Public Works
LOS ANGELES COUNTY

NOTICE INVITING BIDS,

SPECIAL PROVISIONS

AND

SAMPLE AGREEMENT

FOR

PROJECT ID NO. SWQ0000003

LADERA PARK STORMWATER IMPROVEMENTS PROJECT

Approved, MARK PESTRELLA, Director of Public Works

By _____ 10/22/18
Deputy Director Date

NOTICE INVITING BIDS

Sealed bids will be received by the County of Los Angeles Department of Public Works, Construction Division, for the construction of a storm drain system, pre-treatment system, gate valve, monitoring wells, infiltration wells, landscaping, irrigation, shade structure, mechanical equipment, electrical, and other appurtenant work under Project ID No. SWQ0000003, Ladera Park Stormwater Improvements project, in the vicinity of Slauson-Ladera Park.

Pursuant to State Public Contract Code Section 3400, the Board of Supervisors made a finding that water harvesting treatment system components identified in the Special Provisions are designated by specific brand names in order that a field test or experiment may be made to determine the product's suitability for future and in order to obtain a necessary item that is only available from one source; and a finding that stormwater flow metering components, groundwater monitoring components, stormwater quality monitoring components, and irrigation system components identified in the Special Provisions are designated by specific brand names in order to match other products in use on County facilities either completed or in the course of completion.

The bids must be submitted at the Cashier's Office, located on the Mezzanine level, 900 South Fremont Avenue, Alhambra, California 91803-1331, before 11 a.m. on Tuesday, November 27, 2018. The bids will then be publicly opened and read in the location posted in the main lobby. **Alternatively, bids may be submitted electronically using Bid Express, www.BidExpress.com.**

The Department of Public Works Project Management Division II will hold an optional prebid conference from 10:00 a.m. until 11:00 a.m., on November 6, 2018, at the project site, 6027 Ladera Park Ave, Los Angeles, CA 90056, to provide information on the scope of work and answer basic questions from the potential bidders. Bidders shall meet at the project site. Attendance is not mandatory for award of the contract.

The work shall be done in accordance with the Plans and Specifications on file and open for inspection at the Department of Public Works. The work is estimated to cost between $5,200,000 and $7,100,000 and shall be completed in 100 working days. The prime contractor shall possess a valid California Class A contractor's license. Prebid questions regarding the Plans and Specifications shall be submitted via email only to: Mr. Colin McCarter with the Department of Public Works Construction Division at cmccarter@dpw.lacounty.gov. **Prebid questions will not be accepted after 5 p.m. on Monday, November 19, 2018.**

The bids must be submitted on the proposal forms included in the bidder's package of the contract documents. The contract documents for this project may be downloaded free of charge by visiting the following website:

http://dpw.lacounty.gov/general/contracts/opportunities/

Each bid must be accompanied by a certified check, cashier's check, or surety bond payable to County of Los Angeles in an amount equal to at least 10 percent of the bid to

guarantee that the bidder will enter into the contract if it is so awarded.

No contractor or subcontractor may be listed on a bid proposal for a public works project (submitted on or after March 1, 2015) unless registered with the Department of Industrial Relations pursuant to Labor Code Section 1725.5 [with limited exceptions from this requirement for bid purposes only under Labor Code Section 1771.1 (a)]. No contractor or subcontractor may be awarded a contract for public work on a public works project (awarded on or after April 1, 2015) unless registered with the Department of Industrial Relations pursuant to Labor Code Section 1725.5. This project is subject to compliance monitoring and enforcement by the Department of Industrial Relations.

All persons performing the work shall be paid not less than the General Prevailing Wage Determination prepared by the Director of Industrial Relations pursuant to the State Labor Code. Copies of these wage rates are available at the Department of Public Works.

The successful bidder must provide full disclosure of False Claims Act violations, labor law/payroll violations, debarments, and civil/criminal legal actions as provided in the Instructions to Bidders. Failure to complete these forms may result in a determination that the bidder is nonresponsive and/or not responsible.

The contract, if awarded, will be awarded to a responsible contractor with the lowest responsive bid; however, the Board of Supervisors reserves the right to reject any and all bids.

A responsible contractor is one who has demonstrated the attribute of trustworthiness, as well as quality, fitness, capacity, and experience to satisfactorily perform the contract. It is the County's policy to conduct business only with responsible contractors.

The County maintains the Contractor Alert Reporting Database (CARD), which is used to track/monitor poorly performing contractors. When a County department identifies a significant performance/non-compliance issue(s) with a contractor, the department will provide notice to the contractor and will give the contractor an opportunity to correct the issue(s). If the contractor does not take any appropriate steps to correct the issue(s), the County department will enter the contractor, along with any other relevant information pertaining to the contractor’s performance issue(s), into CARD.

The information entered into CARD can be accessed by all County departments, and will be used, along with any other relevant information not included in CARD, in determining bidder responsibility. If a department reviews this information and determines that a finding of non-responsibility should be pursued, the department will adhere to the guidelines specified in the Los Angeles County Code, Chapter 2.202 and the County’s Implementation Procedures for Determinations of Contractor Non-Responsibility and Contractor Debarment.

The County encourages the participation of Community Business Enterprises (CBE) in the project and has established a goal of twenty-five percent CBE participation which all bidders shall aspire to meet. Bidders shall document their good faith efforts to utilize CBEs in accordance with the Special Provisions.

The successful bidder will be required to fully comply with all applicable State and Federal reporting requirements relating to employment reporting for its employees and comply with all lawfully served Wage and Earnings Assignment Orders and Notice of Assignment and continue to maintain compliance throughout the duration of the contract. Failure to comply may be cause for termination of the contract or initiation of debarment proceedings.

The contract is subject to the requirements of the County of Los Angeles' Defaulted Property Tax Reduction Program (Defaulted Tax Program), Los Angeles County Code, Chapter 2.206. Bidders should carefully read the Defaulted Tax Program. The Defaulted Tax Program applies to both contractors and their subcontractors.

Bidders will be required to certify that they are in full compliance with the provisions of the Defaulted Tax Program and shall maintain compliance during the term of the contract, or shall certify that they are exempt from the Defaulted Tax Program by completing a certification of compliance with the County's Defaulted Property Tax Reduction Program. In accordance with Los Angeles County Code, Chapter 2.202, failure to maintain compliance with the Defaulted Tax Program or to cure defects within the time specified may be cause for termination of the contract and/or initiation of debarment proceedings against the noncompliant contractor.

Bids that fail to comply with the certification requirements of the Defaulted Tax Program will be considered nonresponsive and excluded from further consideration.

The successful bidder will be required to submit a faithful performance bond, payment bond, and liability and workers' compensation insurance with the contract.

As provided for in Section 22300 of the State Public Contract Code, the contractor may substitute securities for any monies withheld by the Department of Public Works to ensure performance under the contract, or enter into an escrow agreement for payment of such monies to an escrow agent.

Each person by submitting a response to this Notice Inviting Bids certifies that such bidder and each County lobbyist and County lobbying firm, as defined by Los Angeles County Code, Section 2.160.010, retained by the bidder, is in full compliance with Chapter 2.160 of the Los Angeles County Code.

Para mas informacion con relacion a esta noticia, por favor llame a este numero (626) 458-3118. Nuestras horas de oficina son de 7 a.m. a 5:30 p.m. de Lunes a Jueves.

The County supports and encourages equal opportunity contracting.

By order of the Board of Supervisors of the County of Los Angeles, State of California.

Dated October 30, 2018.

Celia Zavala
Executive Officer of the
Board of Supervisors

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Pre-Bid inquiries regarding the following shall be directed to
Mr. Colin McCarter, cmccarter@dpw.lacounty.gov
Include "Prebid Questions for SWQ0000003" in the subject line of the email

Individuals requiring reasonable accessibility accommodations may request written materials in alternate formats, physical accessibility accommodations, sign language interpreters or other reasonable accommodations by contacting our Departmental Americans with Disabilities Act Coordinator at (626) 458-4081, from 7:30 a.m. to 5:00 p.m., Monday through Thursday (excluding holidays). Persons who are deaf or hard of hearing may make contact by first dialing the California Relay Service at 7-1-1. Requests should be made at least one week in advance to ensure availability. When making a reasonable accommodation request, please reference CON.

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LADERA PARK STORMWATER IMPROVEMENTS PROJECT

SPECIAL PROVISIONS

SECTION G - GENERAL PROVISIONS

The following Special Provisions supplement and amend the Standard Specifications for Public Works Construction, 2015 Edition. As a reference convenience, these Special Provisions have been arranged into a format which parallels the Standard Specifications.

Prepared By:

October 11, 2018
Date

Reviewed:

10/19/18
Date

Pages G-1 through G-59

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PART 1
GENERAL PROVISIONS

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

1-2 TERMS AND DEFINITIONS.

Agency – Add the following to the definition in the Standard Specifications:

The Agency is the County of Los Angeles.

Board – Replace the definition in the Standard Specifications with the following:

The Board of Supervisors of the County of Los Angeles.

Engineer – Replace the definition in the Standard Specifications with the following:

The Director of Public Works of the County of Los Angeles acting either directly or through authorized agents. Pursuant to the authority of the Los Angeles County Code, the term "Director of Public Works" shall mean the Road Commissioner or County Engineer, County of Los Angeles; or Chief Engineer, Los Angeles County Flood Control District; as appropriate.

Working Day – Replace subparagraphs “e” and “f” with the following:

e) any day the Contractor is prevented from working at the beginning of the workday for cause as specified in 6-6.1 and the following:

   i) Inclement weather or conditions resulting immediately therefrom.

   ii) Installation, relocation and/or alteration of public and/or private utilities by others.

or,

f) any day the Contractor is prevented from working during the first 5 hours with at least 60 percent of the normal work force for cause as specified in 6-6.1 and the following:

   i) Inclement weather or conditions resulting immediately therefrom.

   ii) Installation, relocation and/or alteration of public and/or private utilities by others.

Add the following:

Allowance – An amount established in the Bid by the Agency for the purpose of reimbursing the Contractor for its actual expenses plus the specified markup for an item of work.

Bid Guaranty – The cash, certified check or Bidder's surety bond accompanying the Bid as a guaranty that the Bidder will enter into a Contract with the Board for the performance of the Work.

Board Acceptance – The determination by the Board that all of the requirements contained in the Contract Documents have been fulfilled as specified in 6-8.2 of the SSPWC.

Claim – A separate demand by the Contractor for:

a) a time extension,
b) payment of money or damages arising from work done by or on behalf of the Contractor pursuant to the Contract and payment of which is not otherwise expressly provided for, or the claimant is not otherwise entitled to, or
c) an amount, the payment of which is disputed by the Agency.

County – The County of Los Angeles.

Department – The County of Los Angeles Department of Public Works.

Field Acceptance – The determination by the Engineer that the Work has been completed in conformance with the Contract Documents as specified in 6-8.1 of the SSPWC.

Project – See Work.

Quality Assurance – Those standards, systems, processes, procedures and activities exercised by the Agency and the Engineer to ensure that the Work is constructed by the Contractor in accordance with the Contract Documents.

Quality Control – Those standards, systems, processes, procedures and activities exercised by the Contractor to ensure that the Work is constructed in accordance with the Contract Documents.

1-3 ABBREVIATIONS.

1-3.2 Common Usage. Add the following abbreviations:

Abbreviation	**Word or Words**
NTP	Notice to Proceed

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SECTION 2 - SCOPE AND CONTROL OF THE WORK

2-1 AWARD AND EXECUTION OF THE CONTRACT. Replace the entire subsection with the following.

2-1.1 General. No Contractor or Subcontractor may be listed on a Bid Proposal for a public works project (submitted on or after March 1, 2015) unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5 (with limited exceptions from this requirement for Bid purposes only under Labor Code section 1771.1(a)). No Contractor or Subcontractor may be awarded a contract for public work on a public works project (awarded on or after April 1, 2015) unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5.

Award and execution of the Contract shall be as specified in the Instructions to Bidders except as follows:

VI, N, Bid Guaranty. Replace the third sentence of the second paragraph with the following:

Bid bonds shall be prepared on the Agency's standard form. This form may be obtained from the following website:

http://dpw.lacounty.gov/general/forms/download/3449.pdf

Failure to use the Agency's standard form may result in the Bid being found non-responsive.

Upon determination of the lowest responsive and responsible Bidder, the Agency will recommend to the Board award of the Contract to that Bidder. Upon award of the Contract by the Board, the Agency will issue a Notice of Award to the Contractor.

Various documents and instructions for their completion will be mailed to the Contractor prior to issuance of the Notice of Award. The Contractor shall submit the completed documents to the Agency within the time specified.

The Notice to Proceed will be issued per 6-1.2.

2-3 SUBCONTRACTS.

2-3.2 Self Performance. Add the following as the second paragraph:

The following work will be considered "Specialty Items":

a) Item No. 14, "DRYWELLS"

b) Item No. 15, "LANDSCAPING AND IRRIGATION"

b) Item No. 24, "ELECTRICAL WORK"

2-4 CONTRACT BONDS. Replace the second and third sentences of the first paragraph with the following:

Bonds shall be duly executed by a solvent surety company that is authorized by the State of California, is listed in the United States Department of the Treasury's Listing of Approved Sureties (Treasury Circular 570) (www.fms.treas.gov/c570/) and is satisfactory to the Agency.

2-5 PLANS AND SPECIFICATIONS.

2-5.1 General. Add the following:

The Standard Specifications for Public Works Construction and the Standard Plans for Public Works Construction are both promulgated by Public Works Standards, Inc. These publications are available for purchase from BNi Building News, Inc., 1612 South Clementine Street, Anaheim, California 92802, (800) 873-6397, www.bnibooks.com. ***These publications are copyrighted and the Agency will not provide copies.***

Standard Plans of the Los Angeles County Department of Public Works are available for purchase in the Agency's Cashier's Office located at 900 South Fremont Avenue, Alhambra, California 91803-1331, (626) 458-6959, or for downloading on the internet, www.ladpw.org/des/Design_Manuals/StandardPlan.pdf.

Add the following subsections:

2-5.1.1 Plans. Included as part of the Contract Documents are the following which show the location, character, dimensions or details of the Work:

1) Project Plans:

   a. Drainage Plans - 15 sheets

   b. Landscaping Plans (Plan LS) - 10 sheets

   c. Mechanical Plans (Plan M) – 10 sheets

   d. Electrical Plans (Plan E) – 7 sheets

   e. Geotechnical Log of Borings – 1 sheet

   f. Traffic Control Plan (Plan TC) - 4 sheets

2) Standard Plans:

a. Standard Plans for Public Works Construction 2012 Edition, promulgated by Public Works Standards, Inc. (included by reference only):

112-2	120-2	122-2	224-2	225-2
300-3	310-3	313-3	321-2	323-2
324-2	326-2	331-3	333-2	342-2
630-4	633-4	635-3		

b. Standard Plans of the Los Angeles County Department of Public Works, 2000 Edition (included at the end of Section D):

3080-2	3090-1	3091-1	3093-1	6002-1
6008-1				

2-5.1.2 Specifications. The Work shall be constructed or done in accordance with these Special Provisions and the following:

The "Standard Specifications for Public Works Construction 2015 Edition," hereinafter referred to as the “Standard Specifications.”

2-5.2 Precedence of the Contract Documents. Replace the order of precedence under the first paragraph with the following:

a) Permits issued by jurisdictional regulatory agencies.

b) Change Orders and/or Supplemental Agreements; whichever occurs last.

c) Contract/Agreement.

d) Addenda.

e) Bid/Proposal.

f) Special Provisions.

g) Plans.

h) Agency Standard Plans.

i) Other Standard Plans.

j) Notice Inviting Bids.

k) Instructions to Bidders.

l) Standard Specifications for Public Works Construction.

m) Reference Specifications.

Detail drawings shall take precedence over general drawings.

2-5.3 Submittals.

2-5.3.1 General. Replace the third paragraph with the following:

The Contractor shall allow a minimum of 20 Working Days for each review, unless otherwise approved by the Engineer. Review periods are not cumulative. The aforementioned time frames begin anew upon each submission whether the initial submission or a resubmission after a prior review by the Agency. Each set of submittals shall be accompanied by a letter of transmittal describing exactly what is being transmitted.

Add the following:

Submittals shall be submitted to:

Mr. Michael De Leon
Los Angeles County Department of Public Works
Project Management II, 5th Floor
900 South Fremont Avenue
Alhambra, CA 91803
Business hours: 7:00 a.m. - 5:00 p.m. Monday through Thursday
Telephone No. (626) 300-3290
Email Address: MDeLeon@dpw.lacounty.gov
Carbon Copy (Cc): ALopena@dpw.lacounty.gov

Mailing Address:

P.O. Box 1460
Alhambra, CA 91802-1460

All submittals shall be submitted and approved prior to issuance of the Part 2 NTP unless otherwise specified herein or approved by the Engineer.

No work shall begin on the respective items of work which require a submittal until the submittals for those items of work have been approved in writing by the Agency.

2-5.3.2 Working Drawings. Add the following to Table 2-5.3.2:

Item	Subsection Number	Title	Subject
15	306-4.3	Shoring and Bracing	
16	306-7	Prefabricated Gravity Pipe	
17	306-11	Drywell Construction	
18	206-7.2	Manhole Security Barrier	Components and Sequence of Installation
19	M-3	Cast Iron Slide Gate	Assembly and Appurtenances
20	E-5 1.1	Raceways	Conduit Layout and Installation

Falsework shall be designed in accordance with Section 51-1.06, 55-1.05, and 86-6.11 of the State of California Department of Transportation (Caltrans) Standard Specifications, May 2006 edition.

Working Drawings listed as Items 7, 8, 9, and 10 in Table 2-5.3.2 shall be prepared on 2-foot x 3-foot sheets.

Replace the fourth paragraph with the following:

Working Drawings listed as Items 2, 4, 5, 6, 7, 9, 10, 11, 12, 13, 15, 16 and 18 in Table 2-5.3.2 shall be prepared, wet stamped, and signed by a Civil or Structural Engineer registered by the State of California.

2-5.3.3 Shop Drawings. Add the following to Table 2-5.3.3:

Item	Subsection Number	Title	Subject
8	206-7.2	Manhole Security Barrier	
9	206-8	Automatic Retractable Screens	
10	206-9	Connector Pipe Screens	
11	219-1	Precast Stormwater Treatment System	Pre-treatment device
12	306-11	Drywell Construction	52” RCP casing
13	M-3	Cast Iron Slide Gate	
14	M-4	Electric Motor Operator	

Item	Subsection Number	Title	Subject
15	M-4	Equipment Vaults	
16	M-4	Drive Shaft Covers	
17	M-4	Bevel Gear Pedestals	
18	M-8	Pumps	
19	M-5	Flow Meter	
20	M-8	Storage Tank	
21	E-2 1.1	Basic Electrical Methods and Requirements	
22	E-2 2.2	Junction and Pull Boxes	
23	E-2 1.1	Panelboards	
24	E-2 3.4	Wiring Devices	
25	E-2 1.1	Control Devices	
26	E-2 2.7	Fuses	
27	E-2 2.5	Circuit Breakers	
28	E-3	Grounding	
29	E-4	Conductors	
30	E-2 1.1	Telemetry System	
31	E-5 1.1	Raceways	
32	Plan LS 1.01	Shade Structure	
33	Plan LS 1.02	Park Monument Sign	

Add the following:

Shop Drawings listed above as Item 1, 7, 9, 12, 13, and 14 shall be prepared, wet stamped, and signed by a Civil or Structural Engineer registered by the State of California.

2-5.3.4 Supporting Information. Add the following:

n) BMP Manager qualifications per 7-8.6.3.

2-6 WORK TO BE DONE. Add the following:

The estimated quantities of work and materials to be performed, constructed or furnished by the Contractor under this Contract are as shown on the Schedule of Prices in the Bid Proposal.

2-8 RIGHT-OF-WAY. Delete the last sentence.

Add the following:

The Contractor shall conduct all of its activities and operations within the rights of way provided by the Agency or within the confines of public thoroughfares. A proposed staging area has been identified in Attachment B included at the end of this Section G. Upon completion of the Work, this property shall be restored to the original condition or better and all provisions of Section EC 7-8 shall apply to its operation. Photographic documentation shall be submitted to the Engineer detailing the pre and post condition of the property. The Contractor shall not allow its employees to use private property for any reason or to use water or electricity from such property without written permission from the owner.

If, for any reason, the Contractor elects to encroach upon other lands, it shall first obtain written permission from the owner and provide evidence of such permission in writing to the Engineer prior to entering upon such lands. In performing any work or doing any activity on lands outside of public rights of way, the Contractor shall comply with all applicable Federal, State and local laws, ordinances, and regulations. The Contractor shall indemnify and hold the Agency harmless from all claims or suits for damages occasioned by such work or activity, whether done in compliance with this subsection and with permission from the owner or in violation of this subsection without permission from the owner.

2-11 INSPECTION. Add the following**:**

As part of the administration of the Contract and the inspection process, the Agency will perform Quality Assurance compaction testing as required. For unclassified fill, structure backfill, roadway subgrade, base material, trench backfill, and other compacted fills of any nature, the first Quality Assurance compaction test will be performed at no cost to the Contractor. In the event that additional Quality Assurance compaction tests are required due to the failure of the Contractor to construct to the required density, the sum of $250 for each such additional test will be deducted from any monies due the Contractor.

The Contractor and the Engineer shall confer prior to the start of the Work and review the Contractor's schedule. The Engineer will designate those operations which will require continuous inspection by the Agency. Should the Contractor perform any operations requiring continuous inspection for more than eight hours on any working day, or perform any work on a day other than a working day, the Agency will deduct from any monies due the Contractor the amount of $100 per hour for each hour or portion thereof that the Contractor performs such work. The Agency reserves the option to waive this stipulation if it is in its best interests.

Unless otherwise directed by the Engineer, the Agency will perform one inspection and one re-inspection of underground conduit and appurtenant structures. Should subsequent re-inspections be required due to the work not being in conformance with the Plans and Specifications, the Agency will deduct from any monies due the Contractor the amount of $300 per hour for each hour or portion thereof required for the time necessary to perform the second and subsequent re-inspections.

SECTION 3 - CHANGES IN WORK

3-2 CHANGES INITIATED BY THE AGENCY.

3-2.1 General. Add the following after the first paragraph:

A Change Order will require the prior approval of the Board, which will be obtained by the Engineer, when the dollar value exceeds:

a) $5,000 when the Contract Price does not exceed $50,000;
b) 10 percent of the Contract Price when the Contract Price exceeds $50,000, but does not exceed $250,000; or
c) $25,000 plus 5 percent of the Contract Price in excess of $250,000 up to a not to exceed total of $210,000.

3-2.2 Contract Unit Prices. Replace the entire subsection with the following:

If a change is ordered in an item of work covered by a Contract Unit Price in a Detailed Schedule of Prices for a Lump Sum item in the Bid, and such change does not involve a substantial change in the character of the work from that shown on the Plans or specified in the Specifications, then an adjustment in payment will be made. This adjustment will be based on the increase or decrease in quantity and the Contract Unit Price in the Detailed Schedule of Prices for a Lump Sum item in the Bid.

If a change is ordered in an item of work covered by a Contract Unit Price in a Detailed Schedule of Prices for a Lump Sum item in the Bid, and such change does involve a substantial change in the character of the work from that shown on the Plans or specified in the Specifications, an adjustment in payment will be made per 3-2.4.

Add the following subsection:

3-2.6 Allowance Items. The Agency may establish an Allowance in the Bid for items in which there is insufficient information for the Contractor to submit a Contract Unit Price or for which a basis of bidding may not be established for any reason.

The Contractor shall submit to the Engineer an estimate for each element to be furnished or provided under the Bid item for which an Allowance has been established.

Upon approval of the estimate, the Contractor will be reimbursed for its actual costs plus the specified markup, if any, upon presentation to the Engineer of original, itemized, paid invoices. The Contractor shall not be entitled to full payment for the amount of the Allowance should it not be utilized. Should the Contractor's actual costs exceed the Allowance, the difference will be considered as Extra Work.

3-3 EXTRA WORK.

3-3.2 Payment.

3-3.2.2 Basis for Establishing Costs.

3-3.2.2.1 Labor. Replace the first paragraph with the following:

The cost of labor shall be the cost of wages (basic hourly rate) plus the cost of employer payments (health and welfare, pension, vacation/holiday, training, and other payments for assessments or benefits required by lawful collective bargaining agreements) as listed on the General Prevailing Wage Determination made by the Director of Industrial Relations in effect at the time the Extra Work is performed. ***To the total of these costs, a labor surcharge of 15 percent shall be applied for statutory payroll items stipulated by various governmental agencies.*** The items included are worker's compensation insurance, Social Security, Medicare, Federal unemployment insurance, State unemployment insurance, and State training taxes. The markup for labor specified in 3-3.2.3.1 includes the labor surcharge.

3-3.2.2.3 Tool and Equipment Rental. Replace the second paragraph with the following:

Regardless of ownership, the rates to be used in determining equipment rental costs shall not exceed those listed in the current edition of the "Labor Surcharge and Equipment Rental Rates" of the State of California Department of Transportation (Caltrans) (www.dot.ca.gov/hg/construc/equipmnt.html) at the time the work is performed. Standby rates shall be 50 percent of the hourly rate. Payment for standby shall not exceed 8 hours per day, 40 hours per week and 176 hours per month. If the equipment is not listed, the rate allowed shall be that calculated for a comparable item.

3-3.2.3 Markup.

3-3.2.3.1 Work by Contractor. Replace the entire paragraph with the following:

The following percentages shall be added to the Contractor's costs and shall constitute the markup for overhead and profit, and all other costs not specifically provided for on work performed by the Contractor:

1) Labor (including Labor Surcharge*)*..... 35%
2) Materials 15%
3) Equipment Rental..... 15%
4) Other Items and Expenditures..... 15%

To the sum of the costs and markups provided for in this subsection, 1 percent shall be added as compensation for bonding.

3-3.2.3.2 Work by Subcontractor. Replace the entire paragraph with the following:

When all or any part of the Extra Work is performed by a Subcontractor, the markup established in 3-3.2.3.1 shall be applied to the Subcontractor's actual cost of such work. A markup of 5 percent on the subcontracted portion of the Extra Work may be added by the Contractor. This markup shall constitute the Contractor's markup for overhead and profit on work performed by the Subcontractor.

Add the following:

3-3.2.3.3 General. The markups specified in 3-3.2.3.1 and 3-3.2.3.2 above shall be considered as including, but not be limited to, the Contractor's labor costs for personnel not working directly on the Extra Work, including the cost of any tools and equipment which they may use. Such costs shall not be reported as labor or equipment costs elsewhere except when they are actually used in the performance of the Extra Work. Labor costs shall in that case be reported for the labor classification corresponding to the type and nature of Extra Work performed.

Add the following:

3-3.2.3.4 Allowance Items. The following percentage shall be added to the Contractor's actual costs unless otherwise specified: 15 percent.

SECTION 4 - CONTROL OF MATERIALS

4-1 MATERIALS AND WORKMANSHIP.

4-1.2 Protection of Work and Materials. Add the following:

The Contractor shall assume all risks and expenses, including the costs of any interferences, delays to its operations and the protection from, or the repair of, damage to improvements being constructed under the Contract, as may be caused by water of whatever quantity from floods, storms, industrial waste, irrigation, underground or other sources. However, the Contractor shall be entitled to an extension of time per 6-6. The Contractor shall also assume full responsibility for, and the expense of**,** protecting or removing and returning to the Work site, all equipment or materials under its care endangered by any action of the elements.

The Contractor shall provide the Agency with emergency callback information for the Project. The callback information shall include current names, titles, and telephone numbers for both primary and secondary response personnel.

When rain or severe weather is forecast the following procedures shall be implemented:

a) To ensure a timely and proper response, the Contractor shall designate primary and secondary responders. Responders shall be trained personnel such as field superintendents or foremen who are properly equipped with communication devices, tools, and equipment, and who have the authority and ability to make critical on-site decisions and commit the Contractor's resources.

b) Contractor responders and the Engineer will patrol the Work site and identify potential hazards or problems. Should a potential hazard or problem be identified in the absence of a Contractor responder, the Engineer will notify and request a Contractor-designated emergency responder report to the Work site immediately.

c) If notified, the Contractor's responder shall report immediately, irrespective of the day or time, to the Work site and take necessary corrective actions including emergency and/or temporary repairs.

d) If the Contractor fails to respond, the Engineer will arrange for Agency forces to perform the necessary work. The cost to perform this work and related expenses will be deducted from any monies due the Contractor.

4-1.4 Test of Materials. Add the following after the first paragraph:

Unless otherwise specified, initial review of mix design submittals and acceptance testing of a material proposed for use on the Project from up to two sources will be performed by the Agency at no cost to the Contractor. Any additional tests from another source or retest beyond the allowable shall be at the Contractor’s expense. The Agency will deduct from any monies due the Contractor the amount of $250 per each additional test.

The Agency's materials testing laboratory is located at 1537 Alcazar Street, Los Angeles, California 90033, (626) 458-1707.

The Contractor shall notify the Engineer 24 hours in advance of its request for inspection and testing laboratory services for each specific operation. The Engineer will make arrangements for such services which require the presence of Agency personnel not assigned to the Project.

Should the Contractor’s operations or a change in schedule result in Agency personnel being delayed in performing the requested services, the Agency will deduct from any monies due the Contractor the amount of $100 per hour of delay or portion thereof.

4-1.6 Trade Names or Equals. Replace the entire subsection with the following:

Pursuant to the Public Contract Code, Section 3400, the Contractor may supply any of the products or materials specified or offer an equivalent except for the components identified by specific brand or trade name in the enclosure at the end of this Section G and for the ARS units specified in subsection 206-9.3 of Section D of the Special Provisions. Only those ARS units listed will be accepted by the Agency. Pursuant to Public Contract Code 3400, the Board has made a finding that those components are designated by brand or trade name in order to field test the product to determine the product's suitability for future use and to obtain a necessary item that is only available from one source, or to match other products in use on County facilities either completed or in the course of completion.

A listing of materials is not intended to be comprehensive, or in order of preference. The Contractor may offer any material or product it considers to be an equivalent to that specified.

If the Contractor wishes to request consideration of a proposed "equal" product or material, it shall submit such request in writing to the Agency within 2 Working Days after the date of the Bid opening. Requests received after that time period will not be considered.

The Contractor shall, at its expense, furnish information supporting the proposed "equal" product or material offered within 10 Working Days after the date of the Bid opening.

The Contractor shall have the material tested as required by the Engineer to determine if the quality, strength, physical, chemical, or other characteristics, including durability, finish, efficiency, dimensions, service, and suitability are such that the proposed "equal" will fulfill the intended function. Test methods shall be subject to the approval of the Engineer. Test results shall be reported promptly to the Engineer, who will evaluate the results.

The Agency will review the supporting information within 5 Working Days from the date of submission. The findings of the Agency shall be final.

If the proposed "equal" product or material is determined by the Agency to not be equivalent to the specified product or material, the Contractor shall furnish and install the specified product or material.

Agency-approved "equal" products or materials shall not be installed nor put into usage without the prior approval of the Engineer.

The Contract time of completion specified in 6-7 shall not be affected by any circumstance arising from the provisions of this subsection.

SECTION 5 - UTILITIES

5-1 LOCATION.

5-1.1 General. Replace the last sentence of the third paragraph with the following:

The Contractor shall provide the subsurface installation location data to the Engineer prior to issuance of the Part 2 Notice to Proceed.

Add the following:

"Subsurface installation" shall include service connections. Location of subsurface installations shall be shown as an individual activity on the Baseline Schedule. Refer to 6-1.1.

Where water lines exist, at each angle point, cross connection and "T" connection, the Contractor shall assume the existence of a concrete thrust block located such as to resolve thrust loads.

The Agency may arrange for and conduct a preconstruction meeting between the Contractor, the Engineer, and the utility owners to discuss scheduling, coordination of any required utility relocations, and the protection of existing utilities. The Contractor shall attend any preconstruction meeting scheduled by the Agency and shall cooperate with all utility owners performing utility relocation or installation work on the Project site.

The utilities which have facilities located within the limits of the Project are as follows:

Utility Owner	Contact	Phone No./E-Mail
AT&T Distribution	Michael Jefferson	(310) 515-4099 mj6721@att.com
California American Water Co.	Stephen San Nicolas	(916) 568-4268 stephansannicolas@amwater.com
Charter Communications	Manuel Noriega	(310) 750-9187 c-manuel.noriega@charter.com
Crown Castle	Randy Oliver	(724) 416-2725 randy.oliver@crowncastle.com
Los Angeles City Department of Water and Power (Power)	Patrick Magallanes	(213) 367-2659 patrickj.magallanes@ladwp.com
Los Angeles City Department of Water and Power (Water)	Elia Sun	(213) 367-1224 elia.sun@ladwp.com

Metropolitan Water District	Andrew Hoeschele	(213) 217-6808 ahoeschele@mwdh2o.com
Southern California Edison (Distribution)	Kevin Van Duong	(310) 713-4910 kevin.duong@sce.com
Southern California Edison (Telecommunication)	Jun De La Flor	(626) 308-6529 jun.delaflor@sce.com
The Gas Company	Zakee Singleton	(310) 605-7931 zsingleton@semprautilities.com

5-1.2 Payment. Replace the entire subsection with the following:

No separate payment will be made for the location of utilities pursuant to Government Code Sections 4215 and 4216, and 5-1.1, or for attendance at the preconstruction meeting. Payment shall be considered as included in the Contract Unit Price for the various Bid items.

5-1.3 Exploratory Excavations. In addition to the requirements of 5-1.1, the various cases under which exploratory excavations will be required and the respective basis of payment shall be as follows:

CASE 1 - Service connections:

Payment for all necessary exploratory excavations on service connections shall be considered as included in the Contract Unit Prices in the Bid for the various items of work.

CASE 2 - Utilities parallel to trenches:

For all trench excavations, the Contractor shall make exploratory excavations of all utilities, except sanitary sewers, lying wholly or in part within 2 feet of, and which are running approximately parallel to, the Contractor's proposed trench excavation limit. The number of exploratory excavations required shall be that number which is sufficient to determine the alignment of the utility. When such exploratory excavations show the utility location as indicated on the Plans to be in error, the Contractor shall notify the Engineer. Upon completion of the work involved in locating utilities, the Contractor shall immediately backfill and either temporarily or permanently resurface the excavation.

Payment for exploratory excavations required to locate utilities running parallel to trench excavations shall be considered as included in the Contract Unit Prices in the Bid for the various items of work.

CASE 3 - All utilities marked, but not indicated on the Plans which may, as marked, be affected by the Work; and exploratory excavations ordered by the Engineer and not covered under Cases 1, 2, or 3.

The Engineer may require one or more exploratory excavations to be dug prior to any trenching to be performed, or in advance of other construction operations in order to confirm the location of utilities. Payment for exploratory excavations ordered by the Engineer which are 5 feet or less in depth will be made at the Stipulated Unit Price of $300 for each exploratory excavation, including backfilling and restoration of pavement or concrete. Exploratory excavations which are over 5 feet in depth will be considered as Extra Work.

If interference occurs between a storm drain connector pipe and a utility which was not marked as requiring an exploratory excavation, the Contractor shall be entitled to additional compensation in the Stipulated Unit Price of $300 for the changes resulting from the necessary revisions to the connector pipe. It is mutually agreed by the Contractor and the Agency that the Stipulated Unit Price of $300 shall be the total payment for any and all delays and additional work resulting from the connector pipe grade change (or changes) required by a utility interference. The Stipulated Unit Price of $300 will be paid for each connector pipe grade change (or changes) due to interfering utilities. It is not intended that this subsection preclude payment for items of work associated with grade changes included in the Bid such as concrete collars.

5-2 PROTECTION. Add the following before the first paragraph:

5-2.1 General. When directed by the Engineer, the Contractor shall encase interfering service connections in the slab or walls of poured-in-place concrete structures. Such encasing will be considered as Extra Work.

Service connections which do not interfere with any permanent work shall be maintained in place by the Contractor.

Add the following after the second paragraph:

When indicated on the Plans, the Contractor shall construct concrete supports for existing water lines, utility lines, and sanitary sewers or house connections which cross over storm drain or connector pipes constructed as part of the Project, and shall construct concrete blankets and encasements for existing sanitary sewers which cross under the storm drain, connector pipes and appurtenances.

The word existing as used herein in reference to sanitary sewer facilities shall refer to those sewer facilities within the immediate area affected by the Work which are existing and which were not previously constructed as part of the Project.

As required by 2-5.3.2, Working Drawings prepared on 2' x 3' sheets for temporary utility supports shall be prepared by a Civil or Structural Engineer registered by the State of California. Working Drawings and complete calculations bearing an original signature of the designer shall be submitted to the Agency and to the utility owner for review and approval.

Unless otherwise noted or specified, the concrete supports shall be constructed in accordance with Standard Plan 224. In the case of sanitary sewer supports per Cases 1, 2, and 4, the sewer shall be encased. The encasement shall be a minimum of 6 inches (150 mm) wider on each side of the sewer (OD plus 12 inches (300 mm)) and a minimum of 6 inches (150 mm) above the top of the sewer. The support beam or support wall shall be widened to the width of the encasement and shall be lengthened to fully support the encasement.

Concrete blankets shall be constructed in accordance with Standard Plan 225, unless otherwise noted on the Plans.

All costs for encasing, thickening and extending sewer supports to fully support the encasements shall be considered as included in the lump sum prices in the Bid for the various items of work.

5-5 DELAYS. Add the following to the end of the last paragraph:

Payment to the Contractor for actual loss due to a protracted utility delay shall be calculated based on wage increases, price increases of material and equipment, additional insurance costs and actual direct costs of maintaining the Project site incurred as a result of such utility delay.

SECTION 6 - PROSECUTION, PROGRESS AND ACCEPTANCE OF THE WORK

6-1 CONSTRUCTION SCHEDULE AND COMMENCEMENT OF THE WORK.

Replace the entire subsection with the following:

6-1.1 Construction Schedule.

6-1.1.1 Terms and Definitions. The following terms and their respective definitions are in addition to those specified in 1-2.

As-Built Schedule – The final updated Construction Schedule that reflects actual construction progress throughout the entire duration of the Project.

Baseline Schedule – The original Construction Schedule used as the basis for measuring construction progress and Contract performance.

Constraint – A requirement that restricts or dictates the Construction Schedule.

Construction Schedule – The schedule of construction activities that reflects the means and methods, planned sequencing, duration, and Milestone dates for the completion and acceptance of the Work. Types include the Baseline Schedule, Weekly Schedule Update, Monthly Schedule Update, and the As-Built Schedule.

Critical Path – The sequence of activities shown on the Construction Schedule which adds up to the longest overall duration.

Data Date – The latest date through which the activities shown on the Construction Schedule have been updated.

Milestone – A schedule activity that has zero duration and which graphically represents the start or finish of a portion of the Work.

Monthly Schedule Update – An updated Construction Schedule submitted every month that compares actual construction progress versus the progress planned on the Baseline Schedule.

Project Float – The difference between the Scheduled Completion Date and Required Completion Date. Float shall be an expiring resource available to both the Contractor and the Agency. Float shall not be for the exclusive use or benefit of either the Agency or the Contractor.

Required Completion Date – The required date for completion of the Work as specified in 6-7.1 of the SSPWC.

Scheduled Completion Date – The planned date for completion of the Work shown on the Construction Schedule as specified in 6-7.1 of the SSPWC.

Total Float – the maximum amount of time an activity can be delayed from its early start without delaying the completion of the Work. Float shall be an expiring resource available to both the Contractor and the Agency. Float shall not be for the exclusive use or benefit of either the Agency or the Contractor.

Weekly Schedule Update – An updated Construction Schedule submitted every week that reflects the status of construction activities from the past week and also includes construction activities scheduled in detail for the following 2 weeks.

6-1.1.2 General. Construction schedules shall conform to the following requirements:

a) The Construction Schedule shall be prepared using the latest version of Primavera P6.

b) The Construction Schedule shall be prepared using the Critical Path Method (CPM) illustrating the chronological relationship and sequence of work activities. Activities on the Critical Path shall be clearly delineated.

c) Work activities shall be based on the Bid items listed in the Schedule of Prices in the Bid Proposal and the following:

   i) Bid Items shall be subdivided into those portions to be constructed during each stage or phase of construction, or portions which do not exceed 20 Working Days, whichever is less.

ii) Each submittal, and the corresponding Agency review period, shall be shown as an individual activity.

iii) The procurement of construction materials and equipment shall be identified and shown as individual activities.

iv) Part 1 NTP requirements shall be shown as individual activities.

d) The Construction Schedule shall commence on the Part 1 NTP Issuance Date and end on the Required Completion Date milestone, or Scheduled Completion Date milestone, whichever date is later.

e) Change Orders, including number, description, and duration shall be shown as individual activities.

f) Each activity must have at least one predecessor and one successor with the exception the of the Project start and finish milestones.

g) Schedule options within the program file shall be as follows:

i) Use retained logic when scheduling progressed activities.

ii) Define critical activities as Longest Path.

iii) Compute Total Float as the difference between late finish and early finish.

iv) Use predecessor activity calendar for scheduling relationship lag.

v) Use of “Must Finish By” date in the project settings shall not be used.

h) Calendars, codes, and other information shall be on a project-level basis within the schedule software, as opposed to global, so that any changes to subsequent schedules are independent of past schedule submittals.

i) A level-of-effort type activity shall be included named “Project Float”, with the Scheduled Completion Date milestone as a predecessor and the Required Completion Date milestone as a successor.

j) Date and time constraints and lags, other than those specified in this subsection, are not allowed unless otherwise accepted by the Engineer. The use of negative lags is not allowed.

k) Notification activities shall be milestones linked as predecessors to the related work. These milestones shall contain “As Late As Possible” constraints with lags equal to the notice duration specified.

l) The schedule shall reflect the following Constraints:

i) Schedule impacts due to the protection, removal, or relocation of utilities per 5-5.

ii) The Sequence of Work per 6-2.3.

iii) All work along West Slauson Avenue shall only be performed between the hours of 9:00 a.m. and 3:00 p.m. All other work shall only be performed between the hours of 7:00 a.m. and 3:30 p.m. unless otherwise approved by the Engineer.

iv) All work shall only be performed on the allowed days as shown on the Project Calendar included at the end of this Section G, including the erection and removal of temporary traffic control, along West Slauson Avenue shall be completed within 40 Working Days of the issuance of the Part 2 NTP.

v) Temporary traffic control requirements per Section TC of the Special Provisions.

vi) The Time of Completion per 6-7. A Baseline Schedule submitted showing completion earlier or later than the time of completion specified will not be accepted.

m) The schedule shall include the following Milestones:

Activity ID	Activity Name	Constraint Type
NTP1	Part 1 NTP Issuance Date	Start On
NTP2	Part 2 NTP Issuance Date	Start On
REQS	Required Start Date	Start On
REQC	Required Completion Date	Finish On
COMP	Scheduled Completion Date	Finish On or Before

n) The Controller shall use the project-specific activity codes loaded in the Project Template provided by the Agency including, but not limited to, the following:

i) Work Type (TYPE):

Code Value	Description
ADM	Administrative activities such as contract Milestones, meetings, permits, etc.
SUB	Submittals by the Contractor
REV	Submittal Reviews by the Agency
PRO	Procurement of Materials or Equipment
NOT	Notification Activities
CON	Construction Activities
UFE	Unforeseen Events
OTH	Other Activities

ii) Responsibility (RESP).

Code Value	Description
PRI	Prime Contractor Activities
SUB	Subcontractor Activities
AGE	Agency Activities
UTI	Utility Company Activities
OTH	Other Entity Activities

iii) Item No. (ITEM) - Each activity shall be identified using an activity code with its corresponding Bid item number(s) or Change Order item number(s) listed in the Engineer's Monthly Estimate.

6-1.1.3 Submittals.

a) **General.** Construction Schedule submittals shall include a portable document file (pdf) and a program file (.xml), accessible using the latest version of Primavera P6. The submittal shall be emailed to the Engineer or submitted on a compact disc (CD) along with 2 printed color copies on 11-inch x 17-inch sheets.

b) **Baseline Schedule.**

Within 10 Days of issuance of the Part 1 NTP, the Contractor shall submit a Baseline Schedule for review and acceptance by the Engineer.

The Engineer will provide the Contractor with an electronic Primavera P6 Project Template (Project Template) that shall be used as a basis for developing the Baseline Schedule, and the schedule updates. The Project Template includes the required formatting and settings for items including, but not limited to: Project-specific activity codes and WBS structure; calendars; schedule options; milestones; constraints; and other items. The Project Template may also include some basic activities that should be included in the schedule. The schedule developed by the Contractor shall then be submitted.

c) **Weekly Schedule Updates.** During the weekly on-site management meetings, the Contractor shall submit Weekly Schedule Updates which will be used to manage, coordinate, and schedule all upcoming Contract activities. These detailed schedules may be submitted in bar chart format and shall reflect the logic and sequence used for the accepted Baseline Schedule. The Weekly Schedule Update shall include the following:

i) Status of the construction activities of the past week, scheduled vs. actual.

ii) An explanation for deviations from planned activities, together with actions taken or planned to recover lost time, if applicable.

iii) Two-week "look-ahead" Schedule detailing all work activities planned for the next 2 weeks, including all work to be performed by others. Activities included in the Baseline Schedule shall be further broken down into detailed activities, by specific task, by specific area, at the crew level or lower.

d) **Monthly Schedule Updates.** On the 1st day of each month, the Contractor shall submit a Monthly Schedule Update using the same software used to prepare the Baseline Schedule. The Engineer will not submit the Engineer's Monthly Estimate specified in 9-3.2 for processing until the Monthly Schedule Update has been submitted. The schedule may be emailed to the Engineer. Should the update not reflect the actual progress of the Work, the update will be returned to the Contractor for inclusion of the changes on the next update. Updates shall conform to 6-1.1.2 and the following:

i) Actual start and completion dates versus the original accepted Baseline Schedule shall be illustrated.

ii) Deviations in the progress and sequence of the Work shall be identified and supported by a detailed narrative justification. The updates shall include necessary remedies and revisions to recover delays to the schedule to meet the original Contract milestones.

iii) The data date shall be the 1st day of each month.

iv) Change Order work scheduled after the Data Date that includes an approved time extension shall be shown as a Critical Path activity. Change Order work scheduled after the Data Date without an approved time extension shall be shown as a non-Critical Path activity. Change Order work performed prior to the Data Date shall be shown as an as-built activity.

v) The Required Completion Date milestone constraint date shall be adjusted to account for time extensions approved as of the Data Date.

vi) The Scheduled Completion Date milestone constraint date shall be adjusted to match the Required Completion Date as of the Data Date.

vii) Schedule updates shall only include changes related to a Time Impact Analysis (TIA) that has been accepted by the Engineer. Schedule updates shall not include changes related to a rejected TIA, or a TIA that is pending.

e) **As-Built Schedule.** Within 7 Days after completion of the Work per 6-8.1, the Contractor shall prepare and submit an As-Built Construction Schedule using the same software used to prepare the Baseline Schedule. The Engineer will not submit the final monthly progress payment for processing until the schedule has been submitted. The schedule may be emailed to the Engineer.

The As-Built Schedule shall reflect the actual progress of the Work from the date of issuance of the Part 1 NTP through the date of completion. Should the As-Built Schedule not reflect the actual start and finish dates of all work activities, the schedule will be returned to the Contractor for revision and re submittal.

The schedule shall be submitted with a written certificate signed by the Contractor's Authorized Representative stating:

> "To my knowledge and belief, the enclosed As-Built Schedule reflects the actual start and finish dates of the actual work activities for the Contract contained herein."

6-1.1.4 Time Impact Analysis (TIA).

6-1.1.4.1 General. Time Impact Analysis (TIA) is a scheduling technique and analysis report used to assess and quantify the effects of one or more of the following occurrences:

a) an unforeseen event,
b) an approved Change Order,
c) a proposed Change Order, or
d) a changed condition.

6-1.1.4.2 Submittals. A TIA submittal shall be submitted when the Contractor or Engineer identifies an occurrence that potentially impacts the Critical Path and delays progress of the Work. The TIA submittal shall be submitted in accordance with 2-5.3 and shall include the following:

a) **Narrative Report**. A report that defines the scope and conditions of an occurrence specified in 6-1.1.4.1; type of delay as defined in 6-1.1.4.3; provides start and finish dates of impact; provides predecessor and successor activities to the impact period; identifies the party responsible for the occurrence; and describes how the occurrence originated and how it impacts the schedule.

b) **Schedules**. A schedule submission that consists of the following two electronic Primavera P6 schedule files in accordance with 6-1.1.3:

   i) Unimpacted Schedule – The Monthly Schedule Update that has a Data Date closest to and prior to the occurrence. If the Engineer determines that the schedule update submitted does not appropriately represent the conditions prior to the occurrence, the schedule update shall be updated to the day before the occurrence being analyzed. Schedule updates, modifications, and changes shall be listed in the narrative report.

   ii) Impacted Schedule – The schedule developed from incorporating the occurrence into the unimpacted schedule by adding or deleting activities, or by changing durations or logic of existing activities. Schedule updates, modifications, and changes shall be listed in the narrative report.

c) The Contractor shall submit a TIA within 10 Working Days of receiving a written request for a TIA from the Engineer.

d) For a claimed delay in completion of the Work, the unimpacted and impacted schedules shall be modified to account for as-built events known to occur after the Data Date.

e) If the impacted schedule shows that the Critical Path and Scheduled Completion Date are affected by the occurrence, the difference between Scheduled Completion Dates of the unimpacted and impacted schedules, minus any remaining Project Float, must be equal to the request for adjustment of the Contract time of completion. No time of completion extensions will be granted unless a delay occurs which first consumes all available Project Float and extends the Scheduled Completion Date beyond the Required Completion Date.

f) All TIAs must include mitigation measures and must apportion the overall delay assignable to any individual delays. The associated narrative report must clearly describe findings in chronological order.

g) Subsequent Monthly Schedule Updates shall include changes related to a TIA that has been accepted by the Engineer. Schedule updates shall not include changes related to a rejected TIA, or a TIA that is pending review.

6-1.1.4.3 Types of Delay. The TIA shall identify the type of delay as follows:

a) Excusable and Compensable Delay - Delay for which the Agency is the sole proximate cause. The Contractor must not have been delayed for any other reason during that time period.

b) Excusable and Noncompensable Delay - Delay caused from unforeseen events as defined in 6-6.1.

c) Inexcusable and Noncompensable Delay - Delay caused by the fault or negligence of the Contractor.

d) Concurrent Delay - Combination of the types outlined above occuring during the same time period.

6-1.1.4.4 Acceptance. Acceptance of a TIA will be determined in accordance with the following:

a) Upon submittal of a TIA by the Contractor, an analysis of the facts will be performed by the Engineer to determine compensability and entitlement to any time extension under the applicable contract clauses.

b) Acceptance of a TIA is at the sole discretion of the Engineer.

c) The Engineer will construct its own TIA or utilize another method to determine adjustments in the Contract time of completion if the Contractor fails to submit a TIA.

6-1.1.5 Payment. Payment for preparation of the Baseline Schedule will be made at the Stipulated Unit Price for "CONSTRUCTION SCHEDULE (BASELINE)." No payment will be made until the Baseline Schedule has been accepted by the Engineer.

No separate or additional payment will be made for preparation of each Weekly Schedule Update or Time Impact Analysis.

Payment for preparation of each Monthly Schedule Update will be made at the Stipulated Unit Price per month for "CONSTRUCTION SCHEDULE (UPDATE)." No payment will be made for monthly updates submitted after the due date.

Payment for preparation of the As-Built Schedule will be made at the Stipulated Unit Price for "CONSTRUCTION SCHEDULE (AS-BUILT)." No payment will be made until the As-Built Schedule has been accepted by the Engineer.

6-1.2 Commencement of the Work. The Notice to Proceed (NTP) for this Contract will be issued in 2 separate parts. The Agency will issue the Part 1 NTP after the Contractor satisfactorily submits all of the documentation required in the Instructions to Bidders and the Agency has executed the Contract.

The Part 1 NTP shall be for the Contractor to perform the following:

a) Submit all required Submittals per 2-5.3 and receive Agency approval for such submittals unless otherwise specified.

b) Ensure that all labor, equipment, and materials required for the Contract will be available when required by the Construction Schedule per 6-1.1.

c) Mobilization, including the physical and operational establishment of the Class "A" Field Office per 8-2.

d) Attend preconstruction meetings with the Agency.

e) Submit a Baseline Schedule per 6-1.1.3 and receive Agency acceptance.

f) Tree removal per 300-1.3 shall be completed by January 31, 2019.

The Contractor shall complete all of the above stated-activities within 45 Working Days of the Part 1 NTP. Each additional Working Day in which the Contractor is not in compliance with this requirement will be subtracted from the number of Working Days allowed for the Time of Completion per 6-7. When the number of Working Days specified in 6-7.1 is exhausted, the Contractor will be subject to liquidated damages. The counting of Working Days for the completion of Part 1 NTP activities will stop upon the receipt of all required Submittals and resume upon the return of any required submittal to the Contractor per 2-5.3.1.

The Part 2 NTP shall be for the start of the Work. The Part 2 NTP will not be issued until all Part 1 NTP activities have been completed.

Payment for compliance with Part 1 and Part 2 NTP requirements, except for preparation of the Baseline Construction Schedule, shall be considered as included in the lump sum Bid price for "MOBILIZATION."

6-2 PROSECUTION OF THE WORK. Add the following before the first paragraph:

6-2.1 General.

Add the following subsections after the last paragraph:

6-2.2 Work by Others Due to Unsatisfactory Work Prosecution. If, as determined by the Engineer, the Contractor is not prosecuting the Work in a satisfactory manner or is not providing for public safety, traffic and protection of the Work, the Engineer will notify the Contractor of such unsatisfactory conditions and will indicate the date and time when corrective work must be completed. If the Contractor fails to comply, the Agency may elect to do the Work or have the Work performed by others and deduct the cost thereof from any monies due the Contractor. Such action shall not relieve the Contractor from liability.

6-2.3 Sequence of Work. The Contractor's construction schedule and sequence of work shall conform to the following:

a) The first order of construction work shall be any construction work specified as such in 6-1.2 and shall follow in order the sequential Phasing on the Traffic Control Plans.

6-4 TERMINATION OF THE CONTRACT FOR DEFAULT. Delete the entire subsection. Refer to the Agreement.

6-5 TERMINATION OF THE CONTRACT FOR CONVENIENCE. Delete the entire subsection. Refer to the Agreement.

6-6 DELAYS AND EXTENSIONS OF TIME.

6-6.1 General.

Replace the second paragraph with the following:

No extension of time will be granted for a delay caused by the inability to obtain materials unless the Contractor obtains from the supplier and furnishes to the Engineer documentary proof that such materials could not be obtained due to war, government regulations, labor disputes, strikes, fires, floods, adverse weather necessitating the cessation of work, or other similar action of the elements.

6-6.2 Extensions of Time. Add the following:

Extensions of time will be reflected as non-working days on the Statement of Working Days except when such extensions are a result of Extra Work.

6-7 TIME OF COMPLETION.

6-7.1 General. Replace the first sentence with the following:

The Contractor shall complete the Work within 100 Working Days.

6-9 LIQUIDATED DAMAGES. Replace the third sentence of the first paragraph with the following:

For each consecutive calendar day in excess of the time specified for the completion of Work in 6-7.1, as adjusted in accordance with 6-6, the Contractor shall pay to the Agency, or have withheld from monies due it, the sum of $2,000.

Replace the first sentence of the second paragraph with the following:

Execution of the Contract shall constitute agreement by the Agency and the Contractor that $2,000 per day is the minimum value of the costs and actual damage caused by the failure of the Contractor to complete the Work within the allotted time.

6-10 USE OF IMPROVEMENT DURING CONSTRUCTION. Add the following after the first paragraph:

Action by the Agency to take over and utilize any part of the Project shall become effective only upon issuance of a written notice, signed by the Engineer, setting forth a description of the completed improvements to be taken over, the effective date, location and limits thereof.

Add the following subsection:

6-11 NONCOMPLIANCE WITH THE PLANS AND SPECIFICATIONS. Failure of the Contractor to comply with any requirement of the Plans and Specifications, and to immediately remedy any such noncompliance upon notice from the Engineer, may result in suspension of Contract progress payments on all items of work. Any progress payments so suspended shall remain in suspension until the Contractor's operations are brought into compliance to the satisfaction of the Engineer. Upon determination by the Engineer that the Contractor is in compliance, progress payments will resume for those items of work which have been constructed in conformance with the Plans and the Specifications. No additional compensation shall be due the Contractor as a result of the suspension of progress payments due to noncompliance with the Plans and Specifications.

SECTION 7 - RESPONSIBILITIES OF THE CONTRACTOR

7-1 THE CONTRACTOR'S EQUIPMENT AND FACILITIES.

7-1.1 General. Add the following after the second paragraph:

Enclosed toilets shall be in a location approved by the Engineer. There shall be a minimum of one (1) toilet for each multiple of twenty (20) workers, or fractional part thereof, at the Work site.

The toilets shall be removed upon completion of the Work. All disturbed areas shall be put back to its original condition. If the toilets are located on exisitng pavement, then the existing pavement shall be power-washed to remove any stain, grime or dirt.

7-2 LABOR.

7-2.1 General. Add the following:

This Project is subject to compliance monitoring and enforcement by the State of California Department of Industrial Relations.

7-2.2 Prevailing Wages. Add the following after the second sentence:

The Agency will furnish copies of said wage rates for the Contractor's use.
Add the following:

The General Prevailing Wage Rate Determinations are available at www.dir.ca.gov/DLSR/PWD/index.htm. Copies of the General Prevailing Wage Determinations are on file at the Los Angeles County Department of Public Works, Construction Division, 8th Floor, 900 South Fremont Avenue, Alhambra, CA 91803-1331, telephone (626) 458-3104. Copies will be made available to any interested party upon request. Future effective wage rates will be on file with the Department of Industrial Relations, and are referenced but not printed in said publication. The new wage rates shall become effective on the day following the expiration date of the current determinations and apply to the Contract in the same manner as if they had been included or referenced in the Contract.

7-2.3 Payroll Records. Replace the entire subsection with the following:

Pursuant to Section 1776 of the California Labor Code, the Contractor shall keep accurate payroll records ("certified payroll records") showing the name, address, social security number, work classification, straight time, and overtime hours worked each day and week, and the actual per diem wages paid to each journeyman, apprentice, worker, or other employee the Contractor employs in connection with the Work.

Whenever so requested by the Engineer, the Contractor shall submit to the Engineer a certified copy of each such employee's payroll record ("certified payrolls") at the end of each week for the period ending the previous week. Failure to submit such payroll records will result in the Agency withholding from any monies due the Contractor the amount of $250 for each week in which certified payrolls have not been submitted.

Add the following Subsections:

7-2.5 Work Records. Pursuant to Section 1812 of the California Labor Code, the Contractor shall maintain an accurate written record of all employees working on the Project each calendar day. The record shall include each employee's name, Social Security number, job classification and the actual number of hours worked. The Contractor shall submit a signed copy of this record to the Engineer at the end of each week.

7-2.6 County Equal Employment Opportunity (EEO) Provisions. The Agreement will contain a section of the same title (refer to the "Sample Agreement"). The Contractor shall submit the form mentioned to the Engineer before the start of the Work and twice each year, once before March 10, and again before September 10. Failure to so submit will result in the deduction prescribed.

7-2.7 Local and Targeted Worker Hire Policy.

7-2.7.1 Mandatory Hiring Goals.

The County of Los Angeles has implemented a Local and Targeted Worker Hire Policy (LTWHP) to facilitate the hiring of Local and Targeted workers. Pursuant to this policy, this Project has a **mandatory goal** of at least **30 percent** of the total California Construction Labor Hours worked be **performed by** a qualified **Local Resident**. In addition, at least **10 percent** of the total California Construction Labor Hours worked on this Project shall be performed by County residents classified as a Targeted Worker. Hours worked by a **Targeted Worker** who is also a Local Resident may be applied towards the 30 percent Local Resident and 10 percent Targeted Worker Hire goals.

Pursuant to Section 1777.5(g) of the California Labor Code, the Contractor shall maintain a minimum ratio of one apprentice hour for every five journeyman hours worked. Half of all apprentice hours on the Project shall be performed by Local and Targeted Workers. Hours worked by an apprentice, who is also a Targeted Worker or a Local Resident, may be applied towards the 30 percent Local Resident and/or the 10 percent Targeted Worker Hire goals.

7-2.7.2 Definitions. Terms used in the implementation of the LTWHP shall be defined as follows:

California Construction Labor Hours – Includes all craft worker hours performed on the Project by California residents, excluding the hours performed by off-site material fabricators, designers, Contractor or subcontractor field office staff, suppliers, or vendors.

Community Service Providers – A network of public and private partners working to support workers and businesses by serving their employment and training needs.

Craft Employee Request Form – Form 00 19 12-1 used by the Contractor and its subcontractors to request dispatch of craft workers (including, but not limited to, apprentices and journeymen), who are Local Residents or Targeted Workers, from a Community Service Provider or union hiring hall in the event that assistance in obtaining such workers is needed.

Jobs Coordinator – An individual or firm that facilitates implementation of the Local and Targeted Worker Hire requirements of the County of Los Angeles for the Contractor and its subcontractors. Acceptable firms are listed in Form 00 19 12-5.

Local and Targeted Hire Status Report – A monthly report submitted on Form 00 19 12-4.

Local Resident – An individual whose primary place of residence is within the Tier 1 or Tier 2 Zip Codes of the County, as listed in Forms 00 19 12-1 and 00 19 12-3.

Mandatory Compliance Withholding (MCW) – Maximum withholding amount for noncompliance with mandatory goals equal to one percent of the Contract Price, but not to exceed $500,000, comprised of 0.75 percent for Local Worker and 0.25 percent for Targeted Worker goal compliance, respectively.

Monthly Mandatory Compliance Withholding (MMCW) – Maximum withholding per month equal to the Mandatory Compliance Withholding amount divided by the Contract duration, in months.

Targeted Worker – An individual who is a County resident and faces one or more of the following barriers to employment:

- Has a documented annual income at or below 100 percent of the Federal Poverty Level;
- No high school diploma or GED;
- A history of involvement with the criminal justice system;
- Protracted unemployment (receiving unemployment benefits for at least 6 months);
- Is a current recipient of government cash or food assistance benefits;
- Is homeless or has been homeless within the last year;
- Is a custodial single parent;
- Is a former foster youth;
- Is a veteran, or is the eligible spouse of a veteran of the United States armed forces, under Section 2(a) of the Jobs for Veterans Act (38 U.S.C.4215[a]);
- Eligible Migrant and seasonal farmworkers;
- Currently an English language learner;
- Older Individuals (55+);
- Disabled; or
- Individuals with low levels of literacy.

Tier 1 Zip Codes – Tier 1 Zip Codes are those zip codes listed in Form 00 19 12-1.

Tier 2 Zip Codes – Tier 2 Zip Codes are those zip codes listed in Form 00 19 12-3.

Workforce Utilization Plan – Plan and schedule for the hiring of qualified Local Residents and Targeted Workers, including the use of the subcontractors' workforce, to meet the LTWHP mandatory hiring goals submitted on Form 00 19 12-2.

7-2.7.3 Administration and Compliance.

a) Prior to issuance of the Part 2 NTP, the Contractor shall retain the services of a Jobs Coordinator. The Jobs Coordinator shall be retained for the duration of the Contract.

b) Prior to issuance of the Part 2 NTP, the Contractor, on behalf of itself and its subcontractors, shall conduct at least 1 community outreach meeting to target Local Residents and Targeted Workers for potential employment. The meeting shall be in a facility located within 5 miles of the Project site at a location approved by the Agency.

c) Prior to issuance of the Part 2 NTP, the Contractor, on behalf of itself and its subcontractors, shall submit a Workforce Utilization Plan to the Office Engineer named in 2-5.3.1 that contains the plan and schedule for the hiring of qualified Local and Targeted Workers and the assignment and use of the subcontractors' workforce to meet the Local Worker Hire requirement. The Contractor, thereafter, shall submit updates of the Workforce Utilization Plan to reflect changes in Project conditions, schedule, or subcontractors.

d) The Contractor and its subcontractors shall submit certified payroll reports on a monthly basis, but no later than on the 1st Monday of the subsequent month. Certified payroll reports shall be submitted electronically if an online system is designated by the Agency.

e) ***The Contractor and its subcontractors shall first meet the Local and Targeted Worker Hire participation requirement by employing qualified workers from the Tier 1 Preference Area.*** If the Contractor is unable to meet their entire Local and Targeted Worker Hire need from this area, it must submit a statement on company letterhead certifying that it has exhausted all available qualified Local and Targeted Workers from this area during a 48-hour period before pursuing workforce from the Tier 2 Preference Area.

f) The Contractor and its subcontractors shall use the Craft Employee Request Form for all requests for dispatch of qualified Local Resident and Targeted Worker craft workers (including apprentices and journeymen) in the event that assistance in obtaining such workers is needed from a Community Service Provider, union hiring hall, or other source.

g) The Contractor and its subcontractors shall not discriminate against or give preference to any particular individual or group based on race, color, gender, sexual orientation, age or disability.

h) All California Construction Labor Hours shall be included in the calculation for the percentage requirements specified in 7-2.7.1.

i) No later than the 1st Day of each month for the duration of the Project, the Contractor shall submit a completed Local and Targeted Hire Status Report containing the relevant information for the preceding month to demonstrate progress in meeting the Workforce Utilization Plan. The Local and Targeted Hire Status Report shall contain, at a minimum the information specified below for the Contractor and each subcontractor:

1) For each California Project Craft Worker (apprentices and journeymen): (a) the total labor hours, total number of all workers (apprentices and journeymen), and hours worked on the Project; and (b) the wages earned on the Project.

2) Total number of Local Residents (apprentices and journeymen), hours worked (apprentices and journeymen), segregated by Tier 1 and Tier 2 Residency Preference Areas, and wages earned by each Local Resident.

3) Total number of Targeted Worker hours worked (apprentices and journeymen) (by Primary and Secondary Residency Preference Areas).

4) Total number of hours worked by Local Residents by subcontractors.

j) The Agency may, in its sole discretion, elect to provide an online system for the Contractor and its subcontractors to input the data required in the Local and Targeted Hire Status Report. If the Agency so elects, the Contractor and its subcontractors shall utilize that online system.

k) Failure to submit the Local and Targeted Hire Status Report shall be deemed to constitute zero percent Local and Targeted Hire participation for the month, and the Agency may retain the Mandatory Compliance Withholding for the duration of the Project.

l) The Contractor's compliance with the approved Workforce Utilization Plan will be evaluated monthly using the Local and Targeted Worker Hire Status Report.

Should the Contractor fail to comply with the mandatory goals, in any month, the Agency will withhold up to the Monthly Mandatory Compliance Withholding (MMCW).

The actual Monthly Withholding Amount (MWA), if any, will be determined by the following method:

1) Calculate Actual Hire Percentage (AHP) for Local/Targeted Hire Workers:

$$AHP_L = \frac{\text{Actual Local Hire Worker Hours Worked}}{\text{Actual California Construction Labor Hours Worked}}$$

$$AHP_T = \frac{\text{Actual Targeted Hire Worker Hours Worked}}{\text{Actual California Construction Labor Hours Worked}}$$

2) Calculate the Utilization Percentage (UT):

$UT_L = AHP_L \div 30\%$ $UT_T = AHP_T \div 10\%$

3) Calculate the Unmet Percentage of Compliance (UPC):

$UPC_L = 100\% - UT_L$ $UPC_T = 100\% - UT_T$

4) Calculate the Mandatory Compliance Withholding (MCW):

MCW = Contract Price x 1.0% (not to exceed $500,000)

5) Calculate the Monthly Mandatory Compliance Withholding (MMCW):

MMCW = MCW ÷ Contract Duration (in months)

6) Calculate the Monthly Withholding Amount (MWA):

$MWA_L = MMCW \times 75\% \times UPC_L$ $MWA_T = MMCW \times 25\% \times UPC_T$

$MWA = MWA_L + MWA_T$

Should the Actual Hire Percentage of Local or Targeted Hire Workers meet or exceed the mandatory goals of 7-2.7.1, the Monthly Withholding Amount for that portion will be zero.

m) After completion of the Work, the Agency will conduct a final evaluation of the Contractor's compliance with the LTWHP and execute a final release of the withholdings, if applicable. The Contractor's failure to meet the LTWHP will result in the Agency imposing liquidated damages and deducting such amount otherwise owed to the Contractor in its final payment. The Agency will not be required to pay interest on any amounts withheld during the term of the Contract.

n) The Agency and the Contractor specifically agree that the final withholding, minus the total value of previous releases, in direct proportion to the actual Local and Targeted Hire participation levels achieved by the Contractor consistent with the Workforce Utilization Plan, shall be imposed as liquidated damages, and not as a forfeiture or penalty. It is further specifically agreed that the aforesaid amount is presumed to be the amount of damages sustained due to the Contractor's inability to achieve the mandatory goals specified in 7-2.7.1.

7-2.7.4 Community Service Providers. Community Service Providers include local one-stop job/career centers funded by the Federal Workforce Innovation and Opportunities Act (WIOA). These centers help businesses find skilled workers and connect customers to work related training and education; most services are available at no cost. Examples of Community Service Providers that may be used by the Contractor and its subcontractors to identify Local Residents and Targeted Workers include:

- America's Job Center of California:

  http://www.americasjobcenter.ca.gov/

- Cal Jobs:

  http://www.caljobs.ca.gov/vosnet/Default.aspx

- Helmets to Hardhats:

  https://www.helmetstohardhats.org

- LA Jobs:

  https://www.jobsla.org/vosnet/Default.aspx

- Los Angeles County America's Job Centers of California:

  http://workforce.lacounty.gov/

- Los Angeles County Workforce Development, Aging, and Community Services:

  http://wdacs.lacounty.gov/

7-2.7.5 Jobs Coordinator. The Contractor shall submit, in accordance with 2-5.3, the name of the individual or firm that will serve as the Jobs Coordinator for the duration of the Contract. Acceptable firms are listed in Form 00 19 12-5. The Contractor shall not substitute any person for the Jobs Coordinator without prior written approval from the Engineer. Upon approval of the Jobs Coordinator by the Agency, the Contractor shall inform all its subcontractors of the Jobs Coordinator and their services.

If the Contractor wishes to perform the services of the Jobs Coordinator with its own forces, it shall submit such request in writing to the Agency within 2 Working Days after the date of the Bid opening. Requests received after that time period will not be considered. The Contractor shall, at its expense, furnish information supporting the use of its own forces that demonstrates their capacity to act as Jobs Coordinator to meet the mandatory hiring goals. The Agency will review the supporting information within 5 Working Days from the date of submission. The findings of the Agency shall be final.

7-2.7.5.1 Responsibilities. The Jobs Coordinator's services support the Contractor's efforts to meet the mandatory hiring goals of 7-2.7.1 and include the following:

a) Develop, create, design and market specific programs to attract Local and/or Targeted Workers for construction opportunities at the Project (e.g. handouts and fliers for "walk-ins" demonstrating program entrance procedures).

b) Coordinate services for the Contractor to use in the recruitment of Targeted Workers.

c) Educate and assist contractors on incentives provided by state or federal programs for on-the-job training and employer tax credits.

d) Conduct orientations, job fairs and community outreach meetings in the local community.

e) Screen and certify the Targeted status of workers as defined in 7-2.7.2.

f) Establish a referral and retention tracking mechanism for placed Targeted workers and apprentices.

g) Network with the various work source centers, community and faith-based organizations and other non-profit entities that provide qualified Local and/or Targeted workers.

h) Coordinate with the various building and construction trade crafts for referral and placement of Local and Targeted Workers.

i) Coordinate contractor sponsorship of apprentices and coordinate with pre-apprenticeship programs.

j) Maintain a database of pre-qualified Targeted Workers for referral to work on the Project and/or indentureship into a bona fide labor/management apprenticeship program.

k) Act as the point of contact to provide information about available job opportunities on the Project.

l) Assist the Contractor (including all subcontractors) with the documentation effort and other reports as it relates to the Project's Local and Targeted Worker Hire requirements (all reports shall be submitted by the Contractor).

m) Work closely with County staff, the building trades and subcontractors in achieving the Targeted hiring goals.

7-2.7.5.2 Payment. Payment for complying with the Local and Targeted Worker Hire Policy shall be considered as included in the various items in the Bid.

Full compensation for all costs associated with the services provided by the Jobs Coordinator shall be considered as included in the lump sum price in the Bid for "JOBS COORDINATOR".

7-2.8 Community Business Enterprise (CBE) Participation .

A. The County encourages the participation of Community Business Enterprises (CBE) in the project and has established a goal of twenty-five percent (25%) CBE participation which all contractors must aspire to meet. Participation in the Work is based on total monetary value of the proposed subcontract. CBEs are defined as Minority/Women/Disadvantaged/Disabled Veteran owned Business Enterprises (M/W/D/DVBE).

B. Bidders shall document their good faith efforts to utilize CBEs. The apparent responsible Bidder with the lowest responsive Bid shall submit the documentation of its good faith efforts to the County within 24 hours of the Bid opening. The Agency will evaluate the Bidder's good faith efforts to meet the CBE participation goal by the following criteria:

1. Bidder identified and selected specific items of the Project for which the Contract will be awarded to be performed by CBEs to provide an opportunity for participation by those enterprises.
2. Bidder advertised, not less than ten (10) calendar days before the date the Bids are opened, in one or more daily or weekly newspaper trade association publications, minority-or trade-oriented publications, trade journals, or other media, specified by the local agency for CBEs that are interested in participating in the Project.
3. Bidder provided written notice of his or her interest in bidding on the contract to the CBEs required to be notified by the Project specifications not less than ten (10) calendar days prior to the opening of Bids.
4. Bidder followed up initial solicitations of interest by contacting the enterprises to determine with certainty whether the enterprises were interested in performing specific items of the Project.
5. Bidder provided interested CBEs with information about the Plans, Specifications, and requirements for selected subcontracting or material supply Work.
6. Bidder requested assistance from minority and women community organizations; minority and women contractor groups; local, state, or federal minority and women business assistance offices; or other organizations that provide assistance in the recruitment and placement of minority or women business enterprises, if any are available.
7. Bidder negotiated in good faith with the CBEs, and did not unjustifiably reject as unsatisfactory bids prepared by any CBE.
8. Where applicable, the Bidder advised and made efforts to assist interested CBEs in obtaining bonds, lines of credit, or insurance required by these Contract Documents.
9. Bidder's efforts to obtain CBE participation could reasonably be expected by the Agency to produce a level of participation sufficient to meet the goals and requirements of the Agency.

C. Bidder may request for a certified CBE listing via email to Ms. Cynthia Tucker at the County of Los Angeles Office of Small Business at:

CBESBE@isd.lacounty.gov

D. Contractors, material, and services and supplies vendors interested in becoming registered as certified minority or women business enterprises may contact the County of Los Angeles Countywide Contract Compliance Section, at (626) 943-5619.

E. The apparent responsible Bidder with the lowest responsive Bid is required to submit documentation which describes the Bidder's good faith efforts to utilize CBEs within 24 hours of the bid opening. Other Bidders shall so submit within 24 hours if so requested by the Agency.

7-3 INSURANCE.

7-3.1 General. Add the following as the second sentence of the first paragraph:

Such insurance shall be primary to and not contributing with any other insurance or self-insurance programs maintained by the Agency.

Add the following to the third paragraph:

The Contractor shall provide renewal certificates to the Agency not less than 10 Days prior to the Contractor's policy expiration date(s). The Agency reserves the right to obtain complete, certified copies of any required Contractor and/or Subcontractor policies at any time.

7-3.2 General Liability Insurance. Replace the first paragraph with the following:

The policy shall insure the Agency, its officers, employees, and agents while acting within the scope of their duties on the Work, against all claims arising out of or in connection with the Work, except as otherwise specified in 6-10. Notwithstanding any inconsistent statement in the policy or any subsequent endorsement, the Agency shall be the insured or named as an additional insured with respect to liability arising out of the Contractor's ongoing and completed operations. The certificate of insurance submitted to the Agency shall state that the Contractor's insurance is primary and that any other insurance held by the Agency is non-contributory. The endorsement shall contain the language provided in the sample included at the end of this Section G.

Replace the second paragraph with the following:

The Contractor's general liability insurance may cover more than one contract, but must be acceptable to the Agency. General liability insurance shall be written on ISO policy form CG 00 01 or its equivalent with limits of not less than the following:

Personal and Advertising Injury:	$2,000,000
Each Occurrence:	$2,000,000
Products/Completed Operations Aggregate:	$2,000,000
General Aggregate:	$4,000,000

Add the following:

To the fullest extent permitted by law, the Contractor waives its and its insurer(s) rights of recovery against the Agency under all required insurance policies for any loss arising from or related to the Contract. The Contractor shall require its insurers to execute any waiver of subrogation endorsements which may be necessary to affect such waiver.

The Contractor shall provide the Agency with evidence of the required insurance coverage satisfactory to the Agency, including certificate(s) of insurance coverage and copies of applicable additional insured endorsements.

The County of Los Angeles, and the Los Angeles County Flood Control District along with their Special Districts, elected officials, officers, employees, and agents shall be named under the policy as an insureds or additional insureds covering the Work, including the Contractor's ongoing and completed operations. Such coverage for additional insureds shall apply with respect to liability and defense of suits or claims arising out of the Contractor's acts or omissions, whether such liability is attributable to the Contractor or the Agency. The full policy limits and scope of protection shall apply to the aforementioned additional insureds even if they exceed the minimum insurance requirements specified in the Specifications.

In the event the Contractor's policy contains a deductible or self-insured retention, and in the event that any of the additional insureds specified above seeks coverage under such policy, the Contractor shall satisfy such deductible or self-insured retention to the extent of loss covered by such policy, even if the Contractor is not a named defendant. Notwithstanding the foregoing, if, for any reason, one of the additional insureds listed herein pays any such deductible or self-insured retention, the Agency has the right to withhold the amount of such payment from any monies owed to the Contractor.

The Contractor shall include all Subcontractors as insureds under the Contractor's own policies, or shall provide the Agency with each Subcontractor's separate evidence of insurance coverage. The Contractor shall be responsible for verifying each Subcontractor complies with the insurance requirements specified in the Specifications and the Agreement and shall require that each Subcontractor name the Agency and each additional insured, and the Contractor as additional insureds on the Subcontractors general liability policy. The Contractor shall obtain the Agency's prior review and approval of any Subcontractor request for modification of the insurance requirements.

The policy shall not contain a deductible or self-insured retention in excess of $25,000. The Agency retains the right to require the Contractor to provide a bond or other financial agreement guaranteeing payment of all such retained losses and costs attributable to the Contractor's retention, or, withhold payment to the Contractor in the amount of all or any deductibles/retentions as the Agency deems appropriate. The Contractor's policies shall not obligate the Agency to pay any portion of the Contractor's deductible or self-insured retention.

7-3.3 Workers' Compensation Insurance. Add the following:

Should evidence of the renewal or replacement of the policy not be filed with the Agency prior to the expiration or cancellation date, the Agency will stop all work on the Project and no further work shall be performed until new insurance coverage has been obtained by the Contractor. Such stop order shall not be a cause for a time extension to the Contract duration.

Such policy shall be endorsed to waive subrogation against the Agency for injury to the Contractor's employees. If the Contractor's employees will be engaged in maritime employment, the coverage shall provide the benefits required by the U.S. Longshore and Harbor Workers Compensation Act, Jones Act or any other Federal law to which the Contractor is subject. If the Contractor will provide leased employees, coverage shall also include an Alternate Employer Endorsement (providing scope of coverage equivalent to ISO policy form WC 00 03 01 A) naming the Agency as the Alternate Employer and the endorsement form shall be modified to provide that the Agency will receive not less than 30 Days advance written notice of cancellation of this coverage provision.

In all cases, the above insurance shall include employer's liability coverage with limits not less than:

Each Accident: $1,000,000

7-3.4 Automobile Liability Insurance. Replace the entire paragraph with the following:

The Contractor shall provide evidence of and maintain automobile liability insurance. Such insurance shall be written on ISO policy form CA 00 01 or its equivalent with a limit of liability of not less than $2,000,000 for bodily injury and property damage, in combined or equivalent split limits, for each single accident. Such insurance shall cover liability arising out of the Contractor's use of autos in performing the Work, including owned, leased, hired, and/or non-owned autos, as each may be applicable.

Add the following:

7-3.5 Builder's Risk Course of Construction Insurance. The Contractor shall provide evidence of and maintain builder's risk course of construction insurance until acceptance of the Contract by the Agency. Such insurance shall insure against damage from perils covered by the Causes-of-Loss Special Form (ISO policy form CP 10 30), and be endorsed to include earthquake, flood, ordinance or law coverage, coverage for

temporary offsite storage, debris removal, pollutant cleanup and removal, preservation of property, excavation costs, landscaping, shrubs and plants, and full collapse coverage during construction (without restricting collapse coverage to specified perils). Such insurance shall be extended to include machinery coverage for air conditioning, heating, hoist, and other equipment during testing.

Coverage shall be written on a completed-value basis and cover the entire value of the Contract against loss or damage until completion and acceptance by the Agency.

7-5 PERMITS. Add the following:

The Contractor shall obtain the following no fee permits:

1. Building Permit (ADA compliance) – Plan check No. BLDC180510000201
   Contact: Joshua Hussey, (626) 458-6378, JHUSSEY@dpw.lacounty.gov
   Building and Safety Division, County of Los Angeles
   900 S. Fremont Ave, 3rd Floor
   Alhambra, CA 91802-1460

2. Water Efficient Landscape Irrigation Permit – Reference No. EIMP2017000578
   Instructions: Bring 2 copies of the approved landscape plan and original signed water purveyor acknowledgement form (contact project manager) to the public counter located at:
   Contact: Public Counter, (323) 820-6500
   Building and Safety Southwest Office, County of Los Angeles
   1320 W. Imperial Hwy
   Los Angeles, CA 90044

3. South Coast Air Quality Management District (SCAQMD) Permit – only required only if temporary generator, 50hp or greater, will be used.
   Contact: Small Business Assistance Office, (800) 388-2121,
   smallbizassistance@aqmd.gov
   SCAQMD
   21865 Copley Dr.
   Diamond Bar, CA 91765-4182

4. Construction and Demolition Recycling and Reuse Plan – RRP No. 071118-1004
   Amendments to the approved Recycling and Reuse Plan dated 7/11/18 must be submitted to the public counter located at:
   Environmental Programs Division, County of Los Angeles
   900 S. Fremont Ave, Annex Building, 3rd Floor
   Alhambra, CA 91802-1460

7-6 THE CONTRACTOR'S REPRESENTATIVE. Add the following as the last paragraph:

The failure of the designated representative(s) to faithfully prosecute the Work, including, but not limited to, failure to adhere to the Contractor's construction schedule shall be deemed grounds for removal from the Work per 7-2.1.

7-7 COOPERATION AND COLLATERAL WORK. Add the following after the last paragraph:

When the Plans indicate that a portion or all of the above work is to be performed by others, the Contractor shall notify the Engineer a sufficient amount of time in advance of construction to enable the Engineer to give the affected agency 72 hours notice to perform the work. This shall also apply to all other facilities of a similar nature which are located in public streets over which another agency has jurisdiction or control, and which must be relocated, reconstructed, or modified to permit or facilitate the construction of the Project. Such relocation, reconstruction, or modification will be requested when, in the opinion of the Engineer, such work is necessary for construction of the Project. This work will be performed at no cost to the Contractor. However, relocation, reconstruction, or modification of the above-mentioned facilities performed for the convenience of the Contractor, or because of damage caused by the Contractor's operations, shall be at the Contractor's expense.

7-8 WORK SITE MAINTENANCE.

7-8.1 General. Replace the second paragraph with the following:

During all phases of trenching operations and whenever dirt or base material is stored on paved roadways, the Contractor shall furnish and operate a motorized street sweeper with spray nozzles at least once a day within the areas of its operations and, as determined by the Engineer, along haul routes. The sweeping shall be near or after the end of construction operations for the day. At the same time, the Contractor shall also sweep the sidewalks either manually or with a motorized street sweeper in the vicinity of the construction operations. The sweeping operations shall produce a clean surface throughout the Project area.

If, in the opinion of the Engineer, this effort does not result in satisfactorily clean streets and sidewalks, then the Contractor shall take whatever other measures are necessary to keep the streets and sidewalks clean. Such measures may include, but not be necessarily limited to, more frequent use of a motorized street sweeper as noted above, the use of a self-loading vacuum sweeper and/or sufficient hand labor to satisfactorily comply with this specification.

7-8.5 Sanitary Sewers.

7-8.5.3 Spill Prevention and Emergency Response Plan. Add the following:

The Contractor shall make arrangements for an emergency response unit comprised of emergency response equipment and trained personnel to be immediately dispatched to the Project site in the event of a sewage spill. Prior to commencing any work under the Contract, and subject to review and approval by the Engineer, the Contractor shall prepare and implement a written emergency response plan and procedure, to include response teams, access routes, required materials, equipment, clothing and tools, and an emergency response roster with telephone numbers and arrangements for backup personnel and equipment. This plan and emergency response roster shall be provided to the Engineer.

The Contractor shall be fully responsible for containing any sewage spillage, preventing any sewage from reaching a watercourse, recovery and legal disposal of any spilled sewage, any fines or penalties associated with the sewage spill imposed upon the Agency and/or the Contractor by other jurisdictional agencies, and any other expenses or liabilities created or generated as a result of the sewage spillage.

Add the following subsection:

7-8.5.4 Sewage Spill Notification. The Contractor shall immediately notify the Engineer if a sewage spill occurs. The Engineer will notify the Los Angeles County Department of Health Services (213) 974-1234 and, should the volume of spillage appear to exceed 1,000 gallons, the State Office of Emergency Services (800) 852-7550. Should the Engineer not be available, the Contractor shall immediately notify the Agency's Dispatch center, (626) 458-4357, and request the dispatcher to notify the Los Angeles County Department of Health Services, (213) 974-1234, and the Engineer. If the Engineer is not immediately available, and the volume of spillage appears to exceed 1,000 gallons, the Contractor shall request the Agency's Dispatch center to notify the State Office of Emergency Services (800) 852-7550. The Engineer will confirm that all necessary containment and cleanup actions have been taken.

7-9 PROTECTION AND RESTORATION OF EXISTING IMPROVEMENTS. Add the following:

All existing permanent traffic and bus stop signs which are removed or altered during construction shall be replaced by the Contractor to a condition equal to or better than, in all respects, the condition which prevailed prior to the start of construction under the Contract. While construction is in progress, any signs which are removed shall be posted by the Contractor in temporary locations as near the original locations as practicable. Signs shall be replaced in their original location as soon as possible. Traffic sign replacement shall be in conformance with the current requirements of the California Manual on Uniform Traffic Control Devices, http://www.dot.ca.gov/hq/traffops/engineering/mutcd/. If any sign is damaged or lost, thus requiring a new sign, the Contractor shall immediately notify the Engineer, and shall immediately replace any traffic sign in accordance with the above-mentioned manual at its own expense. The replacement of traffic signs must be approved by the Engineer in writing.

The Contractor shall furnish and install one bike rack as shown on Attachment E included at the end of this Section G. The bike rack shall be one of the following:

a) RR3H-FT-EPX by Belson Outdoor:

http://www.belson.com/Rolling-Rack-Bike-Racks

b) 5 Bike Wave Rack – Heavy Duty by the Park and Facilities:

https://www.theparkcatalog.com/bike-racks

c) H-2543-3 Loop by Uline:

https://www.uline.com/BL_8781/Wave-Bike-Racks

No separate payment or additional payment will be made to furnish or install the bike rack.

7-10 SAFETY.

7-10.4 Safety.

7-10.4.1 Work Site Safety.

7-10.4.1.1 General. Add the following:

The Contractor shall be solely responsible for ensuring that all work performed under the Contract is performed in strict compliance with all applicable Federal, State and local occupational safety regulations. The Contractor shall provide at its expense all safeguards, safety devices and protective equipment, and shall take any and all actions appropriate to providing a safe Project and staging site.

7-10.4.1.2 Work Site Safety Official. Add the following:

Failure by the Contractor to provide the required Project Safety Official shall be grounds for the Agency to direct the cessation of all work activities and operations at no cost to the Agency until such time as the Contractor is in compliance.

Add the following subsection:

7-10.4.1.3 Safety Indemnification. To the extent allowed by law, the Contractor agrees to defend, indemnify and hold harmless the Agency and its officers, employees and agents from and against any and all investigations, complaints, citations, liability, expense (including defense costs and legal fees), claims and/or causes of action for damages of any nature whatsoever, including but not limited to injury or death to employees of the Contractor, its subcontractors or Agency, attributable to any alleged act or omission of the Contractor or its subcontractors which is in violation of any Cal/OSHA regulation. The obligation to defend, indemnify and hold harmless includes all investigations and proceedings associated with purported violations of Section 336.10 of Title 8 of the California Code of Regulations pertaining to multi-employer work sites. The Agency may deduct from any payment otherwise due the Contractor any costs incurred or anticipated to be incurred by the Agency, including legal fees and staff costs, associated with any investigation or enforcement proceeding brought by Cal/OSHA arising out of the Project.

7-10.4.1.5 Mental Health Services for Critical Incidents. In the event of a serious accident on the Project site, the Los Angeles County Department of Mental Health (DMH) will, if requested, respond. The response may be within a few hours or as long as a few Days after the incident, depending on when the request was made. The services DMH will provide include crisis intervention, normalization of the stress response that survivors may be experiencing, stress management techniques and resources if the stress reactions increase in frequency or intensity.

Requests for services may be made by calling the DMH Emergency Outreach Bureau Deputy Director, (213) 738-4924, during normal business hours or the ACCESS Center, (800) 854-7771, evenings, holidays, and weekends.

7-10.5 Security and Protective Devices.

7-10.5.2 Security Fencing. Replace the entire subsection with the following:

Fencing or steel plate covers shall be installed in advance of or concurrently with excavation operations in accordance with LACDPW Standard Plan 6008. Fencing shall completely enclose all open excavations and shall remain in place until backfill has been placed to approximately adjacent ground level. Fencing may be removed during working hours as necessary to provide access and working room for construction operations. It shall be the Contractor's responsibility to provide equivalent security during these periods. Fencing shall be of either Type 1 or 2 as defined below or a combination thereof as approved by the Engineer and shall be securely fastened together. However, adjacent to any school or park, fencing shall be Type 2 .

Type 1 fencing shall be in accordance with LACDPW Standard Plan 6002. Type 2 fencing shall be 11 gage, 2-inch mesh, 5-foot chain link fabric securely fastened to metal posts driven in place at 10-foot maximum spacing and extending at least 5 feet above ground, or securely fastened to the shoring system if in the opinion of the Engineer this method will provide equivalent security to the method of driven posts. Privacy screening fabric, with a minimum of 85% visibility blockage, shall be attached to the fencing.

Payment for temporary fencing and/or plating shall be considered as included in the prices in the Bid for the various items of work.

Add the following subsection:

7-10.5.4 Temporary Manhole Shaft Covers. The Contractor shall protect the public at all times from accidental entry into manhole or manhole shaft openings. Any such opening shall be covered with an entry-proof cover approved by the Engineer.

Payment for temporary manhole shaft covers shall be considered as included in the Contract Unit Price for the Bid items for or affecting manholes.

7-13 LAWS TO BE OBSERVED. Add the following:

When required by City ordinance, the Contractor shall obtain and pay for a City business license.

Add the following subsections:

7-15 NOT USED.

7-16 MEETINGS. The Contractor shall attend and participate in all meetings scheduled by, or at the request of, the Engineer. These include, but are not limited to, a regularly scheduled weekly on-site meeting for the purposes of the management of the construction and Project site operations. The Contractor shall make available those resources, reports and records necessary to effectuate timely and productive management meetings.

7-17 NOTIFICATIONS.

Three weeks prior to the start of construction, the Contractor shall notify the agencies listed below:

Service Agency	Contact Name	Telephone no. or Email address
County of Los Angeles Fire Department – Station 58	Front Counter	(323) 291-8292
LA County Sheriff's Department – Marina del Rey Station	Traffic Sergeant	(310) 482-0022
Children Community Academy	Front Counter	(323) 290-0022
LA County Department of Public Health- Cross Connection & Water Pollution Control Program	Carlos Borja Jordi Fuentes Dan Bacani	(323) 715-3013 (213) 305-0911 (323) 274-8695
California Highway Patrol	Any Sergeant	(310) 642-3939

In addition, 30 Days prior to the start of construction, to coordinate bus stop impacts, the Contractor shall notify the agencies below:

Service Agency	Contact Name	Telephone no. or Email address
Metropolitan Transportation Authority	Bus Operation Control Special Event Coordinator	(213) 922-4632
Metropolitan Transportation Authority	Stops and Zone	(213) 922-4632
City of Los Angeles Department of Transportation	Operation Manager	(310) 638-0556

At least 24 hours in advance of closing or restricting access to any property, the Contractor shall notify the owner or resident of said property. A copy of said notification shall be provided to the Engineer. The Contractor shall conduct its operations, including those of its subcontractors and suppliers, so as to provide reasonable access to the adjacent properties and have no greater length or quantity of work under construction than can be properly prosecuted with a minimum of inconvenience to the public and other contractors engaged on adjacent or related work.

7-18 REQUEST FOR INFORMATION (RFI).

7-18.1 General. A RFI shall be submitted to the Engineer when:

a. An unforeseen condition or constructability question occurs.

b. Questions regarding information in the Contract Documents arise.

c. Information not found in the Contract Documents is required.

7-18.2 Submittals. When possible, such clarification shall be requested either verbally or in writing at the next scheduled Project meeting. When the RFI is answered at the Project meeting, the RFI shall be numbered and the response shall be entered into the meeting minutes. When the urgency of the need or the complexity of the item makes clarification at the next scheduled Project meeting impractical, a formal written RFI shall be submitted to the County. The Contractor shall use Primavera Expedition 9.1 (or the latest version) to prepare and submit RFIs unless otherwise instructed by the Engineer.

RFIs shall be submitted within a reasonable time frame so as not to interfere with or impede the progress of the Work. The Contractor shall make every effort to keep the number of RFIs to a minimum. If the number of RFIs becomes unwieldy, the Agency may require the Contractor to abandon the RFI process and submit requests as either submittals, substitutions, or requests for change.

When the response to an RFI effects the cost or time duration of the project, the Agency shall be notified in accordance with the 2-12 at the time of the submittal. Notification shall occur prior to commencing such work, so the Change Order process can be initiated. At the time of the RFI submittal, the Contractor shall notify the Agency of the time available before the response will cause a time or cost impact to the Project. An answered RFI shall not be construed as approval to perform extra work.

7-18.2.1 Submittal Form. Four copies of the written RFI request shall be submitted. The written request shall be legible, on a standard CSI or AIA preprinted form or other such form as approved in advance by the Agency (an email followed by 4 copies forwarded by first class mail is acceptable.) Each RFI request shall include the following information:

a) Project name and project identification number, as listed on the Contract Documents;

b) Date;

c) RFI number;

d) Contractor’s name, address, telephone and e-mail address;

e) Number and title of affected Specification Section(s);

f) Drawing numbers and detail numbers as appropriate;

g) Whether the RFI will result in a time or cost impact;

h) Clear, concise explanation of information or clarification requested;

i) Blank, lined spaces for Engineer's response;

j) Signature block for Agency to acknowledge review of Engineer's response;

k) Each page of each RFI attachment shall be marked in the lower right corner with the RFI number;

l) Submitted RFIs shall be numbered consecutively; and

m) All RFI forms shall be signed and stamped.

RFIs from the subcontractor or material supplies shall be submitted through the Contractor. The Contractor shall review all such information request prior to submitting to the Engineer.

RFIs not meeting the requirements of this section will not be answered and any consequential impact on the Project shall be the sole responsibility of the Contractor. Unanswered RFIs will be returned with a stamp or notification "Not Reviewed."

7-18.2.2 RFI Log. The Contractor shall maintain a RFI log. The log shall be updated weekly and furnished to the Agency when requested. The log shall contain the following minimum information:

a) RFI number

b) Date submitted

c) Brief description of content or subject

d) Date answered

7-18.2.3 RFI Response Time. A minimum of five (5) Working Days shall be allowed for review and response. The reponse time will be increased if more information is required, when the RFI is submitted out of sequence, or if in the opinion of the Agency, more time is required to answer the RFI.

7-18.3 Quality Assurance. The Contractor shall review the Contract Documents carefully before submitting a RFI to the Agency. The information requested shall be verified that it is not indicated in the Contract Documents or cannot be determined from a careful review. The Agency will not answer RFIs for information that is readily available in the Contract Documents.

RFIs requesting clarification of coordination issues, shall include Contractor's suggested solution as an attachment to the RFI. Such coordination issues include, but are not limited to, pipe and duct routing, clearances, specific locations of work shown diagrammatically, and similar items. Scale drawings or sketches indicating the proposed solution shall be provided. RFIs which do not include a suggested solution will not be answered.

RFIs shall not be used for the following:

a) To request approval of submittals,

b) To request approval of substitutions,

c) To request changes to the Contract Documents and to confirm action taken by the Contractor for requested changes/substitutions to the Contract Documents.

7-18.4 Payment. Payment for RFIs shall be considered as included in the prices in the Bid for the various items of work.

7-19 PHOTOGRAPHIC DOCUMENTATION.

7-19.1 General. The Contractor shall provide photographic documentation, which shall include preconstruction photographs and periodic construction photographs. Photographic documentation shall be submitted to the Engineer with the Monthly Schedule Updates.

The photographic documentation shall conform to the following requirements:

a) Photographic images shall be digital images, which shall be in JPEG format, produced by a digital camera with minimum sensor size of 4.0 megapixels, and at an image resolution of not less than 1024 by 768 pixels.

b) Photographs shall be taken using the maximum range of depth of field, and that are in focus, to clearly show the work. Photographs with blurry or out of-focus areas will not be accepted.

c) A key plan shall be maintained with each set of construction photographs that identifies each photographic location.

d) The digital images shall be submitted exactly as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.

e) The date and time shall be included in the file name for each digital image.

f) One set of digital images on CD-ROM shall be maintained in the field office at the project site, available at all times for reference. These digital images shall have the same identification as those submitted to the Engineer.

7-19.2 Preconstruction Photographs. Before commencement of demolition or commencement of construction, photographs of the project site and surrounding properties, including existing items to remain during construction, shall be taken from different vantage points.

7-19.3 Periodic Construction Photographs. Photographs shall be taken weekly. Vantage points shall be selected to show status of construction and progress since last photographs were taken.

7-19.4 Engineer Directed Construction Photographs. From time to time, the Engineer may instruct the Contractor about the number and frequency of photographs and subject, and the general directions or vantage points for photographs. Photographs shall show status of construction and progress since last photographs were taken.

Payment for photographic documentation shall be considered as included in the prices in the Bid for the various items of work.

7-20 AS-BUILTS.

7-20.1 General. The Contractor shall keep one (1) complete and up-to-date set of prints (Plans and Specifications) at all times on the job, reserved for use as a record set of changes from the bid set. Throughout the duration of the construction work, this set of prints shall be the responsibility of the Contractor to maintain as a record of all field changes, including underground runs which are installed in locations other than those indicated on the Plans and those that have been indicated as to be field run as located. The lines shall be located on the Plan dimensionally from a fixed point, such as a street-curb line, or centerline, or a permanent structure. A copy of the updated as-built Plans and as-built Specifications shall be made available to the Agency.

Contractor progress payment will be contingent upon the as-built Plans and Specifications being maintained in current status, and the Agency will not approve progress payments unless these as-built Plans and specifications are current.

As a condition to certifying the final payment under this Contract, within 30 calendar days after completion, the Contractor will submit to the Engineer the original set of as-built Plans as well as the set of as-built specifications. If needed, a complete set of Plans will be furnished to the Contractor for which the as-built Plans are required. All variations from the Plans and any additional information required by the Specifications shall be entered on the as-built Plans and specifications as they occur, neatly and legibly, in ink of a contrasting color or otherwise marked as approved by the Agency. Each set of as-built Plans and specification shall be signed and dated before being accepted by the Agency at the completion of the Work.

The as-builts shall conform to the following requirements:

a) New information that is important to the Agency, but was not shown on the Plans, shall be marked on the as-builts.

b) Where applicable, Change Order numbers shall be noted.

c) The as-builts shall be bound and marked “as-builts” with dates and other identification on the title sheet.

Payment for as-builts shall be considered as included in the prices in the Bid for the various items of work.

SECTION 8 - FACILITIES FOR AGENCY PERSONNEL

8-1 GENERAL. Add the following:

The Contractor shall furnish and place in operation a Class "A" field office for the Project if a Bid item for “OFFICE FACILITIES” is included in the Bid.

8-2 FIELD OFFICE FACILITIES.

8-2.1 Class "A" Field Office. Add the following to the end of the first paragraph:

All exterior doors shall have a locking device consisting of either a padlock hasp or a double cylinder deadbolt lock in which case 3 keys for the lock shall be provided. Provisions shall be made for the locking of windows from the inside and all windows shall have security bars. The field office, if portable, shall be enclosed with a 6-foot high security fence equipped with a suitable lockable gate. Adequate parking shall be provided for the Engineer and other such Agency representatives as are assigned to the Project.

Replace the fourth and fifth paragraphs with the following:

The office shall be equipped with:

a) fully operational heating and air conditioning systems of sufficient capacity,

b) a water cooler with drinking water provided by the Contractor, and

c) an internal restroom, equipped with a toilet and a sink with hot and cold running water, for the sole use of the Engineer,

d) a photocopier/scanner/fax (“all in one”) machine for the sole use of the Engineer,

e) a desktop personal computer with a processor speed equal to or greater than that of an Intel Core I3 processor and a 24-inch monitor,

f) Internet Explorer 11, Microsoft Office 2010, the printer drivers installed in the computer;

g) broadband internet service with wi-fi capability.

Add the following:

The all in one machine shall be capable of using standard 8½-inch x 11-inch, 8½-inch x 14-inch, and 11-inch x 17-inch bond paper. The paper necessary for each copy shall be automatically fed.

The Agency will furnish paper for its own use. All other materials required for the all in one machine shall be furnished by the Contractor.

The location of the field office shall be approved by the Engineer. The field office shall be located on the Project site or within a 0.5 mile drive of the Project limits. The Contractor will not be compensated for a field office located outside the aforementioned limits.

The field office shall be in-place and fully operational prior to the date of issuance of the Part 2 Notice to Proceed. No payment will be made for each Working Day in which the field office is not in-place and fully operational.

8-6 BASIS OF PAYMENT. Add the following:

Payment for office facilities will be made at the Contract Unit Price per month for "OFFICE FACILITIES."

SECTION 9 - MEASUREMENT AND PAYMENT

9-1 MEASUREMENT OF QUANTITIES FOR UNIT PRICE WORK. *The provisions of this subsection shall only apply to measurements of quantities of work when necessary to determine payment adjustment in accordance with 3-2.2.*

9-2 LUMP SUM WORK. Replace the first sentence of the second paragraph with the following:

The Contractor shall submit, per 2-5.3 and 6-1.2, a detailed schedule to be used only as a basis for determining progress payments for all lump sum Bid items, including those items in the Bid with detailed schedules.

9-3 PAYMENT.

9-3.1 General. Replace the last paragraph with the following:

Following acceptance of the performance of the Contract by the Board, or as prescribed by law, the amount deducted from the final estimate and retained by the Agency will be paid to the Contractor, except such amounts as are required by law to be withheld by properly executed and filed notices to stop payment, or as may be provided under the Contract to be deducted.

9-3.2 Partial and Final Payment. Replace the first sentence of the first paragraph with the following:

The closure date for the purpose of making the monthly progress payment shall be the 6th day of each month. Monthly progress payments will be made only if the number of Working Days for the Project plus any extensions of time granted by the Agency after the Work has started equals 20 or more Working Days and the schedule update requirements specified in 6-1.1.5 have been completed and accepted by the Engineer.

Add the following after the first sentence of the second paragraph:

The Agency will transmit to the Contractor within 10 Days after each established monthly payment closure date a copy of the Engineer's Monthly Estimate showing the amount of work completed as of the closure date.

Add the following after the second paragraph:

In the case of a Bid item where several types of work are included in the item, the Agency may make partial payment for the portions of such work that are completed at the time of making the monthly progress estimates, provided, in the opinion of the Engineer, the work considered for payment has been completed in compliance with the requirements of the Plans and the Specifications.

Payment for a lump sum Bid item will be based upon the lump sum Bid price and the Engineer's estimate as to the percentage of completion.

Replace the last paragraph with the following:

Pursuant to Section 22300 of the California Public Contract Code, the Contractor at its own expense may deposit securities with the Agency or with a State or Federally chartered bank as the escrow agent in lieu of having funds withheld by the Agency to ensure performance under the Contract.

The securities which will be allowed to be substituted are those listed in Section 16430 of the Government Code or bank or savings and loan certificates of deposit.

The amount of securities to be deposited shall be equivalent to the maximum amount permitted to be withheld. The Agency may claim and receive all or a portion of these funds to be used for the same purposes and expenditures as if the funds had been withheld as specified above. Formal acceptance of the Project by the Agency terminates the Agency's interest in the securities.

9-3.3 Delivered Materials. Replace the entire subsection with the following:

When approved by the Engineer, payment may be made for materials and equipment other than reinforced concrete pipe delivered to and stored at the Project site, or other approved location, for use on the Project but not yet incorporated in the Work. Before accounting for these materials and equipment on the monthly estimate, the Contractor shall furnish to the Engineer paid invoices therefor. The payment will be limited to the cost shown on said invoices until incorporated into the Work.

Add the following subsection:

9-3.4 Mobilization. Replace the entire subsection with the following:

When a Bid item is included in the Bid for “MOBILIZATION”, the costs of work in advance of construction operations and not directly attributable to any specific Bid item will be included in the progress estimate.

Mobilization shall consist of preparatory work and operations, including, but not limited to, those necessary for the movement of personnel, equipment, supplies and incidentals to the Project site and for all other work and operations which must be performed or costs incurred prior to beginning work on the various Contract items on the Project site.

Payments for mobilization will be made as follows:

a) When the monthly progress payment estimate of the amount earned, not including the amount earned for mobilization, is 5 percent or more of the Contract Price, the total amount earned for mobilization shall be 50 percent of the Contract Unit Price for mobilization or 5 percent of the Contract Price, whichever is less, and said amount will be included in said estimate for payment.

b) When the monthly progress payment estimate of the amount earned, not including the amount earned for mobilization, is 10 percent or more of the Contract Price, the total amount earned for mobilization shall be 75 percent of the Contract Unit Price for mobilization or 7.5 percent of the Contract Price, whichever is less, and said amount will be included in said estimate for payment.

c) When the monthly progress payment estimate of the amount earned, not including the amount earned for mobilization, is 20 percent or more of the Contract Price, the total amount earned for mobilization shall be 95 percent of the Contract Unit Price for mobilization or 9.5 percent of the Contract Price, whichever is less, and said amount will be included in said estimate for payment.

d) When the monthly progress payment estimate of the amount earned, not including the amount earned for mobilization, is 50 percent or more of the Contract Price, the total amount earned for mobilization shall be 100 percent of the Contract Unit Price for mobilization or 10 percent of the Contract Price, whichever is less, and said amount will be included in said estimate for payment.

e) After completion of the Contract Work, the amount, if any, of the Contract Unit Price for mobilization in excess of 10 percent of the Contract Price will be included in the final progress payment.

9-3.5 Claims. Notwithstanding Article 1.5 (commencing with Section 20104) of Chapter 1 of Part 3, Section 9204 of the Public Contract Code shall apply to any claim by the Contractor in connection with the Project.

a) Upon receipt of a claim pursuant to Section 9204 of the Public Contract Code, the Agency will conduct a reasonable review of the claim and, within a period not to exceed 45 Days, provide the Contractor a written statement identifying what portion of the claim is disputed and what portion is undisputed. Upon receipt of a claim, the Contractor and the Agency may, by mutual agreement, extend the aforementioned time period.

b) The Contractor shall furnish reasonable documentation to support the claim.

c) If Board approval is needed to provide the Contractor a written statement identifying the disputed portion and the undisputed portion of the claim, and the Board does not meet within the 45 Days or within the mutually agreed to extension of time following receipt of a claim sent by registered mail or certified mail, return receipt requested, the Agency will have up to 3 Days following the next duly publicly noticed meeting of the Board after the 45-Day period, or extension, expires to provide the Contractor a written statement identifying the disputed portion and the undisputed portion.

d) Any payment due on an undisputed portion of the claim will be processed and made within 60 Days after the Agency issues its written statement. If the Agency fails to issue a written statement, paragraph (j) shall apply.

e) If the Contractor disputes the Agency's written response, or if the Agency fails to respond to a claim issued pursuant to Section 9204 within the time prescribed, the Contractor may demand in writing an informal conference to meet and confer for settlement of the issues in dispute. Upon receipt of a demand in writing sent by registered mail or certified mail, return receipt requested, the Agency will schedule a meet and confer conference within 30 Days for settlement of the dispute.

f) Within 10 business days (Monday-Thursday) following the conclusion of the meet and confer conference, if the claim or any portion of the claim remains in dispute, the Agency will provide the Contractor a written statement identifying the portion of the claim that remains in dispute and the portion that is undisputed. Any payment due on an undisputed portion of the claim will be processed and made within 60 Days after the Agency issues its written statement. Any disputed portion of the claim, as identified by the Contractor in writing, shall be submitted to nonbinding mediation, with the Agency and the Contractor sharing the associated costs equally. The Agency and the Contractor shall mutually agree to a mediator within 10 business days after the disputed portion of the claim has been identified in writing. If the parties cannot agree upon a mediator, each party shall select a mediator and those mediators shall select a qualified neutral third party to mediate with regard to the disputed portion of the claim. Each party shall bear the fees and costs charged by its respective mediator in connection with the selection of the neutral mediator. If mediation is unsuccessful, the parts of the claim remaining in dispute shall be subject to applicable procedures outside those established in Section 9204.

g) Mediation shall include any nonbinding process, including, but not limited to, neutral evaluation or a dispute review board, in which an independent third party or board assists the parties in dispute resolution through negotiation or by issuance of an evaluation. Any mediation utilized shall conform to the timeframes in Section 9204.

h) Unless otherwise agreed to by the Agency and the Contractor in writing, the mediation conducted pursuant to Section 9204 shall excuse any further obligation under Section 20104.4 to mediate after litigation has been commenced.

i) Section 9204 does not preclude the Agency from requiring arbitration of disputes under private arbitration or the Public Works Contract Arbitration Program, if mediation under Section 9204 does not resolve the parties' dispute.

j) Failure by the Agency to respond to a claim from the Contractor within the time periods described in Section 9204 or to otherwise meet the time requirements of Section 9204 shall result in the claim being deemed rejected in its entirety. A claim that is denied by reason of the Agency's failure to have responded to a claim, or its failure to otherwise meet the time requirements of Section 9204, shall not constitute an adverse finding with regard to the merits of the claim or the responsibility or qualifications of the claimant.

k) Amounts not paid in a timely manner as required by Section 9204 will bear interest at 7 percent per annum.

l) If a Subcontractor or a lower tier Subcontractor lacks legal standing to assert a claim against the Agency because privity of the Contract does not exist, the Contractor may present to the Agency a claim on behalf of a Subcontractor or lower tier Subcontractor. A Subcontractor may request in writing, either on its own behalf or on behalf of a lower tier Subcontractor, that the Contractor present a claim for work which was performed by the Subcontractor or by a lower tier Subcontractor on behalf of the Subcontractor. The Subcontractor requesting that the claim be presented to the Agency shall furnish reasonable documentation to support the claim. Within 45 Days of receipt of this written request, the Contractor shall notify the Subcontractor in writing as to whether the Contractor presented the claim to the Agency and, if the original Contractor did not present the claim, provide the Subcontractor with a statement of the reasons for not having done so.

m) A waiver of the rights granted by Section 9204 is void and contrary to public policy, provided, however, that (1) upon receipt of a claim, the Contractor and the Agency may mutually agree to waive, in writing, mediation and proceed directly to the commencement of a civil action or binding arbitration, as applicable; and (2) the Agency may prescribe reasonable change order, claim, and dispute resolution procedures and requirements in addition to the provisions of Section 9204, so long as the contractual provisions do not conflict with or otherwise impair the timeframes and procedures set forth in Section 9204.

CSM :

Policy Number:

Number: Effective Date:

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

ADDITIONAL INSURED

This endorsement modifies insurance provided under the following:

COMMERCIAL GENERAL LIABILITY COVERAGE PART.

Project Name: Ladera Park Stormwater Improvements Project

Project ID No.: SWQ0000003

County of Los Angeles, and the
Los Angeles County Flood Control District, and the

Shall be named under the policy as insureds or additional insureds with respect to liability arising out of the Contractor's ongoing and completed operations.

This Endorsement shall apply to claims arising from occurrences during the time period from the commencement of work until the completion of the work to be performed and the acceptance of the work by the County of Los Angeles.

In the event of expiration, proposed cancellation, or any change in the insurance required in the Specifications, including insurer, limits of coverage, term of coverage or period of this policy for any reason whatsoever, the insurer shall notify the County of Los Angeles by registered mail, return receipt requested, sent to the County of Los Angeles c/o County of Los Angeles, Department of Public Works, Construction Division, 8th Floor, Attention Irma Vasquez, 900 South Fremont Avenue, Alhambra, CA 91802-1460, giving a sufficient time before the date thereof to comply with any applicable law or statute, but in no event less than 10 days in advance of the effective date of proposed cancellation due to non-payment of premium, and not less than 30 days in advance of the effective date of expiration, proposed cancellation for any other reason, or for a policy change.

2018 Project Calendar

LADERA PARK STORMWATER IMPROVEMENTS PROJECT

PROJECT ID NO: SWQ0000003

JANUARY 2018						
Su	Mo	Tu	We	Th	Fr	Sa
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FEBRUARY 2018						
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MARCH 2018						
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APRIL 2018						
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MAY 2018						
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JUNE 2018						
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JULY 2018						
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SEPTEMBER 2018						
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= Work Allowed **= No Work Allowed** **H = Holiday**

2019 Project Calendar

LADERA PARK STORMWATER IMPROVEMENTS PROJECT

PROJECT ID NO: SWQ0000003

JANUARY 2019						
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OCTOBER 2019						
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NOVEMBER 2019						
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DECEMBER 2019						
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= Work Allowed **= No Work Allowed** **H = Holiday**

ATTACHMENT A

LIST OF SPECIFIC BRAND NAMES IN ACCORDANCE WITH STATE PUBLIC CONTRACT CODE SECTION 3400

	Item/Category	Manufacturer	Model	Purpose
1	Water Harvesting Treatment System	Wahaso		(Purpose Item #1) In order that a field test or experiment may be made to determine the product's suitability for future use (Pilot Program).
2	Non-contact Doppler Radar Velocity Meter	HACH	Flo-Dar with Surcharge Velocity Sensor 4000-930	(Purpose Item #2) In order to match other products in use on County facilities either completed or in the course of completion.
3	Flow Measurement Data Logger	HACH	FL1500 Series	(Purpose Item #2) In order to match other products in use on County facilities either completed or in the course of completion.
4	Electric Motor Operator	FLOWSERVE	Limitorque L120 Series	(Purpose Item #2) In order to match other products in use on County facilities either completed or in the course of completion.
5	Pressure Transducer	Aemetek	575 Series	(Purpose Item #2) In order to match other products in use on County facilities either completed or in the course of completion.
6	ISCO 6712C Portable Sampler	Teledyne ISCO/MCRT	68-6710-071	(Purpose Item #2) In order to match other products in use on County facilities either completed or in the course of completion.
7	Model 913 High Capacity Power Pack (ACDC converter)	Teledyne ISCO/MCRT	60-1684-088	(Purpose Item #2) In order to match other products in use on County facilities either completed or in the course of completion.
8	ISCO 720 Module	Teledyne ISCO/MCRT	60-9004-030	(Purpose Item #2) In order to match other products in use on County facilities either completed or in the course of completion.
9	Submerged probe (flow sensor) with 75ft cable, measures 10ft Level Range	Teledyne ISCO/MCRT	60-5314-271	(Purpose Item #2) In order to match other products in use on County facilities either completed or in the course of completion.
10	ISCO Sensor Mounting Plate	Teledyne ISCO/MCRT	60-3204-029	(Purpose Item #2) In order to match other products in use on County facilities either completed or in the course of completion.
11	ISCO Stainless Steel Strainer (3/8")	Teledyne ISCO/MCRT	69-2903-138	(Purpose Item #2) In order to match other products in use on County facilities either completed or in the course of completion.
12	ISCO 3/8 inch vinyl suction line - 200 feet, SPA 491.	Teledyne ISCO/MCRT	60-5304-491	(Purpose Item #2) In order to match other products in use on County facilities either completed or in the course of completion.

	Item/Category	Manufacturer	Model	Purpose
13	ISCO Tubing Coupler, 3/8 inch. One-piece, clampless coupler made of stainless steel	Teledyne ISCO/MCRT	60-3709-002	(Purpose Item #2) In order to match other products in use on County facilities either completed or in the course of completion.
14	ISCO SPA 1026 - 12 foot length (cut to length cable; connector between auto-samplers with simultaneous sampling)	Teledyne ISCO/MCRT	60-5314-026	(Purpose Item #2) In order to match other products in use on County facilities either completed or in the course of completion.
15	ISCO 6712Ci Modem CDMA (cellular) with 60-2004-550 dual band magnetic mount antenna)	Teledyne ISCO/MCRT	60-5324-172	(Purpose Item #2) In order to match other products in use on County facilities either completed or in the course of completion.
16	ISCO 674 Rain Gauge	Teledyne ISCO/MCRT	60-3284-001	(Purpose Item #2) In order to match other products in use on County facilities either completed or in the course of completion.
17	Teledyne ISCO 2.5-gallon glass around bottle with cap	Teledyne ISCO/MCRT	68-6700-005	(Purpose Item #2) In order to match other products in use on County facilities either completed or in the course of completion.
18	ISCO USB Communication Cable (10 feet) (Optional)	Teledyne ISCO/MCRT	60-2004-508	(Purpose Item #2) In order to match other products in use on County facilities either completed or in the course of completion.
19	ISCO Pump Tubing for 6700 series sampler (10 tubes)	Teledyne ISCO/MCRT	60-6700-044	(Purpose Item #2) In order to match other products in use on County facilities either completed or in the course of completion.
20	ISCO Flow Link v5.1, two user licenses	Teledyne ISCO/MCRT	68-2540-200	(Purpose Item #2) In order to match other products in use on County facilities either completed or in the course of completion.
21	Irrigation Controller	Weathertrak	ET-PRO-3	(Purpose Item #2) In order to match other products in use on County facilities either completed or in the course of completion.
22	Master Valve	Superior	3200	(Purpose Item #2) In order to match other products in use on County facilities either completed or in the course of completion.
23	Gate Valve	NIBCO	T-113-K	(Purpose Item #2) In order to match other products in use on County facilities either completed or in the course of completion.
24	Remote Control Valve	Superior	950	(Purpose Item #2) In order to match other products in use on County facilities either completed or in the course of completion.
25	Irrigation Heads	Rainbird	1812-SAM-PRS	(Purpose Item #2) In order to match other products in use on County facilities either completed or in the course of completion.

ATTACHMENT B

PROPOSED STAGING AREA

Site Overview

ATTACHMENT C

COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS
ENVIRONMENTAL PROGRAMS DIVISION

CONSTRUCTION AND DEMOLITION DEBRIS
RECYCLING AND REUSE PLAN APPROVAL SHEET

RRP Number: 071118-1004 **Date:** 7/11/2018

Applicant: Michael De Leon

Project Address: Ladera County Park | 6027 Ladera Park Avenue, Los Angeles, 90056

The Recycling and Reuse Plan(RRP) submitted for the above project has been approved.
Please note the following:

- ☐ A 90 Day Progress Report is required to be submitted no later than 90 days after issuance of the first permit(issued by Building and Safety Division) for your project.
  The 90 Day Progress Report is estimated to be due by **10/9/2018 .**
- ☐ An Annual Progress Report is required to be submitted **on or before March 1st** of every year, until project completion.
- ☑ A Final Compliance Report is due no later than 45 days after project completion along with all weight tickets. The Final Compliance Report is due by **8/24/2019.**
- ☑ Source separation of debris is required for one of more of the facilities you have chosen to use. Coordinate this with your contractor, hauler, and facility to ensure the material is recycled.
- ☑ Changes to the project scope, will require submittal of an Amended Recycling and Reuse Plan.
- ☑ Weight tickets are required to be submitted with the Final Compliance Report and must account for all waste generated from the project.
- ☑ Notify all interested parties(contractor, subcontractors, owner) of recycling requirement and of recycling and disposal facilities to be used.
- ☑ Demolition of 12,727 SF of inert material; grading 2500 CYs to export 1853 CYs.

Failure to recycle the required amount of debris can lead to penalties of up to $250 per ton.

Report forms, best management practices, list of haulers, recyclers, and disposal facilities, and other materials are available at **http://dpw.lacounty.gov/epd/cd/**

If you have any questions, please call Jones, Jason at (626)458-~~3590.~~ 3563

ATTACHMENT D

CONSTRUCTION AND DEMOLITION DEBRIS RECYCLING FACILITIES IN LOS ANGELES COUNTY

Company Name & Address	Phone Number Business Hours	Materials Accepted	Recycling Rate
ANTELOPE VALLEY			
WASTE MANAGEMENT INC. **LANCASTER LANDFILL** 600 East Avenue F Lancaster	(661) 947-7197 Mon - Fri, 9am - 3:30pm Sat 8am - 12pm	C&D debris: wood, metal, drywall, cardboard, rock, soil, gravel, asphalt, concrete	78.14%
ARROW TRANSIT MIX, INC. 507 East Avenue L-12 Lancaster	(661) 945-7600 Mon - Fri, 7am - 4pm	Asphalt, concrete, concrete blocks, gravel, rocks	100%
SANTA CLARITA VALLEY			
BURRTEC SERVICES	(866) 270-5370 Mon - Fri, 7am - 5pm	C&D debris: wood, metal, drywall, cardboard, rock, soil, gravel, asphalt, concrete	65%
REPUBLIC SERVICES	(800) 299-4898 Mon - Fri, 7am - 5pm	C&D debris: wood, metal, drywall, cardboard, rock, soil, gravel, asphalt, concrete	65%
SANTA MONICA and WESTERN LOS ANGELES COUNTY			
SOUTHERN CALIFORNIA DISPOSAL 1908 Frank Street Santa Monica	(310) 828-6444 Mon - Sat, 6am - 2pm	C&D debris: wood, metal, drywall, cardboard, rock, soil, gravel, asphalt, concrete	65%
SAN FERNANDO VALLEY			
AMERICAN RECLAMATION 4560 Doran Street Los Angeles (near Glendale)	(323) 245-0125 Mon - Fri, 7am - 5pm Sat, 7am - 3pm	C&D debris: wood, metal, drywall, cardboard, rock, soil, gravel, asphalt, concrete	82.01%
BRADLEY EAST TRANSFER STATION 9227 Tujunga Avenue Sun Valley	(818) 767-6180 Mon - Fri, 7am - 5pm	Wood, tree trimmings, green waste	100%
RECOLOGY LOS ANGELES **formerly CROWN DISPOSAL** 9147 DeGarmo Avenue Sun Valley	(818) 767-6000 open 24 hours, 7 days	C&D debris: wood, metal, drywall, cardboard, rock, soil, green waste gravel, asphalt, concrete	70%
EAST VALLEY DIVERSION - WM 11616 Sheldon Street Sun Valley	(818) 252-0019 Mon - Fri, 6am - 6pm Sat, 6am - 3pm	C&D debris: wood, metal, drywall, cardboard, rock, soil, gravel, asphalt, concrete	75.17%
NORTH HILLS RECYCLING 11700 Blucher Avenue Granada Hills	(818) 364-1278 Mon - Sat, 6am - 6pm	Brush, logs, plants, tree trimmings, and clean lumber	100%
RAMCO 9005 Bradley Avenue Sun Valley	(818) 767-0700 24 hours, 6am Monday until 4pm Saturday	Asphalt, concrete, gravel, rock, and sand. No dirt	100%

CONSTRUCTION AND DEMOLITION DEBRIS RECYCLING FACILITIES IN LOS ANGELES COUNTY

Company Name & Address	Phone Number Business Hours	Materials Accepted	Recycling Rate
THE REUSE PEOPLE 3015 Dolores Street Los Angeles (near Glendale)	(818) 244-5635 Mon - Fri, 10am - 5pm Sat, 10am - 4pm	Architectural salvage	100%
VALLEY BASE MATERIALS 8960 Bradley Avenue Sun Valley	(818) 767-3088 open 24 hours, 7 days	Asphalt, concrete, concrete block, gravel, rock	100%
VULCAN MATERIALS 11401 West Tuxford Street Sun Valley	(818) 983-0146 Mon - Fri, 6 30am-2:30pm	Asphalt grindings, concrete	100%
SAN GABRIEL VALLEY and SOUTHEAST LOS ANGELES COUNTY			
CONSTRUCTION & DEMOLITION RECYCLING, INC. 9309 Rayo Avenue South Gate	(323) 357-6900 Mon - Fri, 4am - 4pm Sat, 4am - 4pm	C&D debris: wood, metal, drywall, cardboard, rock, soil, gravel, asphalt, concrete	79.72%
GREENCYCLE 12815 East Imperial Highway Santa Fe Springs	(562) 906-5223 Mon - Fri, 6 30am - 5pm Sat, 7am - 5pm	Wood, soil, and greenwaste including palm and yucca	100%
PASADENA ARCHITECTURAL SALVAGE 2600 East Foothill Boulevard Pasadena	(626) 535-9655 Tue - Sat, 9am - 5pm Sun, 12pm - 5pm	Architectural salvage	100%
PECK ROAD GRAVEL 128 East Live Oak Avenue Monrovia	(626) 574-1855 Mon - Fri, 6am - 4:30pm Sat, 6:00am-2:30pm	Asphalt, concrete, brick	100%
SILVERLAKE ARCHITECTURAL SALVAGE 169 Cook Street Pasadena	(626) 445-1092 Daily, 11am - 5pm	Architectural salvage	100%
RECYCLED WOOD PRODUCTS 1313 East Phillips Boulevard Pomona	(909) 868-6882 Mon - Fri, 7am - 5pm Sat, 7am - 1pm	Green waste, soil	100%
CITY OF LOS ANGELES AND CENTRAL LOS ANGELES COUNTY			
25TH STREET RECYCLING 2121 East 25th Street Los Angeles	(323) 583-7913 Mon - Fri, 6:30am - 11pm Sat, 6am - 6pm	Concrete, concrete block, asphalt	100%
CALIFORNIA WASTE SERVICES 621 West 152nd Street Gardena	(800) 839-5550 Mon - Fri, 6am - 10pm Sat, 7am - 7pm	C&D debris: wood, metal, drywall, cardboard, rock, soil, gravel, asphalt, concrete	74.99%
DIRECT DISPOSAL 3720 Noakes Street Los Angeles (East L. A.)	(323) 262-1604 Mon - Fri, 5am - 4pm Sat, 6am - 11am	C&D debris: wood, metal, drywall, cardboard, rock, soil, gravel, asphalt, concrete	76.39%
DOWNTOWN DIVERSION - WM 2424 East Olympic Boulevard, Bldg. 3 Los Angeles	(213) 612-5005 Mon - Fri, 6am - 6pm Sat, 6am - 3pm	C&D debris: wood, metal, drywall, cardboard, rock, soil, gravel, asphalt, concrete	77.08%

CONSTRUCTION AND DEMOLITION DEBRIS
RECYCLING FACILITIES IN LOS ANGELES COUNTY

Company Name & Address	Phone Number Business Hours	Materials Accepted	Recycling Rate
FREEWAY BUILDING MATERIALS 1124 South Boyle Avenue Los Angeles	(323) 261-8904 Mon - Fri, 8am - 4pm Sat, 8am - 3pm	Architectural salvage	100%
SOUTHERN CALIFORNIA ARCHITECTURAL SALVAGE 1600 South Santa Fe Avenue Los Angeles	(213) 623-3119 Mon - Fri, 8am - 5pm Sat - Sun, 9:30am - 3pm	Architectural salvage	100%
LB CRUSHING 321 West 135th Street Los Angeles	(951)691-0625 Mon - Fri, 6am - 4pm Sat, 7am - 5pm	Asphalt, concrete	100%
CITY OF LONG BEACH and SOUTHERN LOS ANGELES COUNTY			
ALLIED WASTE FALCON 3031 East "I" Street Wilmington	(562) 590-8531 Mon - Fri, 6am - 6pm Sat, 6am - 2pm	C&D debris: wood, metal, drywall, cardboard, rock, soil, gravel, asphalt, concrete	65%
HANSON AGGREGATES 6956 Cherry Avenue North Long Beach	(626) 856-6700 Option 1 Mon - Fri, 7am - 3:30pm Sat. 7am -2pm	Asphalt, concrete	100%
HANSON AGGREGATES 2850 California Avenue South Long Beach	(626) 856-6700 Option 1 Mon - Fri, 7am - 3:30pm	Asphalt, concrete	100%

All Recycling Rates are based on the City of Los Angeles List and County of Los Angeles Data Research.

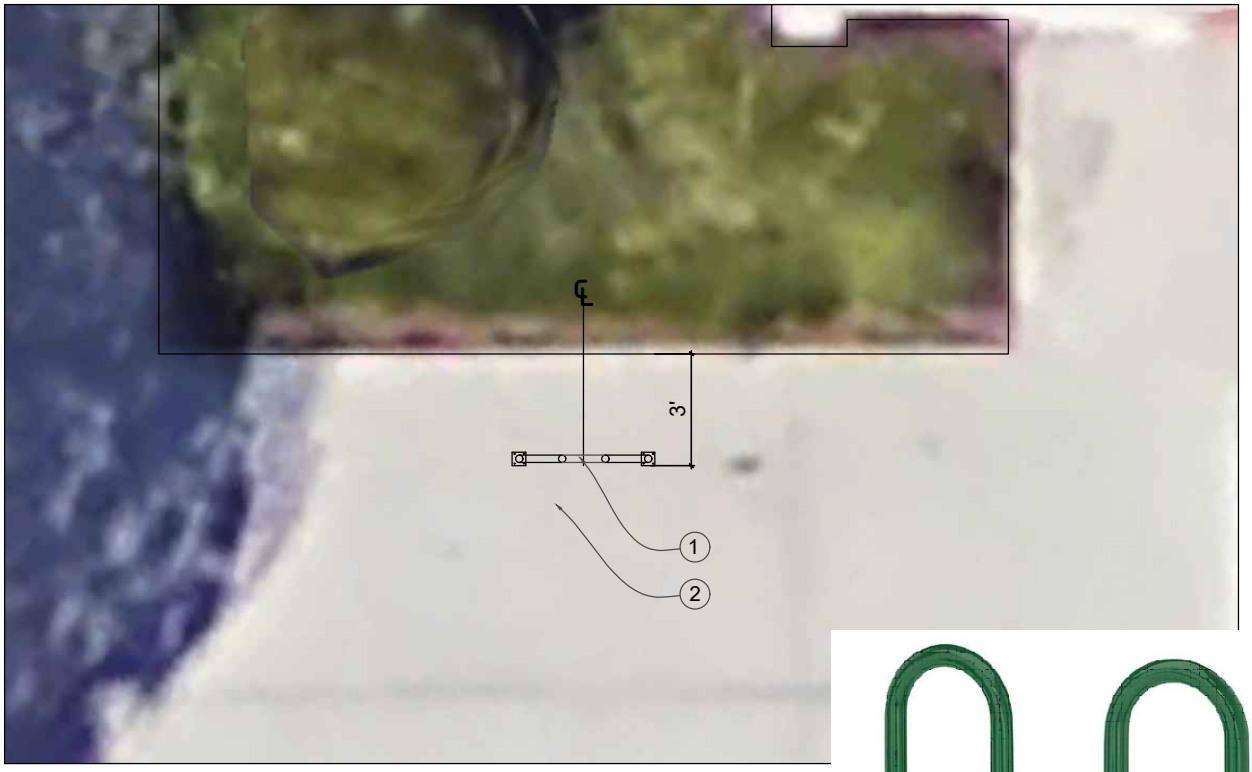
Updated March 21, 2018

The companies listed and the information presented are subject to change without notice and are based on the most readily available information.

The companies listed are not endorsed or recommended by the County, nor is the list necessarily inclusive of all recycling companies in the region.

If you are a recycling company and you would like to be added to the database, or you have information to update the existing list, please call the Construction & Demolition Unit at (626) 458-3517

ATTACHMENT E



1. POWEDERCOATED STEEL WAVE BIKE RACK WITH HUNTER GREEN COLOR. BIKE RACK SHALL BE SURFACE MOUNTED PER MANUFACTURER'S RECOMMENDATION. REFER TO SECTION G IN THE SPECIAL PROVISIONS FOR MODELS AND MANUFACTURES.

2. EXISTING CONCRETE PAVING

WAVE BIKE RACK REFERENCE IMAGE

BIKE RACK LOCATION EXHIBIT - NTS

PROJECT ID NO. SWQ0000003

LADERA PARK REGIONAL STORMWATER CAPTURE PROJECT

SPECIAL PROVISIONS

SECTION EC – ENVIRONMENTAL COMPLIANCE

The following Special Provisions supplement and amend the Standard Specifications for Public Works Construction, 2015 Edition. As a reference convenience, these Special Provisions have been arranged into a format which parallels the Standard Specifications.

Prepared By:

October 11, 2018
Date

Reviewed:

10/19/18
Date

Pages EC-1 through EC-10

TABLE OF CONTENTS
PART 1 - GENERAL PROVISIONS

Page

SECTION 6 - PROSECUTION, PROGRESS AND ACCEPTANCE OF THE WORK

SECTION 7 - RESPONSIBILITIES OF THE CONTRACTOR

PART 1
GENERAL PROVISIONS

SECTION 6 - PROSECUTION, PROGRESS AND ACCEPTANCE OF THE WORK

6-6 DELAYS AND EXTENSIONS OF TIME.

6-3.2 Archaeological and Paleontological Discoveries. Add the following:

To reduce potential impacts on public resources identified during project construction that have the potential to be Tribal Cultural Resources, an Agency archaeologist will monitor all proposed ground-disturbing activities of the project site located in native soils in order to minimize disturbance of subsurface archaeological deposits.

If intact cultural subsurface resources are identified during construction by the Agency's archaeologist, the Contractor shall stop work within a buffer, established by the Agency's archaeologist, around the find until the Agency's archaeologist determines its significance, in cooperation with the Native American monitor. No soil shall be exported off-site until a determination can be made regarding the significance of the resource.

Pursuant to Section 5097.98 of the Public Resources Code and the California Health and Safety Code Section 7050.5, if human remains are found on the project site during construction or during archaeological work, LACDPW, or its authorized representative, shall immediately notify the Los Angeles County Coroner's office by telephone. All work shall stop within a buffer, established by the Agency, of the discovery until the coroner determines if the human remains are those of a Native American.

SECTION 7 - RESPONSIBILITIES OF THE CONTRACTOR

7-8 WORK SITE MAINTENANCE.

7-8.2 Air Pollution Control.

7-8.2.1 General.

Add the following subsection:

***7-8.2.2* Control of Fugitive Dust.**

7-8.2.2.1 General. This Contract is subject to the South Coast Air Quality Management District (SCAQMD) Rule 203, Rule 402, and Rule 403. The Contractor shall comply with these rules. Copies of these rules and further information may be obtained from the following:

South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765
Telephone: (909) 396-3600

http://www.aqmd.gov/home/programs/business/training-403-403-1-fugitive-dust

Payment for complying with SCAQMD Rules shall be considered as included in the prices in the Bid for the appropriate items of work.

7-8.2.3 NO_X and PM_{10} Reduction.

7-8.2.3.1 Off-Road Diesel-Powered Equipment. All off-road diesel-powered construction equipment that will be used during any portion of the Work shall meet the Tier 2 emission standards.

7-8.2.3.2 Reporting Requirements. The Contractor shall submit the completed and signed "NOx and PM_{10} Inventory Forms" (included at the end of Section EC) to the Engineer monthly throughout the duration of the Project.

7-8.2.3.3 Payment. No separate or additional payment will be made for compliance and submission of the monthly "NOx and PM_{10} Inventory Forms". Payment will be considered as included in the Contract Unit Price for the various Bid items affected by these requirements.

7-8.3 Noise Control. Replace the entire subsection with the following:

The Contractor shall implement the following noise reduction measures:

- Place noise-generating construction activities (e.g., operation of compressors and generators, cement mixing, general truck idling) as far as possible from the nearest noise-sensitive land uses.
- Locate stationary construction noise sources as far from adjacent noise-sensitive receptors as possible.

The Contractor shall implement these noise reducing measures throughout the duration of construction activities.

Payment for implementing the noise reducing measures shall be considered as included in the prices in the Bid for the various items of work.

7-8.3.1 Temporary Sound Barriers. Prior to the start of work, the Contractor shall construct the temporary sound barriers as directed by the Engineer.

The temporary sound barrier shall be a manufactured by one of the following or Agency-approved equal:

Environmental Noise Control
STC-25 Acoustical Barrier Blanket
K-Rail Mounted Temporary Sound Wall
13806 Inglewood Avenue
Hawthorne, CA 90250
(310) 771-0571
http://www.environmental-noise-control.com

Acoustical Surface Inc.
BBC-13X-2″ Temporary Construction Noise Barrier, or
BBC-EXT-R-2 Noise Barrier/Sound Absorber Sound Blankets
123 Columbia Ct N,
Chaska, MN 55318
800-854-2948
https://www.acousticalsurfaces.com/

eNoise Control
UNC-XT-1 / UNC-XT-1 Exterior Noise Barrier/Sound Absorber Composite, or
QFA-XT-2D Sound Blankets
129 Penn Street
Westfield, IN 46074
(317) 774-1900
https://www.enoisecontrol.com/products/outdoor-sound-blankets

The Contractor shall maintain the temporary sound wall and its associated performance throughout the duration of construction activities. Upon completion of construction activities, the Contractor to remove and dispose of the temporary sound barriers.

Payment for the construction and maintenance will be made at the Contract Unit Price in the Bid for, “TEMPORARY SOUND BARRIER.”

7-8.6 Water Pollution Control.

7-8.6.2 Best Management Practices (BMPs). Replace the entire subsection with the following:

7-8.6.2.1 Terms and Definitions.

Active Areas of Construction - areas subject to land surface disturbance activities related to the Project including, but not limited to, the Project site, staging areas, immediate access areas, and storage areas. Previously active areas will be considered active areas until temporary or final soil stabilization BMPs are implemented.

Accumulated Precipitation Procedure (APP) – the methods and procedures for management and discharge of accumulated precipitation on the Project site.

Best Management Practices (BMPs) - shall be defined as specified in the permits listed in 7-8.6.2.3.

BMP Manager - an individual who meets the requirements of Los Angeles Regional Water Quality Control Board MS4 Permit Order No. R4-2012-0175-DWQ, Section VI. D. 8. L ii (2).

BMP Manual - the edition of the Los Angeles County Department of Public Works Construction Site Best Management Practices (BMPs) Manual in effect as of the date of advertisement of the Contract.

Exposed Soil - native soil left exposed as the result of uncovering, removal of vegetation or pavement, grading, excavation, or any other construction activity. Soil protected with temporary soil stabilization BMPs will not be considered exposed soil.

Inactive Disturbed Soil Areas (DSA) – areas that have been disturbed and have not or will not be disturbed for at least 14 Days.

Non-Storm Water Discharges - discharges that do not originate from precipitation events.

Run-On - storm water discharges that flow onto the Project site.

Run-On Control BMPs - BMPs used to divert or direct run-on either around or through the Project site

7-8.6.2.2 Abbreviations.

Abbreviation	Word or Words
APP	Accumulated Precipitation Procedure
BMP	Best Management Practice
NPDES	National Pollutant Discharge Elimination System
RWQCB	Regional Water Quality Control Board
SWRCB	State Water Resources Control Board

7-8.6.2.3 General. This Project lies within the boundaries of the County of Los Angeles and shall conform to the following requirements:

a) Waste Discharge Requirements for Municipal Storm Water and Urban Runoff Discharges within the County of Los Angeles, and the Incorporated Cities therein, except the City of Long Beach (Order No. R4-2012-0175. NPDES Permit No. CAS004001). Within the City of Long Beach (Order No. 99-060, NPDES Permit No. CAS004003).

b) Within the unincorporated areas of the County of Los Angeles, Los Angeles County Code, Chapter 12.80.

7-8.6.2.4 Best Management Practices (BMPs).

a) General**.** The Contractor shall effectuate a year-round program for implementing, inspecting, and maintaining BMPs for wind erosion control, tracking control, erosion and sediment control, non-storm water control, and waste management and materials pollution control.

Best Management Practices conforming to the “Minimum Requirements" specified in Table 7-8.6.2.4 shall be implemented throughout the duration of the Project. The Contractor shall be responsible for the implementation, maintenance, and inspection of BMPs throughout any temporary suspension of the Work or designated construction moratorium.

The National Weather Service weather forecast shall be monitored by the Contractor on a daily basis. Whenever a rain event is predicted, the contractor shall implement all required BMPs according to the BMP Manual and these Special Provisions.

b) BMP Manual**.** Water pollution control work shall conform to the requirements in the BMP Manual. Copies of this manual are available for purchase from:

Los Angeles County Department of Public Works
Cashier’s Office
900 South Fremont Avenue
Alhambra, CA 91803
(626) 458-6959

The Contractor shall have a minimum of one readily accessible copy of the BMP Manual on the Project site at all times.

c) BMP Manager. The Contractor shall designate a BMP Manager who meets the requirements of Los Angeles Regional Water Quality Control Board (RWQCB) MS4 Permit Order No. R4-2012-0175-DWQ, Section VI, D. 8.l.ii (2).

The BMP Manager shall have the responsibility and authority to fully implement, maintain and inspect the required BMP’s in accordance with the Contract Documents and as directed by the Engineer. The BMP Manager shall be fully knowledgeable of the requirements in the BMP Manual.

The designated BMP Manager’s name and qualifications shall be submitted in accordance with 2-5.3 prior to issuance of the Part 2 NTP.

d) Minimum Requirements**.** The Contractor shall implement an effective combination of erosion and sediment controls and maintain the appropriate Construction Site BMPs shown in Table 7-8.6.2.4. The BMPs shown in this table meet or exceed the Waste Discharge Requirements referenced in 7-8.6.2.3.

Table 7-8.6.2.4 Construction Site BMPs		
ID	**BMP Name**	**Minimum Requirement**
Temporary Soil Stabilization		
SS-1	Scheduling	**X**
SS-2	Preservation of Existing Vegetation	**X**
SS-3	Hydraulic Mulch	
SS-4	Hydro seeding	
SS-5	Soil Binders	
SS-6	Straw Mulch	
SS-7	Geotextiles, Plastic Covers, & Erosion Control Blankets/Mats	**X**
SS-8	Wood Mulching	
SS-9	Earth Dikes/Drainage Swales & Ditches	
SS-10	Outlet Protection/Velocity Dissipation Devices	
SS-11	Slope Drains	
SS-12	Streambank Stabilization	
Temporary Sediment Control		
SC-1	Silt Fence	**X**
SC-2	Sediment/Desilting Basin	
SC-3	Sediment Trap	
SC-4	Check Dam	
SC-5	Fiber Rolls	**X**
SC-6	Gravel Bag Berm	**X**
SC-7	Street Sweeping and Vacuuming	**X**
SC-8	Sandbag Barrier	**X**
SC-10	Storm Drain Protection	**X**
Wind Erosion Control		
WE-1	Wind Erosion Control	**X**
Tracking Control		
TC-1	Stabilized Construction Entrance/Exit	**X**
TC-2	Stabilized Construction Roadway	
TC-3	Entrance/Outlet Tire Wash	
Non-Storm Water Management		
NS-1	Water Conservation Practices	**X**
NS-2	Dewatering Operations	**X**
NS-3	Paving and Grinding Operations	**X**
NS-4	Temporary Stream Crossing	
NS-5	Clear Water Diversion	
NS-6	Illicit Connection/Illegal Discharge Detection and Reporting	**X**
NS-7	Potable Water/Irrigation	**X**
NS-8	Vehicle Equipment Cleaning	**X**
NS-9	Vehicle Equipment Fueling	**X**
NS-10	Vehicle Equipment Maintenance	**X**
NS-11	Pile Driving Operations	
NS-12	Concrete Curing	
NS-13	Material and Equipment Use Over Water	

NS-14	Concrete Finishing	
NS-15	Structure Demolition Over or Adjacent to Water	
NS-16	Temporary Batch Plant	
Waste Management and Material Pollution Control		
WM-1	Material Delivery	**X**
WM-2	Material Use	**X**
WM-3	Stockpile Management	**X**
WM-4	Spill Prevention and Control	**X**
WM-5	Solid Waste Management	**X**
WM-6	Hazardous Waste Management	**X**
WM-7	Contaminated Soil Management	
WM-8	Concrete Waste Management	**X**
WM-9	Sanitary/Septic Waste Management	**X**
WM-10	Liquid Waste Management	**X**

Additional BMPs may be required as a result of actual field conditions, Contractor activities, or construction operations.

e) Year-Round Implementation Requirements. Implementation shall conform to the requirements in the BMP Manual and the following:

Temporary Soil Stabilization

i. Active Areas of Construction shall be stabilized and temporary sediment controls implemented prior to a rain event.

Temporary Sediment Control

ii. Sediment shall not be discharged offsite or to the storm drain system or receiving waters.

iii. Stockpiles shall be covered and bermed with perimeter sediment controls prior to every rain event and when not in use.

Wind Erosion Control

iv. Wind erosion control BMPs shall be implemented in conformance with the requirements of the jurisdictional air quality regulatory agency.

Tracking Control

v. Each entrance to, and exit from, the Project site shall be stabilized. Traffic entering/exiting the Project site shall be directed so as to only use such stabilized entrances/exits. Tracking of mud and/or sediment onto paved surfaces shall be removed by the end of each Day.

Non-Storm Water Management

vi. Accumulated precipitation shall be discharged in accordance with the Accumulated Precipitation Procedure (Section 7.2 of the BMP Manual).
vii. Separate permits are required for groundwater dewatering.
viii. Non-storm water BMPs shall be implemented to prevent un-authorized discharges.
ix. Non-storm water discharges shall be in compliance with Section III of the Waste Discharge Requirements referenced in 7-8.6.2.3.

Waste Management and Material Pollution Control

x. Material and waste stockpiles shall be covered prior to all rain events.
xi. Stockpiles of temporary asphalt concrete ("cold mix") shall be covered at all times.
xii. The Contractor shall have a minimum of 3 spill response cleanup on the Project site at all times.
xiii. Spills and leaks shall be cleaned up within one hour after spillage and disposed of off the Project site.
xiv. Concrete waste shall be contained in a concrete washout bin. At grade and below grade washouts are prohibited. There shall be no discharge of concrete washout or waste into the underlying soil or onto the surrounding areas. Concrete waste shall be considered as including, but not be limited to, slurry, cement, wash waters, additives, or grout.

7-8.6.2.5 Accumulated Precipitation Procedure (APP). The Contractor shall prepare an accumulated precipitation procedure (APP) for review and approval by the Engineer before any discharge from the Project site and as required by the Engineer. The APP shall describe the location of proposed discharges, the BMPs to be implemented (e.g., NS-2), and the actual equipment to be used. The APP shall be prepared and submitted in accordance with BMP NS-2 and the Section 7 of the BMP Manual.

7-8.6.2.6 BMP Inspections. The Project site shall be inspected by the BMP Manager and documented on the LACDPW BMP checklist (contained in the BMP Manual) as follows:

a) Within 24 hours prior to a rain event.
b) Within 48 hours after a rain event (0.01 inch or more of accumulated precipitation).
c) At 24-hour intervals during extended rain events.
d) Once every week.

7-8.6.2.7 Non-Storm Water Discharge Reporting. If the Contractor identifies any non-storm water discharge(s) as identified in Section III of the Waste Discharge Requirements referenced in 7-8.6.2.3, or if the Project receives a written notice or order from any regulatory agency, the Contractor shall so inform the Engineer within 24 hours. The Contractor shall submit a written report to the Engineer within 5 Days of the discharge event, notice or order. The report shall include the following information:

a) The date, time, location, nature of the operation and type of discharge, including the cause or nature of the notice or order.

b) The BMPs implemented before the discharge event, or prior to receiving the notice or order.

c) The date of deployment and type of water pollution control practices deployed after the discharge event, or after receiving the notice or order, including additional measures installed or planned to reduce or prevent recurrence.

d) The Contractor shall conduct applicable water quality monitoring per Section III A.4 and Table 8 of the Waste Discharge Requirements referenced in 7-8.6.2.3.

7-8.6.2.8 Progressive Enforcement. The Agency, as a permittee, is subject to enforcement action by the State Water Resources Control Board (SWRCB), Environmental Protection Agency, private citizens and citizen groups. The Contractor shall notify the Engineer immediately following receipt of a request from any jurisdictional regulatory agency, to enter, inspect, sample, monitor or otherwise access the Project site or the Contractor's records pertaining to water pollution control.

The Agency will assess the Contractor a penalty of $1,000 for each Day that the Contractor fails to fully-comply with the specified requirements. The penalty will be deducted from Contract progress payments due the Contractor.

The Contractor shall be responsible for the costs and liabilities imposed by law as a result of its failure to fully-comply. Costs and liabilities include, but are not limited to, fines, penalties and damages whether assessed against the Agency or the Contractor, including those levied under the Federal Clean Water Act and the State Porter Cologne Water Quality Act. In addition the Agency will deduct, from any monies due the Contractor, the total amount of any legal fees, staff costs, and consultant fees.

7-8.6.2.9 Payment. Payment for the implementation of BMPs, including the BMP Manager, construction, deployment, inspection, maintenance, removal, and the furnishing of all necessary labor, equipment, materials, and all other related costs shall be considered as included in the Lump Sum Price for "IMPLEMENTATION OF BMPs".

7-18 BIOLOGICAL MONITORING.

7-18.1 General. The Agency Biologist will conduct a bird nesting survey 30 Days prior to the disturbance of suitable nesting habitat. The survey will be for the presence of any nesting bird within 300 feet of the Work area. The surveys will continue weekly until no more than 3 Days prior to the start of clearing/construction work.

If an active nest is found, the Agency Biologist will develop and implement appropriate protection measures for that nest. These protection measures may include, as appropriate, construction of exclusionary devices or avoidance buffers. The Agency Biologist will adjust the buffer area as appropriate based on the construction activity, the bird species involved, and the status of the nest, but will not be less than 30 feet.

SPECIAL PROVISIONS FOR PROJECT ID NO. SWQ0000003

The Contractor shall not work within a buffer area established by the Agency Biologist. The Engineer will allow work in the buffer area to resume once the nest has been determined to be inactive by the Agency Biologist.

Payment will be made on the basis of Extra Work.

ATTACHMENT A

LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS
CONSTRUCTION DIVISION – ENVIRONMENTAL COMPLIANCE UNIT
NOx AND PM10 EMISSIONS REPORTING FORM OFF-ROAD DIESEL-FUELED EQUIPMENT

Project Name	**Ladera Park Regional Stormwater Capture Project**	**Project ID**	**SWQ0000003**
Reporting Month/Year		**Name of Responsible Official (4)**	

Equipment Identification Number (EIN)	Equipment Description	Tier Rating (1)	Equipment Horsepower	DOORS (2) Fleet ID No.	CARB Executive Order (3)	Actual Hours of Operation

By signing below, I, the responsible official, affirm and certify under penalty of perjury, under the laws of the State of California, that I have used all reasonable diligence in preparing this report, and that I have reviewed this report and the information reported on this form below is true, accurate, and complete to the best of my knowledge. By signing below, I further certify that I have the authority to make this affirmation and certification for the equipment indicated below.

_____ _____

Signature of Responsible Official/Designated Official (4) Date

_____ _____

Print Name of Responsible Official/Designated Official (4) Company Name

(1) Only Tier 2 or greater equipment shall be operated on the project.
(2) Diesel Off-Road Online Reporting System.
(3) Attach copy of the Executive Order issued by California Air Resources Board for this engine model.
(4) Responsible Official/Designated Official shall be the person reported on the Responsible Official Affirmation of Reporting (ROAR) for the Current Reporting Year (CARB Form MSCD/ORB-143 (REV 12/15). Attach a copy of the ROAR for the Current Reporting Year. To designate a different Responsible Official, submit the Designated Official Form from the ROAR.

ATTACHMENT A

LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS
CONSTRUCTION DIVISION – ENVIRONMENTAL COMPLIANCE UNIT
NO_x AND PM_{10} EMISSIONS REPORTING FORM OFF-ROAD DIESEL-FUELED EQUIPMENT

Project Name	**Ladera Park Regional Stormwater Capture Project**	**Project ID**	**DES0002980**
Reporting Month/Year		**Name of Responsible Official**	

Equipment Identification Number (EIN)	Equipment Description	Tier Rating (1)	Equipment Horsepower	DOORS (2) Fleet ID No.	CARB Executive Order (3)	Actual Hours of Operation

PROJECT ID NO. SWQ0000003

LADERA PARK STORMWATER IMPROVEMENTS

SPECIAL PROVISIONS

SECTION D – DRAINAGE STRUCTURES AND UNDERGROUND CONDUIT CONSTRUCTION

The following Special Provisions supplement and amend the Standard Specifications for Public Works Construction, 2015 Edition. As a reference convenience, these Special Provisions have been arranged into a format which parallels the Standard Specifications.

CHRISTOPHER J. CALUAG

10/10/18
Date

Reviewed:

10/10/18
Date

SECTION D
DRAINAGE STRUCTURES AND UNDERGROUND CONDUIT CONSTRUCTION

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PART 1
GENERAL PROVISIONS

SECTION 7 – RESPONSIBILITIES OF THE CONTRACTOR

7-9 PROTECTION AND RESTORATION OF EXISTING IMPROVEMENTS. Add the following:

The Contractor will be required to maintain the pavement within construction areas. Any pavement damaged by the Contractor or its subcontractors and all pavement constructed on the Project which becomes damaged shall be repaired or replaced, as directed by the Engineer, at the Contractor's expense.

Where curb or sidewalk in a pedestrian crosswalk area is damaged by the Contractor or must be removed to construct underground improvements, the Contractor shall construct a curb ramp as part of the restoration required by this subsection. At an intersection, the crosswalk area shall be considered as including, but not necessarily limited to, the entire curb return area. If the damaged or removed curb is in an area where no sidewalk exists, the curb ramp will not be required. The curb ramp shall be constructed in accordance with the Standard Plan referenced on the Plans or as directed by the Engineer. This work shall be performed at the Contractor's expense.

In the event field conditions necessitate a change of plan which requires the removal of curb or sidewalk not previously requiring removal within a pedestrian crosswalk area as specified above, the Contractor shall construct a curb ramp. The curb ramp shall be constructed in accordance with the Standard Plan referenced on the Plans or as directed by the Engineer. In this event, payment for construction of a curb ramp will be considered as Extra Work.

Should any operation of the Contractor cause damage to a sewer or storm drain not delineated on the Plans to be removed, relocated or reconstructed which, in the opinion of the Engineer, cannot be properly restored, replaced or reconstructed without a special plan being prepared, the Contractor and the owner of the sewer or storm drain will be so advised by the Engineer. The Contractor shall prepare and submit a suitable reproducible plan for the restoration, replacement or reconstruction of the facility. The Contractor shall obtain a permit for such work from the owner of the facility. The costs of the permit and the restoration, replacement or reconstruction of the facility and associated delay costs shall be borne entirely by the Contractor. In performing the restoration, replacement or reconstruction of the facility under permit, the owner of the facility will furnish the required inspection in order that the facility may be restored, replaced or reconstructed in a manner satisfactory to the owner. The cost of such inspection shall be borne by the Contractor.

Areas to be excavated for storm drains, waterlines, or sewer lines that are neither presently covered nor scheduled to be permanently covered under the Contract by some type of material, such as asphalt concrete, Portland cement concrete, grouted rock, stonework or rubble, which renders such areas as unsuitable for planting, shall be considered for the purposes of these Specifications to be suitable and shall be covered with a 6-inch layer of

topsoil. Unless otherwise specified, the top 6 inches of all such suitable areas shall be restored with imported Class A Topsoil conforming to 800-1.1.2. In lieu of importing such topsoil the Contractor may, at its option, reuse the existing top 6 inches of soil from such areas, provided it has been segregated during excavation and construction operations, and is approved for use by the Engineer. These requirements do not apply to permanent access roads and beach areas.

With respect to the restoration of lawns for the construction of storm drain, waterline, or sewer line improvements, where the Contract requires their removal, or it has been damaged or removed through the Contractor's operations, the Contractor shall comply with the following minimum requirements: The grass seed used shall be for grass of the same type as was removed, or an approved equal, and shall be sown at the rate recommended by the seed distributing company. Processed deseeded steer manure shall be applied to the planted area at the rate recommended by the vendor. The Contractor shall water and care for replaced lawns until the grass has attained a complete cover and has been given its first cutting, unless other arrangements are made with the affected property owner(s). The lawn restoration, as described above, shall be completed prior to the final Contract payment.

The Contractor shall be responsible for the relocation, reconstruction, or modification of traffic control, police and fire signal installations, safety lighting, and street lighting. This will be considered as part of the work provided the utilities are shown on the Plans. All existing permanent traffic and bus stop signs which are removed or altered during construction shall be replaced by the Contractor to a condition equal to or better than, in all respects, the condition which prevailed prior to the start of construction under the Contract.

While construction is in progress, any signs which are removed shall be posted by the Contractor in temporary locations as near the original locations as practicable. Signs shall be replaced in their original location as soon as possible. Traffic sign replacement shall be in conformance with the current requirements of the California Manual on Uniform Traffic Control Devices, http://www.dot.ca.gov/hq/traffops/signtech/mutcdsupp. If any sign is damaged or lost, thus requiring a new sign, the Contractor shall immediately notify the Engineer, and shall immediately replace any traffic sign in accordance with the above mentioned manual at its own expense. The replacement of traffic signs must be approved by the Engineer in writing.

On storm drain, water line, and sewer line construction projects, the Contractor shall be responsible for the relocation, reconstruction, or modification of traffic control, police and fire signal installations, safety lighting, and street lighting. If no items of work are provided therefor, all costs for such work shall be considered as included in the prices in the Bid for the various items of work provided the utilities are shown on the Plans.

Any sprinkler system damaged by the Contractor's operations shall immediately be replaced and rehabilitated by the Contractor at no cost to the Agency. Vegetation damaged because of the sprinkler system being damaged due to the Contractor's operations shall be restored at the Contractor's expense. The Contractor shall completely replace and rehabilitate any interfering sprinkler system, including relocating sprinkler heads to the back of sidewalk, to produce a fully functional system. All costs for removing, modifying, or restoring sprinkler systems, including the relocation of sprinkler heads, shall be considered as included in the prices in the Bid for the various items of work.

Any fence or railing designated on the Plans to be relocated shall be inspected and its existing condition verified by the Engineer prior to the start of construction. Fence or railing to be relocated shall be carefully removed and stored until ready for reinstallation. It shall be reinstalled, in- kind, in the permanent location indicated on the Plans. Posts, rails, tension rods and wires, boards, fabric, gates, barbed wire, footings and other facilities shall be of a size, strength and condition equal to, or better than, the above-mentioned existing condition. Any material damaged during construction shall be replaced by the Contractor at no cost to the Agency. Full compensation for complying with the above requirements for fence or railing relocation and for all necessary materials, new or used, and all labor shall be considered as included in the Contract Unit Price for the appropriate item(s) for relocating fence or railing. If no such items are included in the Bid, the costs of this work shall be considered as included in the prices in the Bid for the various items of work.

Traffic Loop Restoration shall be performed by the Agency. Please contact Paul Ly of the Agency's Operational Services Division at (626) -458-1700, 48 hours prior to completing the paving work.

Pavement striping and marking shall be performed by the Agency. Please contact William (Bill) Ruiz of the Agency's Operational Services Division at (626)-458-1700, fourteen (14) working days prior to the start of construction for coordination

The following provisions shall apply for storm drain, water line, and sewer line construction:

a) Concrete pavement removal and replacement shall conform to 302-6, and Standard Plan 132, unless otherwise specified.

b) In the event a portion of curb, gutter or monolithic curb and gutter is damaged by the Contractor's operations, a minimum of 10 feet of curb, gutter or curb and gutter shall be removed and replaced regardless of how short a length is damaged. One end of said 10-foot section may be taken at a joint or scoring line and the other end shall be measured the minimum distance of 10 feet therefrom. If said 10 feet falls within 3 feet of a joint or scoring line, then the removal shall extend to said joint or scoring line.

c) When concrete local depressions are to be constructed at locations where there is an existing monolithic curb and gutter, the existing monolithic curb and gutter shall be removed to the limits of the local depression, or to the next joint or scoring line beyond the local depression if such joint or scoring line is less than 3 feet away. The new curb shall then be reconstructed monolithic with the local depression or with the gutter if the curb was removed beyond the limits of the local depression.

d) When concrete local depressions are to be constructed using existing finished street surface as the vertical control for the outer edge of the local depressions, the local depression shall be constructed on a straight grade from outer corner to outer corner.

f) Unless otherwise specified on the Plans, the removal and replacement of concrete cross gutters and spandrels shall conform to LACDPW Standard Plan 3082.

g) The Contractor shall exercise all necessary precautions so as not to damage or destroy any trees or shrubs and shall not trim or remove any trees unless such trees have been approved for trimming or removal by the Engineer. All existing trees and shrubs which are damaged during construction shall be trimmed or replaced by the Contractor, or a licensed tree contractor which employs a certified arborist, to the satisfaction of the Engineer. Tree trimming and replacement shall be accomplished in accordance with the following requirements:

(i) Trimming. Symmetry of the tree shall be preserved; no shrubs, splits or torn branches shall be left. Clean cuts shall be made close to the trunk or a large branch. Spikes shall not be used for climbing live trees. All cuts over 1-1/2 inches in diameter shall be coated with a tree sealant approved by the Engineer.

(ii) Replacement. The Contractor shall immediately notify the Engineer and the jurisdictional city involved if a tree is damaged by its operations. If, in the opinion of the Engineer, the damage is such that replacement is necessary, the Contractor shall replace the tree at its own expense. The tree shall be of a like variety as the damaged tree and shall be subject to the approval of the Engineer. The size of the tree shall be 24-inch box and not less than 3/4-inch in diameter measured 3 feet above the root ball, nor less than 6 feet in height.

PART 2
CONSTRUCTION MATERIALS

SECTION 201 - CONCRETE, MORTAR, AND RELATED MATERIALS

201-1 PORTLAND CEMENT CONCRETE.

201-1.1 Requirements.

201-1.1.1 General. Add the following as the third paragraph:

High early strength concrete for underground structures shall conform to 201-1.1.7.

201-1.1.4 Concrete Specified by Compressive Strength. Replace the first paragraph with the following:

The Contractor shall determine the mix proportions of concrete specified by compressive strength shown on the Plans. Unless otherwise specified, the minimum compressive strength of concrete at 28 Days shall be 4000 psi. The proposed concrete mix design and aggregate gradations shall be submitted in accordance with 2-5.3 of Section G. The concrete shall contain not less than 560 pounds of cement per cubic yard. The concrete shall contain an Agency-approved water-reducing admixture. The combined aggregate grading shall be Grading C except for 4000 psi or higher compressive strength concrete to be used for inverts shall be Grading B.

Replace the third paragraph with the following:

The proposed mix design for 4000 psi or higher compressive strength concrete shall be evaluated from field tests of a trial batch conforming to the size of load, materials, proportions, slump, mixing and placing equipment, and procedures to be used in the Work.

The placing of said concrete shall not begin until a trial batch of the mix design to be used has been produced by the Contractor, and sampled and tested by the Agency. The exact proportions of the materials to be used in the trial batches shall be determined by the Contractor, and sampled and tested by the Agency.

For each trial batch, the materials (brand and type of cement; admixture; source, size and gradation of aggregate), proportions, procedures, size of load, and slump shall be the same as that to be used in the Work. The trial batch shall be representative of the concrete to be used in the Work. Should the materials or procedures be changed, new trial batches will be required.

The Contractor's attention is directed to the time required to test trial batches. The Contractor shall be responsible for production of trial batches at a sufficiently early date so that the progress of the Work is not delayed.

The trial batch procedure herein may be waived by the Engineer if the Contractor complies with the following:

a) Test data of prior performance of the proposed mix design is presented by the Contractor as described above and approved by the Engineer. The Contractor may, at its option, utilize any strength data on file with the Agency for this purpose. Submitted data shall include recent 7-Day and 28-Day compressive strength test data for the proposed concrete mix design. In addition, the data shall include the brand name and type of any admixtures used; the type and brand of cement; aggregate source and gradation; mix proportions; procedures; load size; and slump.

b) A concrete mix design which includes an Agency-approved water-reducing admixture and a minimum of 610 pounds of cement per cubic yard for 4000 psi compressive strength concrete, or 660 pounds of cement per cubic yard for 5000 psi compressive strength concrete.

The Contractor is responsible for submitting mix designs with higher cement contents, as necessary, to meet any cement content requirements.

For both alternates to trial batching, the proposed mix design and aggregate gradation shall be submitted in accordance with 2-5.3 of Section G. In the case of alternate "a)", the compressive strength data shall be submitted at the same time.

201-1.1.5 Test for Portland Cement Concrete. Delete the following tests from the first paragraph:

e) Flexural Strength	C78
h) Unit Weight Yield	C138
i) Setting of Mortar	C191 or C266
k) Drying Shrinkage (with admixture)	California Test 530

Add the following:

The Contractor shall furnish all materials required by ASTM C31, C39-90a, C143-90a, C172-90, C470, C539, 540 and C1064 for sampling and testing fresh concrete including a slump cone, proper scoop, required rod for rodding samples, temperature gauge, concrete cylinder molds with caps, wheel barrow, shovel and a laborer to assist the Engineer.

Add the following subsection:

201-1.1.7 High Early Strength Concrete for Underground Structures. Under paved streets, high early strength concrete shall be used in the construction of all cast-in-place structures in open trenches, except invert slabs, junction structures per Standard Plans 332 and 334, and sewer manholes.

The Contractor shall provide concrete mix designs for all high early strength concrete applications which meet the specified strength requirements. The proposed mix designs and aggregate gradations shall be submitted in accordance with 2-5.3.

High early strength in 3250 psi compressive strength concrete shall be attained by using an Agency-approved water-reducing admixture, or by using a concrete mix which has a minimum of 660 pounds of either Type II Portland cement or Type V Portland cement per cubic yard. Rapid hardening hydraulic cement conforming to 201-1.2.1 may also be used.

The following requirements apply to high early strength in 4000 psi compressive strength concrete:

a) The concrete shall attain a 7-Day (9-Day where Type V Portland cement is required) strength such that the average of any 3 consecutive compressive strength tests shall be equal to or greater than 4000 psi, and not more than 10 percent of the tests shall be less than 4000 psi. No test shall be less than 85 percent of 4000 psi.

b) The concrete shall include a minimum of 610 pounds to a maximum of 750 pounds of either Type II Portland cement or Type V Portland cement per cubic yard and an Agency-approved water-reducing admixture.

c) Prequalification of the mix for high early strength in 4000 psi compressive strength concrete by trial batching will not be required.

201-1.2 Materials.

201-1.2.1 Cement. Add the following:

The Certificate of Compliance shall be sent to the Materials Analysis Unit, Geotechnical and Materials Engineering Division, 4th Floor, Los Angeles County Department of Public Works, 900 South Fremont Avenue, P.O. Box 1460, Alhambra, CA 91802-1460.

201-1.3 Proportioning.

201-1.3.3 Concrete Consistency. Add the following as the last paragraph:

Any concrete specified by compressive strength per 201-1.1.4 having a slump greater than 6 inches will be rejected. If the Engineer determines that a slump greater than 6 inches is required, it shall be accomplished using an Agency-approved high range, water-reducing admixture (ASTM C494, Type F) which shall be submitted to the Engineer for approval.

201-2 REINFORCEMENT FOR CONCRETE.

201-2.2 Steel Reinforcement.

201-2.2.1 Reinforcing Steel. Add the following:

All steel, except longitudinal steel, for design pipe, box conduit, open channels, tunnel lining, transition structures to be constructed per Standard Plans 341, 342, 343, 344, 345 or 346; open channel transition structures, and special structures shall be Grade 60. Longitudinal steel shall be Grade 40. Steel conforming to ASTM A706 shall be used if so noted on the Plans.

201-2.4 Samples for Testing.

201-2.4.1 General. Add the following:

Unless otherwise specified, certified mill test reports along with a Certificate of Compliance conforming to 4-1.5 and truck bills of lading are required in lieu of a physical test. The Contractor shall submit the aforementioned documents to the Engineer in accordance with 2-5.3 of Section G. The certified mill test reports shall include the name and location of the mill at which the steel was produced. An additional report shall be furnished to the Engineer prior to installation for each heat or size of reinforcing steel.

SECTION 206 – MISCELLANEOUS METAL ITEMS

206-7 MANHOLE SECURITY BARRIER.

206-7.1 General. Manhole security barriers (Barrier) shall be installed in manhole shafts as shown on the Plans. These barriers shall be made of stainless steel and intended to prevent unauthorized access, control odors and vectors and use the Agency padlocks as the locking mechanism.

206-7.2 Submittals. The Contractor shall submit the following in accordance with subsection 2-5.3 of Section G that detail the components and sequence of installation including the following:

- Manufacturer's standard details: Clearly mark those portions that apply specific to the Project and those parts that do not apply
- Materials and details: Show materials, details of components, sealants and locking mechanism, for approval

206-7.3 Requirements.

The Barrier shall comply with the following items.

1) The Barrier shall be designed to prevent unauthorized access into the manhole. It shall use Agency padlocks for the locking mechanism.

2) The Barrier shall work independently from the manhole frame and cover. The Barrier cover shall have its own subring for locking.

3) Installation shall be with minimal damage to the manhole shaft.

4) The Barrier shall have an odor controlling seal and contain no holes or gaps when closed/locked.

5) Opening or closing the Barrier shall take less than 10 seconds.

6) All parts/components shall be sized to fit through the manhole opening.

206-7.4 Materials. The manhole security barriers shall be made of stainless steel

206-8 AUTOMATIC RETRACTABLE SCREENS (ARS).

206-8.1 General.

The work specified in this subsection includes the furnishing and installation of Automatic Retractable Screen (ARS) units . ARS units shall open automatically with minimal obstruction to the curb opening before the depth of the storm flow in the street exceeds 3 inches.

206-8.2 Manufacturer's Warranty.

The Contractor shall obtain a three (3) year manufacturer’s warranty for all devices included in Section 206-8 and Section 206-9 of these Special Provisions, starting on the date of acceptance of the Project by the Agency. The warranty shall cover the devices against corrosion, excessive wearing of moving parts, and operational malfunction. It shall also include all labor, material and equipment required to repair or replace the devices during the warranty period, including but not limited to calibration and adjustment of moving parts to ensure the device operates properly at no additional cost to the Agency.

All work requested by the Agency during the manufacturer's warranty period shall be completed within three weeks.

206-8.3 Acceptable ARS Units.

The following companies have manufactured the only acceptable ARS units:

1) American Stormwater, Inc. MODEL: Surf Gate
   a. Address: 19500 Normandie Avenue, Torrance, CA 90502
   b. Phone: (310) 354-9999
   c. Website: www.americanstormwater.com

2) G2 Construction, Inc. MODEL: ARS CL12
   a. Address: 13331 “H” Garden Grove Boulevard, Garden Grove, CA 92843
   b. Phone: (714)748-4242
   c. Website: www.g2construction.com

3) United Storm Water Inc. MODEL: Wing-Gate
   a. 14000 East Valley Blvd., City of Industry, CA 91746-2801
   b. Phone: (877) 717-8676
   c. Website: www.unitedstormwater.com

4) EE Engineering MODEL: STS 1
   a. Address: 161 E Jefferson Blvd., Los Angeles, CA 90011
   b. Contact: Alim Shahid
   c. Phone: 661-236-9487
   d. Email: alimshahid@yahoo.com

Bidders are advised that the listing of devices by name in these Special Provisions does not exclude the device from meeting all requirements of these Special Provisions. There shall be no exceptions to this requirement.

206-8.4 Materials and Fabrication.

Units shall be fabricated from uncoated Type 304 stainless steel. Structural members shall have a minimum thickness of 3/16 inches. All mechanical parts fabricated from steel pieces shall be welded.

Moving parts shall be attached using assembly bolts, screws, nuts, washers, and hinges fabricated entirely from Type 304 stainless steel, or an approved equal stainless steel alloy. Mounting brackets shall also be fabricated entirely from Type 304 stainless steel, or an approved equivalent stainless steel alloy. The hinges shall be welded or bolted to the screen frame.

Concrete anchor bolts shall use a Red Head Multi-Set II drop-in anchor, SSRM-38, with Type 316 stainless steel threaded rods, nuts and washers, or Agency approved equal.

206-8.5 Installation and Removal.

Screens shall be welded to the existing catch basin faceplate assembly or grate support frame, or bolted to the concrete walls and soffit of the catch basin. Any faceplate assembly damaged during installation shall be repaired per 210-3 of the Standard Specifications. No part of the screen or mechanism shall interfere with the removal of any existing gratings. All parts of the unit shall be sized to fit through the catch basin's manhole when the unit is disassembled.

206-8.6 Operation.

The screens shall open and close automatically with variations in water flow per the requirements of 206-8.1 of these Special Provisions. All screens shall swing open and remain open as long as the flow depth exceeds 3 inches and return to the mechanically locked and closed position as the flow of water recedes.

206-8.7 Onsite Test.

Each unit shall be manually operated upon completion of the installation to ensure that the screen and all moving parts move freely and the screen locks securely in the closed position. Units that are determined by the Engineer to be malfunctioning shall be repaired or replaced at the sole expense of the Contractor.

The Engineer will test each of the catch basins in which both ARS and Connector Pipe Screen (CPS) units were installed for testing using water supplied from a fire hydrant or water truck. The Contractor shall be responsible for providing the source of water, including written approval from the water agency if a hydrant is used. Sufficient water shall be provided to cause the ARS units to open with no other assistance as follows:

Flowing Water Test

1) Sandbags shall be placed around the catch basin opening to allow the water to pond in front of the catch basin to a depth of 3 inches, measured from the flow line of the catch basin opening local depression. The sand bags shall be located five feet upstream and downstream of the end of the local depression. Sand bags shall also be placed seven feet from and parallel to the curb face.

2) An impermeable rigid membrane/barrier shall be placed covering the catch basin opening to allow the water to pond in front of the catch basin. The membrane/barrier shall be capable of sealing the catch basin opening without leakage so that the water ponds to the depth required.

3) Once the water reaches the depth described herein, the impermeable membrane shall be removed in one quick and continuous motion to allow the ponded water to instantaneously enter the catch basin and cause the ARS to open. A continuous flow of water shall be provided for at least two minutes after the initial opening of the ARS units in sufficient quantity to maintain the unit open. At the end of the two minutes, the flow of the water shall be stopped and the unit shall fully close automatically prior to or immediately after the flow into the catch basin stops.

4) This process shall be successfully completed at least two consecutive times without adjustments and/or calibration between trials.

Any units that do not open, close, and lock closed automatically under the test conditions, described herein, shall be repaired or replaced at the sole expense of the Contractor and retested. This process shall be repeated until the failed unit passes the test at the sole expense of the Contractor.

206-8.8 "Or Equal" Testing.

As specified in Subsection 4-1.6 of Section G, any ARS unit not listed under "Agency-Approved ARS Units" in 206-8.3 shall be tested to the satisfaction of the Agency per the following requirements prior to the Agency's approval of the ARS Unit as an "equal":

1) The Contractor, at its own expense, shall be required to install the ARS unit in a 7-foot wide catch basin (CB 300) located at the Agency's San Gabriel Dam test site. The Contractor shall coordinate the installation with the Engineer.

2) Agency personnel will conduct the testing at no cost to the Contractor. The Contractor may observe but not participate in the testing process.

3) The Agency has established the hydraulic capacity of this catch basin without any ARS units over a range of street flow from 0.5 cfs to 12 cfs. The unit shall not reduce the hydraulic capacity of the catch basin at any flow rate within this range by more than 10 percent.

4) The unit must remain closed when the flow depth is less than 3 inches and must open and remain open when the flow depth is 3 inches or greater. As the flow of water recedes, the unit shall return to the mechanically closed and locked position.

5) In the closed position the screen must be locked to prevent inadvertent opening.

6) The unit must remain open when the water in the catch basin rises to the level of the street flow line.

7) The unit must not interfere with the placement of a CPS unit, and must operate properly with the CPS unit in place.

8) The ARS must open as required above when the screen is partially blocked with trash.

9) The Contractor will be limited to a maximum of 2 tests of the unit, an initial test and one re-test, if required. The retest must take place within 5 calendar days after failing the initial test. Only calibration and adjustment of the unit will be allowed between tests. Test results will be provided to the Contractor within 5 calendar days after the date of the test. If the unit fails both tests, the proposed unit is considered to be not equal to the Agency-approved ARS units and the Contractor will be required to furnish and install one of the Agency approved ARS units listed in Subsection 700-4.3.

206–8.9 Submittals. Prior to initiating fabrication of any ARS units, the Contractor shall submit shop drawings, catalog cuts, and other information required which completely describes the ARS units to be installed under this Contract per 2-5.3. The following information shall be included in this submittal for each type of unit:

1) Detailed shop drawings and descriptions of all components of the unit, showing all dimensions, materials used, connection details, assembly details, and mounting details.

206-9 CONNECTOR PIPE SCREENS (CPS).

206-9.1 General.

The CPS prevents trash and debris from entering the storm drain system during dry weather and moderate storm flows by keeping the trash and debris inside the catch basin.

206-9.2 Requirements.

The CPS shall be designed to retain all trash larger than 5 mm (0.197 inches) in the catch basin and shall comply with the following items.

1) The CPS shall be installed conforming to the configurations shown in the Plans. If the minimum dimensions cannot be met, adjustments shall be made to the satisfaction of the Engineer.

2) The CPS shall not interfere with the operation of the ARS.

3) The CPS unit shall have a structural integrity to withstand a lateral force of standing water (62.4 lb/ft^3) within the catch basin area when the screen becomes 100 percent clogged. The CPS unit shall be bolted to the catch basin walls.

4) The CPS shall be configured with deflector plates or screens preventing trash from falling between the screen and connector pipe. The deflector plate shall be designed to withstand a vertical load of 10 lbs per square foot.

5) The gap at the bottom, sides, and joints of the CPS unit shall not exceed 5mm (0.197 inches).

6) The perimeter of the CPS shall include a structural frame for stiffness, a bolting surface to fasten the CPS to the wall of the catch basin, and as a support for the upper portion of the CPS unit referred to as the “bypass” (see Appendix A-1).

7) All parts/components of the CPS shall be sized to fit through the catch basin’s manhole opening.

206-9.3 Materials and Fabrication.

The CPS shall meet the following requirements:

1) The CPS frame shall be manufactured/fabricated from S-304 stainless steel, or an Agency approved equal stainless steel alloy. The Structural members shall have a minimum thickness of 3/16 inches.

2) The CPS screen shall be manufactured/fabricated from perforated metal of Type 304 stainless steel, or an Agency approved equal stainless steel alloy. The screen shall have a minimum thickness of fourteen (14) gauge (0.0781 inches) The geometrical opening shape shall have a diameter of 5mm (0.197 inches).

3) The screen material used shall have at least a 45 percent open area.

Any edge of the CPS that is not flush with the wall or floor of the catch basin shall be smooth with no prongs or jagged edges.

The assembly bolts, screws, nuts, and washers shall be fabricated entirely from S-316 stainless steel. The concrete anchor bolts shall be Red Head Multi-Sub 11 drop anchor, RM-38, with Type 316 stainless steel threaded rods, nuts, and washers, or Agency approved equal. The red head anchor shall be set in epoxy adhesive.

206-9.4 Staff Gauge.

The contractor shall paint a staff gauge and level indicators per Appendix A-2. The staff gauge shall be located such that it is visible through the curb opening or grating of the catch basin.

206–9.5 Submittals. Prior to initiating fabrication of any CPS units, the Contractor shall submit shop drawings, catalog cuts, and other information required which completely describes the CPS units to be installed under this Contract per 2-5.3. The following information shall be included in this submittal for each type of unit:

1) Detailed shop drawings and descriptions of all components of the unit, showing all dimensions, materials used, connection details, assembly details, and mounting details.

SECTION 207 – GRAVITY PIPE

207-2 REINFORCED CONCRETE PIPE (RCP).

207-2.2 Materials. Add the following to the first paragraph:

d) Reinforcing steel samples may be required to be tested in accordance with 201-2.4.

e) Reinforcing steel for reinforced concrete pipe 108 inches and greater in diameter shall be Grade 60 billet steel conforming to ASTM A615.

207-2.4 Reinforcement.

207-2.4.1 General. Add the following:

All main line reinforced concrete pipe shall be constructed so as to maintain a minimum clear distance of 1 1/4 inches between the interior and exterior pipe surface and the surface of the reinforcing steel closest to the interior and exterior pipe surface.

207-2.4.2 Location of Reinforcement. Add the following after the third paragraph:

The required covers and permitted tolerances shown in Table 207-2.4.2 are applicable to wet cast and spun pipe only. The reinforcement for machine made pipe shall be at the location designated by the manufacturer per their standard details which shall be furnished to the Engineer. The actual location shall not vary more than ± 3/8 inch from the designated location; however, in no case shall the cover over the circumferential reinforcement be less than 5/8 inch. The minimum cover over longitudinal steel shall be as shown in Table 207-2.4.2.

If the joint is of the bell and spigot type similar in shape to that shown on LACDPW Standard Plan 3095, additional reinforcement shall conform to Standard Plan 3095.

Add the following as the last paragraph:

Where single circular reinforcement is used in wet cast or spun pipe, it shall be placed in the center of the wall.

207-2.9 Basis for Acceptance.

207-2.9.1 General. Add the following as the last paragraph:

In addition to the above, rubber-gasketed pipe shall be subjected to the hydrostatic pressure test specified in 207-2.9.6.

207-2.9.3 Structural Design Basis. Replace the second paragraph with the following:

Concrete used in reinforced concrete pipe for which structural details are shown on the Plans shall attain the following 28-Day compressive strength:

The average of any 3 consecutive tests shall be equal to or greater than 4500 psi, and not more than 10 percent of the tests shall be less than 4500 psi. No test shall be less than 85 percent of 4500 psi.

A strength test shall consist of the average strength of 2 test cylinders molded from material taken from a single batch of concrete. The cylinders shall be cured in the same manner as the pipe for the entire 28 Days, including removal from the cylinder molds when the pipe is stripped.

Add the following:

207-2.9.6 Hydrostatic Pressure Test. The pipe to be tested shall be selected in accordance with 207-2.9.2.

The pipe and joint shall be tested concurrently by attaching 2 pipes together or a pipe and a standard joint section together. At the Contractor's option, the test section may be filled with

water and placed under a hydrostatic pressure of 10 psi for a 24-hour period prior to the tests. The hydrostatic pressure in the test section shall be gradually increased until it reaches 13 psi.

The test section shall not show measurable leakage when kept under the test pressure for 20 minutes. Damp spots or water condensing on the surface of the pipe shall not be considered as leakage nor cause for rejection. The joint shall show no leakage at the test pressure.

If the test pipe passes the test, the lot will be accepted.

If the test pipe fails the hydrostatic test, 2 additional pipes from the same lot will be selected for testing. If both pipes pass the test, the lot, except for the first test pipe, will be accepted. If either of the 2 additional pipes fails the test, the lot will be rejected. The Contractor may elect to individually test each pipe in a rejected lot for acceptance.

Repair of leaks in rejected test pipe may be made if so approved by the Engineer. The repaired pipe shall be retested.

SECTION 217 - BEDDING AND BACKFILL MATERIALS

217-1 BEDDING MATERIAL.

217-1.1 General. Add the following:

If the Contractor elects or is required by the Special Provisions to import material from a source outside the Project limit for use as bedding, representative samples of imported material for use as bedding must be approved by the Agency.

217-2 TRENCH BACKFILL.

217-2.1 General. Add the following:

The material obtained from the open trench excavations ***can be used*** as trench backfill, subject to the provisions specified herein, and provided that all organic material, rubbish, debris, and other objectionable materials are first removed.

217-2.3 Imported Backfill. Replace the entire subsection with the following:

If imported backfill is required or if the Contractor elects to import material from a source outside the Project limits for use as backfill, said material shall be clean soil, free from organic material, trash, debris, rubbish, broken Portland cement concrete, bituminous pavement, or other objectionable substances, and shall have a minimum sand equivalent of 20.

The Contractor shall inform the Engineer of the actual street address or location from which the intended material will be furnished not less than 15 days prior to its proposed use. The Contractor will perform testing as deemed appropriate by the Engineer. The Engineer will determine the suitability of the material for use as imported backfill.

Add the following:

SECTION 218 - IMPORTED FILL MATERIAL

218-1 GENERAL. The Contractor shall implement the following sampling and analysis requirements prior to importing fill material (imported borrow, structure backfill, and imported backfill) to the Project site.

218-2 SAMPLING FREQUENCY AND LOCATION. The Contractor shall collect discrete soil samples that are representative of the material to be imported. The Contractor shall establish a grid system over the potential borrow site or stockpile. The Contractor shall collect and analyze one soil sample from each grid. The grid and soil sampling frequency shall be as follows:

TABLE 218-2

Volume of Soil	Number of Grids/Samples
1 to 20 cubic yards	1 sample
21 to 500 cubic yards	1 sample every 50 cubic yards
501 to 1,000 cubic yards	1 sample every 100 cubic yards
>1,000 cubic yards	1 sample every 200 cubic yards

All sampling shall be conducted by qualified personnel under strict chain-of-custody procedures, and analyzed by a State of California Environmental Laboratory Accreditation Program (ELAP)-certified laboratory in accordance with the testing procedures specified in 40 CFR 136.

218-3 SOIL SAMPLE ANALYSIS. Soil sample analysis, containers, preservation methods, and holding times for soil samples shall be in accordance with test procedures provided by 40 CFR 136 and EPA Publication SW-846 “Test Methods for Evaluating Solid Waste, Physical/Chemical Methods,” Third Edition, November 1986.

Soil samples shall be transported, under strict chain-of-custody procedures, to an ELAP-certified analytical laboratory within 24 hours of collection. The soil samples shall be analyzed for the following constituents:

TABLE 218-3

Constituent	EPA Method
Total Recoverable Petroleum Hydrocarbons (TRPH).	EPA Test Method 418.1
Total Petroleum Hydrocarbons (TPH-G) - Gasoline Range C4- C12	Modified EPA Test Method 8015
Total Petroleum Hydrocarbons (TPH-D) - Diesel Range C10-C24	Modified EPA Test Method 8015
Volatile Organic Compounds (VOCs)	EPA Test Method 8260
CCR Title 22 Metals (TTLC)	EPA Method 6010
Simulated Distillation – Hydrocarbon Distribution. Hydrocarbon Chain	EPA Test Method 3550

If the Contractor is aware of other potential contaminants, or the borrow site or stockpile history may indicate other potential contaminants not listed above, the Contractor shall analyze all samples for all other potential contaminants.

Based on the results of the tests, the Engineer may require additional or supplemental soil samples be collected and tested in order to determine whether the proposed imported fill material is acceptable.

218-4 QUALITY CONTROL. One duplicate soil sample shall be collected and analyzed for every ten-soil samples collected and analyzed. If less than ten samples are collected, a minimum of one duplicate sample is required. Duplicate samples shall be collected in separate containers and located immediately adjacent to the original sample location(s).

Any soil samples having a dilution factor of greater than one will be rejected by the Engineer. The Agency reserves the right to approve and observe all sampling, loading, and transportation of soil proposed to be imported.

218-5 REPORTING AND DOCUMENTATION. Prior to the acceptance of the imported fill material, the Contractor shall submit to the Engineer a summary report of all analytical data from soil sampling activities conducted on the proposed fill material. The report shall include a table summarizing all analytical data and observations, a sketch drawing or diagram of the borrow/stockpile site and sample locations, general soil conditions or classification, description of the borrow/stockpile site, signed laboratory analytical data sheets, signed laboratory analytical QA/QC data sheets, signed/completed chain-of-custody forms, field logbook, and all other pertinent information.

The Contractor shall maintain a bound sample documentation logbook. The logbooks will be used for documenting data collection and work activities. Entries shall be made in ink and shall include sufficient detail to reconstruct site activities without reliance on memory. All samples collected shall be recorded in the logbook.

218-6 APPROVAL. The Engineer will evaluate the data submitted in this report and determine if the proposed material may be imported and used on the Project. The Contractor shall not import any soil on to the Project site until the Agency has reviewed the summary report and written approval has been received from the Engineer.

SECTION 219 – PRE-TREATMENT DEVICE

219-1 PRECAST STORMWATER TREATMENT SYSTEM.

219-1.1 General.

The Precast Stormwater Treatment System is a precast reinforced concrete device intended to capture and store debris and other pollutants from stormwater and non-stormwater flow before entering drywell infiltration system. The size, location, and manholes risers shall be per plan.

219-1.2 Submittals.

The Contractor shall submit Shop Drawings in accordance with subsection 2-5.3 of Section G that detail the system components and sequence for installation including the following:

- System configuration and dimensions.
- Materials and details: Show materials, details of components, methods of joining, sealants, openings, and pipe locations.

219-2 PRODUCTS.

219-2.1 System Structural Loading

Precast stormwater treatment system and all its components shall be housed within one structure and accommodate HS-20 truck loading with impact applied.

219-2.2 System Performance.

The precast stormwater treatment system shall demonstrate to the Engineer's satisfaction that it meets the performance specification of 80% removal of 125 Microns at a minimum 10.2 cubic feet per second treatment flow rate.

The precast stormwater treatment system must contain a metal screening system that is positioned above the static water line and designed to capture and store solid debris in a dry state between rain events. It shall allow easy access into the system from the manholes and for a vacuum truck to remove everything in all the lower settling chambers. The screening system shall have aluminum framework and stainless steel screens.

The precast stormwater treatment system shall include sediment settling chambers that collects sediment and eliminates the re-suspension of previously captured sediment; the chambers shall easily be accessible for a vacuum truck to maintain; the chambers shall have a washing system that can force sediment and debris toward center of the chambers to allow for efficient maintenance.

Shall contain a floatable skimmer system to remove oils, grease, and floating pollutants.

Removal efficiencies shall only be considered valid if they are verified by independent third-party testing and be based on mass basis and have a Manufacturers Performance Certification.

219-2.3 Materials

Precast stormwater treatment system shall be reinforced concrete. Furnish per Manufacturer's instructions and as specified in Section 201

PART 3
CONSTRUCTION METHODS

SECTION 300 - EARTHWORK

300-1 CLEARING AND GRUBBING.

300-1.3 Removal and Disposal of Materials.

300-1.3.2 Requirements. Add the following:

d) Tree Removal. Tree removal shall include stump and root removal. Trees designated for removal shall be "topped", or, if in the opinion of the Contractor, a tree is unable to withstand the strain of the topping procedure, the branches shall be lowered by some other means, such as a tree crane. Unless impractical, lower limbs shall be removed first, working toward the top until the tree is de-limbed. Stubs, at least 12 inches or more in length, shall be left following de-limbing to provide crotches for lowering sections of the trunk or main limbs.

Extreme care shall be taken to prevent limbs, branches, and trunks from falling and damaging adjacent structures, driveways, sidewalks, streets, fences, lawns and other property, both public and private. When necessary, brush mats, tires, logs or skids shall be used to prevent such damage.

Stump removal shall include grinding out the stump and all roots, including surface roots, to a minimum depth of 24 inches below existing ground level. Stump holes shall be backfilled with Class "A" Topsoil conforming to 800-1.1.2 and planted in accordance with 801 with grass seed or sod of the same variety as the adjacent lawn. Topsoil used for backfill shall be subject to the approval of the Engineer.

Chips and debris from stump removal shall be removed from the Project site by the end of the work day that such chips and debris were generated. No stump removal chips or debris shall be left on the parkway overnight. The Project site shall be raked and swept.

Add the following subsection:

300-1.3.3 Construction and Demolition Debris Recycling.

300-1.3.3.1 General**.** Consistent with the Agency's efforts to comply with the California Integrated Waste Management Act of 1989 (AB 939), the Contractor shall reduce, reuse, and/or recycle at least 50 percent by weight or volume or to the maximum extent feasible, the construction and demolition debris (debris) generated by this Contract thereby diverting the debris from disposal facilities, saving landfill space, and conserving virgin materials and natural resources.

300-1.3.3.2 Definitions.

1. **"Construction and Demolition Debris (Debris)"** means materials resulting from building, construction or demolition-related activities such as excavation, grading, land clearing, renovation, repair, road work and site cleanup which are considered solid waste pursuant to Section 40191 of the California Public Resources Code. The materials include, but are not limited to, asphalt, brick, cardboard, carpet, cinder block,

concrete, concrete with reinforcement bars, drywall, excavated materials, fixtures and fittings, glass, gravel, green waste, metal, mixed rubble, packaging materials, paper, plastics, porcelain, road work materials, roofing materials, rock, sand, site clearance materials, soil, trees, tree stumps and other vegetative matter, stones, and wood waste.

2. **"Deconstruction"** means the process of carefully dismantling a structure, piece by piece prior to or instead of conventional demolition, to maximize the recovery of building materials for reuse and/or recycling.

3. **"Delivery Site"** means a recycling facility as defined in Subsection E.14 and recycling or reuse site as defined in Subsection E.15 or any place, including a transfer station as defined in Subsection E.20 where the debris is delivered for the sole purpose of reuse and/or recycling in a manner acceptable to the Agency.

4. **"Disposal"** means the process of disposing of debris at a Disposal Facility.

5. **"Disposal Facility"** means a Landfill or any location where the debris is taken for "Transformation" as defined.

6. **"Generation"** means the quantity of debris produced by the Work before the debris is reused and/or recycled.

7. **"Green Waste"** means all vegetative cuttings, shrubs, stumps, logs, brush, tree trimmings, grass, and related materials which have been separated from other solid waste.

8. **"Landfill"** means a solid waste disposal facility that accepts solid waste for land disposal and is operating under a current Solid Waste Facility Permit issued by a local enforcement agency as defined in Section 40130 of the California Public Resources Code and concurred upon by the California Integrated Waste Management Board.

9. **"Recyclable"** means material that still has useful physical or chemical properties after serving its original purpose and that can be reused or re-manufactured into additional products.

10. **"Recycle or Recycling"** means the process of collecting, sorting, cleansing, treating, and reconstituting materials that would otherwise become solid waste and returning them to the economic mainstream in the form of raw materials for new, reused, or reconstituted products which meet the quality standards necessary to be used in the marketplace, and in a manner acceptable to the Agency. "Recycle" or "Recycling" does not include Transformation.

11. **"Recycling Facility"** means any facility (except a transformation facility) whose principal function is to receive, store, convert, separate, or transfer recyclable materials for processing.

12. **"Recycling or Reuse Site"** means any place other than a recycling facility acceptable to the Agency for recycling and/or reuse of debris.

13. **"Reduce"** means any action which causes a net reduction in the generation and/or disposal of solid waste.

14. **"Reuse"** means the use, in the form as it was produced, and in a manner acceptable to the Agency of material which might otherwise be discarded into a Disposal Facility.

15. **"Site Clearance Material"** means materials such as trees, brush, earth, mixed concrete, rubble, sand, steel, extraneous paper, plastics, and other waste materials generated from site clearance.

16. **"Source Separation"** means segregation, by the generator, of materials designated for separate collection for materials recovery or special handling.

17. **"Transfer Station"** means a facility utilized to receive solid wastes and to temporarily store, separate, convert, or otherwise process the materials in the solid wastes, and/or to transfer the solid wastes directly from smaller to larger vehicles or railroad trains for transport.

18. **"Transformation"** means incineration, pyrolysis, distillation, gasification, or biological conversion other than composting.

19. **"Wood Waste"** means solid waste consisting of wood pieces or particles which are generated from the manufacturing or production of wood products, harvesting, processing or storage of raw wood materials, or construction or demolition activities.

300-1.3.3.3 Recycling Summary. The Contractor shall prepare and submit a Recycling Summary report using the form included as Attachment 1 summarizing the disposal, reuse, and/or recycling activities which occurred throughout the Contract duration. This report shall be first faxed to the number shown on the report and submitted to the Agency within 30 Days after field acceptance of the Work.

Failure of the Contractor to submit the Recycling Summary within the time specified will result in damages being sustained by the Agency. Such damages are, and will continue to be, impracticable and extremely difficult to determine. For failure to submit the Recycling Summary within the time specified, the Contractor shall pay to the Agency, or have withheld from monies due it, the sum of $10,000.

Execution of the Contract shall constitute agreement by the Agency and Contractor that $10,000 is the minimum value of the costs and actual damage caused by the failure of the Contractor to submit the Recycling Summary within the time specified. Such sum is liquidated damages and shall not be construed as a penalty, and may be deducted from payments due the Contractor.

300-1.4 Payment. Add the following:

The cost of construction and demolition debris recycling shall be considered as included in the lump sum Bid price for "DRAINAGE". As part of the Recycling Summary report, the Contractor shall fill in the blank after the "Construction Demolition and Debris Recycling Requirements Cost:" This cost shall be the incremental cost of complying with the requirements. This cost will be used for information gathering purposes only and not for

purposes of payment to the Contractor.

Payment for the removal of trees, clear and grubbing as indicated on the Plans, shall be included in the lump sum Bid price for “DRAINAGE”

SECTION 302 – ROADWAY SURFACING

302-5 ASPHALT CONCRETE PAVEMENT.

302-5.1 General. Replace the second sentence of the first paragraph with the following:

For Slauson Avenue, the base course shall be B-PG 64-10, and the surface course shall be ARHM-GG-C; Ladera Park Avenue shall use C2-PG 64-10, unless otherwise shown on the Plans.

302-9 ASPHALT RUBBER HOT MIX (ARHM).

302-9.1 General. Replace the entire subsection with the following:

ARHM shall conform to 203-11.

The Contractor shall schedule the paving work such that no longitudinal drop-offs on the pavement will remain overnight in the travelled way. Any transverse drop-offs on the pavement over 1 inch in height that will remain overnight shall be ramped with temporary AC pavement.

Roadways to receive full-width cold milling shall be resurfaced within ***24 hours*** of cold milling any portion of the Work.

302-9.9 Payment. Replace first paragraph with the following:

The work involved in roadway resurfacing shall include, replacement of base and pavement as shown on Plans. Existing bituminous pavement to be removed to accommodate new asphalt concrete pavement, as shown on the plans, shall be removed by the use of cold milling machines. Payment for roadway resurfacing shall be included in the lump sum Bid price “RESTORATION OF PERMANENT SURFACING”

SECTION 303 – CONCRETE AND MASONRY CONSTRUCTION

303-1 CONCRETE STRUCTURES.

303-1.3 Forms. Replace the eleventh paragraph with the following:

Forms for cast-in-place concrete drain or sewer structures will not be required for concrete to be placed directly against the sides of the excavation or shoring, provided the following conditions are met:

Replace subparagraph “b)” of the eleventh paragraph with the following:

b) If concrete is placed against shoring, such shoring shall be closely fitted and all points shall be outside the concrete lines shown on the Plans. Those surfaces against which the concrete is to be placed shall be faced with building paper, plywood, or other suitable materials approved by the Engineer. Unless otherwise specified herein, all shoring shall be removed, but not until at least 7 Days after placing concrete, or until the concrete has attained a compressive strength of 2,000 psi.

Care shall be taken in removing sheeting so as to avoid damaging the concrete. Voids left by the removal of shoring components shall be backfilled with material having a sand equivalent of not less than 30 and consolidated by jetting to the satisfaction of the Engineer.

303-1.5 Removal of Forms for Box Sections. Replace the first sentence of the first paragraph with the following:

In lieu of form removal as specified in 303-1.4, the Contractor may, at its option, strip the forms on the basis of compressive strengths or by the following method:

Add the following after the last paragraph:

The Contractor shall furnish at its own expense, all equipment, material, supplies and labor for performing field tests which will be used as a basis of determining when forms may be removed or stripped. Forms shall not be removed until approval therefor has been given by the Engineer.

The Contractor shall be responsible for determining when concrete placed in the forms has attained the compressive strength specified for form removal by means of tests on specimens made from the concrete placed in the forms. In connection therewith, the Contractor shall make such number of 6-inch diameter by 12-inch high cylindrical test specimens as may be required to determine whether the specified strength has been attained; however, the number of specimens shall be such as to allow a minimum of 3 specimens to be tested at any one age. The equipment, materials and supplies to be furnished shall include, but not be limited to, molds, tamping rods, sulfur capping compound, capping compound warmer, a capping device and a compression testing machine.

The specimens shall be made in the presence of the Engineer, during every concrete pour for which stripping strengths are required, by taking representative samples of fresh concrete, directly from the mixer, and placing such concrete into suitable molds where it shall be rodded into place. The specimens shall be made in accordance with ASTM C31. Specimens shall be made and stored on a casting board made of 5/8 inch plywood measuring 21 inches x 21 inches.

The specimens shall be covered by a box fabricated of 1/2 inch plywood measuring 21 inches x 21 inches x 15 1/2 inches high, outside dimensions. During the period of November 1 to May 31, inclusive, said casting board and box shall be insulated with an inside covering of 1/2-inch thick styrofoam or Agency-approved equal. No insulation shall be used during the period of June 1 to October 31, inclusive. The use of plastic sheets, light bulbs or other heating

devices, inside or outside of the box, will not be permitted. In connection therewith, not more than 3 specimens shall be stored within the box at any one time.

The box and board containing the 3 specimens shall be stored near the point of sampling, either on hardened concrete adjacent to the freshly placed concrete, or on the ground surface adjacent to the freshly placed concrete.

At an appropriate time, prior to loading, the specimens shall be removed from the box and moved to the location where the capping equipment and compression testing machine are kept; however, under no circumstances shall specimens be stored in the box for a period greater than 24 hours. At the aforementioned location, the specimens shall be removed from the molds and capped with a sulfur capping compound in accordance with the methods of ASTM C31. After the caps have hardened, the specimens shall be loaded to failure in a compression testing machine, in the presence of the Engineer, in accordance with ASTM C39. The compressive strength of each specimen shall be calculated by dividing the maximum load carried by the specimen during the test by the average cross sectional area, and the result expressed to the nearest 10 psi. The compressive strength of the concrete represented by the specimens shall be taken as the average compressive strength of 3 specimens tested at the same age except that if one specimen in a test shows manifest evidence of improper sampling, molding or testing, it shall be discarded and the remaining 2 strengths averaged. Should more than one specimen representing a given test show definite defects due to improper sampling, molding or testing, the entire test shall be discarded.

In the event specimens are to be tested at ages greater than 24 hours, the specimens shall be taken from the box at an age of 24 hours, removed from the molds when the forms are stripped, and stored at the location where the capping equipment and compression testing machine are kept, where they shall receive, insofar as is practicable, the same exposure and/or protection from the elements as the portions of the structure which they represent, until the time of testing.

The equipment, materials and supplies to be furnished by the Contractor shall conform to the following requirements:

a) Molds. Molds for compression test specimens shall be 6 inches inside diameter by 12 inches high, made of nonabsorbent material, watertight and shall conform to the requirements of ASTM C470.

b) Tamping Rod. Tamping rods shall be round, straight steel rods, 7/8 inch in diameter and 24 inches long, having one end rounded to a hemispherical tip of the same diameter.

c) Sulfur Capping Compound. Capping compound shall be plasticized, contain at least 55 percent refined sulfur and not more than 45 percent graded silica aggregate, and shall be free of sodium chloride or other water soluble salts, clay, shale, brick, dust, iron filings or similar fillers. It shall have an absorption of less than 0.5 percent by weight, a compressive strength of not less than 5,000 psi, and a melting point between 265°F and 290°F.

d) Capping Compound Warmer. The capping compound warmer shall be capable of melting the capping compound and maintaining a temperature between 265°F and 290°F.

The capacity of the warmer shall be sufficient to allow at least 3 specimens to be capped on both ends from one filling of the warmer with capping compound.

e) Capping Device. The capping device shall be suitable for use with the capping compound. It may hold the cylindrical specimens in either the vertical or horizontal position, and allow both ends of the specimen to be capped simultaneously, or each end may be capped individually. The device shall produce thin caps with plane end surfaces at right angles to the axis of the specimen.

f) Compression Testing Machine. The compression testing machine shall contain a hydraulic loading unit with a capacity of not less than 200,000 pounds. The loads may be developed by means of a hand-operated pump or a motor driven pump. The machine shall be capable of loading specimens at the rate specified in ASTM C39.

The machine shall accommodate 6-inch by 12-inch cylindrical specimens between the upper and lower steel bearing blocks. The upper block shall be spherically seated, adjustable for specimen height, not less than 6.18 inches in diameter, and have a hardened bearing face. The lower block shall be removable, have a hardened bearing face, and be not less than 6.18 inches in diameter.

The testing machine shall have a hydraulic pressure gauge reading directly in pounds of load applied to the specimen. The capacity of the gauge shall not exceed 200,000 pounds. The gauge shall be not less than 8 inches in diameter, be equipped with a maximum load pointer, and contain a quick coupler which will prevent leakage of hydraulic fluid from the system whenever the gauge is removed.

The testing machine shall be accurate to within one percent of the indicated load and shall be calibrated at intervals not to exceed 6 months by an agency approved by the Engineer.

The completed specimens may be tested by a certified testing laboratory; however, forms shall not be stripped until the Engineer has been furnished with the results of the tests and until approval has been given by the Engineer to remove the forms.

In the event that the compressive strength as determined from the cylinder tests is less than that required for form removal, and the Contractor does not have sufficient specimens to perform additional tests, then the Contractor shall wait 4 hours for each 100 psi that the compressive strength is below that required before removing the top slab forms.

303-1.7 Placing Reinforcement.

303-1.7.1 General. Delete the first paragraph. Add the following after the second paragraph:

Concrete chairs or blocks shall attain a 28-Day compressive strength of 3250 psi or to the requirements prescribed for Class "A" mortar per 201-5.1. In either case, the concrete chairs or blocks shall be water-cured per 303-1.10.

The Contractor shall insure that the dowels for bridge sidewalks, curbs, and barrier railings remain tight and on the intended alignment. Any damage to or loss of bond of the dowels

caused by the Contractor's operations shall be repaired by the Contractor to the satisfaction of the Engineer. When dowels are placed in drilled holes, the Contractor shall first fill the hole with epoxy adhesive and then insert the dowel to insure positive bonding.

Reinforcing steel that extends from previously placed concrete into new construction shall be cleaned and free of any coating which would be likely to destroy, reduce or impair its proper bonding with the new concrete.

Old reinforcement that is to project into new work shall be straightened or bent to conform to the requirements of the Plans. Any damaged reinforcing steel that is to be left in place, and is to be repaired by welding, shall be welded in accordance with the provisions of the American Welding Society Publication, AWS D12.1, "Recommended Practices for Welding Reinforcing Steel, Metal Inserts, and Connections in Reinforced Concrete Construction". The weld shall be sufficient to develop the full strength of the bar.

303-1.7.2 Splicing. Replace the entire subsection with the following:

Splices of bars shall be made only where shown on the Plans or approved by the Engineer. Where bars are spliced, the splices shall be staggered. The length of lapped splices shall be as follows:

a) Reinforcing bars size No. 6, or smaller, shall be lapped 32 diameters of the smaller bar joined.
b) Reinforcing bars sizes Nos. 7, 8 and 9 shall be lapped at least 49 diameters of the smaller bar joined.
c) Reinforcing bars sizes Nos. 10 and 11 shall be lapped at least 60 diameters of the smaller bar joined.
d) Reinforcing bars sizes Nos. 14 and 18 shall not be spliced by lapping.

Splicing shall be accomplished by placing the bars in contact with each other and wiring them together.

Welding of reinforcing steel smaller than Nos. 14 and 18 will not be permitted unless otherwise shown on the Plans or directed by the Engineer. Welding, when permitted, shall conform to AWS D1.4 and utilize reinforcing bars conforming to ASTM A706.

Radiographic examinations shall be performed by the Contractor at its own expense on at least 25 percent of all full penetration butt-welded splices. For each weld found to be defective, a retest shall be made plus one additional splice as selected by the Engineer shall be examined radiographically by the Contractor.

All radiographs shall be submitted to the Engineer with a radiographic report and a certificate of compliance.

Each radiographed splice shall be identified on each radiograph. The radiograph identification and marking system shall be established by the Contractor and approved by the Engineer before radiographic inspection begins.

Welders, welding operators, and tackers shall be prequalified in accordance with the specifications of AWS D1.4 and shall produce written evidence of qualification satisfactory to the Engineer. Written approval of the documentation by the Engineer is required.

303-1.8 Placing Concrete.

303-1.8.1 General. Replace the second sentence of the first paragraph with the following:

Equipment having components made of aluminum or magnesium alloys which will be in contact with plastic concrete during mixing, transporting or pumping of Portland cement concrete shall not be used.

Replace the second paragraph with the following:

Prior to placing any structure concrete, all forms, surfaces of previously placed concrete and reinforcing steel shall be wetted and the free water removed.

Add the following:

Concrete not placed within 10 minutes from the time of leaving the mixer shall be remixed before pouring. Any concrete not poured within a 15-minute interval after mixing shall be wasted.

303-1.8.2 Grouting. Delete the entire subsection.

303-1.8.3 Depositing. Add the following:

When poured monolithically, top slabs of box sections shall not be poured until the concrete in the walls has been consolidated and settlement has occurred. Vibration of the concrete in the top slab shall be conducted in such a manner as to insure that vibrators penetrate into the concrete previously placed in the walls.

303-1.8.4 Consolidating. Replace the first sentence of the third paragraph with the following:

The number of vibrators employed shall be of sufficient size to consolidate the concrete being placed within 15 minutes after it has been placed into the forms.

303-1.8.6 Joints. Add the following after the third paragraph:

Before placing fresh concrete, all construction joints shall be thoroughly wetted. Joints which are approximately horizontal, except expansion or contraction joints, shall be covered with 1 inch of mortar consisting of one part cement to 2 1/2 parts sand. The quantity of water used shall be only that required to produce a mixture with a consistency comparable to that of the fresh concrete.

Water stops for reinforced concrete conduits and structures, where called for on the Plans, shall be of the type specified on the Plans.

303-1.9 Surface Finishes.

303-1.9.2 Ordinary Surface Finish. Add the following:

e) Inside walls of reinforced concrete box storm drain.

303-1.10 Curing. Replace the first paragraph with the following:

As soon after completion of the specified finishing operations as the condition of the concrete will permit without danger of consequent damage thereto, all exposed surfaces shall be sprayed with a curing compound conforming to 201-4.1. Concrete may be cured using earth, sand or burlap kept continuously wet when such method is approved by the Engineer.

303-1.11 Payment. Add the following before the first paragraph:

303-1.11.1 General.

Add the following after the second paragraph:

Should the Contractor request and obtain permission to use admixtures for its own benefit, the Contractor shall furnish such admixtures and incorporate them in the concrete mixture at its own expense and no additional payment will be made therefor.

Should the Engineer direct the Contractor to incorporate any admixtures in the concrete mixture when their use is not required by the Specifications, furnishing the admixtures and incorporating them in the concrete mixture will be paid for as Extra Work.

Add the following subsections:

303-1.11.2 Payment for Pre-Treatment Device.

The work involved in the construction of the pre-treatment device shall include excavation; furnishing and installing all materials including pre-treatment device and manholes; manhole security barriers; backfill; pipe connections; and all other appurtenances necessary for a complete installation.

Payment for the installation of the precast concrete pre-treatment device, including submittals, shall be made at the lump sum Bid price for "PRE-TREATMENT DEVICE."

303-1.12 Drill and Bond Dowel (Epoxy Cartridge).

Drilling and bonding dowels with epoxy cartridge systems shall conform to the details shown on the Plans and the requirements in these Special Provisions.

The epoxy cartridge system shall comply with the 2009 International Building Code and evaluated in accordance with ICC-ES Acceptance Criteria for Post-Installed Adhesive Anchors in Concrete (AC308). The Contractor shall provide one of the following epoxy cartridge systems or Agency approved equal as provided in Subsection 4-1.6:

HILTI, INC.	SIMPSON STRONG-TIE CO., INC.
HIT-RE 500-SD	SET-XP
1-800-879-8000	1-800-999-5099

The epoxy cartridge system used shall be appropriate for the ambient concrete temperature and installation conditions at the time of installation in conformance with the manufacturer's specifications.

Epoxy cartridges shall be accompanied by a Certificate of Compliance as provided in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications. The certificate shall state that the material complies in all respects to the requirements of ICBO AC58 and Caltrans Augmentation/Revisions to ICBO AC58.

Each epoxy cartridge shall be clearly and permanently marked with the manufacturer's name, model number of the epoxy cartridge system, manufacturing date, and lot number. Each carton of epoxy cartridges shall contain the manufacturer's recommended installation procedures, minimum cure time, and such warning or precautions concerning the contents as may be required by Federal or State laws and regulations.

The holes shall be drilled by methods that will not shatter or damage the concrete adjacent to the holes. If reinforcement is encountered during drilling, before the specified depth is attained, the Engineer shall be notified. Unless the Engineer approves, in writing, coring through the reinforcement, the hole will be rejected and a new hole, in which reinforcement is not encountered, shall be drilled adjacent to the rejected hole to the depth recommended by the manufacturer. Rejected holes shall be patched with non-shrink grout. The drilled holes shall be cleaned in conformance with the manufacturer's instructions and shall be dry at the time of placing the epoxy cartridge bonding material and the steel dowels. The bonding material shall be a 2-component epoxy system contained in a cartridge having 2 separate chambers and shall be inserted into the hole using a dispensing gun and replaceable mixing nozzle approved by the manufacturer. Unless otherwise specified, the depth of hole and the installation procedure shall be as recommended by the manufacturer. A copy of the manufacturer's recommended installation procedure shall be provided in accordance with 2-5.3.5 of Section G to the Engineer at least 2 days prior to beginning the bonding of dowels or threaded rods.

Immediately after inserting the dowels into the epoxy, the dowels shall be supported as necessary to prevent movement during curing and shall remain undisturbed until the epoxy has cured a minimum time as specified by the manufacturer. Dowels that are improperly bonded, as determined by the Engineer, will be rejected. Adjacent new holes shall be drilled, and new dowels shall be placed and securely bonded to the concrete. All work necessary to correct improperly bonded dowels shall be performed at the Contractor's expense.

303-5 CONCRETE CURBS, WALKS, GUTTERS, CROSS GUTTERS, ALLEY INTERSECTIONS, ACCESS RAMPS AND DRIVEWAYS.

303-5.9 Measurement and Payment. Replace the entire subsection with the following:

Payment for constructing longitudinal cross gutter shall be included in the lump sum Bid Price "DRAINAGE", including unclassified excavation, crushed miscellaneous base and form work.

Payment for construction of curb and gutter shall be included the lump sum Bid Price "RESTORATION OF EXISTING IMPROVEMENTS", including unclassified excavation, crushed miscellaneous base and form work.

SECTION 306 - OPEN TRENCH CONDUIT CONSTRUCTION

306-3 TRENCH EXCAVATION.

306-3.2 Removal of Surface Improvements. Add the following:

Sewer lines and water lines shall be jacked or tunneled under all concrete curbs, gutters, cross gutters, driveways and sidewalks, or upon approval of the Engineer, such surface improvements may be removed and replaced in accordance with the appropriate Standard Plans and 7-9 unless otherwise specified.

306-3.3 Removal and Abandonment of Existing Conduits and Structures. Add the following after the last paragraph:

All salvageable storm drain manhole frames and covers and other metal appurtenances shall be delivered by the Contractor at its own expense to the following Flood Maintenance Division yard:

5520 W. 83rd St., Los Angeles, California 90045,
(323) 776-7610

306-3.5 Maximum Length of Open Trench. Replace the entire subsection with the following:

Open trench, as referred to herein, shall be defined as all trench excavations which have not been completely backfilled (including attaining required relative compaction) as required elsewhere in these Specifications and in which neither temporary nor permanent resurfacing has been placed.

For purposes of this subsection, pavement breaking in advance of trench excavation is considered a part of the trench excavation and, as such, is a part of the open trench.

a) Case 1, Prefabricated Pipe: The maximum length of open trench along any one heading shall not exceed the following:

Depth of Cover in Feet	Maximum Allowable Trench Length in Multiples of Length of Pipe Actually Placed in a Single Day
0 to 5	7
Over 5 to 10	8
Over 10 to 15	9
Over 15	10

In the event additional curing time is necessary for poured-in-place concrete structures, such structures will not be considered in the calculation of the maximum allowable open trench length but shall be backfilled and the trench restored using either temporary or permanent resurfacing as soon as the required concrete compressive strengths have been attained.

b) Case 2, Reinforced Concrete Box: The maximum length of open trench along any one heading shall not exceed the following:

Depth of Cover in Feet	Maximum Allowable Trench Length in Multiples of Length of RCB Actually Poured in a Single Day
0 to 5	15
Over 5 to 10	16
Over 10 to 15	17
Over 15	18

In the event the Contractor elects to delete the temporary resurfacing and place permanent resurfacing immediately, 2 additional multiples may be added to the above table if so approved by the Engineer. However, the actual length of open trench may be limited by the Engineer due to adverse Project site conditions.

The length completed in a single day as used in both cases above shall be defined as the daily average length completed during the 5 immediately preceding working days exclusive of placement of resurfacing (temporary or permanent) and restoration of other existing improvements. Where more than one line is shown on the Plans, an operation which moves progressively from one line to another shall be considered a single heading. The depth of cover, as referred to in this subsection, shall be the average distance from the top of the completed structure to the ground surface computed from measurements at equal intervals along the conduit constructed during the 5 immediately preceding working days.

Additional length of open trench may be permitted by the Engineer, should it be in the best interests of the Agency.

Failure by the Contractor to comply with the parameters specified herein, or as may be specifically authorized by the Engineer, may result in a written order from the Engineer to halt progress of the Work until the Contractor complies with this subsection.

306-4 SHORING AND BRACING. Add the following before the first paragraph:

306-4.1 General.

Replace the first paragraph with the following:

For the purpose of shoring or bracing, a trench is defined as an excavation in which the depth is greater than the width. Shoring and bracing are required when the depth is greater than 5 feet. In cases where there are unstable soil conditions, shoring or bracing may be required for depths less than 5 feet.

Add the following after the last paragraph:

Open trenches shall be protected by protective and security fencing or plates in accordance with LACDPW Standard Plan 6008. If an exception as specified on LACDPW Standard Plan 6008, Sheet 2 exists, barricades conforming to LACDPW Standard Plan 6009 shall be placed in accordance with the California MUTCD. The maximum spacing of barricades shall not exceed 25 feet. Such open trench areas shall not be opened for vehicular use by the public until temporary or permanent resurfacing has been placed to provide a smooth surface for vehicular travel. Areas that are opened for use of the public shall be maintained by the Contractor to provide a smooth surface until the permanent resurfacing is placed.

306-4.2 Additional Requirements. The Contractor shall be fully responsible for securing the design, and for furnishing and installing adequate shoring, fencing, and covers to protect all excavations from slides and cave-ins, and the public from hazardous conditions. The excavations and shoring therefor shall be such as to protect all existing improvements and utilities from any damage and to be fully compatible with all requirements for traffic and access and the safe performance of the Work.

Except as otherwise specified herein, excavations 5 feet or more in depth shall be shored such that the sides will be supported in accordance with the requirements set forth in LACDPW Standard Plan 3090. Where the use of shields is proposed in lieu of shoring, their use shall conform to LACDPW Standard Plan 3090 and shall be subject to the restrictions shown thereon. When a utility is in Zone A, the restrictions on the use of shields may be waived if:

a) the Contractor submits written approval from the owner of the utility for its proposed construction method, and

b) the Contractor complies with any support or protection method the utility owner requires and submits such requirements to the Engineer for enforcement.

Materials excavated from the trench shall be placed away from the edge of the trench so as not to overstress the shoring or bracing in accordance with LACDPW Standard Plan 6008.

The design shall be based on "Kw" values and soil parameters not less than those specified plus a uniform surcharge of at least 72 psf from the walls of the trench. If these items are not included, they shall be determined by the designer of the shoring system. Structural steel design shall be in accordance with the current edition of the AISC Manual of Steel Construction. Timber design shall be in accordance with the National Specification for Stress-Grade Lumber and Its Fastenings.

Allowable stresses specified in the listed publications may be increased by 1/3. The maximum allowable timber flexural stress shall not exceed 2,000 psi. This includes the 1/3 increase.

The "Kw" values and soil types for use in the design of shoring of excavations are as follows:

Line	Station Limits	Kw (pcf)	Soil Types
Ladera Park – 15 feet excavation	-	30	CL, SM, SP-SM
Ladera Park – 20 feet excavation	-	32	CL, SM, SP-SM

The recommended Kw values are predicated on the water table being below the bottom of the excavation shoring. For a water table above the bottom of the excavation shoring, contact the Contractor for a revised Kw value.

Excavations 5 feet or more in depth for catch basins and connector pipes may be shored with a support system designed in accordance with the criteria set forth on LACDPW Standard Plan 3090 or with a system that meets the requirements in Paragraph 1541 of the Construction Safety Orders of the State of California, Department of Industrial Relations, except that where aluminum rails or wailers are used for hydraulic shoring, they shall be heavy duty. Use of shields shall be as specified above. If the support system is designed in accordance with LACDPW Standard Plan 3090, the plans shall be prepared by a Civil or Structural Engineer, registered as such in the State of California. The design shall be based on "Kw" values not less than those specified above.

The criteria set forth on LACDPW Standard Plan 3090 are the minimum for the conditions shown thereon. In addition to shoring the excavations as specified above, it shall be the Contractor's responsibility to provide all additional shoring required to support loads which may exceed those derived by using the criteria set forth. It shall also be the Contractor's responsibility to provide adequate shoring for the protection of existing improvements in the vicinity of any excavation. The design and details of the shoring system, as submitted, shall reflect the additional shoring necessary to provide for these loads and the required protection. The Contractor shall be solely responsible for any damages which may result from its failure to provide adequate shoring to support the excavations under any or all of the conditions of loading which may exist or which may arise during the construction of the Project.

The provisions of this subsection shall not apply to the support of excavations required for tunneling, boring, jacking or other similar underground excavations. However, shoring for jacking pits or similar open excavations used in connection with such work shall be governed by these Specifications. Support of excavations for boring, jacking or other similar underground excavations shall be in accordance with the Tunnel Safety Orders of the State of California, Department of Industrial Relations.

Prior to the beginning of work, the Contractor shall designate in writing to the Engineer someone whose responsibility it is to supervise the installation and removal of sheeting, shoring and bracing.

306-4.3 Submittals. The Contractor shall prepare and submit in accordance with 2-5.3 Working Drawings and supporting information for its proposed shoring system showing the reaches, design criteria, calculations, sketches, sequence of placement and removal, and other data required in order to shore the excavation for the appropriate cases of shoring expected to be used on the Project. Where shields are to be used, the Working Drawings shall include a typical cross section of the proposed conduit showing adjacent utilities. If a previously approved shield is to be used, submittal of calculations for the shield are not required if the current calculated load does not exceed the load for which the shield was previously approved. If it is requested that the limitation on the use of shields in the vicinity of existing utilities be waived, the submittal shall also include the written statements from the affected utility owners and Working Drawings and calculations of the required utility support. The submitted Working Drawings shall be of the same format as that shown on LACDPW Standard Plan 3091. The Working Drawings shall indicate the methods of sheeting, shoring and bracing which will be used, applicable reaches, and the installation and removal sequence. The Working Drawings shall also show the positioning of said sheeting, shoring and bracing with respect to the planned location of the proposed structures. Existing improvements which may be affected by the proposed excavation shall also be shown. It is the Contractor's responsibility to submit to the Agency all test data and calculations required to substantiate the load supporting ability of special components of shoring systems such as screw jacks, speed shores, etc.

Partial submittals will be rejected. Submittals shall include the following:

a) Shoring plans which show on each sheet the Project title, sheet number, total number of sheets, and wet stamp and signature of the California Registered Civil or Structural Engineer responsible for the design.

b) Limits of application for the shoring design, with beginning station and end station.

c) Working Drawings (plans, sections, elevations, and details), material specifications, notes, construction and removal procedures, etc. necessary for the construction and inspection of the shoring system.

d) Supporting calculations prepared by the responsible Registered Civil or Structural Engineer, who will wet stamp and sign the first sheet of these calculations. The calculations shall show and justify the design loads on the shoring. The calculations shall also show the capacity of the shoring system is adequate to withstand the imposed loads.

e) Shoring design criteria. A sample of some of the information required is shown on LACDPW Standard Plan 3091.

f) Notes as shown on LACDPW Standard Plan 3091.

g) A statement confirming the Contractor has reviewed the proposed shoring Working Drawings and found them compatible with the site conditions and proposed construction methods.

h) If shields are proposed, the shoring Working Drawings shall show the limits of Zone A and Zone B offset from the toe of excavation as delineated on LACDPW Standard Plan 3090 Case 4. The shoring designer shall verify the field condition and state on the Working Drawings that the design conforms to the requirements shown in Section D "SHIELDS" on Sheet 4 of LACDPW Standard Plan 3090.

The submittal package shall also include:

i) Manufacturer's specifications and other data necessary for the review of the proposed shoring as applicable.

j) Traffic Control Plan, *if not included with the Plans,* if it affects the live load surcharge or the aforementioned Zone A requirements on the shoring system.

306-4.4 Agency Review. A detailed review of the submitted Working Drawings and supporting information will be performed by the Agency. The review will be for the purpose of determining that the following items have been considered and are in accordance with the specified criteria.

a) Soil Loads.
b) Surcharge Loads, including effect of existing improvements.
c) Method of Analysis.
d) Allowable Stresses, including soil stresses where applicable.
e) Protection of Existing Improvements.
f) Feasibility of Construction.
g) Delineation of Criteria.
h) Calculations.
i) Statement of Applicable Reaches.
j) Original wet stamp and signature of the California Registered Civil or Structural Engineer responsible for the shoring design.

If the submittal is in conformance with the shoring criteria and the Specifications, the Agency will sign the submitted Working Drawings.

Acceptance of the Contractor's submitted Working Drawings shall not be construed to invalidate other provisions of these Specifications which may be affected by the accepted method of shoring such as, but not limited to, the requirements concerning street closures, detours, barricades and utilities.

Acceptance of shoring for excavations with either vertical or sloping banks shall not be construed to have altered any pay lines shown on the Plans.

306-4.5 Construction. As construction progresses, should a type of soil be encountered which requires a different method of shoring or shoring of greater strength than previously accepted by the Agency, or should a situation or condition arise which in the opinion of the Engineer and/or California Division of Occupational Safety and Health requires additional shoring, then the Contractor shall submit for acceptance revised shoring details, and work in the affected excavations shall be discontinued until the revised shoring details have been accepted by the Agency. The preparation and furnishing of such revised details shall be done as specified above for the Contractor's proposed method of sheeting, shoring and bracing for the Project excavations. All of the above-specified provisions concerning submittal by the Contractor, commencement of work on sheeting, shoring and bracing by the Contractor, and action to be taken by the Engineer and the Contractor shall apply in the event a different type or additional sheeting, shoring and bracing is required beyond that originally contemplated by the Contractor.

The Contractor's attention is directed to the trench width, "W", distances shown on LACDPW Standard Plan 3080. The design of the conduit and the shoring is based on this maximum width. If the trench width exceeds the maximum design width, the pipe bedding, pipe D-Load and the shoring shall be redesigned.

If excavations are supported employing used materials, such materials shall be free from defects which may impair their protective function. Used materials which are damaged, fatigued, or are otherwise defective to the extent that they will not safely perform their intended function, shall not be used in supporting excavations. It shall be solely the Contractor's responsibility to furnish sheeting, shoring, and bracing of such grades and stresses as specified on the accepted Working Drawings.

306-4.6 Vertical Shores for Supporting Trench Excavations. H-beams, piles or other similar supports for trench excavations shall be placed in holes drilled to the bottom of the excavation and then driven the remainder of the required depth. Sonic pile drivers may not be used. Drilled holes shall be filled with jetted sand having a minimum sand equivalent of 30.

In lieu of the above method, vertical supports may be placed in holes drilled to the full depth required and backfilled to subgrade. Backfill shall be trench backfill slurry conforming to 201-1.1.2. However, where the in-situ material is granular and free-draining, the backfill may be sand conforming to 200-1.5. Trench backfill slurry shall be placed 72 hours prior to excavating and sand shall be flooded 24 hours prior to excavating. Calculations for embedment depth shall be based on beam width, not hole diameter.

When driving the vertical supports, as well as when drilling the holes, the Contractor shall take care to avoid damage to any and all existing improvements and utilities.

The Engineer may, upon request of the Contractor, approve in writing the use of means other than drilling for the purpose of placing the vertical supports at locations where the drilling of such holes is impractical because of the existence of running sand, rocks or other similar conditions, and provided impracticability is demonstrated to the satisfaction of the Engineer

by actual drilling operations by the Contractor. Such other means, however, must be of a nature which will accomplish, as nearly as possible, the purpose of drilling, namely, the prevention of damage to existing surface or subsurface improvements, both public and private.

The above specifications shall not apply to driven sheet piling where such piling is necessary, because of the type of material being excavated, to adequately and safely support the excavation.

Immediately after the drilling for, or extraction of, a pile, the Contractor shall place a steel cover over the hole which shall be left in place until the pile is inserted or the hole is filled, as applicable. The cover shall be heavy enough to withstand traffic, be anchored to prevent lateral movement and have a minimum weight of 75 pounds. Drilling or pile extraction will not be permitted until covers are on the Project site and available for immediate use.

The minimum required depth of penetration for vertical shores below the bottom of the excavation shall be determined using soil resistance based on the following equations, the resultant of which shall be applied at a distance "X" below the bottom of the excavation.

Case No.	Equation	X	D_{min}
1	$F_p = E (D-D_1)^2$	2D/3	D_1+ 2'
2	$F_p = A (D)^2$	2D/3	2'
3	$F_p = A (D)^2 + B (D)$	(D/2) + {D(0.167)/[1 + (B/AD)]}	2'
4	$F_p = A (D-D_1)^2$	2D/3	D_1+ 2'

Where F_p = Resultant force in pounds per foot of width of vertical shore.
$D_{min.}$ = Minimum depth of penetration in feet below the bottom of the excavation.
D_1 = Distance in feet between bottom of excavation and point of zero pressure.
X = Distance in feet between bottom of excavation and line of action of F_p.
A, B & E = Soil parameters for continuous abutting vertical shores. (Values may be doubled for single or spaced vertical shores.) Unitless.

The parameters for determining the minimum penetration for vertical shores are as follows:

Line	Station Limits	Case No.	Soil Parameters			Distance D_1 ft
			A (pcf)	B (psf)	E (pcf)	
Ladera Park – 15	-	3	89	359	-	-
Ladera Park – 20		3	89	187	-	-

The recommended shoring parameters are predicated on the water table being below the bottom of the excavation shoring. For a water table above the bottom of the excavation shoring, contact the Contractor for a revised Kw value.

The soils encountered in the borings may be classified as Type C as defined in the California Code of Regulation Title 8, Division 1, Chapter 4, Subchapter 4, Article 6, Appendix A.

Applicable Case Nos., D_1 and soil parameters are provided in the Special Provisions and are to be used in conjunction with LACDPW Standard Plan 3090. It should be noted that this type of system is subject to the restriction that the distance from the bottom of the excavation to the lowest strut shall not exceed 15 feet. It should be further noted that this information is not applicable to the design of cantilevered shoring or sheet piling.

306-5 DEWATERING. Add the following to the end of the first paragraph:

Dewatering shall be performed to a level sufficiently below the structure subgrade to ensure a firm and stable subgrade for the construction of the structure.

306-6 BEDDING.

306-6.1 General. Replace the entire subsection with the following:

Pipe bedding for storm drain construction shall conform to LACDPW Standard Plan 3080-3.

The subgrade upon which the pipe is to be constructed shall be true to grade. Bedding material shall be so loosely placed and shaped as to provide uniform bearing for the bottom of the pipe for a width equal to at least D/3 times the outside diameter and for the entire length of the pipe.

Bedding material for any section of pipe conduit shall first be placed such that, after densification, the top of the bedding material will be approximately at the elevation of the spring line of the pipe. A second lift of bedding shall then be placed such that, after densification, the top of the bedding material will be 1 foot over the top of the pipe. However, bedding for all pipe 51 inches or less in diameter may be placed in one lift such that, after densification, the top of the bedding material will be 1 foot over the top of the pipe.

306-7 PREFABRICATED GRAVITY PIPE.

306-7.3 Reinforced Concrete Pipe (RCP).

306-7.3.2 Joints.

306-7.3.2.1 Tongue and Groove Self-Centering Joints. Replace the fourth paragraph with the following:

When RCP is under 30 inches in diameter, the outer joint space shall be filled with mortar.

Replace the first sentence of the fifth paragraph with the following:

When RCP is 30 inches or greater in diameter, the interior annular space of each joint shall be filled with mortar.

306-7.9 Temporary Bulkheads for Storm Drains. If for its convenience or protection, the Contractor elects to use temporary bulkheads that are not detailed on the Plans, the Contractor shall submit for approval detailed calculations and Working Drawings of the bulkheads in accordance with 2-5.3, whenever the span exceeds 4 feet (1.2 m) or the depth of cover above the bottom of the bulkhead exceeds 20 feet (6.2 m).

Bulkheads for which a submittal is not required shall have the following minimum structural sections, or the Contractor at its option may submit lesser sections for approval in the manner specified hereinabove.

Material	Grade	Section
Timber	D.F. No. 2	3" thick
Concrete	f_c' = 2500 psi	6" thick w/#4 @ 10" parallel to span and #4 @ 18" perpendicular
Brick	2500 psi solid units	12" thick w/#4 @ 9" parallel to span 1/2" from inside course and #4 @ 18" perpendicular to span
Steel Plate	A36 Steel	1/2" thick

All costs involved in temporary bulkhead work for the Contractor's convenience or protection shall be considered as included in the prices in the Bid for the various items of work unless otherwise specified.

306-11 NOT USED. Replace the entire subsection with the following:

306-11 DRYWELL CONSTRUCTION.

306-11.1 General

Drywell construction shall consist of drilling the borehole, installing temporary steel casing, installing perforated and solid wall reinforced concrete casing, gravel packing the annular space, sealing the well with cement mortar and installing the inspection manhole or concrete cover. Drywells with manhole shafts shall have a stainless steel security barrier under the manhole cover with a locking mechanism and odor controlling seal. The drywell shall be constructed as shown on the Plans.

High voltage overhead utility lines are in near proximity of the Project. All equipment is required to maintain a minimum clearance of 17 feet from the conductor per CalOSHA Title 8 requirements.

A representative from the Agency's Geotechnical and Materials Engineering Division must be present to observe and approve drywell drilling and installation. Contact (626) 458-1731 at least 2 weeks prior to construction.

306-11.1.1 Submittals. The contractor shall submit the following in accordance with 2-5.3:

- Drilling methods, equipment for placing temporary steel casing, reinforced

concrete casing, gravel pack, and cement mortar.

- Methods and equipment for verifying bottom of drilled hole is clean before placing leveling pad aggregate
- Methods, equipment, and sequence for placing, positioning, and supporting concrete casing.
- Working Drawings for temporary steel casings.
- Methods, equipment, and sequence for:
    - Placing gravel pack and concrete slurry in annular space
    - Determining depth of gravel pack and concrete slurry in annular space
    - Verifying volume of gravel pack and concrete slurry in annular space
    - Installations and removal of temporary steel casing
- Concrete aggregate samples
- Shop drawings of 52" reinforced concrete casings, 60" precast reinforced concrete covers, security barrier, manhole frame and cover.

306-11.2 Drilling.

306-11.2.1 General.

Drilling the drywell hole shall be accomplished using temporary steel casings or other drilling methods approved by the Engineer. Slurry wet methods and polymer drilling fluids are not allowed.

At the Contractor's option, the drywell hole may be drilled without a temporary steel casing. If caving soils are encountered, as determined by the Engineer, the Contractor shall cease drilling operations until the temporary steel casing is installed to the depth drilled before continuing.

306-11.2.2 Plumbness and Alignment.

All holes shall be drilled round, plumb and true to line as defined herein. The horizontal deflection from the plumb line shall be measured in two planes, 90^{o} from each other. The horizontal drift of the casing or hole shall not exceed 1 inch throughout the depth of the hole. Plumbness and alignment shall be measured at least every 10 feet of holes drilled.

306-11.2.3 Cleanup and Disposal of Materials.

The Contractor shall keep Slauson Ave and Ladera Park Avenue clean at all times. Drill cuttings shall be confined near the holes and placed in soil storage bins as drilling progresses. The Contractor shall effectively implement and maintain appropriate Construction Site BMPs, as provided in 7-8.6.2.

The Contractor shall be responsible for all costs incurred in the disposal of well drill cuttings as prescribed by the Agency. All of this material shall be disposed at locations which have been legally approved for this disposal. The Contractor shall provide soil storage bins in the vicinity of each well site in numbers sufficient to contain all soil generated by the drilling operations. The well drill cuttings shall be disposed offsite within 24 hours after the completion of the drilling of each well.

306-11.3 Drywell Casing.

306-11.3.1 General.

Installation of the drywell casing shall include furnishing and placing solid and perforated reinforced concrete casings; maintaining alignment of the casings; and furnishing all labor, equipment, and materials necessary to place the casings complete in place, in accordance with the Plans and Special Provisions.

306-11.3.2 Reinforced Concrete Drywell Casing

Drywell casings for the wells shall be 52-inch inside diameter, 60-inch outside diameter, reinforced concrete, solid wall and perforated, with tapered openings as shown on the Plans. RCP casings shall have interlocking joints and shall be stacked vertically to the depths shown on the Plans.

The drywell casings shall be designed to withstand all loads acting on them, including the equivalent fluid pressure of 37 pcf that is proportionally increasing to depth acting on the outside face of the drywell casings.

The Contractor shall exercise care to avoid damage to the pipe and pipe ends. Any pipe which is damaged and cannot be repaired to the satisfaction of the Engineer shall be replaced by the Contractor at no additional cost to the Agency.

All foreign matter shall be removed from the outside and inside surfaces of pipe before lowering pipe into well.

306-11.3.3 Plumbness and Alignment.

Drywell casings shall be constructed plumb and true to line as defined herein. The horizontal deflection from the plumb line shall be measured in two planes, 90^{o} from each other. The horizontal drift of the casing shall not exceed 1 inch throughout the depth of the hole. Tests for plumbness and alignment shall be made before the placement of the gravel pack and must be approved by the Engineer.

306-11.3.4 Shop Drawings

The Contractor shall submit the Shop Drawings in accordance with 2-5.3, showing details of the 52-inch drywell casings including the steel reinforcement and perforation patterns. Shop drawings shall be stamped and signed by a California registered engineer.

306-11.4 Gravel Packing.

306-11.4.1 General.

Gravel packing shall consist of the furnishing and placing of select gravel as packing in the annular space between the drywell casings and borehole.

The work shall include obtaining, hauling, and delivery of gravel; and all labor, material, and equipment necessary to place the gravel pack, sound the gravel pack levels, and to otherwise place the gravel pack in the wells to the satisfaction of the Engineer.

306-11.4.2 Materials.

Gravel pack shall be concrete aggregate No.2 per Table 200-1.4 (B).

The concrete aggregate shall be clean and thoroughly washed before delivery and shall be composed of sound, durable, well-rounded material with no organic or other deleterious material contained herein.

The concrete aggregate shall form a continuous unbroken column placed within the limits shown in the Plans.

The Contractor shall submit concrete aggregate samples per 2-5.3.

Samples of the concrete aggregate must be submitted to and approved by the Agency before placing in the wells.

Concrete aggregate delivered to the Project site shall not be dumped on the ground but shall be stored in suitable containers such as sacks, supersacks or equivalent, until installed in the well and shall conform to the following:

Material	Frequency of Sampling by GMED Materials Lab	Test Description	Test Methods ASTM, Caltrans, AASHTO	Remarks
SSPWC 200-1.4 Concrete Aggregate No. 2	One (1) 100-pound bag for every 300cy	Standard Practice for Sampling of Aggregate	ASTM D75, D3665 and C702 CTM 125 AASHTO T2, T248	Plant inspection; sample aggregate from stockpile, feed belt, or hopper

306-11.4.3 Placing Gravel Pack.

The gravel pack shall not be placed by dropping the materials from the top of the well hole. The gravel pack shall be placed by means of a tremie pipe starting from the bottom. The tremie shall be pulled upwards as the gravel is placed in the annular space. The depth of the top of the gravel pack shall be carefully checked and the volume of emplaced gravel shall be verified to determine that the gravel pack materials have not bridged during installation.

306-11.5 Grouting Wells.

306-11.5.1 General.

The work shall consist of grouting the annular space between the solid wall concrete drywell casing and borehole.

306-11.5.2 Materials.

The grout shall be Class "C" cement mortar conforming to the requirements of 201-5. The cement shall conform to 201-1.2.1, Portland cement, Type II. The grout shall contain 3% bentonite which shall be mixed with the cement before the water is added to the grout mix.

The grout shall contain the minimum amount of water (not over 8-1/2 gallons per sack of cement) required to give a mixture of such consistency that it can be placed in the well through a tremie pipe.

306-11.5.3 Placing Grout.

The grout shall be placed by means of a tremie pipe. The grout shall fill the entire annular space through the designated limits.

The Contractor shall calculate the volume of the annular space between the well casing and borehole. The calculated volume will be reviewed by the Engineer prior to placement. The Contractor shall keep a record of the volume of grout used.

The Contractor shall exercise extreme care to avoid having the grout enter the perforations of the casings.

306-11.6 Manhole Security Barrier.

306-11.6.1 General

Drywells with manhole shafts shall have a manhole security barrier to prevent unauthorized access into the drywells and prevent any potential odors.

306-11.6.2 Materials.

The barrier shall stainless steel and conforming to the requirements of 206-7.

306-11.6.3 Shop Drawings

The Contractor shall submit the Shop Drawings in accordance with 2-5.3, showing details of the round stainless steel security barrier, including all hardware, for approval.

306-11.8 Payment

The work involved in the construction of the drywells shall include drilling holes, solid and perforated concrete casings, temporary steel trench plates, reinforced concrete drywell covers, reinforced concrete pit covers, PVC down drains, concrete aggregate packing, cement mortar seal annual space; manhole shafts; manhole frame and cover; steel steps; manhole stainless steel security barrier, wire mesh netting; tremie pipes; installation and removal of temporary steel casings; submittals; disposal of excess excavated materials including furnishing soil storage bins; and all other work to construct the drywells complete in place as shown on the Plans.

Payment for drywells shall be made at the lump sum Bid price for "DRYWELLS."

306-12 BACKFILL.

306-12.1 General. Add the following after the first paragraph:

Whenever fill or backfill is specified to be placed and no method of placement is indicated, it shall mean that the material may be placed either by mechanical compaction methods in accordance with 306-12.3;

Add the following after the second paragraph:

For reinforced concrete box or other cast-in-place structures within street right-of-way where the cover is 3 feet or less, the backfill 1 foot immediately above the structure shall be bedding material conforming to the requirements shown in Table 306-6.1, except that the sand equivalent value shall not be less than 30. However, at the Contractor's option, crushed miscellaneous base conforming to 200-2.4 may be placed from the top of the box or structure to pavement subgrade.

Add the following after Table 306-12.1:

The Contractor may, at its option and at its own expense, furnish all equipment, material, supplies and labor for making field tests of the compressive strength of concrete, and such tests may be used as a basis for determining the time at which backfill operations may be started as described below. Backfill shall not be commenced until approval therefor has been given by the Engineer. The use of tests by the Contractor for determining compressive concrete strengths is permissive only and is subject to the Contractor assuming all risks that may be involved in backfill operations based on the Contractor's tests. Concrete test cylinders shall be prepared and tested in accordance with the applicable provisions of 303-1.5. This includes removal from the molds at the time of form stripping and storing at the location where the capping equipment and compression testing machine are kept. Test cylinders shall receive, insofar as practicable, the same exposure and/or protection from the elements as the portions of the structure which they represent, until the time of testing. For placement of backfill against the sides and top of concrete structures, the required strengths for structures designed for 3000 psi concrete shall be a minimum of 3000 psi. For structures designed for 4000 psi concrete, the average of any three consecutive tests shall be equal to, or greater than, 4000 psi and not more than 10 percent of the tests shall be less than 4000 psi. No test shall be less than 85 percent of 4000 psi.

> Note: A test shall consist of the average strength of 3 concrete cylinder specimens tested at the same age. If less than 3 tests are available, the individual tests shall be equal to, or greater than, 4000 psi.

When high early strength concrete is specified, the Contractor shall make concrete test cylinders as described above to determine the time at which backfill operations may be started.

306-12.3 Mechanically Compacted Trench Backfill.

306-12.3.1 General. Add the following after the first paragraph:

During the placement of backfill by mechanical compaction methods around utilities, the use of other than hand-held vibratory plates or tamping equipment within 1 foot of any utility.

Mechanical compaction methods of placement below 1 foot over the top of pipe conduits shall be limited to the use of hand-held vibratory plates or tamping equipment. The use of impact or roller type compaction equipment will not be allowed for placement of the backfill below 1 foot over the top of the pipe.

Mechanical compaction methods of placement shall not include a sheepsfoot wheel mounted on a backhoe within the top 3 feet of the pipe or one-half of the internal diameter of the pipe, whichever is greater.

Add the following:

Unless otherwise directed by the Engineer, at the beginning of mechanically compacted backfill operations, test sections shall be constructed as follows:

The test section may be any length sufficient, in the opinion of the Engineer, to conclusively demonstrate that the type of compaction equipment, lift thickness and moisture content used will result in the specified relative compactions being met or exceeded. A sufficient number of lifts shall be placed in the test section to conclusively demonstrate that adequate placement is being attained. The Agency will perform the necessary testing, and if the results are in conformance with the Specifications and satisfactory to the Engineer, the type of compaction equipment, lift thickness, moisture content and compaction effort used in the test section shall be used thereafter in the placing and compacting of backfill. However, when backfill material different from that previously tested is used, or when tests indicate that placement is not in conformance with the Specifications, a new test section shall be constructed and the type of compaction equipment, lift thickness, moisture content and compaction effort shall be adjusted or changed as necessary to attain the specified relative compaction. Approval of equipment, thickness of layers, moisture content and compaction effort shall not be deemed to relieve the Contractor of the responsibility for attaining the specified relative compaction. The Contractor, in planning its work, shall allow sufficient time to perform the work connected with the test sections, and for the Agency to perform the necessary testing for determining compliance.

Each lift shall be evenly spread, moistened and worked by disc harrowing or other means approved by the Engineer, and then mechanically compacted until the specified relative compaction has been attained.

306-12.3.2 Compaction Requirements. Replace the entire subsection with the following:

Mechanically compacted trench backfill shall be densified to the following minimum relative compaction:

a) 90 percent relative compaction.

b) 95 percent relative compaction where required by 301-1.3.

The Contractor shall perform compaction tests on mechanically compacted trench backfill as part of its Quality Control Program. The Contractor shall perform a minimum of 1 compaction test per lift for each 300 feet of mechanically compacted trench backfill placed unless otherwise directed by the Engineer.

The Contractor will determine the maximum dry density to be used in determining relative compaction. The Contractor shall furnish representative backfill material samples for the Contractor's use. The Contractor will determine the maximum dry densities prior to the start of the Work and during the progress of the Work as deemed necessary by the Engineer.

306-13 TRENCH RESURFACING.

306-13.1 Temporary Resurfacing. Add the following:

Temporary resurfacing or permanent pavement shall be in place before the traveled way is opened for vehicular traffic.

Temporary resurfacing shall be placed as soon as the backfill is densified or immediately when so directed by the Engineer. If further densification of backfill is necessary due to settlement, failure to achieve the specified compaction, or any other reason, the temporary resurfacing shall be removed and replaced at the Contractor's expense.

Prior to placing the temporary resurfacing, the street and surrounding area shall be cleared of rubbish and debris, the street swept, and the surrounding area cleaned thoroughly.

The finished surface of said temporary resurfacing shall be placed flush with the adjoining pavement grade.

Immediately after placement of temporary resurfacing, the surface and surrounding area shall be swept clean of all dust and debris utilizing a self-loading motorized sweeper with spray nozzles (pick-up broom).

The Contractor shall stockpile enough temporary resurfacing material on the Project site to insure a ready supply at all times for necessary repairs to the temporary resurfacing already placed.

Temporary resurfacing shall not be left in place longer than 30 Days unless otherwise permitted by the Engineer. Permanent resurfacing shall be placed immediately following the removal of the temporary resurfacing.

Delete the last two paragraphs.

306-15 PAYMENT

306-15.1 General.

Replace the entire subsection with the following:

Payment for pipe and conduit shall be included in the lump sum Bid price for “DRAINAGE.” The lump sum price shall include payment for:

a) trench excavation; unclassified excavation; structure excavation (See Attachment A)
b) the control of surface waters;
c) subgrade preparation;
d) removal of interfering portions of existing conduits and improvements;
e) the sealing or removal of abandoned conduit and structures;
f) imported bedding;
g) furnishing and installing prefabricated or precast conduit; pvc conduit
h) construction of cast-in-place diversion box and splitter structure; including furnishing and placing required steel reinforcement;
i) joining and connecting to existing pipe or conduit;
j) concrete pipe support for 18” reinforced concrete pipe
k) manhole security barriers
l) drying, blending, transporting, and importing backfill;
m) catch basin, automatic retractable screens, connector pipe screens, junction and transition structures, manholes, including 72” manholes complete in place; trash rack;
n) support for utilities, blanket protection for utilities
o) backfilling the trench, including slurry backfill and compaction; structure backfill (See Attachment A)
p) temporary and permanent resurfacing; and
q) all other work necessary to install or construct the pipe or conduit, complete in place;
r) non-reinforced and reinforced concrete removal
s) drill and bond (epoxy cartridge)

306-15.2 Shoring and Bracing.

Replace the entire subsection with the following:

Payment for shoring of open excavations will be made at the lump sum Bid price for "SHORING OF OPEN EXCAVATIONS."

ATTACHMENT 1

CONSTRUCTION AND DEMOLITION DEBRIS RECYCLING SUMMARY

Project Information

Check one: ☐ Roadway ☐ Flood Control ☐ Water/Sewer

☐ Traffic Signal/Street Lighting ☐ Bridge/Structure ☐ Other _____

Project Name: _____

Project ID No.: _____

Project Address/Location: _____

Thomas Guide Page/Grid No(s).: _____

Resident Engineer/Inspector: _____ Office Engineer: _____

Contractor Information

Company Name: _____

Company Address: _____

Report Prepared by _____ Phone Number: _____

Project Duration: From: _____ **To:** _____

Construction Demolition and Debris Recycling Requirements Cost: $ _____

Type(s) of Debris Generated	Estimated Quantity Generated (tons, c.y. or units)	Reuse/Recycling		Disposal	
		Estimated Quantity (tons, c.y. or units)	Name of Reuse/Recycling Facility/Site	Estimated Quantity (tons, c.y. or units)	Name of Disposal Facility
Asphalt					
Brick					
Concrete					
Green Waste					
Metal (ferrous)					
Metal (non-ferrous)					
Mixed Debris					
Rock					
Soil					
Wood Waste					
Other:					
Other:					
Total					

Notes:

- Other debris types may include, but are not limited to, Ash, Cardboard, Carpeting, Glass, Gravel, Land Clearing Debris, Non-friable Asbestos, Paper, Plastic, Porcelain, Roofing Material, Sand, and Tires. Attach additional sheets if necessary.
- If the debris is taken to a transfer station solely for the purpose of reuse/recycling, then list the transfer station as the reuse/recycling facility/site.
- If the debris is taken to a transfer station solely for the purpose of transfer to a disposal facility, then list the transfer station as the disposal facility.

- **Please email this completed form to:** cnd@dpw.lacounty.gov
- **To: C&D Unit, LACDPW From:** _____

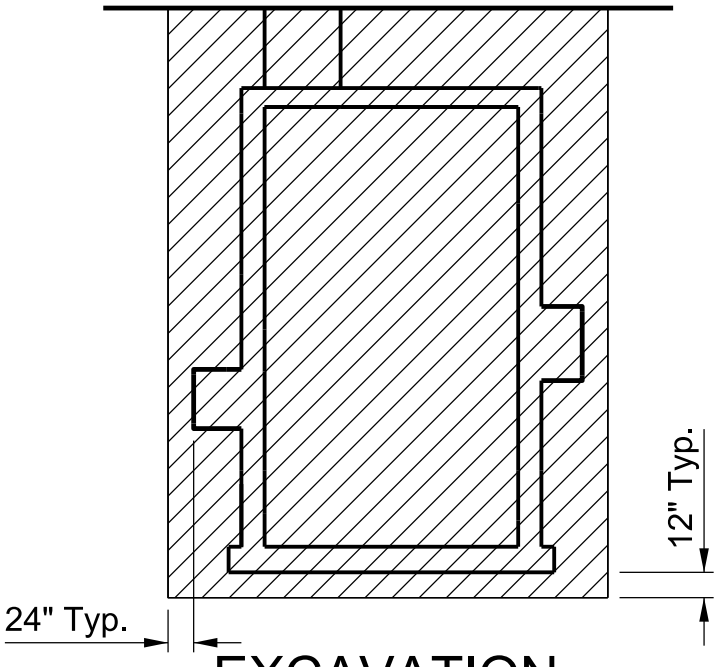
ATTACHMENT A

LEGEND

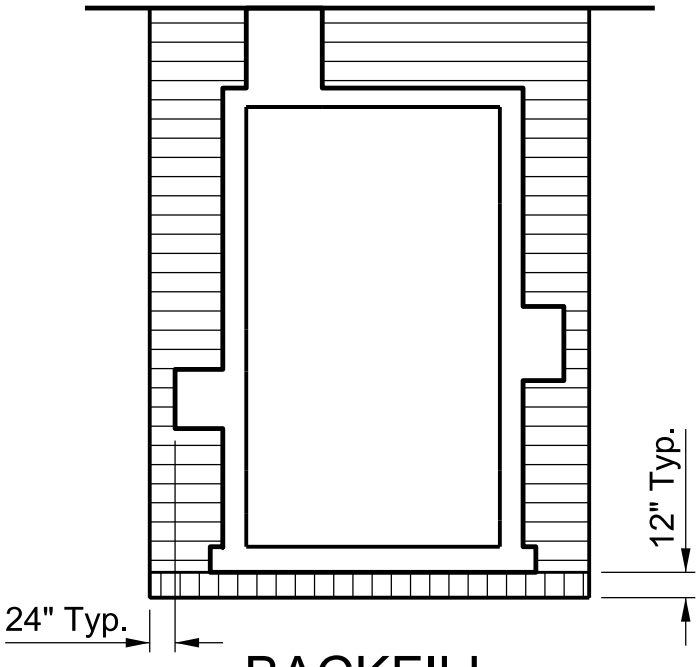
STRUCTURE EXCAVATION

STRUCTURE BACKFILL

LEVELING BED MATERIAL

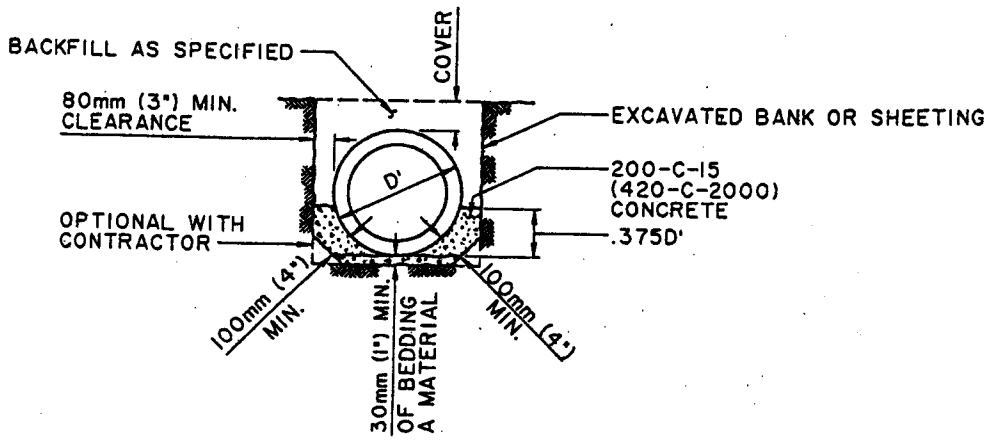


EXCAVATION



BACKFILL

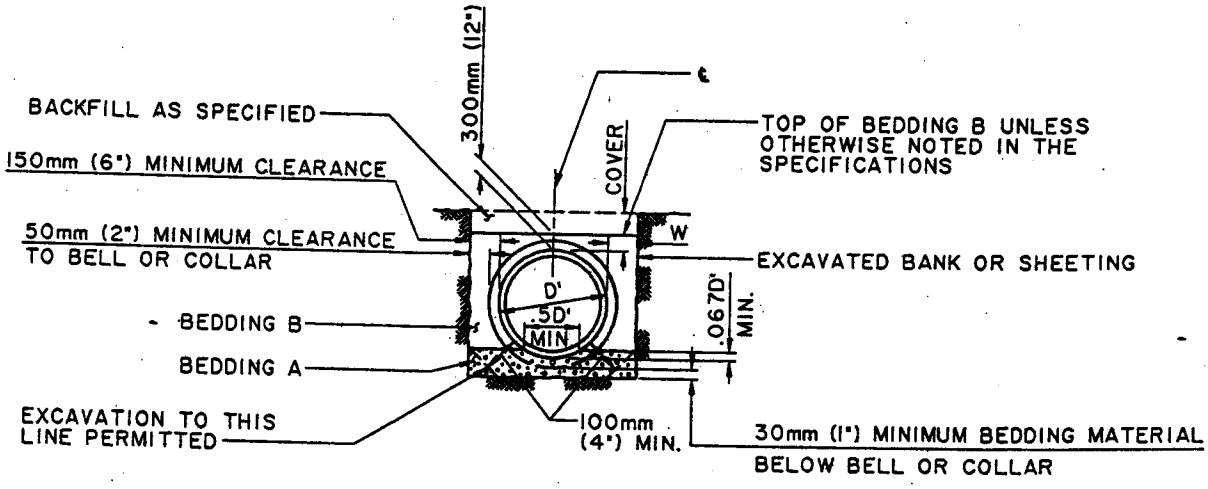
LIMITS FOR PAYMENT FOR EXCAVATION AND BACKFILL



CASE 1

NOTE:

CASE 1 BEDDING (LOAD FACTOR 2.1)
SHALL BE USED WHERE SPECIFIED ON PROJECT DRAWINGS OR WHERE REQUIRED AS AN ALTERNATIVE TO CASE 2 OR CASE 3 BEDDING AS PROVIDED HEREON AND ON SH. 2. CASE 4 BEDDING SHALL BE USED INSTEAD OF CASE 1 AGAINST SHEETING OR UNSTABLE TRENCH SIDES IF SO REQUIRED BY THE ENGINEER.



CASE 2
VITRIFIED CLAY AND PLAIN CONCRETE PIPE

NOTES:

CASE 2 BEDDING & BACKFILL AROUND PIPE (LOAD FACTOR 1.8)

(a) W AT SPRING LINE SHALL NOT BE LESS THAN 150mm (6") FOR ANY DEPTH OF TRENCH. THIS DIMENSION MAY INCLUDE THE THICKNESS OF ANY SHEETING.
(b) WHERE COVER IS 2.5m (8'-0") OR LESS, W MEASURED AT TOP OF PIPE MAY BE ANY DIMENSION GREATER THAN 150mm (6").
(c) WHERE COVER IS GREATER THAN 2.5m (8'-0"), W MEASURED AT TOP OF PIPE SHALL NOT BE GREATER THAN 200mm (8") UNLESS THE CONTRACTOR AT HIS OWN EXPENSE PROVIDES CASE 1 BEDDING OR STRONGER PIPE. THE STATED 200mm (8") INCLUDES THE THICKNESS OF ANY SHEETING.
(d) SCREED BEDDING A TO FIT CURVATURE AND GRADE OF PIPE. TYPE OF SCREED AND THE METHOD OF USE TO BE APPROVED BY THE ENGINEER.

LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS

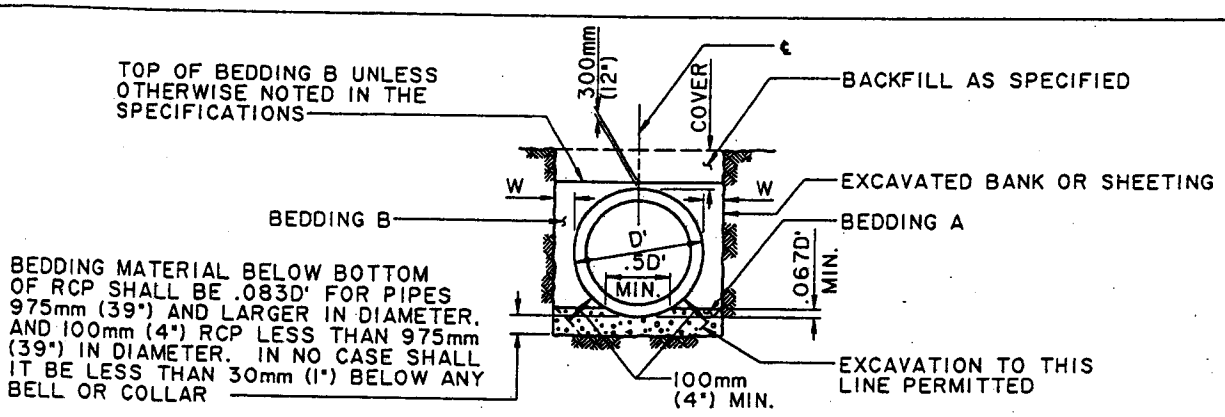
PIPE BEDDING IN TRENCHES

STANDARD PLAN METRIC
3080-2
SHEET 1 OF 3

APPROVED Thomas A. Tidemanson 5/31/1992
DIRECTOR OF PUBLIC WORKS — DATE

1995, 1999
REVISIONS

STDPLNS.DPW.3080-2



CASE 3
REINFORCED CONCRETE PIPE

NOTES:

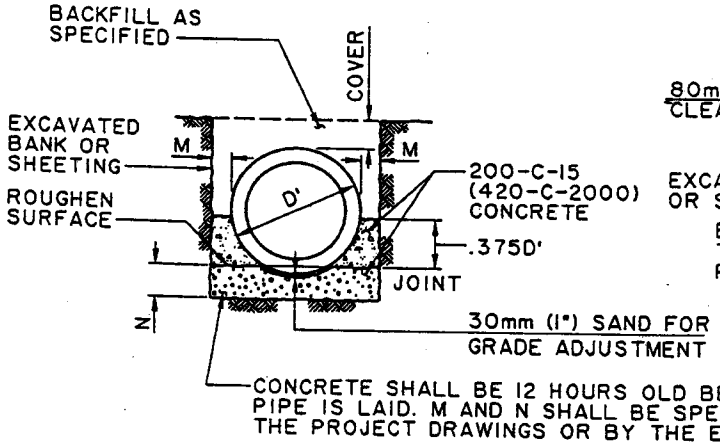
CASE 3 BEDDING & BACKFILL AROUND RCP (LOAD FACTOR 1.8)

(a) W AT SPRING LINE SHALL NOT BE LESS THAN THE FOLLOWING: 150mm (6") FOR RCP 1500mm (60") OR LESS IN DIAMETER, 250mm (10") FOR RCP 1575mm (63") TO 2700mm (108") INCLUSIVE IN DIAMETER, AND 300mm (12") FOR PIPE LARGER THAN 2700mm (108") IN DIAMETER. THESE DIMENSIONS MAY INCLUDE THE THICKNESS OF ANY SHEETING.

(b) WHERE COVER IS 3m (10'-0") OR LESS, W MEASURED AT THE TOP OF THE RCP MAY BE ANY DIMENSION GREATER THAN THE ABOVE SPECIFIED MINIMUM, UNLESS OTHERWISE SPECIFIED ON THE PROJECT DRAWINGS.

(c) WHERE COVER IS GREATER THAN 3m (10'-0"), W MEASURED AT TOP OF PIPE SHALL NOT BE GREATER THAN 250mm (10") FOR RCP 2700mm (108") IN DIAMETER OR LESS, OR 300mm (12") FOR RCP OVER 2700mm (108") IN DIAMETER UNLESS THE CONTRACTOR AT HIS OWN EXPENSE PROVIDES CASE 1 BEDDING OR STRONGER RCP. THESE DIMENSIONS INCLUDE THE THICKNESS OF ANY SHEETING.

(d) SCREED BEDDING A TO FIT CURVATURE AND GRADE OF RCP. TYPE OF SCREED AND THE METHOD OF USE TO BE APPROVED BY THE ENGINEER.

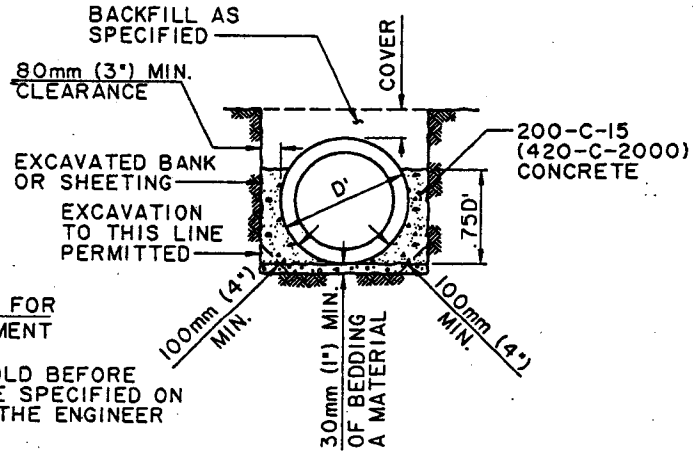


CASE 4.

NOTE:

CASE 4 BEDDING (LOAD FACTOR 3.0)

WHERE REQUIRED BY THE ENGINEER AS AN ALTERNATIVE TO CASE 1 OR CASE 5 TO MEET CONDITIONS ARISING DURING CONSTRUCTION.



CASE 5

NOTE:

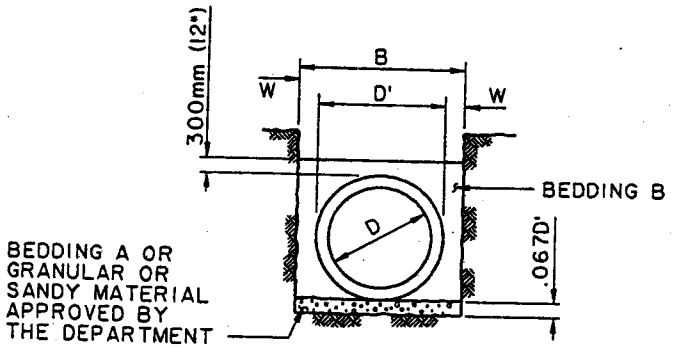
CASE 5 BEDDING (LOAD FACTOR 2.7)

SHALL BE USED WHERE SPECIFIED ON THE PROJECT DRAWINGS. CASE 4 BEDDING SHALL BE USED INSTEAD OF CASE 5 AGAINST SHEETING OR UNSTABLE TRENCH WALLS IF SO REQUIRED BY THE ENGINEER.

LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS

PIPE BEDDING IN TRENCHES

STANDARD PLAN METRIC
3080-2
SHEET 2 OF 3



CASE 6

NOTES:

CASE 6 BEDDING (LOAD FACTOR 1.5)

(a)

(b) NOTES (a), (b), AND (c) FROM CASE 3 SHALL APPLY.

WHERE SUBGRADE IS COMPOSED OF OTHER THAN GRANULAR OR SANDY MATERIAL, THE TRENCH SHALL BE EXCAVATED TO A DEPTH OF AT LEAST 80mm (3") BELOW THE PIPE AND BACKFILLED WITH A BEDDING MATERIAL OR OTHER MATERIALS AS MAY BE SPECIFIED OR OTHERWISE APPROVED BY THE DEPARTMENT.

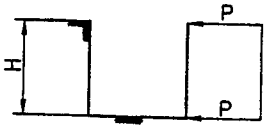
NOTES

1. USE CASE 3 FOR RCP, CASE 2 FOR VITRIFIED CLAY, PLASTIC AND PLAIN CONCRETE PIPE UNLESS OTHERWISE SPECIFIED OR SHOWN ON THE PROJECT DRAWINGS.
2. FOR RCP 675mm (27") IN DIAMETER AND LARGER, BEDDING A SHALL COMPOSED OF SAND, 20mm (3/4") OR 15mm (1/2") CRUSHED ROCK, 5mm (NO.3 OR 4) CONCRETE AGGREGATE OR GRAVEL OR OTHER GRANULAR MATERIAL AS SPECIFIED AND SHALL HAVE A SAND EQUIVALENT VALUE OF NOT LESS THAN 20 UNLESS OTHERWISE APPROVED BY THE ENGINEER.
3. WHERE RCP SMALLER THAN 675mm (27") IN DIAMETER IS USED, THE REQUIREMENTS IN NOTE 2 SHALL BE MET EXCEPT THAT A GRADATION COARSER THAN 4.75mm (NO.4) CONCRETE AGGREGATE OR NO COARSER THAN 15mm (1/2") CRUSHED ROCK SHALL BE USED.
4. BEDDING B SHALL BE COMPOSED OF SAND OR OTHER GRANULAR MATERIAL AND SHALL HAVE A SAND EQUIVALENT VALUE NOT LESS THAN 20 AS SPECIFIED IN SUBSECTION 306-1.2.1 AS AMENDED UNLESS OTHERWISE APPROVED BY THE ENGINEER AND SHALL BE COMPLETED PRIOR TO PLACING THE BALANCE OF THE BACKFILL. THE MAXIMUM ROCK SIZE FOR BEDDING B SHALL BE 100mm (4") IN THE GREATEST DIMENSION. NESTING OF ROCKS WILL NOT BE PERMITTED.
5. UNLESS SPECIFIED ON THE PROJECT DRAWINGS, CONCRETE SHALL BE 200-C-15 (420-C-2000).
6. CONCRETE BACKFILL SHALL BE POURED FROM WALL TO WALL OF THE TRENCH AND FROM THE BOTTOM OF THE TRENCH TO A MINIMUM DEPTH OF 100mm (4") OVER THE TOP OF THE PIPE.
7. CONCRETE BACKFILL SHALL BE PROVIDED FOR RCP 525mm (21") IN DIAMETER OR LESS WHERE THE COVER IS EQUAL TO OR LESS THAN 600mm (24"), FOR RCP GREATER THAN 525m (21") IN DIAMETER BUT LESS THAN 975mm (39") WHERE THE COVER IS LESS THAN 375mm (15") AND FOR RCP 975mm (39") OR GREATER WHERE THE COVER IS LESS THAN 300mm (12"). CONCRETE BACKFILL SHALL BE IN ACCORDANCE WITH NOTES 5 AND 6.
8. 3-EDGE BEARING TEST LOAD FACTOR = 1.0.
9. DIMENSIONS SHOWN ON THIS PLAN FOR METRIC AND ENGLISH UNITS ARE NOT EXACT EQUAL VALUES. IF METRIC VALUES ARE USED, ALL VALUES USED FOR CONSTRUCTION SHALL BE METRIC VALUES. IF ENGLISH UNITS ARE USED, ALL VALUES USED FOR CONSTRUCTION SHALL BE ENGLISH UNITS.

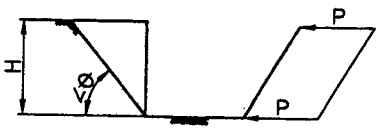
LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS

PIPE BEDDING IN TRENCHES

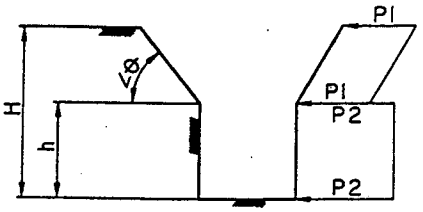
STANDARD PLAN METRIC
3080-2
SHEET 3 OF 3



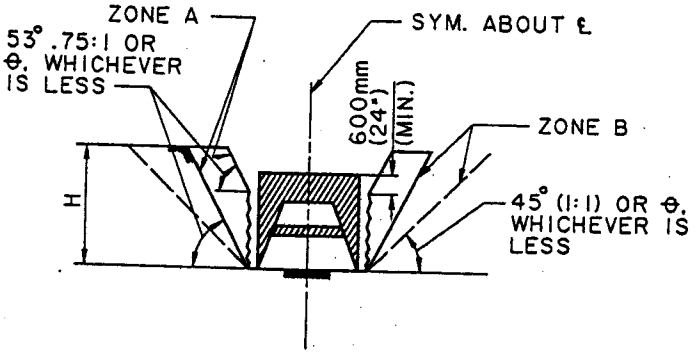
CASE 1
VERTICAL



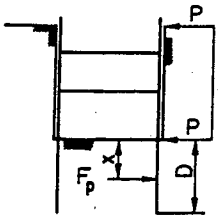
CASE 2
SLOPING



CASE 3
COMBINED



CASE 4
SHIELD



CASE 5
BEAM PENETRATION

NOTE:

IF THE TRENCH WALLS ARE SLOPED, K_w = 25 VALUES MAY BE REDUCED BY THE PERCENTAGES TABULATED BELOW. FOR K_w VALUES OTHER THAN 25 THE PERCENTAGE REDUCTION SHALL VARY UNIFORMLY FROM 0 AT A VERTICAL SLOPE TO 100 AT A SLOPE EQUAL TO THE ANGLE OF REPOSE OF THE SOIL BUT NOT GREATER THAN THE REDUCTION SHOWN FOR K_w = 25.

SLOPE RATIO (HORIZONTAL TO VERTICAL)	PERCENTAGE REDUCTION
1:5.1 TO VERTICAL	0
1:2.1 TO 1:5	33
.75:1.1 TO 1:2	67
HORIZONTAL TO .75:1	100

LEGEND

P = UNIT PRESSURE IN PSF
P1 = UNIT PRESSURE IN PSF (USE Kw VALUE REQUIRED BY THE SLOPE)
P2 = UNIT PRESSURE IN PSF (VERTICAL PORTION), VARIED FROM A VALUE EQUAL TO .8KwHT WHEN θ = 90° TO A VALUE EQUAL TO .8Kw [h+(.25(H-h)) TAN θ] WHEN θ = 53°
K = COEFFICIENT OF ACTIVE EARTH PRESSURE
w = UNIT WEIGHT OF SOIL IN PCF
H = DEPTH OF EXCAVATION IN FEET
h = DEPTH OF VERTICAL PORTION OF EXCAVATION IN FEET
θ = EXCAVATION ANGLE. NO SHORING IS REQUIRED AT THE ANGLE OF REPOSE AT WHICH THE SOIL WILL SAFELY STAND, BUT IN NO CASE SHALL THIS ANGLE BE GREATER THAN 53°
D = DEPTH OF PENETRATION IN FEET
F_p = RESULTANT FORCE IN POUND PER FOOT OF BEAM WIDTH
x = DISTANCE TO F_p FROM SUBGRADE IN FEET

LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS

CRITERIA FOR THE DESIGN OF SHORING FOR EXCAVATIONS

APPROVED Thomas A. Tidemanson 5/31/1992
DIRECTOR OF PUBLIC WORKS DATE

1999
REVISIONS

STANDARD PLAN
METRIC
3090-1
SHEET 1 OF 4

GENERAL MINIMUM REQUIREMENTS

NOTES

DESIGN

1. A SHORING SYSTEM SHALL CONSIST OF MAIN HORIZONTAL AND VERTICAL BRACING THAT WILL FUNCTION AS A TEMPORARY EARTH SUPPORTING STRUCTURE, SUPPORT FOR EXISTING IMPROVEMENTS, AND FOR PROTECTION OF WORKERS. SHORING FOR EXCAVATIONS SHALL BE DESIGNED TO WITHSTAND NOT LESS THAN THE LOADS INDICATED ON SH. 1 AND SHALL COMPLY WITH THE STATE OF CALIFORNIA, DEPARTMENT OF INDUSTRIAL RELATIONS, CONSTRUCTION SAFETY ORDERS UNLESS MODIFIED ON THIS DRAWING OR IN THE SPECIAL PROVISIONS OF THE SPECIFICATIONS.

   A. SOIL PARAMETERS Kw

   Kw IS THE PRODUCT OF THE COEFFICIENT OF ACTIVE EARTH PRESSURE (K) AND THE UNIT WEIGHT OF SOIL (w). VALUES OF Kw SHALL NOT BE LESS THAN NOTED IN THE SPECIAL PROVISIONS OF THE SPECIFICATIONS.

   B. VERTICAL OR HORIZONTAL SHORES

   SHORES SHALL BE DESIGNED FOR P = 0.8KwH UNLESS SOLID SUPPORT SHORES ARE USED IN WHICH CASE P = 0.6KwH MAY BE USED. SHORES SHALL NOT BE LESS THAN 50mm(2") THICK AND 200mm(8") WIDE, SPACED A MAXIMUM OF 2.5m (9'-0") OC HORIZONTALLY, AND EXTEND FROM TOP TO BOTTOM OF EXCAVATION. WHEN PILES ARE USED FOR VERTICAL SHORES, THE EMBEDMENT LENGTH AND ANY ANCHOR DETAILS SPECIFIED MUST BE SUPPORTED BY CALCULATIONS. RESULTANT FORCE Fp SHALL BE PER SUBSECTION 306-1.1.6.2 AS AMENDED.

   DEFINITIONS

   1. SHEETING - A WALL OF PLANKS PLACED AGAINST THE TRENCH EARTH FACE, SPANNING VERTICALLY BETWEEN HORIZONTAL SUPPORTS.
   2. LAGGING - A WALL OF PLANKS PLACED AGAINST THE TRENCH EARTH FACE, SPANNING HORIZONTALLY BETWEEN VERTICAL SUPPORTS.
   3. TYPE A SOLID SUPPORT SHORES - EITHER CONTINUOUS ABUTTING SHEETING OR LAGGING (LAGGING MAY BE INTERMITTENTLY SPACED IF THE LOAD CONDITIONS PERMIT) PLACED IMMEDIATELY AFTER THE EXCAVATION REACHES THE SUBGRADE.
   4. TYPE B SOLID SUPPORT SHORES - EITHER ABUTTING SHEETING OR ABUTTING LAGGING PLACED IMMEDIATELY SUBSEQUENT TO EXCAVATION AND ESTABLISHMENT OF THE TRENCH WALL. IN NO CASE SHALL THE DEPTH OF THE UNSUPPORTED TRENCH WALL EXCEED 600mm(24").

   C. HORIZONTAL BRACES OR STRUTS

   STRUTS SHALL BE DESIGNED FOR P = 0.8KwH AND A 1780N(400 LB.). CONCENTRATED LOAD AT THE CENTER LINE. HORIZONTAL SPACING OF BRACES OR STRUTS SHALL NOT EXCEED 2.5m(9'-0") OC, UNLESS AN APPROVED WALER SYSTEM IS UTILIZED. THE WALERS MUST BE OF SUFFICIENT STRENGTH TO SUSTAIN THE REACTIONS FROM THE VERTICAL MEMBERS, AND BE OF SUFFICIENT STIFFNESS TO MINIMIZE DEFLECTIONS OF THE VERTICAL MEMBERS. TO FACILITATE PLACEMENT OF PIPE THE CONTRACTOR MAY:

   1. REMOVE THE CROSS BRACING BELOW THE LEVEL OF THE TOP OF THE PIPE. REMOVAL OF BRACES SHALL BE LIMITED TO A DISTANCE OF 4m(14'-0") IN ADVANCE OF THE PLACEMENT OF PIPE.
   2. REMOVE AN ENTIRE VERTICAL SHORING SET PROVIDED THAT THE MAXIMUM SPACING BETWEEN THE REMAINING SETS DOES NOT EXCEED 4m(14'-0") OC.
   3. IF ITEMS 1 OR 2 ABOVE ARE USED, WORKERS WILL NOT BE PERMITTED IN THAT PORTION OF THE TRENCH WHERE THE SUPPORT HAS BEEN REMOVED.

   IMMEDIATELY SUBSEQUENT TO PLACEMENT OF THE PIPE THE CONTRACTOR SHALL REPLACE THE VERTICAL SHORING SET PREVIOUSLY REMOVED WITH A SET DESIGNED TO SUPPORT THE EXCAVATION WALL FROM THE TOP OF THE PIPE TO THE GROUND SURFACE. TO FACILITATE CONSTRUCTION OF POURED-IN-PLACE STRUCTURES THE 1.5m(5') LIMITATION NOTED IN THE CONSTRUCTION SAFETY ORDERS ON SPACING OF CROSS BRACING WILL BE WAIVED FOR THE AREA BELOW THE TOP OF THE STRUCTURE.

GENERAL MINIMUM REQUIREMENTS (CONT.)

D. WALERS OR STRINGERS

WALERS SHALL BE DESIGNED FOR P = .8KwH. SPECIAL ATTENTION SHALL BE EXERCISED IN DESIGNING FOR HORIZONTAL SHEAR AND FOR THE CONDITION WHERE INTERMEDIATE WALERS AND/OR CROSS BRACING ARE REMOVED.

E. EXISTING IMPROVEMENTS AND SURCHARGE LOADS

ALL EXISTING IMPROVEMENTS MUST BE CONSIDERED IN THE DESIGN OF THE SHORING SYSTEM AND PROTECTED IN PLACE UNLESS OTHERWISE INDICATED ON THE PROJECT DRAWINGS OR SPECIFICATIONS. PARALLEL UTILITIES EXCEPT FOR METALLIC CONDUITS USED FOR THE PURPOSE OF CONTAINING ELECTRICAL CABLES AND PIPES 100mm(4") OR LESS IN DIAMETER USED FOR LOW PRESSURE GAS DISTRIBUTION SYSTEMS OUTSIDE OF THE LIMITS OF VERTICAL EXCAVATIONS MUST NOT BE EXPOSED BY USING SLOPING EXCAVATIONS. ALSO, EXISTING IMPROVEMENTS SHALL NOT IMPOSE ADVERSE LOADS ON THE SHORING OR BE SUBJECTED TO ADVERSE LOADS CAUSED BY THE SHORING IN ADDITION TO THE EARTH LOADS, THE SHORING SYSTEM MUST SUSTAIN LOADS IMPOSED BY TRAFFIC, CONSTRUCTION EQUIPMENT, ADJACENT STRUCTURES, OR ANY OTHER SURCHARGE LOADS. THE LOAD IMPOSED ON THE SHORING SYSTEM BY NORMAL STREET VEHICULAR TRAFFIC MAY BE ASSUMED TO BE EQUAL TO THE LOAD IMPOSED BY 600mm(24") OF EARTH.

2. DIMENSIONS SHOWN ON THIS PLAN FOR METRIC AND ENGLISH UNITS ARE NOT EXACT EQUAL VALUES. IF METRIC VALUES ARE USED. ALL VALUES USED FOR CONSTRUCTION SHALL BE METRIC VALUES. IF ENGLISH UNITS ARE USED. ALL VALUES USED FOR CONSTRUCTION SHALL BE ENGLISH UNITS.

MATERIALS GENERAL

ALL MATERIALS USED FOR SHORING, SHEETING, AND LAGGING IN COMPLYING WITH THE PROVISIONS OF THIS STANDARD DRAWING, MAY BE NEW OR USED BUT SHALL BE FREE FROM DEFECTS AND DAMAGE THAT MIGHT IN ANY WAY IMPAIR THEIR PROTECTIVE FUNCTION. ALLOWABLE STRESSES SPECIFIED IN THE PUBLICATIONS LISTED HEREON MAY BE INCREASED BY 1/3.

A. LUMBER

DESIGN FOR LUMBER SHALL BE IN ACCORDANCE WITH NATIONAL DESIGN SPECIFICATIONS FOR STRESS-GRADE LUMBER. THE GRADE OR STRUCTURAL PROPERTIES OF LUMBER USED FOR SHORING, SHALL CORRESPOND TO THAT SPECIFIED IN CURRENT STANDARD GRADING AND DRESSING RULES OR THE WEST COAST LUMBER INSPECTION BUREAU. ALL LUMBER MUST BEAR THE GRADE STAMP. USED MATERIAL MAY BE DESIGNED IN ACCORDANCE WITH THE STANDARD GRADING AND DRESSING RULES IN EFFECT AT THE TIME THE LUMBER WAS GRADED. THE MAXIMUM PERMISSABLE FLEXURAL STRESS SHALL NOT EXCEED 15MPa(2000 PSI). THE 15MPa(2000 PSI) STRESS LIMITATION INCLUDES THE .1/3 INCREASE NOTED HEREINABOVE. NON-STRESS GRADE LUMBER FOR SOLID SUPPORT SHORES MAY BE USED WHEN $Kw \leq 4710N/m^3$(30 PCF) PROVIDING THE FOLLOWING THICKNESS AND SPACING REQUIREMENTS ARE OBSERVED.

MINIMUM ROUGH THICKNESS OF SHEETING OR LAGGING	MAXIMUM VERTICAL SPACING OF WALERS FOR SOLID SHEETING	MAXIMUM HORIZ. SPACING OF UPRIGHTS FOR LAGGING
50mm(2")	1m(4'-0")	1m(4'-0")
80mm(3")	2m(7'-0")	2m(7'-0")

HOWEVER, THE MINIMUM ROUGH THICKNESS AND MAXIMUM SPACING TABULATED ABOVE FOR NON-STRESS GRADE LUMBER MAY BE DISREGARDED PROVIDED STRESS GRADE LUMBER OR STEEL IS DESIGNED TO BE USED FOR SOLID SUPPORT SHORES.

B. STRUCTURAL STEEL

DIMENSIONS, PROPERTIES, AND DESIGN SHALL BE IN ACCORDANCE WITH THE CURRENT AISC MANUAL OF STEEL CONSTRUCTION.

GENERAL MINIMUM REQUIREMENTS (CONT.)

C. SPECIAL SHORING SYSTEMS
SYSTEMS SUCH AS SPEED-SHORE, TREN-SHORE, ETC., WILL BE ALLOWED ONLY IF THE CONTRACTOR FILES OR HAS FILED WITH THE DEPARTMENT SUBSTANTIATING CERTIFIED TESTS CLEARLY DENOTING THE CAPACITY OF THE SYSTEM. UNTESTED MEMBERS OF SPECIAL SYSTEMS, COMPOSITE MEMBERS, BUILT-UP MEMBERS, ETC., MUST BE THEORETICALLY DESIGNED. VERTICAL SHORES MUST BE AT LEAST 200mm(8") WIDE. STRUTS TESTED UNDER IDEAL OR LABORATORY CONDITIONS SHALL BE USED WITH A MINIMUM SAFETY FACTOR OF 1.5.

D. SHIELDS
1. SHIELDS ARE ACCEPTABLE AS A MEANS OF SHORING EXCAVATIONS, AS SHOWN ON CASE 4, WITH THE FOLLOWING RESTRICTIONS.
   a. ZONE A SHALL NOT INTERCEPT PROPERTY LINES OR INTERCEPT AN AREA REQUIRED BY THE SPECIFICATIONS FOR TRAFFIC.
   b. ZONE A SHALL NOT CONTAIN ANY EXISTING UTILITY OTHER THAN METALLIC ELECTRIC CONDUITS OR PIPE 100mm(4") OR LESS IN DIAMETER USED FOR LOW PRESSURE GAS DISTRIBUTION.
   c. ZONES A AND B SHALL NOT SUPPORT SURCHARGE DEAD LOADS SUCH AS PILING OR BUILDINGS.

   THE RESTRICTIONS STATED IN b ABOVE WILL BE WAIVED PROVIDED THE CONTRACTOR SUBMITS WRITTEN APPROVAL FROM THE OWNER OF THE UTILITY FOR THE PROPOSED CONSTRUCTION METHOD. THE CONTRACTOR COMPLIES WITH ANY SUPPORT OR PROTECTION METHODS REQUIRED BY THE UTILITY COMPANY, AND THE OWNER OF THE UTILITY STATES, IN WRITING, THAT THEY WILL ACCEPT RESPONSIBILITY FOR ALL CLAIMS FOR DAMAGES THAT MAY ARISE AS A RESULT OF DISTURBANCE TO THE UTILITY. AN ACCEPTABLE SHORING SYSTEM MUST BE INSTALLED WHEN THE SHIELD IS REMOVED.
2. THE LENGTH OF UNSUPPORTED TRENCH IN FRONT OF THE SHIELD SHALL BE 2.5m(9'-0") MAXIMUM FROM THE FORWARD EDGE OF THE SHIELD TO THE TOE OF SLOPE BEING EXCAVATED.
3. SHIELDS SHALL CONFORM TO THE DESIGN CRITERIA NOTED HEREON.

E. TEMPORARY BRIDGES
PLANS AND CALCULATIONS FOR SHORING SYSTEMS AT TEMPORARY BRIDGES SHALL MEET THE REQUIREMENTS OF SUBSECTION 7-10.3.6(7) AS AMENDED.

CALCULATIONS AND DRAWINGS
SHORING SYSTEMS SHALL BE DESIGNED BY A CIVIL OR STRUCTURAL ENGINEER REGISTERED IN THE STATE OF CALIFORNIA.

A. COMPLETE CALCULATIONS MUST BE SUBMITTED TO THE DEPARTMENT NOTING ALL ASSUMPTIONS AND REFERENCES. CALCULATIONS SHALL BE BASED ON STANDARD METHODS AND PROCEDURES BY RECOGNIZED AUTHORITIES. COMPUTER PRINTOUTS AND OTHER SUBMITTALS THAT DO NOT CLEARLY INDICATE THE COMPUTATION METHOD WILL NOT BE ACCEPTED. CROSS-SECTIONS OR SKETCHES SHOWING THE LOCATION OF EXISTING IMPROVEMENTS AND UTILITIES SHALL BE INCLUDED WHEN THE TYPE OF SHORING IS AFFECTED.
B. DEPARTMENT STANDARD PLAN 3091 SHOWS THE FORMAT THAT IS TO BE USED. HOWEVER, THE SUPPORTING CALCULATIONS MAY BE ATTACHED ON LETTER-SIZED PAPER.

ACCEPTANCE
IF FOUND IN CONFORMANCE WITH THIS DRAWING AND THE SPECIFICATIONS, THE DEPARTMENT WILL INDICATE ACCEPTANCE BY SIGNING THE SUBMITTED DRAWINGS. IF THE METHOD SELECTED AND ACCEPTED BY THE DEPARTMENT DOES NOT PROVIDE ADEQUATE SUPPORT UNDER ACTUAL FIELD CONDITIONS, IT SHALL BE REPLACED WITH AN ACCEPTED ALTERNATE. THE DETAILS ARE ALSO SUBJECT TO THE REVIEW OF THE DIVISION OF INDUSTRIAL SAFETY. ANY DEVIATION FROM THE ACCEPTED DESIGN MUST BE APPROVED BY THE DEPARTMENT.

SKETCH

DETAILS OF SHORING INDICATING SIZE AND SPACING OF ALL MEMBERS.

SEQUENCE OF PLACEMENT AND REMOVAL OF MEMBERS SHALL BE NOTED AS REQUIRED TO INSURE SAFETY OF WORKERS.

DESIGN CRITERIA

1. DESIGN LOADS BASED ON LACFCD "CRITERIA FOR THE DESIGN OF SHORING FOR EXCAVATIONS.
2. SOIL TYPE _____
   K.w = _____ N/m3(pcf)
   θ = _____ °
3. ALL TIMBER SHALL BE _____ GRADE.
4. ALLOWABLE STRESSES:

STRESS	WOOD	STEEL
FLEXURAL		
AXIAL COMPRESSION		
SHEAR		
MODULUS.E.		

5. MAXIMUM EXCAVATION DEPTH _____ METERS (FEET).

CALCULATIONS

CASE _____ : SHORING FOR _____ EXCAVATIONS

APPLICABLE REACHES:

STA. _____ TO STA. _____
STA. _____ TO STA. _____

NOTES:

REACHES GIVEN ARE APPROXIMATE. IF A TYPE OF SOIL IS ENCOUNTERED WITHIN THE ABOVE REACHES WHICH, IN ACCORDANCE WITH THE CRITERIA SET FORTH ON STANDARD PLAN 3090. REQUIRES THE USE OF A DIFFERENT METHOD OF SHORING. THEN SHORING DETAILS WILL BE REVISED AS PROVIDED IN THE PROJECT SPECIFICATIONS.

CALCULATIONS BY
NAME _____
R.C.E.NO. _____
ADDRESS _____
PHONE _____
DATE _____
SIGNATURE _____

LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS

ACCEPTED BY _____
DATE _____

PROJECT NO. _____

EXCAVATION SHORING SYSTEM

LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS

SAMPLE SHEET
FOR USE AS A GUIDE IN PREPARING CALCULATIONS FOR SHORING OF EXCAVATIONS

APPROVED Thomas A. Tidemanson 5/31/1992
DIRECTOR OF PUBLIC WORKS — DATE

1999
REVISIONS

STANDARD PLAN
METRIC
3091-1
SHEET 1 OF 1

UNIFIED SOIL CLASSIFICATION
(INCLUDING IDENTIFICATION AND DESCRIPTION)

MAJOR DIVISIONS			GROUP SYMBOLS	TYPICAL NAMES	FIELD IDENTIFICATION PROCEDURES (EXCLUDING PARTICLES LARGER THAN 80mm (3") AND BASING FRACTION ON ESTIMATED WEIGHTS)		
1	2		3	4	5		
COARSE-GRAINED SOILS MORE THAN HALF OF MATERIAL IS LARGER THAN 75 μm (NO. 200) SIEVE SIZE. THE 75 μm (NO. 200) SIEVE SIZE IS ABOUT THE SMALLEST PARTICLE VISIBLE TO THE NAKED EYE.	GRAVELS MORE THAN HALF OF COARSE FRACTION IS LARGER THAN 4.75mm (NO. 4) SIEVE SIZE. (FOR VISUAL CLASSIFICATION, THE 6mm (1/4") SIZE MAY BE USED AS EQUIVALENT TO THE 4.75mm (NO. 4) SIEVE SIZE)	CLEAN GRAVELS (LITTLE OR NO FINES)	GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES.	WIDE RANGE IN GRAIN SIZES AND SUBSTANTIAL AMOUNTS OF ALL INTERMEDIATE PARTICLE SIZES.	
			GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES.	PREDOMINATELY ONE SIZE OR A RANGE OF SIZES WITH SOME INTERMEDIATE SIZES MISSING.	
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)	GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES.	NONPLASTIC FINES OR FINES WITH LOW PLASTICITY. (FOR IDENTIFICATION PROCEDURES SEE ML BELOW)	
			GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES.	PLASTIC FINES (FOR IDENTIFICATION PROCEDURES SEE CL BELOW)	
	SANDS MORE THAN HALF OF COARSE FRACTION IS SMALLER THAN 4.75mm (NO. 4) SIEVE SIZE.	CLEAN SANDS (LITTLE OR NO FINES)	SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES.	WIDE RANGE IN GRAIN SIZES AND SUBSTANTIAL AMOUNTS OF ALL INTERMEDIATE PARTICLE SIZES.	
			SP	POORLY-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES.	PREDOMINANTLY ONE SIZE OR A RANGE OF SIZES WITH SOME INTERMEDIATE SIZES MISSING.	
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)	SM	SILTY SANDS, SAND-SILT MIXTURES.	NONPLASTIC FINES OR FINES WITH LOW PLASTICITY. (FOR IDENTIFICATION PROCEDURES SEE ML BELOW)	
			SC	CLAYEY SANDS, SAND-CLAY MIXTURES.	PLASTIC FINES (FOR IDENTIFICATION PROCEDURES SEE CL BELOW)	
FINE-GRAINED SOILS MORE THAN HALF OF MATERIAL IS SMALLER THAN 75 μm (NO. 200) SIEVE SIZE.					IDENTIFICATION PROCEDURES ON FRACTION SMALLER THAN 450 μm (NO. 40) SIEVE SIZE		
					DRY STRENGTH (CRUSHING CHARACTERISTICS)	DILATANCY (REACTION TO SHAKING)	TOUGHNESS (CONSISTENCY NEAR PL)
	SILTS AND CLAYS LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY.	NONE TO SLIGHT	QUICK TO SLOW	NONE
			CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS.	MEDIUM TO HIGH	NONE TO VERY SLOW	MEDIUM
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50		OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY.	SLIGHT TO MEDIUM	SLOW	SLIGHT
			MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS, ELASTIC SILTS.	SLIGHT TO MEDIUM	SLOW TO NONE	SLIGHT TO MEDIUM
			CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS.	HIGH TO VERY HIGH	NONE	HIGH
			OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS.	MEDIUM TO HIGH	NONE TO VERY SLOW	SLIGHT TO MEDIUM
HIGHLY ORGANIC SOILS			PT	PEAT AND OTHER HIGHLY ORGANIC SOILS.	READILY IDENTIFIED BY COLOR, ODOR, SPONGY FEEL AND FREQUENTLY BY FIBROUS TEXTURE.		

(1) BOUNDARY CLASSIFICATIONS: SOILS POSSESSING CHARACTERISTICS OF TWO GROUPS ARE DESIGNATED BY COMBINATIONS OF GROUP SYMBOLS. FOR EXAMPLE GW-GC, WELL-GRADED GRAVEL-SAND MIXTURE WITH CLAY BINDER. (2) ALL SIEVE SIZES ON THIS CHART ARE U.S. STANDARD.

LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS

UNIFIED SOIL CLASSIFICATION SYSTEM

STANDARD PLAN METRIC

3093-1

SHEET 1 OF 3

APPROVED Thomas A. Tidemanson 5/31/1992

DIRECTOR OF PUBLIC WORKS — DATE

1999

REVISIONS

UNIFIED SOIL CLASSIFICATION
(INCLUDING IDENTIFICATION AND DESCRIPTION)

INFORMATION REQUIRED FOR DESCRIBING SOILS	LABORATORY CLASSIFICATION CRITERIA	GROUP SYMBOLS
6	7	8

FOR UNDISTURBED SOILS ADD INFORMATION ON STRATIFICATION, DEGREE OF COMPACTNESS, CEMENTATION, MOISTURE CONDITIONS AND DRAINAGE CHARACTERISTICS.

GIVE TYPICAL NAME: INDICATE APPROXIMATE PERCENTAGES OF SAND AND GRAVEL, MAX. SIZE: ANGULARITY, SURFACE CONDITION, AND HARDNESS OF THE COARSE GRAINS: LOCAL OR GEOLOGIC NAME AND OTHER PERTINENT DESCRIPTIVE INFORMATION: AND SYMBOL IN PARENTHESIS.

EXAMPLE:

SILTY SAND, GRAVELLY: ABOUT 20% HARD, ANGULAR GRAVEL PARTICLES 10mm (1/2") MAX. SIZE: ROUNDED AND SUBANGULAR SAND GRAINS COARSE TO FINE: ABOUT 15% NONPLASTIC FINES WITH LOW DRY STRENGTH: WELL COMPACTED AND MOIST IN PLACE: ALLUVIAL SAND: (SM).

USE GRAIN SIZE CURVE IN IDENTIFYING THE FRACTIONS AS GIVEN UNDER FIELD IDENTIFICATION.

DETERMINE PERCENTAGES OF GRAVEL AND SAND FROM GRAIN-SIZE CURVE. DEPENDING ON PERCENTAGE OF FINES (FRACTION SMALLER THAN 75 μm(NO. 200) SIEVE SIZE) COARSE-GRAINED SOILS ARE CLASSIFIED AS FOLLOWS:

LESS THAN 5% — GW, GP, SW, SP.
MORE THAN 12% — GM, GC, SM, SC.
5% TO 12% — BORDERLINE CASES REQUIRING USE OF DUAL SYMBOLS.

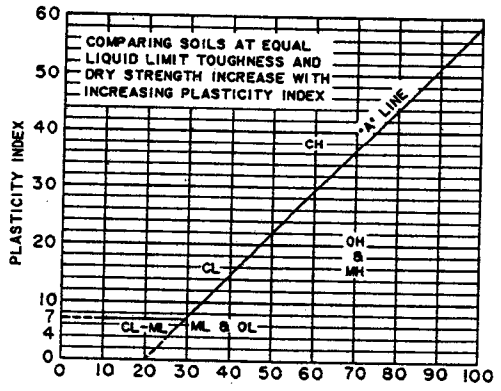
$Cu = \frac{D_{60}}{D_{10}}$ GREATER THAN 4; $Cc = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ BETWEEN ONE AND 3		GW
NOT MEETING ALL GRADATION REQUIREMENTS FOR GW		GP
ATTERBERG LIMITS BELOW "A" LINE OR PI LESS THAN 4	ABOVE "A" LINE WITH PI BETWEEN 4 AND 7 ARE BORDERLINE CASES REQUIRING USE OF DUAL SYMBOLS.	GM
ATTERBERG LIMITS ABOVE "A" LINE WITH PI GREATER THAN 7		GC
$Cu = \frac{D_{60}}{D_{10}}$ GREATER THAN 6; $Cc = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ BETWEEN ONE AND 3		SW
NOT MEETING ALL GRADATION REQUIREMENTS FOR SW		SP
ATTERBERG LIMITS BELOW "A" LINE OR PI LESS THAN 4	LIMITS PLOTTING IN HATCHED ZONE WITH PI BETWEEN 4 AND 7 ARE BORDERLINE CASES REQUIRING USE OF DUAL SYMBOLS.	SM
ATTERBERG LIMITS ABOVE "A" LINE WITH PI GREATER THAN 7		SC

GIVE TYPICAL NAME, INDICATE DEGREE AND CHARACTER OF PLASTICITY, AMOUNT AND MAX. SIZE OF COARSE GRAINS, COLOR IN WET CONDITION, ODOR IF ANY, LOCAL OR GEOLOGIC NAME, AND OTHER PERTINENT DESCRIPTIVE INFORMATION: AND SYMBOL IN PARENTHESIS.

FOR UNDISTURBED SOILS ADD INFORMATION ON STRUCTURE, STRATIFICATION, CONSISTENCY IN UNDISTURBED AND REMOLDED STATES, MOISTURE AND DRAINAGE CONDITIONS.

XAMPLE:

CLAYEY SILT, BROWN, SLIGHTLY PLASTIC, SMALL PERCENTAGE OF FINE SAND, NUMEROUS VERTICAL ROOT HOLES, FIRM AND DRY IN PLACE, LOESS, (ML).



PLASTICITY CHART
FOR LABORATORY CLASSIFICATION OF FINE-GRAINED SOILS

(1) BOUNDARY CLASSIFICATIONS: SOILS POSSESSING CHARACTERISTICS OF TWO GROUPS ARE DESIGNATED BY COMBINATIONS OF GROUP SYMBOLS. FOR EXAMPLE GW-GC, WELL-GRADED GRAVEL-SAND MIXTURE WITH CLAY BINDER. (2) ALL SIEVE SIZES ON THIS CHART ARE U.S. STANDARD.

LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS

UNIFIED SOIL CLASSIFICATION SYSTEM

STANDARD PLAN METRIC
3093-1
SHEET 2 OF 3

GENERAL NOTE

1. DIMENSIONS SHOWN ON THIS PLAN FOR METRIC AND ENGLISH UNITS ARE NOT EXACT EQUAL VALUES. IF METRIC VALUES ARE USED. ALL VALUES USED FOR CONSTRUCTION SHALL BE METRIC VALUES. IF ENGLISH UNITS ARE USED. ALL VALUES USED FOR CONSTRUCTION SHALL BE ENGLISH UNITS.

FIELD IDENTIFICATION PROCEDURES FOR FINE-GRADED SOILS OR FRACTIONS

THESE PROCEDURES ARE TO BE PERFORMED ON THE MINUS 450 μm (NO. 40) SIEVE SIZE PARTICLES, APPROXIMATELY .4mm (1/64"). FOR FIELD CLASSIFICATION PURPOSES, SCREENING IS NOT INTENDED. SIMPLY REMOVE BY HAND THE COARSE PARTICLES THAT INTEREFERE WITH THE TESTS.

DILATANCY (REACTION TO SHAKING)

AFTER REMOVING PARTICLES LARGER THAN 450 μm (NO. 40) SIEVE SIZE, PREPARE A PAT OF MOIST SOIL WITH A VOLUME OF ABOUT 6.504mm^3 (1/2 CUBIC INCH). ADD ENOUGH WATER IF NECESSARY TO MAKE THE SOIL SOFT BUT NOT STICKY. PLACE THE PAT IN THE OPEN PALM OF ONE HAND AND SHAKE HORIZONTALLY, STRIKING VIGOROUSLY AGAINST THE OTHER HAND SEVERAL TIMES. A POSITIVE REACTION CONSISTS OF THE APPEARANCE OF WATER ON THE SURFACE OF THE PAT WHICH CHANGES TO A LIVERY CONSISTENCY AND BECOMES GLOSSY. WHEN THE SAMPLE IS SQUEEZED BETWEEN THE FINGERS, THE WATER AND GLOSS DISAPPEAR FROM THE SURFACE, THE PAT STIFFENS AND FINALLY IT CRACKS OR CRUMBLES. THE RAPIDITY OF APPEARANCE OF WATER DURING SHAKING AND OF ITS DISAPPEARANCE DURING SQUEEZING ASSIST IN IDENTIFYING THE CHARACTER OF THE FINES IN A SOIL.

VERY FINE CLEAN SANDS, GIVE THE QUICKEST AND MOST DISTINCT REACTION WHEREAS A PLASTIC CLAY HAS NO REACTION. INORGANIC SILTS SUCH AS A TYPICAL ROCK FLOUR, SHOW A MODERATELY QUICK REACTION.

DRY STRENGTH (CRUSHING CHARACTERISTICS)

AFTER REMOVING PARTICLES LARGER THAN 450 μm (NO. 40) SIEVE SIZE, MOLD A PAT OF SOIL TO THE CONSISTENCY OF PUTTY, ADDING WATER IF NECESSARY. ALLOW THE PAT TO DRY COMPLETELY BY OVEN, SUN, OR AIR DRYING AND THEN TEST ITS STRENGTH BY BREAKING AND CRUMBLING BETWEEN THE FINGERS. THIS STRENGTH IS A MEASURE OF THE CHARACTER AND QUANTITY OF THE COLLOIDAL FRACTION CONTAINED IN THE SOIL. THE DRY STRENGTH INCREASES WITH INCREASING PLASTICITY.

HIGH DRY STRENGTH IS CHARACTERISTIC FOR CLAYS OF THE CH GROUP. A TYPICAL INORGANIC SILT POSSESSES ONLY VERY SLIGHT DRY STRENGTH. SILTY FINE SANDS AND SILTS HAVE ABOUT THE SAME SLIGHT DRY STRENGTH, BUT CAN BE DISTINGUISHED BY THE FEEL WHEN POWDERING THE DRIED SPECIMEN. FINE SAND FEELS GRITTY WHEREAS A TYPICAL SILT HAS THE SMOOTH FEEL OF FLOUR.

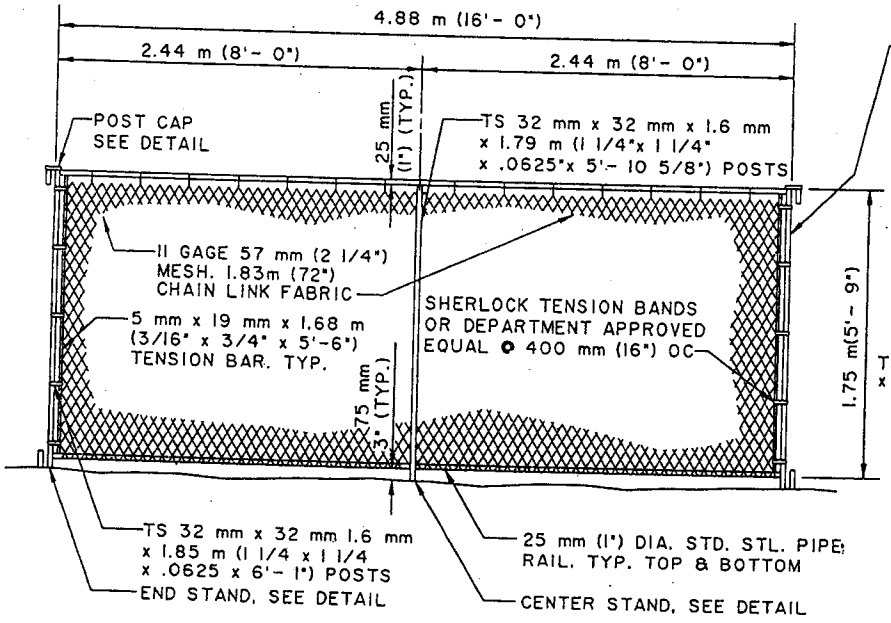
TOUGHNESS (CONSISTENCY NEAR PLASTIC LIMIT)

AFTER REMOVING PARTICLES LARGER THAN THE 450 μm (NO. 40) SIEVE SIZE, A SPECIMEN OF SOIL ABOUT 6.504mm^3 (1/2 CUBIC INCH) IN SIZE IS MOLDED TO THE CONSISTENCY OF PUTTY. IF TOO DRY, WATER MUST BE ADDED AND IF STICKY, THE SPECIMEN SHOULD BE SPREAD OUT IN A THIN LAYER AND ALLOWED TO LOSE SOME OF ITS MOISTURE BY EVAPORATION. THEN THE SPECIMEN IS ROLLED OUT BY HAND ON A SMOOTH SURFACE OR BETWEEN THE PALMS INTO A THREAD ABOUT 3mm (1/8") IN DIAMETER. THE THREAD IS THEN FOLDED AND REROLLED REPEATEDLY. DURING THIS MANIPULATION THE MOISTURE CONTENT IS GRADUALLY REDUCED AND THE SPECIMEN STIFFENS, FINALLY LOSES ITS PLASTICITY, AND CRUMBLES WHEN THE PLASTIC LIMIT IS REACHED.

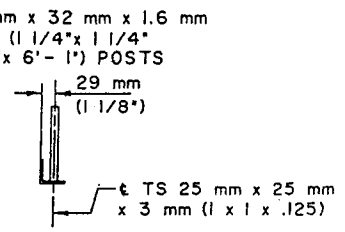
AFTER THE THREAD CRUMBLES, THE PIECES SHOULD BE LUMPED TOGETHER AND A SLIGHT KNEADING ACTION CONTINUED UNTIL THE LUMP CRUMBLES.

THE TOUGHER THE THREAD NEAR THE PLASTIC LIMIT AND THE STIFFER THE LUMP WHEN IT FINALLY CRUMBLES, THE MORE POTENT IS THE COLLOIDAL CLAY FRACTION IN THE SOIL. WEAKNESS OF THE THREAD AT THE PLASTIC LIMIT AND QUICK LOSS OF COHERENCE OF THE LUMP BELOW THE PLASTIC LIMIT INDICATE EITHER INORGANIC CLAY OF LOW PLASTICITY, OR MATERIALS SUCH AS KAOLIN-TYPE CLAYS AND ORGANIC CLAYS WHICH OCCUR BELOW THE A-LINE.

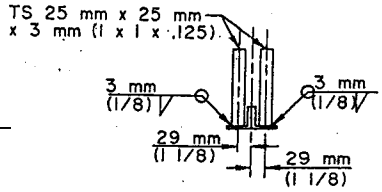
HIGHLY ORGANIC CLAYS HAVE A VERY WEAK AND SPONGY FEEL AT THE PLASTIC LIMIT.



TYPICAL FENCE ELEVATION



SECTION A-A



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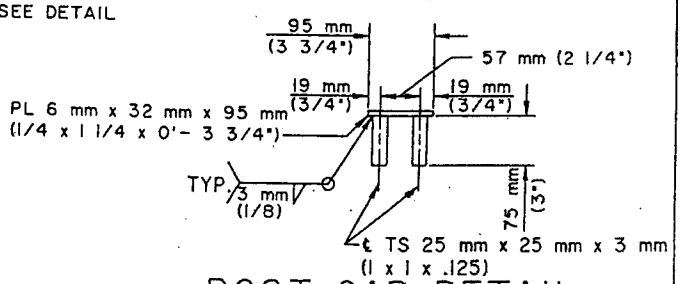
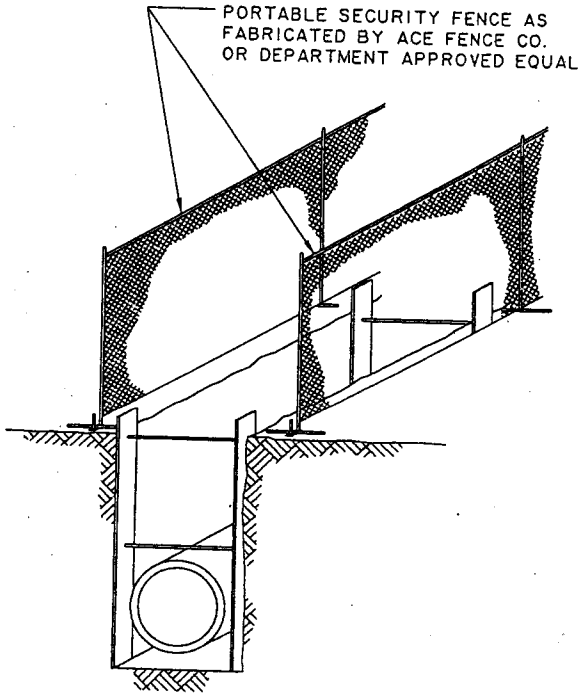
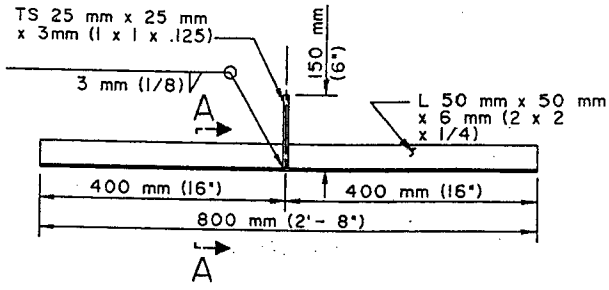


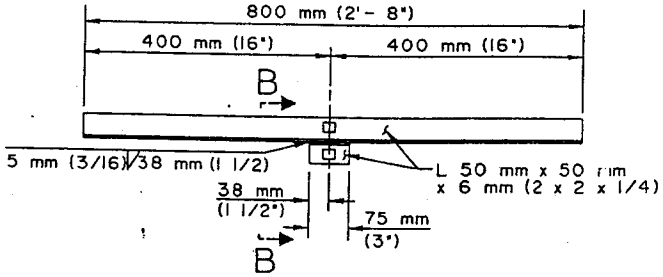
POST CAP DETAIL



TYPICAL FIELD INSTALLATION



CENTER STAND DETAIL



END STAND DETAIL

LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS

PORTABLE SECURITY FENCE FOR OPEN TRENCHES

STANDARD PLAN METRIC

6002-1

SHEET 1 OF 2

APPROVED Thomas A. Tidemanson 5/31/1992

DIRECTOR OF PUBLIC WORKS — DATE

1999 — REVISIONS

NOTES

1. ALL CHAIN LINK FENCE MATERIAL SHALL CONFORM TO "STANDARD SPECIFICATIONS" UNLESS OTHERWISE SPECIFIED.

2. FABRIC SHALL BE TIED TO TOP AND BOTTOM RAILS AND CENTER POSTS WITH 3mm(11 GA.) WIRE AT MAX. 375mm (15") INTERVAL.

3. POST RAIL JOINTS SHALL BE WELDED ALL AROUND WITH 3 mm (1/8") FILLET WELD.

4. IN LIEU OF GALVANIZING, POSTS MAY BE PAINTED WITH A ZINC CHROMATE PRIMER COAT AND AN ALL PURPOSE ALUMINUM FINISH COAT.

5. FENCE PANELS SHALL BE HOSED OFF WITH WATER WHEN NECESSARY TO REMOVE ACCUMULATED DIRT SO THAT A CLEAN APPEARANCE IS MAINTAINED AT ALL TIMES.

6. SAND BAGS SHALL BE PLACED ON THE END STANDS TO INCREASE STABILITY WHEN OVERTURNING IS A PROBLEM, AS DETERMINED BY THE ENGINEER.

7. DIMENSIONS SHOWN ON THIS PLAN FOR METRIC AND ENGLISH UNITS ARE NOT EXACT EQUAL VALUES. IF METRIC VALUES ARE USED, ALL VALUES USED FOR CONSTRUCTION SHALL BE METRIC VALUES. IF ENGLISH UNITS ARE USED, ALL VALUES USED FOR CONSTRUCTION SHALL BE ENGLISH UNITS.

LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS

PORTABLE SECURITY FENCE FOR OPEN TRENCHES

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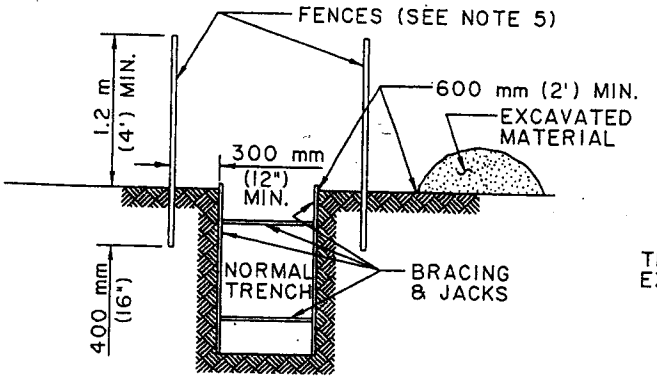
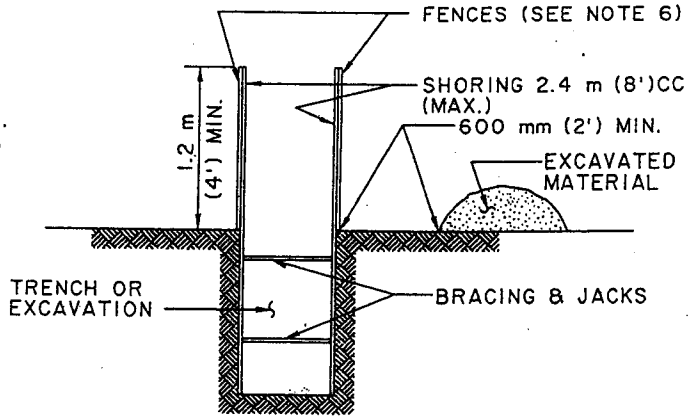
SHEET 2 OF 2

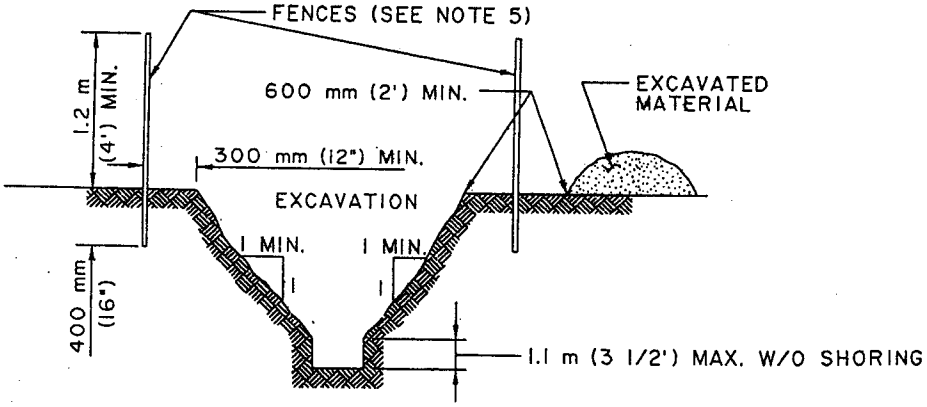
PRIOR TO THE END OF EACH WORKDAY, AND WHENEVER WORKERS ARE NOT WITHIN VISUAL SIGHT OF THE EXCAVATION, THE CONTRACTOR SHALL EITHER BACKFILL THE EXCAVATION OR ERECT AND MAINTAIN FENCES AROUND THE EXCAVATION OR COVER THE EXCAVATION. THE FOLLOWING ARE MINIMUM ACCEPTABLE MEASURES ONLY AND COMPLIANCE WITH THIS STANDARD DOES NOT RELIEVE THE CONTRACTOR OF HIS OBLIGATION TO PROTECT THE PUBLIC BY ALL NECESSARY MEANS.



CASE A

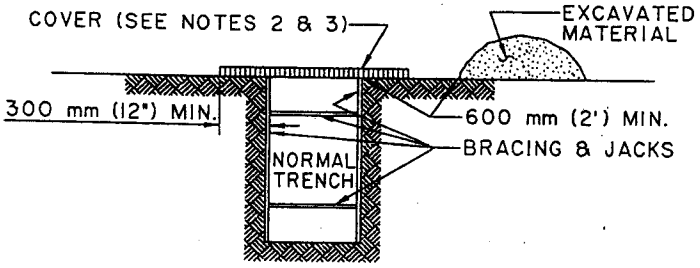


CASE C



CASE B

FENCES



COVER

LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS

MINIMUM PUBLIC SAFETY REQUIREMENT FOR OPEN EXCAVATIONS

STANDARD PLAN METRIC

6008-1

SHEET 1 OF 2

APPROVED *Thomas A. Tidemanson* 5/31/1992

DIRECTOR OF PUBLIC WORKS — DATE

1999

REVISIONS

NOTES

1. EXCEPTIONS: FENCES OR COVERS WILL BE OPTIONAL WITH THE CONTRACTOR IF THE EXCAVATION IS EITHER:

   A. LESS THAN 900 mm (3') DEEP UNLESS UNUSUALLY HAZARDOUS CONDITIONS EXIST.
   B. LESS THAN 1.5 m (5') DEEP WITH SUFFICIENT WARNING DEVICES SUCH AS LANTERNS, FLASHERS, OR BARRICADES.
   C. FOR CASE B, LESS THAN 1.1 m (3 1/2') DEEP IN THE VERTICAL PORTION WITH UPPER SIDE SLOPES OF 1:1 OR FLATTER.
   D. IN AN AREA THAT IS NOT ACCESSIBLE TO THE PUBLIC.

2. COVERS FOR NON-VEHICULAR TRAFFIC MAY BE:

   A. 6 mm (1/4") STEEL PLATES.
   B. 50 mm (2") PLANKS.
   C. 19 mm (3/4") PLYWOOD.

3. STEEL PLATE COVER FOR VEHICULAR TRAFFIC REQUIRES PROPER TRENCH BRACING AND STEEL PLATES WITH SUFFICIENT STRENGTH TO WITHSTAND TRAFFIC LOADING IN ACCORDANCE WITH THE REQUIREMENTS OF THE EXCAVATION PERMIT.

4. POSTS FOR FENCES SHALL BE 50 mmx100 mm (2"x4") WOOD OR EQUIVALENT STEEL OR PIPE. IN PAVED AREAS, POSTS MAY BE FLUSH WITH SURFACE IF SUFFICIENTLY ANCHORED AND BRACED. RAILS SHALL BE 25 mmx100 mm (1"x4") WOOD.

5. FOR CASE A AND B, FENCES MAY BE:

   A. WOOD PICKETS TIED WITH WIRE AND POSTS 2.4 m (8') CC.
   B. 50 mmx100 mm (2"x4") POSTS 2.4 m (8') CC AND WIRE MESH.
   C. 50 mmx100 mm (2"x4") POSTS 2.4 m (8') CC WITH TOP AND BOTTOM RAIL AND CHICKEN WIRE.
   D. SAME AS NOTE 6 ITEM C.

6. FOR CASE C, FENCES MAY BE:

   A. WOOD PICKETS TIED WITH WIRE AND BOTTOM RAIL.
   B. TOP AND BOTTOM RAIL WITH CHICKEN WIRE.
   C. THREE RAILS EQUALLY SPACED WITH BOTTOM RAIL 150 mm (6") ABOVE GROUND.

7. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO PROVIDE ADEQUATE SHORING, BRACING AND/OR COVERS OVER ANY EXCAVATION IN ACCORDANCE WITH SECTIONS 7-10.4 AND 306-1.1.6 OF THE STANDARD SPECIFICATIONS.

8. DIMENSIONS SHOWN ON THIS PLAN FOR METRIC AND ENGLISH UNITS ARE NOT EXACT EQUAL VALUES. IF METRIC VALUES ARE USED, ALL VALUES USED FOR CONSTRUCTION SHALL BE METRIC VALUES. IF ENGLISH UNITS ARE USED, ALL VALUES USED FOR CONSTRUCTION SHALL BE ENGLISH UNITS.

LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS

MINIMUM PUBLIC SAFETY REQUIREMENT FOR OPEN EXCAVATIONS

STANDARD PLAN
METRIC
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SHEET 2 OF 2

PROJECT ID NO. SWQ0000003

LADERA PARK
STORMWATER IMPROVEMENTS

SPECIAL PROVISIONS

SECTION M - MECHANICAL

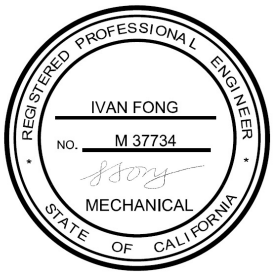
The following Special Provisions supplement and amend the Standard Specifications for Public Works Construction, 2015 Edition.

Prepared By:

Jacqueline Ung

10/11/2018

Date



Reviewed:

Ivan Fong

10/11/2018

Date

Pages M-1 through M-30

SPECIAL PROVISIONS FOR PROJECT ID NO. SWQ0000003

SECTION M – MECANICAL

TABLE OF CONTENTS

SPECIAL PROVISIONS FOR PROJECT ID NO. SWQ0000003

SPECIAL PROVISIONS FOR PROJECT ID NO. SWQ0000003

M-1 SPECIAL REQUIREMENTS

M-1.1 Submittals

All submittals shall be clearly marked "Ladera Park Stormwater Improvements". For submittals and review see Subsection 2-5.3 of Section G.

M-1.1.1 Shop Drawings

Shop Drawings shall be of a size and scale to clearly show all necessary details, dimensions, clearances, finishes, materials, and other pertinent data. Non-scaled, manufacturer general catalog outline drawings are not acceptable as a substitute for Shop Drawings.

The Contractor shall submit the following items to be furnished, fabricated, or manufactured under the Contract:

- Cast-iron slide gate assembly and the appurtenances
- Electric motor operator
- Equipment vaults and the appurtenances
- Drive shaft covers
- Bevel gear pedestals
- Pumps
- Flow meter
- Greywater treatment skid
- Storage tank

M-1.1.2 Supporting Information

Submittals of supporting information shall consist of manufacturer's published brochures, catalog cut sheets, technical bulletins, or product specification sheets. Data shall be specific for the item to be furnished, and not general for a line of products.

The Contractor shall submit all supporting information including, but not limited to the following items to be manufactured or furnished:

- Cast-iron slide gate assembly and the appurtenances
- Electric motor operator and controller
- Bevel gear unit
- Flow meter and data logger
- Monitoring sensors
- Refrigerated sampler
- Pressure transducer

M-1.2 Inspection at Place of Manufacture

The Agency reserves the right to inspect or witness all phases of manufacturing, assembly, and testing of all equipment to be furnished, at the place of manufacture. The Contractor shall provide access to all testing and manufacturing facilities to the Agency, and inspections will be made at the discretion of the Agency.

The Contractor shall notify the Engineer at least two weeks in advance of the time of any equipment fabrication or testing to permit scheduling of the inspection. Fabrication and testing shall be shown as individual activities on the schedules required in 6-1.2 of Section G.

M-1.3 Instruction Manuals and Parts Catalogs

Before final inspection and performance testing of the slide gate assemblies, electric motor operators, flow measuring systems, and submersible pump, the Contractor shall submit one complete bound together set of instruction manuals and parts catalogs and PDF format electronic file on at least five separate CD with proper label described on Section M-1.1 to include, but not limited to the following items:

- Cast-iron slide gate assembly and the appurtenances
- Electric motor operator and the appurtenances
- Bevel gear unit
- Flow meter and data logger
- Pumps
- Greywater treatment skid

M-1.4 Field Tests

After all machinery and equipment called for herein or shown on the Plans has been installed and other necessary appurtenant work performed, and prior to the acceptance of the Work, a complete test shall be made of the entire equipment under working conditions of automatic operations.

In this test, all automatic features of the slide gate and their electric motor operator shall be tested. The operation of the slide gate and operator shall be tested and accurate records taken to verify that slide gate and operator will operate under the specified flow and pressure. For the purpose of making the test, the Contractor shall furnish the required amount of water to conduct the test, as required by the Engineer.

If during the test, any structural defect or weakness, or any leakage of pipe or fittings develops, or if any of the equipment fails to perform as required by the Plans and Specifications, the Engineer reserves the right to reject any part, or the whole of such equipment and demand reconstruction of same to meet the requirements of these specifications. All costs of such reconstruction or replacement shall be borne by the Contractor.

A qualified engineer furnished by the manufacturer of the equipment shall be present at the time final tests are made and assist the Contractor in placing the equipment in final adjustment and operation. Such person shall approve the installation and operation of the equipment before final acceptance. The above shall be performed without additional cost to the Agency.

Prior to final acceptance of the Work, tests shall be made to demonstrate that the equipment meets the following requirements:

1. The slide gate, and all mechanical equipment shall operate without excessive noise or vibration and without overheating of bearings.

2. All automatic and manual electrical controls and instrumentation, including pumps, flow meter, sampler, etc., shall operate in accordance with the Specifications and manufacturer's requirements.

3. All motors shall operate without being overloaded.

M-1.5 Payment

The lump sum Bid price for "OPERATIONAL TESTS" shall include, but is not limited to, furnishing all labor, materials, equipment fabrication; installing and field testing; performing all the required Work to provide a completely operable system.

M-2 MISCELLANEOUS MECHANICAL WORK

M-2.1 General

The Contractor shall furnish and install new cast-iron slide gate and the appurtenances, monitoring system, pumps, greywater treatment skid, storage tank and other appurtenances specified or required to provide a complete and operable installation per Plans.

M-2.2 Scope of Work

The general scope of the work includes, but is not limited to the following:

- Install new cast-iron slide gate with bevel gear and electronic motor operator.
- Install new flow meters with data loggers.
- Install new pressure transducer in monitoring wells and dry wells.
- Install new refrigerated samplers.
- Install new velocity sensors.
- Install new greywater treatment skid with outdoor enclosure.
- Install new 1700 Gallon HDPE storage tank.
- Install new pump and pressure transducer in splitter well and storage tank.
- Install new valve box with three-way ball valve and basket strainer.
- Refer to Electrical Specification sections for all associated electrical work.

M-2.3 Installation of the Equipment and the Appurtenances

M-2.3.1 Basis for Design and Installation

The Plans show the basis for design and installation. Installation details and exact dimensions shall be determined by the Contractor after equipment selection. The Contractor shall submit Working Drawings in full detail of all equipment and appurtenances to be furnished and/or installed by the Contractor per 2-5.3.2 of Section G.

M-2.4 Metal Work

This section includes all of the miscellaneous metal work required for the installation of the pipes, fittings, supports, and valves.

All ferrous metal work below the finished grade, which is not specified to be painted or coated, shall be galvanized. All stainless steel shall remain uncoated.

M-2.4.1 Materials

M-2.4.1.1 Structural Steel

All structural steel shapes, plates, and bars shall conform to ASTM A 36, "Structural Steel."

M-2.4.1.2 Sheet Metal

All sheet metal shall conform to ASTM A 569, "Steel, Carbon (0.15 Maximum percent), Hot-Rolled Sheet and Strip Commercial Quality," galvanized per ASTM A 123.

M-2.4.1.3 Bolts, Nuts, and Steel Washers

Materials for bolts, nuts, and plain steel washers shall conform to ASTM A 307, Grade B or ASTM A325, Type 3, unless otherwise specified.

M-2.4.1.4 Washers

Plate washers shall be fabricated from structural steel plate ASTM A 36.

M-2.4.1.5 Pipe

Pipe for use in structural items and utility purposes shall be standard steel pipe conforming to ASTM A53, for "Black and Hot-Dipped, Zinc Coated (Galvanized) Welded and Seamless Steel Pipe."

M-2.4.1.6 Stainless Steel Plate

Stainless steel plate shall be ASTM A167 or ASTM A240, Type 304.

M-2.4.1.7 Stainless Steel Bolts and Nuts

Stainless steel bolts and nuts shall be ASTM F593 and ASTM F594, Alloy 304.

M-2.4.2 Workmanship

All fabrication and assembly methods used shall be in accordance with the latest AISC Specifications unless otherwise noted or shown on the Plans.

Before laying out or working in any way, materials shall be thoroughly straightened. Sharp kinks or bends in members will be cause for rejection. Finished members shall be free from kinks or bends. Shearing shall be accurately done, and all portions of the work neatly finished. Re-entrant cuts shall be made in a workmanlike manner and, where they cannot be made by shearing, a rectangular punch may be used. Re-entrant cuts shall be filleted unless otherwise approved by the Engineer. Corners shall

be square and true unless otherwise shown on the Plans. All bends, except for minor details, shall be made by approved dies or bending rolls. Where heating is required, precautions shall be taken to avoid overheating the metal, and allowed to cool in such a manner as not to destroy the original properties of the metal. Steel with welds will not be accepted, except where welding is definitely specified or called for on the Plans. All bolts, nuts, and screws shall be tight.

M-2.4.2.1 Welding

All welding shall be done by the electric arc welding process using certified welders, arc welding machines, and approved electrodes, conforming in all respects to the applicable code of the American Welding Society.

M-2.4.2.2 Galvanizing

All metal fabricated items specified in these specifications or on the Plans to be galvanized shall be galvanized in conformance with the requirements specified in Subsection 210-3 of the SSPWC. All galvanizing shall be performed after fabrication.

M-2.4.2.3 Bolted Connections

Bolt holes for fitted bolts shall be truly cylindrical throughout. Holes for unfinished bolts, unless otherwise specified on the Plans, shall be drilled and shall not be more than 1/16-inch larger than the nominal diameter of the bolts.

M-2.4.2.4 Concrete Expansion Anchors

Concrete anchors shall be stainless steel, threaded stud wedge anchor type with expansion clip, supplied with nut and washer. Concrete anchors shall be "Trubolt" by ITW Ramset/Red Head, "Kwik Bolt" by Hilti, or approved equal. Size shall be as indicated or required. In general, it will be required that the anchor system provide load capacity (pull out strength) at least equal to that of the concrete in which it is set.

M-2.4.2.5 Adhesive Anchors

Adhesive anchors shall consist of a self-contained two-component capsule containing vinylester resin and hardening catalyst, supplied with stainless steel threaded stud, nut, and washer. Anchors shall be "HVA Adhesive Anchors" with "HEA" capsule, as manufactured by Hilti, or Agency approved equal.

M-2.4.3 Hangers and Supports

The Contractor shall furnish and install brackets, hangers and supports or other approved devices for all piping, and equipment components to be supported where indicated or necessary.

Items shall be as manufactured by B-Line, Tolco Inc., Grinnell, or Agency-approved equal. All brackets, hangers and supports below pump room floor shall be galvanized.

M-2.5 Painting and Coating

All painting and application of epoxy coatings shall be included in this section. Except as otherwise specified herein, all steel surfaces (except stainless steel) shall be painted or epoxy coated.

M-2.5.1 Paint Primer

A. Iron and Steel Primer

Iron and steel primer shall be “Kromik Metal Primer,” as manufactured by Sherwin-Williams Company, Stops Rust Metal Primer as manufactured by Rust-Oleum Corporation or an Agency-approved equivalent industrial primer.

B. Galvanized Metal Primer

Galvanized metal primer shall be “DTM Acrylic Primer/Finish” as manufactured by Sherwin-Williams Company, “DTM Acrylic Primer” as manufactured by Rust-Oleum Corporation, or an Agency-approved equal. Galvanized metal surfaces shall first be treated with a prepared metal bonderizer before applying metal primer.

M-2.5.2 Paint Finish Coats

A. Interior and Exterior Metal Paint

Interior and exterior metal paint shall be “DTM Acrylic Coating” as manufactured by Sherwin-Williams Company, an equivalent industrial metal finish as manufactured by Rust-Oleum Corporation or an Agency-approved equal.

B. Enamel

Enamel shall be "KEM 400 Enamel" as manufactured by Sherwin-Williams Company, and equal industrial finish as manufactured by Rust-Oleum Corporation, or an Agency-approved equal.

M-2.5.3 Paint Schedule

In general, all exposed metal items of this work above the engine room floor level shall be primed and painted with two coats of finish paint. Other manufactured items that have received factory enamel need not be repainted, except where coatings have been damaged or abraded in shipping or installation.

M-2.5.4 Epoxy Coating – Liquid Applied

A. Epoxy Primer

Epoxy primer shall be "Engard 482", as manufactured by Engard Coatings Corporation (2 mil dry thickness), or an Agency-approved equal.

B. Epoxy Coating

Epoxy coating shall be "Engard 482 (Gray)" as manufactured by Engard Coatings Corporation (15 mil dry thickness), or an Agency-approved equal.

C. Preparation for Epoxy Coatings

All metal surfaces to receive epoxy coatings shall be cleaned to bright metal by sandblasting using clean, dry sharp sand in accordance with SSPC-SP5. After cleaning, all accumulated dust shall be removed. The primer coat shall be applied immediately after cleaning. Coating on pipes to be field welded, shall be held back from the weld joints approximately 2 inches. In held back areas, pipe and fittings shall be brushed or ground to bright metal, cleaned with solvent, then coated as specified.

M-2.6 Payment

The lump sum Bid price for " MISCELLANEOUS MECHANICAL WORK " shall include, but is not limited to, furnishing all labor, materials, equipment fabrication; installing and field testing; performing all the required Work to provide a completely operable system.

M-3 CAST IRON SLIDE GATE ASSEMBLY

M-3.1 General

The Contractor shall furnish and install one (1) self-contained non-rising cast iron slide gate assemblies and the appurtenances per Plans. The gates shall be cast iron, bronzed mounted, and the flush bottom closure type. The gates shall be suitable for storm water service and be designed for the following specification:

Location	Gate Size	Quantity	Maximum Design Head (ft.)		Operating Seating Head	Stem Dia.	Operator Type
	(in.)		Seating	Unseating	(ft.)	(in.)	
Intake Structures	24x24	1	65	37.5	14.33	1.5	EMO w/ bevel gear

The leakage allowable is 0.1 gallon per min (gpm) per foot of seating perimeter. No component shall be stressed beyond the following:

Maximum Allowable Combined Stress = 1/5 Tensile Strength
Maximum Allowable Combined Stress = 1/3 Yield Strength

The gate assemblies shall conform to the latest edition of the AWWA C560 Standard and as modified by the following specifications.

The cast-iron slide gate assembly shall be manufactured by Waterman, Hydro Gate or Agency approved equal.

The cast-iron slide gate assembly shall include, but not be limited to the frame, disc, disc guides, wedges, seat faces, flush-bottom seal, thrust nut, stem, and yoke.

M-3.2 Frame

The frame shall be one piece cast-iron construction with all contact surfaces machined. Dovetailed grooves shall be machined on the front face of the frame for the fitting of the bronze seat facings. The back of the frame shall be machined and drilled for bolting onto the concrete backwall. The frame shall have integrally cast pads, machined to receive the top wedge seats.

M-3.3 Disc

The slide disc shall be cast iron with integrally cast vertical and horizontal reinforcing ribs, and a reinforced nut pocket to receive the bronze thrust nut. Cast pads shall be drilled, tapped, and machined with a groove to receive the mounting tongue of the adjustable wedges. The disc shall have accurately machined tongues on each side extending its full length to fit into the guide grooves with a maximum allowable clearance of 1/16 inch. The back side of the disc shall have machined dovetailed grooves for the fitting of the bronze seat facings.

M-3.4 Disc Guide

Guides shall be cast iron and be integrally cast with the frame, or dowelled and bolted to the frame. The guides shall be machined on all contact surfaces and a groove shall be accurately machined on the entire length of the guide to allow 1/16-inch maximum clearance between the guide groove and disc tongue. Cast pads shall be provided on the guide for the side wedge seats. The guides shall be of sufficient length to support at least one-half of the height of the slide disc when fully opened. The guides shall be capable of taking the thrust produced by water pressure and the wedging action without lateral movement or vibration.

M-3.5 Wedges

Cast-iron slide gate shall be equipped with top and side wedging devices to insure tight contact between the seat facings on the disc and frame when the gate is fully closed. Wedges shall be cast bronze, machined on their contact surfaces to give maximum contact, and wedging action. Wedges shall be fully adjustable and be attached to the gate disc with bronze fasteners. Side wedges shall be keyed to the gate disc to prevent rotation by means of a full length tongue on the wedge fitted into a groove on the mounting pad of the disc. Top wedges shall consist of wedge hooks on the gate disc, which seat onto bronze loops keyed and bolted to the gate frame. All wedges shall be provided with a hold-down stud nut and adjusting screw with lock nut to retain the proper setting once adjusted.

M-3.6 Seat Faces

Seat facings shall be extruded bronze, pneumatically impacted into machined dovetail grooves in the frame and slide disc to permanently lock them into place. Attachment by screws or other fasteners is not allowed. The installed seat facings shall be machined to a plane with a 63 micro-inch finish or better and maximum clearance between seating faces not to exceed 0.004 inch with gate fully closed.

M-3.7 Flush Bottom Closure

The flush bottom closure shall consist of a wide resilient seal made of neoprene, attached to the bottom of the slide disc or invert frame with a stainless steel retainer plate and stainless steel screws. When the gate is closed, the seal is compressed against a machined cast-iron surface between the disc and frame invert, thus creating an effective watertight seal along the invert.

M-3.8 Thrust Nut

A thrust nut shall be provided for connecting the stem to the slide disc. The thrust nut shall be cast bronze, and be threaded to the stem and locked with a gib key secured by a stainless steel set screw. The square-backed thrust nut and slide disc nut pocket shall be constructed to prevent turning of the nut in the pocket while operating the gate.

M-3.9 Stem

The operating non-rising stem shall be continuous length round bar stainless steel. Stem threading shall be machine-cut, left-hand 29° ACME threads with a surface finish of 63 micro-inch or better.

The minimum stem size required shall be as listed in the gate schedule and indicated on the Plans.

M-3.10 Yoke

The yoke shall be mounted on the machined pads provided on the upper ends of the guides. The yoke shall have a machined bearing surface for the pedestal mounting plate.

M-3.11 Pedestal Assembly

The gate manufacturer shall provide the fabricated yoke mounting steel pedestals for the 24”x24” slide gate to support the installation of the bevel gear units as shown on the Plans. The gate manufacturer shall provide shop drawing for the pedestal design for the Agency review and approval prior to begin construction.

M-3.12 Materials

Materials used in the construction of the cast-iron slide gate and appurtenances shall conform to the following requirements:

Part Description	Material	ASTM Standard
Frame	Cast Iron	A126 Class B
Disc	Cast Iron	A126 Class B
Disc Guide	Cast Iron	A126 Class B
Wedges (Top & Side)	Bronze	B584 C86500
Wedge Seats	Bronze	B584 C87300
Wedge Fasteners	Bronze	B98 C65500
Seat Faces	Bronze	B98 C65500
Flush Bottom Seal	Neoprene	D-2000

Seal Retainer	Stainless Steel	A276 Type 304 Cond A
Thrust Nut	Bronze	B584 C86500
Thrust Nut Key	Stainless Steel	A276 Type 304 Cond A
Stem	Stainless Steel	A276 Type 304 Cond A
Gate Assembly Fasteners	Stainless Steel	F593 Alloy 304 Cond A
Hex Nuts	Stainless Steel	F594 Alloy 304 Cond A
Yokes	Cast Iron	A126 Class B

M-3.13 Payment

The lump sum Bid price for " CAST IRON SLIDE GATE ASSEMBLY " shall be included, but not limited to furnish all labor, materials, equipment fabrication, installation and field testing to perform all the required Work to provide a completely operable slide gate.

M-4 ELECTRIC MOTOR OPERATORS AND APPURTENANCES

M-4.1 General.

The Contractor shall furnish and installed one (1) electric motor operator (EMO) for the 24" x 24" slide gate complete with bevel gear unit and the appurtenances in the equipment vault.

The electric motor operator (EMO) shall include, but not be limited to, the electric motor, operator reduction gearing, position limit switches, torque limit switches, limit switch gearing, stem lift nut, declutch lever, auxiliary handwheel, automatic resetting overloads, AC reversing magnetic starter, transformer, 24 point terminal strip, and compartment heaters as a self-contained unit with a ductile iron or cast-iron main housing. The operator shall be Limitorque L-120 Series

M-4.2 Operational Requirements

The electric motor operator shall be capable of raising and lowering the gate with a non-rising stem at a rate of travel of 9 to 12 inches per minute.

M-4.3 Motor

The motor shall be an induction type, specifically designed for actuator service, and be of high starting torque, totally enclosed and nonventilated construction. The motor shall have anti-friction bearings and be permanently lubricated. The motor shall withstand jogging at 90 and 110 percent of nominal voltage without exceeding its temperature rating and shall meet NEMA standards. The motor shall be protected by overload device integral with the motor and shall be of the automatic resettable type. The motor shall have an internal electric heater. The motor shall be a unitized subassembly, independent of the power-gearing, allowing easy removal for replacement, repair, or rewinding. The motor shall be approved by a national independent testing laboratory (Underwriters Laboratory, Factory Manual, Canadian Standards Association, or City of L.A.).

The motor for the slide gate shall comply with the following parameters:

Torque Rating	40 Ft-lb
Voltage	230 volts
Phase	3
Frequency	60 hertz
Speed	1800 RPM (nominal)
Time Rating	15 minute minimum
Number of Starts	10 per minute
Insulation Class	F
Ambient Temperature	40 C minimum
Control Voltage	120 volts
Heater Rating	25 watts @ 120 volts

M-4.4 Operator Reduction Gearing

The operator power gearing shall be a multiple reduction unit consisting of spur, helical, or bevel gears and worm gearing. The spur, helical, or bevel gearing and worm shall be hardened alloy steel, while the worm gear shall be alloy bronze. Nonmetallic and aluminum gears are not acceptable. All gears and shafting shall be supported on anti-friction bearings. All power train gearing and bearings shall be grease or oil lubricated. Provisions shall be provided for inspection and relubrication without disassembly. Seals shall be provided on all shafting exit points of the gear case.

M-4.5 Stem Nut

The operator shall have a removable stem lift nut constructed of high strength bronze alloy. The stem nut supplied shall be internally threaded to mate with the gate stem supplied and shall have the same surface finish of 63 micro-inch or less.

M-4.6 Manual Operation

The motor gate operator shall be equipped with a side mounted handwheel for manual operation. The handwheel shall not rotate during motor operation and the motor shall not rotate during manual operation. A fused motor shall not prevent manual operation. When in the manual operating mode, the operator will automatically return to electric operation when the motor is energized. Changing from motor operation to manual hand wheel operation shall be accomplished by movement of a padlockable declutch lever, which mechanically disengages the motor and related gearing. The handwheel shall have an arrow and the word "OPEN" indicating required rotation and shall require no more than 80 pounds of rim effort at the maximum required torque.

M-4.7 Hammerblow Device

The operator shall have a lost motion device, integral in the power gear train, which allows the motor to attain full speed before engaging the load with a hammerblow effect.

M-4.8 Position Limit Switch

Position limit switches shall be geared directly to the operator drive mechanism and remain synchronous with the gate position whether manually or electrically operated. Limit switch gears shall be bronze or stainless steel, and be grease lubricated and totally enclosed to prevent entrance of foreign matter. The limit switches shall be of the open contact type with a rotary wiping action and be infinitely adjustable, allowing for trip points from fully open to fully closed positions of gate travel. Limit switch contacts shall be heavy duty, silver plated.

M-4.9 Torque Switch

The operator shall include an adjustable torque limiting switch that will interrupt the control circuit in both the opening and closing directions when an obstruction is encountered, resulting in torque overload. Switch contacts shall be silver plated. The torque switch shall have graduated dials for both opening and closing direction of gate travel, and each shall be independently adjustable with a limiter plate to prevent setting beyond operator output torque capability.

M-4.10 Reversing Magnetic Starter

The reversing magnetic starter coil shall be rated for 120 volts, and be capable of starting the motor.

M-4.11 Heater

The operator shall be supplied with at least one control compartment space heater rated at 20 to 25 watts at 120 volts and a motor heater rated at 25 watts at 120 volts.

M-4.12 Electrical Control Enclosure

The position limit switches, torque switches, starter, space heater, and terminal strips shall be housed in a single electrical enclosure compartment to provide single entry access for field servicing of the components. The compartment enclosure shall be hinged and sealed by O-ring and shall meet NEMA 4 weatherproof construction.

M-4.13 Electric Motor Operator Control Station

A pushbutton control station shall be furnished for the motor operator.

The control station shall contain, as a minimum:

One "OPENED" indicating light
One "CLOSED" indicating light
One "OPEN" pushbutton
One "CLOSE" pushbutton
One "STOP" pushbutton

<u>"CLOSED" Indicating Light</u>

The "CLOSED" (red) indicating light shall be off only when the gate is fully opened.

<u>"OPENED" Indicating Light</u>

The "OPENED" (green) indicating light shall be off only when the gate is fully closed.
All indicating lamps shall be removable from the front of the panel. Lamps shall

be rated at 120 volt, 60 hertz, 1 phase. Control stations shall be weatherproof (NEMA 4).

The control station shall be directly mounted and integral with the electric actuator.

Control stations shall be Limitorque SW320 or Agency-approved equal.

M-4.14 Protective Coating and Painting

All exposed ferrous metal surfaces of the cast-iron slide gate assembly shall be coated with the manufacturer's recommended fusion-bond epoxy. Surfaces shall be prepared by abrasive blast cleaning to SSPC-SP-10 before shop-applying of primer and finished coats.

Touch-up coating for each gate, the supplier shall furnish sufficient resin and hardener to make one gallon of the coating to repair any damage to the shop-applied coating sustained during shipping and installation.

All exposed exterior surfaces of the gate operator and pedestal shall have a minimum of one prime coat and two finish coats of machinery enamel suitable for outdoor service.

M-4.15 Bevel Gear Operators

The EMO shall be furnished with a bevel gear operator. The bevel gear operator shall be reducer type with the specified gear ratio. The operator stem nut shall be shouldered in the drive sleeve to capture thrust forces within the thrust housing without transferring those forces to the torque housing. The bevel pinion and bevel gear shall be supported on anti-friction ball bearings. All gears shall be machined from high-strength alloy steel to ensure smooth operation with minimum backlash. The operator shall be permanently lubricated. The enclosure shall be cast iron sealed to NEMA 4. The operator shall be Limitorque V Series.

M-4.15.1 Drive Shaft Assembly

The drive shaft assembly shall be fabricated per plan. The drive shaft assembly shall include a cover, couplings, and end plate with rotary shift seal.

M-4.16 EMO Remote Controller

The EMO shall be furnished with a remote controller. The remote controller shall include NEMA 4X 316 stainless steel enclosure, digital position indicator, selector switch with "Local-Off-Remote" and "Open/Close", and shall be Limitorque.

M-4.17 Equipment Vault

The Contractor shall furnish and install one equipment vault to house the electric motor operator assembly as shown on the Plans. The vault shall be designed for H-20 traffic loading and water tight.

The vault access covers shall be sized to allow direct overhead access to all removable parts. Access covers shall be 2-pieces bolt down and meet the requirement of H-20 traffic loading.

The vault shall be provided with floor drain with backwater valve.

All piping and conduit penetrations through equipment vault walls shall be watertight. Penetration holes shall be performed or cored out smooth without damaging the structure.

M-4.18 Payment

The lump sum Bid price for " ELECTRIC MOTOR OPERATOR AND APPURTENANCES " shall be included, but not limited to furnish all labor, materials, equipment fabrication, installation and field testing to perform all the required Work to provide a completely operable system.

M-5 FLOW METER SENSORS

M-5.1 Flow Meter

The Contractor shall furnish and install two new flow measuring systems capable of measuring water level and average velocity of the open channel. The systems shall include but will not be limited to non-contact velocity detection, non-contact depth detection, flow measurement during submerged conditions, bidirectional velocity measurements, data logger capabilities, and additional appurtenances as needed.

The flow meter shall include a stainless-steel bracket for wall mounting and shall also be able to removed by unlatching from the mounting bracket. The flow meter enclosure shall be IP68 waterproof rating. The flow meter shall detect water levels via ultrasonic waves and measure velocity readings using laser emission technology. The materials of construction shall be Conductive Carbon Filled ABS, SST, Conductive Kynar, Anodized Aluminum, and UV rated PVC. Flow accuracy shall be at ±5% of reading, Velocity accuracy shall be at ±0.5% and ±0.1 ft/s reading, and level accuracy shall be at ±0.02ft for levels ≤ 1ft and ±0.04ft for levels > 1ft.

The flow sensors shall be Hach Flo-DAR AV Sensor with the optional submerged functionality. Minimum lengths of the cable shall be 250ft.

M-5.2 Flow Meter Sensor Data Logger

The Contractor shall furnish and install flow monitors for measuring and logging open channel flow. Flow monitoring equipment shall be Hach Company, Model FL1500.

Contractor shall install the flow meter and data logger in strict accordance with the manufacturer’s instructions and recommendation. Manufacturer’s representative shall include a start-up service, basic operational training and certification of performance of the instrument by a factory-trained technician.

M-5.3 Payment

The lump sum Bid price for " FLOW METER SENSORS " shall be included, but not limited to furnish all labor, materials, equipment fabrication, installation and field testing to perform all the required Work.

M-6 SUBMERSIBLE LEVEL TRANSMITTERS AND APPURTENANCES

The Contractor shall furnish and install level transmitters and the appurtenances for the monitoring wells and infiltration module as shown on the Plans.

M-6.1 Wheatstone Bridge Circuit Level Transmitter

The level transmitter shall be solid state semiconductor sensor, all housing parts 316 stainless steel including nut/washer, 316L stainless steel diaphragm, viton cable grommet and housing “O” ring, removable non-clogging nylon snub nose to protect sensing elements, 2-wire 4-20ma output with current limit of 30ma, 12-40VDC power supply with reverse polarity surge protection, loop resistance of 1400 ohms max at 40VDC, compensated 32 to 122^{o}F, factory applied 20AWG polyurethane shielded cable (unspliced throughout entire run) and vented to atmosphere through the surface end of the cable, cable support bracket, reverse polarity surge protected, lighting protector, manufacturer approved intrinsically safe barrier for Class 1 Division 1 (Group A,B,C&D) operation, calibrated per basin water levels (0-80 feet of water), measurement of hydrostatic pressure via ion implanted silicon semiconductor chip with integral wheatstone bridge circuit, fully compatible with Ametek DMS controller. Level transmitter shall be Ametek model 575. Minimum lengths of the cable shall be 200ft.

M-6.2 Payment

The lump sum Bid price for " SUBMERSIBLE LEVEL TRANSMITTERS AND APPURTENANCES " shall be included, but not limited to furnish all labor, materials, equipment fabrication, installation and field testing to perform all the required Work.

M-7 WATER QUALITY MONITORING INSTRUMENTATION

M-7.1 General

The Contractor shall furnish and install the water quality monitoring instrumentation to monitor the effectiveness of the water capturing and treatment systems. The monitoring system shall include two portable samplers with a flow meter to take water sample of the influent and effluent for stormwater treatment system.

The installation shall be observed by a representative from the Agency's Stormwater Quality Division.

Please contact Emiko Innes at (626) 458-7174 at least 1 week prior to installation.

M-7.2 Portable Sampler And The Accessories

The portable auto-sampling system shall be designed for indoor and outdoor applications include but not limited to pumping system, area velocity flow meter, controller and backup battery supply.

The sampler cabinet shall be molded from polyester resin fiberglass and supported by a stainless steel frame with a UV-resistant gel coat to provide a smooth, non-porous finish for added protection and easy cleaning. The unit shall preserve the samples at the EPA-recommended 39°F (4°C) with an automatically controlled, built-in heater to ensure that samples won't freeze even when ambient temperatures drop to -20°F (29°C).

The pumping system shall be capable of providing a suction lift of 28 feet of pressure head and deliver water sample of 5.0 ml from 99 feet away utilizing a 3/8-inch Vinyl tubing. A 3/8-inch stainless steel strainer shall be installed at the tip of the suction tube to prevent debris from entering the system.

The area velocity flow meter shall use doppler technology to directly measure average velocity in the flow stream. The sensor shall be capable of measuring 0.25 to 10 feet of water with velocity up to 20 feet per second.

The rain gauge shall use a tipping bucket design for rainfall measurement. The rain gauge shall be 8-inch diameter orifice and shall be factory-calibrated to tip at either 0.01 inch or 0.1 mm of rainfall.

The controller interface shall provide plug and play connection with compatible measuring devices such as flower meter, rain gauge, and multi-parameter sondes from leading manufacturers.

SPECIAL PROVISIONS FOR PROJECT ID NO. SWQ0000003

M-7.3 Water Quality Monitoring Equipment List

TABLE 2 – EQUIPMENT TO BE INSTALLED IN THE INFLUENT AND EFFLUENT MANHOLES

MONITORING WELL EQUIPMENT AND ACCESSORIES			
Item no.	Description	Quantity	Remarks
①	ISCO 6712C Portable Sampler	2	Teledyne ISCO/MCRT (Model # 68-6710-071)
②	ISCO 750 Low Profile Area Velocity Flow Module (75FT) and Low Profile Velocity Sensor Measure 10 FT level range	1	Teledyne ISCO/MCRT (Model # 60-9004-030)
③	ISCO Model 913 High Capacity Power Pack (ACDC converter)	2	Teledyne ISCO/MCRT (Model # 60-1684-088)
④	Submerged probe (flow sensor) with 75ft cable, measure 10 ft level range	1	Teledyne ISCO/MCRT (Model # 60-5314-271)
⑤	ISCO Sensor Mounting Plate	1	Teledyne ISCO/MCRT (Model # 60-3204-029)
⑥	ISCO Stainless Steel Strainer (3/8")	2	Teledyne ISCO/MCRT (Model # 60-2903-138)
⑦	ISCO 3/8" vinyl suction line - 200 feet, SPA 491	2	Teledyne ISCO/MCRT (Model # 60-5304-491)
⑧	ISCO Tubing coupler, 3/8", One-piece, clampless coupler made of stainless steel	2	Teledyne ISCO/MCRT (Model # 60-3709-002)
⑨	ISCO SPA 1026 - 12 foot length (cut to length cable; connector between auto-sampler with simultaneous sampling)	1	Teledyne ISCO/MCRT (Model # 60-5314-026)
⑩	ISCO 6712C Modem CDMA (cellular) with 60-2004-550 dual band magentic mount antenna)	1	Teledyne ISCO/MCRT (Model # 60-5324-172)
⑪	ISCO 674 Rain Gauge	1	Teledyne ISCO/MCRT (Model # 60-3284-001)
⑫	Steel Cabinet (42"H x 48"W x 32"D) or equivalent	1	
MISCELLANEOUS/GENERAL ITEMS			
⑬	ISCO 2.5-gallon glass around bottle with cap	4	Teledyne ISCO/MCRT (Model # 68-6700-005)
⑭	ISCO USB Communication Cable (10 feet) (optional)	1	Teledyne ISCO/MCRT (Model # 60-2004-508)
⑮	ISCO Pump Tubing for 6700 series sampler (10 tubes)	1	Teledyne ISCO/MCRT (Model # 60-6700-044)
⑯	ISCO Flow Link v5.1, two use licenses	1	Teledyne ISCO/MCRT (68-2540-200)

M-7.4 Payment

The lump sum Bid price for " WATER QUALITY MONITORING INSTRUMENTATION " shall be included, but not limited to furnish all labor, materials, equipment fabrication, installation and field testing to perform all the required Work to provide a completely operable system.

M-8 WATER HARVESTING SYSTEM

M-8.1 General

The Contractor will furnish and install a complete stormwater harvesting system. The system shall be designed to automatically process stormwater from rainfall and drywell runoff. The water shall be treated and used for spray irrigation.

The system shall contain all components necessary to process, store and pressure the harvested water including, but not limited to:

1. Transfer pump, hydrocarbon sensor and transducer at splitter well
2. Three-way manual diverter valve and basket strainer
3. Greywater processing skid with outdoor enclosure
4. Ozone generation
5. Filtration
6. UV sterilization
7. Processed water holding tank
8. Re-pressurized pump
9. Control System
10. Water quality monitoring

M-8.1.1 Process Description

M-8.1.1.1 Stormwater Pre-Filtration and Collection

The stormwater and dry weather flow shall be directed to a series of drywells. All stormwater will first pass through a nutrient separating baffle box system (NSBB) that shall include a hydrocarbon absorption boom to remove oils and other floating contaminants before reaching the splitter well. Pre-treated stormwater for irrigation shall be collected in splitter well below grade before transfer to the greywater processing skid system. The sump is expected to regularly overflow to the drywell system which will help to prevent stagnation of water in the splitter well. Monitoring sensors for turbidity and pH shall be provided on inlet and outlet of processing. Flow volumes for processed harvested water and Domestic Makeup shall also be logged and displayed on Touch Screen. Hydrocarbon detection shall be provided in splitter well to allow processing system shutdown in event of high level of hydrocarbon detection.

M-8.1.1.2 Stormwater Transfer Sump Pump

Stormwater shall be collected from the rainfall and dry weather runoff. A submersible transfer pump located inside the splitter well. When the control system triggers the start of a treatment cycle, the pump shall be activated to transfer raw stormwater to ozone contact tank at a rate of 20 GPM at 45 feet TDH. A floating valve shall prevent dry-run. No large suspended solids are expected in the raw stormwater, which has already been pre-filtered by the NSBB unit.

M-8.1.1.3 Filtration

Raw stormwater will be processed as it is produced in batches of 30 gallons, and is mixed with ozone in a stainless steel, cone-bottom settling tank. Once the batch level is reached, it is allowed to contact with the ozone for 8 minutes before filtration. After ozone contact, the stormwater is transferred through the filtration system via a skid-mounted pump at a rate of 10 GPM at 30PSI for final filtration and sanitation. Stormwater from the splitter will pass through a three-step filtration process. The first filter is a self-cleaning disc filter, which removes all particles larger than 80 microns. A self-cleaning multi-media filter will then polish the water by removing all other particular greater than 10 microns in size. The water is then polished to 5 microns with a self-cleaning activated carbon filter. Each filter stage uses processed water to automatically self-clean as necessary to maintain filtration capacity and minimize maintenance.

M-8.1.1.4 Water Sterilization

To stabilize the stormwater and to kill any pathogens that may be present, ozone will be added into the settling tank. The ozone generator will be mounted to the settling tank skid. In addition to injecting ozone as the water is processed, water is subjected to UV sanitation before it is sent to the Processed Water Holding Tank. The UV system shall be rated to handle 10 GPM and providing a minimum UV exposure of 40 mJ/cm2 which exceeds NSF/ANSI 55 Class A requirements for potable water.

M-8.1.1.5 Storage of Processes Water

After passing through the filtration and sterilization steps, the treated non-potable water will enter the 1700 gallon GRAF polyethylene Processed Water Holding Tank (PWHT) located below-grade to await pressurization to the irrigation system. When the level of treated water reaches the tank's capacity, water processing shall stop. Should the system demand additional water when the processed water holding tank is empty, the water will drop to a pre-set level that will automatically revert the system to municipal water and pressure through a solenoid valve. A backflow prevention device will ensure that there is no cross-contamination between the non-potable line and the municipal line. The municipal valve is a “normally open” solenoid that is held closed to allow treated rainwater to flow from the system. When power is interrupted or there is a low-level alarm in the cistern, the valve is de-energized and automatically opens, allowing municipal water and pressure to flow to the irrigation system. When municipal water is used, the system shall undergo a system test and will be verified before the treatment system can be used normally. To maintain water quality in the Processed Water Holding Tank, the water shall be recirculated past a UV sanitation unit located on the skid. Recirculation shall be provided by the submersible pump serving the system. A 3-way motorized valve managed by the Control System shall set the pump to send water either to the irrigation system or

to the UV sanitation unit. Water in the storage tank will be recirculated through a UV sterilizer to keep in a sanitary.

M-8.1.1.6 Irrigation

A submersible irrigation pump shall be located in the Processed Water Holding Tank and features a variable speed controlled drive (VFD) that automatically adjusts speed during low and high volume demand saving energy and reducing pump wear. The pump shall be sized to handle the required flow rate of 40 GPM at 50 PSI. The Control System shall monitor pump operating parameters.

M-8.1.1.7 System Monitoring and Control

The master control system shall be included to monitor and data log system operational parameters. The control system shall control tank levels and equipment operation per custom software and shall provide alarms to the Building Automation System.

The system monitoring shall included hydrocarbon monitoring, turbidity monitoring, and pH level monitoring. The hydrocarbon monitoring shall report any floating hydrocarbons that may enter the system. If the levels are too high, the sensor will set off an alarm that will be sent to the control panel. The system shall immediately bypass the upstream stormwater flow to the stormwater system. Until the extent of the contamination is determined, the control system shall revert to municipal water for any irrigation demand.

The turbidity monitoring shall be monitored and reported after the treatment skid as well. Clear water after treatment by the system is a measure of the compliance with the NSF-350 water quality standard and is a good indicator that the filtration and the sanitation components are working as intended. The control system shall be such that levels outside the approved range can result in either diverting the incoming stormwater from the entire system, or suspending the use of the treated water for irrigation until the problem can be resolved.

The pH level monitoring shall be monitored and reported. The control system shall monitor, track, report pH levels. The acceptable range and alarms shall all be adjustable at the control system and the control logic shall be set to make decisions based on the set control limits.

A Visual Display shall interface with the control system and additional communication software shall interface with the Building Automation System.

All control panels shall be NEMA 3R and UL Listed.

M-8.1.1.8 Summary

All system components shall be skid mounted and pre-plumbed, wired, and tested prior to shipment. System manufacturer to provide on-site installation assistance and commissioning support to include successful start-up verification, operations manual, and operator training for building maintenance staff.

M-8.1.2 Delivery, Storage, and Handling

The Contractor shall deliver, store, and handle all water harvesting equipment as follows: protect all electrical equipment from the weather during transit and storage by suitable means, including shrink wrapping or hand wrapping and taping, equipment skids shall be suitably packaged in crates for safe and storage on site in advance of installation, and installation shall be provided with equipment and separate from O&M manuals.

M-8.2 Products

M-8.2.1 Manufacturers

All water harvesting equipment shall be provided by the Contractor through Water Harvesting Solutions, Inc. (WAHASO). The Contractor, through the vendor, shall have the responsibility of matching all components and providing a fully functional system.

The water harvesting equipment shall be provided Water Harvesting Solution, Inc.

M-8.2.2 Greywater Transfer Sump Pump

The submersible sump pump transfers raw greywater from splitter well to process skid system. 20GPM @ 45TDH, 0.5HP, 220Volt, 3450RPM, single phase, 60Hz, 2-inc NPT discharge.

The greywater transfer sump pump shall be Myers VR1 Series or approved equal.

M-8.2.3 Three-Way Manual Diverter Valve and Basket Strainer

The Contractor shall provide a 2” three-way valve to direct raw stormwater in the splitter to drywell in case the splitter well needs to be emptied.

The Contractor shall provide a 2” basket strainer to prevent debris pump into ozone contact tank.

M-8.2.4 Ozone Generation

The Contactor shall provide an Ozone Generator to be sized to produce a minimum of 3 g/hr and include a Mazzai injector (kynar construction), and includes a dry desicant inflow filter.

The unit shall be self-contained and powered by 115 VAC. The unit shall be mounted to GW-3:10-1700 stormwater processing skid.

The Ozone Generator shall be Water Harvesting Solution, Inc., Pacific Ozone G21 or approved equal.

M-8.2.5 Final Filtration

The Contractor shall unitized HDPE Skid with all equipment pre-plumbed and wired.

The final filtration should include disc filter to filter to 80 microns and include automated regeneration (backwashing). Includes 10 micron Self-Cleaning Multi-Media Filter and 5 microns Self-cleaning Activated Carbon Filter.

The final filtration shall be mounted to greywater processing skid with 30 Gallon Stainless Steel Ozone Contact Tank.

The final filtration shall be provided by Water Harvesting Solution, Inc.

M-8.2.6 Greywater GW-3:10-1700 Processing Skid

The final filtration to be pre-assemble, pre-plumbed and pre-wired to processing skid.

The skid includes supports for Rainwater Control System panel. Skid shall be constructed of ¾" HDPE with internal rib supports and side skirts with fork lift access on all 4 sides.

All Ozone piping to be Teflon or 316 stainless steel. All other piping and fittings are Schedule 80 PVC.

The skid shall include inlet pH and turbidity monitors and post treatment pH and turbidity monitors.

The system shall meet NSF350 water standards for processed greywater.

The Greywater GW-3:10-1700 Processing Skid shall be provided by Water Harvesting Solution, Inc.

M-8.2.7 Processed Water Holding Tank

The processed water holding tank shall be a 1700 GRAF polyethylene Processed Water Hold Tank gallon tank. All fittings shall be PVC Bulkhead Fittings.

The tank is a two-part “clam shell” and assembled on-site before burying. The processed water holding tank shall be installed per manufacturer’s underground tank installation requirements.

The Processed Water Holding Tank shall be provided by Water Harvesting Solution, Inc.

M-8.2.8 Irrigation Pump

The submersible irrigation pump shall capable of producing 40 GPM at 50 PSI with a discharge pipe of 1 1/2 inch NPT.

The pump will be installed inside the Process Water Holding Tank. The pump shall sit on the bottom of the tank and be retrievable with a stainless cable with quick disconnects to facilitate servicing without entering the tank.

The pump shall be Goulds 45GS Series, or approved equal.

M-8.2.9 Greywater Control System

The Contractor shall provide Greywater Control System (GWCS) with monitor to control Supply Tank Levels, Pumps and Valves. System to include Wahaso Series 20 Control Logic Software as described below.

The specific operating data and alarm conditions as required by the Building Automatic System (BAS) shall be provided through Mod-bus or other communication protocols as specified by the Engineer.

A full color 5.7” touch screen display shall allow pages of system information to be displayed and levels of security by specific security code access will allow operators and management to change system operating parameters. Touch screen display shall be capable of remote viewing through network connection. All controls to be housed in a NEMA 3R rated UL Listed Enclosure.

The data input points shall include: discharge pressure (transfer pumps), processed water holding tank level, municipal water valve (process water holding tank), discharge pressure (booster pump), motor fault alarms (all drive motors), hours run monitor (all drive motor and filters), manual-off-auto control switches for all drives and automatic valves, and emergency stop.

The control output points shall include: optional municipal valve, transfer pump, re-pressurization pump, and BAS Mod-bus interface communication.

The process controller shall function as a datalogger to log the following parameters. The datalogger will include: daily and year to date greywater harvested, tank volumes in gallon units for processed water holding tank, volume of harvested water sent to irrigation system, volume of municipal make up required, hours run for all pump motors, flow rate, pressure outputs, alarms on pumps, pH, and turbidity inlet and post treatment.

The full color human machine interface (HMI) touch screen shall communicate with the touch screen. The touch screen shall be security level protected and programmed to display overall system operations, alarm states, maintenance instructions and logged data. The touch screen shall be 5.7" full-color display and shall include graphics to show the following: water levels in each tank, pump discharge pressure for each pump, turbidity and pH levels for influent and effluent, green/red indicator for valve open or valve closed position for all automatic valves, green/red indicator for pump run status, alarm condition alerts, separate pages for information on each major component accessed by pressing the touch screen on that item, separate page for alarm history, separate for data logged for required parameters, security accessed pages for maintenance information, and security accessed pages for changing critical set points.

The Greywater Control System shall be Water Harvesting Solution, Inc. Series 200 Control System.

M-8.2.10 Building-Automation-System Interface

The Building-Automation-System Interface shall receive data information through the Greywater Control System. The data information shall include: differential pressures of bag filters, conditions of alarms, volume of staging tank, discharge pressure of re-pressurization pump, status of ozone generation system, normal or alarm, hours run for all motors, volume of municipal water required for make up, data logging for daily water harvested, maintenance alert for filters, turbidity, and pH levels for influent and effluent.

M-8.3 Execution

M-8.3.1 Installation

The Contractor shall install all greywater harvesting equipment in accordance with manufacturer's recommendations and approved shop drawings as specified on the plans. The Contractor shall install all piping connections and accessories, as specified or shown on Contract Drawings, in accordance with respective manufacturer's recommendations. The Contractor shall provide services of qualified representative or vendor to inspect installation, make any necessary adjustments, test equipment, and instruct operating personnel in operation and maintenance of water harvesting equipment.

M-8.4 Start-Up, Testing, Training, and Maintenance

M-8.4.1 Start-Up

The Manufacturer shall travel to the job site and aid the Contractor to ensure the system was installed correctly and that it works as intended. The Contractor shall notify the Manufacturer two weeks in advance of the desired service date to allow for appropriate scheduling.

The Contractor shall be responsible for having the job site readily accessible for service.

The Contractor is responsible for securing the local permits (if required) and to abide all by the local codes and requirements for the service of this non-potable water system. Local codes may require colored piping for non-potable water, coloration of non-potable water, signage at each fixture advising that the water is no-potable, specified location of non-potable piping relative to potable piping and more. The Manufacturer shall not be liable for any violation of local building codes associated with the installation of one of its systems.

M-8.4.2 Testing

The Manufacturer is responsible for verifying start-up, test and confirm pump(s) testing. The Manufacturer shall also check the system for leaks and perform repairs if needed.

M-8.4.3 Training and Maintenance

The Manufacturer is responsible for on-site training of the maintenance crew for two days minimum. The Manufacturer shall ensure the competency of the maintenance crew to maintain the Wahaso system.

Schedule maintenance shall include:

a) Disk filter: The filter is self-cleaning and should be inspected periodically to determine if additional cleaning is necessary.
b) Media filter: The second filter is designed to automatically self-clean through a backwash step on a timed basis or when the system pressure meets a give threshold, and should not require maintenance more than once per year under normal conditions.
c) Activated carbon filter: The final filter is self-cleaning activated carbon filter that will backwash itself as needed. The carbon filter will need to be replace once every 3-5 years.
d) Ozone Generation Unit: The ozone generation unit will need to be replaced every 3-5 years.
e) UV bulbs: UV bulbs come with a wiper that should be used to clean the bulbs periodically to ensure the optimum sanitation performance. Replacement of the

UV bulb is necessary only every 10,000 hours.

M-8.4.4 Warranty

The Manufacturer shall provide a warranty on the entire system for a period of (3) three years from the commission date. Warranty shall cover all components and controls provided by the Manufacturer and include time and travel necessary for system repair.

M-8.5 Payment

The lump sum Bid price for " WATER HARVESTING SYSTEM " shall be included, but not limited to furnish all labor, materials, equipment fabrication, installation and field testing to perform all the required Work to provide a completely operable system.

PROJECT ID NO. SWQ0000003

LADERA PARK
STORMWATER IMPROVEMENTS PROJECT

SPECIAL PROVISIONS

SECTION E – ELECTRICAL

The following Special Provisions supplement and amend the Standard Specifications for Public Works Construction 2015 Edition.

Prepared by:

ALBERTO DE LA MERCED, P.E.

08/16/2018
Date

SECTION E – ELECTRICAL

TABLE OF CONTENTS

SECTION E-1 BASIC ELECTRICAL REQUIREMENTS

PART 1 GENERAL

1.1 RELATED SECTIONS

A. Requirements specified within this section apply to all sections in Electrical. Work specified herein shall be performed as if specified in the individual sections E-2 through E-8.

1.2 DESIGN REQUIREMENTS

A. All equipment anchoring and mounting shall be in accordance with manufacturer's requirements for the seismic zone.

1.3 SUBMITTALS

A. Submit per 2-5.3 of Section G.

B. Supporting Information:

1. Voltage Field Test Results.
2. Voltage Balance Report.
3. Equipment Line Current Report.
4. Factory test certification and reports for all major electrical equipment.
5. Site test certification and reports as specified in other Electrical sections.

1.4 DESCRIPTION OF WORK

A. Furnish and install power, lighting, signal and control conduits, and cables, grounding, luminaires, power distribution equipment (service pedestal and panel board), junction boxes, PLC's, telemetry equipment, remote slide gate control, equipment supports, and testing apparatus for complete electrical installation at the following location:

1. Monitoring equipment steel chest.
2. Electrical equipment cabinet.
3. Wahasoo grey water treatment cabinet.
4. Slide gate vault.
5. Diversion manhole.
6. Influent manhole.
7. Effluent manhole.
8. Monitoring well manholes.
9. Split well manhole.
10. Drywell manholes

B. Furnish the following for powering and operation:

1. Furnish and install conduits, power cables, and associated support hardware from new points of source to power and operate new equipment devices.
2. Furnish and install conduits, cables from the new monitoring equipment cabinet to wet-well level sensor and flow meter for the new galleries.

C. Provide support personnel and testing equipment necessary to facilitate the start-up and testing of all monitoring equipment devices and sports field lighting system.

PART 2 PRODUCTS

2.1 GENERAL

A. Agency Requirements:

1. The Work shall be done in accordance with NFPA 70, 2017 Los Angeles County Electrical Code (2014 NEC). Where required by the Agency, material and equipment shall be labeled or listed by a nationally recognized testing laboratory or other acceptable organization in order to provide a basis for approval under NEC.

2. Materials and equipment manufactured within the scope of standards published by Underwriters Laboratories, Inc. shall conform to those standards and shall have an applied UL listing mark.

B. Equipment Finish:

1. Furnish manufacturers' standard finish and color, except where specific color is indicated.
2. If manufacturer has no standard color, furnish equipment with ANSI No. 61, light gray color.

PART 3 EXECUTION

3.1 GENERAL

A. The Plans show general locations of equipment, devices, and raceway, unless specifically dimensioned.

B. Install work in accordance with NECA Standard, unless otherwise specified.

3.2 LOAD BALANCE

A. Plans and Specifications indicate circuiting to electrical loads and distribution equipment.

B. Balance electrical load between phases as nearly as possible on switchboards, panel boards, motor control centers, and other equipment where balancing is required.

C. When loads must be reconnected to different circuits to balance phase loads, maintain accurate record of changes made, and provide circuit directory that lists final circuit arrangement.

3.3 CHECKOUT AND STARTUP

A. Voltage Field Test:

1. Check voltage at point of termination of power company supply system to project when installation is essentially complete and is in operation.

2. Check voltage amplitude and balance between phases for loaded and unloaded conditions.

3. Unbalance Corrections:

a. Make written request to power company to correct condition if balance (as defined by NEMA) exceeds 1 percent, or if voltage varies throughout the day and from loaded to unloaded condition more than plus or minus 4 percent of nominal.

b. Obtain a written certification from a responsible power company official that the voltage variations and unbalance are within their normal standards if corrections are not made.

B. Equipment Line Current Tests:

1. Check line current in each phase for each piece of equipment.

2. Make line current check after power company has made final adjustments to supply voltage magnitude or balance.

3. If any phase current for any piece of equipment is above rated nameplate current, prepare Equipment Line Phase Current Report that identifies cause of problem and corrective action taken.

SECTION E-2 BASIC ELECTRICAL MATERIALS AND METHODS

PART 1 GENERAL

1.1 SUBMITTALS

A. Submit per 2-5.3 of Section G.

B. Shop Drawings:

1. Junction and pull boxes used at or below grade.
2. Large junction and pull boxes.
3. Terminal junction boxes.
4. Panelboards and circuit breaker data.
5. Wiring devices.
6. Control devices.
7. Control relays.
8. Timers
9. Fuses.
10. Circuit Breakers
11. Program Logic Controller (PLC)
12. Telemetry System

1.2 QUALITY ASSURANCE

A. Agency Requirements:

1. The Work shall be done in accordance with NFPA 70, 2017 Los Angeles County Electrical Code (2014 NEC). Where required by the Agency, material and equipment shall be labeled or listed by a nationally recognized testing laboratory or other acceptable organization in order to provide a basis for approval under NEC.

2. Materials and equipment manufactured within the scope of standards published by Underwriters Laboratories, Inc. shall conform to those standards and shall have an applied UL listing mark.

PART 2 PRODUCTS

2.1 OUTLET AND DEVICE BOXES

A. Cast Metal:

1. Box: Cast ferrous metal.
2. Cover: Gasketed, weatherproof, cast ferrous metal, with stainless steel screws.
3. Hubs: Threaded.
4. Lugs: Cast Mounting.

5. Manufacturers and Products, Nonhazardous Locations:
    a. Crouse-Hinds; Type FS or FD.
    b. Appleton; Type FS or FD.

2.2 JUNCTION AND PULL BOXES

A. Outlet Boxes Used as Junction or Pull Box: As specified under Article Outlet and Device Boxes.

B. Conduit Bodies Used as Junction Boxes: As specified under Article Fittings in Section 16130, Raceways.

C. Large Cast Metal Box:

1. NEMA 250, Type 4.
2. Box: Cast ferrous metal, electrogalvanized finished, with drilled and tapped conduit entrances and exterior mounting lugs.
3. Cover: Hinged with screws.
4. Gasket: Neoprene.
5. Hardware and Machine Screws: ASTM A167, Type 316 stainless steel.
6. Manufacturers and Products, Surface Mounted Nonhinged Type:
    a. Crouse-Hinds; Series W.
    b. O-Z/Gedney; Series Y.
7. Manufacturer and Product, Surface Mounted, Hinged Type: O-Z/Gedney; Series YW.
8. Manufacturers and Products, Recessed Type:
    a. Crouse-Hinds; Type WJBF.
    b. O-Z/Gedney; Series YR.

D. Concrete Box, Nontraffic Areas:

1. Box: Reinforced, cast concrete with extension.
2. Cover: Steel diamond plate with locking bolts.
3. Cover Marking: ELECTRICAL, TELEPHONE, or as shown.
4. Size: 10 inch by 17 inch (minimum).
5. Manufacturers and Products:
    a. Utility Vault Co.; Series 36-1017.
    b. Christy, Concrete Products, Inc.; N9.
    c. Strongwell; “PG” Style.

E. Concrete Box, Traffic Areas:

1. Box: Reinforced, cast concrete with extension and bottom slab.
2. Cover: Steel checked plate. H/20 loading with screw down.
3. Cover Marking: ELECTRICAL, TELEPHONE, or as shown.
4. Manufacturers and Products:
    a. Christy, Concrete Products, Inc.; B1017BOX.
    b. Utility Vault Co.; 3030 SB.

2.3 WIRING DEVICES

A. Switches:

1. NEMA WD 1 and FS W-S-896.
2. Industrial grade, totally enclosed, ac type, with quiet tumbler switches and screw terminals.
3. Rivetless one-piece brass or copper alloy contact arm with silver alloy contacts.
4. Capable of controlling 100 percent tungsten filament and fluorescent lamp loads.
5. Rating: 20 amps, 120/277 volts.
6. Color:
   a. All Areas: Gray.
7. Automatic grounding clip and integral grounding terminal on mounting strap.
8. Manufacturers and Products:
   a. Arrow Hart; 1891/1991 Series.
   b. Bryant; 4801/4901 Series.
   c. Hubbell; 1201/1221 Series.

B. Receptacle, Single and Duplex:

1. NEMA WD 1 and FS W-C-596.
2. Specification grade, two-pole, three-wire grounding type with screw type wire terminals suitable for No. 10 AWG.
3. High strength, thermoplastic base color.
4. Color:
   a. All Areas: Gray.
5. Contact Arrangement: Contact to be made on two sides of each inserted blade without detent.
6. Rating: 125 volts, NEMA WD 1, Configuration 5-20R, 20 amps.
7. One-piece mounting strap with integral ground contact (rivetless construction).
8. Manufacturers and Products:
   a. Arrow Hart; 5263 Series.
   b. Bryant; 5263 Series.
   c. Hubbell; 5263 Series.

C. Receptacle, Ground Fault Circuit Interrupter:

1. Duplex, listed Class A to UL Standard 943, tripping at 5 mA.
2. Color: Gray.
3. Rating: 125 volts, NEMA WD 1, Configuration 5-20R, 20 amps.
4. Size: For 2-inch by 4-inch outlet boxes.
5. Standard Model: NEMA WD 1, with No. 12 AWG copper USE/RHH/RHW-XLPE insulated pigtails and provisions for testing.
6. Impact resistant nylon face.
7. Manufacturers:
   a. Bryant.
   b. Hubbell.

c. Arrow Hart.

2.4 DEVICE PLATES

A. General: Sectional type plates not permitted.

B. Metal:

1. Material: Specification grade, one-piece, 0.040-inch nominal thickness stainless steel.
2. Finish: ASTM A167, Type 302/304, satin.
3. Mounting Screw: Oval-head, finish matched to plate.

C. Cast Metal:

1. Material: Malleable ferrous metal, with gaskets.
2. Screw: Oval-head stainless steel.

D. Engraved:

1. Character Height: 1/8-inch.
2. Filler: White.

E. Weatherproof:

1. For Receptacles:
   a. Gasketed, cast-aluminum, with individual cap over each receptacle opening.
   b. Mounting Screw and Cap Spring: Stainless steel.
   c. Manufacturers and Products:
      1) Crouse-Hinds; Type WLRD-1.
      2) Appleton; Type FSK-WRD.

2. For Switches:
   a. Gasketed, cast-metal or -aluminum, incorporating external operator for internal switch.
   b. Mounting Screw: Stainless steel.
   c. Manufacturers and Products:
      1) Crouse-Hinds; DS-181 or DS-185.
      2) Appleton; FSK-1VTS or FSK-1VS.

F. Raised Sheet Metal: 1/2-inch high zinc- or cadmium-plated steel designed for one-piece drawn type sheet steel boxes.

G. Sheet Steel: Formed sheet steel or Feraloy designed for installation on cast metal boxes.

2.5 LIGHTING AND POWER DISTRIBUTION PANELBOARD

A. NEMA PB 1, NFPA 70, and UL 67, including panelboards installed in motor control equipment.

B. Panelboards and Circuit Breakers: Suitable for use with 75 degrees C wire at full NFPA 70, 75 degrees C ampacity.

C. Short-Circuit Current Equipment Rating: Fully rated; series connected unacceptable.

D. Rating: Applicable to a system with available short-circuit current of 42,000 amperes rms symmetrical at 120/240 volts.

E. Ground Fault Circuit Interrupter (GFCI): UL Class A GFCI, 5 mA trip, 10,000 amps interrupting capacity circuit breakers.

F. Ground Fault Interrupter (GFI): 30 mA trip, 10,000 amps interrupting capacity circuit breaker, and UL listed for equipment ground fault protection.

G. Cabinet:

1. NEMA 3R.
2. Material: Code-gauge, hot-dip galvanized sheet steel, with reinforced steel frame.
3. Front: Fastened with adjustable clamps.
    a. Trim Size:
        1) Surface Mounted: Same as box.
    b. Finish: Rust inhibitor prime, with manufacturer's standard baked enamel or lacquer.
4. Interior:
    a. Factory assembled; complete with circuit breakers.
    b. Capable of circuit breaker replacement without disturbing adjacent circuit breakers or without removing main bus.
    c. Spaces: Cover openings with easily removable metal cover.
5. Door Hinges: Concealed.
6. Locking Device:
    a. Padlock Hasp type.
7. Circuit Directory: Metal frame with transparent plastic face and enclosed card on interior of door.

H. Bus Bar:

1. Material: Tin-plated copper full sized throughout length.
2. Provide for mounting of future circuit breakers along full length of bus regardless of number of units and spaces shown. Machine, drill, and tap as required for current and future positions.
3. Neutral: Insulated, rated same as phase bus bars with at least one terminal screw for each branch circuit.
4. Ground: Copper, installed on panelboard frame, bonded to box with at least one terminal screw for each circuit.
5. Lugs and Connection Points:
    a. Suitable for copper conductors only.

b. Solderless main lugs for main, neutral, and ground bus bars.

6. Bolt together and rigidly support bus bars and connection straps on molded insulators.

I. Circuit Breakers:

1. NEMA AB 1 and UL 489.
2. Thermal-magnetic, quick-make, quick-break, molded case, of indicating type showing ON/OFF and TRIPPED positions of operating handle.
3. Noninterchangeable, in accordance with NFPA 70.
4. Locking: Provisions for handle padlocking, unless otherwise shown.
5. Type: Bolt-on circuit breakers in 240/120-volt panelboard.
6. Multipole circuit breakers designed to automatically open all poles when an overload occurs on one pole.
7. Do not substitute single-pole circuit breakers with handle ties for multipole breakers.
8. Do not use tandem or dual circuit breakers in normal single-pole spaces.
9. Ground Fault Interrupter:
   a. Equip with conventional thermal-magnetic trip and ground fault sensor rated to trip in 0.025 second for a 5 mA ground fault (UL 943, Class A sensitivity).
   b. Sensor with same rating as circuit breaker and a push-to-test button.

J. Manufacturers:

1. Square D Co.
2. General Electric
3. Siemens

2.6 NONFUSED SWITCH, INDIVIDUAL, 0 TO 600 VOLTS

A. NEMA KS 1.

B. Quick-make, quick-break, motor rated, load-break, heavy-duty (HD) type with external markings clearly indicating ON/OFF positions.

C. Suitable for use with 75 degrees C wire at full NFPA 70, 75 degrees C ampacity.

D. Enclosure: NEMA 250, Type as indicated in Part 3 of this Specification unless otherwise shown.

E. Interlock: Enclosure and switch to prevent opening cover with switch in the ON position.

2.7 FUSE, 0 TO 600 VOLTS

A. Current-limiting, with 200,000 ampere rms interrupting rating.

B. Provide to fit mountings specified with switches and features to reject Class H fuses.

C. Motor and Transformer Circuits, 0- to 600-Volt:

1. Amperage: 0 to 600.
2. UL 198E, Class RK-1, dual element, with time delay.
3. Manufacturers and Products:
   a. Bussmann; Type LPS-RK.
   b. Littelfuse, Inc.; Type LLS-RK.

D. Motor and Transformer Circuits, 0- to 250-Volt:

1. Amperage: 0 to 600.
2. UL 198E, Class RK-1, dual element, with time delay.
3. Manufacturers and Products:
   a. Bussmann; Type LPN-RK.
   b. Littelfuse, Inc.; Type LLN-RK.

2.8 PUSHBUTTON, INDICATING LIGHT, AND SELECTOR SWITCHES

A. Contact Rating: NEMA ICS 2, Type A600.

B. Selector Switch Operating Lever: Standard.

C. Indicating Lights: Push-to-test.

D. Pushbutton Color:

1. ON,OFF, or START: Black.
2. OFF or STOP: Black.

E. Pushbuttons and selector switches lockable in OFF position where indicated.

F. Legend Plate:

1. Material: Aluminum.
2. Engraving: 11-character/spaces on one line, 14-character/spaces on each of two lines, as required, indicating specific function.
3. Letter Height: 7/64-inch.

G. Manufacturers and Products:

1. Heavy-Duty, Oil-Tight Type:
   a. General Electric Co.; Type CR 104P.
   b. Square D Co.; Type T.

c. Cutler-Hammer; Type 10250T.

2. Heavy-Duty, Watertight, and Corrosion-Resistant Type:
   a. Square D Co.; Type SK.
   b. General Electric Co.; Type CR 104P.
   c. Cutler-Hammer; Type E34.
   d. Crouse-Hinds; Type NCS.
   e.

2.9 TERMINAL JUNCTION BOX

A. Cover: Hinged, unless otherwise shown.

B. Interior Finish: Paint with white enamel or lacquer.

C. Terminal Blocks:

1. Separate connection point for each conductor entering or leaving box.
2. Spare Terminal Points: 25 percent.

2.10 TERMINAL BLOCK (0 TO 600 VOLTS)

A. UL 486E/GEN and UL 1059.

B. Size components to allow insertion of necessary wire sizes.

C. Capable of termination of control circuits entering or leaving equipment, panels, or boxes.

D. Screw clamp compression, dead front barrier type, with current bar providing direct contact with wire between compression screw and yoke.

E. Yoke, current bar, and clamping screw of high strength and high conductivity metal.

F. Yoke shall guide all strands of wire into terminal.

G. Current bar shall ensure vibration-proof connection.

H. Terminals:

1. Capable of wire connections without special preparation other than stripping.
2. Capable of jumper installation with no loss of terminal or rail space.
3. Individual, rail mounted.

I. Marking system, allowing use of preprinted or field-marked tags.

J. Manufacturers:

1. Weidmuller, Inc.
2. Ideal.
3. Electrovert USA Corp.

2.11 SUPPORT AND FRAMING CHANNELS

A. Carbon Steel Framing Channel:

1. Material: Rolled, mild strip steel, 12-gauge, ASTM A1011/A1011M, Grade 33.
2. Finish: Hot-dip galvanized after fabrication.

B. Manufacturers:

1. B-Line Systems, Inc.
2. Unistrut Corp.
4. Aickinstrut.

2.12 NAMEPLATES

A. Material: Laminated plastic.

B. Attachment: Rivets only. Screws not acceptable.

C. Color: Black, engraved to a white core.

D. Engraving:

1. Pushbuttons/Selector Switches: Name of drive controlled on one, two, or three lines, as required.
2. Panelboards: Panelboard designation, service voltage, and phases.

E. Letter Height:

1. Pushbuttons/Selector Switches: 1/8-inch.
2. Panelboards: 1/4-inch.

PART 3 EXECUTION

3.1 GENERAL

A. Install equipment in accordance with manufacturer's recommendations.

B. Use appropriate conduit and conductor entry fittings with enclosures to maintain the specified enclosure environmental capability after installation.

3.2 OUTLET AND DEVICE BOXES

A Install suitable for conditions encountered at each outlet or device in wiring or raceway system, sized to meet NFPA 70 requirements.

B. Size:

1. Depth: Minimum 2 inches, unless otherwise required by structural conditions. Box extensions not permitted.
2. Switch and Receptacle: Minimum 2-inch by 4-inch sheet steel device box.

B. Locations:

1. Plan locations are approximate.
2. To avoid interference with mechanical equipment or structural features, relocate outlets as directed by the engineer.

C. Mounting Height:

1. General:
   a. Dimensions given to centerline of box.
2. Light Switch: 48 inches above floor.
3. Convenience Receptacle:
   a. Outdoor, All Areas: 24 inches above finished grade.

D. Install plumb and level.

E. Threaded studs driven in by powder charge and provided with lock washers and nuts are acceptable in lieu of expansion shields.

F. Boxes embedded in concrete or masonry need not be additionally supported.

G. Install galvanized mounting hardware in industrial areas.

H. Boxes Supporting Fixtures: Provide means of attachment with adequate strength to support fixture.

I. Open no more knockouts in sheet steel device boxes than are required; seal unused openings.

J. Box Type (Steel Raceway System):

1. Exterior Locations:
   a. Exposed Raceways: Cast metal.
   b. Concrete Encased Raceways: Cast metal.

K. Box Type (Nonmetallic Raceway System):

1. Concrete Encased Raceways: Cast metal.

3.3 JUNCTION AND PULL BOXES

A. Install where shown and where necessary to terminate, tap-off, or redirect multiple conduit runs.

B. Install pull boxes where necessary in raceway system to facilitate conductor installation.

C. Install in conduit runs at least every 150 feet or after the equivalent of three right-angle bends.

D. Use outlet boxes as junction and pull boxes wherever possible and allowed by applicable codes.

E. Use conduit bodies as junction and pull boxes where no splices are required and their use is allowed by applicable codes.

F. Installed boxes shall be accessible.

G. Do not install on finished surfaces.

H. Install plumb and level.

I. Support boxes independently of conduit by attachment to building structure or structural member.

J. Install bar hangers in frame construction or fasten boxes directly as follows:

1. Wood: Wood screws.
2. Concrete or Brick: Bolts and expansion shields.
3. Hollow Masonry Units: Toggle bolts.
4. Steelwork: Machine screws.

K. Threaded studs driven in by powder charge and provided with lock washers and nuts are acceptable in lieu of expansion shields.

L. Boxes embedded in concrete or masonry need not be additionally supported.

L. At or below grade:

1. Install boxes for below grade conduit flush with finished grade in locations outside of paved areas, roadways, or walkways.
2. If adjacent structure is available, box may be mounted on structure surface just above finished grade in accessible but unobtrusive location.
3. Obtain engineer’s written acceptance prior to installation in paved areas, roadways, or walkways.
4. Use boxes and covers suitable to support anticipated weights.

M. Flush Mounted:

1. Install with concealed conduit.
2. Holes in surrounding surface shall be no larger than required to receive box.
3. Make edges of boxes flush with final surface.

N. Mounting Hardware:

1. Wet Areas: Stainless steel.

O. Location/Type:

1. Unfinished, Indoor and Outdoor, Wet: NEMA 250, Type 4.
   a. Steel Raceway System: Cast metal.
2. Underground Conduit: Concrete.
3. Outdoor Locations Where Indicated Weatherproof (WP): NEMA 250, Type 3S, Outdoor, Iceproof.

3.4 WIRING DEVICES

A. Switches:

1. Mounting Height: See Article Outlet and Device Boxes.
2. Install with switch operation in vertical position.
3. Install single-pole, two-way switches such that toggle is in up position when switch is on.

B. Receptacles:

1. Install with grounding slot up, except where horizontal mounting is shown, in which case install with neutral slot up.
2. Ground receptacles to boxes with grounding wire only.
3. Weatherproof Receptacles:
   a. Install in cast metal box.
   b. Install such that hinge for protective cover is above receptacle opening.
4. Ground Fault Interrupter: Install feed-through model at locations where ground fault protection is specified for “downstream” conventional receptacles.

3.5 DEVICE PLATES

A. Securely fasten to wiring device; ensure a tight fit to box.

B. Surface Mounted: Plate shall not extend beyond sides of box, unless plates have no sharp corners or edges.

C. Install with alignment tolerance to box of 1/16-inch.

D. Engrave with designated titles.

E. Types (Unless Otherwise Shown):

1. Exterior: Weatherproof.

3.6 PUSHBUTTON, INDICATING LIGHT, AND SELECTOR SWITCH

A. Heavy-Duty, Oil-Tight Type: Locations (Unless Otherwise Shown): Nonhazardous, indoor, dry locations, including motor control centers, control panels, and individual stations.

B. Heavy-Duty, Watertight, and Corrosion-Resistant Type:

1. Locations (Unless Otherwise Shown): Nonhazardous, outdoor, or normally wet areas.
2. Mounting: NEMA 250, Type 4X enclosure.

3.7 TERMINAL JUNCTION BOX

A. Install in accordance with Article Junction and Pull Boxes.

B. Label each block and terminal with permanently attached, nondestructible tag.

C. Do not install on finished outdoor surfaces.

D. Location/Type:

1. Unfinished, Indoor and Outdoor, Wet: NEMA 250, Type 4.

3.8 LIGHTING AND POWER DISTRIBUTION PANELBOARD

A. Provide typewritten circuit directory for each panelboard.

B. Cabinet Location/Type:

1. General Use in MCC: NEMA 250, Type 12.

3.9 NONFUSED SWITCH ENCLOSURES

A. Location/Type:

1. Wet: NEMA 250, Type 4.

3.10 SUPPORT AND FRAMING CHANNEL

A. Install where required for mounting and supporting electrical equipment and raceway systems.

B. Channel Type:

1. Outdoor, Noncorrosive Locations:

a. Steel Raceway: Carbon steel or paint coated framing channel, except where mounted on aluminum handrail, then use aluminum framing channel.
b. Aluminum Raceway and Other Systems Not Covered: Aluminum framing channel.

C. Paint cut ends prior to installation with the following:

1. Carbon Steel Channel: Zinc-rich primer.

PART 4 PAYMENT

A. All cost for furnishing and installing all the Electrical Work shown on the plans and required in these Special Provisions for which no separate items are included in the Bid, shall be included in the Lump Sum Price in the Bid for “ELECTRICAL WORK”.

SECTION E-3 GROUNDING

PART 1 GENERAL

1.1 SUBMITTALS

A. Submit per 2-5.3 of Section

B. Shop Drawings:

5. Product data for the following:
   a. Exothermic weld connectors.
   b. Mechanical connectors.
   c. Compression connectors.

1.2 QUALITY ASSURANCE

A. Agency Requirements:

The Work shall be done in accordance with NFPA 70, 2017 Los Angeles County Electrical Code (2014 NEC). Where required by the Agency, material and equipment shall be labeled or listed by a nationally recognized testing laboratory or other acceptable organization in order to provide a basis for approval under NEC.

6. Materials and equipment manufactured within the scope of standards published by Underwriters Laboratories, Inc. shall conform to those standards and shall have an applied UL listing mark.

PART 2 PRODUCTS

2.1 GROUND ROD

A. Material: Copper-clad Steel.

B. Diameter: Minimum 3/4-inch.

C. Length: 10 feet.

2.2 GROUND CONDUCTORS

A. Grounding and bonding conductors shall be soft drawn stranded copper conductors.

2.3 CONNECTORS

A. Exothermic Weld Type:

1. Outdoor Weld: Suitable for exposure to elements or direct burial.

2. Indoor Weld: Utilize low-smoke, low-emission process.
3. Manufacturers:
   a. Erico Products, Inc.; Cadweld and Cadweld Exolon.
   b. Thermoweld.

B. Compression Type:

1. Compress-deforming type; wrought copper extrusion material.
2. Single indentation for conductors 6 AWG and smaller.
3. Double indentation with extended barrel for conductors 4 AWG and larger.
4. Barrels prefilled with oxide-inhibiting and antiseizing compound and sealed.
5. Manufacturers:
   a. Burndy Corp.
   b. Thomas and Betts Co.
   c. Ilso Corp.

C. Mechanical Type: Split-bolt, saddle, or cone screw type; bronze material.

1. Manufacturers:
   a. Burndy Corp.
   b. Thomas and Betts Co.

2.4 GROUNDING WELLS

A. Ground rod box complete with cast iron riser ring and traffic cover marked GROUND ROD.

B. Manufacturers and Products:

1. Brooks Catalog No. 1 RD.
2. Lightning and Grounding Systems, Inc.; I-R Series.

PART 3 EXECUTION

3.1 GENERAL

A. Grounding shall be in compliance with NFPA 70 and IEEE C2.

B. Ground electrical service neutral at service entrance equipment to supplementary grounding electrodes.

C. Ground each separately derived system neutral to nearest effectively grounded building structural steel member or separate grounding electrode.

D. Bond together system neutrals, service equipment enclosures, exposed noncurrent-carrying metal parts of electrical equipment, metal

raceways, ground conductor in raceways and cables, receptacle ground connections, and metal piping systems.

E. Shielded Instrumentation Cables:

1. Ground shield to ground bus at power supply for analog signal.
2. Expose shield minimum 1 inch at termination to field instrument and apply heat shrink tube.
3. Do not ground instrumentation cable shield at more than one point.

3.2 WIRE CONNECTIONS

A. Ground Conductors: Install in conduit containing power conductors and control circuits above 50 volts.

B. Nonmetallic Raceways and Flexible Tubing: Install equipment grounding conductor connected at both ends to noncurrent-carrying grounding bus.

C. Connect ground conductors to raceway grounding bushings.

D. Extend and connect ground conductors to ground bus in all equipment containing a ground bus.

E. Connect enclosure of equipment containing ground bus to that bus.

F. Bolt connections to equipment ground bus.

F. Bond grounding conductors to metallic enclosures at each end, and to intermediate metallic enclosures.

G. Junction Boxes: Furnish materials and connect to equipment grounding system with grounding clips mounted directly on box, or with 3/8-inch machine screws.

3.3 MOTOR GROUNDING

A. Extend equipment ground bus via grounding conductor installed in motor feeder raceway; connect to motor frame.

B. Nonmetallic Raceways and Flexible Tubing: Install an equipment grounding conductor connected at both ends to noncurrent-carrying grounding bus.

C. Motors Less Than 10 hp: Furnish compression, spade-type terminal connected to conduit box mounting screw.

D. Motors 10 hp and Above: Tap motor frame or equipment housing; furnish compression, one-hole, lug type terminal connected with minimum 5/16-inch brass threaded stud with bolt and washer.

E. Circuits 20 Amps or Above: Tap motor frame or equipment housing; install solderless terminal with minimum 5/16-inch diameter bolt.

3.4 GROUND RODS

A. Install full length with conductor connection at upper end.

B. Install with connection point below finished grade, unless otherwise shown.

C. Space multiple ground rods at a minimum of 6 feet apart.

3.5 GROUNDING WELLS

A. Install outside of main service switchboard.

B. Install riser ring and cover flush with surface.

C. Place 6 inches of crushed rock in bottom of each well.

3.6 CONNECTIONS

A. General:

1. Above-grade Connections: Install exothermic weld, mechanical, or compression-type connectors; or brazing.
2. Below-grade Connections: Install exothermic weld or compression type connectors.
3. Remove paint, dirt, or other surface coverings at connection points to allow good metal-to-metal contact.
4. Notify Agency prior to backfilling ground connections.

B. Exothermic Weld Type:

1. Wire brush or file contact point to bare metal surface.
2. Use welding cartridges and molds in accordance with manufacturer's recommendations.
3. Avoid using badly worn molds.
4. Mold to be completely filled with metal when making welds.
5. After completed welds have cooled, brush slag from weld area and thoroughly clean joint.

C. Compression Type:

1. Install in accordance with connector manufacturer's recommendations.
2. Install connectors of proper size for grounding conductors and ground rods specified.
3. Install using connector manufacturer's compression tool having proper sized dies.

D. Mechanical Type:

1. Apply homogeneous blend of colloidal copper and rust and corrosion inhibitor before making connection.
2. Install in accordance with connector manufacturer's recommendations.
3. Do not conceal mechanical connections.

3.7 METAL STRUCTURE GROUNDING

A. Ground metal sheathing and exposed metal vertical structural elements to grounding system.

B. Bond electrical equipment supported by metal platforms to the platforms.

C. Provide electrical contact between metal frames and railings supporting pushbutton stations, receptacles, and instrument cabinets, and raceways carrying circuits to these devices.

3.8 SURGE PROTECTION EQUIPMENT GROUNDING

1. Connect surge arrestor ground terminals to equipment ground bus.

PART 4 PAYMENT

A. All cost for furnishing and installing all the Electrical Work shown on the plans and required in these Special Provisions for which no separate items are included in the Bid, shall be included in the Lump Sum Price in the Bid for "ELECTRICAL WORK".

SECTION E-4 CONDUCTORS

PART 1 GENERAL

1.1 SUBMITTALS

A. Submit per 2-5.3 of Section G.

B. Shop Drawings:

1. Wire and cable descriptive product information.
2. Wire and cable accessories descriptive product information.
3. Manufactured wiring systems descriptive product information.
4. Manufactured wire systems rating information.
5. Manufactured wire systems dimensional drawings.
6. Manufactured wire systems special fittings.
7. Busway descriptive product information.
8. Busway rating information.
9. Busway dimensional drawings.
10. Busway special fitting information.
11. Busway-equipment interface information for equipment to be connected to busways.

C. Supporting Information:

1. Certified Factory Test Report for conductors 600 volts and below.

1.2 QUALITY ASSURANCE

A. Agency Requirements:

1. The Work shall be done in accordance with NFPA 70, 2017 Los Angeles County Electrical Code (2014 NEC). Where required by the Agency, material and equipment shall be labeled or listed by a nationally recognized testing laboratory or other acceptable organization in order to provide a basis for approval under NEC.

2. Materials and equipment manufactured within the scope of standards published by Underwriters Laboratories, Inc. shall conform to those standards and shall have an applied UL listing mark.

PART 2 PRODUCTS

2.1 CONDUCTORS 600 VOLTS AND BELOW

A. Conform to applicable requirements of NEMA WC 70.

B. Conductor Type:

1. 120- and 277-Volt Lighting, No. 10 AWG and Smaller: Solid copper.
2. 120-Volt Receptacle Circuits, No. 10 AWG and Smaller: Solid copper.
3. All Other Circuits: Stranded copper.

B. Insulation: Type THHN/THWN-2, except for sizes No. 6 and larger, with XHHW-2 insulation.

2.2 600-VOLT RATED CABLE

A. General:

1. Type TC, meeting requirements of UL 1277, including Vertical Tray Flame Test at 70,000 Btu per hour, and NFPA 70, Article 340, or UL 13 Listed Power Limited Circuit Cable meeting requirements of NFPA 70, Article 725.
2. Permanently and legibly marked with manufacturer's name, maximum working voltage for which cable was tested, type of cable, and UL listing mark.
3. Suitable for installation in open air, or conduit.
4. Minimum Temperature Rating: 90 degrees C dry locations, 75 degrees C wet locations.
5. Overall Outer Jacket: PVC, flame-retardant, sunlight- and oil-resistant.

B. Type 1, Multiconductor Control Cable:

1. Conductors:
   a. No. 14 AWG, seven-strand copper.
   b. Insulation: 15-mil PVC with 4-mil nylon.
   c. UL 1581 listed as Type THHN/THWN rated VW-1.
   d. Conductor group bound with spiral wrap of barrier tape.
   e. Color Code: In accordance with ICEA S-58-679, Method 1, Table 2.

2. Cable: Passes the ICEA T-29-520 210,000 Btu per hour Vertical Tray Flame Test.

3. Cable Sizes:

No. of Conductors	Max. Outside Diameter (Inches)	Jacket Thickness (Mils)
3	0.41	45
5	0.48	45
7	0.52	45
12	0.72	60

No. of Conductors	Max. Outside Diameter (Inches)	Jacket Thickness (Mils)
19	0.83	60
25	1.00	60
37	1.15	80

4. Manufacturers:
   a. Okonite Co.
   b. Southwire.

C. Type 3, No. 16 AWG, Twisted, Shielded Pair, Instrumentation Cable: Single pair, designed for noise rejection for process control, computer, or data log applications meeting NEMA WC 55 requirements.

1. Outer Jacket: 45-mil nominal thickness.
2. Individual Pair Shield: 1.35-mil, double-faced aluminum/synthetic polymer overlapped to provide 100 percent coverage.
3. Dimension: 0.31-inch nominal OD.
4. Conductors:
   a. Bare soft annealed copper, Class B, seven-strand concentric, meeting requirements of ASTM B8.
   b. 20 AWG, seven-strand tinned copper drain wire.
   c. Insulation: 15-mil nominal PVC.
   d. Jacket: 4-mil nominal nylon.
   e. Color Code: Pair conductors black and red.
5. Manufacturers:
   a. Okonite Co.
   b. Alpha Wire Corp.
   c. Belden.

D. Type 4, No. 16 AWG, Twisted, Shielded Triad Instrumentation Cable: Single triad, designed for noise rejection for process control, computer, or data log applications meeting NEMA WC 55 requirements.

1. Outer Jacket: 45-mil nominal.
2. Individual Pair Shield: 1.35-mil, double-faced aluminum/synthetic polymer, overlapped to provide 100 percent coverage.
3. Dimension: 0.32-inch nominal OD.
4. Conductors:
   a. Bare soft annealed copper, Class B, seven-strand concentric, meeting requirements of ASTM B8.
   b. 20 AWG, seven-strand, tinned copper drain wire.
   c. Insulation: 15-mil nominal PVC.
   d. Jacket: 4-mil nylon.
   e. Color Code: Triad conductors black, red, and blue.
5. Manufacturers:

a. Okonite Co.
b. Alpha Wire Corp.
c. Belden.

E. Type 5, No. 18 AWG, Multi-Twisted, Shielded Pairs with a Common, Overall Shield Instrumentation Cable: Designed for use as instrumentation, process control, and computer cable, meeting NEMA WC 55 requirements.

1. Conductors:
   a. Bare soft annealed copper, Class B, seven-strand concentric, in accordance with ASTM B8.
   b. Tinned copper drain wires.
   c. Pair drain wire size AWG 20, group drain wire size AWG 18.
   d. Insulation: 15-mil PVC.
   e. Jacket: 4-mil nylon.
   f. Color Code: Pair conductors black and red with red conductor numerically printed for group identification.
   g. Individual Pair Shield: 1.35-mil, double-faced aluminum/synthetic polymer.
2. Cable Shield: 2.35-mil, double-faced aluminum/synthetic polymer, overlapped for 100 percent coverage.
3. Cable Sizes:

Number of Pairs	Maximum Outside Diameter (Inches)	Nominal Jacket Thickness (Mils)
4	0.50	45
8	0.68	60
12	0.82	60
16	0.95	80
24	1.16	80
36	1.33	80
50	1.56	80

4. Manufacturers:
   a. Okonite Co.
   b. Alpha Wire Corp.
   c. Belden.

2.3 GROUNDING CONDUCTORS

A. Equipment: Stranded copper with green, Type USE/RHH/RHW-XLPE or THHN/THWN, insulation.

B. Direct Buried: Bare stranded copper.

2.4 ACCESSORIES FOR CONDUCTORS 600 VOLTS AND BELOW

A. Tape:

1. General Purpose, Flame Retardant: 7-mil, vinyl plastic, Scotch Brand 33, rated for 90 degrees C minimum, meeting requirements of UL 510.
2. Flame Retardant, Cold and Weather Resistant: 8.5-mil, vinyl plastic, Scotch Brand 88.
3. Arc and Fireproofing:
   a. 30-mil, elastomer.
   b. Manufacturers and Products:
      1) 3M; Scotch Brand 77, with Scotch Brand 69 glass cloth tapebinder.
      2) Plymouth; 53 Plyarc , with 77 Plyglas glass cloth tapebinder.

B. Identification Devices:

1. Sleeve:
   a. Permanent, PVC, yellow or white, with legible machine-printed black markings.
   b. Manufacturer and Product:
      1) Raychem; Type D-SCE or ZH-SCE.
      2) Brady, Type 3PS.
2. Heat Bond Marker:
   a. Transparent thermoplastic heat bonding film with acrylic pressure sensitive adhesive.
   b. Self-laminating protective shield over text.
   c. Machine printed black text.
   d. Manufacturer: 3M Co.; Type SCS-HB.
3. Marker Plate: Nylon, with legible designations permanently hot stamped on plate.
4. Tie-On Cable Marker Tags:
   a. Chemical resistant white tag.
   b. Size: 1/2-inch by 2-inch.
   c. Manufacturer and Product: Raychem; Type CM-SCE.
5. Grounding Conductor: Permanent green heat-shrink sleeve, 2 inch minimum.

C. Connectors and Terminations:

1. Nylon, Self-Insulated Crimp Connectors:
   a. Manufacturers and Products:
      1) Thomas & Betts; Sta-Kon.
      2) Burndy; Insulug.
      3) ILSCO.
2. Nylon, Self-Insulated, Crimp Locking-Fork, Torque-Type Terminator:

a. Suitable for use with 75 degrees C wire at full NFPA 70, 75 degrees C ampacity.
b. Seamless.
c. Manufacturers and Products:
1) Thomas & Betts; Sta-Kon.
2) Burndy, Insulink.
3) ILSCO; ILSCONS.

3. Self-Insulated, Freespring Wire Connector (Wire Nuts):
a. Plated steel, square wire springs.
b. UL Standard 486C.
c. Manufacturers and Products:
1) Thomas & Betts.
2) Ideal; Twister.

4. Self-Insulated, Set Screw Wire Connector:
a. Two piece compression type with set screw in brass barrel.
b. Insulated by insulator cap screwed over brass barrel.
c. Manufacturer:
1) 3M Co.
2) Thomas & Betts.
3) Marrette.

D. Cable Lugs:

1. In accordance with NEMA CC 1.
2. Rated 600 volts of same material as conductor metal.
3. Uninsulated Crimp Connectors and Terminators:
a. Suitable for use with 75 degrees C wire at full NFPA 70, 75 degrees C ampacity.
b. Manufacturers and Products:
1) Thomas & Betts; Color-Keyed.
2) Burndy, Hydent.
3) ILSCO.

4. Uninsulated, Bolted, Two-Way Connectors and Terminators:
a. Manufacturers and Products:
1) Thomas & Betts; Locktite.
2) Burndy; Quiklug.
3) ILSCO.

E. Cable Ties:

1. Nylon, adjustable, self-locking, and reusable.
2. Manufacturer and Product: Thomas & Betts; TY-RAP.

F. Heat Shrinkable Insulation:

1. Thermally stabilized, cross-linked polyolefin.
2. Manufacturer and Product: Thomas & Betts; SHRINK-KON.

2.5 PULLING COMPOUND

A. Nontoxic, noncorrosive, noncombustible, nonflammable, water-based lubricant; UL listed.

B. Suitable for rubber, neoprene, PVC, polyethylene, hypalon, CPE, and lead-covered wire and cable.

C. Approved for intended use by cable manufacturer.

D. Suitable for zinc-coated steel, aluminum, PVC, bituminized fiber, and fiberglass raceways.

E. Manufacturers:

1. Ideal Co.
2. Polywater, Inc.
3. Cable Grip Co.

2.6 WARNING TAPE

A. Furnish and install a 6” wide polyethylene red underground barrier type 12” above full length of conduit run.

2.7 SOURCE QUALITY CONTROL

A. Conductors 600 Volts and Below: Test in accordance with UL 44 and 854 Standards.

PART 3 EXECUTION

3.1 GENERAL

A. Conductor storage, handling, and installation to be in accordance with manufacturer’s recommendations.

B. Conductor and cable sizing shown is based on copper conductors, unless noted otherwise.

C. Do not exceed cable manufacturer’s recommendations for maximum pulling tensions and minimum bending radii.

D. Terminate all conductors and cables, unless otherwise indicated.

E. Tighten screws and terminal bolts in accordance with UL 486A for copper conductors.

F. Cable Lugs: Provide with correct number of holes, bolt size, and center-to-center spacing as required by equipment terminals.

G. Bundling: Where single conductors and cables in manholes, handholes, vaults, cable trays, and other indicated locations are not

wrapped together by some other means, bundle conductors from each conduit throughout their exposed length with cable ties placed at intervals not exceeding 12 inches on center.

H. Ream, remove burrs, and clear interior of installed conduit before pulling wires or cables.

3.2 POWER CONDUCTOR COLOR CODING

A. Conductors 600 Volts and Below:

1. No. 6 AWG and Larger: Apply general purpose, flame retardant tape at each end, and at accessible locations wrapped at least six full overlapping turns, covering an area 1-1/2 to 2 inches wide.
2. No. 8 AWG and Smaller: Provide colored conductors.

3. Colors:

System	Conductor	Color
All Systems	Equipment Grounding	Green
240/120 Volts Single-Phase, Three-Wire	Grounded Neutral One Hot Leg Other Hot Leg	White Black Red
208Y/120 Volts Three-Phase, Four-Wire	Grounded Neutral Phase A Phase B Phase C	White Black Red Blue
240/120 Volts Three-Phase, Four-Wire Delta, Center Tap Ground on Single-Phase	Grounded Neutral Phase A Phase B High (wild) Leg	White Black Orange Blue
480Y/277 Volts Three-Phase, Four-Wire	Grounded Neutral Phase A Phase B Phase C	White Brown Orange Yellow
NOTE: Phase A, B, C implies direction of positive phase rotation.		

4. Tracer: Outer covering of white with an identifiable colored strip, other than green, in accordance with NFPA 70.

3.3 CIRCUIT IDENTIFICATION

A. Circuits Not Appearing in Circuit Schedules:

1. Assign circuit name based on device or equipment at load end of circuit.
2. Where this would result in same name being assigned to more than one circuit, add number or letter to each otherwise identical circuit name to make it unique.

B. Method:

1. Conductors No. 3 AWG and Smaller: Identify with sleeves or heat bond markers.
2. Cables, and Conductors No. 2 AWG and Larger:
   a. Identify with marker plates; or
   b. Tie-on cable marker tags.
   c. Attach with nylon tie cord.
3. Taped-on markers or tags relying on adhesives not permitted.

3.4 CONDUCTORS 600 VOLTS AND BELOW

A. Install 10 AWG or 12 AWG conductors for branch circuit power wiring in lighting and receptacle circuits.

B. Do not splice incoming service conductors and branch power distribution conductors No. 6 AWG and larger, unless specifically indicated or approved by the engineer.

C. Connections and Terminations:

1. Install wire nuts only on solid conductors.
2. Install nylon self-insulated crimp connectors and terminators for instrumentation and control, circuit conductors.
3. Install self-insulated, set screw wire connectors for two-way connection of power circuit conductors No. 12 AWG and smaller.
4. Install uninsulated crimp connectors and terminators for instrumentation, control, and power circuit conductors No. 4 AWG through No. 2/0 AWG.
5. Install uninsulated, bolted, two-way connectors and terminators for power circuit conductors No. 3/0 AWG and larger.
6. Install uninsulated terminators bolted together on motor circuit conductors No. 10 AWG and larger.
7. Place no more than one conductor in any single-barrel pressure connection.
8. Install crimp connectors with tools approved by connector manufacturer.
9. Install terminals and connectors acceptable for type of material used.
10. Compression Lugs:
    a. Attach with a tool specifically designed for purpose.
    b. Tool shall provide complete, controlled crimp and shall not release until crimp is complete.
    c. Do not use plier type crimpers.

D. Do not use soldered mechanical joints.

E. Splices and Terminations:

1. Tape insulate all uninsulated connections.
2. Indoors: Use general purpose, flame retardant tape.
3. Outdoors: Use flame retardant, cold- and weather-resistant tape.

F. Cap spare conductors with UL listed end caps.

G. Cabinets, Panels, and Motor Control Centers:

1. Remove surplus wire, bridle and secure.
2. Where conductors pass through openings or over edges in sheet metal, remove burrs, chamfer edges, and install bushings and protective strips of insulating material to protect the conductors.

H. Control and Instrumentation Wiring:

1. Where terminals provided will accept such lugs, terminate control and instrumentation wiring, except solid thermocouple leads, with insulated, locking-fork compression lugs.
2. Terminate with methods consistent with terminals provided, and in accordance with terminal manufacturer's instructions.
3. Locate splices in readily accessible cabinets or junction boxes using terminal strips.
4. Cable Protection:
   a. Under Infinite Access Floors: May be installed without bundling.
   b. All Other Areas: Install individual wires, pairs, or triads in flex conduit under the floor or grouped into bundles at least 1/2 inch in diameter.
   c. Maintain integrity of shielding of instrumentation cables.
   d. Ensure grounds do not occur because of damage to jacket over the shield.

I. Extra Conductor Length: For conductors to be connected by others, install minimum 6 feet of extra conductor in freestanding panels and minimum 2 feet in other assemblies.

PART 4 PAYMENT

A. All cost for furnishing and installing all the Electrical Work shown on the plans and required in these Special Provisions for which no separate items are included in the Bid, shall be included in the Lump Sum Price in the Bid for "ELECTRICAL WORK".

SECTION E-5 RACEWAYS

PART 1 GENERAL

1.1 SUBMITTALS

A. Submit per 2-5.3 of Section G.

B. Shop Drawings:

1. Manufacturer's Literature:
   a. Rigid galvanized steel conduit.
   b. PVC Schedule 80 conduit.
   c. Flexible metal, liquid-tight conduit.
   d. Conduit fittings.
   e. Wireways.

2. Conduit Layout:
   a. Plan and section type, showing arrangement and location of conduit and duct bank required for:
      1) Low voltage feeder and branch circuits.
      2) Instrumentation and control systems.
      3) Empty conduit for future use.
   b. Reproducible mylar; scale not greater than 1-inch equals 20 feet.

3. Equipment and machinery proposed for bending metal conduit.

4. Method for bending PVC conduit less than 30 degrees.

1.2 QUALITY ASSURANCE

A. Agency Requirements:

1. The Work shall be done in accordance with NFPA 70, 2017 Los Angeles County Electrical Code (2014 NEC). Where required by the Agency, material and equipment shall be labeled or listed by a nationally recognized testing laboratory or other acceptable organization in order to provide a basis for approval under NEC.

2. Materials and equipment manufactured within the scope of standards published by Underwriters Laboratories, Inc. shall conform to those standards and shall have an applied UL listing mark.

PART 2 PRODUCTS

2.1 CONDUIT AND TUBING

A. Rigid Galvanized Steel Conduit (RGS):

1. Meet requirements of ANSI C80.1 and UL 6.
2. Material: Hot-dip galvanized, with chromated protective layer.

B. PVC Schedule 80 Conduit:

1. Meet requirements of NEMA TC 2 and UL 651.
2. UL listed for concrete encasement, underground direct burial, concealed or direct sunlight exposure, and 90 degrees C insulated conductors.
3. Furnish without factory-formed bell.

C. Flexible Metal, Liquid-Tight Conduit:

1. UL 360 listed for 105 degrees C insulated conductors.
2. Material: Galvanized steel, with an extruded PVC jacket.

2.2 FITTINGS

A. Rigid Galvanized Steel Conduit:

1. General:
   a. Meet requirements of UL 514B.
   b. Type: Threaded, galvanized. Set screw and threadless compression fittings not permitted.
2. Bushing:
   a. Material: Malleable iron with integral insulated throat, rated for 150 degrees C.
   b. Manufacturers and Products:
      1) Appleton; Series BU-I.
      2) O-Z/Gedney; Type HB.
3. Grounding Bushing:
   a. Material: Malleable iron with integral insulated throat rated for 150 degrees C, with solderless lugs.
   b. Manufacturers and Products:
      1) Appleton; Series GIB.
      2) O-Z/Gedney; Type HBLG.
4. Conduit Hub:
   a. Material: Malleable iron with insulated throat with bonding screw.
   b. UL listed for use in wet locations.
   c. Manufacturers and Products:
      1) Appleton, Series HUB-B.
      2) O-Z/Gedney; Series CH.
      3) Meyers; ST Series.
5. Conduit Bodies:
   a. Sized as required by NFPA 70.
   b. Manufacturers and Products (For Normal Conditions):
      1) Appleton; Form 35 threaded unilets.
      2) Crouse-Hinds; Form 7 or 8 threaded condulets.

3) Killark; Series O electrolets.
4) Thomas & Betts; Form 7 or 8.

6. Couplings: As supplied by conduit manufacturer.
7. Unions:
   a. Concrete tight, hot-dip galvanized, malleable iron.
   b. Manufacturers and Products:
      1) Appleton; Series SCC Bolt-On Coupling or Series EC Three-Piece Union.
      2) O-Z/Gedney; Type SSP split coupling or Type 4 Series, three-piece coupling.
8. Expansion Fitting Manufacturers and Products:
   a. Deflection/Expansion Movement:
      1) Appleton; Type DF.
      2) Crouse-Hinds; Type XD.
   b. Expansion Movement Only:
      1) Appleton; Type XJ.
      2) Crouse-Hinds; Type XJ.

B. PVC Conduit:

1. Meet requirements of NEMA TC-3.
2. Type: PVC, slip-on.

C. Flexible Metal, Liquid-Tight Conduit:

1. Metal insulated throat connectors with integral nylon or plastic bushing rated for 105 degrees C.
2. Insulated throat and sealing O-rings.
3. Manufacturers and Products:
   a. Thomas & Betts; Series 5331.
   b. O-Z/Gedney; Series 4Q.

2.3 METAL WIREWAYS

A. Meet requirements of UL 870.

B. Type: Steel-enclosed, with removable, screw type cover.

C. Rating: Outdoor raintight.

C. Finish: Gray, baked enamel.

D. Manufacturers:

1. Circle AW.
2. Hoffman.

2.4 ACCESSORIES

A. Duct Bank Spacers:

1. Type: Nonmetallic, interlocking, for multiple conduit sizes.
2. Suitable for all types of conduit.
3. Manufacturers:
   a. Underground Device, Inc.
   b. Carlon.

B. Identification Devices:

1. Raceway Tags:
   a. Material: Permanent, nonferrous metal.
   b. Shape: Round.
   c. Raceway Designation: Pressure stamped, embossed, or engraved.
   d. Tags relying on adhesives or taped-on markers not permitted.
2. Warning Tape:
   a. Material: Polyethylene, 4-mil gauge with detectable strip.
   b. Color: Red.
   c. Width: Minimum 6 inches.
   d. Designation: Warning on tape that electric circuit is located below tape.
   e. Identifying Letters: Minimum 1-inch high permanent black lettering imprinted continuously over entire length.
   f. Manufacturers and Products:
      1) Panduit; Type HTDU.
      2) Reef Industries; Terra Tape.
3. Buried Raceway Marker:
   a. Material: Sheet bronze, consisting of double-ended arrows, straight for straight runs and bent at locations where runs change direction.
   b. Designation: Incise to depth of 3/32 inch, ELECTRIC CABLES, in letters 1/4-inch high.
   c. Minimum Dimension: 1/4-inch thick, 10 inches long, and 3/4-inch wide.

C. Raceway Coating: Clean and apply protective coatings.

D. Wraparound Duct Band:

1. Material: Heat-shrinkable, cross-linked polyolefin, precoated with hot-melt adhesive.
2. 50 mm width (minimum).
3. Manufacturer and Product: Raychem; Type TWDB.

PART 3 EXECUTION

3.1 GENERAL

A. Conduit and Tubing sizes shown are based on the use of copper conductors.

B. All installed Work shall comply with NECA 5055.

C. Crushed or deformed raceways not permitted.

D. Maintain raceway entirely free of obstructions and moisture.

E. Immediately after installation, plug or cap raceway ends with watertight and dust-tight seals until time for pulling in conductors.

F. Avoid moisture traps where possible. When unavoidable in exposed conduit runs, provide junction box and drain fitting at conduit low point.

G. Group raceways installed in same area.

H. Follow structural surface contours when installing exposed raceways. Avoid obstruction of passageways.

I. Run exposed raceways parallel or perpendicular to walls, structural members, or intersections of vertical planes.

J. Install watertight fittings in outdoor, underground, or wet locations.

K. Paint threads and cut ends, before assembly of fittings, galvanized conduit, installed in exposed or damp locations with zinc-rich paint or liquid galvanizing compound.

L. Metal conduit to be reamed, burrs removed, and cleaned before installation of conductors, wires, or cables.

M. Do not install raceways in concrete equipment pads, foundations, or beams.

N. Horizontal raceways installed under floor slabs shall lie completely under slab, with no part embedded within slab.

O. Install concealed, embedded, and buried raceways so that they emerge at right angles to surface and have no curved portion exposed.

P. Install conduits for telephone cables in strict conformance with the requirements of EIA/TIA 596-A.

3.2 INSTALLATION IN CAST-IN-PLACE STRUCTURAL CONCRETE

A. Minimum cover 2 inches, including all fittings.

B. Conduit placement shall not require changes in reinforcing steel location or configuration.

C. Provide nonmetallic support during placement of concrete to ensure raceways remain in position.

D. Slabs:

1. Trade size of conduit not to exceed one-fourth of the slab.

2. Separate conduit by a minimum 3” between conduits, unless otherwise shown.

3. Cross conduit at an angle greater than 45 degrees, with minimum separation of 1 inch.

4. Conduit shall not be installed below the maximum water surface elevation in walls of water holding structures.

3.3 CONDUIT APPLICATION

A. Diameter: Minimum 1-inch.

B. Exterior, Exposed:

1. Rigid galvanized steel.

C. Aboveground, Embedded in Concrete slabs:

1. Rigid galvanized steel.

D. Direct Earth Burial:

1. PVC Schedule 40.

E. Under Slabs-On-Grade:

1. Rigid galvanized steel.

3.4 CONNECTIONS

A. For motors, dry type transformers, electrically operated valves, instrumentation, and other equipment where flexible connection is required to minimize vibration:

1. Conduit Size 4 Inches or Less: Flexible, liquid-tight conduit.
2. Wet Areas: Flexible metal liquid-tight.
3. Dry Areas: Flexible, metallic liquid-tight.
4. Length: 18-inch minimum, 60-inch maximum, sufficient to allow movement or adjustment of equipment.

B. Outdoor Areas, Process Areas Exposed to Moisture, and Areas Required to be Oiltight and Dust-Tight: Flexible metal, liquid-tight conduit.

C. Transition from Underground or Concrete Embedded to Exposed: Rigid galvanized steel conduit.

D. Under Equipment Mounting Pads: Rigid galvanized steel conduit.

3.5 PENETRATIONS

A. Make at right angles, unless otherwise shown.

B. Apply single layer of wraparound duct band to all metallic conduit protruding through grade to a point 2 inches above and 2 inches below concrete surface.

C. Concrete Floors (Aboveground): Provide nonshrink grout dry-pack, or use watertight seal device.

D. Entering Structures:

1. General: Seal raceway at the first box or outlet with oakum or expandable plastic compound to prevent the entrance of gases or liquids from one area to another.
2. Existing or Precast Wall (Underground): Core drill wall and install a watertight entrance seal device.
3. Nonwaterproofed Wall or Floor (Underground, without Concrete Encasement):
   a. Provide Schedule 40 galvanized pipe sleeve, or watertight entrance seal device.
   b. Fill space between raceway and sleeve with expandable plastic compound or oakum and lead joint, on each side.

3.6 SUPPORT

A. Support from structural members only, at intervals not exceeding NFPA 70 requirements, and in any case not exceeding 8 feet. Do not support from piping, pipe supports, or other raceways.

B. Application/Type of Conduit Strap:

1. Rigid Steel: Zinc coated steel, pregalvanized steel or malleable iron.
2. Nonmetallic Conduit: Nonmetallic or PVC coated metal.

3.7 BENDS

A. Install concealed raceways with a minimum of bends in the shortest practical distance.

B. Make bends and offsets of longest practical radius. Bends in conduits and ducts being installed for fiber optic cables shall be not less than 20 times cable diameter, 15 inches, minimum.

C. Install with symmetrical bends or cast metal fittings.

D. Avoid field-made bends and offsets, but where necessary, make with acceptable hickey or bending machine. Do not heat metal raceways to facilitate bending.

E. Make bends in parallel or banked runs from same center or centerline with same radius so that bends are parallel.

F. Factory elbows may be installed in parallel or banked raceways if there is change in plane of run, and raceways are same size.

G. PVC Conduit:

1. Bends 30 Degrees and Larger: Provide factory-made elbows.
2. 90-Degree Bends: Provide rigid steel elbows, tape wrapped where direct buried.
3. Use manufacturer's recommended method for forming smaller bends.

H. Flexible Conduit: Do not make bends that exceed allowable conductor bending radius of cable to be installed or that significantly restricts conduit flexibility.

3.9 PVC CONDUIT

A. Solvent Welding:

1. Provide manufacturer recommended solvent; apply to all joints.
2. Install such that joint is watertight.

B. Adapters:

1. PVC to Metallic Fittings: PVC terminal type.
2. PVC to Rigid Metal Conduit or IMC: PVC female adapter.

C. Belled-End Conduit: Bevel the unbelled end of the joint prior to joining.

3.10 WIREWAYS

A. Install in accordance with manufacturer's instructions.

B. Locate with cover on accessible vertical face of wireway, unless otherwise shown.

C. Applications:

1. Metal wireway in indoor dry locations.
2. Nonmetallic wireway in indoor wet, outdoor, and corrosive locations.

3.11 TERMINATION AT ENCLOSURES

A. Cast Metal Enclosure: Provide manufacturer's premolded insulating sleeve inside metallic conduit terminating in threaded hubs.

B. Nonmetallic, Cabinets, and Enclosures: Terminate conduit in threaded conduit hubs, maintaining enclosure integrity.

C. Sheet Metal Boxes, Cabinets, and Enclosures:

1. Rigid Galvanized Conduit:
   a. Provide one lock nut each on inside and outside of enclosure.
   b. Install grounding bushing. Provide bonding jumper from grounding bushing to equipment ground bus or ground pad; if neither ground bus nor pad exists, connect jumper to lag bolt attached to metal enclosure.
   c. Install insulated bushing on ends of conduit where grounding is not required.
   d. Provide insulated throat when conduit terminates in sheet metal boxes having threaded hubs.
   e. Utilize sealing locknuts or threaded hubs on outside of NEMA 3R and NEMA 12 enclosures.
   f. Terminate conduits at threaded conduit hubs at NEMA 4 and 4X boxes and enclosures.

2. PVC Schedule 80 Conduit: Provide PVC terminal adapter with lock nut.

D. Motor Control Center, Switchboard, and Free-Standing Enclosures:

1. Terminate metal conduit entering bottom with grounding bushing; provide a grounding jumper extending to equipment ground bus or grounding pad.
2. Terminate PVC conduit entering bottom with bell end fittings.

3.12 UNDERGROUND RACEWAYS

A. Grade: Maintain minimum grade of 4 inches in 100 feet, either from one manhole, handhole, or pull box to the next, or from a high point between them, depending on surface contour.

B. Cover: Maintain minimum 2-foot cover above conduit unless otherwise shown.

C. Make routing changes as necessary to avoid obstructions or conflicts.

D. Couplings: In multiple conduit runs, stagger so that couplings in adjacent runs are not in same transverse line.

E. Union type fittings not permitted.

F. Spacers:

1. Provide preformed, nonmetallic spacers, designed for such purpose, to secure and separate parallel conduit runs in a trench.

2. Install at intervals not greater than that specified in NFPA 70 for support of the type conduit used, but in no case greater than 10 feet.

G. Support conduit so as to prevent bending or displacement during backfilling or concrete placement.

H. Installation with Other Piping Systems:

1. Crossings: Maintain minimum 12-inch vertical separation.
2. Parallel Runs: Maintain minimum 12-inch separation.
3. Installation over valves or couplings not permitted.

I. Backfill:

1. Do not backfill until inspected by the engineer.

3.14 EMPTY RACEWAYS

A. Provide permanent, removable cap over each end.

B. Provide PVC plug with pull tab for underground raceways with end bells.

C. Provide nylon pull cord.

D. Identify, as specified in Article Identification Devices, with waterproof tags attached to pull cord at each end, and at intermediate pull point.

3.15 IDENTIFICATION DEVICES

A. Raceway Tags:

1. Identify origin and destination.
2. Install at each terminus, and near midpoint.
3. Provide nylon strap for attachment.

B. Warning Tape: Install approximately 12 inches above underground. Align parallel to, and within 12 inches of, centerline of runs.

3.16 PROTECTION OF INSTALLED WORK

A. Protect products from effects of moisture, corrosion, and physical damage during construction.

B. Provide and maintain manufactured watertight and dust-tight seals over all conduit openings during construction.

C. Touch up painted conduit threads after assembly to cover nicks or scars.

D. Touch up coating damage to PVC-coated conduit with patching compound approved by manufacturer; compound shall be kept refrigerated according to manufacturers' instructions until time of use.

PART 4 PAYMENT

A. All cost for furnishing and installing all the Electrical Work shown on the plans and required in these Special Provisions for which no separate items are included in the Bid, shall be included in the Lump Sum Price in the Bid for "ELECTRICAL WORK".

PROJECT ID NO. SWQ0000003

LADERA PARK STORMWATER IMPROVEMENTS PROJECT

SPECIAL PROVISIONS

SECTION LS – LANDSCAPING AND IRRIGATION

The following Special Provisions supplement and amend Part 8 of the Standard Specifications for Public Works Construction, 2015 Edition. As a reference convenience, these Special Provisions have been arranged into a format which parallels the Standard Specifications.

Prepared by:

Khai Chung

06/23/2018
Date

Reviewed:

Stephen Zurek

09/11/18
Date

SECTION LS – LANDSCAPING AND IRRIGATION

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PART 8
LANDSCAPING AND IRRIGATION

SECTION 800 – MATERIALS

800-1 LANDSCAPING MATERIALS.

800-1.1 Topsoil.

800-1.1.1 General. Add the following:

a) Agronomic Soil Report.

1. Prior to the delivery of imported topsoil and bioswale soil to the Work site, the Contractor shall submit an agronomic soil report(s) and growth (herbicide) test results in report form (test report) for every 150 cubic yards of soil to the Engineer. The test reports shall include the name, location, history and description of the source/site from which the soil was excavated and the depth of harvesting. If imported topsoil is obtained from more than one source/site, the Contractor shall submit the name and location of each source/site and submit test reports per source/site at the aforementioned frequency. Test reports shall be prepared specifically for the Project and shall be dated no earlier than the date of execution of the Contract. Soil test performance and test report submittal shall be shown as individual activities on the Contractor's baseline schedule in accordance with 6-1 of Section G.

   The Contractor shall submit the test reports in accordance with the following:

   i. If existing site soil is used for the Project, the Contractor shall submit test reports for the existing soil after the completion of the grading operations and prior to soil preparation. Soil shall be sampled at a minimum frequency of 1 test per acre of Project size. A minimum of 3 samples shall be tested for Projects less than 1 acre in size.

   ii. The test reports shall be prepared by one of the following agronomic soils testing laboratories:

   Wallace Laboratory
   365 Coral Circle
   El Segundo, CA 90245
   (310) 615-0116
   Email: gaw@wlabs.net

   Waypoint Analytical
   4741 East Hunter Ave. Suite A,
   Anaheim, CA 92807
   (714) 282-8777
   Email: supportca@waypointanalytical.com

2. Additional agronomic soils and growth testing may be required at any time during construction. Areas of testing shall be as directed by the Engineer.

3. Unless otherwise approved by the Engineer, soil samples shall be collected and sampled by the testing laboratory as a part of their services.

4. The report shall indicate soil analysis for plant growth suitability, including permeability rate, and recommendations for soil preparation in all planting areas and soil mix for backfill of planting container material.

5. The recommendations of the agronomic soil report(s) shall take precedence over the quantities of soil amendments and material mix specified in the backfill mix; and only when those recommendations exceed the minimum requirements specified.

6. Germination and growth of monocots and dicots shall not be restricted more than 20 percent without the addition of activated charcoal when compared to the reference soil. Total petroleum hydrocarbons shall not exceed 50 mg/kg when tested in accordance with modified EPA Test Method 8015. Total aromatic volatile organic hydrocarbons (benzene, toluene, xylene, and ethylbenzene) shall not exceed 0.5 mg/kg when tested in accordance with EPA Test Method 8020.

7. The Contractor shall not begin any planting work until the agronomic soil report(s) has been reviewed and approved by the Agency.

800-1.1.2 Class "A" Topsoil. Replace the entire subsection with the following:

Class "A" topsoil shall be imported from a source outside the limits of the Work selected by the Contractor and shall conform to the following requirements:

a) Soil shall be free of roots, clods, pockets of coarse sand, noxious weeds, sticks, brush, litter, and stones larger than 1 inch in greatest dimension.

b) Soil shall not be infested with nematodes or other undesirable disease-causing organisms

c) Continuous, air-filled pore space content on a volume/volume basis shall be at least 15 percent when moisture is present at field capacity. Soil shall have a field capacity of at least 15 percent on a dry weight basis.

d) Mechanical Analysis and Permeability Rate(s). Topsoil shall be a sandy loam, loam, or clay loam. The selection shall be made by the Engineer or else be similar to the Work site soil. The definition of soil texture shall be based on the United States Department of Agriculture (USDA) classification scheme. Gravel over 1/4 inch in diameter shall be less than 10 percent by weight. The hydraulic conductivity rate shall be not less than 1 inch per hour nor more than 5 inches per hour when tested in accordance with the USDA Handbook Number 60, Method 34b.

e) Organic Matter Content. Organic matter (loss of ignition) shall be 7 to 10 percent by weight minimum based on the weight of the sample dried to constant weight at 100 to 110 ^{0}C, or as determined by the sulfuric acid test. Soil organic matter shall not cause toxicity or cause excessive reduction in the volume of soil due to decomposition. The carbon/nitrogen ratio shall be 9.5 to 10.5. When topsoil otherwise complies with the requirements but shows a slight deficiency in organic matter content, humus, peat moss or other approved organic matter may be incorporated when approved by the Engineer.

f) pH. The soil pH range measured in the saturation extract (Method 21a, USDA Handbook Number 60) shall be 6.0 - 7.9.

g) Fertility. The range of the essential elemental concentration in soil shall be as follows:

Ammonium Bicarbonate/DTPA Extraction
Parts Per Million (mg/kilogram)
Dry Weight Basis

Phosphorus	2 - 40
Potassium	40 - 220
Iron	2 - 35
Manganese	0.3 - 6
Zinc	0.6 - 8
Copper	0.1 - 5
Boron	0.2 - 1
Magnesium	50 - 150
Sodium	0 - 100
Sulfur	25 - 500
Molybdenum	0.1 - 2

h) Salinity – Electrical Conductance. The salinity range measured in the saturation extract (Method 3a, USDA Handbook Number 60) shall be 0.5-3.0 dS/m.

i) Chloride. The maximum concentration of soluble chloride in the saturation extract (Method 3a, USDA Handbook Number 60) shall be 150 mg/kg (parts per million).

j) Boron. The maximum concentration of soluble boron in the saturation extract (Method 3a, USDA Handbook Number 60) shall be 1 mg/kg (parts per million).

k) Sodium Absorption Ratio (SAR). The maximum SAR (Method 20b, USDA Handbook Number 60) shall be 3.

l) Aluminum. Available aluminum measured with the ammonium bicarbonate/DTPA extraction shall be less than 3 parts per million.

m) Calcium Carbonate Content. Free calcium carbonate (limestone) shall not be present.

n) Heavy Metals. The maximum permissible elemental concentration in the soil shall not exceed the following:

1. Ammonium Bicarbonate/DTPA Extraction
   Parts Per Million (mg/kilogram)
   Dry Weight Basis

Arsenic	2
Cadmium	2
Chromium	10
Cobalt	2
Lead	30
Mercury	1
Nickel	5
Selenium	3
Silver	0.5
Vanadium	3

2. pH. If the soil pH is between 6 and 7, the maximum permissible elemental concentration shall be reduced 50 percent. If the soil is less than 6.0, the maximum permissible elemental concentration shall be reduced 75 percent. No more than three metals shall be present at 50 percent or more of the above values.

800-1.2 Soil Fertilizing and Conditioning Materials.

800-1.2.4 Organic Soil Amendment. Replace the entire subsection with the following:

Organic soil amendment shall conform to the following requirements:

a) Humus material shall have an acid-soluble ash content of no less than 6 percent and no more than 20 percent. The organic matter content shall be 50 percent or more when determined on a dry weight basis.

b) The pH shall be between 6 and 7.5.

c) The salt content shall be less than 10 millimho/cm at 25 °C in a saturated paste extract.

d) Boron content of the saturated extract shall be less than 1.0 part per million.

e) Silicon content (acid-insoluble ash) shall be less than 50 percent.

f) Calcium carbonate shall not be present if to be applied on alkaline soils.

g) Composted wood products are conditionally acceptable (stable humus must be present). Wood-based products based on redwood or cedar are not acceptable. When applying nitrogen-stabilized wood shavings, fine grade with 1 percent nitrogen added per pound of shavings.

h) Sludge-based materials are not acceptable.

i) Carbon/nitrogen ratio shall be less than 25:1.

j) Compost shall be aerobic without malodorous presence of decomposition products, stable, weed free organic matter sourced from waste materials including yard debris or other organic materials, not including biosolids or manure feedstock. Compost shall conform to California Code of Regulations Title 14, Division 7, Chapter 3.1 requirements.

k) The maximum particle size shall be 0.5 inch. Eighty percent or more shall pass a No. 4 sieve.

l) Agricultural gypsum shall be composed of a minimum of 92 percent calcium sulfate particles of which a minimum of 85 percent by weight must pass a No. 100 sieve.

m) Sulfur shall be 99 percent pure. Not more than 1 percent by weight shall be retained on a No. 8 sieve.

n) Activated charcoal shall be per agronomic soils report.

o) Peat shall be free from alkali.

p) The maximum total permissible pollutant concentrations in parts per million on a dry weight basis shall be as follows:

arsenic	20	molybdenum	20
cadmium	15	nickel	100
chromium	300	selenium	50
cobalt	50	silver	10
copper	100	vanadium	500
lead	200	zinc	200
mercury	10		

q) Prepared backfill mix shall consist of the following:

1. Imported top soil: 60 percent by weight.

2. Humus soil amendment: compost, washed steer manure, mushroom compost, composted wood products (not including redwood or cedar): 40 percent by weight.

3. Urea formaldehyde (38-0-0): 1/3 pound per cubic yard.

4. Potassium sulfate (0-0-50): 1/3 pound per cubic yard.

5. Triple superphosphate (0-45-0): 1/3 pound per cubic yard.

6. Agricultural gypsum: 1 pound per cubic yard.

800-1.2.5 Mulch. Replace the entire subsection with the following:

Mulch shall be medium to fine textured (3/4 inch to 2 inch) ground wood by-product or

shredded bark mulch and shall be dark brown in color. Mulch shall be free of freshly-cut vegetation, seeds, inorganic material, heavy metals, and fungus. Contractor shall submit the name, supplier, and physical sample in a double-lined plastic bag for review and approval prior to use.

800-1.4 Plants.

800-1.4.1 General. Add the following:

The Contractor shall obtain approval from the Engineer and secure all plants required for the Project after issuance of the Part 1 Notice to Proceed.

The Contractor shall submit a list of plant materials (sizes and quantities), sample photographs of plants including size reference (e.g. known container size, yard sticks), and the name, address, contact person, and phone number of the nursery or nurseries where the plants are to be purchased.

Once the plant submittal has been approved by the Engineer, no plant substitutions will be allowed unless such substitutions are deemed necessary due to an unforeseen cause as approved by the Engineer.

Plant materials 15 gallons and larger in size will be inspected and tagged at the nursery by the Engineer no later than 2 weeks prior to the start of planting operations. The Contractor shall coordinate the tagging of plants with the nursery and the Engineer. The provisions of 4-1.3.3 shall be applicable to the nursery location.

Plants 5 gallons in size and smaller will be inspected and approved at the Project site by the Engineer at the time of delivery.

Plants not approved by the Engineer shall be removed from the Project site and replaced with approved plants.

800-1.4.2 Trees and 800-1.4.3 Shrubs. Replace the entire subsections with the following:

800-1.4.2 Trees and Shrubs. Refer to the list of plants and respective quantities shown on the Plans. The quantity listed shall only be used as a guide. The Contactor is responsible for providing all plants shown or implied on the Plans.

The plants sizes and conditions shown on the list of plants on the Plans conforms to the most current American Nursery Standards,

http://americanhort.org/documents/ansi_nursery_stock_standards_americanhort_2014.pdf.

One of each variety of plant shall be labeled with the proper botanical name, identifying genus, species and if applicable, cultivar or variety.

Add the following subsections:

800-1.5.3 Tree Stakes.

Add the following subsections:

Tree stakes shall be pressure treated lodge pole pine, 2 inch to 2-1/2 inch diameter.

Add the following subsection:

800-1.6 Root Control Barriers. Root control barriers (barriers) shall conform to Note 11 of SPPWC Standard Plan 520. Barriers shall be approved by the Engineer prior to use. Barriers shall be installed per Plans. Root Control Barriers shall be manufactured by one of the following:

a) Deep Root, model UB 18-2; Tel: (1) 415-781-9700
http://www.deeproot.com/products/root-barrier/ub18-2.html#head

b) Villa Root Barrier, model Dual Purpose Panels; Tel: (1) 800-654-4067
http://www.villarootbarrier.com/images/pdf-optimized/Dual%20Purpose.pdf

c) Century Products, model CP-18-2; Tel: (1) 714-632-7083
http://centuryrootbarrier.com/product/root-barrier-panel-case-2/

Barriers may be one continuous piece or be securely connected at splice points. Barriers shall be installed in accordance with the manufacturer's instructions and shall not be used as a form.

Backfill shall not be placed until barriers are in place upon completion of the adjacent work provided that adequate safety and warning devices are placed and maintained at each location. The area between the back of curb and the barriers shall be backfilled with topsoil per Plans.

Add the following subsection:

800-1.7 Contact Weed Killer. Contact weed killer shall utilize the biological process of "translocation" to destroy all parts of the treated weed, e.g. the broad-spectrum herbicide "glyphosate." Contact weed killer shall not leave a stain or residue.

Add the following subsection:

800-1.8 Miscellaneous Improvements. The following items are Landscape Materials and are part of the Project.

800-1.8.1 Geotextile for Decomposed Granite, Decorative Boulders, River Rock Cobble and as shown on the Plans. Geotextile shall exceed the minimum standards of type 90N per SSPWC, table 213-5.2(A) nonwoven geotextile. Manufacturers shall be one of the following:

a) Mirafi, model 140n; Tel: (1) 310-903-2120 https://www.tencategeo.us/en-us/products/nonwoven-geotextiles/mirafi-n-series

b) US Fabrics, model US12NW; Tel: (1) 800-518-2290
https://www.usfabricsinc.com/assets/pdf/products/us-120nw/us-120nw.pdf

c) Engineered Synthetic Products, model SKAPS GT-142; Tel: (1) 770-564-1857
http://www.espgeosynthetics.com/wp-content/uploads/2016/05/GT142.pdf

800-1.8.2 Interpretive Signage.

a) Interpretive Signage shall be manufactured by one of the following:

i) Izone Imaging, model Custom High Pressure Laminate; Tel: (1) 888-464-9663 http://www.izoneimaging.com/what-you-need/outdoor/parks-and-open-spaces/

ii) Fossil Graphics, model Custom High Pressure Laminate; Tel: (1) 800-244-9809 https://fossilgraphics.com/specs

iii) Gopher Sign Company, model Custom High Pressure Laminate; Tel (1) 800-383-3156 or 952-854-1978; Wayne@gophersign.com
http://www.gophersign.com/products/imageloc-signs/

b) Interpretive signage artwork (graphic panel) will be provided by the agency as a file in jpg, Illustrator, or Photoshop digital format. Sign and graphic panel shall be fabricated and installed by the contractor. Contractor to provide shop drawing for review and approval by the Agency prior to fabrication and installation. Contractor shall also provide a 8" x 8" sample on the panel material (see below for material description of panel) showing a portion of the colored artwork graphic, that was provided by the Agency to the contractor, for review by the Agency prior to final fabrication and installation.

i) Frame material. All metal and weld joints to be powdercoated finish, color and material per construction material legend and details.

ii) Graphic Panel material. The panel shall be fused polycarbonate: vinyl inkjet print fused between two sheets of uv resistant polycarbonate (fpcs).

800-1.8.3 Four Foot and Six Foot Park Bench. Four Foot and Six Foot Park Bench shall be manufactured by one of the following:

a) Belson Outdoors, Models RB4WB-P, RB6WB-P, colors per plan; Tel: (1) (800) 323-5664
http://www.belson.com/Recycled-Plastic-Park-Benches-with-Aluminum-Frame

b) The Park & Facilities, Model 289-1128, colors per plan; Tel: (1) 800-293-8528
https://www.theparkcatalog.com/6-ft-heritage-recycled-plastic-bench

c) The Bench Factory, Model TBN-64, colors per plan; Tel: (1) 866-941-2116 http://www.thebenchfactory.com/recycled-plastic-benches/tbf-madison-memorial-bench

800-1.8.4 Trash Receptacle. Trash Receptacles shall be manufactured by one of the following:

a) Belson Outdoors, Model # SAW40P-RC, colors per plan; Tel: (1) (800) 323-5664 http://www.belson.com/Covington-Collection-Sawgrass-Waste-Receptacles

b) Witt Industries, Model # SAW40P-RC, colors per plan; Tel: (1) 800-543-7417 http://www.witt.com/outdoor-and-site-furnishings/outdoor-receptacles/avant-garde-collection/sawgrass/

c) Upbeat Site Furnishing, Model # AE2645CT-STX, colors per plan; Tel: (1)-800-325-3047 https://www.upbeat.com/airi-stix-gal-trash-receptacle/AE2645CT-STX/product.aspx

800-1.8.5 Park Monument Sign. Park monument sign shall be manufactured by one of the following:

a) Izone Imaging, model Custom High Pressure Laminate; Tel: (1) 888-464-9663 http://www.izoneimaging.com/what-you-need/outdoor/parks-and-open-spaces/

b) Fossil Graphics, model Custom High Pressure Laminate; Tel: (1) 800-244-9809 https://fossilgraphics.com/specs

c) Gopher Sign Co., painted aluminum graphic sign; Tel: (1) 800-383-3156 http://www.gophersign.com/products/imageloc-signs/

Park monument signage artwork will be provided by the Agency as a file in jpg, Illustrator, or Photoshop digital format. Sign and graphic panel shall be fabricated and installed by the Contractor. Contractor to provide shop drawing and 8” x 8” sample showing a portion of the colored artwork graphic, that was provided by the Agency to the Contractor, for review and approval by the agency prior to fabrication and installation.

- Frame material. All metal and weld joints to be powdercoat finished, color and material per construction material legend.
- Panel material.

Add the following subsection:

800-1.9 Landscape Submittals List.

a) Submit for approval in accordance with specifications Section G, 2-5.3.

b) Landscape Material Submittal List and Descriptive Literature.

Submit for acceptance, six (6) copies of competed forms:

Include the manufacturer's name and model numbers for all materials required under this contract, together with two (2) copies of descriptive literature for each of the items listed below. Contractor shall commence no work prior to receiving statement of acceptance of landscape material submittal list and descriptive literature from the Agency. This list may not be comprehensive the Contractor is responsible for all submittals to be used for completion of the Project. A partial list of items to Submit are as follows:

Agronomic Soil Reports, refer to subsection 800-1.1.1 a
Class "D" Bioswale Soil, refer to subsection 800-1.1.5
Soil Fertilizing and Conditioning Materials, refer to subsection 800-1.2
Mulch, refer to subsection 800-1.2.5
Plants, refer to subsection 800-1.4
Tree Stakes, refer to subsection 800-1.5.3
Root Control Barriers, refer to subsection 800-1.6
Contact Weed Killer, refer to subsection 800-1.7
Geotextile, refer to subsection 800-1.8.1
Interpretive Sign, refer to subsection 800-1.8.2
Four Foot and Six Foot Long Park Bench, refer to subsection 800-1.8.3
Trash Receptacle, refer to subsection 800-1.8.4
Park Monument Sign, refer to subsection 800-1.8.5
Decomposed Granite (DG), refer to section 802
Decorative Boulders, refer to section 803
River rock Paving, refer to section 804
Concrete and Sidewalk Restoration, refer to section 805

800-2 IRRIGATION SYSTEM MATERIALS.

800-2.1 Pipe and Fittings.

800-2.1.3 Plastic Pipe for Use with Solvent Weld Socket or Threaded Fittings.

Add the following:

a) For pipe sizes up to and including 1-1/2 inches, Schedule 40 PVC or Schedule 80 PVC pipe shall be used. For 2-inch up to and including 4-inch pipe sizes, Class 315 PVC or Schedule 80 PVC pipe shall be used.

b) Threaded nipples shall be PVC Type II.

800-2.2 Valves and Valve Boxes.

800-2.2.2 Gate Valves. Replace the entire subsection with the following:

Gate valves shall be AWWA-approved, the same size as the pipe in which they are to be installed, and shall open to the left. Gate valves shall be packed with graphite braided stem packing. Gate valves shall be manufactured by one of the following:

a) Nibco, model T-113LF; Tel: (1) 800-234-0227
http://www.nibco.com/resources/ProductSubmittalDocs/TS113LF.pdf

b) Kennedy, model KS-FW; Tel: (1) 607-734-2211
http://www.kennedyvalve.com/upl/downloads/resources/submittal-sheets/c509-2-12-ulfm-rw-valves.pdf

800-2.3 Backflow Preventer Assemblies. Add the following:

Backflow preventer assemblies shall be Los Angeles County Department of Public Health-approved, and installed in accordance with the requirements of the serving water utility and the County Code.

The strainer shall be a wye-type, the same size as the backflow preventer, constructed of cast bronze or copper, be rated for 250 pounds per square inch of pressure, and be equipped with a removable, 304 stainless steel, 20-mesh strainer. Backflow Preventer Assembly shall be manufactured as follows:

a) Watts, model: LF909, size per plan; Bronze, finish with green color paint Tel: (1) 978-689-6066
http://www.watts.com/pages/_products_details.asp?pid=6966

b) Wilkins, model: 375, size per plan; finish: Epoxy Tel: (1) 855-663-9876
https://www.zurn.com/media-library/web_documents/pdfs/specsheets/bf-375-pdf

Add the following:

800-2.3.1 Backflow Preventer Enclosure. Controller enclosure shall be manufactured as follows:

a) Guard Shack, model CGS-3 (0.75 inch-1.5 inch) or Guard Shack, model CGS-4 (1.25 inch -2 inch), color: Forest Green; Tel: (1) 800-266-5411
http://www.guardshackenclosures.com/products/enclosures/S.S._Hinged/

b) LeMeur, model BF-86 (0.75 inch -1.5 inch), color: Foliage Green;
Tel: (1) 714-956-2010
http://www.lemeurenclosures.com/Backflow-Enclosures/backflow-enclosures.html

c) V.I.T. / Strong Box, model SBBC-30CR (0.75 inch -1.5 inch) Tel: (1) 800-729-1314 http://www.vitproducts.com/sites/default/files/product-files/SBBC-xxCR.pdf

800-2.2.4 Remote Control Valves. Add the following:

a) Refer to the Plans for the approved manufacturer's name(s), model number, and size.

b) Identification tags for electrical remote control valves shall be manufactured from an ultraviolet light stabilized polyurethane material. The tags shall be hot-stamped with black letters on yellow background. The tags shall be numbered to match the programming shown on the Plans. One tag for each electric remote control valve shall be provided.

800-2.2.6 Quick-Coupling Valves and Assemblies. Add the following:

a) Quick-coupling valves. Refer to the Plans for the approved manufacturer's name(s), model number, and size.

800-2.2.7 Valve Boxes. Add the following:

An extension at the bottom shall be furnished and installed as necessary to adjust the height to conform to the details shown on the Plans and to meet actual field conditions. Valve boxes shall be manufactured by one of the following:

a) Brooks Products, model 3-H MB series; Tel: (1) 909-947-7470
http://www.brooksproductsnw.com/catalog/meterboxno03cat.pdf

b) Eisel Enterprises, model 3HL series; Tel: (1) 714-993-1706
http://eiselenterprises.com/water_series/ws3HL.pdf

Valve boxes shall conform to the following:

a) Valve boxes for remote control valves shall be a minimum of 9-1/2 inches x 15-1/2 inches and shall have a hinged, cast iron locking lid. Lids shall be marked “RCV” with 3-inch high epoxy paint or cast letters.

b) Valve boxes for flow meters and master control valves shall be a minimum of 9-1/2 inches x 15-1/2 inches and shall have a hinged, locking lid. Lids shall be marked “FM” and “MV” with 3-inch high epoxy paint or cast letters.

c) Valve boxes for gate valves shall be an 8-inch diameter, adjustable concrete sleeve with a cast iron locking lid. Lid shall be marked “GV” with 3-inch high epoxy paint or cast letters.

d) Valve boxes for quick coupler valves shall be a minimum of 9-1/2 inches x 15-1/2 inches and shall have a hinged, cast iron locking lid. Lids shall be marked “QCV” with 3-inch high epoxy paint or cast letters.

e) Valve boxes for pressure regulator valves shall be a minimum of 9-1/2 inches x 15-1/2 inches and shall have a hinged, cast iron locking lid. Lids shall be marked “PRV” with 3-inch high epoxy paint or cast letters.

f) Valve boxes for air relief and flush valves shall be round plastic with a locking lid as manufactured by Carson Industries, Applied Engineering Products, or Agency-approved equal. The inside diameter shall be a minimum of 9 inches. Lids shall be marked "ARV" and "FV" with 3-inch high letters using epoxy paint or by stamping into the surface.

Add the following subsections:

800-2.2.8 Check Valves and/or Anti-Drain Valves. Check valves and/or anti-drain valves shall conform to the following:

a) Check valves shall be the vertical-type; the same size as the riser; and have a stainless steel spring-loaded (5 to 6 pounds) bronze-type poppet valve lined with a flat neoprene disc. Valve seats shall be tapered to sit against the disc.

b) Horizontal check valves shall be constructed of bronze with a closing disc plate set on an angle. The disc holder shall contain a renewable composition disc and close tightly.

c) Check valves shall be constructed of corrosion-free materials enclosed in a PVC housing with a stainless steel spring and neoprene internal components, and be adjustable from 5 feet to 40 feet in elevation.

800-2.2.9 Pressure Regulator Valves. Pressure regulator valves shall be of all bronze construction and include a 3-1/2-inch diameter pressure gauge. The pressure gauge shall have a bottom connection, cast iron case, and a range of 0 to 200 pounds. Refer to the Plans for the approved manufacturer and model name. Pressure Regulator Valve shall be manufactured by one of the following:

a) CLA-VAL, model 90-23; Tel: (1) 949-722-4800
https://www.cla-val.com/documents/pdf/E-90-23.pdf

b) Wilkins, model ZA209; Tel: (1) 855-663-9876
http://www.zurn.com/media-library/web_documents/pdfs/specsheets/acv-zw209bpex-pdf

800-2.2.10 Pressure Relief Valves. Pressure relief valves shall be of all bronze construction, have a 1/8 inch Monel strainer with a removable basket, and include a 3-1/2-inch diameter pressure gauge. The pressure gauge shall have a bottom connection, cast iron case, and a range of 0 to 200 pounds.

800-2.2.11 Combination Master Valve and Flow Sensor. Refer to the Plans for the approved manufacturer and model name.

800-2.4 Sprinkler Equipment. Delete the second sentence and add the following:

a) Sprinkler heads must be a current model in production for at least one year.

b) Spray heads shall have an adjustable nozzle.

c) Tree Bubbler heads. Refer to the Plans for the approved manufacturer's name. All tree bubblers furnished shall be from the same manufacturer and model. Tel: (1) 800-458-3005 ;https://www.rainbird.com/documents/turf/ts_RWS.pdf

d) Irrigation riser assemblies shall consist of an irrigation inlet which utilizes a triple-swing joint riser assembled in the field using Schedule 80 PVC threaded ells and Schedule 80, Type II PVC nipples (threaded at both ends) or galvanized steel of the same size as shown on the Plans for the irrigation head inlet. Street ells will not be allowed.

e) Detectable type tracer/warning tape shall be per the Plans.

f) Dripline shall be flexible, kink resistant, dual-layered, polyethylene tubing with heavy-duty check valves and factory-installed, inline pressure compensating emitters. The outer diameter shall be approximately 0.6 inch and the inner diameter shall be approximately 0.5 inch minimum.

Add the following subsection:

800-2.5 Miscellaneous Irrigation Improvements. The following items are Irrigation Materials and are part of the Project.

800-2.5.1 Rain Sensor and Rain Sensor Enclosure.

a) Rain sensor Shall be manufactured by one of the following:

i) Hunter, model Mini-Clik; Tel: (1) 800-733-2823
https://www.hunterindustries.com/sites/default/files/BR_MINICLIK_dom.pdf

ii) Rainbird, model RSD-CEx; Tel: (1) 800-724-6247
http://www.rainbird.com/Landscape/products/controllers/RSD.htm

b) Rain sensor enclosure shall be manufactured by one of the following:

i) Hunter, model SG-MC; Tel: (1) 800-733-2823
https://www.hunterindustries.comrec /sites/default/files/BR_MINICLIK_dom.pdf

ii) Allspec, model ASRG-SS; Tel: (1) 877-255-7732
http://allspecenclosures.com/wp-content/uploads/2014/02/Catalog-All-Spec-Enclosures-2013.pdf

800-2.5.2 Irrigation Controller Enclosure. Top entry irrigation controller enclosure shall be manufactured by one of the following:

a) Strongbox, model SB22SS; Tel: (1) 800-729-1314
http://www.vitproducts.com/controller-enclosures

b) Allspec, model ASTO-SS24; Tel: (1) 877-255-7732
http://allspecenclosures.com/wp-content/uploads/2014/02/Catalog-All-SpecEnclosures-2013.pdf

800-2.6 Irrigation Submittals List.

a) Submit for approval in accordance with Section G, 2-5.3

b) Irrigation Material Submittal List and Descriptive Literature.

Submit for acceptance, six (6) copies of competed forms:

Include the manufacturer's name and model numbers for all materials required under this contract, together with two (2) copies of descriptive literature for each of the items listed below. Contractor shall commence no work prior to receiving statement of acceptance of irrigation material submittal list and descriptive literature from Agency. This list may not be comprehensive the Contractor is responsible for all submittals to be used for completion of the Project. A partial list of items to Submit are as follows:

Pipe and Fittings, refer to subsection 800-2.1
Solvent Weld, refer to subsection 800-2.1.3
Gate Valves, refer to subsection 800-2.2.2
Remote Control Valves, refer to subsection 800-2.2.4
Quick-Coupling Valves and Assemblies, refer to subsection 800-2.2.6
Valve Boxes, refer to subsection 800-2.2.7
Check Valves and/or Anti-Drain Valves, refer to subsection 800-2.2.8
Pressure Regulator Valves, refer to subsection 800-2.2.9
Pressure Relief Valves, refer to subsection 800-2.2.10
Combination Master Valve and Flow Sensor, refer to subsection 800-2.2.11
Sprinkler Equipment, refer to subsection 800-2.4
Tree Bubbler Heads, refer to subsection 800-2.4 c
Rain Sensor, refer to subsection 800-2.5.1
Irrigation Controller Enclosure, refer to subsection 800-2.5.2
Detectable type tracer/warning tape, refer to subsection 800-2.4 e
Conduit and Conductors, refer to subsection 800-3.2
Conduit, refer to subsection 800-3.2.1
Controller Unit, refer to subsection 800-3.3
Automatic irrigation control wire, refer to subsection 800-3.3 d

800-3 ELECTRICAL MATERIALS.

800-3.2 Conduit and Conductors.

800-3.2.1 Conduit. Replace the entire subsection with the following:

Conduit shall be galvanized steel or Schedule 40 PVC or Schedule 80 PVC conforming to 700-3.5. Conduit shall be 1 inch in size unless otherwise shown on the Plans.

800-3.3 Controller Unit. Add the following:

a) Controller units shall be equipped with a pump start relay switch. Refer to the Plans for the approved manufacturer's name.

b) Automatic controller units shall have the following features:

1. The minimum number of stations required as shown on the Plans.

2. Programmable for various schedules and equipped with the following features:

i. Each station shall be capable of operating at least 2 minutes to 60 minutes with incrementally variable timing periods for each station; automatic, semi-automatic and manual operation. Each station shall have an "OFF" or "OMIT" switch.

ii. Repeat switch allowing any and all stations to be repeated after completion of the initial watering schedule, or allowing repeat operations for any or all stations to be scheduled throughout a 24 hour day.

iii. "ON-OFF" switch for turning controller "OFF" during rainy weather, while allowing day and hour clocks to continue in operation.

iv. Capable of operating 24-volt electric valves.

v. 48-hour rain delay

vi. Controller shall operate with input from off-site evapotranspiration or on-site rain sensor. Controller shall operate through an activated data plan (5 years of data fully paid for at the time of installation of the fully operating controller) and allow the controller to suspend or alter irrigation operations during unfavorable weather conditions. Controller shall also function to detect via a connection with the irrigation system's flow sensor any high-flow conditions such as damage or malfunctions and operate the master valve to shut down the system automatically. Refer to the Plans for the approved manufacturer's name.

c) Automatic irrigation control wire shall consist of the following:

1. Twenty-four volt wire to solenoid valves shall be direct-burial conductor-type UF #12 and #14 AWG copper per Plan, 3/64 inch thickness, with a PVC coating, and be UL-. approved.

2. Common wires shall be white-coded and pilot wires shall be color-coded using a minimum of 8 different colors.

d) Twenty-four volt valve solenoids shall be constructed of corrosion-proof stainless steel protected by solid epoxy resin. The coil shall operate one valve at 4,000 feet on a No. 14 wire. Solenoid valves shall not bleed to the atmosphere.

SECTION 801 - INSTALLATION

801-1 GENERAL. Add the following:

a) Inspection. In addition to the provisions of 2-11, the Contractor shall conform to the following:

1. Written notice requesting an inspection shall be submitted to the Engineer at least 10 Days prior to the anticipated date.

2. Prior to scheduling an inspection for the purpose of determination completion of the Work by the Engineer as specified in 6-8, and determination of the start of the Plant Establishment Period, the Contractor shall ensure that landscaping and irrigation improvements are placed in accordance with the Contract Documents, all plants in-place are in a healthy condition, landscaped areas are clean and free of weeds and debris, and the Work site is in a neat condition.

3. The following inspections are required:

   i. Inspections will be performed by the Engineer with the assistance of the Agency Landscape Architect.

   ii. Plants (5 gallons and smaller) after delivery to the Work site.

   iii. Plants and specimen plants (15 gallons and larger) at the source before delivery to the Work site.

   iv. Plant locations on-site prior to excavation of plant pits.

   v. Lawn areas, fine graded, prior to seeding or sod installation.

   vi. Prior to the start of the 90-Day Plant Establishment Period.

   vii. During required fertilizer application within the Plant Establishment Period.

   viii. Upon completion of the 90-Day Plant Establishment Period.

b) Root Zone Protection. The adjoining soil should be maintained at the same grade as the root zone before and after construction. No soil shall be in contact with the trunk of the tree above the root flare. Where lowering the grade is unavoidable, roots may be clean cut at right angles to the root with a sharp tool. No more than 25 percent of the root zone shall be impacted. Roots greater than 1-1/2 inches in diameter within 5 feet of the trunk shall not be cut without a Certified Arborist's report of tree conditions including the probability of survival, and the Engineer's approval.

The Contractor shall protect the tree and root zone during construction by conforming to the following:

1. Chain link fencing with an access gate shall be furnished and installed if needed to protect the root zone. The location of the fencing shall be approved

by the Engineer. Clippings from pruning mounded up to 3 feet high may be used to protect the root zone but must still effectively irrigate the root zone. Clippings shall be removed after construction is completed.

2. The root zone shall be irrigated with clean potable water.

3. No trenching or cutting of roots will be allowed in the root zone without the presence of the Engineer and a Certified Arborist. Pipes or cables shall be relocated outside the dripline of trees. Roots may be bored or tunneled under. Trenches shall be radial to the trunk. The same trench shall be used for multiple utilities unless otherwise approved by the Engineer.

4. Exposed and bridging tree roots shall be wrapped with 3 layers of burlap and kept moist. Trenches within driplines shall be closed within 24 hours of opening.

5. Work shall be accomplished with hand tools within the root zone. Heavy equipment shall not pass over the root zone.

6. No construction staging, storage and disposing of materials will be allowed within the root zone.

7. Light pruning in the presence of the Agency's Landscape Architect or a Certified Arborist may be performed to avoid damage to branches from construction vehicles or cranes.

801-2 EARTHWORK AND TOPSOIL PLACEMENT.

801-2.1 General. Add the following:

Site grading shall include:

a) Excavating, sloping, rounding tops and ends of excavations, erosion control, and loading, unloading, and stockpiling native and imported soils.

b) Areas where changes of grade are shown on the Plans by contours, elevations, dimensions, or as otherwise noted.

c) Compaction of planting areas a maximum of 75 to 85 percent relative compaction.

d) Stockpiling of native topsoil for re-use.

801-2.2 Topsoil Preparation and Conditioning.

801-2.2.2 Fertilizing and Conditioning Procedures. Delete the third paragraph and add the following:

a) Planting areas shall include all lawn, sod, ground cover, vine, shrub and tree planting areas.

b) All planting areas except slopes steeper than 3:1 shall be thoroughly cultivated to a depth of 12 inches using a ripper with teeth no wider than 12 inches on-center. Cultivation shall be performed in at least 2 directions at right angles.

c) Prior to incorporating soil amendments, thoroughly moisten soil and grade all planting areas to within 0.1 of a foot of finished grades.

d) During the cultivation process, irrigation equipment shall be protected from damage. The Contractor shall replace damaged irrigation equipment.

e) Prior to cultivating existing soil, all vegetation not shown to remain, stumps, roots, rocks, stones larger than 1 inch in diameter, and all other deleterious material shall be removed.

f) Where shown on the Plans, fumigate with a fumigant approved by the Engineer in accordance with the recommendations of the applicable regulatory agencies and the manufacturer.

801-2.3 Finish Grading. Delete the second paragraph and add the following:

The finish grade of all planting areas where mulch is shown on the Plans shall be 3 inches below the adjacent paving, curbs and mowing strips. The finish grade of all sod areas shall be 1 inch below the adjacent paving, curbs and mowing strips. The Contractor shall furnish and place additional approved topsoil if so required to meet the aforementioned requirements.

801-4 PLANTING.

801-4.1 General. Add the following:

a) Plants shall not be allowed to dry out either before or during planting. Exposed roots shall be kept moist by means of wet sawdust, peat moss or burlap at all times during planting operations. Roots shall not be exposed to the air except while being placed in the ground. Wilted plants, whether in place or not, will not be accepted.

b) Plants shall be watered immediately after planting and in accordance with 801-4.9.5.

c) Trees, shrubs and ground covers shall be mulched in accordance with the following:

1. All ground cover areas shall receive 1-1/2 cubic yards per 1000 square feet. Stabilized slopes and slopes steeper than 3:1 shall not be mulched.

2. Each container plant shall have a 3-inch layer of mulch placed in its watering basin.

3. Except for sod or lawn areas, all planted areas shall have a 3-inch layer of mulch.

801-4.5 Tree and Shrub Planting. Replace the first paragraph with the following:

Plant containers up to and including 15-gallon shall be placed in planting pits having

vertical sides; a width 2 times wider than the width of the root ball; and a height equal to that of the root ball.

Plant containers 24 inches and larger shall be placed in planting pits having vertical sides; a width 3 times wider than the width of the root ball; and a height equal to that of the root ball.

Planting pits for flat-sized plants are to be at least 6 inches x 6 inches x 6 inches.

Planting shall be in moistened soil.

Replace the fourth paragraph with the following:

Planting pits shall be backfilled with backfill mix. Backfill mix shall be placed at the bottom of pit and foot-tamped so that the plant rootball will be approximately 1 inch higher than the adjacent grade after settlement. The trunk flare of trees (increased diameter of trunk where roots and trunk meet) shall be visible. No soil shall be placed on top of the rootball.

Add the following to the fifth paragraph:

h) Existing trees or shrubs shown on the Plans to be relocated (moved) or to be changed in elevation shall be moved utilizing a box of sufficient size to encompass the roots. Equivalent trees or plants of the same size may be furnished and planted by the Contractor in lieu of transplanting existing plants if so approved by the Engineer. Plants that die within the Plant Establishment Period shall be replaced by the Contractor.

801-4.6 Plant Staking and Guying. Replace 801-4.6.1 and 801-4.6.2 with the following:

Trees shall be staked in 2 locations at the time of planting by driving a stake at the outside edge of the rootball perpendicular to the prevailing winds. Fasten the tree to the upper end of each stake with tree ties in 2 places. Staking shall be uniform throughout the entire Project.

801-5 IRRIGATION SYSTEM INSTALLATION.

801-5.1 General. Add the following:

The Contractor shall adjust the location or alignment of the irrigation system to avoid existing utilities, signs, trees, and other interfering improvements as directed and approved by the Engineer.

a) Inspection. In addition to the provisions of 2-11, the following inspections will be performed in the presence of the Engineer, with the assistance of the Agency Landscape Architect, prior to the final inspection specified in 801-6:

1. Pressure test before backfilling.

2. Marker locations for placement of irrigation heads prior to installation.

3. Irrigation system coverage test. The coverage test inspection shall be

scheduled for and will be performed immediately after completion of the irrigation system and prior to the start of any planting. The entire irrigation system shall have been flushed clean and all heads and other irrigation equipment have been adjusted for proper operation, and the controller fully-operational and ready for automatic cycling prior to the coverage test. Necessary adjustments and additional work shall be completed prior to the start of planting.

b) "As-Built" Plans.

1. The Contractor shall provide and keep up to date a complete set of black line prints of the Plans (draft "as-built" Plans) which shall be annotated daily to show every change from the Plans and Specifications issued at the time of advertisement of the Contract and the exact locations, sizes and kinds of equipment installed.

2. The Contractor shall dimension from 2 permanent points of reference the location of all buried pipes and valves, any and all pilot wires to valves and controllers, and all electric service lines to controllers. Dimensions shall be taken prior to the backfilling of trenches.

3. Prior to the start of the plant establishment period specified in 801-6, the Contractor shall transfer the annotations from the aforementioned "draft as-built" Plans onto a clean set of black line prints (final "as-built" Plans). Annotations shall be neatly drafted in ink and shall be approved by the Engineer.

c) Controller Charts.

1. The Contractor shall provide 2 controller charts for each automatic controller supplied showing the area covered. The chart size shall be the maximum size the controller door will allow unless otherwise approved by the Engineer.

2. Controller charts shall be a reduced-size copy of the final 'as-built' Plans of the irrigation system. However, in the event the controller sequence is not legible after the size is reduced, it shall be enlarged to a readable size.

3. Controller charts shall have a different color for each station showing the area of coverage.

4. When completed and approved, each chart shall be hermetically sealed between 2 pieces of plastic, each piece being a minimum of 20 mils thick.

5. Controller charts must be completed and approved prior to the final inspection of the irrigation system.

d) Point of Connection (to a dedicated irrigation water meter).

1. The Contractor shall construct an irrigation supply line from the water meter to the backflow prevention device.
2. The supply line shall be Type K copper pipe unless otherwise required by the

water utility owner.

3. The supply line pipe size shall be the same as the backflow prevention device but no larger than the size of the water meter.

e) Point of Connection (to an existing supply line).

1. The Contractor shall construct an irrigation supply line to the existing cold water supply line where shown on the Plans.

2. Connections to existing cast iron, PVC, and/or galvanized pipe shall be by any of the following methods.

   i. Pressure-rated 150-200 AWS-A21.10 cast iron fittings.

   ii. Tapping sleeves.

   iii. Cutting in a "tee."

   iv. Threaded fittings.

   v. Saddle with double-bale flattened, double-bronze straps.

   vi. PVC fittings for solvent welding (PVC pipe only).

3. Irrigation supply line size shall be the same as the backflow prevention device unless otherwise shown on the Plans, but shall be no larger than the existing supply line.

4. The irrigation supply line shall be:

   i. Type K copper pipe.

   ii. Installed a minimum of 30 inches below finish grade as measured from the top of the pipe.

   iii. Cut square on ends and all burs removed.

   iv. Cleaned on the outside of pipe and on the inside of the fittings to a bright finish using a sand cloth.

   v. Coated with a paste-type non-corrosive solder flux.

   vi. Connect to galvanized steel with a dielectric union or coupling.

f) Pre-Completion Submittals. The following items shall be submitted to the Engineer prior to final inspection and acceptance of the irrigation system:

1. Two sets of operation and maintenance manuals.

2. Two controller charts for each controller installed.

3. One 5-foot valve wrench where 2-1/2 inch and larger gate valves are installed.
4. Two key couplers to match quick coupling valves installed.
5. 10 percent additional of each type check and anti-drain valves installed.
6. Two keys for opening each type lock lid valve box installed.
7. Two extension keys to operate manual control valves.
8. Two keys for each controller installed.
9. Handheld Remote Control Unit as shown on the Plans.
10. Two keys to operate lock lid quick coupling valves.
11. Two sets of wrenches for servicing and adjusting each type irrigation head installed.
12. 10 percent additional of each "Type" irrigation head installed.
13. As-Built Plans reviewed and approved by the Engineer.

801-5.2 Trench Excavation and Backfill. Delete the second paragraph and add the following:

The Work shall be scheduled so excavations are left open and exposed for a minimum period of time. Backfill shall begin immediately after piping and conduit are laid in place, and have been tested and approved.

801-5.3 Irrigation Pipeline Installation.

801-5.3.2 Steel Pipeline. Add the following:

a) Main lines (upstream of RCV) shall be constructed 30 inches below grade as measured from top of pipe

b) Lateral lines (downstream of RCV) shall be constructed 18 inches below grade as measured from top of pipe.

c) Lines installed on grade.

d) Lines installed as detailed or as shown on the Plans.

e) Change of direction shall be made by the installation fittings. Springing or bending, and street ells or close nipples, will not be allowed.

f) Burrs shall be removed.

g) Threaded seal tape shall be applied on all threaded joints.

801-5.3.3 Plastic Pipeline. Add the following:

a) Main lines (upstream of RCV) shall be constructed 30 inches below grade (minimum 36 inches under roadways), as measured from the top of the pipe.

b) Lateral lines (downstream of RCV) shall be constructed 18 inches below grade (minimum 24 inches under roadways), as measured from the top of the pipe.

c) The bottom of the trench shall be free of rocks, clods and other sharp-edged objects. If rocks over 1 inch in size are encountered at the bottom of the trench or within the backfill 4 inches or less above the top of the pipe, the Contractor may remove the rocks or place 4 inches of sand below and above the pipe.

d) A No. 12 gauge copper identification wire shall be placed at the bottom of the trench for all mainline PVC pipe to provide a continuous electrical conductor between gate valves. Each end shall be wrapped around the valve body and up to the ground surface, inside the valve box, and loop back with 2 feet of wire free. Ends shall be scraped clean.

e) In addition to the identification wire, detectable tracer/warning tape shall be placed in the trench 12 inches above the pipe while backfilling. The tracer/warning tape shall be electronically detectable.

f) Plastic pipe assembles.

Pipe lengths and fitting shall be joined by solvent welding. Primer and solvent cement used shall be as recommended by pipe manufacturer.

The Contractor shall:

1. Cut the pipe square. Remove burrs from the inside end. The outside end shall be chamfered 10 to 15 degrees.

2. Clean and dry the pipe and fitting.

3. Check the dry fit. The pipe end must be between 1/3 to 3/4 of the fitting socket depth.

4. Dissolve the inside socket surface by brushing with primer. Use a scrubbing motion to assure penetration.

5. Dissolve the surface of the male end of the pipe to be inserted into the socket to the depth of the fitting socket by brushing liberally with a coat of primer. Ensure the entire surface is well dissolved.

6. Brush the inside of the socket surface with primer. Immediately apply solvent cement liberally to the male end of the pipe without delay.

7. Also apply solvent cement lightly to the inside of the socket, using straight outward strokes to keep out excess filler solvent. Immediately apply a second coat of cement to the pipe end.

8. While both the inside socket surface and the outside surface of the male end of the pipe are soft and wet with solvent cement, forcefully bottom the male end of the pipe in the socket, giving the male end a 1/4 turn if possible. The pipe must go to the bottom of the socket. Hold the joint together until both soft surfaces are firmly gripped for at least 30 seconds.

9. After assembly, wipe excess cement from the pipe at the end of the fitting socket. A properly constructed joint will show a bead around its entire perimeter.

10. Not disturb the joint for 30 minutes until initial setup of the cement occurs.

11. Snake the pipe from side to side of the trench bottom to allow for expansion and contraction. One additional foot per 100 feet of pipe shall be the minimum allowance for snaking.

12. Center load the pipe with a small amount of backfill to prevent arching and whipping under pressure. Leave joints exposed, for inspection during the pressure test. No water will be permitted in the pipe until the above has been accomplished and a period of at least 24 hours has elapsed for solvent weld setting and curing.

g) Plastic pipe fittings and connections.

1. A Schedule 40 female adaptor shall be used with a Schedule 80 threaded nipple on one end when connecting solvent welded pipe to threaded joints.

2. 45-degree fittings shall be used at all changes in depth of the pipe. Couplings shall be of the same material and wall thickness as the pipe used.

3. Thread seal tape shall be applied on all threaded joints. Connections shall be screwed hand-tight followed by 1/2 turn by a wrench.

4. The minimum length of PVC nipples shall be 4 inches.

801-5.4 Installation of Valves, Valve Boxes, and Special Equipment. Delete the fifth and sixth paragraphs.

Add the following:

a) Gate Valves.

1. Shutoff valves shall be installed as shown on the Plans.

2. A concrete valve box with a cast iron locking lid shall be installed at every gate valve. The valve box shall be centered over the valve operating nut.

b) Quick-Coupling Valves, Couplers, and Hose Swivels.

1. Within 10 feet of where a quick-coupling valve is installed, the Contractor shall paint a 3-inch diameter yellow-mark on the adjacent pavement, curb, or mow strip.

c) Check Valves and/or Anti-Drain Valves.

1. Vertical-type check valves shall be installed on vertical risers where shown on the Plans.

2. Horizontal-type check valve units shall be sized as, and installed in a valve box where, shown on the Plans.

3. Vertical or horizontal anti-drain valves shall be installed where shown on the Plans and adjusted for site conditions to prevent irrigation head drainage.

d) Pressure Regulator Valves.

1. Installation shall conform to the details shown on the Plans. The valve pressure shall be set at 10 pounds per square inch over the highest recorded working pressure with the system in operation.

2. Pressure gauges equipped with a gauge cock shall be installed upstream of each pressure regulator valve.

e) Pressure Relief Valves.

1. Valves shall be installed in a concrete box with a cast iron hinged lockable lid. Valve pressure shall be set at 10 pounds per square inch over the highest recorded working pressure with the system in operation.

2. Pressure gauges equipped with a gauge cock shall be installed upstream of each pressure regulator valve.

3. A strainer of the same size as the pressure relief valve shall be installed in a valve box upstream of each pressure relief valve.

f) Valve Boxes.

1. Installation shall conform to the details shown on the Plans.

2. Valve boxes shall be installed near paved walk/surfaces wherever possible. Valve boxes shall be installed square to, and 12 inches from, the edge of pavement, walk or concrete curb.

3. Bricks shall be furnished and installed around the base of each box.

4. A minimum clearance of 1 foot between each valve box shall be provided wherever their location is clustered.

5. Valve boxes shall be installed 3 inches above finish grade in planting areas, 1 inch above finish grade in turf areas, and set to finish grade in paved areas.

6. Galvanized wire mesh (1/4 inch sieve size) shall be placed between the valve and crushed rock and extend 3 inches up each side of the valve box.

7. 3/4 inch crushed rock conforming to 200-1.2.1 (A), 8 inches thick, shall be placed below valve boxes.

801-5.5 Sprinkler Head Installation.

801-5.5.1 General. Add the following:

Sprinkler heads shall be sourced from one manufacturer for each type of head.

801-5.5.2 Location, Elevation, and Spacing. Delete the last four paragraphs and add the following:

The Contractor shall:

a) Place irrigation heads in lawn areas on temporary nipples or on risers extending 2 inches above the ground surface. After the lawn is established and the ground has settled around the heads, lower the top of each head to a position level with the finish grade.

b) Space irrigation heads 2 feet from the edge of adjacent impermeable paving.

c) Adjust all spray nozzles to provide even balance between each lateral system.

d) Adjacent to paving and curbs:

   1. Install irrigation heads 1 inch below adjacent paving and curbs;

   2. Install on heavy duty high pop-up stems with screw-adjustable nozzles.

   3. Install on PVC high-pop risers with screw-adjustable shrub nozzles.

e) Irrigation heads in shrub/groundcover areas shall be installed 1-1/2 inches above finished grade.

f) All other shrub heads to be brass screw adjustable, installed on Schedule 80 PVC nipples 6" above grade.

g) Utilize triple swing joints for all risers on irrigation heads. Use threaded Schedule 80 PVC nipples with PVC. Assemble in the field only.

h) Install each tree bubbler inside a plastic valve box as shown on the details on the Plans.

i) Not to exceed the maximum spacing shown on the Plans.

801-5.6 Automatic Control System Installation. Add the following as the second sentence of the second paragraph:

Installation shall conform to the details shown on the Plans.

Add the following to the second paragraph:

a) Grounding. Irrigation controllers shall be grounded. Grounding shall be to a metal cold water pipe whenever available. If not available, grounding shall consist of 2, 5/8 inch diameter driven copper-clad steel rods driven not less than 6 feet apart to a minimum depth of 8 feet below grade. The grounding system location shall be approved by the Delete the last sentence of the third paragraph.

Replace the third sentence of the fourth paragraph with the following:

Conductors shall conform to 800-3.2.2.

Delete the last sentence of the fourth paragraph.

Add the following as the fourth sentence of the fifth paragraph:

Wiring installed in concrete, masonry or where exposed to moisture, weather or damage, shall be installed in a galvanized steel conduit.

Add the following to the fifth paragraph:

b) 24-Volt Wires (Splicing). No field splicing between the controller and a remote control valve will be allowed. Factory splices in a wire roll will be allowed.

c) 24-Volt Wires (End Splicing). The ends of control and common wires shall be spliced as specified in 701-17.4.2.

d) When wires from more than one controller are in a common trench, the wires from the individual controllers shall be bundled together separately with one wrap of tape.

Add the following after the first sentence of the sixth paragraph:

Common wires shall be coated white. Pilot wires shall be color-coated using a minimum of 8 different colors.

801-5.7 Flushing and Testing.

801-5.7.1 General. Add the following:

Underground mains upstream of control valves and lead-in connections to irrigation system shall be flushed by utilizing a flush-out assembly or quick-coupler valve at the lowest elevation shown on the Plans.

Laterals downstream of control valves shall have the risers in-place and the trench backfilled with the joints exposed prior to flushing. Laterals shall be flushed one at a time starting at the one nearest to the water source and progress toward the end of the supply main.

Add the following subsection:

801-5.7.5 Water Main Disinfection. Water mains shall be disinfected only if used for potable water purposes. Disinfection procedures shall be in accordance with 306-8.9.4.3.

801-6 MAINTENANCE AND PLANT ESTABLISHMENT. Replace the second sentence of the fifth paragraph with the following:

The plant establishment period shall be for a period of ***90 Days*** and will be extended by the Engineer if the planted areas are improperly maintained, appreciable plant replacement is required, or other corrective work becomes necessary.

Add the following as the sixth paragraph:

The Contractor shall perform the following during the plant establishment period:

a) Keep all plants and planting areas watered, trash-free, and weed-free (except sloped areas).

b) Control insects and fungi using appropriate insecticides and fungicides.

c) Apply fertilizer in the presence of the Engineer at the beginning of the plant establishment period and after 30 Days

d) Apply commercial fertilizer, analysis 10-6-4, at the rate of 10 pounds per 1000 square feet uniformly over all shrub, ground cover and lawn areas except for slopes steeper than 3:1.

e) Apply soil conditioner-fertilizer, controlled release (12-8-8) at the rate of 20 pounds per 1000 square feet uniformly over all shrub, ground cover and lawn areas.

f) Repair planting areas.

g) Fill depressions caused by erosion, vehicles, bicycles or foot traffic with topsoil and level.

h) Re-seed damaged lawn areas.

i) Replace all plant materials which, for any reason, die, are unhealthy or are damaged. Trees or other plant materials that die-back and lose the form and size as originally specified shall be replaced even if they have taken root and are growing after the die-back. Replacement shall be made with the same tree or plant as originally specified or shown on the Plans.

j) Prior to completion, cultivate all ground cover and shrub areas and apply an additional application of pre-emergent herbicide in accordance with manufacturers recommendations.

SECTION 802 – DECOMPOSED GRANITE

802-1 GENERAL. Decomposed granite shall be derived from the crushing and screening of naturally friable granite, color per Plans. Decomposed granite with and without stabilizer per plan. Soil stabilizer shall be thoroughly blended into the decomposed granite by mechanical means at the rate of 15 pounds per ton. Mixing shall be performed by the supplier prior to delivery to the Work site. Decomposed granite shall be from one of the following:

a) Gail Materials, model: Natracil Stabilized Decomposed Granite/Aggregate Stone; Tel: (1) 951-667-6106 http://www.gailmaterials.net/natracil-stabilized-decomposed-granite-crushed-aggregate-stone

b) Whitter Fertilizer, model: Decomposed Granite; Tel: (1) 562-699-3461 http://whittierfertilizer.com/product/decomposed-granite/

c) Sands Building Materials, model: Decomposed Granite; Tel: (1) 818-834-5400 http://sandbuildingmaterials.com/hardscaping-links.htm

802-2 SUBMITTALS. In accordance with Section G, 2-5.3, submit the following for approval by the Agency:

a) Three samples of decomposed granite in quart-size clear plastic bags, sieve test results (ASTM C136), and gradation chart from the supplier.

b) Manufacturer's product information for the soil stabilizer and decomposed granite material.

802-3 MATERIALS. Decomposed granite shall conform to the following gradation and be uniformly graded in accordance with ASTM C136.

Sieve Size	**Percent Passing**
1/2"	100
3/8"	90-100
No.4	50-100
No. 30	25-55
No. 100	10-20
No. 200	5-18

Soil stabilizer shall be a colorless, non-toxic organic binder in powder form suitable for landscape use. Soil stabilizer shall be manufactured by one of the following:

a) "Stabilizer" by Stabilizer Solutions; Tel: (1) 800-336-2468 www.stabilizersolutions.com

b) "Natracil" by Gail Materials; Tel: (1) 951-667-6102 www.gailmaterials.net

c) "PHP Organic Binder" by TMT Enterprises, Inc., ; Tel: (1) 408-432-9040 http://www.tmtenterprises.net/product-php.php

802-4 PLACEMENT.

802-4.1 General. The Contractor shall construct a 10 foot segment sample at the Project site using the materials proposed for the Work. Decomposed granite for the Work shall not be placed on the Project prior to approval of the sample by the Engineer.

802-4.2 Subgrade. The subgrade shall be prepared immediately prior to placement of decomposed granite.

The subgrade shall conform to the lines, grades, and cross sections shown on the Plans and in accordance with 301-1.

No placement of surfacing material shall occur until the subgrade has been approved by the Engineer.

802-4.3 Spreading and Compacting. Decomposed granite material shall be evenly spread in a maximum of 2-inch lifts Each lift shall be compacted to a relative compaction of not less than 90 percent and result in a smooth surface.

After placement, final compaction shall not begin less than 6 hours nor more than 72 hours after placement. Water shall be applied as necessary to result in the full-depth of decomposed granite being moist. After a period of 6 hours, compact the final lift by making 4 passes with a 2 to 5 ton double drum roller. Allow for a curing period of 4 days prior to use.

The finished surface shall be smooth and uniform and conform to the lines, grades, and cross sections shown on the Plans.

SECTION 803 – DECORATIVE BOULDERS

803-1 GENERAL. Decorative boulders shall be granitic origin.

803-2 SUBMITTALS. In accordance with Section G, 2-5.3, submit the following for approval by the Agency:Photos and product information sheet for decorative boulders per Plans.

803-3 MATERIALS.

803-3.1 General. Decorative boulders shall be from one of the following:

a) Southwest Boulder and Stone, model: Sierra Boulders; Tel: (1) 760-466-3277 https://www.southwestboulder.com/t/categories/boulders?page=4

b) KRC Rock, model: Desert Marble; Tel: (1) 800-KRC-ROCK http://www.krcrock.com/wp-content/uploads/2017/12/Desert-Marble-done.pdf

c) Sepulveda Building Materials, model: Mountain Grey Boulder Tel: (1) 800-394-4726 http://www.sepulveda2.com/catalog_sepulveda/show_product_info.php?product=32

803-4 PLACEMENT.

803-4-.1 General. The Contractor shall construct a mock-up sample of the placement of typical boulder layout per plans at the location specified on plans for boulders for review and approval by the Engineer. Decorative boulders shall not be placed on the Project prior to approval of the sample by the Engineer.

803-4.2 Subgrade. The subgrade shall be prepared per Plans prior to placement of decorative boulders.

The subgrade shall conform to the lines, grades, and cross sections shown on the Plans and in accordance with 301-1.

No placement of decorative boulders shall occur until the subgrade has been approved by the Engineer.

803-4.3 Installation. Decorative boulder size per Plans and shall be installed per Plans. Set boulder one-third of the diameter below the top finish grade of proposed decomposed granite.

Review and Inspection by the Engineer must occur before proceeding with Planting and Irrigation installation activities per Plans.

SECTION 804 – RIVER ROCK PAVING

804-1 GENERAL. River rock paving shall conform to the following.

804-2 SUBMITTALS. In accordance with Section G, 2-5.3, submit the following for approval by the Agency:

a) Photos and product information sheet for river rock paving per Plans.

804-3 MATERIALS.

804-3.1 General.

River rock paving shall use river rock at 4 – 8 inch diameter, and granitic in origin. Color shall be white with black or brown striping. River rock shall be from one of the following:

a) Southwest Boulder and Stone, model: Sierra Cobble; Tel: (1) 760-466-3277 https://www.southwestboulder.com/products/sierra-cobble

b) KRC Rock, model: Riverside Cobble; Tel: (1) 800-KRC-ROCK
http://www.krcrock.com/portfolio-items/riverside-cobble/?portfolioCats=4

c) Sepulveda Building Materials, model: Mountain Grey Cobbles Tel: (1) 800-394-4726
http://www.sepulveda2.com/catalog_sepulveda/show_product_info.php?product=339

804-4 SUBMITTALS. In accordance with Section G, 2-5.3, submit the following for approval by the Agency:

a.) List with photos supplier and model per Plans.

b.) Provide 2' by 2' sample mock-up for approval by the Engineer prior to installation.

804-5 PLACEMENT.

804-5-.1 General. The Contractor shall construct a mock-up sample of the placement of typical river rock paving layout per plans for review and approval by the Engineer. All river rock paving shall not be placed on the Project prior to approval of the sample by the Engineer.

804-5.2 Subgrade. The subgrade shall be prepared per Plans prior to placement of all river rock paving.

The subgrade shall conform to the lines, grades, and cross sections shown on the Plans and in accordance with 301-1.

No placement of all river rock paving shall occur until the subgrade has been approved by the Engineer. Sample must be approved by the Engineer prior to installation.

804-5.3 Installation. All River rock paving shall be installed per Plans.

Review and Inspection by the Engineer must occur before proceeding with Planting and Irrigation installation activities per Plans.

SECTION 805 – CONCRETE SIDEWALK AND CURBING RESTORATION

804-1 GENERAL. Concrete sidewalk and curbing restoration shall conform to the following.

805-2 SUBMITTALS. In accordance with Section G, 2-5.3, submit the following for approval by the Agency:

a) Testing and material recommendation of the concrete sidewalk and curbing restoration shall be conformed to the National Parks Service's Technical Preservation Services of Preservation of Historic Concrete guidelines per the Attachment I and Los Angeles County Department of Parks and Recreation's Historical Resource Evaluation for Ladera Park dated April 2017 per the Attachment II

805-3 MATERIALS.

805-3.1 General. Concrete sidewalk and curbing restoration shall match existing concrete sidewalk and curbing designated on the Contract Documents for restoration. Following are acceptable companies for material analysis and concrete restoration work:

a) Edison Coatings, Inc; Tel: (1) (800) 341-6621
http://www.edisoncoatings.com/Home/home.html

b) Spectra Company; Tel: (1) 800-375-1771
http://spectracompany.com

c) Griswold Conservation Associates, LLC Tel: (1) 310.842.8133
http://griswoldconservation.com/

805-4 SUBMITTALS. In accordance with Section G, 2-5.3, submit the following for approval by the Agency:

a.) List, photos, and construction method and details of restoration work.
b.) Forms and molds
c.) Cement characteristic and concrete mix design including cement, sand, aggregate gradation etc.

d.) Colors and texture.

e.) Joints and scoring type

805-5 CONSTRUCTION.

805-5-.1 General. The Contractor shall construct a mock-up sample of the concrete sidewalk and curbing per plans for review and approval by the Engineer. Concrete sidewalk and curbing shall be installed at existing and proposed grades per plans.

805-5.2 Subgrade. The subgrade shall be prepared per Plans prior to placement of all concrete sidewalk and curbing.

The subgrade shall conform to the lines, grades, and cross sections shown on the Plans and in accordance with 301-1.

No placement of all concrete sidewalk and curbing restoration shall occur until the subgrade has been approved by the Engineer.

SECTION 806 – LANDSCAPE AND IRRIGATION PAYMENT

Payment will be made at the lump sum Bid price for “LANDSCAPE AND IRRIGATION”, No.14 of Schedule of Prices. The lump sum Bid price shall include all Work as shown in the Plans and specified here in the Special Provisions, Section LS – Landscaping and Irrigation.

ATTACHMENT I

Some of the web versions of the Preservation Briefs differ somewhat from the printed versions. Many illustrations are new and in color; Captions are simplified and some complex charts are omitted. To order hard copies of the Briefs, see Printed Publications.

PRESERVATION BRIEFS

15

Preservation of Historic Concrete

Paul Gaudette and Deborah Slaton

Introduction to Historic Concrete

Concrete is an extraordinarily versatile building material used for utilitarian, ornamental, and monumental structures since ancient times. Composed of a mixture of sand, gravel, crushed stone, or other coarse material, bound together with lime or cement, concrete undergoes a chemical reaction and hardens when water is added. Inserting reinforcement adds tensile strength to structural concrete elements. The use of reinforcement contributes significantly to the range and size of building and structure types that can be constructed with concrete.

While early twentieth century proponents of modern concrete often considered it to be permanent, it is, like all materials, subject to deterioration. This Brief provides an overview of the history of concrete and its popularization in the United States, surveys the principal causes and modes of concrete deterioration, and outlines approaches to repair and protection that are appropriate to historic concrete. In the context of this Brief, historic concrete is considered to be concrete used in construction of structures of historical, architectural, or engineering interest, whether those structures are old or relatively new.

Brief History of Use and Manufacture

The ancient Romans found that a mixture of lime putty and pozzolana, a fine volcanic ash, would harden under water. The resulting hydraulic cement became a major feature of Roman building practice, and was used in many buildings and engineering projects such as bridges and aqueducts. Concrete technology was kept alive during the Middle Ages in Spain and Africa. The Spanish introduced a form of concrete to the New World in the first decades of the sixteenth century, referred to as "tapia" or "tabby." This material, a mixture of lime, sand, and shell or stone aggregate mixed with water, was placed between wooden forms, tamped, and allowed to dry in successive layers. Tabby was later used by the English settlers in the coastal southeastern United States.

Figure 1. The Sebastopol House in Seguin, Texas, is an 1856 Greek Revival-style house constructed of lime concrete. Lime concrete or "limecrete" was a popular construction material, as it could be made inexpensively from local materials. By 1900, the town had approximately ninety limecrete structures, twenty of which remain. Photo: Texas Parks and Wildlife Department.

The early history of concrete was fragmented, with developments in materials and construction techniques occurring on different continents and in various countries. In the United States, concrete was slow in achieving widespread acceptance in building construction and did not begin to gain popularity until the late nineteenth century. It was more readily accepted for use in transportation and infrastructure systems.

The Erie Canal in New York is an example of the early use of concrete in transportation in the United States. The natural hydraulic cement used in the canal construction was processed from a deposit of limestone found in 1818 near Chittenango, southeast of Syracuse. The use of concrete in residential construction was publicized in the second edition of Orson S. Fowler's *A Home for All* (1853) which described the advantages of "gravel wall" construction to a wide audience. The town of Seguin, Texas, thirty-five miles east of San Antonio, already had a number of concrete buildings by the 1850s and came to be called "The Mother of Concrete Cities," with approximately ninety concrete buildings made from local "lime water" and gravel (Figure 1).

Impressed by the economic advantages of poured gravel wall or "lime-grout" construction, the Quartermaster General's Office of the War Department embarked on a campaign to improve the quality of building for frontier military posts. As a result, lime-grout structures were constructed at several western posts soon after the Civil War, including Fort Fred Steele and Fort Laramie, both in Wyoming (Figure 2). By the 1880s, sufficient experience had been gained with unreinforced concrete to permit construction of much larger buildings. A notable example from this period is the Ponce de Leon Hotel in St. Augustine, Florida.

Figure 2. Chatterton House was the home of the post trader at Fort Fred Steel in Wyoming, one of several forts established in the 1860s to protect the Union Pacific Railroad. The walls of the post trader's house were built using stone aggregate and lime, without cement. The use of this material presents special preservation challenges.

Figure 3. The Lincoln Highway Association promoted construction of a high quality continuous hard surface roadway across the country. The Boys Scouts of America installed concrete road markers along the Lincoln Highway in 1928.

Extensive construction in concrete also occurred through the system of coastal fortifications commissioned by the federal government in the 1890s for the Atlantic, Pacific, and Gulf coasts. Unlike most concrete construction to that time, the special requirements of coastal fortifications called for concrete walls as much as 20 feet thick, often at sites that were difficult to access. Major structures in the coastal defenses of the 1890s were built of mass concrete with no internal reinforcing, a practice that was replaced by the use of reinforcing bars in fortifications constructed after about 1905.

The use of reinforced concrete in the United States dates from 1860, when S.T. Fowler obtained a patent for a reinforced concrete wall. In the early 1870s, William E. Ward built his own house in Port Chester, New York, using concrete reinforced with iron rods for all structural elements. Despite these developments, such construction remained a novelty until after 1880, when innovations introduced by Ernest L. Ransome made the use of reinforced concrete more practicable. Ransome made many contributions to the development of concrete construction technology, including the use of twisted reinforcing bars to improve bond between the concrete and the steel, which he patented in 1884. Two years later, Ransome introduced the rotary kiln to United States cement production. The new kiln had greater capacity and burned more thoroughly and uniformly, allowing development of a less expensive, more uniform, and more reliable manufactured cement. Improvements in concrete production initiated by Ransom led to a much greater acceptance of concrete after 1900.

The Lincoln Highway Association, incorporated in 1913, promoted the use of concrete in construction of a coast-to-coast roadway system. The goal of the Lincoln Highway Association and highway advocate Henry B. Joy was to educate the country in the need for good roads made of concrete, with an improved Lincoln Highway as an example. Concrete "seedling miles" were constructed in remote areas to emphasize the superiority of concrete over unimproved dirt. The Association believed that as people learned about concrete, they would press the government to construct good roads throughout their states. Americans' enthusiasm for good roads led to the involvement of the federal government in road-building and the creation of numbered U.S. routes in the 1920s (Figure 3).

During the early twentieth century, Ernest Ransome in Beverly, Massachusetts, Albert

Figure 5. Following World War II, architects and engineers took advantage of improvements in concrete production, quality control, and advances in precast concrete to design structures such as the Police Headquarters building in Philadelphia, Pennsylvania, constructed in 1961. Photo: Courtesy of the Philadelphia Police Department.

Figure 4. The highly ornamental concrete panels on the exterior facade of the Baha'i House of Worship in Wilmette, Illinois, illustrate the work of fabricator John J. Earley, known as "the man who made concrete beautiful."

Kahn in Detroit, and Richard E. Schmidt in Chicago, promoted concrete for use in "Factory Style" utilitarian buildings with an exposed concrete frame infilled with expanses of glass. Thomas Edison's cast-in-place reinforced concrete homes in Union Township, New Jersey (1908), proclaimed a similarly functional emphasis in residential construction. From the 1920s onward, concrete began to be used with spectacular design results: examples include John J. Earley's Meridian Hill Park in Washington, D.C.; Louis Bourgeois' exuberant, graceful Baha'i Temple in Wilmette, Illinois (1920 –1953), for which Earley fabricated the concrete (Figure 4); and Frank Lloyd Wright's Fallingwater near Bear Run, Pennsylvania (1934). Continuing improvements in quality control and development of innovative fabrication processes, such as the Shockbeton method for precast concrete, provided increasing opportunities for architects and engineers. Wright's Guggenheim Museum in New York City (1959); Geddes Brecher Qualls & Cunningham's Police Headquarters building in Philadelphia, Pennsylvania (1961); and Eero Saarinen's soaring terminal building at Dulles International Airport outside Washington, D.C., and the TWA terminal at Kennedy Airport in New York (1962), exemplify the masterful use of concrete achieved in the modern era (Figure 5).

Throughout the twentieth century, a wide range of architectural and engineering structures were built using concrete as a practical and cost-effective choice—and concrete also became valued for its aesthetic qualities. Cast in place and precast concrete were readily adapted to the Streamlined Moderne style, as exemplified by the Bailey Magnet School in Jackson, Mississippi, designed as the Jackson Junior High School by N.W. Overstreet & Town in 1936 (Figs. 6 and 7). The school is one of many concrete buildings designed and constructed under the auspices of the Public Works Administration. Recreational structures and landscape features also utilized the structural range and unique character of exposed concrete to advantage, as seen in Chicago's Lincoln Park Chess Pavilion, designed by Morris Webster in 1956 (Figure 8), and the Ira C. Keller Fountain in Portland Oregon, designed by Lawrence Halprin in 1969 (Figure 9). Concrete was also popular for building interiors, with ornamental features and exposed structural elements recognized as part of the design aesthetic (See Figs. 10 and 11).

Figure 7. Detailed bas reliefs as well as sculptures, such as this lion at the Bailey Magnet School, could be used as ornamentation on concrete buildings. Sculptural concrete elements were typically cast in molds.

Figure 6. The Bailey Magnet School in Jackson, Mississippi, was designed as the Jackson Junior High School by the firm of N. W. Overstreet & Town in 1936. The streamlined building exemplifies the applicability of concrete to creating a modern architectural aesthetic. Photo: Bill Burris, Burris/Wagnon Architects, P.A

Historic Interiors

Figure 10. The Berkeley City Club has significant interior spaces alld features of concrete construction, including the lobby and pool. Photos: Una Gilmartin (left) and Brian Kehoe (right), Wiss, Janney, Elstner Associates, Inc.

The expanded use of concrete provided new opportunities to create dramatic spaces and ornate architectural detail on the interiors of buildings, at a significant cost savings over traditional construction practices. The architectural design of the Berkeley City Club in Berkeley, California, expressed Moorish and Gothic elements in concrete on the interior of the building (Figure 10). Used as a woman's social club, the building was designed by noted California architect Julia Morgan and constructed in 1929. The vaulted ceilings, columns, and ornamental capitals of the lobby and the ornamental arches and beamed ceiling of the "plunge" are all constructed of concrete.

The historic character of a building's interior can also be conveyed in a more utilitarian

manner in terms of concrete features and finishes (Figure 11). The exposed concrete structure— columns, capitals, and drop panels— is an integral part of the character of this old commercial building in Minneapolis. In concrete warehouse and factory buildings of the early twentieth century, exposed concrete columns and formboard finish concrete slab ceilings are common features as seen in this warehouse, now converted for use as a parking garage and shops.

Figure 11. Whether in a circa 1925 office (left) or in a parking garage and retail facility (right), exposed concrete structures help characterize these building interiors. Photo: Minnesota Historical Society (left).

Concrete Characteristics

Concrete is composed of fine (sand) and coarse (crushed stone or gravel) aggregates and paste made of portland cement and water. The predominant material in terms of bulk is the aggregate. Portland cement is the binder most commonly used in modern concrete. It is commercially manufactured by blending limestone or chalk with clays that contain alumina, silica, lime, iron oxide and magnesia, and heating the compounds together to high temperatures. The hydration process that occurs between the portland cement and water results in formation of an alkali paste that surrounds and binds the aggregate together as a solid mass.

The quality of the concrete is dependent on the ratio of water to the binder; binder content; sound, durable, and well-graded aggregates; compaction during placement; and proper curing. The amount of water used in the mix affects the concrete permeability and strength. The use of excess water beyond that required in the hydration process results in more permeable concrete, which is more susceptible to weathering and deterioration. Admixtures are commonly added to concrete to adjust concrete properties such as setting or hardening time, requirements for water, workability, and other characteristics. For example, the advent of air entraining agents in the 1930s provided enhanced durability for concrete.

Figure 8. The Chess Pavilion in Chicago's Lincoln Park was designed by architect Morris Webster and constructed in 1956. The pavilion is a distinctive landscape feature, with its reinforced concrete cantilevered slab that provides cover for chess players.

Figure 9. The Ira C. Keller Fountain in Portland, Oregon, was designed by Lawrence Halprin and constructed in 1969. The fountain is constructed primarily of concrete pillars with formboard textures and surrounding elements, patterned with geometric lines, which facilitate the path of water. Photo: Anita Washko, Wiss, Janney, Elstner Associates, Inc

During the twentieth century, there was a steady rise in the strength of ordinary concrete as chemical processes became better understood and quality control measures improved. In addition, the need to protect embedded reinforcement against corrosion was acknowledged. Requirements for concrete cover over reinforcing steel, increased cement content, decreased water-cement ratio, and air entrainment all contributed to greater concrete strength and improved durability.

Mechanisms and Modes of Deterioration

Causes of Deterioration

Concrete deterioration occurs primarily because of corrosion of the embedded steel, degradation of the concrete itself, use of improper techniques or materials in construction, or structural problems. The causes of concrete deterioration must be understood in order to select an appropriate repair and protection system.

While reinforcing steel has played a pivotal role in expanding the applications of concrete in twentieth century architecture, corrosion of this steel has also caused deterioration in many historic structures. Reinforcing steel embedded in the concrete is normally surrounded by a passivating oxide layer that, when present, protects the steel from corrosion and aids in bonding the steel and concrete. When the concrete's normal alkaline environment (above a pH of 10) is compromised and the steel is exposed to water, water vapor, or high relative humidity, corrosion of the steel reinforcing takes place. A reduction in alkalinity results from carbonation, a process that occurs when the carbon dioxide in the atmosphere reacts with calcium hydroxide and moisture in the concrete. Carbonation starts at the concrete's exposed surface but may extend to the reinforcing steel over time. When carbonation reaches the metal reinforcement, the concrete no longer protects the steel from corrosion.

Corrosion of embedded reinforcing steel may be initiated and accelerated if calcium chloride was added to the concrete as a set accelerator during original construction to promote more rapid curing. It may also take place if the concrete is later exposed to deicing salts, as may occur during the winter in northern climates. Seawater or other marine environments can also provide large amounts of chloride, either from inadequately washed original aggregate or from exposure of the concrete to seawater.

Corrosion-related damage to reinforced concrete is the result of rust, a product of the corrosion process of steel, which expands and thus requires more space in the concrete than the steel did at the time of installation. This change in volume of the steel results in expansive forces, which cause cracking and spalling of the adjacent concrete (Figure 12). Other signs of corrosion of embedded steel include delamination of the concrete (planar separations parallel to the surface) and rust staining (often a precursor to spalling) on the concrete near the steel.

Lack of proper maintenance of building elements such as roofs and drainage systems can contribute to water-related deterioration of the adjacent concrete, particularly when concrete is saturated with water and then exposed to freezing temperatures. As water within the concrete freezes, it expands and exerts forces on the adjacent concrete. Repeated freezing and thawing can result in the concrete cracking and delaminating. Such damage appears as surface degradation, including severe scaling and micro-cracking that extends into the concrete. The condition is most often observed near the surface of the concrete but can also eventually occur deep within the concrete. This type of deterioration is usually most severe at joints, architectural details, and other areas with more surface exposure to weather. In the second half of the twentieth century, concrete has utilized entrained air (the incorporation of microscopic air bubbles) to provide enhanced protection against damage due to cyclic freezing of saturated concrete.

The use of certain aggregates can also result in deterioration of the concrete. Alkali-aggregate reactions—in some cases alkali-silica reaction (ASR)—occur when alkalis normally present in cement react with certain aggregates, leading to the development of an expansive crystalline gel. When this gel is exposed to moisture, it expands and causes cracking of the aggregate and concrete matrix. Deleterious aggregates are typically found only in certain areas of the country and can be detected through analysis by an experienced petrographer. Low-alkali cements as well as fly ash are used today in new construction to prevent such reactions where this problem may occur.

Figure 12. The concrete lighthouse at the Kilauea Point Light Station, Kilauea, Kauai, Hawaii, was constructed circa 1913. The concrete, which was a good quality, high strength mix for its day, is in good condition after almost one hundred years in service. Deterioration in the form of spalling related to corrosion of embedded reinforcing steel has occurred primarily in areas of higher ornamentation such as projecting bands and brackets (see close-up photo).

Problems Specifically Encountered with Historic Concrete

Materials and workmanship used in the construction of historic concrete structures, particularly those built before the First World War, sometimes present potential sources of problems. For example, where the aggregate consisted of cinder from burned coal or crushed brick, the concrete tends to be weak and porous because these aggregates absorb water. Some of these aggregates can be extremely susceptible to deterioration when exposed to moisture and cyclic freezing and thawing. Concrete was sometimes compromised by inclusion of seawater or beach sand that was not thoroughly washed with fresh water, a condition more common with coastal fortifications built prior to 1900. The sodium chloride present in seawater and beach sand accelerates the rate of corrosion of the reinforced concrete.

Another problem encountered with historic concrete is related to poor consolidation of the concrete during its placement in forms, or in molds in the case of precasting. This problem is especially prevalent in highly ornamental units. Early twentieth century concrete was often tamped or rodded into place, similar to techniques used in forming cast stone. Poorly consolidated concrete often contains voids ("bugholes" or "honeycombs"), which can reduce the protective concrete cover over the embedded reinforcing bars, entrap water, and, if sufficiently large and strategically numerous, reduce localized concrete strength. Vibration technology has improved over time and flowability agents are also used today to address this problem.

A common type of deterioration observed in concrete is the effect of weathering from exposure to wind, rain, snow, and salt water or spray. Weathering appears as erosion of the cement paste, a condition more prevalent in northern regions where precipitation can be highly acidic. This results in the exposure of the aggregate particles on the exposed concrete surface. Variations may occur in the aggregate exposure due to differential erosion or dissolution of exposed cement paste. Erosion can also be caused by the mechanical action of water channeled over concrete, such as by the lack of drip grooves in belt

courses and sills, and by inadequate drainage. In addition, high-pressure water when used for cleaning can also erode the concrete surface.

In concrete structures built prior to the First World War, concrete was often placed into forms in relatively short vertical lifts due to limitations in lifting and pouring techniques available at the time. Joints between different concrete placements (often termed cold joints or lift lines) may sometimes be considered an important part of the character of a concrete element (Figure 13). However, wide joints may permit water to infiltrate the concrete, resulting in more rapid paste erosion or freeze-thaw deterioration of adjacent concrete in cold climates.

In the early twentieth century, concrete was sometimes placed in several layers parallel to the exterior surface. A base concrete was first created with formwork and then a more cement rich mortar layer was applied to the exposed vertical face of the base concrete. The higher cement content in the facing concrete provided a more water-resistant outer layer and finished surface. The application of a cement-rich top layer, referred to in some early concrete publications as "waterproofing," was also used on top surfaces of concrete walls, or as the top layer in sidewalks. With this type of concrete construction, deterioration can occur over time as a result of debonding between layers, and can proceed very rapidly once the protective cement-rich layer begins to break down.

Figure 13. Fort Casey on Admiralty Head, Fort Casey, Washington, was constructed in 1898. The lift lines from placement of concrete are clearly visible on the exterior walls and characterize the finished appearance.

It is common for historic concrete to have a highly variable appearance, including color and finish texture. Different levels of aggregate exposure due to paste erosion are often found in exposed aggregate concrete. This variability in the appearance of historic concrete increases the level of difficulty in assessing and repairing weathered concrete.

Signs of Distress and Deterioration

Characteristic signs of failure in concrete include cracking, spalling, staining, and deflection. Cracking occurs in most concrete but will vary in depth, width, direction, pattern, and location, and can be either active or dormant (inactive). Active cracks can widen, deepen, or migrate through the concrete, while dormant cracks remain relatively unchanged in size. Some dormant cracks, such as those caused by early age shrinkage of the concrete during curing, are not a structural concern but when left unrepaired, can provide convenient channels for moisture penetration and subsequent damage. Random surface cracks, also called map cracks due to their resemblance to lines on a map, are usually related to early-age shrinkage but may also indicate other types of deterioration such as alkali-silica reaction.

Structural cracks can be caused by temporary or continued overloads, uneven foundation settling, seismic forces, or original design inadequacies. Structural cracks are active if excessive loads are applied to a structure, if the overload is continuing, or if settlement is ongoing. These cracks are dormant if the temporary overloads have been removed or if differential settlement has stabilized. Thermally-induced cracks result from stresses produced by the expansion and contraction of the concrete during temperature changes. These cracks frequently occur at the ends or re-entrant corners of older concrete structures that were built without expansion joints to relieve such stress.

Spalling (the loss of surface material) is often associated with freezing and thawing as well as cracking and delamination of the concrete cover over embedded reinforcing steel. Spalling occurs when reinforcing bars corrode and the corrosion by-products expand, creating high stresses on the adjacent concrete, which cracks and is displaced. Spalling can also occur when water absorbed by the concrete freezes and thaws (Figure 14). In addition, surface spalling or scaling may result from the improper finishing, forming, or other surface phenomena when water-rich cement paste (laitance) rises to the surface. The resulting weak material is vulnerable to spalling of thin layers, or scaling. In some cases, spalling of the concrete can diminish the load-carrying capacity of the structure.

Figures 14. Layers of architectural concrete that have debonded (spalled) from the surface were removed from a historic water tank during

Deflection is the bending or sagging of structural beams, joists, or slabs, and can be an indication of deficiencies in the strength and structural soundness of concrete. This condition can be produced by overloading, corrosion of embedded reinforcing, or inadequate design or construction, such as use of low-strength concrete or undersized reinforcing bars.

Staining of the concrete surface can be related to soiling from atmospheric pollutants or other contaminants, dirt accumulation, and the presence of organic growth. However, stains can also indicate more serious underlying problems, such

as corrosion of embedded reinforcing steel, improper previous surface treatments, alkali-aggregate reaction, or efflorescence, the deposition of soluble salts on the surface of the concrete as a result of water migration (Figure 15).

the investigation performed to assess existing conditions. Photos: Anita Washko, Wiss, Janney, Elstner Associates, Inc.

Planning for Concrete Preservation

The significance of a historic concrete building or structure—including whether it is important for its architectural or engineering design, for its materials and construction techniques, or both—guides decision making about repair and, if needed, replacement methods. Determining the causes of deterioration is also central to the development of a conservation and repair plan. With historic concrete buildings, one of the more difficult challenges is allowing for sufficient time during the planning phase to analyze the concrete, develop mixes, and provide time for adequate aging of mock-ups for matching to the original concrete.

An understanding of the original construction techniques (cement characteristics, mix design, original intent of assembly, type of placement, precast versus cast in place, etc.) and previous repair work performed on the concrete is important in determining causes of existing deterioration and the susceptibility of the structure to potential other types of deterioration. For example, concrete placed in short lifts (individual concrete placements) or constructed in precast segments will have numerous joints that can provide entry points for water infiltration. Inappropriate prior repairs, such as installation of patches using an incompatible material, can affect the future performance of the concrete. Such prior repairs may require corrective work.

As with other preservation projects, three primary approaches are usually considered for historic concrete structures: **maintenance**, **repair**, or **replacement**. Maintenance and repair best achieve the preservation goal of minimal intervention and the greatest retention of existing historic fabric. However, where elements of the building are severely deteriorated or where inherent problems with the material lead to ongoing failures, replacement may be necessary.

During planning, information is gathered through research, visual survey, inspection openings, and laboratory studies. The material should then be reviewed by professionals experienced in concrete deterioration to help evaluate the nature and causes of the concrete problems, to assess both the short-term and long-term effects of the deterioration, and to formulate proper repair approaches.

Condition Assessment

A condition assessment of a concrete building or structure should begin with a review of all available documents related to original construction and prior repairs. While plans and specifications for older concrete buildings are not always available, they can be an invaluable resource and every attempt should be made to find them. They may provide information on the composition of the concrete mix or on the type and location of reinforcing bars. If available, documents related to past repairs should also be reviewed to understand how the repairs were made and to help evaluate their anticipated performance and service life. Archival photographs can also provide a valuable source of information about original construction.

Figure 15. Evidence of moisture movement through concrete is apparent in the form of mineral deposits on the concrete surface. Cyclic freezing and thawing of entrapped moisture, and corrosion of embedded reinforcement, have also contributed to deterioration of the concrete column on this fence at Crocker Field in Fitchburg, Massachusetts, designed by the Olmsted Brothers.

A visual condition survey will help identify and evaluate the extent, types, and patterns of distress and deterioration. The American Concrete Institute offers several useful guides on how to perform a visual condition survey of concrete. Generally, the condition assessment begins with an overall visual survey, followed by a close-up investigation of representative areas to obtain more detailed information about modes of deterioration.

A number of nondestructive testing methods can be used in the field to evaluate concealed conditions. Basic techniques include sounding with a hand-held hammer (or for horizontal surfaces, a chain) to help identify areas of delamination. More sophisticated techniques include impact-echo testing (Figure 16), ground penetrating radar, pulse velocity, and other methods that characterize concrete thickness and locate voids or delaminations. Magnetic detection instruments are used to locate embedded reinforcing steel and can be calibrated to identify the size and depth of reinforcement. Corrosion measurements can be taken using copper-copper sulfate half-cell tests or linear polarization techniques to determine the probability or rate of active corrosion of the reinforcing steel.

To further evaluate the condition of the concrete, samples may be removed for laboratory study to determine material components and composition, and causes of deterioration. Samples need to be representative of existing conditions but should be taken from unobtrusive locations. Laboratory studies of the concrete may include petrographic evaluation following ASTM C856, *Practice for Petrographic Examination of Hardened Concrete*. Petrographic examination, consisting of microscopical studies performed by a geologist specializing in the evaluation of construction materials, is performed to determine air content, water-cement ratio, cement content, and general aggregate characteristics. Laboratory studies can

also include chemical analyses to determine chloride content, sulfate content, and alkali levels of the concrete; identification of deleterious aggregates; and determination of depth of carbonation. Compressive strength studies can be conducted to evaluate the strength of the existing concrete and provide information for repair work. The laboratory studies provide a general identification of the original concrete's components and aggregates, and evidence of damage due to various mechanisms including cyclic freezing and thawing, alkali-aggregate reactivity, or sulfate attack. Information gathered through laboratory studies can also be used to help develop a mix design for the repair concrete.

Cleaning

As with other historic structures, concrete structures are cleaned for several reasons: to improve the appearance of the concrete, as a cyclical maintenance measure, or in preparation for repairs. Consideration should first be given to whether the historic concrete structure needs to be cleaned at all. If cleaning is required, then the gentlest system that will be effective should be selected.

Three primary methods are used for cleaning concrete: water methods, abrasive surface treatments, and chemical surface treatments. Low-pressure water (less than 200 psi) or steam cleaning can effectively remove surface soiling from sound concrete; however, care is required on fragile or deteriorated surfaces. In addition, water and steam methods are typically not effective in removing staining or severe soiling. Power washing with high-pressure water is sometimes used to clean or remove coatings from sound, high-strength concrete, but high-pressure water washing is generally damaging to and not appropriate for concrete on historic structures.

When used with proper controls and at very low pressures (typically 35 to 75 psi), microabrasive surface treatments using very fine particulates, such as dolomitic limestone powder, can sometimes clean effectively. However, microabrasive cleaning may alter the texture and surface reflectivity of concrete. Some concrete can be damaged even by fine particulates applied at very low pressures.

Chemical surface treatments can clean effectively but may also alter the appearance of the concrete by bleaching the concrete, removing the paste, etching the aggregate, or otherwise altering the surface. Detergent cleaners or mild, diluted acid cleaners may be appropriate for removal of staining or severe soiling. Cleaning products that contain strong acids such as hydrochloric (muriatic) or hydrofluoric acid, which will damage concrete and are harmful to persons, animals, site features, and the environment, should not be used.

Figure 16. Impact echo testing is performed on a concrete structural slab to help determine depth of deterioration. In this method, a short pulse of energy is introduced into the structure and a transducer mounted on the impacted surface of the structure receives the reflected input waves or echoes. These waves are analyzed to help identify flaws and deterioration within the concrete.

For any cleaning process, trial samples should be performed prior to full-scale implementation. The intent of the cleaning program should not be to return the structure to a like new appearance. Concrete can age gracefully, and as long as soiling is not severe or deleterious, many structures can still be appreciated without extensive cleaning.

Methods of Maintenance and Repair

The maintenance of historic concrete often is thought of in terms of appropriate cleaning to remove unattractive dirt or soiling materials. However, the implementation of an overall maintenance plan for a historic structure is the most effective way to help protect historic concrete. For examples, the lack of maintenance to roofs and drainage systems can promote water related damage to adjacent concrete features. The repeated use of deicing salts in winter climates can pit the surface of old concrete and also may promote decay in embedded steel reinforcements. Inadequate protection of concrete walls adjacent to driveways and parking areas can result in the need for repair work later on.

The maintenance of historic concrete involves the regular inspection of concrete to establish baseline conditions and identify needed repairs. Inspection tasks involve monitoring protection systems, including sealant joints, expansion joints, and protective coatings; reviewing existing conditions for development of distress such as cracking and delaminations; documenting conditions observed; and developing and implementing a cyclical repair program.

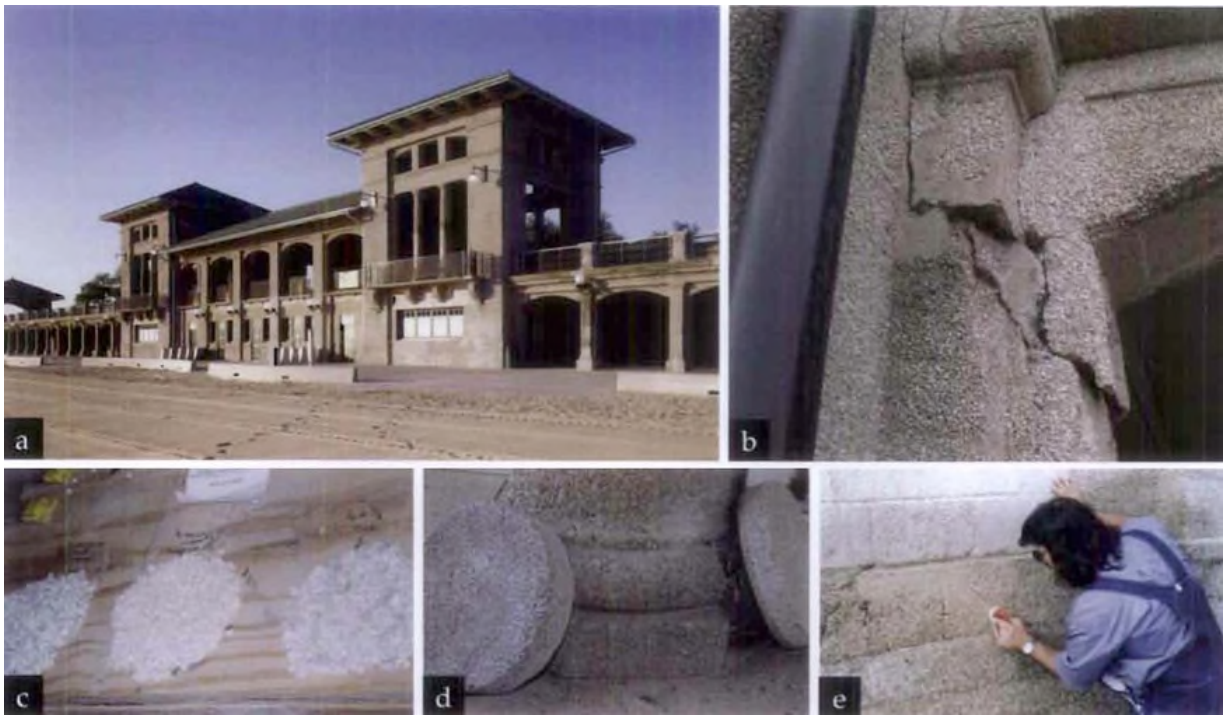

Figure 17. (a) The 63rd Street Beach House was constructed on the shoreline of Chicago in 1919. The highly exposed aggregate concrete of the exterior walls of the beach house was used for many buildings in the Chicago parks as an alternative to more expensive stone construction. Photo: Leslie Schwartz Photography. (b) Concrete deterioration included cracking, spalling, and delamination caused by corrosion of embedded reinforcing steel and concrete damage due to cyclic freezing and thawing. (c) Various sizes and types of aggregates were reviewed for matching to the original concrete materials. (d) Mock-ups of the concrete repair mix were prepared for comparison to the original concrete. Considerations included aggregate type and size, cement color, proportions, aggregate exposure, and surface finish. (e) The craftsman finished the surface to replicate the original appearance in a mock-up on the structure. Here, he used a nylon bristle brush to remove loose paste and expose the aggregate, creating a variable surface to match the adjacent original concrete.

Sealants are an important part of maintenance of historic concrete structures. Elastomeric sealants, which have replaced traditional oil-resin based caulks for many applications, are used to seal cracks and joints to keep out moisture and reduce air infiltration. Sealants are commonly used at windows and door perimeters, at interfaces between concrete and other materials, and at attachments to or through walls or roofs, such as with lamps, signs, or exterior plumbing fixtures.

Where used for crack repairs on historic facades, the finished appearance of the sealant application must be considered, as it may be visually intrusive. In some cases, sand can be broadcast onto the surface of the sealant to help conceal the repair.

Urethane and polyurethane sealants are often used to seal joints and cracks in concrete structures, paving, and walkways; these sealants provide a service life of up to ten years. High-performance silicone sealants also are often used with concrete, as they provide a range of movement capabilities and a service life of twenty years or more. Some silicone sealants may stain adjacent materials, which may be a problem with more porous concrete, and may also tend to accumulate dust and dirt. The effectiveness of sealants for sealing joints and cracks depends on numerous factors including proper surface preparation and application. Sealants should be examined as part of routine maintenance inspections, as these materials deteriorate faster than their substrates and must be replaced periodically as a part of cyclical maintenance.

Repair of historic concrete may be required to address deterioration because the original design and construction did not provide for long-term durability, or to facilitate a change in use of the structure. Examples include increasing concrete cover to protect reinforcing steel and reducing water infiltration into the structure by repair of joints. Any such improvements must be thoroughly evaluated for compatibility with the original design and appearance. Care is required in all aspects of historic concrete repair, including surface preparation; installation of formwork; development of the concrete mix design; and concrete placement, consolidation, and curing.

An appropriate repair program addresses existing distress and reduces the rate of future deterioration, which in many cases involves moisture-related issues. The repair program should incorporate materials and methods that are sympathetic to the existing materials in character and appearance, and which provide good long-term performance. In addition, repair materials should age and weather similarly to the original materials. In order to best achieve these goals, concrete repair projects should be divided into three phases: development of trial repair procedures, trial repairs and evaluation, and production repair work.

For any concrete repair project, the process of investigation, laboratory analysis, trial samples, mock-ups, and full-scale repairs allows ongoing refinement of the repair work as well as implementation of quality-control measures. The trial repair process provides an opportunity for theowner, architect, engineer, and contractor to evaluate the concrete mix design and the installation and finishing techniques for the repairs from both technical and aesthetic standpoints. The final repair materials and procedures should match the original concrete in appearance while meeting the established criteria for durability, Information gathered through trial repairs and mock-ups is invaluable in refining the construction documents prior to the start of the overall repair project (Figure 17).

Surface Preparation

In undertaking surface preparation for historic concrete repair, care must be taken to limit removal of existing material while still providing an appropriate substrate for repairs. This is particularly important where ornamentation and fine details are involved. Preparation for localized repairs usually begins with removal of the loose concrete to determine the general extent of the repair, followed by saw-cutting the perimeter of the repair area. The repair area should extend beyond the area of concrete deterioration to a sufficient extent to provide a sound substrate. When repairing concrete with an exposed aggregate or other special surface texture, a sawcut edge may be too visually evident. To hide the repair edge, techniques such as lightly hand-chipping the edge of the patch may be used to conceal the joint between the original concrete and the new repair material. The depth to which the concrete needs to be removed may be difficult to determine without invasive probing in the repair area. Removal of concrete should typically extend beyond the level of the reinforcing steel, if present, so that the patch encapsulates the reinforcing steel, which provides mechanical attachment for the repair.

If the concrete was originally of lower strength and quality, the assessment of present soundness is more difficult. Deteriorated and unsound concrete is typically removed using pneumatic chipping hammers. Removal of concrete in historic structures is better controlled by using smaller chipping hammers or hand tools. The area of the concrete to be repaired and the exposed reinforcing steel are then cleaned, usually by careful sandblast and air blast procedures applied only within the repair area. Adjacent original concrete surfaces should be protected during this work. In some cases, project constraints such as dust control may limit the ability to thoroughly clean the concrete and steel. For example, it may be necessary to use needle scaling (a small pneumatic impact device) and wire brushing instead of sandblasting.

Supplemental steel may be needed when existing reinforcing steel is severely deteriorated, or if reinforcing steel is not present in repair areas. Exposed existing reinforcing and other embedded steel elements should be cleaned, primed, and painted with a corrosion-inhibiting coating. The patching material should be reinforced and mechanically attached to the existing concrete. Reinforcement materials used in repairs most often include mild steel, epoxy-coated steel, or stainless steel, depending on existing conditions.

Formwork and Molds

Special formwork is needed to recreate ornamental concrete features—which may be complex, in high relief, or architecturally detailed—and to provide special surface finishes such as wood form board textures. Construction of the formwork itself requires particular skill and craftsmanship. Reusable forms can be used for concrete ornamentation that is repeated across a building facade, or precast concrete elements may be used to replace missing or unrepairable architectural features. Formwork for ornamental concrete is often created using a four-step process: a casting of the original concrete is taken; a plaster replica of the unit is prepared; a mold or form is made from the plaster replica; and a new concrete unit is cast. Custom formwork and molds are often the work of specialty companies, such as precasters and cast stone fabricators.

The process of forming architectural features or special surface textures is particularly challenging if early age stripping (removal of formwork early in the concrete curing process) is needed to perform surface treatment on the concrete. Timing for formwork removal is related to strength gain, which in turn is partly dependent on temperature and weather conditions. Early age removal of formwork in highly detailed concrete can lead to damage of the new concrete that has not yet gained sufficient strength through curing.

Selection of Repair Materials and Mix Design

Selection and design of proper repair materials is a critical component of the repair project. This process requires evaluation of the performance, characteristics, and limitations of the repair materials, and may involve laboratory testing of proposed materials and trial repairs. The materials should be selected to address the specific type of repair required and to be compatible with special characteristics of the original concrete. Some modern repair materials are designed to have a high compressive strength and to be impermeable. Even though inherently durable, these newer materials may not be appropriate for use in repairing a low strength historic concrete.

The concrete’s durability, or resistance to deterioration, and the materials and methods selected for repair depend on its composition, design, and quality of workmanship. In most cases, a mix design for durable

replacement concrete should use materials similar to those of the original concrete mix. Prepackaged materials are often not appropriate for repair of historic concrete. The concrete patching material can be air entrained or polymer-modified if subject to exterior exposure, and should incorporate an appropriate selection of aggregate and cement type, and proper water content and water to cement ratio. Some admixtures, including polymer modifiers, may change the appearance of the concrete mix. Design of the concrete patching material should address characteristics required for durability, workability, strength gain, compressive strength, and other performance attributes. During installation of the repair, skilled workmanship is required to ensure proper mixing procedures, placement, consolidation, and curing.

Matching and Repair Techniques for Historic Concrete

Repair measures should be selected that retain as much of the original material as possible, while providing for removal of an adequate amount of deteriorated concrete to provide a sound substrate for a durable repair. The installed repair must visually match the existing concrete as closely as possible and should be similar in other aspects such as compressive strength, permeability, and other characteristics important in the mix design of the concrete (Figure 18).

Understanding the original construction techniques often provides opportunities in the design of repairs. For example, joints between the new and old concrete can be hidden in changes in surface profile and cold joints. The required patching mix for the concrete to be used in the repair will likely need to be specially designed to replicate the appearance of the adjacent historic concrete. A high level of craftsmanship is required for finishing of historic concrete, in particular to create the sometimes inconsistent finish and variation in the original concrete in contrast to the more even appearance required for most non-historic repairs.

To match the various characteristics of the original concrete, trial mixes should be developed. These mixes need to take into account the types and colors of aggregates and paste present in the original concrete. Different mixes may be needed because of variations in the appearance and composition of the historic concrete. The trials should utilize different forming and finishing techniques to achieve the best possible match to the original concrete. Initial trials should first take place on site but off the structure. The mix designs providing the best match are then installed as trial repairs on the structure, and assessed after they have cured.

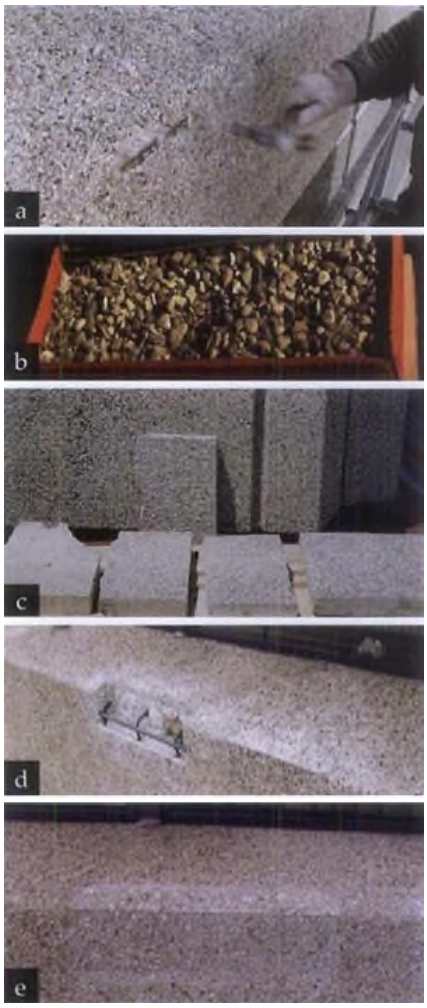

Figure 18. (a) Exposed aggregate precast concrete is sounded with a hammer to detect areas of deterioration. Corrosion of the exposed reinforcing steel bar has led to spalling of the adjacent concrete. (b) Samples of aggregate considered for use in repair concrete are compared to the original concrete materials in terms of size, color, texture, and reflectance. (c) Various sample panels are made using the selected concrete repair mix design for comparison to the original concrete on the building, and the mix design is adjusted based on review of the samples. (d) After removal of the spall, the concrete surface is prepared for installation of a formed patch. (e) Prior to placement of the concrete, a retarding agent is brush-applied to the inside face of the formwork to slow curing at the surface. After the concrete is partially cured, the forms are removed and the surface of the concrete is rubbed to remove some of the paste and expose the aggregate to match the original concrete.

Achieving compatibility between repair work and original concrete may be difficult, especially given the variability often present in historic concrete materials and finishes. Formed rather than trowel-applied patch repairs are recommended for durability, as forming permits better ranges of mix ingredients (such as coarse aggregates) and improved consolidation as compared to trowel-applied repairs. Parge coatings usually are not recommended as they do not provide as durable repair as formed concrete. However, in some cases parge coatings may be appropriate to match an original parged surface treatment. Proper placement and finishing of the repair are important to obtain a match with the original concrete. To minimize problems associated with rapid curing of concrete, such as surface cracking, it is important to use proper curing methods and to allow for sufficient time.

Hairline cracks that show no sign of increasing in size may often be left unrepaired. The width of the crack and the amount of movement usually limits the selection of crack repair techniques that are available. Although it is difficult to determine whether cracks are moving or non-moving, and therefore most cracks should be assumed to be moving, it is possible to repair non-moving cracks by installation of a cementitious repair mortar matching the adjacent concrete. It is generally desirable not to widen cracks prior to the mortar application. Repair mortar containing sand in the mix may be used for wider cracks; unsanded repair mortar may be used for narrower cracks.

When it is desirable to re-establish the structural integrity of a concrete structure involving dormant cracks, epoxy injection repair has proven to be an effective procedure. Such a repair is made by first sealing the crack on both sides of a wall or structural member with epoxy, polyester, wax, tape, or cement slurry, and then injecting epoxy through small holes or ports drilled in the concrete. Once the epoxy in the crack has hardened, the surface sealing material may be removed; however, this type of repair is usually quite apparent. Although it may be possible to inject epoxy without leaving noticeable residue, this process is difficult and, in general, the use of epoxy repairs in visible areas of concrete on historic structures is not recommended.

Active structural cracks (which move as loads are added or removed) and thermal cracks (which move as temperatures fluctuate) must be repaired in a manner that will accommodate the anticipated movement. In some more extreme cases, expansion joints may have to be introduced before crack repairs are undertaken. Active cracks may be filled with sealants that will adhere to the sides of the cracks and will compress or expand during crack movement. The design, detailing, and execution of sealant repairs require considerable attention, or they will detract from the appearance of the historic building. The routing and cleaning of a crack, and installation of an elastomeric sealant to prevent water penetration, is used to address cracks where movement is anticipated. However, unless located in a concealed area of the concrete, this technique is often not acceptable for historic structures because the repair will be visually intrusive (Figure 19). Other approaches, such as installation of a cementitious crack repair, may need to be considered even though this type of repair may be less effective or have a shorter service life than a sealant repair.

Replacement

If specific components of historic concrete structures are beyond repair, replacement components can be cast to match historic ones. Replacement of original concrete should be carefully considered and viewed as a method of last resort. In some cases, such as for repeated ornamental units, it may be more cost-effective to fabricate precast concrete units to replace missing elements. The forms created for precast or cast-in-place units can then be used again during future repair projects.

Careful mix formulation, placement, and finishing are required to ensure that replacement concrete units will match the historic concrete. There is often a tendency to make replacement concrete more consistent in appearance than the original concrete. The consistency can be in stark contrast with the variability of the original concrete due to original construction techniques, architectural design, or differential exposure to weather. Trial repairs and mock-ups are used to evaluate the proposed replacement concrete work and to refine construction techniques (Fig 20).

Figure 19. A high-speed grinder is used to widen a crack in preparation for installation of a sealant. This process is called "routing." After the crack is prepared, the sealant is installed to prevent moisture infiltration through the crack. Although sealant repairs can provide a durable, watertight repair for moving cracks, they tend to be very visible.

Protection Systems

Coatings and Penetrating Sealers. Protection systems such as a penetrating sealers or film forming coating are often used with non-historic structures to protect the concrete and increase the length of the service life of concrete repairs. However, film-forming coatings are often inappropriate for use on a historic structure, unless the structure was coated historically. Film-forming coatings will often change the color and appearance of a surface, and higher build coatings can also mask architectural finishes and ornamental details. For example, the application of a coating on concrete having a formboard finish may hide the wood texture of the surface. Pigmented film-forming coatings are also typically not appropriate for use over exposed aggregate concrete, where the uncoated exposed surface contributes significantly to the historic character of the facade. In cases where the color of a substrate needs to be changed, such as to modify the appearance of existing repairs, an alternative to pigmented film-forming coatings is the use of pigmented stains.

Many proprietary clear, penetrating sealers are currently available to protect concrete substrates. These products render fine cracks and pores within the concrete hydrophobic; however, they do not bridge or fill cracks. Clear sealers may change the appearance of the concrete in that treated areas become more visible after rain in contrast to the more absorptive areas of original concrete. Once applied, penetrating sealers cannot be effectively removed and are therefore considered irreversible. They should not be used on historic concrete without thorough prior consideration. However, clear penetrating sealers provide an important means of protection for historic concrete that is not of good quality and can help to avoid more extensive future repairs or replacement. Thus they are sometimes appropriate for use on historic concrete. Once applied, these sealers will require periodic re-application.

Waterproofing membranes are systems used to protect concrete surfaces such as roofs, terraces, plazas, or balconies, as well as surfaces below grade. Systems range from coal tar pitch membranes used on older buildings, to asphalt or urethane-based systems. On historic buildings, membrane systems are typically used only on surfaces that were originally protected by a similar system and surfaces that are not visible from grade. Waterproofing membranes may be covered by roofing, paving, or other architectural finishes.

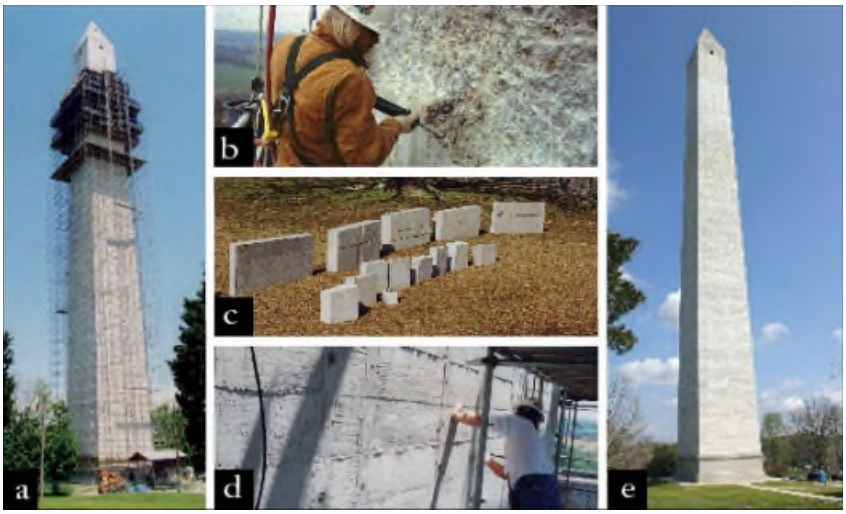

Figure 20. (a) The Jefferson Davis Memorial in Fairview, Kentucky, constructed from 1917-1924, is 351 feet tall and constructed of unreinforced concrete. The walls of the memorial are 8 feet thick at the base and 2 feet thick at the top of the wall. Access to the monument for investigation was provided by rappelling techniques, while ground supported and suspended scaffolding was used to access the exterior during repairs. (b) The concrete was severely deteriorated at isolated locations, with spalling and damage from cyclic freezing and thawing of entrapped water. In addition, previous repairs were at the end of their service life and removal of deteriorated concrete and failed previous repairs was required. Light duty chipping hammers were used to avoid damage to adjacent material when removing deteriorated concrete to the level of sound concrete. (c) Field samples were performed to match the color, finish, and texture of the original concrete. A challenge in matching of historic concrete is achieving variability of appearance. (d) The completed surface after repairs exhibits intentional variability of the concrete surface to match the appearance of the original concrete. Some formwork imperfections that would normally be removed by finishing were intentionally left in place, to replicate the highly variable finish of the original concrete. (e) The Jefferson Davis Memorial after completion of repairs in 2004. Photo e: Joseph Lenzi, Senler, Campbell & Associates, Inc.

Laboratory and field testing is recommended prior to application of a protection system or treatment on any concrete structure; testing is even more critical for historic structures because many such treatments are not reversible. As with other repairs, trial samples are important to evaluate the effectiveness of the treatment and to determine whether it will harm the concrete or affect its appearance.

Cathodic Protection. Corrosion is an electrochemical process in which electrons flow between cathodic (positively charged) and anodic (negatively charged) areas on a metal surface; corrosion occurs at the anodes. Cathodic protection is a technique used to control the corrosion of metal by making the whole metal surface the cathode of an electrochemical cell. This technique is used to protect metal structures from corrosion and is also sometimes used to protect steel reinforcement embedded in concrete. For reinforced concrete, cathodic protection is typically accomplished by connecting an auxiliary anode to the reinforcing so that the entire reinforcing bar becomes a cathode. In sacrificial anode (passive) systems, current flows naturally by galvanic action between the less noble anode (such as zinc) and the cathode. In impressed-current (active) systems, current is impressed between an inert anode (such as titanium) and the cathode. Cathodic protection is intended to reduce the rate of corrosion of embedded steel in concrete, which in turn reduces overall deterioration. Protecting embedded steel from corrosion helps to prevent concrete cracking and spalling.

Impressed-current cathodic protection is the most effective means of mitigating steel corrosion and has been used in practical structural applications since the 1970s. However, impressed-current cathodic protection systems are typically the most costly to install and require substantial ongoing monitoring, adjustment, and maintenance to ensure a proper voltage output (protection current) over time. Sacrificial anode cathodic protection dates back to the 1800s, when the hulls of ships were protected using this technology. Today many industries utilize the concept of sacrificial anode cathodic protection for the protection of steel exposed to corrosive environments. It is less costly than an impressed-current system, but is somewhat less effective and requires reapplication of the anode when it becomes depleted.

Re-alkalization. Another technique currently available to protect concrete is realkalization, which is a process to restore the alkalinity of carbonated concrete. The treatment involves soaking the concrete with an alkaline solution, in some cases forcing it into the concrete to the level of the reinforcing steel by passage of direct current. These actions increase the alkalinity of the concrete around the reinforcement, thus restoring the protective alkaline environment for the reinforcement. Re-alkalization has been used in the United States for a little more than a decade. Like impressed-current cathodic protection methods, it is costly. However, it is a one-time operation and therefore does not require periodic reapplication.

Careful evaluation of existing conditions, the causes and nature of distress, and environmental factors is essential before a protection method is selected and implemented. Not every protection system will be effective on each structure. In

addition, the level of intrusion caused by the protection system must be carefully evaluated before it is used on a historic concrete structure.

Summary and References

In the United States, concrete has been a popular construction material since the late nineteenth century and recently has gained greater recognition as a historic material. Preservation of historic concrete requires a thorough understanding of the causes and types of deterioration, as well as of repair and replacement materials and methods. It is important that adequate time is allotted during the planning phase of a project to provide for trial repairs and mock-ups in order to evaluate the effectiveness and aesthetics of the repairs. Careful design is essential and, as with other preservation efforts, the skill of those performing the work is critical to the success of the repairs. The successful repair of many historic concrete structures in recent years demonstrates that the techniques and materials now available can extend the life of such structures and help ensure their preservation.

Acknowledgements

Paul Gaudette is an engineer with Wiss, Janney, Elstner Associates, Inc., in Chicago, Illinois. **Deborah Slaton** is an architectural conservator with Wiss, Janney, Elstner Associates, Inc., in Northbrook, Illinois. All photographs by Paul Gaudette unless otherwise stated.

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This publication has been prepared pursuant to the National Historic Preservation Act of 1966, as amended, which directs the Secretary of the Interior to develop and make available information concerning historic properties. Comments about this publication should be addressed to: Charles E. Fisher, Technical Preservation Publications Program Manager, Technical Preservation Services—2255, National Park Service, 1849 C Street, NW, Washington, DC 20240.

2007

Reading List

American Concrete Institute. *Guide for Making a Condition Survey of Concrete in Service*. ACI Committee 201, ACI 201.1R-92.

American Concrete Institute. *Guide to Evaluation of Concrete Structures before Rehabilitation*. ACI Committee 364, ACI 364.1R-07.

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State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary #
HRI #
Trinomial
NRHP Status Code: 3B

Other Listings
Review Code **Reviewer** **Date**

Page 13 **of** 20 ***Resource Name or #** (Assigned by recorder)**:** Ladera Park
P1. Other Identifier: Concrete Walkway and Curbs

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted**
***a. County:** Los Angeles **and** (P2b and P2c or P2d. Attach a Location Map as necessary.)
***b. USGS 7.5' Quad:** Inglewood **Date**: 1981 **T**2S**; R**14W**;___of___of Sec** 21;**___B.M.**
c. Address: 6027 Ladera Park Avenue **City:** Los Angeles **Zip:** 90056
d. UTM (Give more than one for large and/or linear resources) **Zone:** 11 , 374423.32 mE/ 553951.01 mN
e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate):
Assessor's Parcel No.: 4019-019-900 and 4002-023-900

***P3a. Description** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries):

The concrete walkway is of early construction and retains WPA-era style curbstones. The walkway and curbing are associated with the WPA projects that comprise Ladera Park. These features contribute to the Ladera Park Historic District for conveying the proposed period of significance pursuant to Criteria A/1. The walking and curbing retain integrity of materials, design, workmanship, feeling, association, and location.

***P3b. Resource Attributes** (List attributes and codes)**:** HP46 Walls/Gates/Fences
***P4. Resources Present:** ☐Building ☒Structure ☐Object ☐Site ☐District ☒Element of District ☐Other (Isolates, etc.)

P5a. Photo or Drawing (Photo required for buildings, structures, and objects.)

P5b. Description of Photo (view, date, accession #): View of concrete walkway and curb, February 25, 2016

***P6. Date Constructed/Age and Source:**
☒Historic ☐Prehistoric ☐Both

***P7. Owner and Address:**
County of Los Angeles
500 W. Temple Street, Room 754
Los Angeles, CA 90012

***P8. Recorded by** (Name, affiliation, and address): Donald Faxon and Alexandra Madsen
Sapphos Environmental, Inc.
430 N. Halstead Street
Pasadena, CA 91107

***P9. Date Recorded:** August 9, 2016

***P10. Survey Type** (Describe)**:** Intensive, CEQA Compliance

***P11. Report Citation** (Cite survey report and other sources, or enter "none")**:** Sapphos Environmental, Inc. 2016. Historic Evaluation for Ladera Park.

Attachments: ☒ NONE ☐ Location Map ☐ Sketch Map ☐ Continuation Sheet ☐ Building, Structure, and Object Record ☐ Archaeological Record ☐ District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record ☐ Photograph Record ☐ Other (List):

PROJECT ID NO. SWQ0000003

LADERA PARK STORMWATER IMPROVEMENTS

SPECIAL PROVISIONS

SECTION TC – TEMPORARY TRAFFIC CONTROL

The following Special Provisions supplement and amend the Standard Specifications for Public Works Construction, 2015 Edition. As a reference convenience, these Special Provisions have been arranged into a format which parallels the Standard Specifications.

Prepared By:

8/20/18
Date

Reviewed:

8/20/18
Date

Pages TC-1 through TC-5

SECTION TC – TEMPORARY TRAFFIC CONTROL

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SECTION 600 - ACCESS

SECTION 601 – WORK AREA TRAFFIC CONTROL

PART 6
TEMPORARY TRAFFIC CONTROL

SECTION 600 - ACCESS

600-1 GENERAL. Add the following:

At least 24 hours in advance of closing or restricting access to any property, the Contractor shall notify the owner or resident of said property. A copy of said notification shall be provided to the Engineer. The Contractor shall conduct its operations, including those of its subcontractors and suppliers, so as to provide reasonable access to the adjacent properties and have no greater length or quantity of work under construction than can be properly prosecuted with a minimum of inconvenience to the public and other contractors engaged on adjacent or related work.

600-2 VEHICULAR ACCESS. Add the following:

Unless the Contractor makes other arrangements satisfactory to the Engineer and the owners, the following shall also apply to business establishments:

a) For each establishment (such as, but not limited to, gas stations, markets and other "drive-in" businesses) on the corner of an intersection which has a driveway (or driveways) on each intersecting street, the Contractor shall provide vehicular access to at least one driveway on each intersecting street unless otherwise approved in writing by the Engineer.

b) For each establishment (such as but not limited to motels, parking lots and garages) which has a one-way traffic pattern with the appropriate entrance driveway and exit driveway, the Contractor shall provide vehicular access to both the entrance driveway and the exit driveway.

SECTION 601-WORK AREA TRAFFIC CONTROL

601-1 GENERAL. Add the following:

Street closures, detours, lane closures, signs, lights and other traffic control devices shall conform to the latest approved version of the California Manual on Uniform Traffic Control Devices (California MUTCD). The California MUTCD is available at the following address:

http://www.dot.ca.gov/hq/traffops/engineering/mutcd/

The Agency will furnish any necessary "No Parking" signs (signs) at no cost to the Contractor. Signs shall be installed by the Contractor after approval for such by the Engineer. Signs shall be installed for each construction activity or operation, unless such activities or operations will occur within 2 working days of each other. Signs shall be posted a minimum of 48 hours in advance of the start of each “No Parking” restriction.

Unless otherwise approved by the Engineer, the Contractor shall allow passage of public transit coaches through the Work area at all times. For the Metropolitan Transportation Authority (Metro), the Contractor shall notify the Stops and Zones Representative, (213) 922-5190, at least 48 hours prior to construction at bus stop zones to allow Metro to temporarily abandon and relocate bus stop zones within the construction area.

Striped roadways shall be delineated with temporary raised reflective markers when left without striping overnight.

Lips greater than one inch created during construction which is to remain overnight shall be ramped with temporary asphalt concrete at a slope not to exceed 1:1.

The roadway shall be cold milled and/or paved to full width at the end of each day.

601-2 (NOT USED).

601-3 TRAFFIC LANES AND CLEARANCES.

601-3.1 Traffic Lane Requirements. Traffic lane requirements shall be as follows:

SLAUSON AVENUE AND LADERA AVENUE PARK:

Traffic control shall be in conformance with the Traffic Control Plans included as a part of the Project Plans.

For installation of traffic control devices during daylight working hours, the Contractor shall conform to the latest approved version of the California MUTCD.

601-3.2 (NOT USED).

601-3.3 Street Closures and Detours. The Contractor shall comply with all applicable State, County and City requirements for the closure of streets. The Contractor shall provide flag persons and watch persons as required to control traffic and advise the public of detours and construction hazards. The Contractor shall also be responsible for compliance with additional public safety requirements which may arise during construction.

At least 48 hours in advance of closing, or partially closing, or reopening, any street, alley, or other public thoroughfare, the Contractor shall notify the Police, Fire, traffic and engineering departments of jurisdictional agencies involved, and comply with their requirements. Proposed deviations from this procedure must first be approved in writing by the Engineer.

The Contractor shall submit in accordance with 2-5.3 of Section G its proposed schedules for street and lane closures, and its proposed methods for traffic control to comply with the requirements specified in 601-3.1. Key traffic control schedule activities

and milestones shall be included in the Contractor's construction schedule as specified in 6-1 of Section G. This submittal shall be made sufficiently in advance of any rerouting or diversion of traffic by the Contractor to allow for review and approval of the proposed traffic control by the Agency. Street closure schedules must be submitted 20 Days prior to closing any street.

Where streets in which storm drain, waterline, or sewer line conduit is being constructed are to be closed to through traffic, it shall be understood that such closures shall apply only to the portions of such streets where construction is actually in progress. Unless otherwise specified, the Contractor shall provide access for local vehicular and pedestrian traffic on streets closed to through traffic.

Any street or alley, which intersects the street in which mainline conduit construction work is being done and for which traffic requirements are not otherwise specified, may be closed at its intersection with the Work provided that two adjacent streets are not closed simultaneously. However, where the street in which mainline conduit construction work is being done is the only access to a cul-de-sac or dead-end street or alley, vehicular access thereto shall be maintained at all times.

Where access to the Work sites involves passage through locked gates, the Contractor shall furnish its own locks in order to provide passage through the gates while maintaining security.

Add the following:

601- 4 TRAFFIC CONTROL DEVICES.

601-4.1 General. The Contractor shall provide, install, and maintain all the traffic control devices including signing, striping, marking, barricades, delineators, flashing arrow signs, and other devices deemed necessary for the protection of the vehicular and pedestrian traffic throughout the Project area as required by these Specifications and as directed by the Engineer. The Project area shall include the construction area and areas required for the advance signing and transitions to and from the existing traffic control and the construction traffic control.

Traffic control devices shall conform to latest approved version of the California MUTCD, http://www.dot.ca.gov/hq/traffops/engineering/mutcd/, and the Standard Plans.

When no longer required, all temporary traffic control devices installed and/or covered by the Contractor shall be promptly removed and/or restored by the Contractor.

Any action on the part of the Engineer in directing the Contractor's attention to any inadequacy of the required devices and services or any action of the Agency to alleviate the Contractor's inadequacies shall not relieve the Contractor from its responsibility for public safety or abrogate its obligation to provide and maintain these devices and services. If the Contractor fails to provide and maintain these devices and services and the Agency is required to alleviate said condition, the total charges of labor, equipment

and materials, including overhead and transportation, accrued by the Agency for such work will be deducted from any monies due the Contractor.

601-4.2 Maintenance. The Contractor shall be responsible for maintaining traffic control devices in their proper positions at all times. The Contractor shall replace, repair or clean such devices whenever necessary in order to ensure and preserve their appearance and functionality. The Contractor shall remove and dispose of all damaged barricades, including those furnished and placed by the Agency.

601-4.3 (NOT USED).

601-4.4 (NOT USED).

601-4.5 Flashing Arrow Signs. Flashing arrow signs (flashing arrow installed, and maintained boards) shall be furnished, installed, and maintained by the Contractor at the locations shown on the Traffic Control Plans and as directed by the Engineer.

601-4.6 Changeable Message Signs. Changeable message signs shall be furnished, installed, and maintained by the Contractor at the locations shown on the Traffic Control Plans and as directed by the Engineer.

601-5 (NOT USED).

601-6 (NOT USED).

601-7 (NOT USED).

601-8 MEASUREMENT.

Changeable Message Signs and Flashing Arrow Signs will not be measured separately for payment.

601-9 PAYMENT. Payment for traffic control, including:

a) furnishing, installing, maintaining, and removing traffic control devices not specified as individual Bid items;

b) furnishing, installing, maintaining, and removing temporary raised reflective markers;

c) furnishing, installing, maintaining, and removing steel plate covers;

d) restoration of traffic striping and pavement markings to their original conditions;

e) removal and disposal of damaged barricades, including those furnished by the Agency; and

f) all other work required by Subsections 600 and 601, and the Traffic Control Plans

shall be considered as included in the lump sum Bid price for "TRAFFIC CONTROL."

No separate or additional payment will be made for “No Parking” signs. Payment shall be considered as included in the lump sum Bid price for “TRAFFIC CONTROL.”

No separate or additional payment will be made for changeable message signs and flashing arrow signs. Payment shall be considered as included in the lump sum Bid price for “TRAFFIC CONTROL.”

LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS

AGREEMENT

Project Name LADERA PARK STORMWATER IMPROVEMENTS PROJECT
Project ID Number SWQ0000003

This Agreement, made and entered into this ____ day of _____, 20____, by and between the COUNTY OF LOS ANGELES, hereinafter called the Agency and _____, hereinafter called the Contractor.

W I T N E S S E T H:

1. Contractor's Services.

The Contractor, in consideration of the promises of the Agency hereinafter set forth, hereby agrees to furnish all tools, equipment, labor and material (except as specified in the Contract Documents hereinafter referred to), necessary to perform and complete in a good and workmanlike manner the construction of a storm drain system, filtration units, dry wells, infiltration galleries, slide gates, monitoring wells, landscaping, irrigation, electrical, and other incidental and appurtenant work at Ladera Park in the unincorporated community of Ladera Heights under Project ID No. SWQ0000003 and said work to be performed and completed in accordance with this Agreement, including the following "Contract Documents" which are hereby incorporated by reference into this Agreement and made a part hereof as though fully set forth herein:

a. Addendum(s) No(s). 1 (through __) for Project ID No. SWQ0000003.
b. Bid Proposal for Project ID No. SWQ0000003 submitted by the Contractor.
c. Special Provisions for Project ID No. SWQ0000003.
d. Plans for Project ID No. SWQ0000003.
e. Standard Plans published by the Los Angeles County Department of Public Works, 2000 Edition.
f. Standard Plans for Public Works Construction, 2012 Edition.
g. Standard Specifications for Public Works Construction ("Greenbook"), 2015 Edition.
h. Notice Inviting Bids for Project ID No. SWQ0000003.
i. Instructions to Bidders dated January 2013.

2. Prevailing Wage Rates.

The Contractor agrees to comply with the provisions of Sections 1771 and 1774 of the California Labor Code pertaining to the payment of prevailing wage rates, and to require each of its subcontractor to so comply. Pursuant to Section 1775 of the California Labor Code, the Contractor, and any of its subcontractor, shall forfeit to the Agency, and the Agency will withhold from any monies due the Contractor, the amount of any penalties, as determined by the Labor Commissioner, to be assessed for non-payment of prevailing wage rates.

Attached hereto (Exhibit A), State Prevailing Wages 2018-1, and made a part hereof, are the prevailing rate of per diem wages determined by the Labor Commissioner.

3. Payroll Records.

The Contractor agrees to comply with the provisions of Section 1776 of the California Labor Code pertaining to payroll records and will be responsible for compliance by its subcontractor(s).

4. Employment of Apprentices.

The Contractor agrees to comply with the provisions of Section 1777.5 of the California Labor Code relating to the employment of apprentices by the Contractor and its subcontractor(s).

5. Hours of Labor.

The Contractor agrees to comply with Sections 1810 through 1815 of the California Labor Code pertaining to the hours of labor and payment for such.

Pursuant to Section 1813 of the California Labor Code, the Contractor and any of its subcontractor, shall forfeit to the Agency, and the Agency will withhold from any monies due the Contractor, the amount of twenty-five dollars ($25) for each worker employed in the execution of the Contract by the Contractor or any of its subcontractor for each calendar day required or permitted to work more than 8 hours in any one calendar day and 40 hours in any one calendar week in violation of the provisions of the Sections 1810 through 1815 of the California Labor Code.

6. Workers' Compensation Insurance Certification.

The Contractor, as required by Section 1861 of the California Labor Code, agrees to the following statement:

"I am aware of the provisions of Section 3700 of the Labor Code which require every employer to be insured against liability for workers' compensation or to undertake self-insurance in accordance with the provisions of that code, and I will comply with such provisions before commencing the performance of the work of this Contract."

7. Assignment of Rights, Title, and Interest.

The Contractor agrees to comply with, and be responsible for compliance by its subcontractor with, the provisions of Section 7103.5 of the California Public Contract Code as follows:

"In entering into a public works Contract or a subcontract to supply goods, services, or materials pursuant to a public works Contract, the Contractor or subcontractor offers and agrees to assign to the awarding body all rights, title, and interest in and to all causes of action it may have under Section 4 of the Clayton Act (15 U.S.C. Sec. 15) or under the Cartwright Act (Chapter 2 [commencing with Section 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. This assignment shall be made and become effective at the time the awarding body tenders final payment to the Contractor, without further acknowledgement by the parties."

8. County Lobbyist Ordinance.

The Contractor and each County lobbyist or County lobbying firm as defined in Los Angeles County Code Section 2.160.010, retained by the Contractor, shall fully comply with the County Lobbyist Ordinance, Los Angeles County Code Chapter 2.160. Failure on the part of the Contractor or any County lobbyist or County lobbying firm retained by the Contractor to fully comply with the County Lobbyist Ordinance shall constitute a material breach of the Contract upon which the Agency may immediately terminate or suspend the Contract.

9. Employment of Aliens.

The Contractor shall warrant that it fully complies with all laws regarding employment of aliens and others, and that all of its employees performing services hereunder meet the citizenship or alien status requirements contained in Federal statutes and regulations including, but not limited to, the Immigration Reform and Control Act of 1986 (P.L. 99-603). When requested by the Engineer, this warrant shall be in writing to the Agency. The Contractor shall obtain, from all covered employees performing services hereunder, all verification and other documentation of employment eligibility status required by Federal statutes and regulations as they currently exist and as they may be hereafter amended. The Contractor shall retain such documentation for all covered employees for the period prescribed by law. The Contractor shall indemnify, defend, and hold harmless, the Agency, its officers and employees from employer sanctions and any other liability which may be assessed against the Contractor or the Agency or both in connection with any alleged violation of Federal statutes or regulations pertaining to the eligibility for employment of persons performing services under the Contract.

10. Prohibition Against Use of Child Labor.

The Contractor shall not knowingly supply to the Agency any products, goods, supplies or other personal property produced or manufactured in violation of child labor standards set by the International Labor Organization through its 1973 Convention Concerning Minimum Age for Employment.

The Contractor shall upon request by the Agency, identify the country/countries of origin of any products, goods, supplies or other personal property supplied to the Agency.

The Contractor shall upon request by the Agency, provide to the Agency the manufacturer's certification of compliance with all international child labor conventions.

Should the Agency discover that any products, goods, supplies or other personal property supplied by Contractor to County are produced in violation of any international child labor conventions, Contractor shall immediately provide an alternative, compliant source of supply.

Failure by Contractor to comply with the provisions of this clause will be grounds for immediate termination of this Agreement and award to an alternative Contractor.

11. Termination for Default.

The Agency may, by written notice to the Contractor, terminate the Contractor's right to proceed with the Work (or the separable part of the Work), if the Contractor refuses or fails (i) to commence the Work within the time required by the Contract, (ii) to prosecute the Work or any separable part with the diligence that will ensure completion within the time specified in the Contract, including any authorized extension, (iii) to provide sufficient and properly skilled workers or proper materials or equipment to complete the Work in an acceptable manner and without delay, (iv) to promptly pay its subcontractor, employees, and material suppliers, (v) to perform any of the Contractor's other obligations under this Contract, (vi) to complete the Work within the time specified in the Contract, or (vii) if the Contractor assigns or subcontracts any part of the Work without the Board's consent. Items (i) - (vii) inclusive are hereinafter referred to as "events of default". In this event, the Agency may take over the Work and complete it by Contract or otherwise, and may take possession of and use any material and equipment on the Work site necessary for completing the Work. The Contractor and the Surety shall be liable for any damages to the Agency resulting from events of default, whether or not the Contractor's right to proceed with the Work is terminated. This liability includes any increased costs incurred by the Agency in completing the Work.

The Contractor's right to proceed will not be terminated because of delays, nor will the Contractor be charged with damages under this subsection, if:

a. the delay in completing the Work arises from unforeseeable causes beyond the control and without the fault or negligence of the Contractor (examples of such causes include: (i) acts of God, (ii) acts of the public enemy, (iii) acts of the Agency in either its public or Contractual capacity, (iv) acts of another Contractor in the performance of a Contract with the Agency, (v) fires, (vi)

floods, (vii) epidemics, (viii) quarantine restrictions, (ix) strikes, (x) freight embargoes, (xi) unusually severe weather, or (xii) delays of subcontractor or suppliers at any tier arising from unforeseeable causes beyond the control and without the fault or negligence of both the Contractor and its subcontractor or suppliers); and,

b. the Contractor, within 14 calendar days from the beginning of any delay (unless extended by the Agency), notifies the Agency in writing of the causes of the delay. The Agency will ascertain the facts and the extent of the delay. If, in the judgment of the Agency, the findings warrant such action, the time for completing the Work may be extended by Change Order. The findings of the Agency will be final and conclusive on the parties.

If the Agency terminates the Contractor's right to proceed with the Work for any of the events of default, the Agency may serve written notice upon the Surety on its Faithful Performance Bond. The Surety shall, within 5 days, assume control and perform the Work as successor to the Contractor. If the Surety assumes any part of the Work, it shall take the Contractor's place in all respects for that part.

If the Surety does not assume control and perform the Work within 5 days after receiving notice of cancellation, or fails to continue to comply, the Agency may exclude the Surety from the Work site.

In the event of termination of its right to proceed, the Contractor will be paid for the value of the Work completed as of the date of the termination subject to the other terms of the Contract. For Contract Unit Price Bid items, the Contractor will be paid for the quantity of the item constructed. For lump sum Bid items, the Contractor will be paid for the percentage of the item constructed. No payment will be made for items not constructed in accordance with the Plans and Specifications. The amount of any prior progress payments, and any applicable Liquidated Damages will be withheld and deducted from any amounts due the Contractor. The amounts of outstanding Stop Notices or Labor Compliance notices to withhold will be withheld until the Stop Notices or notices to withhold are resolved as provided by law.

If, after termination of the Contractor's right to proceed, it is determined that the Contractor was not in default, or that the delay was excusable, the rights and obligations of the parties will be the same as if the termination had been issued for the convenience of the Agency.

The rights and remedies of the Agency in this subsection are in addition to any other rights and remedies provided by law or under this Contract. Time is of the essence for all delivery, performance, submittal, and completion dates in this Contract.

12. Termination for Convenience.

The Board may, whenever the interests of the Agency so require, terminate the Contract, in whole or in part, for the convenience of the Agency. The Agency will give written notice of the termination to the Contractor specifying the part of the Contract terminated and the date termination becomes effective.

The Contractor shall incur no further obligations in connection with the terminated Work, and, on the date set in the notice of termination, the Contractor shall stop Work to the extent specified. The Contractor shall also terminate outstanding orders and subcontracts as they relate to the terminated Work. The Contractor shall settle the liabilities and claims arising out of the termination of subcontracts and orders connected with the terminated Work. The Agency may direct the Contractor to assign the Contractor's right, title, and interest under the terminated orders or subcontracts to the Agency. The Contractor must still complete the Work not terminated by the notice of termination and may incur obligations as are necessary to do so.

The Agency may require the Contractor to transfer title and deliver to the Agency, in the manner and to the extent directed by the Agency, the fabricated or un-fabricated parts, Work in process, completed Work, supplies, and other material produced or acquired for the Work terminated and other property that, if the Contract had been completed, would be required to be furnished to the Agency. The Contractor shall, upon direction of the Agency, protect and preserve property in the possession of the Contractor in which the Agency has an interest. If the Agency does not exercise this right, the Contractor shall use its best efforts to sell such supplies and manufacturing materials for the benefit of the Agency.

If the parties are unable to agree on the amount of a termination settlement, the Agency will pay the Contractor the following amounts:

a. For Contract Work performed before the effective date of termination, the total (without duplication of any items) of:

   (i) the cost of work completed in accordance with the Plans and Specifications based on the quantity constructed and the Contract Unit Price or lump sum Bid price of the respective Bid item less prior progress payments, and any applicable Liquidated Damages and any other deductions or withholds to which the Agency may be entitled to in accordance with applicable law, including the amounts of outstanding Stop Notices or labor compliance notices to withhold shall be withheld until the Stop Notices or notices to withhold are resolved as provided by law.

   (ii) the cost of settling and paying terminated subcontracts and orders that are properly chargeable to the terminated portion of the Work;

b. The reasonable costs of effectuating the settlement of the Work terminated, including:

(i) accounting, clerical, and other expenses reasonably necessary for the preparation of termination settlement bids and supporting data;

(ii) the termination and settlement of subcontracts (excluding the amounts of such settlements); and

(iii) storage, transportation, and other costs incurred, reasonably necessary for the preservation, protection, or disposition of the termination inventory.

13. Termination for Improper Consideration.

The Agency may, by written notice to the Contractor, immediately terminate the right of the Contractor to proceed under the Contract if it is found that consideration, in any form, was offered or given by the Contractor, either directly or through an intermediary, to any Agency officer, employee or agent with the intent of securing the Contract or securing favorable treatment with respect to the award, amendment or extension of the Contract or the making of any determinations with respect to the Contractor's performance pursuant to the Contract. In the event of such termination, the Agency shall be entitled to pursue the same remedies against the Contractor as it could pursue in the event of default by the Contractor.

The Contractor shall immediately report any attempt by an Agency officer or employee to solicit such improper consideration. The report shall be made either to the Agency manager charge with the supervision of the employee or to the County Auditor-Controller's Employee Fraud Hotline at (213) 974-0914 or (800) 544-6861.

Among other items, such improper consideration may take the form of cash, discounts, service, the provision of travel or entertainment, or tangible gifts.

14. Agency's Quality Assurance Plan.

The Agency will evaluate the Contractor's performance under the Contract on not less than an annual basis. Such evaluation will include assessing the Contractor's compliance with the requirements of the Contract Documents. Contractor deficiencies which the Agency determines are severe or continuing, and that may place performance of the Contract in jeopardy if not corrected, will be reported to the Board. The report will include improvement/corrective action measures taken by the Agency and the Contractor. If improvement does not occur consistent with the corrective action measures, the Agency may terminate the Contract or impose other penalties as specified in the Agreement.

15. Resolution of Construction Claims.

Claims shall be resolved in accordance with Article 1.5 (commencing with Section 20104) of Chapter 1 of Part 3 of the Public Contract Code. All claims shall be in writing and shall include the documents necessary to substantiate the claim. Claims must be filed on or before the date of final payment.

For claims of less than $50,000, the Agency will respond in writing to any written claim within 45 Days of receipt of the claim, or may request, in writing, within 30 days of receipt of the claim, any additional documentation supporting the claim or relating to defenses or claims the Agency may have against the Contractor. If additional information is thereafter required, it shall be requested and provided pursuant to mutual agreement of the Agency and the Contractor. The Agency's written response to the claim, as further documented, will be submitted to the Contractor within 15 days after receipt of the further documentation or within a period of time no greater than that taken by the Contractor in producing the additional information, whichever is greater.

For claims of over $50,000 and less than or equal to $375,000, the Agency will respond in writing to all written claims within 60 days of receipt of the claim, or may request, in writing, within 30 Days of receipt of the claim, any additional documentation supporting the claim or relating to defenses or claims the Agency may have against the Contractor. If additional information is thereafter required, it shall be requested and provided pursuant to mutual agreement of the Agency and the Contractor. The Agency's written response to the claim, as further documented, will be submitted to the Contractor within 30 Days after receipt of the further documentation, or within a period of time no greater than that taken by the Contractor in producing the additional information or requested documentation, whichever is greater.

If the Contractor disputes the Agency's written response, or the Agency fails to respond within the time prescribed, the Contractor may so notify the Agency, in writing, either within 15 Days of receipt of the Agency's response or within 15 days of the Agency's failure to respond within the time prescribed, respectively, and demand an informal conference to meet and confer for settlement of the issues in dispute. Upon a demand, the Agency will schedule a meet and confer conference within 30 days for settlement of the dispute.

If following the meet and confer conference the claim or any portion remains in dispute, the Contractor may file a claim pursuant to Chapter 1 (commencing with Section 900) and Chapter 2 (commencing with Section 910) of Part 3 of Division 3.6 of Title 1 of the Government Code. For purposes of those provisions, the running of the period of time within which a claim must be filed shall be tolled from the time the Contractor submits its written claim until the time the claim is denied as a result of the meet and confer process, including any period of time utilized by the meet and confer process.

The following procedures apply for all civil actions filed to resolve claims subject to this subsection:

a) Within 60 days, but no earlier than 30 days, following the filing or responsive pleadings, the court will submit the matter to nonbinding mediation unless waived by mutual stipulation of both parties. The mediation process shall provide for the selection within 15 days by both parties of a disinterested third person as mediator, shall be commenced within 30 days of the submittal, and shall be concluded within 15 days from the commencement of the mediation unless a time requirement is extended upon a good cause showing to the court or by stipulation of both parties. If the parties fail to select a mediator within the 15-day period, any party may petition the court to appoint the mediator.

b) (1) If the matter remains in dispute, the case shall be submitted to judicial arbitration pursuant to Chapter 2.5 (commencing with Section 1141.10) of Title 3 of Part 3 of the Code of Civil Procedure, notwithstanding Section 1141.11 of that code. The Civil Discovery Act of 1986 [Article 3 (commencing with Section 2016) of Chapter 3 of Title 3 of Part 4 of the Code of Civil Procedure] shall apply to any proceeding brought under this subdivision consistent with the rules pertaining to judicial arbitration.

(2) Notwithstanding any other provision of law, upon stipulation of the parties, arbitrators appointed for purposes of this article shall be experienced in construction law, and upon stipulation of the parties, mediators and arbitrators shall be paid necessary and reasonable hourly rates of pay not to exceed their customary rate, and such fees and expenses shall be paid equally by the parties, except in the case of arbitration where the arbitrator, for good cause, determines a different division. In no event shall these fees or expenses be paid by State or County funds.

(3) In addition to Chapter 2.5 (commencing with Section 1141.10) of Title 3 of Part 3 of the Code of Civil Procedure, any party who after receiving an arbitration award requests a trial de novo but does not obtain a more favorable judgment shall, in addition to payment of costs and fees under that chapter, pay the attorney's fees of the other party arising out of trial de novo.

c) The court may, upon request by any party, order any witnesses to participate in the mediation or arbitration process.

16. County Child Support Compliance Program.

The Contractor shall acknowledge that the County has established a goal of ensuring that all individuals who benefit financially from the Agency through Contracts are in compliance with their court-ordered child, family, and spousal support obligations in order to mitigate the economic burden otherwise imposed upon the County and its taxpayers.

As required by the County's Child Support Compliance Program (County Code Chapter 2.200) and without limiting the Contractor's requirements under the Contract to comply with all applicable provisions of law, the Contractor warrants that it is now in compliance, and shall during the duration of the Contract, maintain compliance with employment and wage reporting requirements as required by the Federal Social Security Act (42 USC Section 653a) and California Unemployment Insurance Code- Section 1088.5, and shall implement all lawfully served Wage and Earnings Withholdings Orders or Child Support Services Department (CSSD) Notices of Wage and Earnings Assignment for Child, Family, or Spousal Support, pursuant to Code of Civil Procedure Section 706.031 and Family Code Section 5246(b).

17. Termination for Failure to Comply with Child Support Compliance Program Requirements.

If the CSSD finds that a Contractor is not in compliance with a lawfully served earnings assignment order or income withholding order, as self-certified in the Contract, CSSD will send notice to the contracting department for commencement of termination or debarment procedures. Further, CSSD will enter the name of the non-compliant Contractor in the Child Support Compliance Program Intranet Web Site at http://cssd.lacounty.gov/compliance-program/.

18. Termination for Breach of Warranty to Maintain Compliance with the County's Child Support Compliance Program.

Failure of the Contractor to maintain compliance with the requirements of the County Child Support Compliance Program shall constitute default under the Contract. Without limiting the rights and remedies available to the Agency under any other provisions of the Contract, failure of the Contractor to cure such default within 90 calendar days of written notice shall be grounds upon which the Agency may terminate the Contract and/or pursue debarment of the Contractor pursuant to County Code Chapter 2.202.

19. Defaulted Property Tax Reduction Program.

The Contractor shall acknowledge that the County has established a goal of ensuring that all individuals who benefit financially from the Agency through Contracts are current in paying their property tax obligations (secured and unsecured roll) in order to mitigate the economic burden otherwise imposed upon the County and its taxpayers, or are exempt therefrom.

As required by the County's Defaulted Property Tax Reduction Program, "Defaulted Tax Program" (County Code Chapter 2.206), and without limiting the Contractor's requirements under the Contract to comply with all applicable provisions of law, and unless the Contractor qualifies for an exemption or exclusion, the Contractor warrants and certifies that to the best of its knowledge it is now in compliance, and during the term of the Contract, will maintain compliance with Los Angeles County Code 2.206.

20. Termination for Breach of Warranty to Maintain Compliance with the County's Defaulted Property Tax Reduction Program.

Failure of the Contractor to maintain compliance with the requirements of the County's Defaulted Tax Program shall constitute default under the Contract. Without limiting the rights and remedies available to the Agency under any other provisions of the Contract, failure of the Contractor to cure such default within 10 business days of written notice shall be grounds upon which the Agency may terminate the Contract and/or pursue debarment of the Contractor pursuant to County Code Chapter 2.202.

21. Recycled Paper.

Consistent with the Board policy to reduce the amount of solid waste deposited at the County landfills, the Contractor shall use recycled paper to the maximum extent possible throughout the duration of the Contract.

22. Contractor Responsibility and Debarment.

a. A responsible Contractor is a Contractor who has demonstrated the attribute of trustworthiness, as well as quality, fitness, capacity and experience to satisfactorily perform the Contract. It is the Agency's policy to conduct business only with responsible Contractors.

b. The Contractor is hereby notified that, in accordance with Chapter 2.202 of the County Code, if the Agency acquires information concerning the performance of the Contractor on this or other Contracts which indicates that the Contractor is not responsible, the Agency may, in addition to other remedies provided in the Contract, debar the Contractor from bidding or proposing on, or being awarded, and/or performing work on County or Agency Contracts for a specified period of time, which generally will not exceed 5 years but may exceed 5 years or be permanent if warranted by the circumstances, and terminate any or all existing Contracts the Contractor may have with the Agency.

c. The Agency may debar a Contractor, if the Board of Supervisors in its discretion, finds, that the Contractor has done any of the following: (i) violated any term of a Contract with the County, the Agency, or a nonprofit corporation created by the County; (ii) committed an act or omission which negatively reflects on the Contractor's quality, fitness, or capacity to perform a Contract with the County, the Agency, any other public entity, or a nonprofit corporation created by the County, or engaged in a pattern or practice which negatively reflects on same; (iii) committed an act or offense which indicates a lack of business integrity or business honesty, or (iv) made or submitted a false claim against the County, the Agency, or any other public entity.

d. If there is evidence that the Contractor may be subject to debarment, the Agency will notify the Contractor in writing of the evidence which is the basis for the proposed debarment and will advise the Contractor of the scheduled date for a debarment hearing before the Contractor Hearing Board.

e. The Contractor Hearing Board will conduct a hearing where evidence on the proposed debarment is presented. The Contractor and/or the Contractor's representative shall be given an opportunity to submit evidence at that hearing. After the hearing, the Contractor Hearing Board shall prepare a tentative proposed decision, which shall contain a recommendation regarding whether the Contractor should be debarred, and, if so, the appropriate length of time of the debarment. The Contractor and the Agency shall be provided an opportunity to object to the tentative proposed decision prior to its presentation to the Board of Supervisors.

f. After consideration of any objections, or if no objections are submitted, a record of the hearing, the proposed decision and any other recommendation of the Contractor Hearing Board shall be presented to the Board of Supervisors. The Board of Supervisors shall have the right to modify, deny, or adopt the proposed decision and recommendation of the Contractor Hearing Board.

g. If a Contractor has been debarred for a period longer than 5 years, that Contractor may, after the debarment has been in effect for at least 5 years, submit a written request for review of the debarment determination to reduce the period of debarment or terminate the debarment. The Agency may, in its discretion, reduce the period of debarment or terminate the debarment if it finds that the Contractor has adequately demonstrated one or more of the following: (i) elimination of the grounds for which the debarment was imposed; (ii) a bona fide change in Agency-ship or management; (iii) material evidence discovered after debarment was imposed; or (iv) any other reason that is in the best interests of the Agency.

h. The Contractor Hearing Board will consider a request for review of a debarment determination only where (i) the Contractor has been debarred for a period longer than 5 years; (ii) the debarment has been in effect for at least 5 years; and (iii) the request is in writing, states one or more of the grounds for reduction of the debarment period or termination of the debarment, and includes supporting documentation. Upon receiving an appropriate request, the Contractor Hearing Board will provide notice of the hearing on the request. At the hearing, the Contractor Hearing Board shall conduct a hearing where evidence on the proposed reduction of debarment period or termination of debarment is presented. This hearing shall be conducted and the request for review decided by the Contractor Hearing Board pursuant to the same procedures as for a debarment hearing.

i. The Contractor Hearing Board's proposed decision shall contain a recommendation on the request to reduce the period of debarment or terminate the debarment. The Contractor Hearing Board shall present its proposed decision and recommendation to the Board of Supervisors. The Board of Supervisors shall have the right to modify, deny, or adopt the proposed decision and recommendation of the Contractor Hearing Board.

j. These terms shall also apply to subcontractor of the Contractor.

23. Jury Service Program.

a. General. This Contract is subject to the provisions of the Contractor Employee Jury Service Ordinance ("Jury Service Program") as codified in Sections 2.203.010 through 2.203.090 of the Los Angeles County Code.

b. Written Employee Jury Service Policy. Unless the Contractor has demonstrated to the Agency's satisfaction either that the Contractor is not a "Contractor" as defined under the Jury Service Program (Section 2.203.020 of the County Code) or that the Contractor qualifies for an exception to the Jury Service Program (Section 2.203.070 of the County Code), the Contractor shall have and adhere to a written policy that provides that its employees shall receive from the Contractor, on an annual basis, no less than five days of regular pay for actual jury service. The policy may provide that employees deposit any fees received for such jury service with the Contractor or that the Contractor deduct from the employee's regular pay the fees received for jury service.

   For purposes of this subsection, "Contractor" shall mean a person, partnership, corporation or other entity which has a Contract with the Agency or a subcontract with an Agency Contractor and has received or will receive an aggregate sum of $50,000 or more in any 12-month period under one or more Agency Contracts or subcontracts. "Employee" shall mean any California resident who is a full time employee of the Contractor. "Full time" means 40 hours or more worked per week, or a lesser number of hours if the lesser number is a recognized industry standard and is approved as such by the Agency. If the Contractor uses any subcontractor to perform services for the Agency under the Contract, the subcontractor shall also be subject to the provisions of this subsection. The provisions of this subsection shall be inserted into any such subcontract agreement and a copy of the Jury Service Program shall be attached to the agreement.

c. Change in Contractor Status. If the Contractor is not required to comply with the Jury Service Program when the Contract commences, the Contractor shall have a continuing obligation to review the applicability of its "exception status" from the Jury Service Program, and the Contractor shall immediately notify the Agency if the Contractor at any time either comes within the Jury Service Program's definition of "Contractor" or if the Contractor no longer qualifies for an exception to the Program. In either event, the Contractor shall immediately implement a written policy consistent with the Jury Service Program. The Agency may also require, at any time during the Contract and at its sole discretion, that the Contractor demonstrate to the Agency's satisfaction the Contractor either continues to remain outside of the Jury Service Program's definition of "Contractor" and/or that the Contractor continues to qualify for an exception to the Program.

d. Noncompliance. The Contractor's noncompliance with this subsection may constitute a material breach of the Contract. In the event of such material breach, the Agency may, in its sole discretion, terminate the Contract and/or bar the Contractor from the award of future Agency Contracts for a period of time consistent with the seriousness of the breach.

24. Federal Earned Income Credit Notification.

The Contractor shall notify its employees, and shall require each subcontractor to notify its employees, that they may be eligible for the Federal Earned Income Credit under the Federal income tax laws. Such notice shall be provided in accordance with the requirements set forth in Internal Revenue Service Notice 1015.

25. Safely Surrendered Baby Law.

The Contractor shall notify and provide to its employees, and shall require each subcontractor to notify and provide to its employees, a fact sheet regarding the Safely Surrendered Baby Law, its implementation in the County, and where and how to safely surrender a baby. The fact sheet is available on the Internet at www.babysafela.org for printing purposes.

The Contractor acknowledges that the County places a high priority on the implementation of the Safely Surrendered Baby Law. The Contractor understands that it is the County's policy to encourage all County Contractors to voluntarily post the County's "Safely Surrendered Baby Law" poster in a prominent position at the Contractor's place of business. The Contractor shall also encourage its subcontractor, if any, to post this poster in a prominent position in the subcontractor's place of business. The County's Department of Children and Family Services will supply the Contractor with the poster to be used.

26. Indemnification.

Notwithstanding any other provision in this Agreement, The Contractor shall indemnify, defend and hold harmless the County, its Special Districts, elected and appointed officers, employees, agents and volunteers ("County Indemnitees") from and against any and all liability, including but not limited to demands, claims, actions, fees, costs and expenses (including attorney and expert witness fees), arising from and/or relating to this Contract, except for such loss or damage arising from the sole negligence or willful misconduct of the County Indemnitees.

27. Cancellation of or Changes in Insurance.

The Contractor shall provide the Agency with, or the Contractor's insurance policies shall contain a provision that the Agency shall receive, written notice of cancellation or any change in the insurance required in the Specifications, including insurer, limits of coverage, term of coverage, or policy period. The written notice shall be provided to the Agency at least ten (10) days in advance of cancellation for non-payment of premium and thirty (30) days in advance for any other cancellation or policy change. Failure to provide written notice of cancellation or any change in the insurance required in the Specifications may constitute a material breach of the Contract, in the sole discretion of the Agency, upon which the Agency may suspend or terminate the Contract.

28. Failure to Maintain Insurance.

The Contractor's failure to maintain or provide acceptable evidence that it maintains the insurance required in the Specifications shall constitute a material breach of the Contract, upon which the Agency may immediately withhold payments due to the Contractor, and/or suspend or terminate the Contract. The Agency, at its sole discretion, may obtain damages from the Contractor resulting from said breach. Alternatively, the Agency may purchase the insurance required in the Specifications and, without further notice to the Contractor, deduct the premium cost from sums due to the Contractor or pursue reimbursement from the Contractor.

29. Compliance with County's Zero Tolerance Policy on Human Trafficking

Contractor acknowledges that the County has established a Zero Tolerance Policy on Human Trafficking prohibiting contractors from engaging in human trafficking.

If the Contractor or a member of the Contractor's staff is convicted of a human trafficking offense, the County shall require that the Contractor or member of Contractor's staff be removed immediately from performing services under the Contract. County will not be under any obligation to disclose confidential information regarding the offenses other than those required by law.

Disqualification of any member of Contractor's staff pursuant to this paragraph shall not relieve Contractor of its obligation to complete all work in accordance with the terms and conditions of this Contract

30. Consideration of Hiring County Employees Targeted for Layoff.

Should the Contractor, or any subcontractor performing more than $250,000 of the Contract Price, require additional or replacement personnel to perform services under this Contract other than the performance of a skilled trade, the Contractor or subcontractor shall give first consideration for such employment openings to qualified County employees who are targeted for layoff or qualified former County employees who are on a re-employment list.

Should the Contractor, or any subcontractor performing more than $250,000 of the Contract Price, require additional or replacement personnel to perform a skilled trade not covered by an existing union hiring agreement under this Contract, the Contractor is encouraged to consider for such employment openings qualified County employees who are targeted for layoff or qualified former County employees who are on a re-employment list. In no event shall the Agency be liable for any cost, delay or impact claims arising out of efforts to hire such present and former County employees.

31. Consideration of Hiring Participants in GAIN and GROW Programs.

Should the Contractor require additional or replacement personnel after the effective date of the Contract, the Contractor shall give consideration for any such employment openings to participants in the County Department of Public Social Services (DPSS) Greater Avenues for Independence (GAIN) and General Relief Opportunities for Work (GROW) Programs who meet the Contractor's minimum qualifications for the open position. DPSS will refer GAIN/GROW participants by job category to the Contractor.

32. County Equal Employment Opportunity (EEO) Provisions.

During the performance of this Contract, the Contractor agrees as follows:

a. The Contractor shall not discriminate against any employee or applicant for employment because of race, color, religion, sex or national origin. The Contractor certifies and agrees that all persons employed by such firm, its affiliates, subsidiaries, or holding companies are and will be treated equally by the firm without regard to or because of race, color, religion, sex or national origin and in compliance with all antidiscrimination laws of the United States of America and the State of California.

b. In all advertisements for labor or other personnel, or requests for employment of any nature, the Contractor shall state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex or national origin.

c. The Contractor shall deal with its subcontractor without regard to or because of race, color, religion, sex or national origin.

d. The Contractor shall comply with current Federal employment and reporting requirements for County funded construction Contracts. Specifically, the Contractor shall make a good faith effort to comply with Federal employment goals for minority and female employment. The Contractor shall report minority and female employment data on the Federal form provided by the Agency.

   This form shall be submitted to the Engineer before the start of construction and twice annually by March 1 and September 1 of each year. Each failure to submit this form by due date will result in a Contractor penalty of $200, which shall be deducted from any monies due the Contractor.

e. The Contractor shall send to each labor union or representative of workers with which it has a collective bargaining agreement or other Contract or understanding, a notice, to be provided by the Agency, advising the said labor union or worker's representative of the Contractor's commitments under this subsection.

f. The Contractor shall allow the Agency access to its employment records during regular business hours to verify compliance with these provisions when so requested by the Agency.

g. The Contractor agrees that if the Agency finds that any of the above provisions have been violated, the same shall constitute a material breach of the Contract upon which the Agency may determine to cancel, terminate or suspend the Contract. While the Agency reserves the right to determine independently that the antidiscrimination provisions of the Contract have been violated, in addition, a determination by the Federal Equal Employment Opportunity Commission or the California Fair Employment and Housing Commission that the Contractor has violated Federal or State antidiscrimination laws may constitute a finding by the Agency that the Contractor has violated the antidiscrimination provisions of the Contract.

h. The Contractor must ensure that facilities provided for employees are provided in such a manner that segregation on the basis of race, color, religion, sex or national origin cannot result. The Contractor may neither require such segregated use by written or oral policies nor tolerate such use by employee custom. The Contractor's obligation extends further to ensuring that its employees are not assigned to perform their services at any location, under the Contractor's control, where the facilities are segregated. This obligation extends to all Contracts containing the equal opportunity clause regardless of the amount of the Contract. The term "facilities," as used in this section, means waiting rooms, work areas, restaurants and other eating areas, time clocks, restrooms, wash rooms, locker rooms, and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing provided for employees; *Provided*, That separate or single-user restrooms and necessary dressing or sleeping areas shall be provided to assure privacy between the sexes.
The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the provisions of non-discrimination clause.

At its option, and in lieu of canceling, terminating or suspending the Contract, the County may impose damages for any violation of the antidiscrimination provisions of this subsection, in the amount of $200.00 for each violation found and determined. The County and the Contractor specifically agree that the aforesaid amount shall be imposed as liquidated damages, and not as a forfeiture or penalty. It is further specifically agreed that the aforesaid amount is presumed to be the amount of damages sustained by reason of any such violation, because, from the circumstances and the nature of the violation, it is impracticable and extremely difficult to fix actual damages.

i. The Contractor shall include the provisions of the foregoing paragraphs 1 through 8 in every subcontract over $10,000.00, so that such provisions will be binding upon each subcontractor performing work required by the Contract.

33. Local Small Business Enterprise Program.

The Contract is subject to the provisions of the County's ordinance entitled "Local Small Business Enterprise Program," as codified in Chapter 2.204 of the Los Angeles County Code.

The Contractor shall not knowingly and with the intent to defraud, fraudulently obtain, retain, attempt to obtain or retain, or aid another in fraudulently obtaining or retaining or attempting to obtain or retain certification as a Local Small Business Enterprise.

The Contractor shall not willfully and knowingly make a false statement with the intent to defraud, whether by affidavit, report, or other representation, to a County official or employee for the purpose of influencing the certification or denial of certification of any entity as a Local Small Business Enterprise.

If the Contractor has obtained County certification as a Local Small Business Enterprise by reason of having furnished incorrect supporting information or by reason of having withheld information, and which knew, or should have known, the information furnished was incorrect or the information withheld was relevant to its request for certification, and which, by reason of such certification has been awarded this Contract to which it would not otherwise have been entitled, shall:

a. Pay to the Agency any difference between the Contract Price and what the Agency's costs would have been if the Contract had been properly awarded;
b. In addition to the amount described above, be assessed a penalty in an amount of not more than 10 percent of the amount of the Contract; and
c. Be subject to the provisions of Chapter 2.202 of the Los Angeles County Code (Determinations of Contractor Non-Responsibility and Contractor Debarment).

The above penalties shall also apply if the Contractor is no longer eligible for certification as a result in a change of their status and the Contractor failed to notify the State and the County's Internal Services Department (Purchasing & Contracts) of this information.

34. Audits and Records.

The Contractor shall maintain all data and records pertinent to the Work performed under the Contract, in accordance with generally accepted accounting principles, and shall preserve and make available all data and records until the expiration of 4 years from the date of final payment under the Contract, or for such longer period, if any, as is required by applicable statute or by other provisions of the Contract. The authorized representatives of the Agency shall have access to all such data and records for such time period to inspect, audit and make copies thereof during normal business hours. The Contractor shall covenant and agree that it shall require any subcontractor utilized in the performance of the Contract to permit the authorized representatives of the Agency, to similarly inspect and audit all data and records of said subcontractor relating to the performance of said subcontractor under the Contract for the same time period.

35. County Maintained Contractor Performance History Databases.

The County maintains databases that track/monitor contractor performance history. Information entered into such databases may be used for a variety of purposes, including determining whether a bidder is responsible for the purposes of a future County contract.

36. Payment.

The Agency agrees, in consideration of the performance of this Contract, to pay to the Contractor, and the Contractor agrees to accept in full satisfaction of the work done hereunder, subject to additions and deductions as provide for in the Contract Documents, the following amounts at the time and in the manner set forth in the Contract Documents:

LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS
SCHEDULE OF PRICES

CONTRACT ID NO. SWQ0000003
CONTRACT NAME GATES CANYON STORMWATER IMPROVEMENTS PROJECT

Item	Description	Unit	Quantity	Unit Price	Amount

IN WITNESS WHEREOF, the Agency has, by order of its Board of Supervisors, caused this Contract to be signed by the County Director of Public Works or her designee and the Contractor has signed the same on the day, month, and year hereinabove first written.

MARK PESTRELLA
DIRECTOR OF PUBLIC WORKS
COUNTY OF LOS ANGELES

By _____
Deputy Director

APPROVED AS TO FORM

MARY C. WICKHAM
County Counsel

a corporation

By _____
Deputy

By _____
President

_____
Print Name

By _____
Secretary

_____
Print Name

IV:
ALL SIGNATURES MUST BE WITNESSED BY NOTARY
(Attach appropriate acknowledgment)

LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS
BOND FOR FAITHFUL PERFORMANCE

KNOW ALL MEN BY THESE PRESENTS:

That we, XXXXX, as principal, and _____ as surety, are held and firmly bound unto the COUNTY OF LOS ANGELES, State of California, in the sum of XXX AND 100 Dollars ($ 000), lawful money of the United States, for the payment of which sum, well and truly to be made, we bind ourselves, jointly and severally, firmly by these presents.

The condition of the above obligation is such that whereas said principal has been awarded and is about to enter into a written Contract with the County of Los Angeles for the work described in PIN# XXX, XXXXX which is attached hereto, made a part hereof, and to which reference is hereby made for all particulars, and is required by said County to give this bond in connection with the execution of said Contract;

NOW, THEREFORE, if the said principal shall well and truly do and perform all of the covenants and obligations of said Contract on principal's part to be done and performed at the times and in the manner specified therein, then this obligation shall be null and void, otherwise it shall be and remain in full force and effect. No premature payment by said County to said principal shall exonerate any surety unless the Board of Supervisors of said County shall have actual notice that such payment is premature at the time it is ordered by said Board, and then only to the extent that such payment shall result in loss to such surety, but in no event more than the amount of such premature payment.

It is agreed, that any alterations in the work to be done, or increase or decrease of the material to be furnished, which may be made pursuant to the terms of said Contract shall not in any way release either the principal or surety hereunder, nor shall any extensions of time granted under the provisions of said Contract release either the principal or surety, and notice of such alterations or extensions of the Contract is hereby waived by the surety. The provisions of Section 2845 of the Civil Code are not a condition precedent to the SURETY'S obligation hereunder and are waived by the SURETY.

WITNESS our hands this _____ day of _____ , 20 _____

_____

Surety

a corporation

_____

By President

_____

Print Name

_____

By Secretary

_____

Print Name

ALL SIGNATURES MUST BE WITNESSED BY NOTARY
(Attach appropriate acknowledgment)

LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS
PAYMENT BOND
(FOR LABOR AND MATERIAL)

KNOW ALL MEN BY THESE PRESENTS:

That we, XXXXX, as principal, and _____ as surety, are held and firmly bound unto the COUNTY OF LOS ANGELES, State of California, in the sum of XXX AND 100 Dollars ($ 000), lawful money of the United States, for the payment of which sum, well and truly to be made, we bind ourselves, jointly and severally, firmly by these presents.

The condition of the above obligation is such that whereas said principal has been awarded and is about to enter into a written Contract with the County of Los Angeles for the work described in PIN# XXX, XXXXX which is attached hereto, made a part hereof, and to which reference is hereby made for all particulars, and is required by said County to give this bond in connection with the execution of said Contract;

NOW, THEREFORE, if said principal, as Contractor in said Contract, or principal's subcontractor, fails to pay any of the persons referred to in Section 9100 of the Civil Code of the State of California for labor performed, skills or other necessary services bestowed, site improvement made, equipment leased, or appliances, equipment implements, machinery, materials, power, provender, provisions, teams, or trucks furnished or used in, upon, for, or about the performance of the work Contracted to be done, or for amounts due under the Unemployment Insurance Code with respect to work or labor performed by any such claimant, said surety shall pay for the same, in an amount not exceeding the sum specified above; and if suit is brought upon this bond, a reasonable attorney's fee to be fixed by the court. This bond is executed pursuant to the provisions of Ch 5 of Div 4, Pt 6, Tit 3, of the Civil Code of the State of California, and shall inure to the benefit of any of the persons referred to in said Civil Code Section 9100, as it now exists or may hereafter be amended, so as to give a right of action to such persons or their assigns in any suit brought upon this bond. No premature payment by said County to said principal shall exonerate any surety unless the Board of Supervisors of said County shall have actual notice that such payment is premature at the time and it is ordered by said Board, and then only to the extent that such payment shall result in loss to such surety, but in no event more than the amount of such premature payment.

It is agreed, that any alterations in the work to be done, or increase or decrease of the material to be furnished, which may be made pursuant to the terms of said Contract shall not in any way release either the principal or surety hereunder, nor shall any extensions of time granted under the provisions of said Contract release either the principal or surety, and notice of such alterations or extensions of the Contract is hereby waived by the surety. The provisions of Section 2845 of the Civil Code are not a condition precedent to the SURETY'S obligation hereunder and are waived by the SURETY.

WITNESS our hands this _____ day of _____ , 20 _____

_____

a corporation

_____

Surety

_____

By President

_____

Print Name

_____

By Secretary

_____

Print Name

ALL SIGNATURES MUST BE WITNESSED BY NOTARY
(Attach appropriate acknowledgment)
O:\Contract Documents\