final grade, installation, and PEP phases shall be included in the associated Bid items requiring the Work.

   d. The payment for Biological Monitoring and Reporting throughout installation and the PEP includes the payment for the Project Biologist when required and shall be included in the lump sum Bid item for "Biological Monitoring and Reporting".

e. The payment for the monitoring, reporting, and maintenance Work required during the maintenance period beyond the PEP in accordance with the Long Term Maintenance and Monitoring Agreement (LTMMA) included in the Contract Documents includes payment for the Project Biologist when required, furnishing the required reports, site observations, and bond(s), and shall be included in the lump sum Bid item for the "25-Month Re-vegetation Maintenance and Monitoring Program" or the "60-Month Re-vegetation Maintenance and Monitoring Program", **unless otherwise specified**.

END OF PART 8 - LANDSCAPING AND IRRIGATION

ADD: PART 9

WATER WORKS

SECTION 900 - MATERIALS

900-1 HIGH-LINING MATERIALS.

900-1.1 General.

1. Materials may have been used previously, but shall be in good working condition, free of defect, and have only been used to convey potable water.
2. You shall procure pipe, fittings, adapters, materials, and components required for a complete and operable high-lining system installation.
3. Products and materials shall be suitable for the intended purpose and recommended by the manufacturer for the application intended.
4. Hoses shall be used only at corners and curves and for connections to user's service meter(s).

900-1.2 Galvanized Pipe.

1. Pipes shall be fabricated in sections of 2 inches (50.8 mm) Galvanized steel pipe and shall conform to the following:
   a. ASTM A53 or other equal ASTM galvanized pipe standard.
   b. Minimum wall thickness shall be Schedule 40.
   c. Pipe ends shall be machine cut or rolled for grooved couplings and fittings in compliance with ANSI/AWWA C606.
2. Fittings shall be ductile iron and shall conform to the following:
   a. Fittings and couplings, including tees, wyes, elbows, reducers, caps, plugs, and adapters, shall have standard flexible grooved mechanical joint connections in compliance with ANSI/AWWA C606.
   b. Minimum pressure rating shall be 200 psig.
   c. Housing material shall be ductile iron coated with the manufacturer's standard painting system. Coupling gasket material shall be standard Ethylene-Polypropylene Diene Monomer (EPDM) rubber.
   d. Couplings shall be Victaulic Style 78 or approved equal.
   e. The branch outlet of reducing tees shall be 1 inch (25.4 mm) male pipe thread. Connections of standard tees shall be grooved.
   f. Grooved elbows with 11¼°, 22½°, 45°, and 90° bend angles shall be required to configure the high-line piping system to existing bends and contours at the Site.
   g. Manufacturers shall be Victaulic, Mechline, or approved equal.

900-1.3 Grooved-End PVC Pipe.

1. Pipes shall be fabricated in sections of 2 inch (50.8 mm) fusible PVC pipe and shall conform to the following:
    a. ASTM A53 or other equal ASTM fusible PVC pipe standard.
    b. Minimum wall thickness shall be Schedule 80.
    c. Pipe ends shall be grooved for couplings and fittings in compliance with ANSI/AWWA C606.
2. Fittings shall be PVC and shall conform to the following:
    a. Fittings and couplings, including tees, wyes, elbows, reducers, caps, plugs, and adapters, shall have standard flexible grooved mechanical joint connections in compliance with ANSI/AWWA C 606.
    b. Minimum pressure rating shall be 200 psig.
    c. Housing material shall be ductile iron coated with the manufacturer's standard painting system. Coupling gasket material shall be standard Ethylene-Polypropylene Diene Monomer (EPDM) rubber.
    d. Couplings shall be Victaulic Style 78 or approved equal.
    e. The branch outlet of reducing tees shall be 1 inch (25.4 mm) male pipe thread. Connections of standard tees shall be grooved.
    f. Grooved elbows with 11¼°, 22½°, 45°, and 90° bend angles shall be required to configure the high-line piping system to existing bends and contours at the Site.

900-1.4 Yelomine Pipe.

1. Pipes shall be fabricated in sections of 2 inches (50.8 mm) Yelomine pipe and shall conform to the following:
    a. Designed and Manufactured in accordance with ASTM (D2241) and ASTM (D1784).
    b. Performance requirement for SDR 17, rated 250 psi for 2 inches (50.8 mm) - 8 inches (203.2 mm) diameter pipe.
    c. Field cut is permissible when necessary to configure the high-line piping system to existing bend and contours at the Site.
2. Fittings shall be Certa-Lok Yelomine material (or compatible) and shall conform to the following:
    a. Coupling and fittings shall be Yelomine pipe including tees, elbows, reducers, caps, plugs, flange adapters and tapped couplings, shall have standard flexible grooved mechanical joint connections in compliance with ASTM D3139.

b. Minimum pressure rating shall be 250 psi.

c. Manufacturers shall be CertainTeed, Certa-Lok Yelomine, or approved equal.

900-1.5 Miscellaneous Materials.

1. Meter Connections.

a. For meters up to 1 inch (25.4 mm) in size:

1) The connections shall be 90°, long radius, brass elbow couplings with a swivel meter nut on one end and male pipe threads on the other.

2) The swivel meter nut shall be sized to fit the specific meter. The male pipe thread end shall be fitted with a galvanized steel "Chicago" 2-lug, quarter-turn, quick disconnect hose fitting-to-female pipe thread fitting.

3) Manufacturers shall be James Jones Co., Ford Meter Box Co., Inc., or approved equal.

b. For meters larger than 1 inch (25m.4 m) in size:

1) The connections shall be elbows with a 2-bolt Class 125 flange on one end and female pipe threads on the other.

2) The flange shall be sized to fit the specific meter. The female pipe thread end shall be fitted with a short pipe thread to grooved connection adapter nipple.

3) Alternately, the assembly shall be a 2-bolt Class 125 flange-to-male pipe thread fitting, a threaded pipe elbow, and a short pipe thread-to-grooved connection adapter nipple.

4) Manufacturers shall be James Jones Co., Ford Meter Box Co., Inc., or approved equal.

2. Bushings, Reducers, and Adapters.

a. The City Forces will be responsible for all fit-up and connections in the system.

b. You shall provide all bushings, reducers, and adapters required to connect the high-line system to the existing fire hydrants, meters, and other facilities at the Site. Bushings, reducers, and adapters shall be provided at no additional cost to the City.

c. For pipe-to-hose adapters, when 1-inch (25.4 mm) hoses are used, the adapter shall be a 1 inch (25 mm), galvanized steel, "Chicago" 2-lug, quarter-turn, quick disconnect hose-to-female pipe thread fitting.

d. For fire hydrant-to-pipe connectors, the actual connection to the live fire hydrant shall be a brass or bronze 2.5 inches (63.5 mm) female fire hydrant thread to 2 inches (50.8 mm) male pipe thread fitting.

3. Bolts and Fasteners.

a. Bolts and fasteners, including bolts, nuts, and washers, shall meet the minimum requirements of ASTM A 307, and shall be hot dipped galvanized according to ASTM A 153.

b. Bolts shall be installed with nuts face down.

4. Valves.

a. Pipe shutoff valves shall be 2 inches (50.8 mm), lever handle, two-position, manual butterfly valves with grooved mechanical connections in compliance with AWWA C 606. Minimum pressure rating shall be 200 psig.

b. Housing material shall be ductile iron coated with the manufacturer's standard painting system. Seal material shall be standard EPDM rubber.

c. Manufacturers shall be Victaulic, Mechline, or approved equal.

5. Curb Stop Valves.

a. Curb Stop Valves shall be bronze full-port ball valves without handles.

b. Seats shall be molded Buna-N rubber or other approved material. The ball shall be Teflon-coated brass or bronze. Approved plastic ball materials shall be considered as substitutes.

c. Size shall be 1 inch (25.4 mm), with female pipe thread connections. Other sizes and end connections may be required to accommodate specific user connections.

d. Manufacturers shall be James Jones Co., Ford Meter Box Co., Inc., A. Y. McDonald Mfg. Co., or approved equal.

6. Hoses.

a. User Connection (Service Meters).

1) For meters up to 1 inch (25.4 mm), the hose shall be 1 inch (25.4 mm) potable water hose with 300 WP rating. End connections shall be galvanized steel, "Chicago" 2-lug, quarter-turn, quick-disconnect fittings banded to the hose.

2) Materials shall meet the NSF/ANSI 61 certification for potable water use in conformance with AWWA C651-14.

b. Curves and Curbs.

1) Hose shall be 2 inch (50.8 mm) potable water hose with 300 WP rating. End connections shall be galvanized steel grooved mechanical end fittings in compliance with AWWA C606 banded to the hose.

2) Materials shall meet the NSF/ANSI 61 certification for potable water use in conformance with AWWA C651-14.

7. Check Valves.

a. Check valves shall be swing check type with grooved mechanical connections in compliance with ASTM C606. Minimum pressure rating shall be 200 psig.

b. Housing material shall be ductile iron coated with the manufacturer's standard painting system. Seal material shall be standard EPDM rubber.

c. Manufacturers shall be Victaulic, Mech-Line, or approved equal.

8. Backflow Preventers.

a. Backflow preventers shall meet the requirements of AWWA C511.

b. Manufacturer and model shall be approved by the Department of Public Health.

9. Pressure Regulators.

a. If required, you shall provide 2-inch (50.8 mm) pipe size of bronze or ductile iron construction. Materials, coatings, seals, diaphragms, and trim shall be approved for potable water service. Connections shall be pipe threaded union couplings.

b. Pressure ratings and regulation ranges shall be approved for the pressure zones involved.

c. Manufacturer shall be Braukmann or approved equal.

10. Pipe Supports:

a. Supports shall be adjustable type and fabricated from galvanized carbon steel.

b. Manufacturers shall be Grinnell, Tolco, or approved equal.

900-1.6 High-lining Materials for City Forces Work.

1. **If required in the Contract Documents** and if a Bid item is provided for "Contractor Furnished Materials for the City Forces High-line Work", you shall furnish the necessary materials for the City Forces high-line Work to the City, as shown on the Plans. You shall coordinate with the City Forces for the delivery of the materials. The delivery location for furnished materials shall be determined by the City Forces.

2. Materials shall not be delivered to the City until the City Forces are ready to install high-lining. **Unless otherwise specified in the Contract Documents**, the City will retain the high-lining materials at the end of construction.

900-1.7 High-lining Materials for Contractor Work.

1. You shall furnish all necessary materials for your high-line Work as shown on the Plans.

2. **Unless otherwise specified in the Contract Documents**, you shall retain the high-lining materials at the end of construction.

900-1.8 Submittals for High-lining.

1. Prior to the start of the Work, you shall submit the following:

   a. An itemized list of high-lining materials to be used, including information on:

      1) which parts are new and which have been used before

      2) verification that used parts have only been used to convey potable water

   b. Catalog data for all high-lining materials and components required.

   c. High-line system installation and detail drawings (shop and Working Drawings) prior to ordering or purchasing material.

   d. High-lining schedule prior to ordering or purchasing material of any part of the high-lining system.

   e. One (1) set of Traffic Control Plans to the Traffic Control Section. You shall obtain a permit a minimum of 2 Working Days (5 Working Days when the Work affects a traffic signal) prior to ordering or purchasing material of each phase of the high-lining system in accordance with 601-2, "TRAFFIC CONTROL PLAN (TCP)".

900-1.9 Payment.

1. The payment for furnished materials for the City Forces high-line Work shall cover materials (fittings, valves, and hardware) and shall include delivery and unloading. You shall be paid under the Bid item for "Contractor Furnished Materials for the City Forces High-line Work". If you request the City Forces to high-line in excess of what is shown on the Plans, those costs incurred,

including additional materials due to excess high-lining, shall be at your expense. Costs incurred by the request of excess high-line Work shall be billed at the current hourly rates (loaded) according to the schedule available from the Public Utilities Department. Any request for additional high-lining material shall have prior approval by the Engineer.

2. The Payment for your high-lining materials (fittings, valves, and hardware), including delivery and unloading, shall be paid for under the linear foot Bid item "Furnished Materials for Contractor High-line Work".

900-2 CONNECTION, CUT AND PLUG, AND CUT-IN MATERIALS.

900-2.1 Connection, Cut and Plug, and Cut-in Materials Provided by the Contractor for City Forces Work.

1. **If required in the Contract Documents**, you shall furnish the necessary materials for the City Forces' connection, cut and plug, and cut-in Work as shown on the Plans to the City.

2. You shall coordinate closely with the City Forces for the delivery of materials. The delivery location for furnished materials shall be determined by the City Forces.

3. Materials shall not be delivered to the City until the City Forces are ready to perform their work, **unless otherwise specified in writing by the City**.

900-2.2 Connection, Cut and Plug, and Cut-in Materials for Contractor Work.

1. You shall furnish the necessary materials for your connection, cut and plug, and cut-in Work as shown on the Plans to the City.

900-2.3 Payment.

1. **Unless specified otherwise**, the material for City Forces connection, cut and plug, and cut-in Work for mains smaller than 16-inch (406.4 mm) shall be provided by City Forces.

2. **If required**, payment for furnishing materials for City Forces connection, cut and plug, and cut-in Work for mains 16-inch (406.4 mm) and larger, as shown on the Plans, shall be paid under the bid item for "Contractor Furnished Materials for City Forces Connection, Cut and Plug, and Cut-in Work for Mains 16-inch and Larger".

3. The payment for furnishing materials for your connection, cut and plug, and cut-in Work shall cover all necessary materials (fittings and hardware, excluding valves and pipes), delivery, and unloading. The payment shall be included within the Bid item of the Work involved and no separate payment for furnishing those materials shall be made. The payment for furnishing valve and pipe materials for your connection, cut and plug, and cut-in Work shall be included in the separate Bid items for each valve and pipe.

SECTION 901 – INSTALLATION AND CONNECTION

901-1 HIGH-LINING INSTALLATION.

901-1.1 General.

1. Only City Forces will isolate the water system and perform all shutdowns by closing valves on water mains. Trial shutdowns will be performed by the City at all shutdown locations. The City is responsible for the cost of the City Forces work.

2. The Engineer will coordinate all interactions between you and the City Water Operations Division, the City Water Quality Laboratory, and other City organizations. Upon your request, the Engineer shall notify the City's Public Utilities Department's staff as noted below which shall be required at least 20 Working Days prior to the beginning of Work that involves shutting down pipelines, high-lining, cutting and plugging of, or making connection to the existing water mains. Unless otherwise specified on the Plans, contact the below:

    a. Transmission Mains (16 inches and larger) – Water Distribution Operations Supervisor (619-533-4657)

    b. Distribution Mains (less than 16 inches) – Water Systems Technician Supervisor (619-527-3143)

    c. Water Facilities – (Potable Water Reservoirs, Pump Stations, Pressure Reducing Stations): Water Production Superintendent (619-527-7438) and Senior Water Distribution Operations Supervisor (619-527-7609)

901-1.1.1 High-lining Installation by City Forces.

1. City Forces shall be responsible for notifying and providing the residents with water services, by means of high-lining (temporary above ground supply lines), during construction and as shown on the Plans, **unless otherwise specified in the Contract Documents.**

901-1.1.2 High-lining Installation by the Contractor.

1. **If specified and when a bid item is provided for "High-lining Installation by the Contractor",** you shall be responsible for notifying and providing the residents with water services, by means of high-lining (temporary above ground supply lines), during construction and as shown on the Plans.

2. You shall bypass sections of the existing water main line with a temporary above-ground supply line (high-line) to services affected by the water main replacement and in phases shown in the contract documents.

3. You shall provide the Engineer a schedule for the high-line Work at least 20 Working Days prior to work required by the City Forces (connections or disconnects).

4. You shall phase the Project such that all structures in the area are within 1,000 feet (304.8 m) of an active fire hydrant, measured using streets, private roads, or other routes driven by emergency vehicles. The Work includes shutoff valves at intersections to isolate sections of the high-line if there is a leak or break to minimize the water service shutdowns.

5. The high-line system shall have a dual feed and provide continuous full service to connected water services until the new water main line is installed and in operation. The Work shall be coordinated, scheduled, and performed to minimize disruption of water services during installation and removal of the high-line system.

6. You shall flush, disinfect, and leak test the high-line in accordance with the applicable codes and regulations prior to connection Work beginning.

7. You shall perform connections to high-lining system and disconnects to meters and fire hydrants, after the City has verified the high-lining system has passed bacteriological testing. Connections shall be properly covered with cold mix asphalt for protection.

8. Bacteriological sampling and testing will be performed by the City Water Quality Laboratory.

9. You shall ensure proper installation, pressure control, and operation of the high-line to avoid damage to water users' property and related public health and safety issues.

10. You shall transfer the new fire services and water services to the meter after the new mains have been accepted. While making the transfers and once service is interrupted, you shall continuously work until service is fully restored.

11. You shall notify the Engineer 5 Working Days prior to any Work that will affect water service. You shall prepare and distribute, after approval by the City, written notification 5 Working Days prior to starting Work on any water main that will affect water service. This notification shall be delivered door-to-door to water users in the affected area. A copy shall be delivered to the Engineer on the date of user notification.

12. For each service connection, you shall also notify the customer immediately prior to beginning Work which will interrupt service and shall again notify the customer immediately after the service is restored.

13. You shall notify all consumers with fire services 20 Working Days in advance of any shutdown.

14. You shall dismantle and remove the high-line system from the Site, and restore streets, gutters, fire hydrants, other disturbed facilities, and surface improvements within 5 Working Days from the time the reconnections are completed.

15. Parallel mains, fire services, and water services which are not high-lined shall be connected to the meter only after the adjacent sections of the new main have been fully constructed, hydrostatic and chlorine residual tested, and certified acceptable by the Public Utilities Department.

16. Cleanliness of the main shall not be compromised. The Engineer will decide whether re-disinfection is required at your expense.

17. Services shall be thoroughly flushed by you prior to restoration of water supply to customer's premises.

901-1.1.2.1 Construction.

1. Workmanship:

    a. High-lining system shall be installed and maintained such that it is neat, orderly, and leak-free, and shall be arranged to minimize interference with or present a hazard to normal usage of streets, sidewalks, driveways, and other affected facilities.

    b. High-lining system shall be installed in such a manner that does not cause flooding or erosion to the surrounding area.

    c. Excess materials and debris shall be removed from the Site by the end of the Working Day on which they are generated.

    d. Highlining crossings and run at curb ramps shall be installed and maintained per SDW-174.

2. Water Users Notification: You shall coordinate the Work to minimize the duration of water shutdowns and outages.

3. Emergency Telephone:

    a. The 24-hour Emergency Services telephone number which shall be listed in user notifications, imprinted on safety barricades, and posted in the Work area shall be your emergency number.

    b. On receipt of notification of a problem in the Work area, you shall immediately notify the Engineer and Water Operations Division (City Forces). In case of emergency such as life-threatening situations, you shall contact Emergency Services.

4. Repair and Maintenance:

    a. You shall maintain the temporary asphalt (coldmix) protective ramps for the duration of the high-line installation. You shall repair coldmix damage on the day of discovery.

b. You shall repair and maintain the high-line system during Normal Working Hours.

c. You shall provide replacement parts needed for highline repairs. Leaks or damage shall be repaired within one hour of discovery or reporting. These repair criteria shall apply to leaks or damage arising for any reason, including vandalism and damage by your personnel, equipment, or Work activities.

d. If the repair involves any disassembly of the system, you shall disinfect and flush the affected components according to AWWA C651. This shall be done in the presence of the City Public Utilities Department, Water Operations Division employee familiar with the water system.

e. Repair Work shall be inspected and approved by the Engineer and the City Public Utilities Department, Water Operations employee familiar with the water system. At the sole discretion of the Engineer, you shall be billed separately for non-responsive or otherwise unacceptable repair and maintenance Work that the City must do to restore any service.

5. Problem Reporting: High-line system problems discovered or reported, and corrective actions taken shall be documented in your daily log.

6. Traffic Control: You shall provide traffic control for all high-line Work.

7. Schedules and Timing:

   a. The time required to furnish and install the high-lining system as a whole or in accordance with phases, shall be included in the Contract Time. The high-lining schedule shall be submitted to the Engineer for review and approval.

   b. You shall coordinate high-lining operations such that the Project's Schedule is not affected or delayed.

8. Installation of High-line Piping System:

   a. The high-line piping system shall be installed in accordance with the approved schedule.

   b. Piping phases shall be installed in loop systems, with a fire hydrant connection to the water supply at each end.

   c. The high-line piping system shall be inspected and approved by the City Public Utilities Department, Operations Division familiar with the water system via the Engineer prior to the City Forces charging the system with potable water or connecting to any user service line.

   d. The high-line piping shall be installed along both sides of streets to supply water service connections to water meters. Meter service connection shall not be routed across a roadway, driveway, or other area subject to vehicular traffic.

e. Shutoff valves shall be installed at each fire hydrant connection, along the piping runs at the check valve, on either side of high-line tee fittings for user connections to all meters and at the ends of cul-de-sac blind runs to permit flushing. The lever handles shall be removed from the valves to prevent unauthorized operation.

f. The 2-bolt grooved couplings shall be installed with the bolts oriented as shown on SDW-173, "Highlining Crossing & Run at Driveways and Curbs". This orientation permits the pipe to be laid closer to the curb and is less susceptible to damage by auto traffic. To prevent damage to auto tires, coupling bolts shall not extend beyond the thickness of the nut when installed and tightened.

9. Fire Hydrant Connection:

a. The fire hydrant connection shall be laid as shown in SDW-171, "4–Inch Fire Hydrant High-lining Connection". You shall make the final connection to the fire hydrant system.

b. You shall use elbows of different bend angles as required to align the connection fittings parallel to the sidewalk or curb.

c. In situations where the fire hydrant is located such that piping must cross a sidewalk, piping shall be routed under the sidewalk surface in a 6 inches wide x 6 inches deep (152.4 mm x 152.4 mm) saw cut trench by you. The trench backfill and temporary asphalt surface shall be tamped and compacted to provide a smooth, safe surface for the duration of the high-lining by you. Routing the pipe above the sidewalk shall not be permitted.

10. User Connection (Service Meters):

a. You shall furnish and install all material and labor as specified. Connect the water services to the system in accordance with SDW-172, "Residential User High-lining Connection".

b. Connection to meters sized up to 1-inch (25.4 mm) shall be as shown in or the details included in the Contract Documents for Residential User High-lining Connection.

c. Connection to meters 1½ inches (38.1 mm) and larger shall be made with 2 inches (50.8 mm) galvanized steel pipe with grooved connections.

d. A shutoff valve in the user connection line shall be provided at the high-line tee fitting.

e. Meters 1½ inches (38.1 mm) and larger typically have 2-bolt flanged connections. Provide adapters as required to connect to specific meters.

f. Sidewalk crossings may be routed above ground and covered with an ADA compliant cable cover and ramp. Details shall be included in the Working Drawings for Driveway High-lining Crossing or Curb Ramp High-lining Crossing, Type Driveway or Accessible Crossing, and as required elsewhere in this subsection.

g. Field cut, groove, and fit pipe as required to make user connections. Sections of the high-line piping shall be cut such that service tees are as close as possible to the user meters and service connection hose or piping length is minimized.

h. Provide barricades and cones as required by the approved Traffic Control Plan at service tees and meters and as required to ensure public safety.

11. Roadway Crossing and Trenching:

a. Portions of the high-line system shall be trenched and buried to avoid interference with roadways.

b. Wherever piping is required to cross a roadway, piping shall be routed below the roadway surface in a 6 inches wide x 6 inches deep (152.4 mm x 152.4 mm) (approximate dimensions) trench. Routing the pipe above the roadway shall not be permitted. The trench backfill and temporary asphalt surface shall be tamped and compacted to provide a smooth, safe surface for the duration of the high-lining.

12. Vehicle Driveway or Curb Ramp Crossing: Wherever the high-line piping crosses a vehicle driveway or curb ramp crossing, the piping shall be provided with temporary asphalt crossing ramps as shown in the Standard Drawings or the details included in the Contract Documents for Typical Driveway or Curb Ramp Crossing. The temporary asphalt crossing ramps shall be tamped and compacted to provide a smooth, safe surface for the duration of the high-lining. The temporary asphalt crossing ramps shall be constructed such that they do not interfere with normal storm water or other drainage flows. They shall not divert drainage flows either into the street or onto adjacent properties. Where required to achieve proper drainage, sections of galvanized steel piping shall be installed in the crossing ramp parallel to the high-line piping to allow for drainage past the crossing ramp. Crossing ramp installations shall be inspected and approved by the Engineer.

13. Corners and Curves:

a. Routing the high-lining system around corners and curves shall be accomplished using 2 inches (50.8 mm) hose or PVC pipe.

b. A 2 inches (50.8 mm) shutoff valve shall be installed at each end of the curve.

c. Portions of corners and curves with driveways or curb ramps shall be crossed with galvanized steel or PVC pipe as shown on the Standard

Drawings or the details included in the Contract Documents for Driveway or Curb Ramp High-lining Crossing. Use of hose shall not be permitted at these crossings.

d. Corners and curves with bend radii too short to be accommodated by hose shall be routed with short sections of pipe and grooved elbows of different bend angles. Pipe shall be cut, grooved, and fitted in the field as required.

e. Portions of the piping and fittings extending 12 inches (304.8 mm) or more from the curb shall be protected with temporary asphalt covering of not less than 1 inch (25.4 mm) thickness above the pipe and fittings. The temporary asphalt covering shall be sloped over the pipe and tamped in place to provide a durable surface.

901-1.1.2.2 Start-up Procedures.

1. System Leak Test:

   a. You shall charge the system with available water pressure, bleed the system of air, and verify that the entire system is filled.

   b. You shall visually inspect the system for leaks and repair any leaks discovered. The system will not be accepted by the Engineer until all leaks are repaired.

2. Flushing, Disinfection, and Bacteriological Testing of High-line Mains:

   a. You shall not use the high-lining system to fill and flush any main or piping.

   b. After the high-line system is fully assembled but not hooked-up to the consumer meters, you shall flush the piping with potable water from a commercial metered source until the effluent is clear and free of dirt and debris. You shall designate the disposal of flushing water via approved methods.

   c. You shall disinfect the high-lining piping according to AWWA C651 and 306-8.9.4, “Disinfection.”

   d. The transport, storage, and handling of disinfection materials shall be in accordance with the CFR 1910.120 Hazardous Waste Operations and Emergency Response, CFR Title 49 Subtitle B Chapter I Subchapter C Hazardous Materials Regulations, and the General Industry Safety Orders of the California Code of Regulations, Title 8, Section 5194.

   e. Pipeline disinfection shall be accomplished with calcium hypochlorite tablets. Short pipe sections, valves, fittings, and similar small portions of the system shall be disinfected with a solution of sodium hypochlorite.

f. You shall notify the Engineer 5 Working Days in advance of the date that the high-line system will be disinfected and ready for bacteriological testing.

g. The City Water Quality Laboratory will collect samples from three points in the high-lining piping. Two points shall be from taps near the fire hydrant connections at each end and one from a tap near the center of the piping.

h. The City Water Quality Laboratory shall perform bacteriological testing in accordance with AWWA C651 and the City standards.

i. The high-line system shall not be accepted until two consecutive sets of acceptable samples collected 24 hours apart pass tests administered by the City Water Quality Laboratory, and until written notice of acceptance is issued by the Engineer. The City Water Quality Laboratory shall be the sole judge as to whether the test samples meet or exceed the established test criteria.

j. If the high-line piping system fails to pass the required bacteriological testing, you will be expected to help investigate and perform corrective actions if warranted by the findings and you shall re-flush and re-disinfect the lines for re-testing at no additional cost to the City. Disposal of chlorinated water for retesting shall be in accordance with the City standards and regulations. Indiscriminate disposal of chlorinated water shall not be permitted.

k. On acceptance of bacteriological testing, you shall drain and flush the highline piping system according to AWWA C651 and the City standards. Disposal of chlorinated water shall be in accordance with the City standards and regulations. Indiscriminate disposal of chlorinated water shall not be permitted.

3. Restoration of Normal Service:

a. You shall not flush the new main line with water from the high-line system.

b. Restoration of user service to the new water main line shall be done only after installation, disinfection, and bacteriological testing of the new water main line is verified by the City and when user connection lines are completed.

c. Transfer of the water service from the high-line to the new water main line shall be performed by you.

901-1.1.2.3 High-lining Removed by the Contractor.

1. After restoration of normal service to water users, you shall disconnect high-lining from all services, breakdown and fully disassemble the high-line system and remove all high-line construction materials and debris from the area by the end of the Working Day.

2. After removing all high-lining construction material and debris, you shall restore streets, curbs, gutters, sidewalks, fire hydrants, and other disturbed facilities in accordance with PART 4 - EXISTING IMPROVEMENTS. Street resurfacing shall be restored in accordance with the SDG-107, “Pavement Restoration for Asphalt Concrete Surfaced Streets - Major Excavation", SDG-108, "Pavement Restoration for Concrete Surfaced Streets and Alleys - Major Excavation".

901-1.2 Reference Specifications, Codes, and Standards.

1. Reference specifications, codes, and standards shall be the latest unless a specific code issue date, edition, or adoption date is specified.

2. The Work shall be done in accordance with the applicable AWWA standards and State Department of Public Health codes and shall be in accordance with the applicable parts of the following codes and safety regulations:

    a. California Fire Code.

    b. California Mechanical Code.

    c. California Plumbing Code.

    d. City of San Diego Water and Municipal Sewer Approved Materials List, where applicable.

    e. California State Water Resources Control Board (CSWRCB) Division of Drinking Water (DDW) latest standards.

    f. Applicable City, local, state, and federal codes and regulations.

3. The Work shall be in accordance with the following commercial and industrial standards:

    a. ANSI/AWWA C606 - Grooved and Shouldered Pipe Joints.

    b. ASTM A53 - Specification for Pipe, Steel, Black and Hot-Dipped Zinc Coated, Welded and Seamless.

    c. ASTM A123 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

    d. ASTM A153 - Standard Specification for Zinc Coating (Hot-Dipped) on Iron and Steel Hardware

    e. ASTM A307 - Specification for Carbon Steel Bolts and Studs, 6,000 psi Tensile Strength.

f. ASTM A395 grade 65-45-15 Snap-Joint Coupling and ASTM A536 grade 65-45-12 Snap-Joint Coupling with orange enamel Coating

g. AWWA C511 - Standard for Reduced Pressure Principal Backflow Prevention Assembly.

h. AWWA C651 - Disinfecting Water Mains

901-1.3 Payment.

1. The Bid item provided for the high-line installation Work by the Contractor as described in 901-1.1.2, "High-lining Installation by the Contractor" shall be full compensation for installing, maintaining, and repairing the high-lining system during normal working hours. High-lining materials shall be paid for separately in accordance with 900-1.9, "Payment".

2. The Bid item provided for the removal of high-lining shall cover the Work described in 901-1.1.2.3, "High-Lining Removed by the Contractor". The payment for removing high-lining shall include the removal of the high-lining material and the restoration of existing improvements and trenches shall be included under the Bid item for "High-lining Removed by the Contractor".

3. The payment for the temporary asphalt material and temporary resurfacing Work for the protection of high-lining shall be included under the Bid item for "Temporary Resurfacing" in accordance with 306-15.9, "Temporary Resurfacing".

901-2 CONNECTIONS TO THE EXISTING SYSTEM.

901-2.1. Coordination During Connections to the Existing System by City Forces.

901-2.1.1 General.

1. The City Forces shall be responsible for making connections and cut-ins to the existing mains as part of the base Bid, **unless otherwise specified in the Contract Documents**.

901-2.1.2 Utility Verification for Connection Location.

1. You shall provide information about the condition of the pipes and valves prior to connections.

2. You shall pothole the location and depth of all utilities to verify that there are no utility conflicts prior to excavation.

3. You shall locate and confirm vertical and horizontal locations, size, condition, materials, types of fittings and joints of existing water mains to which connections are to be made.

901-2.1.3 Submittals.

1. You shall submit Shop Drawings, Working Drawings, and other information prior to start of construction.

2. The drawings and other descriptive material shall adequately describe procedures to be used, materials to be furnished, any related pipeline appurtenances, and trench shoring.

3. Each drawing shall be reproducible original, accompanied by 6 copies of all submitted information. If approved without change or correction, two approved copies will be returned to you.

901-2.2 Connections to the Existing System by the Contractor.

901-2.2.1 General.

1. **If shown on the Plans or specified in the Special Provisions**, you shall make the connection (cut-in or tie-in) to the existing mains as shown on the Plans, specified in these specifications, and in conformance with the latest standards of the California State Water Resources Control Board (CSWRCB) Division of Drinking Water (DDW) .

2. Suitable facilities shall be provided by you for proper de-watering, drainage, and disposal of all water removed from the excavation and pipe without damage to adjacent property.

3. You shall locate and expose the existing water main to which connection is to be made prior to and in advance of trenching to permit grade and alignment changes as approved by the Engineer.

4. In the presence of the Engineer or an authorized City Public Utilities Department, Water Operations Division employee familiar with the water system), you shall make the connections as shown on the Plans regardless of the condition or location of the existing pipe, valves, and fittings with no adjustment in the Contract Price.

5. The Engineer will coordinate all interactions between you and the City Water Operations Division, the City Water Quality Laboratory, and other City organizations. Upon your request, the Engineer shall notify the City's Public Utilities Department as noted below which shall be required at least 20 Working Days prior to the beginning of Work that involves shutting down pipelines, high-lining, cutting and plugging of, or making connection to the existing water mains. Unless otherwise specified on the Plans, contact the below:

    a. Transmission Mains (16 inches and larger) – Water Distribution Operations Supervisor (619-533-4657)

    b. Distribution Mains (less than 16 inches) – Water Systems Technician Supervisor (619-527-3143)

    c. Water Facilities – (Potable Water Reservoirs, Pump Stations, Pressure Reducing Stations): Water Production Superintendent (619-527-7438) and Senior Water Distribution Operations Supervisor (619-527-7609)

901-2.2.2 Submittals.

1. You shall submit Shop Drawings and Working Drawings for the cut and plug of existing water mains larger than 16 inches (406.4 mm) diameter prior to the start of construction.
2. The submittals shall adequately describe procedures to be used, such as distance from valves, thrust blocks for temporary plugs, materials to be furnished, any related pipeline appurtenances, and trench shoring. Each drawing shall be reproducible original, accompanied by 6 copies of all submitted information.
3. If approved without change or correction, 2 approved copies will be returned to you.
4. You shall submit traffic control drawings and obtain the Traffic Control Permit from the City prior to the start of the cut and plug and reconnection operations.

901-2.2.3 Notification and Timing of Shutdowns.

1. You shall coordinate the Work with the City Water Operations Division and notify them a minimum of 20 Working Days after the Engineer's approval of your Work plan and prior to any shutdown of an existing water line. The City Forces will perform all shutdowns including trial and final attempts.
2. If you fail to keep the field appointments, the City will bill you for City Forces waiting or standby time and the costs incurred by the City for notification of its customers for the subsequent appointment.
3. You shall schedule the requested shutdowns during low demand times. **Unless otherwise shown on the Plans**, you shall assume residential areas may be done during the day and shall assume that all commercial, industrial, school, and business areas shall be shut down at night.
4. No shutdowns to the system shall be scheduled for the week of Thanksgiving Day, between Christmas Day and New Year's Day, and any moratoriums specified in the Contract Documents.
5. You shall coordinate with the City's Public Utilities Department to verify the appropriate times of shutdowns prior to construction. The City may refuse to shut down a water line on the day requested by you due to operational circumstances.
6. You shall notify the Engineer 5 Working Days prior to any Work that will affect water service.
7. You shall prepare and distribute, after approval by the City, written notification 5 Working Days prior to starting Work on any water main that will affect service. This notification shall be delivered door-to-door to water users in the affected area. A copy shall be delivered to the Engineer on the date of user notification.

8. You shall notify all consumers with fire services 20 Working Days in advance of any shutdown.

901-2.2.4 Preparation for Connection.

1. Prior to connecting to the existing water main, you shall have all personnel, material, and equipment ready to connect the fittings to the existing mains to minimize the shutdown time.
2. The City may postpone or reschedule any shutdown operation if, for any reason, the City determines that you are not prepared with competent personnel, equipment, or materials to proceed with the connection.
3. When installing a cut-in tee or cross with new valves, reducers, or other fittings that are larger than the existing pipe, the new assembly shall be installed at the depth sufficient to allow the valve to remain below the subgrade of the street which may necessitate lowering the existing pipe.
4. You shall provide and install the entire assembly (valves, reducers, and any other hardware) necessary under the City inspection in accordance with the City Standards.
5. The entire assembly shall be connected in advance to facilitate the expedient connection to the existing main.
6. You shall clean and disinfect the connection in accordance with AWWA C651.
7. Upon receiving notification of a shutdown date by City Water Operations Division for your planned connection, you shall trench and steel plate the pit(s) necessary to make the connection(s) prior to the start of the scheduled shutdown to facilitate an expedient connection to the existing main. Shutdown of the water main and connection shall be completed within the timeline agreed upon and as specified by City Water Operations staff so that water is restored in accordance with the shutdown notification and as needed for operation of the water system.
8. If you anticipate connection operations exceed the time as identified in the notification, causes health and safety risks, or disrupts water services to the consumers, you shall notify the Engineer and the City's Station 38 at (619) 527-7500 as soon as possible for assistance to provide potable water and temporary high-lines to restore water to the affected consumers.
9. The City will order necessary corrective measures. All costs for corrective measures shall be paid by you. You shall be liable to the City for the costs of the City Forces' emergency work.
10. If existing valves leak excessively once they have been closed during the isolation of the segment that is going to be connected, you shall use methods at your disposal to work with the resulting leakage.

11. If the influx of water cannot be controlled with two 2-inch (50.8 mm) pumps sufficiently to complete the Work, then the shutdown shall be rescheduled, as agreed upon by you and the City.

12. After the connection operation (for mains or services), you shall request the Engineer notify City Water Laboratory take water samples for bacteriological tests in accordance with AWWA C651. If the test does not pass, you will be expected to help investigate and perform corrective actions if warranted by the findings.

13. Bacteriological Testing (Bac-T) sample results are valid only for 14 Calendar Days from the date the results are first made available. If any system is not placed into service within the 14 Calendar Days, then bacteriological testing shall be reinitiated.

901-2.3 Cut and Plug of the Existing Main.

901-2.3.1 General.

1. Prior to the cutting and plugging of existing water mains, you shall have all personnel, material, and equipment ready to minimize the shutdown time. You shall organize its workforce, equipment, and operations to protect the existing water main while performing the Work.

2. Shutdown of water main and cut and plug operations shall be coordinated with high-lining operations, shall be performed during low demand times, and shall be completed within the timeline specified.

3. If the existing valves leak once closed during the isolation of the segment that is going to be plugged, you shall use methods at your disposal to Work with the resulting leakage. If the influx of water cannot be controlled with two 2-inch pumps sufficiently to complete the Work, then the shutdown shall be rescheduled, as agreed upon by you and the City.

4. If the cut and plug operations exceed the time as identified in the notification, causes health and safety issues, or disrupts water service to the consumers, you shall notify the Engineer and the City's Station 38 at (619) 527-7500 for assistance. The City will provide potable water and or temporary high-lining to restore water to the affected consumers. The City will order necessary corrective measures.

5. All costs for corrective measures shall be paid by you. You shall be liable to the City for the costs of the City Forces' emergency work.

901-2.3.2 Utility Verification for Cut and Plug Location.

1. You shall pothole the location and depth of all utilities to verify that there are no utility conflicts prior to excavation.

2. You shall locate and confirm vertical and horizontal locations, sizes, condition, and materials of existing water mains.

901-2.3.3 Cut and Plug of the Existing Main by City Forces.

1. The City Forces will isolate existing water mains to be replaced by you. The City Forces will mark locations, elevations, and approximate grades of existing mains on street pavement and will record this information for future use. You shall consult and cooperate with the City Forces' supervisor to ensure that the information is understood and used correctly.
2. Within the last 10 feet (3 m) to be installed by you, you shall install bends, concrete thrust blocks, short lengths of pipe, and other appurtenances necessary to put the new installation on line and grade with the existing pipe.

901-2.3.4 Cut and Plug of the Existing Main by the Contractor.

1. You shall expose the existing water main where the Work ends.
2. You shall be responsible for determining the elevations of existing water mains and fittings.
3. The new water main shall be at the same grade and alignment as the existing main and shall be no farther away than 10 feet (3 m) from the existing water main.

901-2.3.4.1 Quality Control.

1. Cut and plug of existing water lines shall be completed in a safe, neat, and orderly manner. Plugs shall be capable of blocking the pressurized main with no visual leak detected. You shall take every precaution necessary to prevent trench water, dirt, or debris from entering the water mains during the capping or plugging operation.
2. Cut and plug Work shall not proceed if the City Public Utilities Department Operations Division employee familiar with the water system is not present for the duration of the cut and plug Work.
3. After the cut and plug operation, the water main and its appurtenances shall be disinfected, and field tested by you in accordance with the latest edition of AWWA C651. You shall also request the Engineer to notify the City Water Laboratory to take water samples for bacteriological tests in accordance with AWWA C651. If the test does not pass, you will be expected to help investigate and perform corrective actions if warranted by the findings.
4. Suitable facilities shall be provided for proper de-watering, drainage, and disposal of all water removed from the excavation or pipe without damage to adjacent property.

901-2.3.4.2 Water Main Repairs During Cut and Plug Operations.

1. If the water main is damaged by your operations, you shall immediately notify the Engineer and the City Water Operations Division representative or the City's Station 38.

2. The City Forces will perform all necessary repairs to the water main. You shall be liable to the City for the costs of the City Forces' repair work.

901-2.3.4.3 Operation of Valves.

1. Valves on the City's water main system shall be cleaned and operated only by the City Forces.

2. You may exercise valves on services as necessary to complete the Work.

901-2.4 Pavement Restoration.

1. You shall restore surfaced areas to its original grade and condition in accordance with Part 4 - EXISTING IMPROVEMENTS.

2. After the final connection is completed, you shall remove all temporary resurfacing, compact sub-grade and restore affected area with permanent resurfacing in accordance with the City of San Diego Standard Drawings or as shown on the Plans. Payment for pavement restoration, including influence area, shall be included in the associated Bid Items pertinent to the Work.

901-2.4.1 Compaction.

1. Compaction of the trench after installation of the water main shall be in accordance with 306-12, "BACKFILL".

2. If the Work is located within a different jurisdiction or agency other than the City or private easement, compaction shall meet the requirements of that agency or utility granting the permit.

901-2.5 Payment.

1. The payment for connecting to the existing system (cut-in or tie-in Work), regardless of the time or the day of the scheduled shutdown, excluding new main interconnections between various phases, shall be included under the Bid items for the connection (cut-in or tie-in Work) and shall include the following:

    a. Trenching, furnishing, and installing all materials and labor to complete the Work, including up to 10 feet of new water pipe

    b. Potholing

    c. Protecting the water main while performing the Work

    d. Coordinating your Work with the City Forces

    e. Coordinating with the community (community outreach including door hangers)

    f. Traffic control and construction BMPs

    g. Pavement Restoration including influence area.

2. The payment for cut and plug Work of the existing system, regardless of the time or the day of the scheduled shutdown, shall be included under the Bid item for "Cut and Plug by the Contractor" and shall include coordination of Work with City Forces, any scheduling impact costs, community outreach, furnishing and installing of materials, and traffic control. Potholing and protecting the water main while performing the Work shall be included in this payment.

3. Traffic Control, saw cutting the trench area, trench caps, and other spot repairs in the vicinity of the disturbed area at each restored connection shall be included in the square foot Bid Item for "Pavement Restoration for Final Connection". Asphalt overlay Work shall be paid for under separate Bid items.

~~4.~~ Interconnections between various phases of newly installed watermains shall be included in the associated pipeline bid items.

END OF PART 9 - WATER WORKS

PART-10
ASPHALT CONCRETE RECYCLING

DELETE in its entirety and SUBSTITUTE with the following:

PART-10 – NOT USED

ADD: PART-11

STORMWATER

SECTION 1100 - GENERAL

1100-1 GENERAL.

1. You shall comply with the most current City of San Diego Stormwater Standards. The municipal permit requires development and implementation of a Standard Urban Stormwater Mitigation Plan (SUSMP) to reduce the negative impacts from development runoff to receiving waters.
2. You shall apply the San Diego Regional Water Quality Control Board standards to the project and shall provide all design and technical documentation needed to comply with these standards.
3. Unless specified otherwise, you shall obtain the regulatory approvals and permits required for the Project.
4. All costs, fines, penalties, additional mitigation, or litigation costs associated with your negligence to comply with any of the permit conditions, federal, state, and local laws, ordinances, codes, orders and regulations, shall be your responsibility.
5. As-Built Drawings shall accurately record the final location and configuration of permanent BMPs.

SECTION 1101 – CONSTRUCTION BEST MANAGEMENT PRACTICES (BMPs)

1101-1 GENERAL.

1. The Project will be subject to the Stormwater Pollution control requirements listed on the Plans or as specified in the SSP.
2. For Contracts subject to the Construction General Permit (CGP), your QSD shall verify the City's assessment prior to Bid submittal.
3. These specifications set the City's minimum requirements. You shall comply with the requirements of the City's Stormwater Standards Manual, Municipal Permit, and Construction General Permit for any construction or demolition activity that results in a land disturbance.
4. You shall pay the City for regulatory or court-imposed fees, fines, or penalties imposed on the City arising from your failure to complete the Work in compliance with the requirements of the City's Stormwater Standards Manual, Municipal Permit, and CGP.
5. You shall be responsible for delays associated with your failure to complete the Work in compliance with the requirements of the City's Stormwater Standards Manual, Municipal Permit, and CGP.
6. Conform to all applicable local, state, and Federal regulations and laws pertaining to water pollution control. You shall conduct and schedule its operations and follow and implement best management practices in such a manner as to prevent water pollution.
7. You shall provide the City with email addresses (Owner, Project Manager, Superintendent, Foreman, QSP/QCP, etc.) to be linked to the BMP/Stormwater Module. You shall notify the City within 24 hours if any of the contact person/email address has been changed/updated so the City can update the project contact information.

1101-1.1 Terms, Definitions, and Acronyms.

1. The terms, definitions, and acronyms listed in Attachments A and B of the CGP shall apply except as follows**:**
   a. **Attachments -** Attachments referenced in these specifications are from the CGP. Attachments can be viewed at the following website:

      https://www.waterboards.ca.gov/water_issues/programs/stormwater/construction/general_permit_reissuance.html

   b. **Best Management Practice (BMP).**

      1) A method that is implemented to protect water quality and prevent or reduce the potential for pollution associated with

stormwater runoff and construction activities. Examples include scheduling of activities, prohibitions of practices, maintenance procedures, and other management practices.

2) Any program, process, siting criteria, technology, treatment requirement, or operating method, measure, or device that controls, prevents, removes, or reduces pollution.

c. **Construction General Permit (CGP) -** National Pollutant Discharge Elimination System permit for Stormwater Discharges associated with the construction and land disturbance activities (State Water Resources Control Board Permit, Order No. 2022-0057-DWQ).

d. **Discharger -** The Contractor (You).

e. **Legally Responsible Person (LRP) -** The City of San Diego for the City's Public Works projects.

f. **Linear Utility/Overhead Project (LUP) -** LUPs include the following:

1) Any conveyance, pipe, or pipeline for the transportation of any gaseous liquid including water, wastewater for domestic municipal services, liquescent, or slurry substances.

2) Any cable line or wire for the transmission of electrical energy.

3) Any cable line or wire for communications such as telephones, telegraphs, radios or television messages.

4) Associated ancillary facilities.

g. **Maximum Extent Practicable (MEP) -** The technology-based standard established by the United States Congress in the Clean Water Act 402(p)(3)(B)(iii) that municipal discharges of urban runoff shall meet. MEP generally emphasizes pollution prevention and source control BMPs primarily as the first line of defense in combination with treatment methods serving as backup and additional lines of defense.

h. **Municipal Permit -** Municipal Separate Storm Sewer System (MS4) permit for San Diego Region. Order Number R9-2013-0001 and all other subsequent amendments.

i. **Numeric Effluent Limitation (NEL) -** Any numeric or narrative restriction imposed on quantities, discharge rates, and concentrations of pollutants, which are discharged from point sources into waters of the United States, the waters of the contiguous zone, or the ocean. The CGP contains both narrative Effluent limitations and numeric Effluent limitations for pH and Turbidity.

j. **Permit Registration Documents (PRD) -** Includes a Notice of Intent (NOI), Risk Assessment, Site Map, Stormwater Pollution Prevention Plan (SWPPP), Annual Fee, and a signed Certification Statement.

k. **Qualified Contact Person (QCP) -** The trained and competent person you employ that shall be responsible for the implementation of a WPCP.

l. **Rainfall Erosivity Waiver -** For projects subject to the CGP, the EPA's Small Construction Erosivity Waiver applies to sites between one and five acres demonstrating that there are no adverse water quality impacts. Projects which qualify for a Rainfall Erosivity Waiver shall submit a WPCP in lieu of a SWPPP as part of the PRDs.

m. **Stormwater Multiple Application and Report Tracking System (SMARTS) -** The Stormwater program regulates stormwater discharges from locations such as industrial facilities, construction sites, and small linear projects. SMARTS is also responsible for processing, reviewing, updating, terminating Notices of Intent (NOIs), annual reports, and maintaining the billing status of each discharger. SMARTS has been developed to provide an online tool to assist dischargers in submitting their NOIs, NOTs, and Annual Reports, as well as, viewing/printing Receipt Letters, monitoring the status of submitted documents, and viewing their application/renewal fee statements. The system shall also allow the Regional Board and State Board staff to process and track the discharger's submitted documents. SMARTS is a user account and password protected system where a valid user account and password is needed to access the system.

n. **Stormwater Pollution Prevention Plan (SWPPP) -** Site specific document required by the CGP and Municipal Permit.

o. **Water Pollution Control Plan (WPCP) -** A plan required by the City Stormwater Standards Manual for projects with less than 1 acre of ground disturbance, inclusive of any unpaved areas associated with the Project or for projects which exceed an acre and qualify for a Rainfall Erosivity Waiver, which is determined to have a potential to impact water quality during construction.

p. **Water Quality Sensitive Area -** Areas that include, but are not limited to, all Clean Water Act 303(d) impaired water bodies ("303[d] water bodies"); areas designated as an "Area of Special Biological Significance" (ASBS) by the State Water Resources Control Board (Water Quality Control Plan for the San Diego Basin (1994) and amendments); water bodies designated as having a RARE beneficial use by the State Water Resources Control Board (Water Quality Control Plan for the San Diego Basin (1994) and amendments), or areas

designated as preserves or their equivalent under the Multiple Species Conservation Program (MSCP) within the Cities and County of San Diego. The limits of ASBS are those defined in the Water Quality Control Plan for the San Diego Basin (1994 and amendments). The City of San Diego has identified the Los Penasquitos Lagoon as an impaired water body (CWA 303(d)) for sediment. The City of San Diego has two (2) areas of ASBS, La Jolla (#29) and San Diego-Scripps (#31).

q. **WDID # -** Waste Discharge Identification number required prior to the start of any construction activities for projects that disturb more than one acre.

r. **Weather Triggered Action Plans (WTAP)** - A WTAP is a written document and corresponding site map designed to be used as a planning tool for the Qualified Contact Person (QCP) to protect areas of exposed soils and materials prior to forecasted rain. All projects that require development of a pollution control plan per the Stormwater Standards Manual and have a land disturbance greater than 5,000 square feet or greater than a 5-foot elevation differential over the entire project area are required to develop a WTAP.

1101-1.2 Illegal Discharges.

1. Any discharge to the MS4 that is not composed entirely of stormwater except discharges allowed under an NPDES permit and discharges conditionally allowed under the MS4 permit, as set forth in San Diego Municipal Code section 43.0305. Illicit discharges include irrigation runoff discharged to the MS4.

1101-1.3 Additional Control Requirements for Areas of Special Biological Significance.

1. These are ocean areas requiring protection of species or biological communities to the extent that alteration of natural water quality is undesirable and are classified as a subset of State Water Quality Protection Areas. For construction sites located within the La Jolla Shores sub-watershed, non-stormwater discharges are prohibited from entering the City's stormwater conveyance system, including, but shall not be limited to, natural drainages, ditches, roads, streets, constructed channels, aqueducts, storm drains, pipes, street gutters, or catch basins. The method for the removal and disposal of non-stormwater discharges shall be included with detail in the WPCP or SWPPP.

1101-1.4 Training.

1. You shall ensure that all persons responsible for compliance with the San Diego Municipal Code Section §43.03, City's Stormwater Standards Manual, Municipal Permit, and CGP shall be appropriately trained in accordance with the CGP. Training shall be both formal and informal, occur on an ongoing

basis, and shall include training offered by recognized governmental agencies or professional organizations. You shall include documentation of all training to the Engineer and as required by the Annual Report.

1101-1.5 Legally Responsible Person (LRP).

1. For projects with coverage under the CGP the City has identified the LRP for the regulated Site and designated at least one Approved Signatory (AS) in the event that the LRP is unavailable. Only the LRP or the AS may certify the final submittal of the PRDs, Annual Reports, SWPPP Amendments, and Notice of Termination using SMARTS.

1101-1.6 Qualified SWPPP Developer (QSD).

1. For projects subject to the CGP, you shall appoint a QSD to prepare the SWPPP with site specific BMPs and pertinent information in accordance with the CGP prior to uploading onto SMARTS. The verification of the certification shall be included in the SWPPP.
2. The QSD shall have the certification and appropriate experience as required for in the CGP.
3. You shall retain a QSD from the beginning of the project through the Notice of Termination and ensure that all requirements specified in the CGP Section V.C are complied with.

1101-1.7 Qualified SWPPP Practitioner (QSP).

1. For projects subject to the CGP, you shall appoint a QSP. The QSP shall be responsible for non-stormwater and stormwater visual observations, sampling and analysis, the preparation of the annual compliance evaluation, and the elimination of unauthorized discharges. The QSP shall be on-Site daily to evaluate the conditions of the Site with respect to stormwater pollution prevention.
2. The QSP shall have one of the certifications and appropriate experiences as required for in the CGP.
3. You shall retain a QSP from the beginning of the project through the Notice of Termination and ensure that all requirements specified in the CGP Section V.D are complied with.

1101-1.8 Permit Registration Documents (PRDs).

1. For projects subject to the CGP, you shall prepare and upload the PRDs into SMARTS. The PRDs shall be reviewed, certified, and filed by the LRP or designee following the review of your submittal. You shall submit the PRD's to the Engineer for review prior to the Pre-construction Meeting. The Contract Time shall start in accordance with 6-1.2, "Commencement of the Work" or as

determined by the Engineer. The Work shall not commence without a valid WDID number.

2. The City shall initiate the NOI form application process and set up the project in SMARTS. You shall complete the Developer, Risk Assessment, Billing Information, and Additional Site Info tabs in SMARTS. The LRP/AS shall certify the NOI application.

3. A preliminary Risk Assessment has been calculated for design purposes based on the Site's characteristics and the CGP requirements. You shall perform a separate Risk Assessment to verify the City's Preliminary Risk Assessment. The Risk Assessment shall be completed by the QSD using the Risk Determination Worksheet in Attachment D.1 of the CGP.

4. You shall prepare the Site maps with the PRDs as described in the CGP. As phases of the construction change, the Site Map shall be adjusted to correspond to each phase. A copy of each Site Map shall be included in the SWPPP. At a minimum, the Site Map shall include:

    a. The project's surrounding area (vicinity).

    b. Site layout.

    c. Construction site boundaries.

    d. Drainage areas.

    e. Discharge locations.

    f. Sampling locations.

    g. Areas of soil disturbance (temporary or permanent).

    h. Active areas of soil disturbance (cut or fill).

    i. Locations of all runoff BMPs.

    j. Locations of all erosion control BMPs.

    k. Locations of all sediment control BMPs.

    l. ATS location (if applicable).

    m. Locations of sensitive habitats, watercourses, or other features which are not to be disturbed.

    n. Locations of all post-construction BMPs.

o. Locations of storage areas for waste, vehicles, service, loading/unloading of materials, access (entrance/exits) points to construction site, fueling, water storage, water transfer for dust control, and compaction practices.

For LUPs, at least 3 Site Maps shall be submitted. The first map shall be a zoomed 1000 feet - 1500 feet (304.8 m – 457.2 m) vicinity map that shows the starting point of the project. The second map shall be a zoomed map of 1000 feet - 1500 feet (300 m - 450 m) showing the ending location of the project. The third map shall be a larger view vicinity map, 1000 feet - 2000 feet (304.8 m – 609.6 m), displaying the entire project location depending on the project size and indicating the LUP type (1, 2, or 3) areas within the total project footprint.

5. For LUPs only, submit construction drawings that show the locations of storm drain inlets and waterbodies that may receive discharges from the construction activities and that shows the locations of BMPs to be installed.

6. The SWPPP shall be prepared using the guidelines in Appendix G of the City's Stormwater Standards Manual and in accordance with the requirements of the CGP. CASQA and Caltrans SWPPP Templates are available online electronically and may be used for this purpose. The SWPPP and each amendment shall be prepared and signed by the QSD and shall be submitted to the Engineer for review. If extensive additions or corrections are required, the Engineer shall return the submittal for corrections and re-submission. After the SWPPP is revised to the satisfaction of the Engineer, the SWPPP shall be uploaded through SMARTS. The QSD shall notify the Engineer no later than 24 hours from when the upload is complete.

7. The SWPPP shall be implemented by you and updated as necessary to address Site conditions. Make the SWPPP available at the Site during working hours while construction is occurring and make it available immediately upon request by a State inspector or the Engineer.

8. You shall be responsible for paying the required permit fee to the State Water Resources Control Board immediately following the filing of the PRDs by the LRP. The QSD shall notify the Engineer when the payment is mailed to the State Water Board.

9. Once all PRDs are submitted to SMARTS and payment is received by the State Water Board, the LRP shall receive a notification to certify the PRDs. You shall allow for 5 Working Days for Certification by the LRP or AS.

1101-1.9 Effluent Standards.

1. For projects subject to the CGP, refer to the CGP for the applicable effluent standards pertinent to Risk Levels 2 and 3 and LUP Types 2 and 3. Site evaluations and testing and sampling results shall be documented in the SWPPP in accordance with requirements of the CGP.

1101-1.10 Record Retention.

1. As required in the CGP, you shall submit a completed SWPPP with all inspection reports, annual reports, and updated Site Maps to the Engineer at the completion of the project.

1101-1.11 Post-construction Requirements.

1. You shall comply with the post-construction stormwater requirements when post-construction requirements have been identified in the Contract Documents.
2. You shall mark every storm drain inlet within the project boundaries with stenciled inlet markings or imbedded concrete stamps. You shall use stenciled inlet markings on existing inlets and concrete stamps on new inlets. On curb inlets, the concrete stamp or stenciled inlet markings shall be placed on the top of the curb at the inlet roof. On catch basins, the concrete stamp shall be imprinted next to the inlet grate.
3. Final site stabilization requirements shall be as follows:
    a. The site shall not pose any additional sediment discharge risk than it did prior to the commencement of construction activity.
    b. There shall not be any potential for construction-related stormwater pollutants to be discharged into site runoff.
    c. All final landscaping and hardscaping has been installed.
    d. Construction materials and wastes have been disposed of properly.
    e. Post-construction stormwater management measures have been installed and a long-term maintenance plan has been established.
    f. All construction-related equipment, materials, and any temporary BMPs that are no longer needed are removed from the site.
4. For projects subject to the CGP, the QSP shall notify the Engineer immediately if the removal of the construction BMP shall expose the Site to conditions that would impair the water quality and put the City at risk of violations to the CGP and/or Municipal Permits.
5. You shall remove any damaged decal-disk inlet markers.
6. You shall comply with the following post-construction requirements: Storm Drain Inlet Markings.
7. The stencil shall be approximately 3’ x 7-1/4” in size.
8. White and blue waterborne traffic paint shall be used for the inlet markings.
9. You shall apply a white base with stenciled blue lettering.

10. You shall allow sufficient time for the base to dry prior to applying the lettering.

11. A copy of the stencil shall be provided at the pre-construction meeting.

1101-1.12 Notice of Termination (NOT).

1. **For projects subject to the CGP,** within 90 days from the completion date shown on SMARTS you shall terminate coverage of a site by uploading an electronic NOT, a final site map, and photos onto SMARTS. The final site map and photos shall be submitted to the Engineer as a submittal for review prior to the upload to SMARTS. By uploading a NOT, you shall be certifying that construction activities are complete and that the Project is in full compliance with the requirements of the CGP. The LRP shall be notified by SMARTS that a NOT was submitted for certification. You shall allow for 5 Working Days for the LRP or AS to certify the NOT. Upon approval by the appropriate Regional Water Board office, permit coverage shall be terminated and communicated to the LRP. Approval of the NOT does not relieve you of the responsibility for the submittal of Annual Reports and the payment of the Annual Fee.

1101-1.13 Annual Reports and Annual Fee.

1. For projects subject to the CGP, you are responsible for the submittal of the Annual Reports and for the payment of the Annual fee in accordance with requirements of the CGP. If the Project is enrolled for more than one continuous 3-month period, you shall electronically upload an Annual Report through SMARTS no later than August 1st of each year. SMARTS shall notify the City of submittals and reviews for certification. You shall allow the City 5 Working Days for review. If extensive additions or corrections are required, the Engineer shall notify you of corrections and re-submission. After the Annual Report is revised to the satisfaction of the Engineer, the Annual Report shall be uploaded through SMARTS. You shall allow for 5 Working Days for the LRP or AS to certify the Annual Report. Copy of all Annual Reports shall be retained on Site and included in the SWPPP and be made available to the Engineer or the State authorized inspector immediately upon request. The annual reports shall include the following:

    a. Stormwater monitoring information as listed in Section IV.P.3. of the CGP.

    b. Training information for all individuals responsible for Permit compliance.

2. You shall pay the Annual Fee to the State Water Board within 30 Calendar Days of the Invoice Date. Your failure to pay within this timeframe will place the City of San Diego (City) at a risk of receiving a Notice of Violation and the assessment of penalties from the San Diego Water Board. Should this occur, the City will exercise its rights and seek reimbursement for the penalties including all soft costs associated with the case.

1101-1.14 Change of Information.

1. For projects subject to the CGP, you are responsible for updating SMARTS to reflect the most current project schedule, to submit revised Site Plans, to reflect changes to types of BMPs, and any changes to the QSD and/or QSP. This includes, but shall not be limited to, changes of information to the Developer, Risk, and Billing Info tabs. At least 5 Days prior to updating SMARTS, you shall notify the Engineer as to the nature of the change(s).

2. If the scope of work has not been completed and the NOT cannot be filed within 90 days of the completion date in SMARTS, the contractor must file for a Change of Information (COI) to extend the completion date.

1101-1.15 Risk Assessment.

1. For projects subject to the CGP, you shall update the project schedule in the Risk tab of SMARTS monthly to match the schedule provided at the monthly progress meetings. If during construction, the Risk level or LUP type is increased you shall comply with the additional requirements required by the CGP.

1101-1.16 Rainfall Erosivity Waiver Expiration.

1. For projects subject to the CGP, 30 Days prior to expiration of the Rainfall Erosivity Waiver, you shall update the project schedule in the Risk Assessment tab of SMARTS. Should the project construction extend beyond the projected completion date given on the waiver certification, you shall recalculate the rainfall erosivity factor for the new project duration and submit this information through the SMARTS system.

2. If the new R factor is below 5, you shall update all applicable information on the waiver certification through SMARTS and retain a copy of the revised waiver onsite.

3. If the new R factor is 5 or above, you shall immediately notify the Engineer. The Engineer shall initiate the NOI application process and set up the project in SMARTS to obtain coverage under the CGP. You shall complete the Developer, Risk, Billing Information, and Additional Site Info tabs in SMARTS. You shall be required to retain a QSP, shall prepare and submit a SWPPP, Site Map, and Drawings (for LUPs), and shall pay the permit fee.

4. Should the Rainfall Erosivity Waiver expire prior to obtaining permit coverage (active WDID#), you shall cease all construction Work. No additional payment to you shall be made as a result of the delay in Work.

1101-1.17 Risk Levels and LUP Types.

1. You shall refer to the Risk Level or LUP Type identified for the Contract and the following to determine the applicable requirements of the CGP:

    a. **Risk Levels (Traditional).**

1) Risk Level 1 (Baseline for all Risk Levels). See Attachment D of the CGP**.**

2) Risk Level 2. See Attachment D of the CGP**.**

3) Risk Level 3. See Attachment D of the CGP.

b. **LUP Types (Linear Underground/Overhead Projects). See Attachment A of the CGP.**

1) Type 1 LUP.

2) Type 2 LUP.

3) Type 3 LUP.

1101-2 BEST MANAGEMENT PRACTICES (BMPS).

1. Implement and maintain such BMPs as are relevant to the Work and as are specifically required by the Plans or Special Provisions.

2. You shall be responsible throughout the duration of the Contract for installing, constructing, inspecting, maintaining, removing, and disposing of BMPs for wind erosion control, tracking control, erosion and sediment control, non-stormwater control, and waste management and materials pollution control. Unless otherwise directed by the Engineer, you shall be responsible for BMP implementation and maintenance throughout any temporary suspension of the Work.

1101-2.1 Construction BMP.

1. As required by the City's Stormwater Standards Manual and Municipal Permit, BMPs shall be installed in accordance with California Stormwater Quality Association (CASQA) BMP handbooks:

   https://www.casqa.org/
   or Caltrans Construction Site BMP Manual:
   http://www.dot.ca.gov/hq/construc/stormwater/details.htm

2. You shall store and have readily accessible, sufficient and appropriate standby BMP materials necessary to protect the Site against erosion, to prevent sediment discharge, and to prevent non stormwater discharges.

1101-2.2 Erosion Control.

1. You shall control the Site erosion through the implementation of effective wind erosion control and effective soil cover for Inactive Areas, all finished slopes, open spaces, utility backfills, and completed lots.

2. Erosion shall be prevented. Erosion-susceptible slopes and denuded areas shall be stabilized, covered, planted, or otherwise protected in a way that prevents displacement.

3. You shall protect unpaved areas, including landscaping, from erosion-using vegetation or other physical stabilization.

4. Exposed soils that are actively eroding, or prone to erosion due to disturbance, shall be protected from erosion. Significant accumulations of eroded soil shall be removed or contained to prevent sediment transport in runoff to the storm drain system.

5. Such temporary measures shall be maintained and replaced as needed until such time a permanent solution can be implemented.

6. The SWPPP/WPCP shall include the sequencing of the Work activities and the implementation of effective Erosion Control BMPs while taking local climate, such as rainfall and wind, into consideration thereby reducing the amount and duration of soil exposed to erosion by wind, rain, runoff, and vehicle tracking.

7. The SWPPP/WPCP shall:

   a. Describe when Work shall be performed that could cause the discharge of pollutants in stormwater.

   b. Describe the water pollution control practices associated with each construction phase.

   c. Identify the soil stabilization and sediment control practices for all disturbed soil area.

1101-2.3 Good Site Management "Housekeeping".

1. You shall ensure construction-related materials, wastes, spills, or residues are prevented from discharging from the Work Site to streets, drainage facilities, receiving waters, or adjacent properties by wind or runoff.

2. You shall ensure non-stormwater runoff from equipment, vehicle washing, or any other activity shall be contained within the Work Site using appropriate BMPs.

3. You shall assess the potential pollutant sources, identify areas of the Site where additional BMPs are necessary, and ensure the effectiveness of existing BMPs.

4. You shall stabilize and berm all stockpiled construction materials that are not actively being used (soil, spoils, concrete debris, aggregate, fly-ash, stucco, hydrated lime, and etc.).

5. You shall store chemicals in watertight containers (with appropriate secondary containment to prevent any spillage or leakage) or in a storage shed (completely enclosed).

6. You shall minimize exposure of construction materials to precipitation. This does not include materials and equipment that are designed to be outdoors

and exposed to environmental conditions (poles, equipment pads, cabinets, conductors, insulators, bricks, and etc.).

7. You shall implement BMPs to prevent the offsite tracking of loose construction and landscape materials.

8. You shall prevent the disposal of any rinsed or washed waters or materials on impervious or pervious site surfaces or into the storm drain system.

9. You shall ensure that the containment of sanitation facilities, such as portable toilets, prevent discharges of pollutants to the stormwater drainage system or receiving water.

10. You shall provide secondary containment for all temporary sanitary facilities. Water must not be left in the secondary containment and You shall ensure that it is free of sediment and debris.

11. You shall clean or replace sanitation facilities and inspect them regularly for leaks and spills.

12. You shall cover waste disposal containers at the end of every day and prior to a rain event. You shall inspect waste disposal containers for leaks on a daily basis and you shall empty them when they become 95% full. Wash down of waste containers is prohibited onsite.

13. You shall prevent waste disposal containers from discharging to the stormwater drainage system or to receiving water.

14. You shall contain and securely protect stockpiled waste material from wind and rain at all times unless actively being used.

15. You shall implement procedures that effectively address hazardous and nonhazardous spills.

16. You shall develop a spill response and implementation element of the SWPPP/WPCP prior to commencement of construction activities. The SWPPP/WPCP shall require the following:

    a. Equipment and materials for cleanup of spills shall be available on site and that spills and leaks shall be cleaned up immediately and disposed of properly.

    b. Appropriate spill response personnel are assigned and trained.

17. You shall ensure that concrete washouts are watertight and fitted with secondary containment to prevent any concrete waste from being able to discharge on to the ground or offsite. You shall ensure that concrete washout containers are emptied or exchanged when containment reaches 75% capacity. Concrete washout containers must be covered securely at the end of every workday.

18. You shall contain stockpiled materials, such as mulches and topsoil, when they are not actively being used.

19. You shall contain fertilizers and other landscape materials when they are not actively being used.

20. You shall discontinue the application of any erodible landscape material within 2 Days before a forecasted rain event or during periods of precipitation.

21. You shall apply erodible landscape material at quantities and application rates according to manufacture recommendations or based on written specifications by knowledgeable and experienced field personnel.

22. You shall stack erodible landscape material on pallets and shall cover or store such materials when not being used or applied.

23. You shall maintain vehicles and equipment to prevent leaks and spills.

24. You shall prevent stormwater, ground water, and soil contamination by capturing leaks and spills before they contact the ground. Collect fluid leaks using drip pans or sealable containers and prevent spills using funnels, rags, and/or drop cloths when performing maintenance.

25. You shall control potential sources of water pollution before they come in contact with stormwater systems or watercourses by implementing the measures specified in CGP for the following sources:

    a. Delivery, inventory, storage, stockpiling, and use of construction material.

    b. Air depositions from the Work which include pollutants such as particulates as sediment, nutrients, trash, metals, bacteria, oil, grease, and organic matters.

1101-2.4 Non-Stormwater Management.

1. For projects located in an ASBS, you shall refer to 1101-1.3, "Additional Control Requirements for Areas of Special Biological Significance" for additional requirements.

2. You shall identify all non-stormwater discharges and either eliminate, control, or treat them.

3. You shall wash vehicles and clean streets in such a manner as to prevent unauthorized non-stormwater discharges from reaching surface water or drainage conveyance systems.

4. You shall prevent oil, grease, or fuel to leak into the ground, street, gutter, paved areas, storm drains, or surface waters.

5. You shall place all equipment or vehicles which are to be fueled, maintained, and stored in a designated area fitted with appropriate BMPs.

6. You shall clean leaks immediately and dispose of leaked materials properly.

1101-2.5 Sediment Control.

1. You shall control sources of sediment associated with the performance of the Work to the MEP.
2. You shall install and maintain effective perimeter controls along the perimeter of the construction site or limits of grading, the stabilization of construction entrances and exits, and the protection of storm drain inlets with the potential to receive runoff from the Site.
3. Sediments shall not be discharged to a storm drain system or receiving waters.
4. Sediments generated on the Work Site shall be contained at the Work site using appropriate BMPs.
5. Storm drain inlet protection must be implemented during dry weather at every storm drain inlet that has the potential to receive construction related pollutants from active construction areas. Inlet protection in the public right-of-way for streets open to the public must be temporarily removed prior to rain to ensure no flooding occurs and reinstalled after rain is over. Inlet protection must be removed during emergency water main breaks. If rain is forecast after working hours or over the weekend, contractor must remove inlet protection and replace prior to the resuming construction work.
6. The storm drain inlet sediment control measures shall be of sufficient weight so as not to shift out of place or shall be secured in place against movement. Inlet sediment control measures shall be maintained daily and/or as often as needed. Maintaining inlet sediment control measures shall include replacing damaged BMPs and removing and disposing of accumulated sediment, trash, and debris at the end of every workday and prior to rain.
7. You shall design the sediment basins according to the method provided in CASQA's Construction BMP Guidance Handbook.

1101-2.6 Run-on and Runoff Controls.

1. You shall effectively manage run-on, runoff within the Site, and runoff that discharges off the Site. Run-on from offsite shall be directed away from disturbed areas or shall collectively be in compliance with the effluent limitations in the CGP, as applicable.
2. Calculations and design details as well as BMP controls for site run-on and runoff shall be included in the SWPPP/WPCP and shall be shown on the Site Map.

1101-2.7 Construction Entrance and Exit Area.

1. Temporary construction entrance and exit areas shall be on level and stabilized ground. Stabilized construction entrance/exits must be sufficiently

implemented at every construction project to control and prevent sediment tracking from the site. Construction entrances/exits must be constructed with a length of 50 feet or as allowable by project site conditions and a minimum width of 10 feet or greater to accommodate vehicles.

1101-2.7.1 Payment.

1. The payment for the construction, maintenance, and removal of entrance and exit areas shall be included in the Bid items for **"WPCP Implementation"** or **"SWPPP Implementation"**.

1101-2.8 Performance Standards.

1. You shall be responsible for implementing water pollution control measures based on performance standards. The performance standards shall be the following:
    a. Non-stormwater discharges from the Site shall not occur to the MEP. Stormwater discharges shall be free of pollutants including sediment to the MEP.
    b. Erosion shall be controlled by acceptable BMPs to the MEP. If rills and gullies appear, they shall be repaired and additional BMPs shall be installed to prevent a reoccurrence of erosion.
    c. An Inactive Area shall be protected to prevent pollutant discharges. A Site or portions of a Site shall be considered inactive when construction activities have ceased for a period of 14 Days or more.
2. BMPs shall be implemented and maintained at all times during construction. You are responsible for the cleanup of debris, concrete waste, sweeping, and dust control. Construction debris and waste shall be contained and disposed of properly. Access locations shall be kept clean and swept daily and/or as needed to ensure that sediment will not leave the construction site. The surrounding public streets shall be kept clean and swept daily and/or as needed to keep sediment out of the storm drain conveyance system.

1101-2.9 Additional BMP Control Requirements for Significant Threat to Water Quality.

1. You shall include and implement additional controls as part of the WPCP or SWPPP for all construction sites tributary to a CWA section 303 (d) water body impaired for sediment or within, directly adjacent to, or discharging directly to a receiving water with a Water Quality Sensitive Area as follows:
    a. Use of high-performance erosion control methods including, but shall not be limited to, bonded fiber material or anchored erosion control blankets on all exposed slopes.
    b. Ensure a sufficient vegetated buffer between the construction activity and the protected water body.

c. Where construction site drainage is directed to an inlet or other drainage structure that conveys flow to an impaired or sensitive water body or to a down gradient perimeter near the impaired or sensitive water body, there shall be at least 2 lines of defense for sediment control. Such defenses shall include, but shall not be limited to, two parallel lines of silt fence along the perimeter or silt fence barriers strategically located upstream of a protected inlet. Each line of defense shall be designed to independently control sediment to the maximum extent practicable.

d. Stockpiles shall be fully protected and shall be located at a sufficient distance from the site perimeter that is near the sensitive water body.

1101-2.10 BMP Inspection, Maintenance, and Repair.

1. Inspection, maintenance, repair, and sampling activities on-site shall be performed by the QSP or QCP.
2. At a minimum, inspections shall be performed weekly and at least once each 24-hour period during extended storm events, Pre-storm (within 48 hours before) and Post-storm (within 48 hours after).
3. Inspections and observations shall identify BMPs that need maintenance to operate effectively, have failed, or could fail to operate as intended.
4. You shall complete implementing repairs or design changes to BMPs within 72 hours of identification. However, if BMP deficiencies impact the MS4 conveyance system, operations, services, facilities, or public health and safety, you shall complete the repairs within 24 hours of identification or sooner as directed by the Resident Engineer.

1101-2.11 Weather Triggered Action Plan (WTAP).

1. The WTAP must be prepared by the QSP/QCP 48 hours prior to any rain event forecast of 50% or greater probability to allow for adequate time to implement BMPs.
2. A WTAP template from Appendix D of the Stormwater Standards Manual must be used for City projects (both CGP and non-CGP projects).
3. The WTAP must be kept onsite with the SWPPP/WPCP document and be made available to the Engineer or the State authorized inspector immediately upon request.
4. You shall ensure that the implementation of WTAP begins no later than 24 hours prior to any rain event forecast of 50% or greater probability.
5. The Stormwater Standards Manual requires all projects subject to SWPPP and WPCP to develop a WTAP.

6. All developed WTAPs shall be submitted to the Engineer at the completion of the Project.

1101-3 STORMWATER POLLUTION PREVENTION PLAN (SWPPP).

1. When so specified in the Special Provisions or if so required by a jurisdictional regulatory agency, you shall prepare and submit in accordance with 3-8, "SUBMITTALS" a stormwater pollution prevention plan. The SWPPP shall conform to the requirements specified in the Special Provisions and those of the jurisdictional regulatory agency.

1101-3.1 SWPPP Risk Level 1.

1. The detailed requirements for Risk Level 1 are in Attachment D of the CGP.
2. The SWPPP shall address the following objectives:
   a. Control all pollutants and their sources associated with the Work.
   b. Identify and either eliminate, control, or treat all non-stormwater discharges.
   c. Reduce or eliminate pollutants in stormwater discharges and authorized non-stormwater during and after construction through the implementation of appropriate BMPs.
3. The SWPPP shall include supporting information such as the conclusions, selections, use, and maintenance of BMPs.
4. A copy of the SWPPP and the BMP maps shall be kept at the Site and be made available to the Engineer or the State authorized inspector immediately upon request.

1101-3.1.1 Monitoring and Reporting.

1. You shall develop and implement a written Site-specific Construction Site Monitoring Program (CSMP) as required by CGP. The CSMP shall be developed prior to the commencement of construction activities and shall be revised as necessary to reflect Project revisions. The CSMP shall be a part of the SWPPP and shall be included as an appendix or separate SWPPP chapter.
2. The CSMP shall address the objectives specified in CGP Section IV.O.2, Item c.i. and Attachment D Section III and IV.
3. The CSMP shall include monitoring procedures and instructions, location maps, forms, and checklists, which shall cover the following requirements:
   a. Visual Monitoring for Qualifying Rain Events.
   b. Visual Observation Exemptions.
   c. Monitoring Methods.
   d. Non-Stormwater Discharge Monitoring.

e. Non-Visible Pollutant Monitoring.

f. Particle Size Analysis for Project Risk Justification.

1101-3.2 SWPPP Risk Level 2.

1. The detailed requirements for Risk Level 2 are in Attachment D of the CGP.

2. Risk Level 2 sites are subject to items required for Risk Level 1 and the following subsections.

1101-3.2.1 Sediment and Erosion Control.

1. Implement appropriate Sediment and Erosion Control BMPs for areas under active construction as defined in the CGP.

2. Implement appropriate erosion control BMPs (runoff control and soil stabilization) in conjunction with sediment control BMPs for areas under active construction.

3. Apply linear sediment controls along the toe of the slope, face of the slope, and at the grade breaks of exposed slopes to comply with sheet flow lengths per the Storm Water Standards Manual, Table 5-5.

4. Ensure that construction activity traffic to and from the Project is limited to entrances and exits that employ effective controls to prevent offsite tracking of sediment.

5. Ensure that all storm drain inlets and perimeter controls, runoff control BMPs, and pollutant controls at entrances and exits, such as tire wash-off locations, are maintained and protected from activities that reduce their effectiveness.

6. At a minimum, inspect on a daily basis all immediate access road. Prior to any rain event, the discharger shall remove any sediment or other construction activity related materials that are deposited on the roads by vacuuming or sweeping.

1101-3.2.3 Monitoring and Reporting Requirements.

1. You shall develop and implement a written Site-specific Construction Site Monitoring Program (CSMP) as required by CGP. The CSMP shall be developed prior to the commencement of construction activities and shall be revised as necessary to reflect Project revisions. The CSMP shall be a part of the SWPP and shall be included as an appendix or separate SWPPP chapter. The CSMP shall be subject to the objectives specified in the CGP, Section IV.O.2, Item c.i. and Attachment D, Section III and IV.

2. The CSMP shall include the following requirements:

   a. Visual Monitoring for Qualifying Rain Events.

   b. Water Quality Sampling and Analysis.

c. Stormwater Discharge Water Quality Sampling Locations.

d. Stormwater Sampling and Handling Instructions.

e. Monitoring Methods.

f. Analytical Methods.

g. Non-Stormwater Discharge Monitoring.

h. NAL Exceedance Report, when applicable.

3. Water Quality Sampling and Analysis

a. At a minimum, the QSP shall collect one sample from each discharge location per 24-hour period of each Qualifying Precipitation Event, during active discharge. The QSP shall electronically submit all storm event sampling results to the State Water Board no later than 10 Days after the conclusion of a qualifying event to be certified by the LRP or designee.

4. NAL Exceedance Report

a. The QSP shall develop a NAL Exceedance Report in the event that any effluent sample exceeds an applicable NAL and a copy of each report shall be retained on Site and included in the SWPPP and be made available to the Engineer or the State authorized inspector immediately upon request**.**

1101-3.3 SWPPP Risk Level 3.

1. The requirements for Risks Level 3 are in Attachment of CGP.

2. Risk Level 3 sites are subject to the requirements for Risk Levels 1 and 2 and the following subsections.

1101-3.3.1 Monitoring and Reporting Requirements.

1. You shall comply with all requirements for a Risk Level 3, with emphasis on the following requirements:

a. You shall develop and implement a written Site-specific Construction Site Monitoring Program (CSMP) as required by CGP. The CSMP shall be developed prior to the commencement of construction activities and shall be revised as necessary to reflect Project revisions. The CSMP shall be a part of the SWPPP and shall be included as an appendix or separate SWPPP chapter. The CSMP shall address the objectives specified in CGP Section IV.O.2, Item c.i. and Attachment D, Section III and IV.

b. The CSMP shall include the following requirements:

1) Visual Monitoring for Qualifying Rain Events.

2) Water Quality Sampling and Analysis.

3) Stormwater Discharge Water Quality Sampling Locations.

4) Stormwater Sampling and Handling Instructions.

5) Monitoring Methods.

6) Analytical Methods.

7) Non-Stormwater Discharge Monitoring.

8) NAL Exceedance Report, when applicable.

9) Bio-assessment, when applicable.

1101-3.4 SWPPP LUP Type 1.

1. The SWPPP shall be designed in accordance with the objectives specified in Section IV.O of the CGP.

2. The QSD shall include information in the SWPPP that supports the conclusions, selections, use, and maintenance of BMPs.

3. You shall comply with the narrative effluent standards listed in Section III.G of Attachment E of the CGP.

1101-3.4.1 Construction BMP Requirements.

1. Refer to LUP Type 1 requirements specified in Attachment E of the CGP.

1101-3.4.2 BMP Inspection, Maintenance and Repair.

1. You shall at all times properly operate, inspect, maintain, and repair BMPs in accordance with Section 1101-2.8, Performance Standards and Section II of Attachment E of the CGP.

1101-3.4.3 Monitoring and Reporting Requirements.

1. You shall prepare a Monitoring and Reporting Program as required by Section III and IV of Attachment E of the CGP and shall immediately implement the program at the start of construction. The monitoring program shall be implemented at the appropriate level to protect water quality to the MEP at all times throughout the life of the Project. The Monitoring and Reporting Program shall be a part of the SWPPP, included as an appendix, or shall be a separate SWPPP chapter.

2. You shall conduct visual inspections daily during working hours and in conjunction with other daily activities in areas where active construction is occurring.

3. You shall take photographs of the site before, during, and after rain events while conducting inspection and submit reports through SMARTS once every

three rain events. The QSP's reporting through SMARTS shall not be subject to a LRP certification.

4. The Monitoring and Reporting Program shall address the following:

   a. Monitoring Requirements for Non-Visible Pollutants.

   b. Visual Observation Exemptions.

   c. Particle Size Analysis for Project Risk Justification.

1101-3.5 SWPPP LUP Type 2.

1. You shall follow the requirements listed for LUP Type 1 and the following subsections.

1101-3.5.1 BMP Inspection, Maintenance and Repair.

1. You shall at all times properly operate, inspect, maintain and repair BMPs in accordance with Section 1101-2.8, Performance Standards and Section II of Attachment E of the CGP.

1101-3.5.2 Monitoring and Reporting Requirements.

1. You shall follow the following requirements from Section III and IV of Attachment E of the CGP:

   a. Inspection Requirements.

   b. Effluent Monitoring and Sampling.

   c. Monitoring Requirements for Non-Visible.

   d. Monitoring Methods.

   e. Analytical Methods.

   f. NAL Exceedance Report.

1101-3.6 SWPPP LUP Type 3.

1101-3.6.1 BMP Inspection, Maintenance, and Repair.

1. You shall follow the requirements listed for SWPPP LUP Type 2.

1101-3.6.2 Monitoring and Reporting Requirements.

1. You shall follow the following requirements from Section III and IV of Attachment E of the CGP. Also, you shall follow the requirements listed for LUP Type 1 and LUP Type 2 and the following:

   a. Stormwater Effluent Monitoring Requirements.

   b. Receiving Water Monitoring Requirements.

   c. RW Sampling Locations.

d. Analytical Methods.

e. NAL Exceedance Report.

1) You shall electronically submit all storm event sampling results to the State Water Board no later than 10 Days after the conclusion of the qualifying storm event to be certified by the LRP or designee. In addition, you shall provide an NAL Exceedance Report when requested by the Regional Water Board.

1101-3.7 Payment.

1. The payment for SWPPP Development, SWPPP Implementation, and compliance with the requirements of the CGP and these specifications shall be included in the Bid items for **"SWPPP Development"** and **"SWPPP Implementation"**. The payment for the pertinent required trainings and certifications shall be included in these Bid items.

2. The payment for the permit to obtain coverage under the Construction General Permit shall be made under the Allowance Bid item for "SWPPP Permit Fee".

3. You shall submit a Schedule of Values in accordance with 7-2.1 "Schedule of Values (SOV)". The SOV shall itemize the Work further, as applicable, as follows:

a. Development and Amendment of PRDs.

b. Good Site Management "Housekeeping" BMPs.

c. Non-Stormwater Management.

d. Erosion Control.

e. Sediment Control.

f. Run-on and Runoff Management.

g. BMP Inspection, Maintenance, Repair, and Construction BMP Maintenance Log.

h. Development and Implementation of CSMP.

i. Annual Report.

j. Change of Information.

k. Notice of Termination.

l. Development and Implementation of Sampling and Analysis Portion of CSMP.

m. Development and Implementation of Monitoring and Reporting Program.

n. Street Sweeping.

o. Development and Implementation of Weather Triggered Action Plan.

p. Development and Implementation of Active Treatment System (Risk Level 3 only).

q. When specified, Post Construction Requirements (such as Inlet Markers).

4. For private projects, disregard references to the measurement and payment and refer to the permit conditions for additional requirements.

1101-4 WATER POLLUTION CONTROL PLAN (WPCP).

1. A WPCP shall be prepared for construction activities that result in land surface disturbances of less than 1 acre (0.4 hectare) according to the guidelines of the City Stormwater Standards Manual, for projects over 1 acre (0.4 hectare) determined to be exempt from the CGP, or if a project qualifies for a Rainfall Erosivity Waiver.

2. The WPCP shall include Erosion and Sediment Control BMPs, Good Housekeeping Measures, and Site management.

3. The WPCP shall identify all construction BMP requirements listed in the City Stormwater Standards Manual, Construction BMPs, including routine monitoring and maintenance of the BMPs.

4. The WPCP shall also show the BMPs to be implemented during construction to reduce or eliminate discharges of pollutants to the storm drain conveyance system.

5. The WPCP shall be submitted to the Resident Engineer prior to the Pre-construction meeting and shall be kept at the Site and made available at all times during normal business hours. Land disturbance can only occur when there are no exceptions taken to the WPCP by the Engineer.

6. The WPCP shall be amended when there is a change of QCP or whenever there is a change in construction or operations which may affect the discharge of pollutants to surface waters, groundwater, or to the City's MS4, or are deemed necessary by the Engineer. Amendments shall be documented in the Amendment Log (Appendix A). Copy of each amendment **shall be retained on site and included in the WPCP and be made available to the Engineer or the State authorized inspector immediately upon request**.

7. The WPCP shall be prepared by a qualified WPCP preparer if the project is not subject to the State Construction General Permit requirements, is a Priority Development Project, and is classified under any of the following scenarios:

   a. The project is located in the Los Penasquitos or Tijuana River Watershed.

b. The project discharges directly to or is located adjacent to an Environmentally Sensitive Area.

c. The project discharges to an Area of Special Biological Significance (ASBS). Refer to Appendix A of the Construction BMP Standards in the Stormwater Standards Manual for more details.

8. A qualified WPCP preparer shall be at least one of the following:

a. A California registered civil engineer.

b. A California registered geologist.

c. A California registered landscape architect.

d. A professional hydrologist registered through the American Institute of Hydrology.

e. A certified professional soil scientist registered through the Soil Science Society of America.

f. A certified professional in erosion and sediment control registered through EnviroCert International, Inc.

g. A certified professional in stormwater quality registered through EnviroCert International, Inc.

h. A certified professional in erosion and sediment control registered through the National Institute for Certification in Engineering Technologies.

9. The WPCPs that do not require a Qualified WPCP Preparer must be prepared, certified, and amended by a Qualified Contact Person (QCP).

10. Any hydrology or hydraulic calculations, soils report or geotechnical reports prepared in support of the WPCP must be prepared by a professional engineer with appropriate registration qualifications issued by the State of California.

1101-4.1 Site Management.

1. You shall implement and update the WPCP and BMP maps with each phase of construction activity, monitor the Site, and shall maintain BMPs in effective working condition. A copy of the WPCP and the BMP maps shall be kept at the site and be made available to the Engineer or the State authorized inspector immediately upon request.

2. You shall do the following:

a. Designate a Qualified Contact Person (QCP) who shall be responsible for the development, implementation, maintenance, and improvement of the BMPs and WPCP. The QCP shall be trained and competent in the use of BMPs.

1) The QCP shall be on-Site daily to evaluate the conditions of the Site with respect to stormwater pollution prevention.

2) The QCP shall be responsible for monitoring the weather and for the implementation of any emergency plans that shall be activated when there is a 50% or greater chance of rain. The weather shall be monitored with the National Weather on a 5-day forecast plan.

3) The QCP shall be responsible for overseeing any site grading and construction operations and for evaluating the effectiveness of the BMPs. The QCP shall ensure the modification of the BMPs, as necessary, to keep the Site in compliance and to ensure adequate routine maintenance of the BMPs.

b. Educate all Subcontractors and employees about stormwater pollution prevention measures required during construction activities to prevent the impact of construction discharges to the stormwater conveyance system. Education requirements shall be in accordance with Section E.7 of the San Diego Regional Water Quality Control Board (SDRWQCB) Order No. R9-2013-0001 NPDES NO. CAS0109266. You shall ensure that all personnel are trained in basic stormwater construction management. A log of the trained staff and the educational materials shall be kept in the WPCP file and shall be available to the Engineer at all times.

c. Protect new and existing stormwater conveyance systems from sedimentation, concrete rinse, or other construction related debris and discharges with the appropriate BMPs that are acceptable to the Engineer and as indicated in the WPCP.

d. Indicate in the WPCP the locations of BMPs like concrete wash outs, vehicle maintenance, staging and storage area protection, and etc. to be implemented. You shall ensure that these areas shall be utilized properly and maintained regularly.

e. Ensure that all waste and debris generated from the project and public during the period of construction within the storage, staging area, and designated area is contained and properly disposed of. Perimeter and runoff control measures shall be installed around the storage and staging area. The entrance to the construction storage and staging area shall be stabilized to prevent any tracking to impervious or paved surfaces

f. Inspect and document weekly or as directed by the Engineer the condition of all BMPs during the dry season (May 1st through

September 30th). Inspect and document daily or as directed by the Engineer the condition of all BMPs during the rainy season (October 1st through April 30th). You shall include documentation in the WPCP that BMPs were inspected at the intervals required and shall update and maintain this documentation for the duration of the Project.

g. Conduct visual inspections daily and maintain all BMPs as needed. Visual Inspections and maintenance of all BMPs shall be conducted before, during, and after every rain event and every 24 hours during any prolonged rain event. You shall maintain and repair all BMPs as soon as possible as safety allows.

h. Return the land areas disturbed during construction to the pre-construction or equivalent protection at the end of each workday to eliminate or minimize erosion and the possibility for discharge of sediment or other pollutants during a rain event.

3. If non-stormwater discharge leaves the Site, you shall immediately stop the activity and repair the damages. You shall immediately notify the Engineer of the discharge. Any and all waste material, sediment, and debris from each non-stormwater discharge shall be removed immediately from the storm drain conveyance system and shall be properly disposed of at no cost to the City.

1101-4.2 Payment.

1. The payment for the development of the Water Pollution Control Plan shall be included in the Bid item for **"WPCP Development"**.

2. The payment for the implementation of the Water Pollution Control Plan shall be included in the Bid item for **"WPCP Implementation".**

3. Submit a Schedule of Values for these Lump Sum Bid items in accordance with 7-2.1, "Schedule of Values (SOV)". The SOV shall itemize the Work further to show the following details:

   a. Development and Amendment of WPCP.

   b. Good Site Management "Housekeeping" BMPs.

   c. Non-Stormwater Management.

   d. Erosion Control.

   e. Sediment Control.

   f. BMP Inspection, Maintenance, and Repair.

   g. Street Sweeping.

   h. Development and Implementation of the Weather Triggered Action Plan.

i. When specified, Post Construction Requirements such as Inlet Markers.

1101-4.2 Payment.

4. All work, materials, labor, costs, and time associated with installing stenciled inlet marking shall be paid at the unit bid price **"Post-construction Requirements – Inlet Markings"** for each stenciled marking installed.

5. The unit bid price for **"Post-construction Requirements – Inlet Markings"** shall include the cost of removal of any decal-disk inlet markers.

1101-5 MINOR WATER POLLUTION CONTROL PLAN.

1. A Minor WPCP (DS-570) shall be prepared for construction activities that result in land surface disturbances of less than 5,000 square feet and have less than a 5-foot elevation differential over the entire project area.

2. The Minor WPCP shall identify all required construction BMP requirements listed in the City Stormwater Standards Manual, Construction BMPs.

3. The Minor WPCP shall also show the BMPs to be implemented during construction to reduce or eliminate discharges of pollutants to the storm drain conveyance system.

4. The Minor WPCP shall be submitted to the Resident Engineer at or prior to the Pre-construction meeting and shall be kept at the Site and made available at all times during normal business hours.

1101-5.1 Payment.

1. The payment for the development and implementation of the Minor Water Pollution Control Plan shall be included in the Bid item for **"Minor WPCP Development and Implementation"**.

SECTION 1102 – PERMANENT BEST MANAGEMENT PRACTICES (BMPs)

1102-1 PERMEABLE INTERLOCKING CONCRETE PAVERS.

1102-1.1 General.

1. Permeable interlocking concrete pavers shall consist of the paving unit, joint fill and bedding aggregate, base aggregate, and subbase aggregate.

1102-1.2 Materials.

1. **Permeable Interlocking Concrete Paver.** All paver material shall comply with ASTM C 936. Paver color pigment material shall comply with ASTM C 979. For vehicular applications, the minimum allowable paver thickness shall be $3^{1}/_{8}$ inch (80 mm). For pedestrian applications the minimum allowable paver thickness shall be $2\ ^{3}/_{8}$ inch (60 mm). The joints and/or openings shall comprise a minimum of 5% of the paver surface.

2. **Crushed Stone Joint Filler and Bedding.** The joint filler and bedding material shall conform to 200-1, "ROCK PRODUCTS". The gradation shall conform to Table 200-1.2.1 (A) and ASTM No. 8. When the joints are narrow, gradation permitted shall conform to Table 200-1.2.1 (A) and ASTM No. 89 or ASTM No. 9.

3. **Base Aggregate.** The base aggregate shall conform to 200-1, "ROCK PRODUCTS". The aggregate gradation shall conform to Table 200-1.2.1 (A) and AASHTO No. 57.

4. **Subbase Aggregate.** The subbase aggregate shall conform to 200-1, "ROCK PRODUCTS". The aggregate gradation shall conform to Table 200-1.2.1 (A) and ASTM No. 2.

1102-1.3 Storage.

1. Store materials in protected areas such that they are kept free from mud, dirt, and other foreign materials. Store concrete paver cleaners and sealers per the manufacturer's instructions.

1102-1.4 Bedding.

1102-1.4.1 General.

1. Permeable interlocking concrete pavers bedding layer shall be constructed of material conforming to Table 200-1.2.1 (A) ASTM No. 8, ASTM No. 89, or ASTM No. 9 as directed by the Plans.

1102-1.4.2 Spreading.

1. Imported aggregate bedding shall be delivered to the roadbed as uniform mixtures and each layer shall be spread in 1 operation. Segregation shall be avoided, and the bedding shall be free from pockets of coarse or fine material.

2. Aggregate bedding shall be deposited on the roadbed at a uniform quantity per linear foot (meter) which quantity will provide the required compacted thickness within the tolerances specified herein without resorting to spotting, picking up, or otherwise shifting the aggregate bedding material. At the time the aggregate is spread, it shall have a moisture content sufficient to obtain the required compaction. Such moisture shall be uniformly distributed throughout the material.

3. The bedding thickness shall be installed at 2 inches (50.8 mm). The layer may be spread and compacted in 1 layer.

4. The surface tolerance of the screeded bedding material is ± 3/8 inches over 10 feet (± 9.5 mm over 3 m).

1102-1.5 Construction Methods.

1. Work shall be performed by a qualified installer meeting the following requirements:

   a. Submit documentation showing comparable concrete paver installation similar in scope, design material, and extent indicated on the Plans has been successfully installed within the past 5 years or more of documented performance record for the proposed product and has been successfully performed by the installer and its personnel assigned to the concrete paver installation for this project.

   b. Holds a current certificate from the Interlocking Concrete Pavement Institute Concrete Paver Installer Certification program.

1102-1.5.1 Construction Test Section.

1. Construct a test section using the same method and crew performing the installation.

2. The test section shall be used to determine the surcharge of the bedding layer, joint sizes, and lines, laying pattern, color, and texture of the job.

3. The test section shall be a minimum of 100 ft^2 (9.3 m^2).

4. The test section may be incorporated in the Work if approved by the Engineer.

5. The Engineer shall be notified at least 24 hours in advance of construction of the test section.

1102-1.5.2 Subgrade.

1. The subgrade preparation shall conform to 301-1, “SUBGRADE PREPARATION”.

1102-1.5.3 Base/Subbase.

1. The base/subbase aggregate installation shall comply with 1102-2, “PERMEABLE PAVEMENT STRUCTURAL BASE AND SUBBASE”.

1102-1.5.4 Bedding.

1. The bedding aggregate installation shall comply with 1102-1, "Permeable Interlocking Concrete Pavers Bedding". Do not subject screeded bedding material to any pedestrian or vehicular traffic before paving unit installation begins.

1102-1.5.5 Paving Unit Placement.

1. Paving units can be installed by manual methods or with mechanical equipment. The paving units shall be laid in the pattern(s) and joint widths shown in the Plans. The straight pattern lines shall be maintained.
2. Fill gaps at the edges of the paved area with cut paver units. Cut pavers subject to tire traffic shall be no smaller than 1/3 of a whole unit.
3. Openings and joints shall be filled with the fill material identified in the Plans. Excess fill aggregate on the surface shall be removed by sweeping the pavers clean.
4. The pavers shall be compacted and seated into the bedding material using a low-amplitude, 75-90 Hz plate compactor capable of at least 5,000 lbf (22 kN) centrifugal compaction force. At least 2 passes with the plate compactor shall be required. Compaction within 6 feet (1.8 m) of an unrestrained edge shall not be performed.
5. After compaction, additional filling aggregate shall be applied as needed and the cleaning and compaction process repeated.
6. The final surface tolerance of compacted pavers shall not deviate more than ± 3/8 inches over 10 feet (± 9.5 mm over 3 m).

1102-1.5.6 Acceptance.

1. Permeable interlocking concrete pavers shall have an infiltration rate of a minimum of 100 inches per hour (254 cm/hr) when tested.
2. Adjacent pavers shall be no greater than 1/8-inch (3.2 mm) difference in height. Final elevations shall be checked for conformance to the Plans.

1102-1.6 Measurement and Payment.

1. The payment for quantities of structural bedding shall be measured by the square yard (square meter) or cubic yard (cubic meter) in place as shown on the Plan or as directed by the Engineer and shall be included in the Bid item for **"Permeable Interlocking Concrete Pavers Bedding"**. The volumetric quantities of bedding material shall be those compacted in place within the limits of the dimensions shown on the Plans.
    a. The weight of material to be paid for shall be determined by deducting (from the weight of material delivered to the Work) the weight of water in the material (at the time of weighing) in excess of 1% more than the

optimum moisture content. No payment shall be made for the weight of water deducted as provided in this subsection.

2. The payment for permeable interlocking concrete pavers and installation Work as shown on the Plan or as directed by the Engineer shall be included under the square foot Bid item for **"Permeable Interlocking Concrete Pavers"**.

1102-2 PERMEABLE PAVEMENT STRUCTURAL BASE AND SUBBASE.

1102-2.1 General.

1. Permeable pavement structural base shall be constructed of material conforming to Table 200-1.2.1 (A) and AASHTO No. 57.

2. The permeable pavement structural subbase shall be constructed of material conforming to Table 200-1.2.1 (A) and ASTM No. 2.

3. Rounded river material shall not be used for vehicular applications.

1102-2.2 Spreading.

1. Imported aggregate bases/subbases shall be delivered to the roadbed as uniform mixtures and each layer shall be spread in one operation. Segregation shall be avoided, and the base/subbase shall be free from pockets of coarse or fine material.

2. Aggregate bases/subbases shall be deposited on the roadbed at a uniform quantity per linear foot (meter) which quantity will provide the required compacted thickness within the tolerances specified herein without resorting to spotting, picking up, or otherwise shifting the aggregate base/subbase material. At the time the aggregate is spread, it shall have a moisture content sufficient to obtain the required compaction. Such moisture shall be uniformly distributed throughout the material.

3. The base thickness shall be installed to a minimum of 4 inches (100 mm) and a maximum of 6 inches (150 mm). The layer may be spread and compacted in 1 layer.

4. The subbase thickness shall be installed to a minimum of 6 inches (150 mm). Where the required thickness is more than 6 inches (150 mm) the subbase material shall be spread and compacted in 2 or more layers of approximately equal thickness and the maximum compacted thickness of any one layer shall not exceed 6 inches (150 mm). Each layer shall be spread and compacted in a similar manner.

1102-2.3 Compacting.

1. Each lift shall be compacted with a minimum 10 ton roller to be firm and unyielding. A minimum of 2 passes with a vibratory roller and then 2 passes

with a static roller shall be performed until there is no visible movement of the base/subbase. The aggregate shall not be crushed.

1102-2.4 Measurement and Payment.

1. The payment for quantities of structural base and subbase will be measured by ton and shall be included under the Bid item for "Permeable Pavement Structural Base And Subbase". The volumetric quantities of base and subbase material shall be those compacted in place within the limits of the dimensions shown on the Plans.
2. The weight of material to be paid for shall be determined by deducting (from the weight of material delivered to the Work) the weight of water in the material (at the time of weighing) in excess of 1% more than the optimum moisture content. No payment shall be made for the weight of water deducted as provided in this subsection.

1102-3 PLASTIC LINER.

1102-3.1 General.

1. This section shall apply to all areas that receive a plastic liner to provide an impermeable barrier to prevent water or other liquids from infiltrating into the subgrade. This section shall also apply for the material required to provide a seal at each utility penetration through the plastic liner that is associated with water service, gas service, sewer lateral, and underdrain crossings.

1102-3 Submittal.

1. You shall submit a Manufacturer's Certificate in accordance with 3-8, "SUBMITTALS" that the material complies with this specification.

1102-3.3 Materials.

1. **Flexible Plastic Liner.**
   a. PVC liners used for the lining of green infrastructure shall meet the requirements of ASTM D-7176 Standard Specification for PVC geomembranes used in buried applications and shall conform to the requirements in Table 1102-3.3 (1).
   b. The PVC liner shall be ultraviolet light resistant and shall be sufficiently flexible to cover and closely conform to all edges and corners of the filter bed excavation at ambient temperatures as low as 45° F (7.2° C) without application of heat.
   c. A geotextile fabric shall be placed on the top and bottom of the membrane for puncture protection. The geotextile fabric shall be nonwoven geotextile fabric meeting the requirements indicated in Table 213-5.2 (A): NONWOVEN.

TABLE 1102-3.3 (1)

Property	**Test**	**Unit**	**PVC 30**
Thickness	ASTM D-5199	in	± 0.030
Grab Tensile Strength	ASTM D-882	kN/m (lb/in)	12.8 (73)
Tensile Elongation	ASTM D-882	%	380
Tensile Modulus	ASTM D-882	kN/m (lb/in)	5.6 (32)
Tear Strength	ASTM D-1004	N (lb)	35 (8)
Dimensional Stability	ASTM D-1204	%	3.0
Low Temp. Impact	ASTM D-1790	C	-29°
Index Properties			
Specific Gravity	ASTM D-792	g/cc	1.2
Water Extraction % Loss (Max.)	ASTM D-1239	%	0.15
Avg. Plasticizer Molecular Weight	ASTM D-2124	—	400
Volatile Loss	ASTM D-1203	%	0.7
Soil Burial Break Strength	G160	%	5.0
Soil Burial Elongation	G160	%	20
Soil Burial Modulus at 100%	G160	%	20
Hydrostatic Resistance	ASTM D-751	kPa (psi)	690 (100)
UV Resistance	ASTM D-4355	%	70
Seam Strengths			
Shear Strength	ASTM D-882	kN/m (lb/in)	10 (58.4)
Peel Strength	ASTM D-882	kN/m (lb/in)	2.6 (15)

2. **Clay Liners.**

a. A geosynthetic clay liner (GCL) is a woven fabric-like material, primarily used for the lining of green infrastructure. Geosynthetic clay liners shall conform to the requirements in Table 1102-3.3 (2).

TABLE 1102-3.3 (2) Geosynthetic Clay Liner Specifications

Property	**Test Method**	**Unit**	**GCL Specification**
Bentonite Mass per unit Area (min)	ASTM D-5890	g/m^2	3,700
Swell index (min)	ASTM D-5891	ml/2g	24
Fluid loss (max)	ASTM D-5890	ml	18
Peel Strength (min)	ASTM D-6496	N/m	360
Index Flux (max)	ASTM D-5887	$(m^3/m^2)/s$	1×10^{-8}
Permeability (max)	ASTM D-5887	m/sec	1×10^{-8}
Tensile Strength (min)	ASTM D-6768	kN/m	4.0
Total Mass per unit Area (min)	ASTM D-5993	g/m^2	4,000

3. **Field-welded Joints.**

1. All joints shall be field-welded using adhesive, chemical fusion, or thermal fusion welding methods or in accordance with the manufacturer's recommendations. Adhesives shall be in accordance with the manufacturer's recommendations.

4. **Hose Clamps.**

a. All hose clamps shall be 1 piece 300 series stainless steel with worm gear. The hose clamps shall be suited for water environments. Alternative clamps may be submitted to the Engineer for approval.

1102-3.4 Plastic Liner Construction Methods.

1. Plastic liners or PVC geomembranes that are placed within green infrastructure shall be placed in accordance with the following provisions:

a. **Pre-Installation Examination and Preparation.** Prior to beginning Work, you shall examine previous Work, related Work, and conditions

under which this Work is to be performed. This shall include the following:

1) Verify the subgrade is at correct depths, lines, and dimensions for installing the liner.

2) Ensure that overly wet conditions do not exist or are not anticipated to occur during installation, as they will contaminate the liner. Prior to placement, the trench shall have no standing water, mud, debris, or excessive moisture. No liner shall be placed on a subgrade that has become softened by water or overly dried until the subgrade has been properly reconditioned, restored, and re-inspected.

3) Clear any construction debris present within the placement area which may damage the liner. Work is to be sequenced to avoid construction traffic on the exposed liner at any time.

b. **Placement.**

1) Liner shall be cut, fit to the dimensions, and placed in the trench in accordance with the Plans. Trench sides and bottom shall be excavated to provide a smooth surface, free of obstructions and debris.

2) The liner shall be installed on the bottoms and the sides of the trench and/or on top of the permeable aggregate base and to the elevations in accordance with the plan details. To prevent lateral flow, the hydraulic restriction layer shall extend the full depth of the media to the base of the drainage layer in situations where underdrains are required. In situations where underdrains are not required, the vertical hydraulic restriction layer shall extend to a depth in accordance with the Right-Of-Way Design Manual. At locations where liners are not required in the vertical surfaces of the trench, the liners in the horizontal placements shall be extended and turned up minimum 6 inches (152.4 mm) on the vertical surfaces to provide tight layer separation.

3) Voids between liner and excavation sides shall be prevented during construction. Removing boulders or other obstacles from the trench walls may create such voids. Natural soils shall be placed in these voids at the most convenient time during the construction to ensure liner completely and uniformly conform to the sides of the excavation.

4) During construction, waterproofing membrane shall be held in place by backfilling or other means without puncturing the

material. Other methods of pinning can also be used as allowed by the Engineer.

5) No traffic or other equipment shall be allowed directly on the liners.

6) The liners shall have minimum longitudinal and vertical overlaps. Unless specified otherwise, when overlaps are required between rolls, the upstream roll shall overlap the downstream roll in order to provide a shingled effect. If chemical seams are used, the panels shall overlap by 6 inches to 8 inches (152.4 mm to 203.2 mm) with a 4 inches (101.6 mm) wide seam. If thermal seams are used, the single track weld shall overlap 4 inches to 6 inches (101.6 mm to 152.4 mm) with a minimum 2 inches (50.8 mm) wide seam. All seams shall be made in accordance with the manufacturer's recommendation. If at all possible, seams shall not be located at low points in the subgrade unless the geometry requires seaming to be done at these locations. Field seams shall be inspected and, when ordered by the Engineer, shall be tested and pass the Vacuum Box Test.

7) Before covering with backfill material, the conditions of the liner including all factory seams shall be observed by the inspectors to determine that there are no holes or rips that exist in the liner and all piping or conduit penetrations are properly sealed and welded. Damaged liner material shall be repaired at your expense by placing new material that meets overlap requirements over the damaged area. The liner shall be covered as soon as possible after being inspected, but not later than 7 Days after placement. Material left uncovered for more than 7 Days shall be removed and rejected.

8) All liners shall have a minimum of 3 inches (76.2 mm) top soil and/or mulch covers and they shall not be exposed to any sunlight. After placement of granular fill and soil media, two edges of the liner protruding at the top of the trench shall be anchored to concrete curb or sidewalk. Excess material shall be trimmed neatly such that it is not exposed. Excess liner shall not be trimmed until the site is fully stabilized.

c. **Pipe Penetrations and Pipe Sealant.**

1) Provide pipe penetrations and joint sealant sealing systems for all utilities and underdrain penetrations through the liner.

2) Penetrations shall be sealed using the same plastic liner or PVC geomembrane material, flat stock and accessories as shown on the Plans and specified hereon.

3) The field fabricated assembly shall be field welded to the main liner as shown on the Plans so as to prevent leakage. These field welds shall be in accordance with the manufacturer's recommendations.

4) All sealed areas shall be Air Lance tested using ASTM D-4437 and verified to be leak free.

5) Adhesive and stainless-steel hose clamps shall be included as indicated on Plans.

1102-3.5 Payment.

1. The payment for the plastic liner shall be measured by the area of fabric placed, not including any material for overlaps and splices. The square foot Bid item for **"Plastic Liner"** shall include testing, transportation, seams, overlaps, staking, embedment, protection measures, and the lining used for pipe penetrations and joints.

1102-4 PERFORATED PVC UNDERDRAINS.

1102-4.1 General.

1. Trenches for underdrains where perforated PVC pipes are located shall be excavated, the plastic liner placed in accordance with 1102-3, "PLASTIC LINER", the pipe installed, and the trench backfilled with permeable material according to the dimensions and details shown on the plans. When underdrains are installed in trenches outside the subgrade area, the top 6 inches (152.4 mm) of the trench shall be backfilled, as shown on the plans, with structure backfill conforming to 300-3, "STRUCTURE EXCAVATION AND BACKFILL".

2. The underdrain system shall be located above the invert of adjacent stormwater systems.

3. To prevent clogging of underdrain from construction sediments, the associated stormwater facilities shall be excavated to rough grade. After the contributing drainage area is stabilized, the underdrains and the stormwater facilities shall be constructed to achieve the final elevation.

4. Materials shall be in accordance with 207-17.7, "Perforated PVC Pipe".

1102-4.2 Installation.

1. The solid and perforated PVC pipe shall be installed in accordance with SECTION 306 - OPEN TRENCH CONDUIT CONSTRUCTION.

2. The perforated PVC pipe shall be placed such that the perforations are pointed downward. The drainage stone shall be placed and compacted so that it is firm and unyielding prior to placing the pipe. Subsequent backfill shall be in lifts no greater than 8 inches (203.2 mm) and compacted to be firm and unyielding. The underdrain shall be encased in a layer of clean, double washed ASTM D448 No.57 or smaller (No. 68, 8, or 89) stone.

1102-4.3 Jointing.

1. Jointing of solid PVC pipe shall be securely made in accordance with 306-7.7.2.3, "Jointing of Injection-Sealed PVC Pipe". Where there is less than 12 inches (304.8 mm) of vertical clearance between the underdrain and the existing water line (or more if indicated on the plans), then no joints shall be within 4 feet (1.2 m) of either side of the existing water line.

2. Perforated PVC pipe shall be connected with belled ends, or with sleeve-type or stop-type couplings under AASHTO M 278. Solvent cementing of joints shall be required.

1102-4.4 Measurement and Payment.

1. Perforated PVC Pipes are measured along the longitudinal axis between the ends as laid and shall include the actual pipe in place and shall not include the inside dimensions of junction structures.

2. The linear foot Bid item for **"Perforated PVC Pipe (Underdrain Pipe)"** shall be considered full compensation for all materials, labor, tools, equipment, and incidentals (including pipe risers, caps, fittings, pipe penetrations, and joint sealants). The payment quantity includes the length of elbows, outlets, risers, tees, wyes and other branches to the point of intersection.

1102-5 UNDERDRAIN CLEANOUTS.

1102-5.1 General.

1. Underdrain cleanout structures shall include in-line wye fittings and stub for access where called for in the plans.

1102-5.2 Installation.

1. The wells/cleanouts shall be connected to the perforated underdrain with the appropriate manufactured connections. The wells/cleanouts shall be capped with a lockable screw cap. The ends of underdrain pipes not terminating in an observation well/cleanout shall also be capped.

1102-5.3 Test Methods and Acceptance.

1. When construction is complete, you shall test all completed underdrain systems for continuous, unimpeded flow.

2. The test methods for each pipe run are as follows:

   a. At highpoint or upstream end of underdrain pipe, open cleanout and insert hose from water source.

   b. Turn on water.

   c. Acceptance of pipe run consists of free flow of water through drain outlet into the existing storm drain structure.

3. Any sections of the underdrain that are clogged or crushed shall be replaced at your expense.

1102-5.4 Payment.

4. The payment for underdrain cleanouts shall be included in the Bid item for **"Underdrain Cleanout"** and shall include shoring, backfill, compaction, installation of cleanout including wyes and jointing, pipe risers, gaskets, frames and covers or screw caps, and concrete encasements. This payment shall also include the Work required for testing and acceptance.

1102-6 CHECKDAMS.

1102-6.1 General.

1. Checkdams for green infrastructure are intended to slow the velocity of the water to prevent erosion within the system.

1102-6.2 Materials.

1. **Cast-in-place Concrete.**

   a. The checkdams (cast-in-place concrete) material shall conform to 201-1, "PORTLAND CEMENT CONCRETE".

2. **Mason Blocks.**

   a. The checkdams (mason blocks) material shall conform to 202-2, "CONCRETE BLOCK".

3. **Recycled Concrete.**

   a. Checkdams may reuse pieces of demolished driveways, sidewalks, and other flatwork for construction.

   b. The sizes of the recycled concrete material shall be as specified on the Plans.

1102-6.3 Sequence of Work.

1. **Placement.**

   a. **Cast-in-place Concrete.** Concrete work shall conform to the requirements in 303-1, "CONCRETE STRUCTURES".

b. **Mason Blocks.** Mason work shall conform to the requirements in 303-4, "MASONRY CONSTRUCTION".

c. **Recycled Concrete.**

1) All work shall be laid true, level, and plumb in accordance with the Plans.

2) Mortar joints shall be straight, clean and uniform in thickness. Horizontal and vertical joints shall be a maximum of 3/8" thick with full mortar coverage.

3) Stacked units shall have mortar joints offset at 6 inches minimum.

4) Units shall be laid with push joints. No slushing or grouting of a joint will be permitted nor shall a joint be made by working in mortar after the joints have been laid.

5) All joints shall be tooled with a round bar to produce a dense, slightly concave surface well-bonded to the block at the edges. Tooling shall be done when the mortar is partially set but still sufficiently plastic to bond. All tooling shall be done with a tool which compacts the mortar, pressing the excess mortar out of the joint rather than dragging it out.

1102-6.4 Protection and Curing.

1. During construction operations, all adjoining Work shall be protected from mortar and/or concrete droppings.

2. The checkdams shall be protected from surrounding work and kept free from mud, dirt, and other foreign materials.

3. Recycled concrete work shall be protected from the sun and rain.

1102-6.5 Measurement and Payment.

1. The payment for checkdams shall be included under the square foot Bid item for **"Checkdams"** and shall include but shall not be limited to labor, materials, and other appurtenances as shown on Plans.

1102-7 BIORETENTION SOIL MEDIA (BSM).

1102-7.1 General.

1. Bioretention Soil Media (BSM) is a formulated soil mixture that is intended to filter stormwater and support plant growth while minimizing the leaching of chemicals found in the BSM itself.

2. BSM consists of 70% to 85% by volume washed sand and 15% to 30% by volume compost or alternative organic amendment.

3. Alternative proportions may be justified under certain conditions. BSM shall be mixed thoroughly using a mechanical mixing system at the plant site prior to delivery.

4. In order to reduce the potential for leaching of nutrients, the proportion of compost or alternative organic amendment shall be held to a minimum level that will support the proposed vegetation in the system.

1102-7.2 Sand for Bioretention Soil Media.

1. The sand shall conform to ASTM C33 "fine aggregate concrete sand" requirements. A sieve analysis shall be performed in accordance with ASTM C 136, ASTM D 422, or approved equivalent method to demonstrate compliance with the gradation limits shown in TABLE 1102-7.2 below.

2. The sand shall be thoroughly washed to remove fines, dust, and deleterious materials prior to delivery. Fines passing the No. 200 sieve shall be non-plastic.

TABLE 1102-7.2: Sand Gradation Limits

Sieve Size (ASTM D422)	**Percent Passing (by weight)**	
	Minimum	**Maximum**
3/8 inch	100	100
#4	95	100
#8	80	100
#16	50	85
#30	25	60
#50	5	30
#100	0	10
#200	0	5

Note: Coefficient of Uniformity (Cu = D60/D10) equal to or greater than 4.

1102-7.3 Compost.

1. Compost shall be certified by the U.S. Composting Council's Seal of Testing Assurance Program or an approved equivalent program.

2. Compost shall comply with the following requirements:

a. Organic Material Content shall be 35% to 75% by dry weight.

b. Carbon to nitrogen (C:N) ratio shall be between 15:1 and 40:1, preferably above 20:1 to reduce the potential for nitrogen leaching/washout.

c. Physical contaminants (manmade inert materials) shall not exceed 1% by dry weight.

d. pH shall be between 6.0 and 7.5.

e. Soluble Salt Concentration shall be less than 10 dS/m (Method TMECC 4.10-A, USDA and U.S. Composting Council).

f. Maturity (seed emergence and seedling vigor) shall be greater than 80% relative to positive control (Method TMECC 5.05-A, USDA and U.S. Composting Council).

g. Stability (Carbon Dioxide evolution rate) shall be less than 2.5 mg CO2-C per g compost organic matter (OM) per day or less than 5 mg CO2-C per g compost carbon per day, whichever unit is reported. (Method TMECC 5.08-B, USDA and U.S. Composting Council). Alternatively, a Solvita rating of 6 or higher is acceptable.

h. Moisture shall be 25%-55% wet weight basis.

i. Select Pathogens shall pass US EPA Class A standard, 40 CFR Section 503.32(a).

j. Trace Metals shall pass US EPA Class A standard, 40 CFR Section 503.13, Tables 1 and 3.

k. Shall be within gradation limits in Table 1102-7.3 (ASTM D 422 sieve analysis or approved equivalent).

Table 1102-7.3: Compost Gradation Limits

Sieve Size	**Percent Passing (by weight)**
16 mm (5/8”)	99 to 100
6.3 mm (1/4”)	40 to 95
2 mm	40 to 90

1102-7.4 Alternative Mix Components and Proportions.

1. Alternative mix components and proportions may be utilized, provided that the whole blended mix (1102-7.5) conforms to agricultural, chemical, and hydraulic suitability criteria, as applicable. Alternative mix designs may include alternative proportions, alternative organic amendments and/or the use of natural soils. Alternative mixes are subject to approval by the City Engineer.
2. Additional mix components, such as granular activated carbon, zeolite, and biochar may be considered to improve performance for other parameters.

1102-7.5 Whole BSM Testing Requirements and Criteria.

1. You shall submit the following information to the City Engineer at least 30 Calendar days prior to ordering materials:
    a. Source/supplier of BSM
    b. Location of source/supplier
    c. A physical sample
    d. Available supplier testing information
    e. Whole BSM test results from a third-party independent laboratory
    f. Description of proposed methods and schedule for mixing, delivery, and placement of BSM
2. Test results shall be no older than 120 Calendar Days and shall accurately represent the materials and feed stocks that are currently available from the supplier.
3. Test results shall demonstrate conformance to 1102-7.6, “BSM Agricultural Suitability”, 1102-7.7, “BSM CHEMICAL SUITABILITY”, and 1102-7.8, “BSM Hydraulic Suitability”.
4. No delivery, placement, or planting of BSM shall begin until test results confirm the suitability of the BSM.
5. You shall submit a written request for approval which shall be accompanied by written analysis results from a written report of a testing agency. The testing agency shall be registered by the State for agricultural soil evaluation which indicates compliance stating that the tested material proposed source complies with these specifications.
6. Third party independent laboratory testing shall be paid at your expense.

1102-7.6 BSM Agricultural Suitability.

1. The BSM shall be suitable to sustain the growth of the plants specified and shall conform to the following requirements:

a. pH range shall be between 6.0-7.5

b. Salinity shall be less than 3.0 millimho/cm (as measured by electrical conductivity)

c. Sodium adsorption ration (SAR) shall be less than 3.0

d. Chloride shall be less than 150 ppm

2. The test results shall show the following information:

a. Date of Testing

b. Project Name

c. The Contractor's Name

d. Source of Materials and Supplier's Name

e. pH

f. E_C

g. Total and plant available elements (mg/kg particle concentration): phosphorus, potassium, iron, manganese, zinc, copper, boron, calcium, magnesium, sodium, sulfur, molybdenum, nickel, aluminum, arsenic, barium, cadmium, chromium, cobalt, lead, lithium, mercury, selenium, silver, strontium, tin, and vanadium. Plant available concentration shall be assessed based on weak acid extraction (ammonium Bicarbonate/DTPA soil analysis or similar)

h. Soil adsorption ratio

i. Carbon/nitrogen ratio

j. Cation exchange capacity

k. Moisture content

l. Organic content

m. An assessment of agricultural suitability based on test results

n. Recommendations for adding amendments, chemical corrections, or both.

3. BSM which requires amending to comply with these specifications shall be uniformly blended and tested in its blended state prior to testing and delivery. BSM that does not meet all the agricultural standards in this section may be accepted at the discretion of the City Engineer if the project's landscape designer certifies that the BSM shall be suitable to sustain the growth of the plants.

1102-7.7 BSM Chemical Suitability.

1. For systems with underdrains, the BSM shall exhibit limited potential for leaching of pollutants that are at levels of concern. Potential for pollutant leaching shall be assessed using either the Saturated Media Extract Method (aka, Saturation Extract) that is commonly performed by agricultural laboratories or the Synthetic Precipitation Leaching Procedure (SPLP) (EPA SW-846, Method 1312). The referenced tests express the criteria in terms of the pollutant concentration in water that is in contact with the media. Note that this test, unlike tests often run in soils labs for assessing agricultural suitability, does not include adding acid (e.g., DTPA) as part of the test method. Running a test with acid addition may result in higher reported values, which may result in a sample not meeting the numeric requirements listed below. In areas in which a pollutant or pollutants are associated with a water quality impairment or a TMDL, BSM in systems with underdrains shall conform to the following Saturation Extract or SPLP criteria for applicable pollutant(s):

    a. Nitrate < 3 mg/L

    b. Phosphorus < 1 mg/L

        1) Alternative mixtures may be considered for systems with underdrains in areas where phosphorus is associated with a water quality impairment or a TMDL or where the BSM does not achieve the Saturation Extract or SPLP criteria of < 1 mg/L total phosphorus as specified. Details regarding alternative mixtures requirements and potential components are included in 1102-7.4, “Alternative Mix Components and Proportions”.

    c. Zinc < 0.1 mg/L

    d. Copper < 0.025 mg/L

    e. Lead < 0.025 mg/L

    f. Arsenic < 0.02 mg/L

    g. Cadmium < 0.01 mg/L

    h. Mercury < 0.01 mg/L

    i. Selenium < 0.01 mg/L

2. Criteria shall be met as stated where a pollutant is associated with a water quality impairment or Total Maximum Daily Load (TMDL) in any downstream receiving water. Criteria may be waived or modified, at the discretion of the

Resident Engineer, where a pollutant does not have a nexus to a water quality impairment or TMDL of downstream receiving water(s). Criteria may also be modified at the discretion of the Resident Engineer if you demonstrate that suitable BSM materials cannot be feasibly sourced within a 50-mile radius of the project site and a good faith effort has been undertaken to investigate available materials. BSM that meets alternative specifications developed by the County of San Diego or other local agencies may also be accepted as satisfying the "good faith effort" standard at the discretion of the City Engineer.

3. The chemical suitability criteria listed in this section do not apply to systems without underdrains, unless groundwater is impaired or susceptible to nutrients contamination.

1102-7.8 BSM Hydraulic Suitability.

1. The saturated hydraulic conductivity or infiltration rate of the whole BSM shall be measured by one of the following methods:

   a. Measurement of hydraulic conductivity (USDA Handbook 60, method 34b) (commonly available as part of standard agronomic soil evaluation)

   b. ASTM D2434 Permeability of Granular Soils (at approximately 85% relative compaction Standard Proctor, ASTM D698)

2. BSM shall conform to hydraulic criteria associated with the BMP design configuration that best applies to the facility where the BSM will be installed:

   a. **Systems with unrestricted underdrain system (i.e., media control).** For systems with underdrains that are not restricted, the BSM shall have a minimum measured hydraulic conductivity of 8 inches per hour to ensure adequate flow rate through the BMP and longevity of the system. The BSM shall have a maximum measured hydraulic conductivity of no more than 20 inches per hour. BSM with higher measured hydraulic conductivity may be accepted at the discretion of the Resident Engineer. In all cases, an upturned elbow system on the underdrain, measuring 9 to 12 inches above the invert of the underdrain, shall be used to control velocities in the underdrain pipe and reduce potential for solid migration through the system.

   b. **Systems with restricted underdrain system (i.e., outlet control).** For systems in which the flowrate of water through the media is controlled via an outlet control device (e.g., orifice or valve) affixed to the outlet of the underdrain system, the hydraulic conductivity of the media shall be at least 15 inches per hour and not more than 40 inches per hour. The outlet control device shall control the flowrate to between 5 and 12 inches per hour.

c. **Systems without underdrains.** For systems without underdrains, the BSM shall have a hydraulic conductivity at least 4 times higher than the underlying soil infiltration rate but shall not exceed 12 inches per hour.

1102-7.9 Delivery, Storage and Handling.

1. You shall not deliver or place soils in frozen, wet, or muddy conditions. You shall protect soils and mixes from absorbing excess water and from erosion at all times. You shall not store materials unprotected during large rainfall events (>0.25 inches). If water is introduced into the material while it is stockpiled, you shall allow the material to drain to the acceptance of the Resident Engineer before placement.

2. BSM shall be thoroughly mixed prior to delivery using mechanical mixing methods such as a drum mixer. BSM shall be lightly compacted and placed in loose lifts approximately 12 inches (300 mm) to ensure reasonable settlement without excessive compaction. Compaction within the BSM area shall not exceed 75 to 85% standard proctor within the designed depth of the BSM. Machinery shall not be used in the bioretention facility to place the BSM. A conveyor or spray system shall be used for media placement in large facilities. Low ground pressure equipment may be authorized for large facilities at the discretion of the Resident Engineer.

3. Placement methods and BSM quantities shall account for approximately 10% loss of volume due to settling. Planting methods and timing shall account for settling of media without exposing plant root systems.

4. The Resident Engineer may request up to three double ring infiltrometer tests (ASTM D3385) or approved alternative tests to confirm that the placed material meets applicable hydraulic suitability criteria in accordance with 1102-7.8, “BSM Hydraulic Suitability”.

5. In the event that the infiltration rate of placed material does not meet applicable criteria, the Resident Engineer may require replacement and/or decompaction of materials.

1102-7.10 Quality Control and Acceptance.

1. Close adherence to the material quality controls herein are necessary in order to support healthy vegetation, minimize pollutant leaching, and assure sufficient permeability to infiltrate/filter runoff during the life of the facility.

2. Amendments may be included to adjust agronomic properties.

3. Acceptance of the material will be based on test results certified to be representative.

4. Test results shall be conducted no more than 120 Calendar Days prior to delivery of the blended BSM to the project site.

5. For projects installing more than 100 cubic yards of BSM, batch-specific tests of the blended mix shall be provided to the Resident Engineer for every 100 cubic yards of BSM along with a site plan showing the placement locations of each BSM batch within the facility.

1102-7.11 Measurement and Payment.

1. The payment for quantities of Bioretention Soil Media shall be measured by the cubic yard in place as shown on the Plans or as directed by the Engineer and shall be included under the Bid item for **"Bioretention Soil Media"**. This Bid item shall include all labor, placement, soil mixture as specified herein, testing and all other incidentals necessary to install the BSM.

1102-8 AGGREGATE MATERIALS FOR BSM DRAINAGE LAYERS.

1102-8.1 Drainage of BSM. Drainage of BSM requires the use of specific aggregate materials for filter course (aka choking layer) materials and for an underlying drainage and storage layer.

1102-8.2 Rock and Sand Products for Use in BSM Drainage.

1. Size classifications detailed in Tables 1102-8.2 (1) and 1102-8.2 (2) shall apply with respect to BSM drainage materials. All sand and stone products used in BSM drainage layers shall be clean and thoroughly washed.

TABLE 1102-8.2 (1): Crushed Rock and Stone Gradation Limits

Sieve Size	Percent Passing Sieves	
	AASHTO No. 57	ASTM No. 8
3 in	-	-
2.5 in	-	-
2 in	-	-
1.5 in	100	-
1 in	95 – 100	-
0.75 in	-	-
0.5 in	25 – 60	100

Sieve Size	Percent Passing Sieves	
	AASHTO No. 57	**ASTM No. 8**
0.375 in	-	85 – 100
No. 4	10 max.	10 – 30
No. 8	5 max.	0 – 10
No. 16	-	0 – 5
No. 50	-	-

TABLE 1102-8.2 (2): Sand Gradation Limits

Sieve Size	Percent Passing Sieves
	Choker Sand - ASTM C33
0.375 in	100
No. 4	95 – 100
No. 8	80 – 100
No. 16	50 – 85
No. 30	25 – 60
No. 50	5 – 30
No. 100	0 – 10
No. 200	0 – 3

1102-8.3 Graded Aggregate Choker Stone.

1. Graded aggregate choker material shall be installed as a filter course to separate BSM from the drainage rock reservoir layer. This ensures that no migration of sand or other fines occurs.

2. The filter course consists of two layers of choking material increasing in particle size. The top layer of the filter course shall be constructed of thoroughly washed ASTM C33 fine aggregate sand material conforming to gradation limits contained in Table 1102-8.2 (2). The bottom layer of the filter

course shall be constructed of thoroughly washed ASTM No. 8 aggregate material conforming to gradation limits contained in Table 1102-8.2 (1).

1102-8.4 Open-Graded Aggregate Stone.

1. Open-graded aggregate material shall be installed to provide drainage for overlying BSM and filter course layers, provide additional stormwater storage capacity, and contain the underdrain pipe(s). This layer shall be constructed of thoroughly washed AASHTO No. 57 open graded aggregate material conforming to gradation limits contained in Table 1102-8.2 (1).

1102-8.5 Spreading.

1. Imported BSM drainage material shall be delivered to the BMP system installation site as uniform mixtures and each layer shall be spread in one operation. Segregation within each aggregate layer shall be avoided and the layers shall be free from pockets of coarse or fine material.
2. Aggregate shall be deposited on underlying layers at a uniform quantity per linear foot (meter), which quantity will provide the required compacted thickness within the tolerances specified herein without resorting to spotting, picking up, or otherwise shifting the aggregate material.
3. The thickness of the aggregate storage layer (AASHTO No. 57) will depend on site specific design and shall be detailed in contract documents.
4. The bottom layer of the filter course (ASTM No.8) shall be installed to a thickness of 3 inches (75 mm). The layer shall be spread in one layer. The top layer of the filter course (ASTM C33) shall be installed to a thickness of 3 inches (75 mm). The layer shall be spread in one layer. Marker stakes shall be used to ensure uniform lift thickness.

1102-8.6 Compacting.

1. Filter course material and aggregate storage material shall be lightly compacted to approximately 80% standard proctor without the use of vibratory compaction.

1102-8.7 Measurement and Payment.

1. The payment for quantities of graded aggregate choker material shall be included under the cubic yard Bid item for **"Graded Aggregate Choker Stone"** and shall include all labor, installation, compaction, and other incidentals necessary to install the graded aggregate choker material. The volumetric quantities of graded aggregate choker stone material shall be those placed within the limits of the dimensions as shown on the Plans.

2. The payment for quantities of open-graded aggregate storage material shall be included under the cubic yard Bid item for **"Open-Graded Aggregate Stone"** and shall include all labor, installation, compaction, and other incidentals necessary to install the open-graded aggregate storage material. The volumetric quantities of open-graded storage material shall be those placed within the limits of the dimensions as shown on the Plans.

3. The weight of material to be paid for will be determined by deducting (from the weight of material delivered to the Work) the weight of water in the material (at the time of weighing) in excess of 1% more than the optimum moisture content. No payment will be made for the weight of water deducted.

END OF PART 11– STORMWATER

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