



**Contract Documents and
Specifications**
for
River Park Project

Account Nos.: 471-213-4792-9505
BLD2025-04799, GRA2025-04067, SGN2025-00163

Fiscal Year 2026-27
Carlos Castellanos, P.E. - City Engineer

Community Services Department
& Department of Public Works
Anaheim, California

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SPECIAL NOTICE

This project is partially funded with Federal and State money granted by the **Land and Water Conservation Fund (LWCF), Rivers and Mountains Conservancy (RMC), State Coastal Conservancy (SCC) and Environmental Enhancement and Mitigation Program (EEMP)**

The awarded Contractor and subcontractors are subject to Federal and State policies and requirements mandated by the grantors. Refer to the Agreement for applicable policies and requirements.

AGREEMENT FOR PUBLIC WORK

THIS AGREEMENT FOR PUBLIC WORK is made and entered into by and between the

CITY OF ANAHEIM, a municipal corporation,
organized pursuant to a freeholder's charter,
hereinafter referred to as "CITY,"

A
N
D

hereinafter referred to as "CONTRACTOR."

W I T N E S S E T H:

WHEREAS, the City Council of the City of Anaheim has heretofore by resolution, duly passed and adopted, approved and authorized the construction of the public improvement (Project) described in Exhibit A (which Exhibit A is incorporated by reference herein) in accordance with the design, plans, profiles, drawings and/or specifications as prepared; and

WHEREAS, the City Council of the City of Anaheim duly caused to be published a notice as required by law on the Publication Dates (set forth in Exhibit A) inviting sealed proposals for the furnishing of all plant, labor, services, materials, and equipment, and all utilities and transportation, including power, fuel and water, and performing all work necessary to construct and complete in a good and workmanlike manner, in strict accordance with said plans and specifications on file in the Office of the City Clerk of the City of Anaheim of Project, which notice specified that such sealed proposals would be received at the Office of the City Clerk up to the hour of 2:00 o'clock P.M., on the Bid Opening Date set forth in Exhibit A and would be opened on said date at the hour of 2:00 o'clock P.M., in public, in the City Council Chamber in the City Hall, City of Anaheim, State of California, by the City Clerk and the City Engineer, and the result of the said sealed proposals tabulated by the City Engineer and reported to the City Council for its consideration at a meeting held no later than thirty (30) days after the bids were opened; and

WHEREAS, said notice did state and declare that pursuant to the provisions of Section 1770 of the Labor Code, the Director of the Department of Industrial Relations had ascertained the prevailing rate of wages in the locality in which this type of labor is to be performed, for each craft or type of workman or mechanic needed to execute the Agreement, and did state that the prevailing hourly wage scale so ascertained can be found on the following websites: <http://www.dir.ca.gov/dlsr/DPrewageDetermination.htm> and <http://www.wdol.gov/dba.aspx#0>; and

WHEREAS, the City Engineer did thereupon duly tabulate all of the sealed proposals so received and did make a report to the City Council; and

WHEREAS, the City Council of the City of Anaheim did, at a subsequent regular or adjourned regular meeting held on the Award Date (set forth in Exhibit A), find that the sealed proposal of CONTRACTOR for furnishing of all plant, labor, services, materials and equipment and all utilities and transportation, including power, fuel and water, and performing all work necessary to construct and complete the Project in strict accordance with the design, plans, profiles and specifications for said Project prepared by Designer and on file in the Office of the City Clerk of the City of Anaheim was the lowest responsible proposal submitted for the furnishing of said plant, labor services, materials and equipment, and all utilities and transportation, including power, fuel and water and performing all work necessary for the construction of said Project as specified in the notice inviting sealed proposals; and

WHEREAS, the City Council of the City of Anaheim did, on the Award Date, adopt the Award Resolution accepting the sealed proposal of, and awarding to, CONTRACTOR, the Agreement to furnish all of said plant, labor, services, materials and equipment, and all utilities and transportation, including power, fuel and water, and perform all work necessary to construct and complete the herein above described Project in strict accordance with the design, plans, profiles and specifications for said Project prepared by Designer, and on file in the Office of the City Clerk of the City of Anaheim for the construction and completion of said Project above described in accordance with the notice inviting sealed proposals, the plans and specifications, the instructions to bidders, and in accordance with the written Agreement to be made and entered into by and between CITY and CONTRACTOR, a copy of which is on file in the Office of the City Clerk of the City of Anaheim.

NOW, THEREFORE, FOR AND IN CONSIDERATION OF THE PROMISES, COVENANTS AND CONDITIONS HEREIN CONTAINED, THE PARTIES HERETO AGREE AS FOLLOWS:

FIRST: That the complete Agreement shall consist of and include the following documents, all of which, from 2 to 14 inclusive, shall be, and are hereby incorporated by reference and made a part hereof as fully as if set out in full herein:

1. This Agreement.
2. The resolution adopted by the City Council of the City of Anaheim approving the design, plans and specifications for said Project prepared by Designer and authorizing and approving the construction thereof, together with all addenda thereto and modifications incorporated therein prior to the opening of bids.
3. The notice inviting sealed proposals published by the City of Anaheim on the Publication Dates (set forth in Exhibit A).
4. The Instruction to Bidders.
5. The Bid Proposal.

6. The accepted proposal.
7. The design, plans, profiles, drawings and the general specifications and the detail specifications and drawings and all addenda thereto and all modifications incorporated therein prior to the date of the opening of bids as prepared by Designer and on file in the Office of the City Clerk of the City of Anaheim.
8. The Award Resolution adopted by the City of Anaheim, accepting the sealed proposal of CONTRACTOR and awarding the Agreement for the Project.
9. The Bid Security Form for check or bond.
10. The Faithful Performance Bond.
11. The Labor and Material Bond.
12. The Non-Collusion Declaration.
13. The Insurance policies, endorsements and certificates.

All Agreement documents and plans are intended to be consistent one with the other so that any document or plan called for in any document or plan but not mentioned in any other document or plan is to be executed the same as if mentioned in all agreement documents and set forth in the specifications and drawings.

SECOND: The said CONTRACTOR agrees to furnish all tools, equipment, apparatus, facilities, plant, labor, services and materials and all utilities and transportation, including power, fuel and water, and to perform all work necessary to construct and complete in a good and workman like manner said Project herein above mentioned and particularly described, together with the appurtenances thereto, at the location specified in the general and detail plans and specifications and in the manner designated and in strict conformity with the notice inviting sealed proposals, the proposal submitted and accepted, and said general and detail plans and specifications adopted by the City Council of the City of Anaheim as aforesaid, and all Agreement documents herein above referred to. It is understood and agreed that all said plant, labor, services, materials and equipment shall be furnished and said work performed and completed by CONTRACTOR as an independent contractor, subject to the inspection and approval of CITY, its City Engineer, Field Engineers or Inspectors or their representatives.

THIRD: For and in consideration of the furnishing by said CONTRACTOR as herein provided of said tools, equipment, apparatus, facilities, plant, labor, services and materials, and utilities and transportation, including power, fuel and water and the performing of all work for the construction, installation and completion in strict accordance with the plans and specifications herein above referred to and the Agreement documents of said Project as herein above described together with the appurtenances thereto, said contractor shall be entitled and shall be paid by CITY, and CONTRACTOR agrees to accept in full satisfaction therefore the sum (Contract Price) (Set forth in Exhibit A), subject to any additions thereto or deductions therefrom which may be made in accordance with the provisions of the agreement documents,

which contract price shall be paid at the times and in the manner set forth in the specifications and addenda thereto or modifications thereof prepared by Designer prior to opening of bids.

FOURTH: CONTRACTOR agrees that CONTRACTOR will pay to every laborer or mechanic employed by CONTRACTOR no less than the prevailing rate of per diem wages and rates for work, which latest rates are promulgated on the following websites: <http://www.dir.ca.gov/dlsr/DPre wageDetermination.htm> and <http://www.wdol.gove/dba.aspx#0>, and which prevailing rates or wages so ascertained and determined and so specified are incorporated herein by reference and made a part hereof the same as though set out in full herein,

Pursuant to the provisions of Section 1775 of the Labor Code of the State of California, CONTRACTOR shall forfeit as a penalty to CITY the sum of Twenty-Five Dollars (\$25.00) for each calendar day or portion thereof for each laborer, workman or mechanic employed and paid less than the stipulated rates for any work done under the Agreement by CONTRACTOR or any subcontractor under CONTRACTOR in violation of the provisions of this Agreement.

CONTRACTOR agrees to comply with the provisions of Section 1777.5 of the Labor Code of the State of California.

FIFTH: Eight (8) hours of labor shall constitute a legal day's work upon all work done hereunder, and it is expressly stipulated that no workman employed at any time by CONTRACTOR or by any subcontractor under this Agreement upon the work or upon any part of the work contemplated by this Agreement shall be required or permitted to work thereon any more than eight (8) hours in any one day except as provided in Sections 1810 to 1815, inclusive, of the Labor Code of California, all of the provisions whereof are deemed to be incorporated herein. It is further expressly stipulated that for each and every violation of said last named stipulation, said CONTRACTOR shall forfeit as a penalty to CITY Twenty-Five Dollars (\$25.00) for each workman employed in the execution of this Agreement by CONTRACTOR or any subcontractor under this Agreement, for each calendar day during which any workman is required or permitted to labor more than eight (8) hours in violation of the provisions of said sections of the Labor Code.

CONTRACTOR shall keep full, true and accurate records of the names and actual hours worked by the respective workers and laborers employed under this Agreement and shall allow access to the same at any reasonable hour to CITY, its agents or representatives and to any person having the authority to inspect the same as contemplated under the provisions of said Labor Code.

SIXTH: CONTRACTOR agrees to commence the work provided herein immediately upon the receipt of a written NOTICE TO PROCEED from CITY, and to continue in a due and diligent, workmanlike manner, without interruption, and to complete the work within the number of days (Contract Completion Days) set forth in Exhibit A (excluding Saturdays, Sundays and holidays). Delivery of an executed copy of the Agreement shall be completed when an executed copy thereof is delivered personally to CONTRACTOR or its authorized agent or representative, or when a copy thereof is placed in an envelope to said CONTRACTOR at its address as shown on the first page of this Agreement and deposited in the United States mail at Anaheim, California, with the postage thereon fully prepaid.

CONTRACTOR acknowledges and agrees that time is of the essence in the performance of work provided in the agreement. CONTRACTOR agrees that all certificates of insurance and bonds (or approved alternative forms of security) required by the Agreement, together with three (3) copies of the Agreement fully executed by CONTRACTOR, (collectively referred to herein as the "Contract, Insurance and Bond Documents") shall be delivered to CITY by CONTRACTOR on or before the twenty-first (21st) calendar day ("Document Deadline Date") following the Award Date set forth in Exhibit A. CONTRACTOR further acknowledges and agrees that no NOTICE TO PROCEED with the work shall be given to CONTRACTOR by CITY until such time as CITY has received and approved said Contract, Insurance and Bond Documents. In the event said Contract, Insurance and Bond Documents are not received by CITY on or before said Document Deadline Date, CONTRACTOR agrees to the deduction of one (1) working day from the number of Contract Completion Days set forth in Exhibit A for every day in delay of receipt by CITY of the Contract, Insurance and Bond Documents beyond the Document Deadline Date. Said deduction shall be alternative to any other remedy available to CITY upon CONTRACTOR's failure to provide said Contract, Insurance and Bond Documents on or before the Document Deadline Date, including the right of CITY to refuse to execute and deliver the Agreement due to such failure by CONTRACTOR and to take such other action as may be authorized by law. In the event said Contract, Insurance and Bond Documents are not received by CITY on or before the Document Deadline Date, the subsequent delivery of a fully executed copy of this Agreement to CONTRACTOR by CITY shall be deemed an election by CITY to exercise the deduction of working days provision of this Paragraph without further notice to CONTRACTOR being required.

SEVENTH: All tools, equipment, apparatus, facilities, plant, labor, services and materials shall be furnished and work performed and completed subject to inspection, the final approval, and acceptance of CITY or its authorized representatives.

EIGHTH: Should any dispute arise respecting the true value of any work omitted or of any work which CONTRACTOR may be required to do, or respecting the size of any payment to CONTRACTOR during the performance of the Agreement, said dispute shall be decided by the Engineer of CITY, subject to the approval of CITY.

NINTH: CONTRACTOR shall at all times maintain proper facilities and provide safe access for inspection by CITY, its engineering or representatives, to all parts of the work and to the jobs wherein the work is in preparation. Where the specifications require work to be specially tested or approved, it shall not be tested without timely notice to CITY of its readiness for inspection and without the approval thereof, or consent thereto by the latter.

TENTH: Contractor hereby releases and agrees to indemnify and hold harmless CITY, its officers, agents, employees, and representatives for damage to property or for injury to or death of any persons and from all claims, demands, actions, of any kind whatsoever, arising out of or encountered in connection with this Agreement or the prosecution of work under it, whether such claims, demands, actions, or liability are caused by CONTRACTOR, CONTRACTOR's agents or employees or products installed on the Project by CONTRACTOR or subcontractors, excepting only such injury, death, or damages as may be caused solely and exclusively by CITY. Such indemnification shall extend to all claims, demands, actions, or liability for injuries, death or damages, occurring after completion of the Project as well as during

the work's progress. CONTRACTOR agrees that it shall at its own cost, expense and risk, defend CITY, its officers, agents, employees, and representatives in any and all claims, demands, actions, suits or other legal proceedings which may be brought or instituted against CITY, its officers, agents, employees, or representatives.

Without limiting CITY'S right to indemnification, it is agreed that CONTRACTOR shall secure, prior to commencing any activities under this Agreement, and maintain, during the term of this Agreement, insurance coverage as follows:

Workers' Compensation Insurance as required by California law and Employers Liability Insurance in an amount not less than \$1,000,000 per occurrence.

Commercial General Liability Insurance, including coverage for Premises and Operations, Contractual Liability, Bodily Injury, Sexual Abuse and Molestation, Personal Injury Liability, Products/Completed Operations Liability, and Independent CONTRACTOR'S Liability, in an amount not less than Two Million Dollars (\$2,000,000) per occurrence, Four Million Dollars (\$4,000,000) annual aggregate, written on an occurrence form. Such insurance shall be written on a primary basis, but may include a deductible of not more than Ten Thousand (\$10,000) per occurrence, provided that such deductible or self-insured retention is disclosed to CITY, in writing, at the inception of this Agreement.

Comprehensive Automobile Liability Coverage including—as applicable—owned, non-owned, and hired autos, in an amount not less than Two Million Dollars (\$2,000,000) per occurrence, combined single limit, as required by California law.

Each insurance policy required by this Agreement shall contain the following clause or shall otherwise provide for the following conditions:

“This insurance shall not be cancelled, or limited in scope or coverage, until after thirty (30) days prior written notice has been given to the City Clerk, City of Anaheim, 200 S. Anaheim Blvd., Anaheim, CA 92805, except in the event of cancellation for non-payment of premium that shall provide for not less than ten (10) days' notice.”

Each insurance policy required by this Agreement, except policies for Workers' Compensation, shall contain the following clauses or shall otherwise provide for the following conditions:

“It is agreed that any insurance maintained by CONTRACTOR pursuant to this Agreement shall be primary to, and not contribute with, any insurance or self- insurance maintained by the City of Anaheim.”

“The City of Anaheim, its officers, agents, employees, representatives and CITY- designated volunteers are added as additional insured as respects the acts, omissions, operations and activities of, or on behalf of, the named insured, in regard to products supplied to, or work or services performed for, or related to, the City of Anaheim.”

Prior to commencing any work under this Agreement, CONTRACTOR shall deliver to CITY insurance certificates confirming the existence of the insurance required under this Agreement, and including the applicable clauses referenced above. Also, within thirty (30) days of the execution date of this Agreement, CONTRACTOR shall provide CITY (i) endorsements to the insurance policies that add to these policies the applicable clauses referenced above, or (ii) in lieu of said endorsements, documentation acceptable to CITY evidencing that the coverage, terms, and conditions set forth in the above-referenced clauses are otherwise included in said insurance policies. Insurance required hereunder shall be placed with insurers (i) admitted to write insurance in California, (ii) possessing an *A. M. Best's* rating of A VII or higher, or (iii) otherwise acceptable to CITY, with prior written permission from CITY. In the event that a claim or other legal action is filed against CITY, and if CITY, in its good faith opinion, believes it may have coverage under any of the insurance required herein, then CITY has the right to demand, and to receive within a reasonable time period, copies of the insurance policies related to such required insurance; provided, however, that this provision shall not apply if the parties agree that CONTRACTOR shall fully defend, hold harmless, and indemnify CITY against any such claim or other legal action.

In addition to other remedies CITY may have if CONTRACTOR fails to provide or maintain any insurance policies or policy endorsements to the extent and within the time herein required, CITY may, at its sole option:

1. Order CONTRACTOR to stop work under this Agreement and/or withhold any payment(s) that become due to CONTRACTOR hereunder until CONTRACTOR demonstrates compliance with the requirements hereof;
2. Terminate this Agreement.

Exercise of any of the above remedies, however, is an alternative to other remedies ANAHEIM may have and is not the exclusive remedy for CONTRACTOR'S failure to maintain insurance or secure appropriate endorsements.

Nothing herein contained shall be construed in any way as limiting the extent that an CONTRACTOR may be held responsible for payments of damages to persons or property resulting from CONTRACTOR'S , (or CONTRACTOR'S AGENT or SUB-AGENT, if any) performance of the work covered under this Agreement.

In the event CONTRACTOR hires other persons or firms to perform some of the work related to this Agreement, CONTRACTOR shall ensure (i) that the acts or omissions of such persons or firms are covered under the above-referenced liability insurance, or (ii) that such firms maintain insurance equal to or better than, and subject to the same limits, terms and conditions as, the insurance required of CONTRACTOR under this Agreement shall provide, or cause to be provided, evidence of such insurance coverage, reasonably acceptable to CITY.

ELEVENTH: CONTRACTOR shall under no circumstances assign this Agreement without the written permission of CITY.

In addition to the change orders and extra work specified and provided for in the plans and specifications, CITY may at any time during the progress of said work when the public interest and necessity so require or when it is for the best interest or advantage of CITY so to do, request any alterations, deviations, additions to or omissions from said Agreement, specifications or plans or the work, labor and materials to be furnished thereunder, and the same shall in no way affect or make void this Agreement, but will be added to or deducted from the amount of said Contract Price as the case may be. Any alterations, additions or deviations requiring extra work shall be compensated for as provided in the specifications, unless otherwise mutually agreed upon.

TWELFTH:

(A) Inspection of Records - CITY, through its authorized agents, engineers or representative, shall have the right to inspect all work as it progresses and shall have access to all payrolls, records of personnel, invoices of materials and any and all other data relevant to the performance of this Agreement. There shall be submitted to CITY through its authorized agents, the names and addresses of all personnel and such schedules of cost of labor, cost and quantities of materials and other items, supported as to correctness by such evidence as, and in such form as, CITY through its authorized agents or representatives may require. The submission and approval of such schedules, if required shall be a condition precedent to the making of any payments under the Agreement.

(B) There shall be provided for the use of the CITY Engineer of CITY inspectors such reasonable facilities as they may request.

(C) CONTRACTOR shall furnish to CITY the names and addresses of all subcontractors on the Project at the earliest date practicable.

THIRTEENTH: CONTRACTOR shall notify CITY or its engineer a sufficient time in advance of the manufacture or production of materials to be supplied by CONTRACTOR under this Agreement in order that CITY may arrange for mill or factory inspection and the testing of same.

Any material shipped by CONTRACTOR from the factory prior to having passed such testing and inspection by CITY's engineer or prior to the receipt of notice from said engineer that such testing and inspection will not be required, shall not be incorporated on the job.

CONTRACTOR shall also furnish to CITY, in triplicate, certified copies of all required factory and mill test reports.

FOURTEENTH: It is hereby understood that the time for the completion of said Agreement work is the number of Contract Completion Days as specified in Paragraph "SIXTH" hereof, excluding Saturdays, Sundays and holidays, subject, however, to delays caused by reason of a suspension ordered by the City Engineer or because of any other act or neglect of CITY or its officers or employees without contributory fault or negligence on the part of CONTRACTOR or his agents or employees or subcontractors, or if the work should be delayed by fire, storm, flood or other acts of God, by war or act of public enemies, by restriction of the use of, procurement of, or inability to obtain materials, by strikes, by unusual delay in transportation,

unavoidable casualties or any cause beyond the control and without the fault and negligence of CONTRACTOR, or for any other reason which, in the opinion of the City Engineer of CITY, is proper justification for delay. The time for completion shall be extended for the length of time equal to the delay caused by any other reason which, in the opinion of the City Engineer of CITY, is proper justification for delay. The time for completion shall be extended for the length of time equal to the delay caused by any of the above-mentioned causes. And should the work not be completed within the time herein specified or any extension thereof, to the satisfaction of CITY, there shall be deducted from the final payment to CONTRACTOR a sum per day as Liquidated Damages (set forth in Exhibit A), and not as a penalty, for each day's delay after the expiration of such period until the final acceptance of the work and its delivery to said CITY. It is further understood and agreed that should CONTRACTOR fail to furnish the plant, materials, equipment and do and perform all work and labor as herein provided in the manner herein set forth in good and workmanlike manner, it shall, in addition to any other penalties provided in the Agreement documents, be liable to CITY for all losses or damages that the latter may suffer on account thereof.

FIFTEENTH: CITY may withhold from CONTRACTOR so much of accrued payments as may be necessary to pay laborers and mechanics employed on the work the difference between the rate of wages required by this Agreement to be paid to laborers and mechanics on the work and the rate of wages actually paid to such laborers or mechanics.

SIXTEENTH: CONTRACTOR shall, at all times, exercise reasonable precautions for the safety of employees on the Project, and applicable provisions of State and local laws and building and construction codes shall be observed by CONTRACTOR. All machinery and equipment and other physical hazards shall be guarded in accordance with the safety provisions of the Manual of Accident Prevention in construction of the Associated General Contractors of America unless such provisions are incompatible with State or Municipal laws or regulations, in which event such State or Municipal laws or regulations shall control.

SEVENTEENTH: CONTRACTOR shall insert appropriate provisions in all subcontracts relating to this Project to insure the fulfillment of Paragraphs 1 to 18 inclusive.

EIGHTEENTH: In the event that any of the provisions of this Agreement are violated by CONTRACTOR or by any subcontractor under any subcontract on the Project, CITY may terminate the Agreement by serving written notice upon CONTRACTOR of its intention to terminate such Agreement and, unless within ten (10) days after the serving of such notice, such violation shall cease, the Agreement shall, upon the expiration of said ten days, cease and terminate. As to violations of the provisions of this Agreement which cannot be remedied or corrected within ten days, said Agreement shall, at the option of CITY, cease and terminate upon the giving of like notice. In the event of any such termination for any of the reasons above-mentioned, CITY may take over the work and prosecute the same to completion by Agreement or otherwise for the account and at the expense of CONTRACTOR and/or subcontractor or subcontractors, and CONTRACTOR and its sureties shall be liable to CITY for any excess cost occasioned in the event of any such termination, and CITY may take possession of and utilize in completing the work, such materials, appliances and plant as may be on the site of work and necessary therefore. This clause shall not be construed to prevent the termination, for other causes, authorized by law or other provisions of this Agreement.

NINETEENTH: Whenever in the specifications any material or process is indicated or specified by patent or proprietary name or by name of manufacturer, such specification shall be deemed to be used for the purpose of facilitating description of the material and/or process desired, and shall be deemed to be followed by the words "OR EQUAL," and the bidder, in the proposal submitted by bidder, may offer any material or process which shall be equal in every respect to that so indicated or specified.

If the bidder shall not offer any substitute in said proposal or if a substitute so offered by the bidder is not found to be equal to that so indicated or specified by name, if one only be so specified or named, or, if more than one be so specified or named, then such one as shall be specified in the proposal, or if none be so specified, then such one shall be required by CITY.

TWENTIETH: If CONTRACTOR should neglect to prosecute the work properly or fail to perform any provisions of this Agreement, CITY, after three days' written notice to CONTRACTOR, may without prejudice to any other remedy it may have, make good such deficiencies and may deduct the cost thereof from the payment then or thereafter due CONTRACTOR; provided, however, that the City Engineer of CITY shall approve such action and certify the amount thereof to be charged to CONTRACTOR.

TWENTY-FIRST: If CONTRACTOR should be adjudged a bankrupt, or should make a general assignment for the benefit of creditors, or if a receiver should be appointed on account of insolvency of CONTRACTOR, or if CONTRACTOR should persistently or repeatedly refuse or should fail, except in cases for which an extension of time is provided, to supply enough properly skilled workmen or proper materials to construct and complete said Project within the time herein required, in a good and workmanlike manner, or if CONTRACTOR should fail to make prompt payment to subcontractors, or for materials or labor, or persistently disregard laws, ordinances or the instructions of CITY or its duly authorized engineers, inspectors or representatives, or otherwise be guilty of a substantial violation of any provision of the agreement documents, then CITY, upon the certification of its CITY and Consulting Engineers that sufficient cause exists to justify such action may, without prejudice to any other right or remedy and after giving CONTRACTOR five (5) days' written notice, terminate the employment of said CONTRACTOR and take possession of the premises and of all materials, tools and appliances thereon and finish the work by whatever methods it may deem expedient. In such case, CONTRACTOR shall not be entitled to receive any further payment until the work is finished. If the unpaid balance of the Contract Price shall exceed the expense of finishing the work, including compensation for additional managerial and administrative services, such excess shall be paid to CONTRACTOR. If such expense shall exceed such unpaid balance, CONTRACTOR shall pay the difference to CITY. The expense incurred by CITY as herein provided, and the damage incurred through CONTRACTOR's default, shall be certified by the City Engineer.

TWENTY-SECOND: It is expressly understood and agreed that CONTRACTOR herein named in the furnishing of all plant, labor, services, materials and equipment and performing the work as provided in this Agreement is acting as an independent contractor and not as the agent, servant or employee of the City of Anaheim.

TWENTY-THIRD: It is expressly understood and agreed that CONTRACTOR shall comply throughout the entire term of this Agreement with the all express

requirements of Labor Code Sections 1725.5, 1771.1, 1771.4 and 1776, including but not limited to, compliance with contractor and subcontractor registration and requirements related to certified payroll records.

TWENTY-FOURTH: Any notices, demands, correspondence, or communications required or permitted to be given by this Agreement shall be sufficiently given by CONTRACTOR when received by CITY at the Office of the City Clerk, Anaheim Civic Center, 200 South Anaheim Boulevard, Anaheim, California 92805. CONTRACTOR shall concurrently mail a copy to the City Engineer at 200 South Anaheim Boulevard, Second Floor, Anaheim, California 92805.

Any notice, demands, correspondence or communications required or permitted to be given by this Agreement shall be sufficiently given by CITY when placed in the United States mail, postage prepaid to CONTRACTOR at CONTRACTOR's address shown on Page 1 of this Agreement.

Either party may, from time to time, designate a different address to which such notice, demands, correspondence or communications are to be delivered.

TWENTY-FIFTH: Unless a different date is provided in this Agreement, the Effective Date shall be the latest Date of Execution, hereinafter set forth below the names of the signators hereto. Should CONTRACTOR fail to enter a Date of Execution, the Effective Date shall be the Date of Execution by CITY.

[Remainder of page intentionally left blank]

DATE OF EXECUTION

CITY OF ANAHEIM
A municipal corporation,

By: _____

MAYOR

“CITY”

ATTEST:
THERESA BASS, CITY CLERK

By: _____

DATE OF EXECUTION:

By: _____

Title: _____

“CONTRACTOR”

APPROVED AS TO FORM:
ROBERT FABELA, CITY ATTORNEY

By: _____

Bryn M. Morley
Deputy City Attorney

Date: _____

PREMIUM

LABOR AND MATERIAL BOND

KNOW ALL MEN BY THESE PRESENTS:

WHEREAS, the City of Anaheim, a municipal corporation of Orange County, California, has awarded to _____, License No. _____, (hereinafter called "Principal"), a _____ contract for _____.

Account No. _____.

WHEREAS, under the terms of said agreement, Principal is required before entering upon the performance of the work, to file a good and sufficient payment bond with the City of Anaheim to secure the claims to which reference is made in Part 6 of Division 4 of the Civil Code of the State of California (commencing with Section 8000).

NOW, THEREFORE, said Principal and _____, as corporate Surety are held firmly bound unto the City of Anaheim and all contractors, subcontractors, laborers, materialmen and other persons employed in the performance of the aforesaid agreement and referred to in Part 6 of Division 4 of the Civil code of the State of California (commencing with Section 8000) in the sum of _____ (\$ _____) for materials furnished or labor thereon of any kind, or for amounts due under the Unemployment Insurance Act with respect to such work or labor, that said Surety will pay the same in an amount not exceeding the amount hereinabove set forth, and also in case suit is brought upon this bond, will pay, in addition to the face amount thereof, costs and reasonable expenses and fees, including reasonable attorneys' fees, incurred by City in successfully enforcing such obligation, to be awarded and fixed by the court, and to be taxed as costs and to be included in the judgment therein rendered.

It is hereby expressly stipulated and agreed that this bond shall inure to the benefit of any and all persons, companies and corporations entitled to file claims under Part 6 of Division 4 of the Civil Code of the State of California (commencing with Section 8000), so as to give a right of action to them or their assigns in any suit brought upon this bond.

Should the condition of this bond be fully performed, then this obligation shall become null and void, otherwise it shall be and remain in full force and effect.

The Surety hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of said agreement or the specifications accompanying the same shall in any manner affect its obligations on this bond, and it does hereby waive notice of any such change, extension, alteration or addition.

IN WITNESS WHEREOF, three (3) identical counterparts of this instrument, each of which shall for all purposes be deemed an original thereof, have been duly executed by the Principal and Surety herein named, the name and corporate seal of each corporate party being

hereto affixed and these presents duly signed by its undersigned representative pursuant to authority of its governing body.

By: _____
PRINCIPAL

By: _____
PRESIDENT

By: _____
SECRETARY

SURETY

Attorney in Fact

APPROVED AS TO FORM:

ROBERT FABELA,
CITY ATTORNEY

CORPORATE ADDRESS OF SURETY

By: _____

Dated: _____

PREMIUM

FAITHFUL PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS:

WHEREAS, the City of Anaheim, a municipal corporation of Orange County, California, has awarded to _____, License No. _____, (hereinafter called _____ "Principal"), a _____ contract for _____

Account No. _____.

WHEREAS, said Principal is required under the terms of said contract to furnish a bond for the faithful performance of said contract.

NOW, THEREFORE, we, as Principal, and _____, as Surety, are held and firmly bound unto the City of Anaheim, a municipal corporation (hereinafter called "City"), in the penal sum of _____, (\$ _____), lawful money of the United States of America, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, successors, executors, and administrators, jointly and severally, firmly by these presents.

The condition of this obligation is such that, if the above bounded Principal, his or its heirs, executors, administrators, successors or assigns, shall in all things stand to and abide by and well and truly keep and perform all the undertakings, terms, covenants, conditions and provisions in the said contract and any alteration thereof made as therein provided, on his or their part, to be kept and performed at the time and in the manner therein specified, and in all respects according to their true intent and meaning, and shall indemnify and save harmless City, its officers, agents and employees, as therein stipulated, then this obligation shall become null and void; otherwise, it shall be and remain in full force and effect.

As a part of the obligation secured hereby and in addition to the face amount specified therefore, there shall be included costs and reasonable expenses and fees, including reasonable attorneys' fees, incurred by City in successfully enforcing such obligation, all to be taxed as costs and included in any judgment rendered.

The said Surety hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract, or to the work to be performed thereunder or to the specifications accompanying the same shall in any way affect its obligation on this bond, and it does hereby waive notice of any such change, extension of time, alterations or additions to the terms of the contract or to the work or to the specifications.

IN WITNESS WHEREOF, three (3) identical counterparts of this instrument, each of which shall for all purpose be deemed an original thereof, have been duly executed by the Principal and Surety herein named, the name and corporate seal of each corporate party being

hereto affixed and these presents duly signed by its undersigned representative pursuant to authority of its governing body.

By: _____
PRINCIPAL

By: _____
PRESIDENT

By: _____
SECRETARY

SURETY

Attorney in Fact

APPROVED AS TO FORM:

ROBERT FABELA,
CITY ATTORNEY

CORPORATE ADDRESS OF SURETY

By: _____

Dated: _____

Assembly Bill No. 456

SECTION 1. Section 9204 of the Public Contract Code is amended to read:

9204.

(a) The Legislature finds and declares that it is in the best interests of the state and its citizens to ensure that all construction business performed on a public works project in the state that is complete and not in dispute is paid in full and in a timely manner.

(b) Notwithstanding any other law, including, but not limited to, Article 7.1 (commencing with Section 10240) of Chapter 1 of Part 2, Chapter 10 (commencing with Section 19100) of Part 2, and Article 1.5 (commencing with Section 20104) of Chapter 1 of Part 3, this section shall apply to any claim by a contractor in connection with a public works project.

(c) For purposes of this section:

(1) "Claim" means a separate demand by a contractor sent by registered mail or certified mail with return receipt requested, for one or more of the following:

(A) A time extension, including, without limitation, for relief from damages or penalties for delay assessed by a public entity under a contract for a public works project.

(B) Payment by the public entity of money or damages arising from work done by, or on behalf of, the contractor pursuant to the contract for a public works project and payment for which is not otherwise expressly provided or to which the claimant is not otherwise entitled.

(C) Payment of an amount that is disputed by the public entity.

(2) "Contractor" means any type of contractor within the meaning of Chapter 9 (commencing with Section 7000) of Division 3 of the Business and Professions Code who has entered into a direct contract with a public entity for a public works project.

(3)

(A) "Public entity" means, without limitation, except as provided in subparagraph (B), a state agency, department, office, division, bureau, board, or commission, the California State University, the University of California, a city, including a charter city, county, including a charter county, city and county, including a charter city and county, district, special district, public authority, political subdivision, public corporation, or nonprofit transit corporation wholly owned by a public agency and formed to carry out the purposes of the public agency.

(B) "Public entity" shall not include the following:

(i) The Department of Water Resources as to any project under the jurisdiction of that department.

(ii) The Department of Transportation as to any project under the jurisdiction of that department.

(iii) The Department of Parks and Recreation as to any project under the jurisdiction of that department.

(iv) The Department of Corrections and Rehabilitation with respect to any project under its jurisdiction pursuant to Chapter 11 (commencing with Section 7000) of Title 7 of Part 3 of the Penal Code.

(v) The Military Department as to any project under the jurisdiction of that department.

(vi) The Department of General Services as to all other projects.

(vii) The High-Speed Rail Authority.

(4) “Public works project” means the erection, construction, alteration, repair, or improvement of any public structure, building, road, or other public improvement of any kind.

(5) “Subcontractor” means any type of contractor within the meaning of Chapter 9 (commencing with Section 7000) of Division 3 of the Business and Professions Code who either is in direct contract with a contractor or is a lower tier subcontractor.

(d) (1)

(A) Upon receipt of a claim pursuant to this section, the public entity to which the claim applies shall conduct a reasonable review of the claim and, within a period not to exceed 45 days, shall provide the claimant a written statement identifying what portion of the claim is disputed and what portion is undisputed. Upon receipt of a claim, a public entity and a contractor may, by mutual agreement, extend the time period provided in this subdivision.

(B) The claimant shall furnish reasonable documentation to support the claim.

(C) If the public entity needs approval from its governing body to provide the claimant a written statement identifying the disputed portion and the undisputed portion of the claim, and the governing body 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 public entity shall have up to three days following the next duly publicly noticed meeting of the governing body after the 45-day period, or extension, expires to provide the claimant a written statement identifying the disputed portion and the undisputed portion.

(D) Any payment due on an undisputed portion of the claim shall be processed and made within 60 days after the public entity issues its written statement. If the public entity fails to issue a written statement, paragraph (3) shall apply.

(2)

(A) If the claimant disputes the public entity’s written response, or if the public entity fails to respond to a claim issued pursuant to this section within the time prescribed, the claimant 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 public entity shall schedule a meet and confer conference within 30 days for settlement of the dispute.

(B) Within 10 business days following the conclusion of the meet and confer conference, if the claim or any portion of the claim remains in dispute, the public entity shall provide the claimant 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 shall be processed and made within 60 days after the public entity 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 public entity and the claimant sharing the associated costs equally. The public entity and claimant 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 this section.

(C) For purposes of this section, mediation includes 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 this section.

(D) Unless otherwise agreed to by the public entity and the contractor in writing, the mediation conducted pursuant to this section shall excuse any further obligation under Section 20104.4 to mediate after litigation has been commenced.

(E) This section does not preclude a public entity from requiring arbitration of disputes under private arbitration or the Public Works Contract Arbitration Program, if mediation under this section does not resolve the parties' dispute.

(3) Failure by the public entity to respond to a claim from a contractor within the time periods described in this subdivision or to otherwise meet the time requirements of this section shall result in the claim being deemed rejected in its entirety. A claim that is denied by reason of the public entity's failure to have responded to a claim, or its failure to otherwise meet the time requirements of this section, shall not constitute an adverse finding with regard to the merits of the claim or the responsibility or qualifications of the claimant.

(4) Amounts not paid in a timely manner as required by this section shall bear interest at 7 percent per annum.

(5) If a subcontractor or a lower tier subcontractor lacks legal standing to assert a claim against a public entity because privity of contract does not exist, the contractor may present to the public entity a claim on behalf of a subcontractor or lower tier subcontractor. A subcontractor may request in writing, either on their 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 public entity 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 public entity and, if the original contractor did not present the claim, provide the subcontractor with a statement of the reasons for not having done so.

(e) The text of this section or a summary of it shall be set forth in the plans or specifications for any public works project that may give rise to a claim under this section.

(f) A waiver of the rights granted by this section is void and contrary to public policy, provided, however, that (1) upon receipt of a claim, the parties 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) a public entity may prescribe reasonable change order, claim, and dispute resolution procedures and requirements in addition to the provisions of this section, so long as the contractual provisions do not conflict with or otherwise impair the timeframes and procedures set forth in this section.

(g) This section applies to contracts entered into on or after January 1, 2017.

(h) Nothing in this section shall impose liability upon a public entity that makes loans or grants available through a competitive application process, for the failure of an awardee to meet its contractual obligations.

(i) This section shall remain in effect only until January 1, 2027, and as of that date is repealed, unless a later enacted statute that is enacted before January 1, 2027, deletes or extends that date.

STANDARD SPECIFICATIONS SUPPLEMENT

2021 STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION

The City of Anaheim has adopted the 2021 Edition and subsequent Supplements thereto, of the Standard Specifications for Public Works Construction (SSPWC) by Public Works Standards, Inc. as its specification for public works construction projects. All work shall be performed in accordance with the “Standard Specifications for Public Works Construction (SSPWC),” 2021 Edition, and any Supplement thereto, except as modified by the Special Provisions and this Standard Specifications Supplement.

These additions, deletions, and amendments modify the specifications in the “Standard Specifications for Public Works Construction,” 2021 Edition, and any Supplement thereto.

These additions, deletions, and amendments shall take precedence in the event of a conflict with any Standard Specifications.

As a convenience, these additions, deletions, and amendments have been arranged in a format that parallels the “Standard Specifications for Public Works Construction,” 2021 Edition, and any Supplement thereto.

The SSPWC set forth above will control the General Provisions and construction methods and materials for the contract, except as amended by other contract documents. The following provisions are intended to supplement the provisions of the SSPWC unless noted otherwise. The section numbers of these provisions coincide with the section numbers of the SSPWC. Only those sections that require additions, deletions, or revisions are included herein.

Copies of the SSPWC are available from:

BNI Publications, Inc.
990 Bark Center Drive, Suite E
Vista, CA 92081
Telephone (888) BNI-BOOK; (888) 264-2665
Website: www.bnibooks.com

This project is subject to compliance monitoring and enforcement by the Department of Industrial Relations.

No contractor or subcontractor may be listed on a bid proposal for a Public Works project unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5.

No contractor or subcontractor may be awarded a contract for public work on a Public Works project unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.50

PART 1 - GENERAL PROVISIONS

SECTION 1 - GENERAL

REVISE as follows:

1-1 GENERAL. *ADD the following term:*

The word *provide* shall mean furnish and install.

1-2 TERMS AND DEFINITIONS. *MODIFY to include the following:*

Acceptance, Final Acceptance – Formal action by the City acknowledging the Work is complete.

Agency – City of Anaheim.

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

As-Built Plans – As-Built Plans (aka redline drawings or As-Builts) are those prepared by the contractor as they construct the project and upon which it documents the actual locations of the improvements, building components, and changes to the original contract plans. These As-Built Plans are provided to the City Representative at the completion of construction.

Area – It is a portion or subzone within a Neighborhood as determined by the Engineer.

Balancing Change Order – A Change Order limited to the increase or decrease between the Bid quantity and the actual quantity of each Contract Unit Price.

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

Board – *REPLACE the definition with the following:*

City Council of the City of Anaheim

Calendar Day – The 24-hour day denoted on the calendar.

City – See Agency.

City Representative – The person or engineering/architectural firm City authorizes to represent it during the performance of the Work by the Contractor and until Final Acceptance. The City Representative means the City Representative or his assistants.

Clarification – Verbal or written interpretation of Contract Documents by the City Representative to clarify intent, procedures, materials, or processes with no change in contract sum or time.

Completion of Work Date - Date upon which all items of work are fully complete, inspected and approved excluding all landscape establishment and maintenance.

Contract Documents – *REPLACE the definition with the following:*

The Contract Documents shall be considered to also include the Instructions to Bidders, Proposal, Bid Bond, the Agreement which is prepared for execution by the City and the Contractor, Plans Specifications and Special Provisions, Contract Bonds, Change Order, Non-Collusion Declaration, Designation of Subcontractors, Equal Opportunity Certificates of Compliance, Community Workforce Agreement (CWA), Insurance Policies and Certificates, State Requirements, Federal Requirements, and any Supplemental Written Agreements or Addenda amending or extending the scope of the work originally contemplated that may be required to complete the work in a substantial and acceptable manner.

Contract Completion Days – The time in Working Days, unless specified in the proposal as calendar days, specified for completion of the Work.

County – The County of Orange.

Cost Breakdown – A Schedule of Values that lists the value/cost of every billable item in a Lump Sum item of work.

Driveway Entrance/Driveway Approach/Driveway – These terms are equal and used interchangeably.

Instructions to Bidders – The document describing and specifying the requirements for submission of the Bid, interpretation of the Bids, and award and execution of the Contract.

Engineer – *REPLACE the definition with the following:*

The City Engineer of the City of Anaheim or his authorized Representative.

Federal - The United States of America national government

Field Order – Authorization by City Representative to proceed with Change Order work after completion of negotiations but before the issuance of the Change Order.

Final Completion Date - The Final Completion Date shall mean the date on which all work is completed, including all landscape establishment and maintenance.

Laboratory – The laboratory authorized by the City or the City Representative to test material.

Notice of Completion – A notice filed by the City pursuant to Civil Code Section 8180.

Notice Inviting Bids – A written notice issued by the Agency inviting the submission of Bids for the Contract. Also known as the Invitation to Bidders.

Quality Assurance – Those standards, systems, processes, procedures, and activities exercised by the City 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.

Record Drawings - Drawings prepared by the Civil Engineer or Architect of Record. They are usually a compendium of the original drawings, Plan Revisions, and information taken from the Contractor's As-Built Plans.

Request for Quotation – Contemplated revision of Contract Documents by the City requesting detailed information from the Contractor on impacts to contract sum or contract time.

State Standard Specifications – Standard Specifications issued by the State of California, Department of Transportation, 2018 Edition.

Traffic Control Devices – All signs, signals, markings, and other devices used to regulate, warn, or guide traffic, placed on, over, or adjacent to a street, highway, pedestrian facility, or bikeway, by authority of the Engineer.

Zone – It is an entire Neighborhood as shown on location maps.

1-6 BIDDING AND SUBMISSION OF THE BID.

1-6.1 General. *ADD the following after the first paragraph:*

The Contractor acknowledges, as precedent to submission of its Bid, that it has satisfied itself as to the nature and location of the Work, the general and local conditions, conditions of the Work site, availability of labor, electric power, water and the surface and subsurface materials on the Work site, the type and capability of equipment needed, and all other matters which may in any way effect the Work or the Contract Price. Failure of the Contractor to acquaint itself with all

the available information pertaining to existing Work site conditions will not relieve it from responsibility for the difficulties or cost of the Work.

1-6.2 Subcontractor Listing.

ADD the following after the last paragraph:

Contractor shall certify and provide proof that all Subcontractors to be employed under this contract are properly registered with the Department of Industrial Relations as required by California Law. Documentable proof of proper registration with DESIGNATION OF SUBCONTRACTORS form duly completed are required to be submitted along with the bid proposal forms and failure to comply with this provision may be deemed sufficient to render the Contractor's bid non-responsive.

1-7 AWARD AND EXECUTION OF THE CONTRACT.

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

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

Bid bonds shall be prepared on the City's Bid Bond form. Failure to use the City's standard form may result in the Bid being found non-responsive.

The award of the Contract, if awarded, will be made to the lowest responsible, responsive, and qualified Bidder whose Bid Proposal complies with all the prescribed requirements. **Such award, if made, will be made within sixty (60) Days after the opening of the Bid Proposals and the Bidder shall hold its Bid Proposal open to the City for said sixty (60) Day period.** Until an award is made, the right will be reserved to reject any or all Bids, and to waive technical errors or discrepancies, if to do so is deemed to best serve the interest of the City.

In selecting the lowest responsible, responsive, and qualified Bidder, consideration will be given to the Bidder's financial standing, its general competency and capacity for the performance of the Work covered by the bid proposal and the size of previous jobs Contracts satisfactorily completed by him, as well as whether he it has breached any terms of Public Works contracts he has entered in the past. Bidders may be required to present satisfactory evidence that they have been regularly engaged in the business, or are reasonably familiar therewith, and that they are fully prepared with the necessary capital, materials, and equipment machinery to complete the Work to be contracted for, to the satisfaction of the Board. Each Bidder must be prepared to furnish, at the time of opening of the Bids, a certified copy of his financial statement.

Failure to execute the Contract and file acceptable Bonds, as specified in Section 1-7.2, and insurance certificates, as specified in 5-4, shall be just cause for the annulment of the award and the forfeiture of the Bid Bond. Transfers of contract, or of interest in contracts, are prohibited.

The Contractor shall possess a valid California Contractor's and other business licenses required by law with respect to the Work to be performed under this Contract prior to the start of construction and shall certify to the City that they are properly licensed.

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.

The Contractor shall promptly, and not later than the **twenty-first (21st) calendar day** (Document Deadline Date) after receipt of the Notice of Award, deliver to the City the following documents:

- a) One (1) notarized original of the Agreement on the City's form. Evidence must be attached showing that the signatures are of person(s) who have the authority to bind the Contractor to the Agreement.
- b) One (1) original of the Labor and Material Bond on the City's form duly executed by your firm and surety. All signatures must be notarized.
- c) One (1) original of the Faithful Performance Bond on the City's form duly executed by your firm and surety. All signatures must be notarized.
- d) One (1) original certificate of insurance (duly executed by insurers) evidencing coverage required by the Contract.
 - 1) An additional insured endorsement (separate forms) to the general liability and automobile liability insurance policy naming the City of Anaheim, its officers, agents, employees, representatives, and volunteers are also required and said endorsement must bear the wet signature of an authorized representative of the insurance company.
 - 2) The endorsement must also contain a statement that thirty (30) days' notice must be given to the City of any change or cancellation of the policy.
- e) Resume of proposed Superintendent to include qualifications and references.
- f) Preliminary Baseline Construction Schedule pursuant to Section 6-1 as evidence of the Contractor's ability to accomplish the Work of the project within the required Contract time.
- g) One copy of the Letter of Assent (Attachment A to the Community Workforce Agreement) signed by the Prime Contractor. Letters of Assent by Subcontractors and all others covered by the CWA shall be submitted in accordance with the deadlines prescribed in Section 1-7.4.
- h) Cost Breakdown (schedule of values) for Contract lump sum bid items, if applicable.

In the event said Agreement, Insurance and Bond Documents are not received by the City on or before the Document Deadline Date, the Contractor agrees to the deduction of one (1) working day from the number of Contract Completion Days for every day of delay in receipt by the City beyond the Document Deadline Date. Said deduction shall be in addition to any other remedy available to the City upon the Contractor's failure to timely provide said Contract, Insurance and Bond Documents, including the right of the City to refuse to execute and deliver the Agreement or to take such other action as may be authorized by law.

1-7.2 Contract Bonds. *ADD the following after the first paragraph:*

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) (<https://fiscal.treasury.gov/surety-bonds/circular-570.html>) and is satisfactory to the Agency.

ADD the following:

1-7.3 Department of Industrial Relations (DIR) Registration. This Project is subject to compliance monitoring and enforcement by the DIR. 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 DIR 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 registered with the DIR pursuant to Labor Code section 1725.5.

The Contractor shall certify and provide proof that the Subcontractors it lists in its Bid Proposal, and those not required to be listed in the Bid Proposal pursuant to Public Contract Code 4100-4114, but listed as required in 3-3, are currently registered with the DIR. Documented proof shall be submitted with the Proposal. Failure to submit may result in the Contractor's Bid being found non-responsive.

ADD the following:

1-7.4 Community Workforce Agreement. The City has entered into a Community Workforce Agreement (CWA) with the Los Angeles/Orange Counties Building and Construction Trades Council and the Signatory Craft Councils and Local Unions. The CWA is a pre-hire collective bargaining agreement that establishes labor relations procedures. Among other provisions, the CWA addresses: requirements for craft employment including specific goals for the employment of local hires, work stoppages and lockouts, jurisdictional disputes, and settlement of grievances and disputes.

When a project is deemed covered "Project Work" as defined in the CWA, the awarded Contractor, subcontractors, and all others covered by the CWA, regardless of tier shall agree to be party to and bound by the CWA by signing a Letter of Assent (a form attached to the CWA as Appendix A).

The CWA is incorporated by reference in the Construction Contract and can be accessed on the City's website at: <https://www.anaheim.net/296/Contract-Administration>

a) Assent by Prime Contractor

An authorized representative of the Prime Contractor shall sign the Letter of Assent evidencing the Prime Contractor's agreement to be party to and bound by the terms and conditions of the CWA for the duration of the work contained in this Contract and submit it to the City not later than the 21st calendar day after receipt of notice of award. The Prime Contractor will be subject to the conditions outlined in the section titled Failure to Deliver by Document Deadline Date in the Standard Specifications Supplement.

b) Assent by Subcontractors and All Others Covered by the CWA

At the time the awarded Prime Contractor enters into a subcontract with any subcontractor of any tier providing for the performance of Project Work, the Prime Contractor shall provide a copy of the CWA to said Subcontractor and shall require the Subcontractor, as a part of accepting the award from the Prime Contractor, to agree in writing in the form of the Letter of Assent to be bound by each and every provision of the CWA prior to the commencement of Project Work. No Prime Contractor or subcontractor shall commence Project Work without executing a Letter of Assent and submitting copies in accordance with the procedures outlined in the CWA.

Subcontractors and all others covered by the CWA shall submit signed Letters of Assent at the earliest of the following: 1) at the mandatory Pre-Job Conference described in Sections 8.4 and 16.1 of the CWA, 2) within 48 hours after the award of the work contained in this Contract to the awarded Contractor, or 3) no later than 48 hours prior to the time the subcontractor desires to gain site access and commence work at the site. Access to the site includes initial mobilization of equipment and materials.

c) Prime Contractor's CWA Administration Costs

All costs associated with the Prime Contractor's administration of and compliance with the CWA shall be included in its bid proposal. The bid amount shall be an allowance used by the Prime Contractor for all work associated with fulfilling its obligations to comply with the policies and procedures prescribed in the CWA, including working with the City's designated CWA Administrator to ensure full compliance with the CWA. No additional compensation will be allowed.

SECTION 2 – SCOPE OF WORK

REVISE as follows:

2-2 PERMITS. *DELETE 1st paragraph and SUBSTITUTE with the following:*

Prior to the start of any Work the Contractor shall obtain all the applicable City permits and arrange for City inspections. The City will issue the permits at no charge to the Contractor. The signing contractor must hold a General A or B contractor's license for right of way construction and/or specific on-site scope of work license type with the State of California. The Contractor and all Subcontractors shall each obtain a City business license and shall be licensed in accordance with State Business and Professions Code. The Contractor and all Subcontractors shall keep current all City business licenses current and shall not lapse over the project duration. The Contractor shall also obtain and pay for all other permits, licenses, inspections, certificates, or authorizations required by any governing body or entity.

The Contractor and Subcontractors acknowledge that the City of Anaheim, per Anaheim Municipal Code (AMC) Section 3.04.050, does impose upon the businesses, trades, professions, callings, and occupations license taxes in the amounts prescribed in the code. It is unlawful for any person to transact and carry on any business, trade, profession, calling, or occupation without first having procured a license from the City and then complying with all applicable provisions of the code. Contractor license fees shall be as prescribed by the Anaheim Municipal Code Section 3.24.010.

If the Work extends through or into an adjacent city, county, railroad right of way, or Caltrans, the Contractor shall obtain and pay any required fee for a Permit or Rider to the Permit.

The Contractor shall obtain all necessary permits for the discharge or disposal of any ground or surface water in accordance with the California Regional Water Quality Control Board Regulations.

2-3 RIGHT OF WAY. *DELETE the 1st sentence and SUBSTITUTE with the following:*

Rights of way, easements, agreements, licenses, or rights of entry (all referred to as right of way) for the Work have been provided by the City. Temporary right-of-way to construct one or more portions of the Work may also have been acquired by the City. The Contractor shall comply with all the terms and obligations related to the physical use of the temporary right of way and its eventual return of the property to the owner.

Work in the public right of way shall be done in accordance with the requirements of the permit issued by the public agency in whose right of way the Work is located in addition to conforming to the Contract Documents. If a permit or traffic control plan is not required, the Work shall conform to the standards set forth in the MUTCD.

The Contractor or his employees shall not use private property water or electricity from such property. The Contractor shall obtain permits for temporary water or electricity from the City if required.

The Contractor shall comply with all applicable federal, state, and local laws, ordinances, codes and regulations in performing any work or doing any activity on lands outside the public rights of way.

The Contractor, and any Subcontractors, shall limit all construction activity and operations within the City right-of-way. The Contractor shall, prior to conducting Work on any occupied property within the area of the Work, confirm with the Engineer the location of the City's right-of-way, and the extent of any applicable temporary construction easements, which serve as the permissible bounds of construction activity. No person, or construction activity, shall pass beyond or engage in any construction-related activity outside of the defined temporary construction easements. The Contractor shall monitor its personnel, and the personnel of its Subcontractors, to assure compliance with this provision. The prohibition on construction-related activity beyond the defined City right-of-way and temporary construction easements includes Work for the sidewalk, landscaping and slough walls, etc., and extends to prohibit storage of materials or vehicles, including parking or storage of vehicles of employees, and any utilization of private property for staging, storage, or any other purpose unless the Contractor obtains written permission from the private property owner and provides a copy to the City.

The Contractor shall hold harmless, indemnify, and defend the City, the Engineer and each of their officers, employees, and agents from all claims or suits for damages occasioned by such work or activity, whether done according to this section and with permission from the City or in violation of this section without permission from the City. To the maximum extent permitted by law, all obligations of the Contractor stated in 5-4 shall apply in the case of any such claims or suits.

2-4 COOPERATION AND COLLATERAL WORK. *DELETE in its entirety 4th paragraph and SUBSTITUTE with the following:*

Nothing in the Contract shall be interpreted as granting to the Contractor exclusive occupancy of the site of the project. The Contractor must ascertain to his own satisfaction the scope of the project and the nature of any other contracts that have been or may be awarded by the City in the construction of the project, to the end that the Contractor may perform this Contract in the light of such other constraints, if any.

The Contractor shall not cause any unnecessary hindrance or delay to any other contractor working on or adjacent to the project. If the performance of any Contract for the project is likely to be interfered with by the simultaneous performance of some other contract or contracts, the Engineer will decide which contractor shall cease work temporarily and which contractor shall continue or whether the work under the contracts can be coordinated so that the Contractors may proceed simultaneously. On all questions concerning conflicting interest of Contractors performing related work, the decision of the Engineer shall be binding upon the affected Contractors.

The City, the Engineer, the City Representative, and each of their officers, employees, and agents shall not be responsible for any damages suffered or extra costs incurred by the Contractor resulting directly or indirectly from the award of performance or attempted performance of any other contract or contracts on the project or caused by a decision or omission of the Engineer respecting the order of precedence in the performance of the contracts.

If, through acts of neglect on the part of the Contractor, any other contractor or any subcontractor shall suffer loss or damage on the Work, the Contractor agrees to settle with such other contractor or subcontractor by agreement or arbitration, if such other contractor or subcontractor will so settle. If such other contractor or subcontractor shall assert any claim against the City, the Engineer, the City Representative, or their consultants because of any damage alleged to have been so sustained, the City will notify the Contractor. To the maximum extent permitted by law, all obligations of the Contractor

stated in 5-4.2 shall apply in the case of the assertion of any such claims or liabilities against the City, the Engineer, the City Representative and each of their officers, employees, and agents against any such claim.

The Contractor shall cooperate with property owners, various utility companies, Subcontractors, and other interested parties within or adjacent to the limits of the work specified herein.

It shall be the responsibility of the Contractor to schedule its work and that of its Subcontractors to produce a smooth flow of work in a competent manner. All Contractors on this project shall cooperate with each other scheduling their work.

ADD the following:

2-4.1 Coordination with Other Owners and Utility Agencies. The Contractor shall be responsible for ascertaining that the coordination of all adjustments of utility structures or facilities to finished grade to be performed by other owners, agencies, and utility purveyors. Utility structures or facilities shall include but not be limited to manhole frame and cover, water valve boxes, vaults, gas valves, and other utility facilities, necessary to be adjusted in a timely manner to maintain the construction schedule (orderly sequence of work and scheduled project completion), optimize efficiency, and not cause delay. Should it become necessary to work simultaneously with other utility agencies, the Contractor shall deploy its work force to other parts of the work while simultaneously accommodating the utility agencies to perform the adjustments.

The Contractor shall make good faith effort to contact the following agencies and coordinate schedule of the adjustment of the utilities or facilities (adjustment of utilities and facilities to be performed by the following agencies) and coordinate completion of all necessary work involved, prior to City acceptance of this project.

It is the intent of this section to clarify that this is “to communicate the work to other utility agencies and utility owners for the purpose of maintaining schedule and not to be interpreted by the Contractor that he/she will be performing the actual adjustment”. Should the Contractor or bidder be in doubt as to the meaning or intent of any part thereof, he/she must contact the City or request for clarifications in writing on the City’s electronic bidding/procurement platform prior to the question submission deadline.

Payment for conformance to the requirements of this Section, to coordinate Adjustment of Utility Structures or Facilities to Grade (Adjustment of Utility Structures or Facilities to be Performed by Utility Owner, including unforeseen adjustments to be performed by other agencies, that will require the Contractor to communicate and coordinate with other utility agencies, as directed by the City, shall be deemed to be included in the various items of work (unless specifically specified under a separate bid item). No additional compensation will be allowed therefore.

2-5 THE CONTRACTOR’S EQUIPMENT AND FACILITIES.

2-5.1 General. *MODIFY to ADD the following:*

Only equipment and plants suitable to produce the quality of work and materials required will be permitted to operate on the project. Such equipment and plants shall be maintained in a good state of repair during the process of the Work. No obsolete or badly worn equipment and plants shall be used. The manufacturer’s ratings shall not be exceeded.

Plants shall be designed and constructed in accordance with general practice for such equipment and shall be of sufficient capacity to ensure a production rate of sufficient material to carry to completion within the time limit(s) specified in the Contract Documents, if any.

The Contractor's trucks shall have the company name or logo, and all vehicles and equipment shall be in good condition and appearance.

The Contractor, when requested by the Engineer, shall remove unsuitable equipment from the work site and discontinue the operation of unsatisfactory plants and equipment.

2-5.2 Temporary Utility Services. *MODIFY to ADD the following:*

The Contractor shall be responsible to provide all of their utility needs as part of the various items of work. The Contractor shall obtain water service/meter application and permit as required by the City of Anaheim-Public Utilities. Water service and meter application can be obtained at the 6th floor, 201 S. Anaheim Blvd., Anaheim, CA 92805. Application must be filed within a week after award of this contract. Allow a minimum of two weeks for the City of Anaheim-Public Utilities to process applications prior to meter installation. The permit fee is waived by the City for water service and meter installation only.

The Contractor shall be responsible for payment of all billings for water and electrical service for the planting and maintenance of the landscaping of the various areas shown on the plans until such time as the City accepts the Landscaping and Irrigation Systems.

2-6 CHANGES REQUESTED BY THE CONTRACTOR. *ADD the following after the 1st paragraph:*

The Contractor may initiate changes by submitting a written Change Order Request to the Engineer containing:

- a) Description of the proposed changes.
- b) Statement of the reason for making the changes.
- c) Reference applicable specifications sections and specific plans in support of the request.
- d) Statement of the effect on the Contract Price and Contract time.
- e) Statement on the effect on the work of separate subcontractors.
- f) Documentation supporting any change in Contract Price or Contract time as appropriate.

No change shall be made to the Plans and Specifications, except as directed by the Engineer in writing.

2-7 CHANGES INITIATED BY THE AGENCY.

2-7.1 General. *DELETE the 1st paragraph and SUBSTITUTE with the following:*

The Agency may change the Plans, Specifications, character of the work, or quantity of work under the Contract.

ADD the following:

2-7.2 Balancing Change Order. Throughout the duration of the Contract, the Contractor shall perform field measurements and associated calculations documenting the quantity of each Contract Unit Price Bid item. The Contractor shall submit the documentation to the Engineer each month prior to the date for request of the progress payment. The Engineer will independently measure and calculate the quantities. In the case of a difference in the quantities, the quantity calculated by the Engineer shall prevail. Upon completion of the Work per 3-13.1, the Contractor and the Engineer shall meet to discuss the final quantities of each Contract Unit Price Bid item. If the quantity of each item cannot be agreed upon, the quantity determined by the Engineer shall prevail.

After determination of the final quantities, the Agency will issue a Balancing Change Order for the difference between the Bid quantity and final quantity of each Contract Unit Price Bid item constructed in accordance with the Contract Documents and the associated adjustment in the Contract Price per 7-3.5.

2-10 DISPUTED WORK. *DELETE the 2nd sentence and SUBSTITUTE with the following:*

Payment shall be as later determined by 7-3, 7-4, if the Agency and Contractor agree thereto, or as fixed in a court of law.

Any claims submitted by the Contractor against the Agency for Work covered by this Contract in the amount of \$375,000 or less shall be subject to the procedures specified in Public Contract Code § 20104, *et seq.*

ADD the following:

2-11 RESOLUTION OF CONSTRUCTION CLAIMS. Contractor claims are subject to the procedures specified in Public Contract Code § 9204.

2-11.1 Claims Submission and Documentation. The Contractor may submit a claim concerning a matter properly noticed in accordance with the requirements of this Contract.

The Contractor shall furnish all claim documentation as specified herein no later than thirty (30) Calendar Days after the event or situation causing the claim has been overcome. Failure by the Contractor to furnish the required claim documentation within the time set forth above shall constitute a waiver of the Contractor's right to compensation for such claim.

The Contractor shall furnish three (3) certified copies of the required claim documentation. The claim documentation shall be complete when furnished. The evaluation of the Contractor's claim will be based upon City of Anaheim project records and the Contractor's furnished claim documentation.

Claim documentation shall conform to Generally Accepted Accounting Principles and shall be in the following format:

- a) General Introduction
- b) General Background Discussion
- c) Index of Issues (listed numerically). For each issue
 - 1) Background
 - 2) Chronology
 - 3) Contractor's position (reason for City's potential liability)
 - 4) Supporting documentation of merit or entitlement
 - 5) Supporting documentation of damages
 - 6) Begin each issue on a new page.
- d) All critical path method schedules, both as-planned, monthly updates, schedule revisions, and as-built along with the digital copies of all schedules related to the claim.
- e) Productivity exhibits (if appropriate)
- f) Summary of Issues and Damages

Supporting documentation of merit for each issue shall be cited by reference, photocopies, or explanation. Supporting documentation may include, but shall not be limited to, general conditions; general requirements; technical specifications; drawings; correspondence; conference notes; shop drawings and submittals; shop drawing logs; survey books; inspection reports; delivery schedules; test reports; daily reports; subcontracts; fragmentary CPM schedules or time

impact analyses; photographs; technical reports; requests for information; field instructions; and all other related records necessary to support the Contractor's claim.

Supporting documentation of damages for each issue shall be cited, photocopied, or explained. Supporting documentation may include, but shall not be limited to, any or all documents related to the preparation and submission of the bid; certified, detailed labor records including labor distribution reports; material and equipment procurement records; construction equipment ownership cost records or rental records; subcontractor or vendor files and cost records; service cost records; purchase orders; invoices; project as-planned and as-built cost records; general ledger records; variance reports; accounting adjustment records; and any other accounting materials necessary to support the Contractor's claim.

Each copy of the claim documentation shall be certified by a responsible officer of the Contractor in accordance with the requirements of the Standard Specifications Supplement.

Should the Contractor be unable to support any part of the claim and it is determined that such inability is attributable to falsity of such certification or misrepresentation of fact or fraud on the part of the Contractor, the Contractor shall be liable to the Owner as provided for under California Government Code Section 12650 et. seq.

ADD the following:

2-12 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 Work site operations. The Contractor shall make available those resources, reports and records necessary to effect timely and productive management meetings.

SECTION 3 – CONTROL OF THE WORK

REVISE as follows:

3-1 ASSIGNMENT. *REVISE to include the following:*

The performance of the Contract may not be assigned, except upon the written consent of the City. Consent will not be given to any proposed assignment that would relieve the original Contractor or its Surety of their responsibilities under the Contract, nor will the City consent to any assignment of any part of the Work under the Contract.

Assignment of this Contract shall contain a provision that the funds to be paid to the assignee under the assignment are subject to a prior lien for services rendered or materials supplied for performance of the work called for under the Contract in favor of all persons, firms, or corporations rendering such services or supplying such materials.

3-2 SELF PERFORMANCE.

DELETE the 1ST sentence and SUBSTITUTE with the following

The Contractor shall perform, with its own organization, Contract work amounting to at least 30 percent of the Contract Price except that any designated "Specialty Items" may be performed by subcontract and the amount of any such "Specialty Items" so performed will be deducted from the Contract Price before computing the amount required to be performed by the Contractor with its own organization.

ADD the following:

The self-performance percentage is not affected by the Federal Aid requirement specified under “Required Contract Provisions Federal Aid Construction Contracts” of these Special Provisions that the Contractor perform not less than thirty (30) percent of the original contract work with the Contractor’s own organization.

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

Before the work of any Subcontractor is started, the Contractor shall submit to the Engineer for approval a written statement showing the work to be subcontracted giving the name and business of each Subcontractor and description and value of each portion of the work to be so subcontracted.

The Contractor shall certify and provide proof that all Subcontractors to be employed under this contract are properly registered with the Department of Industrial Relations as required by California Law. Documentable proof of proper registration with designation of Subcontractors form duly completed are required to be submitted along with the bid proposal forms, and failure to comply with this provision may be deemed sufficient to render the Contractor’s bid non-responsive.

The Contractor shall not employ or otherwise use any Subcontractor, supplier, or equipment vendor at any tier that is on the City’s debarment list, the Department of Industrial Relations debarment list, or on the US General Services Administration “List of Parties Excluded from Federal Procurement and Non-Procurement Programs.”

3-4 AUTHORITY OF THE BOARD AND THE ENGINEER. *REVISE to ADD the following:*

No change shall be made to the approved Plans and Specifications, except as directed by the Engineer, in writing.

3-5 INSPECTION. *DELETE in its entirety and SUBSTITUTE with the following:*

Inspection of the Work will be conducted by a City Representative and will include monitoring and enforcing compliance of materials, equipment, installations, workmanship, methods and requirements of the Contract Documents.

The City Representative shall, always, have safe access to the Work during construction and shall be furnished with every reasonable facility for ascertaining full knowledge respecting the progress, workmanship, and character of materials and equipment used and employed in the Work.

Whenever the Contractor varies the work hours in which inspection is required, the Contractor shall give at least two (2) Working Days written notice to the City Representative.

All installations which are to be backfilled or otherwise covered will be inspected by the City Representative prior to backfilling or covering. The Contractor shall give the City Representative a minimum of two (2) days advance notice prior to backfilling or covering any part of the Work.

Work or materials concealed or performed without the prior notice specified above, will be subject to such tests or exposure as may be necessary to prove to the satisfaction of the Engineer, that all materials used, and the Work is in strict conformity with the Contract Documents. All labor and equipment necessary for exposing and testing shall be furnished and paid for by the Contractor. The Contractor shall replace, without additional cost to the City, any materials or Work damaged by exposure or testing.

Defective Work shall be made good at the Contractor's expense including any unsuitable materials and equipment that may have been previously inspected by the City Representative, and/or that payment therefore has been included in an estimate for payment.

Inspection of the Work shall not relieve the Contractor of the obligation to fulfill all requirements of the Contract.

All submittals and correspondence between the City and the Contractor, related to inspection of the Work of this Contract, shall be directed to the Engineer.

City material inspection and workmanship inspection is solely for the benefit of the City. The Contractor is responsible for providing all materials and workmanship in conformance with the Contract Documents. Upon request, the Contractor shall provide the City with copies of their Quality Control procedures and results of the inspections they have performed. If the Contractor requires inspection to ensure conformance of the material and workmanship and meet the contract documents this inspection is at their cost. The City will provide Quality Assurance as the City sees fit and will notify the Contractor of any deficiencies observed as soon as practical. Quality Control of all materials and workmanship including Contractor provided inspection services shall be included in the various items of Work and therefore no additional compensation shall be provided.

If there is a dispute with rejected materials or work the Contractor shall submit their Quality Control procedures, reports, results, and testing activities to prove the work or material does conform to the Contract requirements. Failure by the Contractor to have or follow their Quality Control procedures shall be grounds for rejection of the materials or work related to the rejected materials.

ADD the following:

3-5.1 Inspection Requirements. The Contractor shall notify the City Representative a minimum of two (2) Working Days before inspection is required.

- a) Unless specified elsewhere in the Special Provisions, inspection of the Work will be provided by the City between the hours of 8:30 a.m. and 3:30 p.m., Monday through Friday, exclusive of City holidays. The Contractor at the prevailing rate of 1 1/2 times the regular hourly wage rate, and overhead costs shall pay for any inspections requested by or made necessary because of the actions of the Contractor beyond the hours stated above.

The Contractor shall submit a request to the Engineer for approval, a minimum of five (5) Working Days, in advance of inspections requested by or made necessary as a result of the actions of the Contractor on Saturdays, Sundays or City and Federal holidays. The Contractor shall pay for these inspections at the prevailing rate of 1-1/2 times for Saturdays and two (2) times the regular hourly wage rate for Sundays or City and/or Federal holidays plus associated overhead costs.

For purposes of this section, the following holidays are observed by the City:

<u>DATE</u>	<u>EVENT</u>
January 1	New Year's Day
Third Monday in January	Martin Luther King's Birthday
Third Monday in February	President's Day
Last Monday in May	Memorial Day

July 4	Independence Day
First Monday in September	Labor Day
November 11	Veteran's Day
Fourth Thursday in November	Thanksgiving Day
Fourth Friday in November	Day after Thanksgiving
December 25	Christmas Day

- b) The Contractor shall telephone the designated City Representative at least two (2) Working Days prior to starting construction or resuming construction following suspension of the Work for any reason.

Prior to commencing any work on the Contract, the Contractor shall submit a completed Inspection Overtime Permit form provided by the City of Anaheim.

ADD the following:

3-5.2 Overtime Inspection Costs. The Contractor is hereby notified that he/she is responsible for all overtime inspection costs incurred by the City for all Work performed at the discretion of the Contractor outside working hours in 3-5.1.

The Contractor will be notified in writing of all overtime inspection costs incurred by the City.

Payment for overtime inspection costs will be withheld from progress payments to the Contractor if not paid when invoiced.

ADD the following:

3-5.3 Re-Inspections

Should status of completion of Work require re-inspection(s) by the City due to failure of the Contractor to comply with the City's claims on the initial inspection, the City may deduct the cost for re-inspection services from the final payment to the Contractor. Observed deficiencies of more than ten (10) will be reason for re-inspection.

Inspections initiated at the request of the City will not be subject to the provisions of this Subsection.

3-6 THE CONTRACTOR'S REPRESENTATIVE. *DELETE in its entirety and SUBSTITUTE with the following:*

Before starting the Work, the Contractor shall designate in writing, a representative who shall have complete authority to act for it. The Contractor shall file with the Engineer the addresses and telephone numbers where he or his representative may be reached during hours when the Work is not in progress, so that twenty-four (24) hour, seven (7) day a week contact can be maintained. An alternative representative may be designated as well. Said authorized representative shall be always present at the site of the Work while Work is in progress for the Contract. When Work is not in progress and during periods when Work is suspended, arrangements acceptable to the City Representative shall be made for any emergency work, which may be required.

Any order or communication given to this representative shall be deemed delivered to the Contractor. A joint venture shall designate only one representative and an alternate. In the absence of the Contractor or its authorized representative, instructions or directions may be given by the Engineer to the superintendent, foreman or person in charge of the specific work to which the order applies. Such an order shall be complied with promptly and referred to the Contractor or its representative.

The failure of the designated representative 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 of the representative from the Work per 5-3.1.

The City reserves the right to approve the Contractor's Superintendent. Once approved, the Superintendent shall remain on the project for the duration of the project so long as he is in the employment of the Contractor.

In order to communicate with the Agency, the Contractor's representative, superintendent, or person in charge of specific work shall be able to speak, read, and write the English language.

ADD the following:

3-6.1 Contractor's Personnel. No personnel shall be employed on any work under these specifications that are found to be incompetent, disorderly, troublesome, intemperate, or otherwise objectionable. Any employee who fails or refuses to perform the work properly and acceptably, as determined by the City's Representative, shall be immediately removed from work on the City contract.

All personnel shall wear all required personal protective equipment, including, but not limited to: reflective safety vests and other required safety gear when working on the project site and/or within the public right of way.

The Contractor shall have the ability to contact their field crews within thirty (30) minutes of notification by the City during normal working hours.

The Contractor shall respond to an emergency no later than two (2) hours after notification. If Contractor does not respond to the emergency within 2 hours, the City can exercise outside crews and be reimbursed by the Contractor for all costs incurred.

3-7 CONTRACT DOCUMENTS.

3-7.1 General. *REVISE to include the following:*

If, in the opinion of the Contractor, the Work to be done or any matter relative thereto is not sufficiently detailed or explained in the Plans or Specifications, the Contractor shall apply to the Engineer for such further explanation as may be necessary and shall conform to such explanation or interpretation as part of the Contract.

In the event of any discrepancy between any scaled dimensions on the Plans and the figures written thereon, the figures shall be taken as correct.

If a discrepancy or inconsistency is discovered in the Plans, Specifications or Contract Documents for the Work in relation to any such law, ordinance, regulation, order or decree, the Contractor shall forthwith report the same to the Engineer in writing, otherwise the provisions of 3-7.2 shall govern.

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

The precedence of the Contract Documents shall be as follows:

- a) All applicable laws, ordinances, codes, and permits issued by jurisdictional regulatory agencies.

- b) Change Orders; whichever occurs last.
- c) Contract /Agreement.
- d) Addenda.
- e) Bid / Proposal.
- f) Special Provisions.
- g) Technical Provisions.
- h) Construction Plans.
- i) City of Anaheim Standard Details.
- j) City of Anaheim Standard Specifications Supplement
- k) Standard Plans and Standard Specifications for Public Works Construction (SSPWC) 2021 edition.
- l) Reference Specifications.

Detail drawings shall take precedence over general drawings.

ADD the following:

3-7.3 As-Built Plans. Prior to the start of the Work, the Contractor shall identify and maintain for the Engineer a complete set of As-Built Plans and Specifications on the Work site at all times. Final locations determined in the field per Section 5-9.2, and any deviations from the Plans and Specifications, shall be marked in red to show the as-built conditions. The Contractor shall update this set daily, showing every change from the original, as-advertised set, including exact as-built locations, sizes and types of underground piping, valves, equipment, and all other work or obstructions not visible at surface grade.

The As-Built Plans shall graphically show all as-built conditions, locations, configurations, and other details which vary from the details shown on the originals including all revisions made necessary by Addenda, Change Orders, and to meet field conditions.

In the case of details shown on the Plans which are superseded by approved Working Drawings or Shop Drawings, the As-Built Plans shall be updated by noting or graphically showing how those details are superseded.

Prior to submitting each monthly progress payment request, the Contractor shall request the City Representative's approval of the current As-Built Plans. The City Representative's approval will be a prerequisite to approval of requests for each progress and final invoice payment. If the As-Built Plans are not forwarded to the City Representative twenty-one (21) days prior to submitting the final invoice for review and acceptance, the retention will continue to be withheld from the final invoice.

The Contractor shall submit the final As-Built Plans to the Engineer per 3-14.

3-8 SUBMITTALS.

3-8.1 General. *REVISE to include the following:*

The review period is ten (10) Working Days for each submittal or resubmittal.

In providing a letter of transmittal for each specified submittal, the Contractor shall certify that they are complete in all respects, and all materials, equipment, and other work shown thereon conforms to the Contract Documents.

A separate letter of transmittal shall be used for each specific item or class of materials or equipment for which a submittal is required. Submittals transmitted by facsimile will not be accepted.

The City will return any submittal sent without a transmittal letter, with an incomplete form, or sent by facsimile.

The Contractor shall assign a unique sequential number to each submittal package, which shall be clearly written in the space provided on the transmittal letter. This number shall be used in all correspondence to the City when referencing a particular submittal. The Contractor shall be responsible for ensuring the same submittal number is not assigned to different submittal packages.

Resubmittals shall incorporate the original submittal number followed by the revision number (i.e., the first resubmittal of submittal #1 is numbered 1R1, the second 1R2, etc.). The City will return improperly numbered submittals without review. The Contractor shall indicate on the transmittal letter that either no exceptions to the Contract Documents are taken, or deviations are submitted. All deviations indicated shall be listed on the transmittal letter and the Contractor shall be solely responsible for any omitted deviations. Approval by the City of any submittal does not extend to deviations that are not identified on the transmittal. If any deviations are omitted, the City will return the submittal and the engineering data without review for resubmittal. Any consequences from the resulting delay shall be fully borne by the Contractor.

The Engineer's review of the Contractor's submittals will cover only general conformity to the Contract Documents. The Engineer's acceptance of drawings returned marked NO EXCEPTION TAKEN or RESUBMITTAL NOT REQUIRED (CORRECTIONS ARE NOTED) shall not constitute a blanket approval of dimensions, qualities, and details of the materials, equipment, device, or item shown, and does not relieve the Contractor from any responsibility for errors, omission, or deviations from conforming to the Contract Documents. The City reserves the right to reject any previously accepted equipment, material, and/or construction method that deviates from the Contract Documents. When the drawings and data are returned marked CORRECT AND RESUBMIT, the corrections shall be made as noted thereon and as instructed by the Engineer, resubmittal shall be made in the same manner as the original submittal.

If the Engineer rejects the submittals, the Contractor is responsible for any subsequent time delays at no additional compensation from the City. Subject to these requirements, drawings and data, after final processing by the Engineer, shall become a part of the Contract Documents, and the work shown or described thereby shall be performed in conformity therewith unless otherwise required by the Engineer. In the event of conflict between accepted submittals and the other Contract Documents, the most stringent requirements shall apply unless the City has agreed in writing to less stringent requirements in response to a deviation listed on a submittal letter of transmittal.

No portion of the Work requiring a submittal shall be commenced until the submittal has been reviewed by the Engineer and returned to the Contractor with a notation indicating that resubmittal is not required.

The review by the Engineer is only of general conformance with the design concept of the project, and general compliance with the Contract Documents and shall not be construed as relieving the Contractor of these full responsibilities for providing materials, equipment, and work required by the Contract; the proper fitting and construction of the Work; the accuracy and completeness of the submittals; selecting fabrication processes and techniques of construction; and performing the Work in a safe manner.

3-8.2 Working Drawings. *DELETE the last paragraph and SUBSTITUTE with the following:* Working Drawings listed above as Items 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, and 14 shall be prepared by a Civil or Structural Engineer registered in the State of California.

ADD the following:

3-8.7 Pre-Construction Submittals. The Contractor shall submit the following within twenty one (21) days after receipt of the Notice of Award:

- a) Permits to be obtained by the Contractor per 2-2.
- b) List of all Subcontractors per 3-3.
- c) Submittal Schedule per 3-8.8.
- d) Contract information signs shop drawing per 3-11
- e) WPCP per 3-12.6
- f) Shoring Plan per 5-7.2.2 and 306-4.
- g) Baseline Construction Schedule per 6-1.1.
- h) Detailed schedule for the Lump Sum Bid item(s) specified in 7-2.
- i) Contractor's Emergency Contact List
- j) Traffic Control Plan (TCP) per 601-2
- k) Equipment List
- l) Equipment Staging Plan
- m) USA DigAlert Ticket Notification per 402-1.1
- n) Not limited to long lead Equipment and Materials required to be ordered per the City of Anaheim Traffic Engineering Specifications for Traffic Signal and Safety Lighting Facilities and the Intelligent Transportation System (ITS) Special Provisions.

ADD the following:

3-8.8 Submittals Schedule. The Contractor shall prepare a schedule listing the submittals it has identified as being required and the date upon which each submittal will be made. Each submittal shall be identified on the baseline construction schedule and each update as an individual activity. The Agency review time frame specified in 3-8.1 shall be reflected on the submittal schedule and shown as an individual activity.

3-10 SURVEYING.

3-10.1 General. *DELETE in its entirety and SUBSTITUTE with the following:*

When monuments exist that control the location of subdivisions, tracts, boundaries, roads, streets, or highways, or provide horizontal or vertical survey control and may be destroyed during construction improvement or maintenance projects, the monuments are legally required to be perpetuated, as defined in Section 8771(b) of the Professional Land Surveyors Act. The monuments perpetuated

shall be according to the requirements set forth in the Professional Land Surveyors Act, the Board Rules, and any other applicable law.

It is the Contractor's responsibility prior to the start of any construction activity to contact the City Surveyor at (714) 765-4648 to coordinate the perpetuation of any existing monument that may be disturbed. The Contractor shall contact the City Surveyor a minimum of (2) Two Working Days before any monument is disturbed. If the Contractor fails to notify the City Surveyor resulting in the disturbance of a monument, the City will re-establish the position of the monument pursuant to the Professional Land Surveyors Act and the Contractor will be charged \$10,000.00 per monument. The cost thereof will be deducted from monies due or to become due the Contractor.

ADD the following:

3-10.3 Survey Service. The City of Anaheim Survey Section is responsible for providing construction surveys to establish "control stakes", also known as "grade stakes," for line and grade as shown on the approved Plans, for project construction. From these "control stakes" the contractor provides and sets, when needed, supplemental "working stakes". The City's basic policy regarding City of Anaheim Survey Section-furnished construction survey is to provide the necessary control stakes and information to establish the lines and grades as shown on the approved Plans required for the completion of the Work.

The Contractor shall submit a survey request to the City Surveyor a minimum of two (2) Working Days in advance of any required staking. The Contractor shall provide a clear and safe area as required by the City Surveyor, including any required traffic control required to provide sufficient access for all requested offsets. The City's Surveyor, or designated representative, will be solely responsible for determining the limits required for any traffic control implementation. The Contractor's failure to provide a sufficiently safe work zone will result in the City Surveyor canceling the survey request. If a survey request is canceled due to an unsafe work zone, the Contractor shall be required to submit a new survey request and abide by the minimum two (2) Working Days' notice for any required staking. The Contractor shall submit suitable requests for City-furnished "control stakes", ensuring that the requested staking area is ready for stakes and that the stakes will begin to be used within five (5) days of staking. The Contractor shall make reasonable efforts to preserve construction survey stakes and marks for the duration of their usefulness. Any re-staking caused solely by the actions/inactions of the Contractor shall be at the expense of the Contractor. Upon completion of staking by City surveyors, the Contractor shall ensure complete understanding of the survey stakes provided. Working stakes used by the Contractor when performing the Work are the Contractor's responsibility and are to be set by the Contractor's forces from City-furnished "control stakes".

Costs for re-staking "control stakes" required by the City Surveyor, lost time from the Contractor's failure to provide an accessible site, or the Contractor's misinterpretation of survey data will be charged to the Contractor; and the Contract Sum will be adjusted by Change Order. Additionally, costs associated with cancellations of scheduled survey services within one (1) Working Day or the Contractor's failure to meet the City Surveyor or designated representative the scheduled time will be charged to the Contractor accordingly as determined by the City.

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

At a minimum of seven (7) Days prior to the start of construction, the Contractor shall furnish and install two (2) information signs, one (1) at each end of the project. The Contractor shall have and can use a total of four (4) signs to work on two street projects simultaneously, or as otherwise directed. As a minimum, the information on the signs shall include the following:

- a) Project name and limits
- b) Start and completion season for construction
- c) Mayor and City Council Member for the District
- d) Specific funding information and Department logos
- e) Information phone number (714) 765-5079 or 311

The layout of the construction information sign shall be in accordance with the City Standard Detail 175 included in the Special Provisions. Each sign shall be constructed on two wooden signposts in accordance with Caltrans Standard Plans RS1 and RS2. The Contractor shall submit to the Engineer for approval a shop drawing of the proposed information signs in accordance with Section 3-8.1. The shop drawing shall include, at a minimum, the proposed signboard size, material, and color, letter sizes and colors, and the proposed locations where the signs will be installed.

For State and Federally funded projects, the layout of the Project Information Signs shall be in accordance with California MUTCD Latest edition, not per Section 3-11 described above. Where the California MUTCD does not specify material, sign height, proposed locations and other relevant information, notes from City Standard Detail 175 shall be used.

Payment will be made at the contract unit price bid per Each (EA) sign furnished and installed shall include all work including maintenance, graffiti removal, and removal from the site. No additional compensation will be allowed therefore.

3-12 WORK SITE MAINTENANCE.

3-12.1 General. *REVISE to include the following:*

Materials and equipment shall be removed from the site as soon as they are no longer necessary. Before the final inspection, the site shall be cleared of equipment, unused materials, rubbish, and all markings placed by the Contractor, the City, Survey, Underground Service Alert (USA), or other agent(s)' markings necessary for the performance of various items of work. These markings shall include, but not limited to paint, stakes, and metal tags.

Before the final inspection, the site shall also be cleared of all detour traffic signs and equipment, including all detour signs posted or attached to power poles, street light structures, utility poles or structures, etc., all inclusive of the project. All detour traffic signs installed and posted by others and are not a part of the contracted work shall remain and shall be protected in place.

DELETE 2nd paragraph in its entirety and SUBSTITUTE with the following:

The Contractor shall furnish and operate a motorized street sweeper equipped with brooms, vacuum suction, and a functional water spray system over paved areas within the Work site, along paved haul routes, as directed by the field inspector, and at the end of each Working Day. The Contractor shall also sweep the sidewalks either manually or with a motorized sweeper. 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. The cost of all clean up shall be included in the price bid for the various items of Work and no additional payment will be made for the cleanup measures. If the Contractor fails to perform the work above specified, the City may perform that work and the cost thereof will be deducted from monies due or to become due the Contractor.

Before the final inspection, the Contractor shall:

- a) Clear the Work site of equipment, unused materials, rubbish, and all markings placed by the Contractor, the City, Underground Service Alert (USA), or other agent(s) markings necessary for the performance of the Work. These markings shall include, but not limited to paint, stakes, and metal tags.
- b) The Work site shall also be cleared of all detour traffic signs and equipment, including all detour signs posted or attached to power poles, street light structures, utility poles or structures, etc., all inclusive of the project. All detour traffic signs installed and posted by others.

Payment for Worksite Maintenance, Cleanup, Marking Removal and Dust Control shall be considered as included in the Contract Unit Price for the various Bid items.

3-12.2 Air Pollution Control.

ADD the following:

3-12.2.1 Smog Control. All Contractor's equipment shall meet the requirements of the State of California, and all local requirements including the South Coast Air Quality Management District. In addition, extreme precautions shall be exercised by the Contractor to minimize the escaping of smoke into the air by either the machine or the burning of the pavement during the heater-planning process, if the smoke problem becomes excessive, it may be necessary to add an additional blower system to reduce the problem. No additional compensation will be made for any necessary steps required to reduce the smoke.

3-12.3 Noise Control. *DELETE the 1st sentence and SUBSTITUTE with the following:*

The Contractor shall comply with the City Municipal Code on noise and noise control during their Work. All engine powered construction equipment shall be equipped with a muffler in good working order. All additional measures required to mitigate noise such as sound blankets and noise barriers shall be included in the cost of various bid items and no additional compensation shall be provided.

3-12.4 Storage of Equipment and Materials.

3-12.4.1 General. *REVISE to include the following:*

No storage in the public Right of Way shall be permitted. The Contractor shall obtain a construction yard at their cost to store all equipment and materials. Provide a copy of the construction yard agreement on private property to the Engineer. The construction yard shall be included in the bid price for various items of work and no additional compensation or time shall be provided for any equipment or material storage or logistical issue.

3-12.4.2 Storage in Public Streets. *DELETE the first paragraph and SUBSTITUTE with the following:*

No equipment or material storage will be allowed within the project area during non-working hours for the duration of construction. Unused equipment or material (including the displaced material) shall be removed and stored offsite (in a fenced and screened area) daily.

Payment for conformance to the requirements of this section shall be deemed to be included in the price bid for the various items of work. No additional compensation will be allowed therefore.

ADD the following:

3-12.4.3 Construction Cleaning. The Contractor shall:

- a) Initiate and maintain a daily program to prevent accumulation of debris on-site and along access roads and haul routes. Maintain areas under Contractor's control free of waste materials, debris, weeds 6" high, and rubbish. Maintain site in a clean and orderly condition.
- b) Provide suitable covered containers for depositing debris and rubbish. Dispose of accumulation of extraneous materials, prohibit overloading of trucks to prevent spillages on access and haul routes and provide daily inspection of haul routes to enforce requirements.
- c) The Contractor shall supply self-loading motorized street sweepers equipped with a functional water spray system and functional vacuum suction system as part of his daily program.
- d) Schedule at a minimum, weekly collection, and disposal of debris from Contractor's construction yard. Provide additional collections and disposals of debris whenever the weekly schedule is inadequate to prevent accumulation.

The Contractor shall remove debris from closed or remote spaces prior to closing the space, control cleaning operations to minimize dust and other particulates and immediately remove clay and earth which adhere to the paved surface of the roadway. Remove by hand scraping, washing, sweeping, and/or other method(s) which will leave a clean non-skid surface without impairing, injuring, or loosening the surface.

The Contractor shall be aware that the City of Anaheim has entered into franchise agreements with waste management companies and all construction debris removal shall conform to the existing agreements the City has. The Contractor shall either self-perform debris hauling or shall hire a company in conformance with the existing franchise agreements. Currently Republic Services has an exclusive franchise and can be reached at (800) 700-8610.

The Contractor shall remove waste materials, debris, vegetation, other rubbish, and non-recyclable materials as required by the Contract Documents and dispose of off-site in an approved disposal site or recycling center.

Unless otherwise specified in the Special Provisions, all concrete, asphalt, aggregate or sand base material, cement block, trees, shrubs, bushes, and all other recyclable material generated during cleaning, demolition, clearing and grubbing or other phases of the work is to be disposed of at appropriate recycling centers. The Contractor shall be responsible for removing reinforcing steel, wood, or other deleterious materials as required by the recycling center for acceptance of recycled materials. The Contractor shall supply proof of disposal at a recycling center. The proof of disposal shall include verification of tonnage by certified weigh masters' tickets. If weigh masters tickets are not feasible, the Contractor and City Representative shall estimate the tonnage prior to disposal at the recycling centers.

The Contractor is required to control dust throughout the life of the Contract. Control may be required by job conditions or City Representative. In any case, the Contractor shall use water or other means to control the dust. No chemical agents may be used without written authorization from the City. The Contractor shall be solely responsible for safety problems, accidents or any other complications or claims arising from inadequate dust control.

No separate payment will be made for any work performed or material used to control dust resulting from the Contractor's performance of the Work inside or outside the right of way. Full compensation for such dust control will be considered as included in the price paid for the various items of work involved.

No separate payment will be made for any work performed or material used in cleaning the project. Full compensation for such cleaning shall be considered as included in the price paid for the various items of work involved and no additional compensation will be allowed therefor.

If the Contractor fails to perform Construction Cleaning under this section, the City may perform the work and deduct the amount from the Contractor's invoice for the City's actual cost.

ADD the following:

3-12.4.4 Material Management.

3-12.4.4.1 General. The Contractor shall prevent the discharge of material into the air, storm drain systems, sewer system, ground infiltration and receiving waters while taking delivery of, using, or storing the following materials:

- a) Hazardous chemicals, including acids, lime, glues, adhesives, paints, solvents, and curing compounds
- b) Soil stabilizers and binders
- c) Fertilizers
- d) Detergents
- e) Plaster
- f) Petroleum materials, including fuel, oil, and grease
- g) Asphalt and concrete components
- h) Pesticides and herbicides.

The Contractor's employees trained in emergency spill cleanup procedures must be present during the unloading of hazardous materials or chemicals. The Contractor shall use the least hazardous materials practicable.

The following activities must be performed at least one hundred (100) feet from concentrated flows of stormwater, drainage courses, and inlets if within the floodplain and at least fifty (50) feet if outside the floodplain, unless otherwise authorized:

- a) Stockpiling materials
- b) Storing pile-driving equipment, drilling equipment and liquid waste containers
- c) Washing vehicles and equipment in outside areas
- d) Fueling and maintaining vehicles and equipment

3-12.4.4.2 Material Storage. If materials are stored by the Contractor, they shall:

- a) Store liquids, petroleum materials, and substances listed in 40 CFR 110, 117, and 302 and place them in secondary containment facilities as specified by USDOT for storage of hazardous materials.
- b) Ensure that secondary containment facilities are impervious to the materials stored there for a minimum contact time of seventy-two (72) hours.
- c) Cover secondary containment facilities during nonworking days and whenever precipitation is forecasted. Secondary containment facilities must be adequately ventilated.
- d) Keep secondary containment facilities free of accumulated rainwater or spills. After precipitation, or in the event of spills or leaks, collect accumulated liquid and place it into

drums within twenty four (24) hours. Handle the liquid as hazardous waste in accordance with existing law.

- e) Not store incompatible materials, such as chlorine and ammonia, in the same secondary containment facility.
- f) Store materials in their original containers with the original material labels maintained in legible condition. Immediately replace damaged or illegible labels.
- g) Ensure that secondary containment facilities have the capacity to contain precipitation from a 24-hour-long, 25-year storm, plus 10 percent of the aggregate volume of all containers or the entire volume of the largest container within the facility, whichever is greater.
- h) Store bagged or boxed material on pallets. Protect bagged or boxed material from wind and rain during nonworking days and whenever precipitation is forecasted.
- i) Provide sufficient separation between stored containers to allow for spill cleanup or emergency response access. Storage areas must be kept clean, well-organized, and equipped with cleanup supplies appropriate for the materials being stored.
- j) Repair or replace perimeter controls, containment structures, covers, and liners as necessary. Inspect storage areas before and after precipitation and at least weekly during other times.

3-12.4.4.3 Stockpile Management. The Contractor shall minimize stockpiling of materials at the job site and implement water pollution control practices within 72 hours of stockpiling material or before a forecasted storm event, whichever occurs first. If stockpiles are being used, do not allow soil, sediment, or other debris to enter storm drains, open drainages, and watercourses.

Active and inactive soil stockpiles must be:

- a) Covered with soil stabilization material or a temporary cover
- b) Surrounded with a linear sediment barrier

Stockpiles of asphalt concrete and PCC rubble, HMA, aggregate base, or aggregate subbase must be:

- a) Covered with a temporary cover
- b) Surrounded with a linear sediment barrier

Stockpiles of pressure-treated wood must be:

- a) Placed on pallets
- b) Covered with impermeable material

Stockpiles of cold mix asphalt concrete must be:

- a) Placed on an impervious surface
- b) Covered with an impermeable material
- c) Protected from stormwater run-on and runoff

The Contractor shall control wind erosion year-round.

The Contractor shall repair or replace linear sediment barriers and covers as needed to keep them functioning properly. Whenever sediment accumulates to 1/3 of the linear sediment barrier height, remove the accumulated sediment.

3-12.4.4.4 Waste Management.

- a) **Paint Waste.** The Contractor shall clean water-based and oil-based paint from brushes or equipment within a contained area in a way that does not contaminate soil, receiving waters, or storm drain systems. Handle and dispose of the following as hazardous waste: paints, thinners, solvents, residues, and sludge that cannot be recycled or reused. When thoroughly dry, dispose of the following as solid waste under dry latex paint, paint cans, used brushes, rags, absorbent materials, and drop cloths.
- b) **Concrete Waste.** The Contractor shall use practices to prevent the discharge of asphalt concrete, PCC, and HMA waste into storm drain systems and receiving waters. The Contractor shall collect and dispose of asphalt concrete, PCC, and HMA waste at locations where:
- 1) Concrete material, including grout, is used.
 - 2) Concrete dust and debris result from demolition.
 - 3) Saw cutting, coring, grinding, grooving, or hydro-concrete demolition creates a residue or slurry.
 - 4) Concrete trucks or other concrete-coated equipment is cleaned at the job site.
- c) **Sanitary and Septic Waste.** The Contractor shall not bury or discharge wastewater from a sanitary or septic system anywhere at the site of Work. A sanitary facility discharging into a sanitary sewer system must be properly connected and free from leaks. The Contractor shall place a portable sanitary facility at least 50 feet away from storm drains, receiving waters, and flow lines. The Contractor shall comply with local health agency provisions if using an on-site disposal system.
- d) **Liquid Waste.** The Contractor shall use practices that will prevent job-site liquid waste from entering storm drain systems and receiving waters. Liquid wastes include the following:
- 1) Drilling slurries or fluids
 - 2) Grease-free and oil-free wastewater and rinse water
 - 3) Dredgings, including liquid waste from cleaning drainage systems
 - 4) Liquid waste running off a surface, including wash or rinse water
 - 5) Other non-stormwater liquids not covered by separate permits.

The Contractor shall hold liquid waste in structurally sound, leak-proof containers, such as roll-off bins or portable tanks. Liquid waste containers must be of sufficient quantity and volume to prevent overflow, spills, and leaks.

The Contractor shall store containers at least 50 feet from moving vehicles and equipment.

The Contractor shall remove and dispose of deposited solids from sediment traps in accordance with 3-12 of the Standard Specifications and the Standard Specifications Supplement. Liquid waste may require testing to determine hazardous material content before disposal.

The Contractor shall dispose of drilling fluids and residue.

If an authorized location is available within the job site, fluids and residue exempt under 23 CA Code of Regs § 2511(g) may be dried by evaporation in a leak-proof container. The Contractor shall dispose of the remaining solid waste in accordance with 3-12 of the Standard Specifications and this Supplement.

e) Non-Stormwater Management.

Water Control and Conservation. The Contractor shall manage water used for work activities in a way that will prevent erosion and the discharge of pollutants into storm drain systems and receiving waters. Obtain authorization before washing anything at the job site with water that could discharge into a storm drain system or receiving waters. Report discharges immediately.

The Contractor shall implement water conservation practices if water is used at the job site. Inspect irrigation areas. Adjust watering schedules to prevent erosion, excess watering, or runoff. Shut off the water source to broken lines, sprinklers, or valves and repair breaks within 24 hours. Reuse water from waterline flushing for landscape irrigation if practicable. Sweep and vacuum paved areas. Do not flush paved areas with water to clean them.

The Contractor shall direct runoff water, including water from water line repair, from the job site to areas where it can infiltrate into the ground. Do not allow runoff water to enter storm drain systems and receiving waters. Do not allow spilled water to escape filling areas for water trucks. Direct water from off-site sources around the job site if practicable. Minimize the contact of off-site water with job site water.

f) Illicit Connection and Illegal Discharge Detection and Reporting. Before starting work, the Contractor shall inspect the job site and the job site's perimeter for evidence of illicit connections, illegal discharges, and dumping. After starting work, inspect the job site and perimeter on a daily schedule for illicit connections and illegal dumping and discharges.

Whenever illegal connections, discharges, or dumping are discovered, The Contractor shall notify the Engineer immediately, should take no further action unless ordered and assume that unlabeled or unidentifiable material is hazardous.

The Contractor shall look for the following evidence of illicit connections, illegal discharges, and dumping:

- 1) Debris or trash piles
- 2) Staining or discoloration on pavement or soils
- 3) Pungent odors coming from drainage systems
- 4) Discoloration or oily sheen on water
- 5) Stains and residue in ditches, channels, or drain boxes
- 6) Abnormal water flow during dry weather
- 7) Excessive sediment deposits
- 8) Nonstandard drainage junction structures
- 9) Broken concrete or other disturbances at or near junction structures.

g) Vehicle and Equipment Cleaning. The Contractor shall limit vehicle and equipment cleaning or washing at the job site except for what is necessary to control vehicle tracking or hazardous waste. The Contractor shall notify the Engineer before cleaning vehicles and

equipment at the job site with soap, solvents, or steam and contain and recycle or dispose of resulting waste under 5-7.4. The Contractor shall not use diesel to clean vehicles or equipment and minimize the use of solvents.

The Contractor shall clean or wash vehicles and equipment in a structure equipped with disposal facilities. The Contractor may wash vehicles in an outside area if the area is:

- 1) Paved with asphalt concrete, HMA, or PCC
- 2) Surrounded by a containment berm
- 3) Equipped with a sump to collect and dispose of wash water.

The Contractor shall use as little water as practicable whenever washing vehicles and equipment with water and hoses used must be equipped with a positive shutoff valve.

The Contractor shall discharge liquid from wash racks to a recycling system or to another authorized system. Remove liquids and sediment as necessary.

h) Vehicle and Equipment Fueling and Maintenance. If practicable, the Contractor shall perform maintenance on vehicles and equipment off-site.

If fueling or maintenance must be performed at the job site, the Contractor shall assign a site or sites, and obtain authorization before using them. The Contractor shall minimize mobile fueling and maintenance activities. The Contractor's fueling and maintenance activities must be performed on level ground covered with an impervious material approved in the WPCP in areas protected from stormwater run-on and runoff.

The Contractor shall use containment berms or dikes around fueling and maintenance areas.

Keep adequate quantities of absorbent spill-cleanup material and spill kits in the fueling or maintenance area and on fueling trucks. The Contractor shall dispose of spill-cleanup material and kits immediately after use and use drip pans or absorbent pads during fueling or maintenance.

The Contractor shall not leave fueling or maintenance areas unattended during fueling and maintenance activities. The Contractor's fueling nozzles must be equipped with an automatic shutoff control. The Contractor shall use equipment with vapor-recovery fueling nozzles where required by the Air Quality Management District, secure nozzles in an upright position when not in use and shall not top off fuel tanks.

The Contractor shall recycle or properly dispose of used batteries and tires.

If leaks cannot be repaired immediately, the Contractor shall remove the vehicle or equipment from the job site.

i) Material and Equipment Used Over Water. The Contractor shall place drip pans and absorbent pads under vehicles and equipment used over water, keep an adequate supply of spill-cleanup material with vehicles and equipment, place drip pans or plastic sheeting under vehicles and equipment on docks, barges, or other surfaces over water whenever vehicles or equipment will be idle for more than one (1) hour.

The Contractor shall furnish watertight curbs or toe boards on barges, platforms, docks, or other surfaces over water to contain material, debris, and tools and shall secure material to prevent spills or discharge into the water due to wind.

The Contractor shall report discharges to receiving waters immediately upon discovery and shall submit a discharge notification.

- j) Structure Removal Over or Adjacent to Water.** The Contractor shall not allow demolished material to enter storm drain systems and receiving waters, use authorized covers and platforms to collect debris, use attachments on equipment to catch debris during small demolition activities and empty debris-catching devices daily and dispose of debris in accordance with 3-12 of the Standard Specifications and this Supplement.
- k) Paving, Sealing, Saw Cutting, Grooving, and Grinding Activities.** The Contractor shall prevent material from entering storm drain systems and receiving waters including:
- 1) Cementitious material
 - 2) Asphaltic material
 - 3) Aggregate or screenings
 - 4) Saw cutting, grooving, and grinding residue
 - 5) Pavement chunks
 - 6) Shoulder backing
 - 7) Methacrylate
 - 8) Sandblasting residue.

The Contractor shall cover drainage inlets and use linear sediment barriers to protect downhill receiving waters until paving, sealing, saw cutting, grooving, and grinding activities are completed, and excess material has been removed and cover drainage inlets and manholes during the application of seal coat, tack coat, slurry seal, or fog seal.

Whenever precipitation is forecasted, the Contractor shall limit paving, saw cutting, and grinding to places where runoff can be captured.

The Contractor shall not start seal coat, tack coat, slurry seal, or fog seal activities whenever precipitation is forecasted during the application and curing period and shall not excavate material from existing roadways during precipitation.

The Contractor shall use a vacuum to remove slurry immediately after slurry is produced and shall not allow the slurry to run onto lanes open to traffic or off the pavement.

The Contractor shall collect the residue from PCC grooving and grinding activities with a vacuum attachment on the grinding machine. The Contractor shall not leave the residue on the pavement or allow the residue to flow across pavement.

The Contractor shall not coat asphalt trucks and equipment with substances that contain soap, foaming agents, or toxic chemicals.

The Contractor shall park paving equipment over drip pans or plastic sheeting with absorbent material to catch drips if the paving equipment is not in use.

- l) Thermoplastic Striping and Pavement Markers.** The Contractor shall not preheat, transfer, or load thermoplastic within 50 feet of drainage inlets and receiving waters.

The Contractor shall not unload, transfer, or load bituminous material for pavement markers within 50 feet of drainage inlets and receiving waters.

The Contractor shall collect and dispose of bituminous material from the roadway after removing markers.

- m) Pile Driving.** The Contractor shall keep spill kits and cleanup materials at pile driving locations; park pile driving equipment over drip pans, absorbent pads, or plastic sheeting with absorbent material; protect pile driving equipment by parking on plywood and covering with plastic whenever precipitation is forecasted.

The Contractor shall store pile driving equipment on level ground and protect it from stormwater run-on when not in use. Use vegetable oil instead of hydraulic fluid if practicable.

- n) Concrete Curing.** The Contractor shall not overspray chemical curing compounds and shall not allow runoff of curing compounds.

The Contractor shall minimize the drift by spraying as close to the concrete as practicable, cover drainage inlets before applying the curing compound, and minimize the use and discharge of water by using wet blankets or similar methods to maintain moisture when concrete is curing.

- o) Concrete Finishing.** The Contractor shall collect and dispose of water and solid waste from high-pressure water blasting, collect and dispose of sand and solid waste from sandblasting. Before sandblasting, the Contractor shall cover drainage inlets within 50 feet of sandblasting and shall minimize the drift of dust and blast material by keeping the nozzle close to the surface of the concrete. If the character of the blast residue is unknown, the Contractor shall test it for hazardous materials and dispose of it properly.

The Contractor shall inspect containment structures for concrete finishing for damage before each day of use and before forecasted precipitation and remove liquid and solid waste from containment structures after each work shift.

- p) Sweeping.** The Contractor shall sweep paved roads in conformance with 3-12.4.3 at construction entrance and exit locations and paved areas within the job site:

- 1) During clearing and grubbing activities
- 2) During earthwork activities
- 3) During trenching activities
- 4) During pavement structure activities
- 5) When vehicles are entering and leaving the job site
- 6) After soil-disturbing activities
- 7) After observing off-site tracking of material
- 8) As deemed necessary by the Engineer

The Contractor shall monitor paved areas and roadways within the project and sweep within:

- 1) 1 hour whenever sediment or debris is observed during activities that require sweeping.
- 2) by the end of the workday whenever sediment or debris is observed during activities that do not require sweeping.

The Contractor shall remove collected material, including sediment, from paved shoulders, drain inlets, curbs and dikes, and other drainage areas, may stockpile collected material at the job site, and shall dispose of collected material at least once per week if stockpiled.

The Contractor shall keep dust to a minimum during street sweeping activities and use water and vacuum.

The Contractor shall remove and dispose of trash collected during sweeping.

3-12.5 Sanitary Sewers.

3-12.5.1 General. *REVISE to include the following:*

Full compensation for all work associated with maintaining sewage flow shall be made at the contract lump sum bid price (LS) and shall include full compensation for conforming to the requirements of these specifications and federal, state and local requirements, including but not limited to, all labor, tools, equipment, materials, incidentals, maintaining existing sewer flows, sewer bypass plans and submittals, sewer bypass system, including standby equipment, outside agency or other coordination, acquiring all permits, all excavations, backfill, compaction, temporary and permanent repairs and restoration of all impacts from said bypassing.

3-12.5.2 Sewage Bypass and Pumping Plan *REVISE to include the following:*

The Contractor shall insure that a backup power generator with the same capacity as the primary generator shall be on site during all bypass pumping utilizing a generator. Lay flat hose or aluminum piping shall not be utilized in a location that in the sole judgement of the Engineer could affect pedestrian or vehicular traffic. Bypass pumping that remains in place during non-working hours shall have an onsite person to monitor the operation and ensure that no spills or pump failure for any reason occurs. The Engineer may consider other proposals to monitor on site bypass pumping during non-working hours. The Contractor shall assume for bidding purposes that bypass pumping flow volumes shall be 8-inch pipe.

3-12.5.3 Spill Prevention and Emergency Response Plan. *REVISE to include the following:*

The Contractor shall keep material or waste storage areas clean, well-organized, and equipped with enough cleanup supplies for the material being stored.

The Contractor shall implement spill and leak prevention procedures for chemicals and hazardous substances stored on the job site. Whenever the Contractor spills or leaks chemicals or hazardous substances at the job site, he is responsible for all associated cleanup costs and related liability.

The Contractor shall report minor, semi significant, and significant or hazardous spills to the WPC manager and the WPC manager must notify the Engineer immediately.

As soon as it is safe, the Contractor shall contain and clean up spills of petroleum materials and sanitary and septic waste substances listed under 40 CFR, parts 110, 117, and 302.

- a) **Minor Spills.** Minor spills consist of quantities of oil, gasoline, paint, or other materials that are small enough to be controlled by a first responder upon discovery of the spill. The Contractor shall clean up a minor spill using the following procedures:

- 1) Contain the spread of the spill
 - 2) Recover the spilled material using absorption
 - 3) Clean the contaminated area
 - 4) Dispose of the contaminated material and absorbents promptly and properly.
- b) Semi Significant Spills.** Semi significant spills consist of spills that can be controlled by a first responder with help from other personnel. The Contractor shall clean up a semi significant spill immediately using the following procedures:
- 1) Contain the spread of the spill.
 - 2) On paved or impervious surfaces, encircle and recover the spilled material with absorbent materials. Do not allow the spill to spread widely.
 - 3) If the spill occurs on soil, contain the spill by constructing an earthen dike and dig up the contaminated soil for disposal.
 - 4) If the spill occurs during precipitation, cover the spill with 10-mil plastic sheeting or other material to prevent contamination of runoff.
 - 5) Dispose of the contaminated material promptly and properly.
- c) Significant or Hazardous Spills.** Significant or hazardous spills consist of spills that cannot be controlled by job site personnel. The Contractor shall immediately notify qualified personnel of a significant or hazardous spill and take the following steps:
- 1) Do not attempt to clean up the spill until qualified personnel have arrived.
 - 2) Notify the Engineer and follow up with a report.
 - 3) Obtain the immediate services of a spill contractor or hazardous material team.
 - 4) Notify local emergency response teams by dialing 911 and county officials by using the emergency phone numbers retained at the job site.
 - 5) Notify the California Emergency Management Agency State Warning Center at 916-845-8911.
 - 6) Notify the National Response Center at (800) 424-8802 regarding spills of Federal reportable quantities under 40 CFR 110, 119, and 302.
 - 7) Notify other agencies as appropriate, including:
 - (a) Fire Department
 - (b) Public Works Department
 - (c) Coast Guard
 - (d) Highway Patrol
 - (e) City Police or County Sheriff's Department
 - (f) Department of Toxic Substances
 - (g) California Division of Oil and Gas
 - (h) Cal/OSHA
 - (i) Regional Water Resources Control Board.

The Contractor shall prevent a spill from entering stormwater runoff before and during cleanup activities and shall not bury or wash the spill with water.

ADD

3-12.6 Water Pollution Control. *ADD the following:*

3-12.6.1 General.

Summary

The Contractor shall prepare an Erosion and Sediment Plan (E&S Plan) for projects where soil disturbance from work activities will be less than one (1) acre). Required work includes developing and implementing the WPCP, providing a WPC manager, conducting water pollution control training, and monitoring, inspecting and correcting water pollution control practices.

The E&S Plan shall be developed by a QSD.

Submittals

Within seven (7) days after Contract approval:

- a) The Contractor shall submit two (2) copies of his E&S Plan for review. The Engineer provides comments and specifies the date when the review stopped if revisions are required.
- b) The Contractor shall resubmit a revised E&S Plan within seven (7) days of receiving the Engineer's comments. The City's review resumes when the complete E&S Plan has been resubmitted.
- c) When the Engineer authorizes the E&S Plan, the Contractor shall submit an electronic copy and three (3) printed copies of the authorized E&S Plan.
- d) If the RWQCB requires review of the authorized E&S Plan, the Engineer submits the authorized E&S Plan to the RWQCB for its review and comment.
- e) If the Engineer orders changes to the E&S Plan based on the RWQCB's comments, the Contractor shall amend the E&S Plan within 3 business days.

The E&S Plan must utilize the applicable plan sheets of the Design Plans to identify activities and operations that may cause generation or discharge of pollutants from the site and clearly identify the appropriate and applicable construction phase BMPs to adequately control, or address said activity and associated pollutants. The E&S Plan shall utilize the Orange County Construction Runoff Guidance Manual to assist in identifying applicable construction activities and the associated BMPs. The E&S Plan Shall:

- a) Show the location of disturbed soil areas, water bodies, and water conveyances
- b) Describe the work involved in the installation, maintenance, repair, and removal of temporary water pollution control practices
- c) Show the locations and types of water pollution control practices that will be used for:
 - 1) Stormwater and non-stormwater in areas outside the job site but related to work activities, including:
 - (a) Staging areas
 - (b) Storage yards
 - (c) Access roads
 - 2) Activities or mobile activities related to all NPDES permits

- 3) Contractor-support facilities
- d) Show the locations and types of temporary water pollution control practices that will be used in the work for each construction phase
- e) Show the locations and types of water pollution control practices that will be installed permanently under the Contract
- f) Include a schedule showing when:
 - 1) Work activities will be performed that could cause the discharge of pollutants into stormwater
 - 2) Water pollution control practices associated with each construction phase will be implemented
 - 3) Soil stabilization and sediment control practices for disturbed soil areas will be implemented
- g) Include a copy of any permits obtained by the City, including Fish & Wildlife permits, US Army Corps of Engineers permits, RWQCB 401 certifications, aerially deposited lead variance from the Department of Toxic Substance Control, aerially deposited lead variance notification, and RWQCB waste discharge requirements for aerially deposited lead reuse.

The Contractor shall amend the E&S Plan whenever:

- a) Changes in work activities could affect the discharge of pollutants
- b) Water pollution control practices are added by Change Order work
- c) Water pollution control practices are added at the Contractor's discretion
- d) Changes in the quantity of disturbed soil are substantial
- e) Objectives for reducing or eliminating pollutants in stormwater discharges have not been achieved
- f) Project receives a written notice or order from the RWQCB or any other regulatory agency.

The Contractor shall allow the same review time for amendments to the E&S Plan as for the original E&S Plan.

3-12.6.1.1 Construction. The Contractor shall manage work activities in a way that reduces the discharge of pollutants to surface waters, groundwater, and separate municipal storm sewer systems.

The Contractor shall monitor and inspect water pollution control practices at the job site.

The Contractor shall notify the Engineer within six (6) hours whenever any of the following occurs:

- a) The Contractor identifies discharges into receiving waters or drainage systems that are causing or could cause water pollution
- b) The Contractor receives a written notice or order for the project from the RWQCB or any other regulatory agency.

The Contractor shall continue E&S Plan implementation during any suspension of work activities.

The Contractor is responsible for delays and must pay all costs associated with submitting a SWPPP due to his actions that result in one of the following:

- a) One (1) or more acres of soil disturbance on projects without an Erosivity Waiver
- b) More than five (5) acres of soil disturbance on projects with an Erosivity Waiver
- c) Failure to comply with the schedule for soil disturbing activities for projects with an Erosivity Waiver if the delays void the Erosivity Waiver

3-12.6.1.2 Payment. Payment for EROSION AND SEDIMENT CONTROL PLAN shall be per the Lump Sum (LS) price bid and shall include full compensation for furnishing all labor, materials, tools, equipment to perform all the work involved in 3-12.6, including preparing and modifying a E&S Plan, permitting fees, City filing and processing, furnishing, installing, maintaining and removing BMPs, monitoring and reporting, and all incidentals for doing all the work involved as described herein or as otherwise required by the permit process, and shall be included in the contract lump sum price in the bid. No additional compensation shall be allowed therefor.

Payment will be issued by the City as follows:

- a) 25% - upon WPCP approval.
- b) 25% - upon installation of project BMPs
- c) 50% - to be paid monthly as a percentage of the total working days expended for monitoring, maintenance, testing, reporting and all other requirements as outlined in this Standard Specifications Supplement.

3-12.6.4 Dewatering. *REVISE to include the following:*

Dewatering consists of discharging accumulated stormwater, groundwater, or surface water from excavations or temporary containment facilities. The Contractor shall submit a dewatering plan for approval along with a cost breakdown of the anticipated items of work identified and durations of activities based on the approved construction schedule. No dewatering work shall start until the plan and cost have been approved.

The Contractor shall perform dewatering work as specified for the work items involved, such as temporary active treatment system or dewatering and discharge.

If dewatering and discharging activities are not specified under a work item and the Contractor performs dewatering activities, he shall:

- a) Comply with all requirements and conditions of the DeMinimus Permit (see link https://www.waterboards.ca.gov/santaana/board_decisions/adopted_orders/orders/2020/R8-2020-0006.pdf)
- b) Conduct dewatering activities under the Caltrans' *Field Guide for Construction Site Dewatering*.
- c) Ensure that any dewatering discharge does not cause erosion, scour, or sedimentary deposits that could impact natural bedding materials.
- d) Discharge the water within the project limits if approved by the Engineer. Dispose of the water if it cannot be discharged within project limits due to site constraints or contamination.

- e) Not discharge stormwater or non-stormwater that has an odor, discoloration other than sediment, an oily sheen, or foam on the surface.
- f) Notify the Engineer immediately upon discovering any such condition.

3-12.6.4.1 Payment. *ADD the following:*

The allowance for dewatering activities shall only be accessed with the written approval of the Engineer. Should any dewatering be required, it shall be paid for in accordance with 7-4.

3-13 COMPLETION, ACCEPTANCE AND WARRANTY.

3-13.1 Completion. *REVISE to include the following:*

When the Contractor considers the Work is complete, the Contractor shall submit a written request to the City Representative for inspection. By submittal of such request, Contractor certifies that:

- a) Contract Documents have been reviewed.
- b) Work has been completed in accordance with Contract Documents and is ready for inspection.
- c) Equipment and systems have been tested, adjusted/balanced and are fully operational.
- d) The Contractor shall submit the request a minimum of five (5) Working Days in advance of the requested inspection date. Contractor shall be responsible for allowing sufficient time during the Contract period to complete inspections and make any corrections. Each day beyond the time prescribed to complete the Contract will be subject to assessment of liquidated damages in accordance with 6-9.

Should City Representative's inspection find Work incomplete, City Representative will notify the Contractor in writing, listing observed deficiencies and time allowed to complete the deficient work.

The Contractor shall remedy listed deficiencies within the time allowed and send a request for final inspection. Failure of the Contractor to remedy deficiencies within the time allowed, at the City's option, may result in re-inspection(s) of the work to identify additional deficiencies, if any. City's costs associated with re-inspection(s) are subject to 3-5.3.

When the City confirms Work is complete and closeout submittals have been provided, City Representative will notify Contractor of date of completion on the Weekly Statement of Working Days.

3-13.3 Warranty. *REVISE to include the following:*

The Contractor shall guarantee the Work to satisfaction of the City.

If, in the opinion of the City, defective work creates a dangerous condition or requires immediate correction or attention to prevent further loss to the City or to prevent interruption of operations of the City, the City will attempt to give the notice required by this article.

If the Contractor cannot be contacted or does not comply with the City's request for correction within a reasonable time as determined by the City, the City may notwithstanding the provisions of this article, proceed to make such correction or provide such attention; and the costs of such correction or attention shall be charged against the Contractor. Such action by the City will not relieve the Contractor of the guarantees provided in this article or elsewhere in this Contract.

This article does not, in any way, limit the guarantee on any items for which a longer guarantee is specified or any items for which a manufacturer gives a guarantee for a longer period. The Contractor shall furnish City all appropriate guaranty or warranty certificates upon Acceptance of the Work.

ADD the following:

3-14 CONTRACT CLOSE-OUT. Within twenty-one (21) Days of the date of completion of the Work as determined by the Engineer per 3-13.1, the Contractor shall submit the following:

- a) Approval of the Balancing Change Order.
- b) Final invoice.
- c) As-Built Plans.
- d) Certified payrolls.
- e) Operations and Maintenance Manuals.
- f) Warranties. Schedule and attend Warranty walkthrough with the City eleven (11) months after approval and acceptance of warranties or Notice of Completion, whichever occurs earlier.
- g) CCTV inspection videos and reports for all sewer and storm drainpipes over four (4) inches diameter
- h) Other outstanding documents.

If deficiencies in the submittals are identified, the Contractor shall correct the deficiencies and re-submit within seven (7) Days of the date of issue of the correction notice from the Engineer. The Agency will not proceed with acceptance of the Contract per 3-13.2 and release of retention per 7-3.2.1 until the submittals are accepted by the Engineer.

No separate or additional payment will be made for Contract Close-Out activities and submittals. Payment shall be considered as included in the Contract Unit Price for the various Bid items.

SECTION 4 - CONTROL OF MATERIALS

REVISE as follows:

4-3 INSPECTION.

4-3.1 General. *REVISE to include the following:*

The Contractor shall furnish all materials required to complete the Work, a minimum of twenty (20) calendar days in advance of their intended use except materials that are designated in the Special Provisions to be furnished by the City.

ADD the following after the 2nd paragraph:

The Contractor shall defend (at City's option), hold harmless, and indemnify the City of Anaheim, the Engineer, and City's officers, agents, employees, representatives, and volunteers from and against and from all claims and liability arising from damage and injury due to said defects. The Contractor shall make all repairs and replacements promptly upon receipt of written order from the Engineer. If the Contractor fails to make the repairs and replacements promptly the City may do work, the Contractor, and his surety shall be liable to the City for the cost of the work.

The Engineer may inspect the production of material, or the manufacture of products at the source of supply. Plant inspection, however, will not be undertaken until the Engineer is assured of the cooperation and assistance of both the Contractor and the material producer. The Engineer shall have free entry at all times to such parts of the plant as concerns the manufacture or production of the materials. Adequate facilities shall be furnished free of charge to make the necessary inspection. The City assumes no obligation to inspect materials at the source of supply.

Materials, equipment, and supplies provided shall, without additional charge to City, fully conform with all applicable local, State and Federal safety laws, rules and regulations, and orders, and it shall be the Contractor's responsibility to provide only such materials, equipment, and supplies notwithstanding any omission in the Contract Documents therefore on that material, equipment or supply as specified.

4-4 TESTING.

ADD the following:

4-4.1 Testing Laboratory.

Employment of testing laboratories will in no way relieve Contractor of its obligation to perform the Work in accordance with Contract Documents.

Laboratory field technicians employed by the City shall have no authority to release, revoke, alter, or enlarge on requirements of Contract Documents, or to approve, accept or stop any portion of the Work. The Contractor shall:

- a) Cooperate with laboratory personnel, provide access to work, arrange access to manufacturer's operations.
- b) Provide the laboratory with preliminary representative samples of materials to be tested, in required quantities.
- c) Furnish copies of mill test reports.
- d) Provide casual labor and facilities for access to work being tested; obtain and handle samples at the site; facilitate inspections and tests; provide facilities for the laboratory's exclusive use for storage and curing of test samples.
- e) Coordinate requests for testing through the City Representative. Notify City Representative a minimum of three (3) Working Days in advance of operations to allow for assignment of personnel and scheduling of tests.
- f) Pay for additional laboratory inspections, sampling and testing required for Contractor's convenience and when initial tests indicate that work does not comply with Contract Documents.
- g) When required by the Contract Documents, submit manufacturer's certificate, executed by responsible officer, certifying that the product(s) meet or exceed specified requirements. Provide certification in duplicate.

4-5 CERTIFICATE OF COMPLIANCE. REVISE to include the following:

The City reserves the right to refuse to permit the use of materials based on a Certificate of Compliance. The form and disposition of the Certificate of Compliance shall be as directed by the Engineer.

4-6 TRADE NAMES. REVISE to include the following:

The Contractor shall submit a proposed equivalent products list in accordance with the following:

- a) Within ten (10) Days after Award of Contract, transmit number of copies the Contractor needs plus four (4) of a list of major products which are proposed for substitution with the

proposed equivalent, including name of manufacturer. Tabulate products by specification section number, title and article number.

- b) For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.
- c) The Engineer will reply in writing, stating whether there is reasonable objection to listed items. Failure to object to a listed item shall not constitute a waiver of requirements of Contract Documents.

The following limitations shall apply to substitutions:

- a) Requests for substitutions of products shall be submitted within ten (10) Days after award of the Contract. The Contractor shall allow twenty (20) Days for the Engineer to make this determination. Requests will be considered only in the case of product unavailability or other conditions beyond control of Contractor. Material delivery schedules will not be considered justification for substitution.
- b) Substitute products shall not be ordered or installed without written acceptance by the Engineer.
- c) Only one request for substitution for each product line will be considered. When substitution is not accepted, provide specified product.
- d) The Engineer will determine acceptability of substitutions.

Requests for substitutions shall conform to the following:

- a) Submit separate requests for each substitution. Document each request with complete data substantiating compliance of proposed substitution with requirements of Contract Documents.
- b) Identify product by specifications section and article numbers. Provide manufacturer's name and address, trade name or product, and model or catalog number. List fabricators and suppliers, as appropriate.
- c) Give itemized comparison of proposed substitution with specified product, listing variations, and reference to specifications section and article numbers.
- d) Give cost data comparing proposed substitution with specified product, and amount of net change to Contract sum.
- e) State effect of substitution on construction schedule, and changes required in other work or products.

Request for substitution constitutes a representation that Contractor has investigated proposed product and has determined that it is equal to or superior in all respects to specified product. The Contractor shall provide the same warranty for the substitution as for the specified product, shall coordinate installation of accepted substitute, making such changes as may be requested for Work to be complete in all respects, certifies that cost data presented is complete and includes all related costs with no change in the schedule under this Contract and waives claims for additional costs related to substitution which may later become apparent. The Contractor shall submit the number of copies the Contractor needs plus four of request for substitution. For accepted products, submit shop drawings, product data and samples, and tests conducted in accordance with 3-8.

SECTION 5 – LEGAL RELATIONS AND RESPONSIBILITIES

REVISE as follows:

5-1 LAWS AND REGULATIONS. *DELETE in its entirety and SUBSTITUTE with the following:*

It shall be understood by the Contractor and its Subcontractors that the City, per Municipal Code Section 3.04.050, imposes upon businesses, trades, professions, calling, and occupations specified in the code, license taxes in the amounts prescribed in the code. It is unlawful for any person to transact and carry on any business, trade, profession, calling, or occupation without first having procured a license from the City and then complying with any and all applicable provisions of the code. Contractor license fees shall be as prescribed by the Anaheim Municipal Code Section 3.24.010.

The Contractor shall keep itself fully informed of all existing and future State and National laws and County and Municipal ordinances and regulations which in any manner affect those engaged or employed in the Work or the materials used in the Work or which in any way affect the conduct of the Work and of all such order and decrees of bodies or tribunals having any jurisdiction or authority in the Plans, Specifications, or Contract for the Work in relation to any such law, ordinance, regulation, order or decree, he shall forthwith report the same to the City Representative in writing.

The Contractor shall at all times observe and comply with and shall cause all its agents, employees, and Subcontractors to observe and comply with all such existing and future laws, ordinances, regulations, orders, and decrees even though such requirements may not be specifically mentioned in the specifications or shown on the Plans, and shall hold harmless, indemnify, and defend the City, the Engineer, and each of their officers, employees, and agents against any claim or liability arising from or based on the violation of any such law, ordinance, regulation, order, or decree, whether by itself, its employees, its agents, or its subcontractors. To the maximum extent permitted by law, all obligations of the Contractor stated in 5-4.2 shall apply in the case of any such claim or liability.

As a material part of this Contract, Contractor's and Subcontractors' owners and employees agree to be bound by and adhere to the Federal Department of Transportation (DOT) regulations found in Title 49 CFR 382. All Contractor's and Subcontractors' owners and employees who are required to hold commercial licenses and/or who are in safety sensitive positions shall be subject to the provisions of the DOT regulations.

5-2 SPECIAL NOTICES. *REVISE to include the following:*

Any notice required or given by one party to the other under the Contract shall be in writing and shall be dated and signed by the party giving such notice or by a duly authorized representative of such party. Any such notices shall not be effective for any purpose whatsoever, unless served in the following manner:

- a) If the notice is given to the City, by personal delivery or by depositing the same in the United States mail, enclosed in a sealed envelope addressed to the City, postage prepaid and registered.
- b) If the notice is given by the Engineer to the Contractor by personal delivery to said Contractor or to his authorized representative or by depositing the same in the United States mail, enclosed in a sealed envelope addressed to said Contractor at his regular place of business or such other address as may have been established for the conduct of the work under this Contract, postage prepaid and registered.
- c) If notice is given to the surety or any other person by personal delivery to said surety or other person, or by depositing the same in the United States mail, enclosed in a sealed

envelope addressed to such surety or person at the address of said surety or person last communicated by him to the party giving the notice, postage prepaid and registered.

5-3 LABOR.

5-3.1 General. *REVISE to include the following:*

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

5-3.2 Prevailing Wages. *REVISE to include the following:*

In accordance with the provisions of Section 1773.2 of the Labor Code, copies of the current prevailing rate of per diem wages at the time of the Bid as determined by the Director of the Department of Industrial Relations (DIR) are available on the website as follows: www.dir.ca.gov/DLSR/PWD/index.htm

5-3.3 Payroll Records. *REVISE to include the following:*

The Contractor and each of its Subcontractors, suppliers, and vendors, shall comply with all City, State, and Federal orders regarding affirmative action to ensure equal employment opportunities and fair employment practices. Failure to file any report due under said orders will result in suspension of progress payments.

Contractors and Subcontractors on all Public Works projects shall submit Certified Payroll Records (CPRs) to the Labor Commissioner.

The Contractor and each of his Subcontractors' shall prepare payrolls on forms prescribed and in accordance with instructions furnished by the City. Within seven (7) days after the regular payment date of the payroll, the Contractor shall deliver to the City a certified and legible copy of each payroll. Such payroll shall be stated under penalty of perjury to in accordance with the federal regulations made pursuant to the "Anti-Kick-Back Statute (41 U.S.C. Sec.51)".

Such copies of payrolls shall be accompanied by proof that all bills for services rendered, and materials supplied have been duly paid for. The Contractor shall not carry on its payroll any person it does not employ. Employees of a Subcontractor must be carried on the payroll of the employing Subcontractor.

Each Contractor or Subcontractor shall preserve its weekly payroll records for a period of three (3) years from the date of the contract. The payroll records shall set out accurately and completely the name, address, social security number, occupational classification, and hourly wage rate of each employee, hours worked by him during the payroll period, and full weekly wages earned by him, any deductions made from such weekly wages and the actual weekly wages paid. Such payroll records, when requested by the City shall be always made available for inspection by the City or its authorized representatives and response and records shall be given to the City within 48 hours from the time the request was made.

The Contractor agrees that, in case of underpayment of wages to any worker on the project under this Contract by the Contractor or any Subcontractor, the City shall withhold from the Contractor out of payments due, an amount sufficient to pay such worker the difference between the wages required to be paid under this Contract and the wages actually paid such worker for the total number of hours worked and that the City may disburse such amount so withheld by it for and on account of the Contractor to the employee to whom such amount is due. The Contractor further agrees that the amount to be withheld pursuant to this paragraph may be in addition to the percentages to be retained by the City pursuant to other provisions of this Contract.

The Contractor shall provide unlimited access to the job site for all equal employment opportunity compliance officers.

The Contractor and all its Subcontractors shall submit to the City and the Labor Commissioner (Division of Labor Standards Enforcement) certified payroll records every Friday until Notice of Completion is filed and recorded.

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 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.

5-4 INSURANCE.

5-4.1 General. *REVISE to include the following:*

Without limiting the City of Anaheim's right to indemnification, it is agreed that Contractor shall not commence work until he procures and maintains, at his sole cost and for the duration of this Contract, insurance coverage as provided below, against all claims for injuries against persons or damages to property which may arise from or in connection with the performance of the Work hereunder by Contractor, its agents, representatives, employees, and/or subcontractors. In the event that Contractor subcontracts any portion of the Work in compliance with 3-3, the Contract between the Contractor and such subcontractor shall require the subcontractor to maintain the same policies of insurance that the Contractor is required to maintain pursuant to 5-4.

Coverage written with a self-insured retention shall be approved by the City of Anaheim's risk manager prior to the submittal of the bid proposal.

Coverage written with primary and excess/umbrella layers shall be approved by the City of Anaheim's risk manager prior to the submittal of the bid proposal.

ANAHEIM'S Risk Manager is hereby authorized to amend the requirements set forth herein in the event such reduction is in ANAHEIM'S best interest.

Insurance policies shall be deemed not to comply if they include any limiting provision or endorsement that has not been submitted for approval in accordance with 5-4.

This insurance shall not be voluntarily cancelled or materially limited in scope or coverage, until after thirty (30) days prior written notice has been given to the City Clerk, City of Anaheim, 200 S. Anaheim Blvd., Anaheim, CA 92805.

Each insurance policy required by this Contract, except policies for Workers' Compensation, shall contain the following clauses or shall otherwise provide for the following conditions:

Cancellation for non-payment of premium shall provide for not less than ten (10) days' notice.

"It is agreed that any insurance maintained by Contractor pursuant to the Contract shall be primary to, and not contribute with, any insurance or self- insurance maintained by the City of Anaheim."

The Contractor shall name as additional insured "The City of Anaheim, its officers, agents, employees, representatives and ANAHEIM- designated volunteers are added as additional insured as respects the acts, omissions, operations and activities of, or on behalf of, the

named insured, in regard to products supplied to, or work or services performed for, or related to, the City of Anaheim.”

Prior to commencing any work under this Contract, Contractor shall deliver to the City of Anaheim insurance certificates confirming the existence of the insurance required under the Contract, and including the applicable clauses referenced above. Also, within ten (10) days of the execution date of the Contract, Contractor shall provide the City of Anaheim (i) endorsements to the insurance policies that add to these policies the applicable clauses referenced above, or (ii) in lieu of said endorsements, documentation acceptable to City of Anaheim evidencing that the coverage, terms, and conditions set forth in the above-referenced clauses are otherwise included in said insurance policies.

Insurance required hereunder shall be placed with insurers (i) admitted writing insurance in California, (ii) possessing an A. M. Best’s rating of “A” or higher and a Financial Class VII or higher, or (iii) otherwise acceptable to City of Anaheim, with prior written permission from the City of Anaheim. In the event that a claim or other legal action is filed against the City of Anaheim, and if the City of Anaheim, in its good faith opinion, believes it may have coverage under any of the insurance required herein, then the City of Anaheim has the right to demand, and to receive within a reasonable time period, copies of the insurance policies related to such required insurance; provided, however, that this provision shall not apply if the parties agree that Contractor shall fully defend, hold harmless, and indemnify the City of Anaheim against any such claim or other legal action.

No officers, agents, employees, representatives and the City of Anaheim - designated volunteers or their consultants shall be personally responsible for any liability arising under or by virtue of the Contract.

In addition to other remedies, the City of Anaheim may have if Contractor fails to provide or maintain any insurance policies or policy endorsements to the extent and within the time herein required, the City of Anaheim may, at its sole option:

- a) Order Contractor to stop work under the Contract and/or withhold any payment(s) that become due to Contractor hereunder until Contractor demonstrates compliance with the requirements hereof.
- b) Terminate the Contract and pursue Surety for Breach of Contract.

Exercise of any of the above remedies, however, is an alternative to other remedies City of Anaheim may have and is not the exclusive remedy for Contractor’s failure to maintain insurance or secure appropriate endorsements.

Nothing herein contained shall be construed in any way as limiting the extent that the Contractor may be held responsible for payments of damages to persons or property resulting from Contractor, and any Subcontractors performance of the work covered under the Contract.

5-4.2 General Liability Insurance. *DELETE the 2nd paragraph and SUBSTITUTE with the following:*

Commercial General Liability Insurance, including coverage for Premises and Operations, Contractual Liability, Bodily Injury, Sexual Abuse and Molestation, Personal Injury Liability, Products/Completed Operations Liability, and Independent Contractor Liability, in an amount not less than Two Million Dollars (\$2,000,000) per occurrence, Four Million Dollars (\$4,000,000)

annual aggregate, written on an occurrence form. Such insurance shall be written on a primary basis but may include a deductible of not more than Ten Thousand (\$10,000) per occurrence, provided that such deductible or self-insured retention is disclosed to City of Anaheim, in writing, at the inception of the Contract.

5-4.3 Workers' Compensation Insurance. *REVISE to include the following:*

Workers' Compensation and Employer's Liability: Workers' Compensation Insurance in an amount required by the laws of the State of California (Statutory Limits). Employer's Liability Insurance with a minimum limit of One Million Dollars (\$1,000,000) per occurrence.

5-4.4 Auto Liability Insurance. *DELETE in its entirety and SUBSTITUTE with the following:*

Automobile Liability (including owned, non-owned, leased, and hired autos): Insurance covering "Any Auto" with minimum limits of Two Million Dollars (\$2,000,000.00), single limit, per occurrence for bodily injury and property damage, as required by California law.

5-6 PATENT FEES OR ROYALTIES. *REVISE to include the following:*

The Contractor shall assume all costs arising from the use of patented materials, equipment, devices, or processes used on or incorporated in the Work and shall hold harmless, indemnify, and defend the City, the Engineer, the City Representative and each of their officers, employees, and agents from all claims, suits or actions of every nature for or on account of the use of any patented materials, equipment devices, or processes. To the maximum extent permitted by law, all obligations of the Contractor stated in 5-4.2 shall apply in the case of any such claim, suit, or action.

5-7 SAFETY.

5-7.1 Work Site Safety.

5-7.1.1 General. *REVISE to include 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 all actions appropriate to providing a safe Project site.

When construction occurs within a developed residential area and/or through a school site, the Contractor shall take all necessary precautions to protect the public, from the hazards of open excavations.

Trenches shall either be covered or adequately fenced and lighted at night and on weekends or whenever operations are not in actual process.

Unusual conditions may arise on the work, which will require that immediate and unusual provisions be made to protect the public from danger, loss, or damage to life and property, due directly or indirectly to the prosecution of the work. It is part of the service required of the contractor to make such provisions and to furnish such protection.

The Contractor shall use such foresight and shall take such steps and precautions as his operations make necessary to protect the public from danger or damage, loss of life or property, which could result from the interruption or contamination of public water supply, irrigation, or other public service or from the failure of partly completed work.

Whenever, in the opinion of the City, an emergency exists against which the Contractor has not taken sufficient precaution for the safety of the public or the protection of the utilities or of adjacent structures or property which may, in the opinion of the City, require immediate action in order to protect public or private or personnel or property interest or prevent likely loss of human life or damage on account of the operations under the contract, then and in that event the City may provide suitable protection to said interest by causing such work to be done and material to be furnished, as, in the opinion of the City, may seem reasonable and necessary.

The cost and expense of said labor and material together with the cost and expense of such repairs as may be deemed necessary shall be borne by the Contractor, and if he shall not pay said cost and expense upon presentation of the bills therefore, duly certified by the Engineer, then said cost and expense will be paid by the City and shall therefore be deducted from any amounts due, or which may become due to said Contractor. The failure of the City, however, to take such precautionary measure, shall not relieve the Contractor of his full responsibility for public safety.

The foregoing provisions are in addition to and not in limitation of any other rights or remedies available to the City.

5-7.1.2 Work Site Safety Official. *REVISE to include the following:*

Failure by the Contractor to provide the required Work Site Safety Official shall be grounds for the City to direct the cessation of all work activities and operations at no cost to the City until the Contractor complies.

5-7.8 Steel Plate Covers.

5-7.8.1 General. *REVISE to include the following:*

Excavations or trenching shall not be left open during non-working hours.

5-7.8.3 Installation. *DELETE reference to Method 2 and ADD the following:*

The Contractor shall install plates per Method 1 regardless posted speeds and locations for vehicular traffic, bike paths, or pedestrian ways. Steel plates shall fit snug within the recessed area, flush with the adjacent roadway surface, and shall be installed to operate with minimum noise. Multiple plates shall be tack welded as needed to secure the plates with 6" long minimum welds. Steel plates shall be removed, and permanent pavement shall be placed within fifteen (15) working days or as approved in writing by the Engineer.

ADD the following:

5-8 CONTRACTOR'S RESPONSIBILITY FOR THE WORK. Until Final Acceptance of the Work, the Contractor shall have the responsibility, charge and care of the Work and of the materials to be used therein (including materials for which it has received partial payment or materials which have been furnished by the City) and shall bear the risk of injury, loss or damage to any part thereof by the action of the elements or from any other cause, whether arising from the execution or from the non-execution of the Work.

The Contractor shall rebuild, repair, restore, and make good all injuries, losses, or damages to any portion of the Work or the material occasioned by any cause before its completion and acceptance and shall bear the expense thereof. Where necessary to protect the Work or materials from damage, the Contractor shall at his expense provide suitable drainage and erect such temporary structures as are necessary to protect the Work or materials from damage. The suspension of the Work from any cause whatever shall not relieve the Contractor of his responsibility for the Work and materials as herein specified. If ordered by the City Representative, the Contractor shall at his expense properly store materials which have been partially paid for by the City or which have been furnished by the

City. Such storage by the Contractor shall be on behalf of the City, the City shall always be entitled to the possession of such materials, and the Contractor shall promptly return the same to the site of the Work when requested. The Contractor shall not dispose of any of the materials so stored, except on written authorization from the City.

In an emergency affecting the safety of life or property, including adjoining property, the Contractor, without special instructions or authorizations, is authorized to act at his discretion to prevent such threatened loss or injury, and he shall so act as though instructed to do so by the City.

ADD the following:

5-9 PROJECT RECORD DOCUMENTS.

5-9.1 Maintenance of Documents and Samples. The Contractor shall maintain one record copy of:

- a) Contract bid documents
- b) Contract As-Built Plans
- c) Specifications
- d) Addenda
- e) Change Orders and Other Modifications to the Contract
- f) Reviewed Shop Drawings, Product Data, and Samples
- g) Field Test Records
- h) Construction Schedules
- i) Manufacturer's Certificates

The Contractor shall maintain documents in clean, dry, legible condition.

The Contractor shall keep As-Built Plans and samples accessible for inspection by the City Representative. Applications for progress payments will be withheld each month if the As-Built Plans are not kept current. The City Representative will verify the As-Built Plans prior to submittal of each Application for Payment.

5-9.2 Recording. The Contractor shall record changes to the plans and discoveries of buried objects at the Work on As-Built Plans with red ball-point pen, label each Document "AS-BUILTS" in large printed letters, record information concurrently with construction progress, not conceal any work until required information is recorded and legibly mark each item on Contract As-Built Plans and Shop Drawings to record actual construction, including:

- a) Measured depths of elements in relation to fixed datum point
- b) Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements
- c) Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of construction
- d) Field changes of dimension and detail
- e) Changes made by Contract modifications
- f) Details not on original Contract Drawings
- g) Previously unknown buried objects.

The Contractor shall legibly mark each item to record actual construction, including:

- a) Manufacturer, Trade Name, and Catalog Number of each product actually installed particularly optional items and substitute items
- b) Changes made by Addenda or modifications.

The Contractor shall maintain other documents per requirements of individual specifications sections.

5-9.3 Submittals. At Contract closeout the Contractor shall deliver As-Built Plans and samples as specified in 5-9.1 Request for final payment will not be approved until all record documents have been delivered.

The submittals shall be transmitted with cover letter with signature of Contractor or authorized representative, listing date, project title and number and number and title of each record document.

SECTION 6 – PROSECUTION AND PROGRESS OF THE WORK

REVISE as follows:

6-1 CONSTRUCTION SCHEDULE AND COMMENCEMENT OF WORK.

6-1.1 Construction Schedule. *REVISE to include the following:*

- a) The Contractor shall coordinate with and provide the City Representative with a work schedule.
- b) Perform all work between the hours of 8:30 a.m. and 3:30 p.m., Monday through Friday in the Public Right of Way, unless approved in advance by the City Representative or as specified in the Special Provisions. No work shall be performed on weekends and City recognized holidays without written City approval.

Within five (5) working days after Notice of Award, the Contractor shall submit to the Engineer, for review and approval, the Construction Schedule for the entire project. The Contractor shall correct any schedule deficiencies within two (2) working days of the City's Deficiency Notice. All subcontractor work shall be incorporated in the Prime Contractor's schedule. Separate schedules will not be admitted.

The Contractor shall deliver to the Engineer a construction progress schedule employing the critical path method, in a form satisfactory to the City Representative, showing the proposed dates of commencement and completion of each item of the Work and the anticipated amount of each monthly payment that will become due the contractor in accordance with the progress schedule.

When a change in the schedule occurs for any reason, the Contractor shall submit a revised construction schedule to the Engineer/City Representative for review and approval within (3) Working Days. The Contractor shall only be allowed to work in areas identified in the most recently approved schedule. The full cost of this provision shall be considered as included in the cost for Mobilization and no additional compensation shall be allowed.

The schedule format shall be as follows:

- a) Prepare schedules as horizontal bar chart with separate bar for each portion of work or operation in accordance with approved schedule of values, identifying first workday of each week. Allow space for updating.
- b) Sequence of Listings: Chronological order of the start of each item of work.
- c) Sheet Size: Multiple of 8-1/2 x 11 inches.
- d) Provide a three week look-ahead schedules (updated weekly).

The content of the schedules shall:

- a) Show complete sequence of construction by activity, with dates for beginning and completion of each element of construction. Include any special sequencing specified in the Contract Documents.
- b) Provide sub-schedules to define major and significant portions of the entire schedule.
- c) Show accumulated percentage of completion of each item, and total percentage of Work completed as of first day of each month.
- d) Show the critical path.
- e) Identify Street Segments, Limits, and Estimated Quantity for Each Major Work Item shown in the Construction Schedule.

Revisions to schedules shall:

- a) Indicate progress of each activity to date of submittal, and projected completion date of each activity.
- b) Identify activities modified since previous submittal, major changes in scope, and other identifiable changes.
- c) Provide written report to define any problem areas, anticipated claim, and impact on schedule. Report corrective action taken, or proposed, and its effect.
- d) Revise periodically as directed by the Engineer/City Representative. Failure to comply with directive will be considered as grounds to delay progress payment.
- e) Show the revised critical path.

Required submittals:

- a) Submit initial schedules within five (5) days after Notice of Award of the Contract. If requested, resubmit required revisions within three (3) days of request.
- b) Submit an update schedule on or before the first day of each month, beginning one month after the initial schedule as outlined in (a) above. If requested, resubmit required revisions within three (3) Working days of request.
- c) Submit copies of schedules to Engineer.
- d) Submit under transmittal letter.

Contractor shall:

- a) Distribute copies of current schedules to job site file Subcontractors, suppliers, and other concerned parties.
- b) Instruct recipients to promptly report, in writing, problems anticipated by projections shown in schedules.

6-1.2 Commencement of the Work. *REVISE to include the following:*

The Contractor acknowledges and agrees that time is of the essence in completing the Project in a timely manner as set forth in the Contract Documents.

Prior to issuance of the Notice to Proceed, the Contractor must submit the Contract, Bonds, and Insurance documents listed in 1-7.1 within the time frame specified.

The Contract Time shall commence upon the project start date identified in the Notice to Proceed issued to the Contractor. The Contractor shall not begin any Construction Work on this project prior to this date. Work on non-construction items such as Traffic Control Plans, CMS signs placement, and Public Notification may begin before the date identified in the Notice to Proceed, if approved by the Engineer.

Work shall not commence prior to approval of a Baseline Construction Schedule by the Engineer. The Contractor's failure to submit an acceptable Construction Schedule prior to the project start date identified in the Notice to Proceed shall not entitle the contractor to an extension of time or additional working days.

In the event a Notice to Proceed has not been issued within sixty (60) days from the Award of the Contract due to failure of the Contractor to submit or correct the required documents, the Contract time shall commence on the 61st day after award and each day thereafter will be charged against the Contract time in accordance with Section 6-3.2.

The Contractor shall notify the Engineer of his intent to begin work at least two (2) Working Days prior to the start of any scheduled or rescheduled work.

ADD the following:

6-1.3 Order of Work Requirements. When required by these Standard Specifications Supplement or the Plans, the Contractor shall follow the sequence of operations and restrictions as set forth therein.

The Work shall be performed in conformance with the staging of construction shown on the Plans and indicated below. Subject to approval by the Engineer, non-conflicting work in subsequent stages may proceed concurrently with work in preceding stages, provided satisfactory progress is maintained in the preceding stages of construction. The Engineer's approval of any Contractor-requested modifications to the order of work or staging of the work shall not be grounds for a Change Order request or time extension request by the Contractor. If the Contractor deviates from the specified order of work or the staging plans, it does so at its own risk and shall assume all time impacts and cost associated with such deviations.

6-2 PROSECUTION OF THE WORK. *REVISE to include the following:*

The major order of work for roadway construction projects shall be as follows: a) Subsurface installations, b) PCC construction, c) Asphalt Concrete Pavement (HMA), d) Slurry Seal, and e) Traffic Striping.

The Contractor, and all Subcontractors, shall limit all construction activity and operations to the City Right-of-Way. The Contractor shall, prior to conducting work on any occupied property within the project area, confirm with the City Representative the location of the City's Right of Way, location of other Agency Permit work, and the extent of any applicable Temporary Construction Easements or areas covered under a Right of Entry, which serve as the permissible bounds of construction activity. No person, or construction activity, shall pass beyond or engage in any construction-related activity outside of the defined Temporary Construction Easements or Right of Entry area, and the Contractor shall monitor its personnel, and the personnel of its subcontractors, to assure compliance with this provision. The prohibition on construction-related

activity beyond the defined City Right of Way, Temporary Construction Easements, or Right of Entry area includes work for the sidewalk, landscaping and slough walls, etc., and extends to prohibit storage of materials or vehicles, including parking or storage of vehicles of employees, and any utilization of private property for staging, storage, or any other purpose.

The Contractor shall coordinate scheduling, submittals, and the Work to provide an efficient and orderly sequence of construction elements with provisions for accommodating items to be installed later.

In addition to weekly progress meetings, as required by the City, the Contractor shall hold coordination meetings and pre-installation conferences with City Representatives and Subcontractors to ensure coordination of the Work.

6-3 TIME COMPLETION.

6-3.1 General. *The following is added to this section:*

This project shall be completed within the working days, excluding Saturdays, Sundays, and Legal Holidays, as defined in the Proposal and Special Provisions.

6-4 DELAYS AND EXTENSIONS OF TIME.

6-4.2 Extension of Time. *REVISE to include the following:*

The City may extend the time fixed for completion of the Work under the Contract from time to time. All applications for extensions of time shall be in writing and shall be filed with the City before the expiration of the original time fixed in the Contract or as previously extended.

An extension of time may be granted by the City after the expiration of the time originally fixed in the Contract or as previously extended, and the extension so granted shall be deemed to commence and be effective from the date of such expiration. Any extension of time shall not release the sureties upon any bond required under the Contract nor effect forfeitures due to delay.

No additional compensation will be allowed due to just the extension of contract time for delays that are not part of an approval change order that includes compensation.

6-4.4 Written Notice and Report. *DELETE in its entirety and SUBSTITUTE with the following:*

If the Contractor desires an extension of time, it shall file with the City a written time extension notice within three (3) Calendar Days after the beginning of the delay. Time extensions related to the delay will be determined by the Engineer based on the impact on the critical path of the project.

Within fifteen (15) Calendar Days of the Contractor's first-time extension notice, the Contractor shall submit to the City a full and written detailed change order request, which fully documents the amount of time to be claimed. The change order for time extensions shall include an "impacted" schedule showing the effect of the claimed delay event on the critical path and contract completion dates. Any change order for extension of time shall fully document the Contractor's request for time extensions pursuant to the requirements of the Contract Documents. The Contractor's failure to submit the above-described written change order request to the City within fifteen (15) Calendar Days of the original commencement of the delay, shall constitute a waiver of the Contractor's claim for a time extension.

If the Contractor desires a payment for delay per 6-4.3, it shall file with the City a written notice of its intent to make a claim for such payment within three (3) Calendar Days after the beginning of the delay.

Any payment for the delay will be as set forth in 6-4.3.

Additionally, within three (3) Calendar Days after the beginning of the delay, the Contractor shall submit to the City a written notice containing a good faith estimate of the payment it will seek for each day of delay. If the Contractor cannot make a good faith estimate of the payment it will seek for each day of delay, it shall submit within three (3) Calendar Days after the beginning of the delay a full explanation as to why it cannot make a good faith estimate of the payment it will seek for each day of delay.

6-6 SUSPENSION OF THE WORK.

6-6.1 General. *DELETE in its entirety and SUBSTITUTE with the following:*

The Engineer shall have the authority to suspend the Work wholly or in part, for any time period as the Engineer deems necessary in the interest of City, for City's convenience, or due to the failure on the part of the Contractor to carry out orders given, or to perform any provision of the Contract. The Contractor shall immediately comply with the written order of the Engineer to suspend the Work wholly or in part. The suspended work shall be resumed as ordered or approved in writing by the Engineer.

Resumption of work shall be predicated on receipt of the following from the Contractor:

- a) A revised schedule showing each task yet to be accomplished and the timeline to accomplish each – until final completion.
- b) The work force projections attached to each task are listed per workweek.
- c) The cost expenditures attached to each task are summarized for each workweek.
- d) Lien releases from each subcontractor, supplier, and vendor to which the Contractor has requested materials, equipment or any other service recognizing the payments received.
- e) An Income and Expense Statement projecting how the Contractor will finance the remainder of the project.

Such suspension shall be without liability to the Contractor on the part of the City except as otherwise specified in 6-4.3. For purposes of 6-4.3, delays resulting from suspensions ordered by the Engineer due to the failure on the part of the Contractor to carry out orders given, or to fulfil any provision of the Contract, shall not be delays for which the City is responsible.

If a suspension of Work is ordered as provided above, the Contractor, at the Contractor's expense, shall do all the work necessary to provide a safe, smooth, and unobstructed passageway through construction for use by public traffic during the period of that suspension as provided in 5-7, and as specified in this Standard Specifications Supplement. If the Contractor fails to perform the work above specified, the City will perform that work and, if the suspension is due to Contractor's failure to carry out orders given or to perform any provision of the Contract, the cost thereof will be deducted from monies due or to become due the Contractor.

If a suspension of work for cause is ordered by the Engineer, in accordance with this subsection, the days on which the suspension order is in effect shall be considered working days if those days are working days within the meaning of the definition set forth in 6-3.2.

The suspension of Work shall not relieve the Contractor of the responsibilities as set forth in the Contract Documents.

It is understood that the City may require temporary omissions and “leap frogging” of portions of the work at locations to be designated by the Engineer. All fill-in and “come back” required for those previously omitted areas or openings shall be completed at the direction of the Engineer and all costs are to be included in the various items of work and no additional payment shall be allowed.

6-7 TERMINATION OF THE CONTRACT FOR DEFAULT. *REVISE to include the following:*

In the event this Contract is terminated for grounds which are later determined not to justify a termination for default, such termination shall be deemed to constitute a termination of the contract for convenience pursuant to 6-8.

6-8 TERMINATION OF THE CONTRACT FOR CONVENIENCE. *DELETE in its entirety and SUBSTITUTE with the following:*

The City reserves the right to terminate the Contract at any time upon a determination by the Engineer that termination of the Contract is in the best interest of the City.

If the City elects to terminate the Contract, the termination of the Contract and the total compensation payable to the Contractor shall be governed by the following:

- a) The Engineer will issue the Contractor a signed written notice, specifying that the Contract will be terminated. Upon termination of the Contract, the Contractor will be relieved of further responsibility for damage to the Work (excluding materials) as specified in 4-2 of the Standard Specifications, 5-9 of this Supplement and, except as otherwise directed in writing by the Engineer, the Contractor shall:
 - 1) Stop all work under the Contract except that specifically directed to be completed prior to Acceptance.
 - 2) Perform work the Engineer deems necessary to secure the project for termination.
 - 3) Remove equipment and plant from the site of the Work.
 - 4) Take action that is necessary to protect materials and Work from damage.
 - 5) Notify all Subcontractors and suppliers that the Contract is being terminated and that their contracts or orders are not to be further performed unless otherwise authorized in writing by the Engineer.
 - 6) Provide the Engineer with an inventory list of all materials previously produced, purchased or ordered from suppliers for use in the Work and not yet used in the Work, including its storage location, and such other information as the Engineer may request.
 - 7) Dispose of materials not yet used in the Work as directed by the Engineer. It shall be the Contractor's responsibility to provide the City with good title to all materials purchased by the City hereunder, including materials for which partial payment has been made as provided in 7-3.2 and with bills of sale or other documents of title for those materials.
 - 8) Subject to the prior written approval of the Engineer, settle all outstanding liabilities and all claims arising out of subcontracts or orders for materials terminated hereunder. To the extent directed by the Engineer, the Contractor shall assign to the City all the rights, title, and interest of the Contractor under subcontracts or orders for materials terminated hereunder.

- 9) Furnish the Engineer with the documentation required to be furnished by the Contractor under the provisions of the Contract including, on projects as to which Federal funds are involved, all documentation required under the Federal requirements included in the Contract.
 - 10) Take other actions directed by the Engineer.
- b) Acceptance of the contract as hereinafter specified shall not relieve the Contractor of responsibility for damage to materials. The Contractor shall continue to be responsible for damage to materials after issuance of the Notice of Termination, except as follows:
- 1) The Contractor's responsibility for damage to materials for which partial payment has been made as provided in 7-3.2 and for materials furnished by the City for use in the Work and unused shall terminate when the Engineer certifies that those materials have been stored in the manner and at the locations the Engineer has directed.
 - 2) The Contractor's responsibility for damage to materials purchased by the City after the issuance of the notice that the Contract is to be terminated shall terminate when title and delivery of those materials has been taken by the City.
- When the Engineer determines that the Contractor has completed the Work under the Contract directed to be completed prior to termination and such other work as may have been ordered to secure the project for termination, the Engineer will formally accept the Contract, and immediately upon and after the acceptance by the Engineer, the Contractor will not be required to perform any further work thereon.
- c) Termination of the Contract shall not relieve the surety of its obligation for any just claims arising out of the work performed.
- d) Where City terminates the Contract for City's convenience and not due to the fault of Contractor, the total compensation to be paid to the Contractor shall be determined by the Engineer based on the following:
- 1) The reasonable cost to the Contractor, without profit, for all work performed under the contract, including mobilization, demobilization and work done to secure the project for termination. In determining the reasonable cost, deductions will be made for the cost of materials to be retained by the Contractor, amounts realized by the sale of materials, and for other appropriate credits against the cost of the work. When, in the opinion of the Engineer, the cost of a contract item of work is excessively high due to costs incurred to remedy or replace defective or rejected work, the reasonable cost to be allowed will be the estimated reasonable cost of performing that work in compliance with the requirements of the Plans and Specifications and the excessive actual cost shall be disallowed.
 - 2) A reasonable allowance for profit on the cost of the work performed as determined under part (1) above, provided the Contractor establishes to the satisfaction of the Engineer that it is reasonably probable that the Contractor would have made a profit had the Contract been completed and provided further, that the profit allowed shall in no event exceed four (4) percent of the cost.
 - 3) The reasonable cost to the Contractor of handling material returned to the vendor, delivered to the City or otherwise disposed of as directed by the Engineer.
 - 4) A reasonable allowance for the Contractor's administrative costs in determining the amount payable due to termination of the Contract.

All records of the Contractor and the Contractor's subcontractors, necessary to determine compensation in conformance with the provisions in this Section 6-8, shall be always open to inspection or audit by representatives of the City after issuance of the notice that the Contract is to be terminated and for a period of three (3) years, thereafter, and those records shall be retained for that period.

After acceptance of the Work by the City, the Engineer may make payments based on interim estimates pending issuance of the final estimate in conformance with the provisions in 7-3.2 and 2-10, when, in the Engineer's opinion, the amount thus paid, together with all amounts previously paid or allowed, will not result in total compensation in excess of that to which the Contractor will be entitled. All payments, including payment upon the final estimate shall be subject to deduction for prior payments and amounts, if any, to be kept or retained under the provisions of the Contract.

THE PROVISIONS IN THIS SUBSECTION 6-8 SHALL BE PHYSICALLY INCLUDED IN ALL SUBCONTRACTS.

6-9 LIQUIDATED DAMAGES. *DELETE the third sentence of the first paragraph and the entire second paragraph and SUBSTITUTE with the following:*

For each consecutive calendar day more than the time specified for completion of the Work, as adjusted in accordance with 6-4, the Contractor shall pay to the City, or have withheld from monies due it, the sum as described in the Special Provisions.

Execution of the Contract shall constitute agreement by the City and Contractor that sum 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. Such sum is liquidated damages and shall not be construed as a penalty and may be deducted from payments due to the Contractor if such delay occurs.

SECTION 7 - MEASUREMENT AND PAYMENT

REVISE as follows:

7-2 LUMP SUM WORK. *DELETE 2nd paragraph in its entirety and SUBSTITUTE with the following:*

The Contractor shall furnish the City a cost breakdown schedule of values "Schedule of Values" for all contract lump sum items. The Schedule of Values shall be submitted to the City Representative for approval within fifteen (15) Working Days after the Contract has been approved. The City Representative, before any partial payment is made for the applicable items involved, will review, and provide acceptance or request modifications for the Schedule of Values in writing.

The Schedule of Values shall be completed and furnished on 8-1/2" x 11" paper. The Contractor's standard form will be considered upon request. The Contractor shall determine the quantities required to complete the Work shown on the Plans, maps or any material provided by the City to successfully complete this project. The quantities and their values shall be included in the Schedule of Values submitted to the City Representative for approval. The Contractor shall be responsible for the accuracy of the quantities and values used in the Schedule of Values submitted for acceptance. The sum of the amounts for the line items of work listed in each Schedule of Values

for each lump sum item shall be equal to the contract lump sum price bid. Overhead and profit shall be included in each individual line item of work listed in a Schedule of Values. No adjustment in compensation will be made in the contract lump sum prices due to differences between the items or quantities shown in the cost breakdowns furnished by the Contractor and the items or quantities required to complete the Work as shown on the plans and as specified in this Standard Specifications Supplement.

Individual line-item values in the accepted Schedule of Values will be used to determine partial payments during the progress of the Work.

7-3 PAYMENT.

7-3.1 General. *REVISE to include the following:*

It also includes costs such as supervision, labor, equipment, rentals, traffic control measures, lighting needed for night work, materials, consumables, taxes, freights, permits, etc. This language supersedes any other reference to taxes elsewhere in the Contract Documents.

No payment will be made for work which is not in conformance with the requirements of the Contract Documents nor for work performed outside the limits of the Work as specified in the Special and Technical Provisions, as shown on the Plans or otherwise approved by the Engineer.

Whenever the Contractor is required to perform work or furnish equipment, labor, tools and materials of any class of work contained in the Plans and Specifications for which no price is fixed in the proposal, it shall be understood that such Work, Equipment, Labor, Tools, and Material shall be provided without extra charge, allowance, or direct payment of any kind. The cost of performing such work or furnishing such Equipment, Labor, Tools, and Materials shall be included in the unit bid prices in the proposal and no additional compensation will be made therefore.

7-3.2 Partial and Final Payment. *DELETE the 2nd paragraph in its entirety and SUBSTITUTE with the following:*

On the workday following the designated closure date for preparation of progress estimates, the Contractor shall submit to the Engineer a written progress estimate based on the contract unit prices or as provided for as in 7-2 of the work that has been satisfactorily completed. However, prior to submitting each monthly progress payment request, the Contractor shall request the City Representative's approval of the current As-Built Plans. The City Representative's approval will be a prerequisite to approval of requests for each progress and final invoice payment. The Engineer will then review the estimate and approve it or notify the Contractor of any exceptions. The Engineer will determine and prepare the partial and final payments. No such progress estimate will be required, nor payment be made when the total number of working days is twenty-five (25) or less or when the value of the work totals less than \$500.00. Progress payment will, when properly completed as specified, be paid within thirty (30) calendar days of submittal, and it is understood that any delay in the preparation, approval and payment of these demands will not constitute a breach of contract on the City.

ADD the following:

7-3.2.1 City Right to Withhold Certain Amounts and Make Application Thereof.

In addition to the amount, which the City may retain under the above article on progress payments, the City may withhold enough or amounts from any payment otherwise due to the Contractor as in the City's judgment may be necessary to cover:

- a) Payments, which may be past due and payable for just claims against the Contractor or any subcontractors for labor or materials, furnished in or about the performance of the Work on the project under this Contract.
- b) Estimated or actual costs for correcting defective work not remedied.
- c) Amounts claimed by the City as forfeiture due to delay or other offsets.
- d) Fines related to the Contractor's performance.
- e) Any other amounts the City is authorized to withhold under the Contract Documents or under applicable law.

7-3.3 Delivered Materials. *DELETE in its entirety and SUBSTITUTE with the following:*

Materials and equipment delivered but not incorporated into the work will not be included in the estimates for progress payment, unless otherwise approved by the Engineer.

7-3.4 Mobilization. *DELETE in its entirety and SUBSTITUTE with the following:*

7-3.4.1 General. When a Bid item is included in the Bid for "MOBILIZATION", the costs of work in advance and during 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 and includes demobilization.

7-3.4.2 Measurement and Payment. Mobilization is eligible for partial payment if the Contract includes a bid item for mobilization. Payment for **Mobilization** will be per the **Lump-Sum (LS)** price bid and shall include obtaining and paying for all permits and business licenses as required from the City of Anaheim, State of California and other agencies. The Contractor shall comply with the requirements specified by each license or permit. No payment for Mobilization will be made until the Contractor's Construction Schedule has been submitted, reviewed, and accepted and is current. Progress payments for this item shall be paid in accordance with the percentage completion of the project and shall include the costs of such mobilization and administration for the entire contract period including construction schedule as specified in these specifications. Payments shall be made upon the basis of the following:

- a) When the monthly partial payment estimate of the amount earned, not including the amount earned for mobilization, is 5% or more of the original contract amount, 25% of the contract item price for mobilization or 5% of the original contract amount, whichever is the lesser, will be included in the estimate for payment.
- b) When the monthly partial payment estimate of the amount earned, not including the amount earned for mobilization, is 25% or more of the original contract amount, the total amount earned for mobilization shall be 50% of the contract item price for mobilization or 25% of the original contract amount, whichever is the lesser, and that amount will be included in the estimate for payment.
- c) When the monthly partial payment estimate of the amount earned, not including the amount earned for mobilization, is 50% or more of the original contract amount, the total amount earned for mobilization shall be 75% of the contract item price for mobilization or 50% of the original contract amount, whichever is the lesser, and that amount will be included in the estimate for payment.

d) When the monthly partial payment estimate of the amount earned, not including the amount earned for mobilization, is 90% or more of the original contract amount, the total amount earned for mobilization shall be 90% of the contract item price for mobilization or 90% of the original contract amount, whichever is the lesser, and that amount will be included in the estimate for payment.

e) Upon completion of all work on the project, the remaining 10% of the contract item price for Mobilization will be paid.

7-3.5 Contract Unit Prices.

7-3.5.1 General. *DELETE 2nd through 4th paragraphs in their entirety. ADD the following:*

If a change is ordered in an item of work covered by a Contract Unit Price, an adjustment in payment will be made. This adjustment will be based upon the increase or decrease in quantity at the Contract Unit Price Bid.

7-3.5.2 Increases of More than 25 Percent. *DELETE in its entirety.*

7-3.5.3 Decreases of More than 25 Percent. *DELETE in its entirety.*

7-3.7 Agreed Prices. *DELETE in its entirety and SUBSTITUTE with the following:*

Agreed prices shall be negotiated before commencement of the changed work. If a mutual agreement cannot be reached, the Engineer may direct the Contractor to proceed based on Extra Work.

7-3.8 Eliminated Items. *DELETE the first paragraph in its entirety.*

ADD the following:

7-3.9 Allowance to Accommodate Unknown and Unforeseen Site Conditions on a Time and Material Basis as Directed by the Agency.

Payment for conformance to the requirements of this bid item shall be made on a Time and Material (TM) basis as agreed upon between the Contract Administrator and Contractor, and shall be considered as full compensation for furnishing all labor, materials, equipment and incidentals necessary to complete the additional agreed upon work. No additional compensation shall be allowed therefore.

7-4 PAYMENT FOR EXTRA WORK.

7-4.2 Basis for Establishing Costs.

7-4.2.1 Labor. *DELETE in its entirety and SUBSTITUTE with the following:*

Labor payment shall be the full compensation for the cost of labor used in the direct performance of the work plus markup as established in Sections 7-4.3.1. The labor payment consists of:

a) Employer payment to the worker (per certified payroll and per Department of Industrial Regulations and Federal guidelines) for:
FRINGES:

- 1) Basic hourly wage
- 2) Health and welfare
- 3) Pension
- 4) Vacation and Holiday

- 5) Training
 - 6) Other State and federal recognized fringe benefit payments
- b) Labor surcharge percentage as, “additional work” as defined in “Labor Surcharge and Equipment Rental Rates” of the State of California Department of Transportation (Caltrans) shall be 10% or at current published rate at time of work.
- 1) Worker’s compensation insurance
 - 2) Social security
 - 3) Medicare
 - 4) Federal unemployment insurance
 - 5) State unemployment insurance
 - 6) State training taxes
- c) Subsistence and travel allowances paid to the workers, subject to the professional requirements from the collective bargaining agreement.
- d) Employer payment to superintendent, if authorized by the Engineer.

7-4.2.3 Tool and Equipment Rental. *DELETE the 2nd paragraph and SUBSTITUTE 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)

<https://dot.ca.gov/programs/construction/equipment-rental-rates-and-labor-surcharge>

at the time the work is performed.

7-4.3 Markup.

7-4.3.1 Work by Contractor. *DELETE in its entirety and SUBSTITUTE with the following:*

A markup of fifteen percent (15%) shall be added to the Contractor’s costs for all items 1 through 6, inclusive of Section 7-4.2.1. Already inclusive of this markup are the following charges:

- a) Home office overhead
- b) Field office overhead
- c) Profit
- d) Labor liability insurance
- e) Other fixed or administrative costs that are not costs of labor used in the direct performance of the work
- f) Bond

Labor payment and markup as determined under Section 7-4.2.1 and Section 7-4.3 shall constitute the Contractor’s only payment for all overhead of any type and profit on “extra work”. No other additional overhead and profit shall be paid unless approved by the Engineer.

7-4.3.2 Work by Subcontractor. *DELETE in its entirety and SUBSTITUTE with the following:*

When a subcontractor performs all or any part of the extra work, the markup established in 7-4.3.1 shall be applied to the subcontractor's actual cost of such work and shall constitute its only payment for all overhead of any type and profit. The Contractor shall receive an additional markup, not to exceed five percent (5%), for all its overhead and profit on the "extra work" performed by the Subcontractor.

7-4.4 Daily Reports. *REVISE to include the following:*

The Contractor shall notify the City Representative at the beginning of each day when extra work is in progress. No payment will be made for work not verified by the City Representative.

ADD the following:

7-6 CONTRACTOR'S COST FOR ADMINISTRATION AND COMPLIANCE OF COMMUNITY WORKFORCE AGREEMENT (CWA). This item shall include all costs associated with Contractor's administration and compliance for the fulfillment of the CWA requirements.

Payment for conformance to the requirements of this CWA bid item shall be made at the Contract bid per Lump Sum (LS) price bid and shall be considered as full compensation for furnishing all labor, materials, equipment, and incidentals necessary to complete the work. No additional compensation shall be allowed therefore.

SECTION 8 – FACILITIES FOR AGENCY PERSONNEL

8-1 GENERAL. *ADD the following after the 4th paragraph:*

Prior to installation of field office, the Contractor shall consult with City Representative on location, access and related facilities. The facilities shall be structurally sound, weather tight, with floors raised above ground.

At the Contractor's option, portable or mobile buildings may be used. Mobile homes, when used, shall be modified for office use. Mobile homes shall not be used for living quarters.

The Contractor shall pay fees and charges for applications, permits, and building inspections.

The Contractor shall fill and/or grade site for temporary structures to provide surface drainage. Construct temporary field office on proper foundations, provide connections for utility services. Provide secure portable or mobile buildings with security lighting, alarms, or cameras. Provide steps and landings at entrance doors.

With approval from the City Representative, the Contractor shall remove the temporary field office, contents and services when no longer needed. The Contractor shall remove foundations and debris and restore site to required elevations and clean the areas.

8-2.1 Class "A" Field Office. *ADD the following before the 1st paragraph:*

The office for City Representative shall be a separate space for sole use of the City with a lockable entrance door and two (2) keys.

Interior lighting shall be provided at desk and table. Exterior lighting shall be provided at the entrance door.

PART 2 - CONSTRUCTION MATERIALS

SECTION 201 - CONCRETE, MORTAR AND RELATED MATERIALS

REVISE as follows:

201-1 PORTLAND CEMENT CONCRETE.

201-1.3 Mixtures.

201-1.3.3 Concrete Specified by Class and Alternate Class. *REVISE to include the following:*

For 2500 class concrete, a prequalified mix design may be used in accordance with the provisions of ACI 318-71, section 4.2.2.1 in which $f'_c = 2500$ psi.

Street Drainage Cross Gutter and Alley Drainage Cross Gutter and spandrel PCC shall be a Concrete Class to achieve a minimum compressive strength of 3,250 psi.

When identified in the plans, high early strength PCC shall achieve 2500 psi within 24 hours of placement for areas with urgent need to place back in service. Examples include bus pads, cross gutters, driveways, driveway approaches, PCC intersections, alleys with limited access to garages, etc... Contractor shall submit mix design for approval prior to ordering or placing of mix.

SECTION 203 - BITUMINOUS MATERIALS

REVISE as follows:

203-6 ASPHALT CONCRETE.

203-6.1 General. *DELETE in its entirety and SUBSTITUTE with the following:*

Asphalt concrete to be used III-C3 PG 64-10 for finish surface course and III-B2-PG-64-10 for base course conforming to the SSPWC. Any other asphalt concrete mix used shall be subject to prior approval by the Engineer. Unless otherwise specified in the Special Provisions or shown on the Plans, asphalt concrete mixtures shall conform to 203-6.4.

- Finish Surface Coarse: C3-PG-64-10-R0
- Base Coarse: B2-PG-64-10-R25

The asphalt concrete in the base course shall be the product of mixing mineral aggregate and up to 25 percent reclaimed asphalt pavement (RAP) with asphalt binder at a central mixing plant.

Finish surface course mix design shall not consist of any reclaimed asphalt pavement (RAP).

Crushed aggregate data is required, and it shall be submitted with respective mix designs.

Coarse aggregate shall consist of material of which at least 75% by weight shall be crushed particles.

Performance Graded (PG) asphalt binder shall conform with Section 203-1.

SECTION 208 – PIPE JOINT TYPES AND MATERIALS

REVISE as follows:

208-2 JOINTS FOR CLAY PIPE.

208-2.1 General. *REVISE to include the following:*

Only the following types of joint materials will be permitted for vitrified clay pipe: “D” and “G”. Type “G” joints shall be used whenever possible. Type “D” joints shall only be used upon approval by the Engineer.

SECTION 214 - TRAFFIC STRIPING, CURB AND PAVEMENT MARKINGS, AND PAVEMENT MARKERS

REVISE as follows:

214-1 GENERAL. *REVISE to include the following:*

All traffic striping material (including pavement markers) shall conform to Caltrans Standard Specifications Latest Edition, MUTCD latest Edition and any supplements therein.

214-5 THERMOPLASTIC MATERIAL FOR TRAFFIC STRIPING AND MARKINGS.

214-5.1 General. *REVISE to include the following:*

Thermoplastic material shall not exude fumes, which are toxic, obnoxious, or injurious to persons or property when heated during application.

214-6 PAVEMENT MARKERS.

214-6.1 Type of Markers. *REVISE to include the following:*

Two-way blue pavement markers shall be installed for all fire hydrants per City Standard Detail 457.

214-6.4 Retroreflective Pavement Markers. *REVISE to include the following:*

Retroreflective raised pavement markers shall be either "one-way clear", "one-way yellow", "two-way clear", "two-way yellow", "red/clear", or "two-way blue", specified accordingly as per layout and installation details.

214-7 ADHESIVES FOR PAVEMENT MARKERS.

214-7.2 Epoxy Adhesives.

214-7.2.1 General. *REVISE to include the following:*

All epoxy adhesive for pavement markers shall conform to the California Department of Transportation (Caltrans) Standard Specifications, Latest Edition.

SECTION 220 - TRAFFIC SIGNING

220-1 SIGN MATERIAL

All work shall conform to detail drawings as shown on the plans and as specified in City Standard Detail 426, Section 82 of the State of California Department of Transportation (Caltrans) Standard Specifications, Latest Edition, and this Standard Specifications Supplement.

All signs shall be standard size and color as specified in the MUTCD, latest edition, unless otherwise specified by the Engineer.

All new signs to be installed shall be the international symbol (if available) unless otherwise specified.

All signs shall be aluminum panel not less than 0.125 inch thick, 6061-T6 or 5052-H38 Alloys. Exceptions are Type L, K and street name signs which shall be 0.125 inch thick, radius corners 1/2 inch. Aluminum base metal shall be cleaned, deoxidized, and coated with a light tightly adherent chromated conversion coating free of any powdery residue. For installation of signs that are 36" or larger and/or sign combinations, a brace is used for strength (3/16"x1"x30" or 36" brace).

All sign facings shall be manufactured of high intensity grade, encapsulated lens sheeting, (Hi-Intensity or equal) except for R26 signs which shall be Engineering Grade material (enclosed lens). All signs which could result in a moving violation shall be high intensity. All signs provided under this CONTRACT shall include an anti-graffiti film overlay. Protective overlay shall be 3M Series 1160A overlay or approved equivalent. The anti-graffiti overlay shall be considered as included in the price bid for the item of work and no additional payment will be made therefore.

220-2 SIGN POSTS

Sign posts and anchor post assembly shall be pursuant to City Standard Detail 426. Sign posts shall be Square perforated steel tube with break-away base, "telspar" or equal. Anchor posts assembly shall consist of a 2 1/2" square by 2' 6" anchor post.

PART 3 - CONSTRUCTION METHODS

SECTION 300 - EARTHWORK

300-1 CLEARING AND GRUBBING.

300-1.1 General. *REVISE to include the following:*

Areas to be cleared shall be limited to the immediate construction area only and shall not include the entire right-of-way.

Demolition and removal of irrigation equipment and other items not mentioned that are required are part of this work in the section.

All tree roots will be pruned in a clean matter on either side of any damaged concrete facility to be replaced to get the new concrete facility back in proper place. Up to six (6) inches of root pruning on either side of the concrete surface is allowed to install a form board back in place. Root pruning depth for sidewalks, curb ramps, and driveways will be the minimum of four (4) inches below sub-grade, curb and gutter, cross gutter, and street area depth will also be the maximum of four (4) inches below sub-grade, or as directed by the Engineer.

Root pruning equipment shall be specifically designed for this purpose with cutting teeth sharpened to sever roots in a clean manner.

Should the Contractor create a hazardous condition in the sole judgment of the Engineer the Contractor shall remove the tree and replace it with a specimen of the same species and value at the Contractor's expense.

All significant root pruning (3-inch diameter and larger) shall be performed under the direct supervision of an ISA Certified Arborist in the Contractor's employ.

Contractor shall notify the Engineer of any damaged or non-salvageable materials prior to commencing any removal or grading operations. Materials found to be damaged after work commences shall be assumed the responsibility of the Contractor. The Contractor will not be paid

for the replacement or repair of facilities or equipment believed by the Engineer to be damaged after the work commences.

Payment for temporary trench resurfacing shall be included in the various items of work and no additional payment will be allowed.

300-1.4 Payment. *DELETE in its entirety and SUBSTITUTE with the following:*

Full compensation for conforming to the requirements of this section shall be considered as included in the price bid for the various items of work and no additional payment will be made therefore.

Concrete Curb, Curb and Gutter, Retaining Curb and Median Curb to be removed and reconstructed shall be paid at the contract price bid per linear foot, and shall include saw cutting, removal including the removal and replacement of the one (1.5) foot of asphalt concrete (per slot paving detail), any necessary grading and compaction, tree root pruning, landscape repairs and replacements as required, disposal, all labor, material, equipment, and incidentals necessary to complete the work as directed by the City Representative.

Sidewalks, Cross Gutters, Spandrels, Driveways, Masonry Walls, and Alley Gutters to be removed and reconstructed shall be paid at the contract price bid per square foot and shall include saw cutting, removal including the removal and replacement of the one and one half (1.5) foot of asphalt concrete (per slot paving detail), any necessary grading and compaction, tree root pruning, landscape repairs and replacements as required, disposal, all labor, material, equipment, and incidentals necessary to complete the work as directed by the City Representative.

Curb Ramps to be removed and reconstructed shall be paid at the unit price and shall include saw cutting, removal including the removal and replacement of the one (1) foot of asphalt concrete (per slot paving detail), any necessary grading and compaction, tree root pruning, landscape repairs and replacements as required, disposal, all labor, material, equipment, and incidentals necessary to complete the work as directed by the City Representative.

Truncated Domes shall be included at the unit price for Curb Ramps and shall include full compensation for furnishing all labor, tools, materials, equipment and incidentals and for doing all work as required and as directed by the City Representative. Product to be Armor-Tile, Battleship Grey in color, cast-in-place.

300-2 UNCLASSIFIED EXCAVATION.

300-2.2 Unsuitable Materials.

300-2.2.1.1 Removal and Disposal of Materials. *REVISE to include the following:*

For this project, the Contractor shall make all arrangements for disposal of the material at off-site locations in accordance with all applicable ordinances. No additional compensation will be allowed.

300-2.6 Surplus Material. *REVISE to include the following:*

All surplus material shall be disposed of in a legal manner at the expense of the Contractor. Contractor shall make all arrangements for disposal of the material at off-site locations in accordance with all applicable ordinances. Refer to Section 3-12 contained in this Supplement, Anaheim Municipal Code, and Chapter 10.10.

SECTION 302 - ROADWAY SURFACING

REVISE as follows:

302-4 SLURRY SEAL SURFACING.

302-4.2 Mix Design(s).

302-4.3 Emulsion-Aggregate Slurry (EAS)

302-4.3.2.2 Emulsified Asphalt. *REVISE to include the following:*

Emulsified asphalt for EAS shall be cationic and shall be designated CQS-1h and shall conform to the requirements of Section 203-3.

Emulsified asphalt shall be latex modified; latex shall be Ultrapave UP-65K by the Textile Rubber & Chemical Co., Inc., or approved equal. The latex shall be added to the emulsified asphalt at the asphalt plant at the rate of 3% by volume. Field addition of polymer/latex shall not be allowed.

302-4.6 Continuous-Flow Mixers.

302-4.6.1 General. *DELETE in its entirety and SUBSTITUTE with the following:*

The mixing machine shall comply with maximum axle loadings and City of Anaheim weight restrictions and shall not carry excessive amount of materials exceeding the GVW rating recommended by the equipment manufacturer.

The mixing machine shall be designed and manufactured to lay slurry seal with a minimum aggregate capacity of eight (8) cubic yards to reduce the number of transverse joints. The slurry seal mixing equipment shall be a continuous flow mixing unit, capable of delivering accurately predetermined proportions of aggregate, asphalt emulsion, and mineral filler (if required) to a revolving spiraled multi-blade mixer and of discharging the thoroughly mixed product on a continuous basis. The mixing unit shall be capable of thoroughly blending all ingredients together. The mixing machine shall be equipped with fines feeder that provides an accurate metering device or method of introducing a predetermined proportion of mineral filler to the aggregate. The fines feeder shall be used only when mineral filler is part of the mix design. The mixing machine shall be equipped with a water pressure system and fog type spray bar. The machine shall be capable of mixing materials at preset proportions regardless of the speed of the machine and without changing machine settings.

The amount of emulsified asphalt as a percentage of aggregate weight for each type of slurry shall conform to the optimum mixing proportions on the approved mix design.

302-4.6.5 Verification Testing. *REVISE to include the following:*

The Contractor shall mix trial batches for each type of slurry seal required using the approved mix designs and place them at test strips designated by the Engineer. The test strips shall be at least one hundred (100) feet long and same width as the street. Trial Batches shall be scheduled at least two (2) weeks prior to the 1st scheduled day of slurry sealing.

The product's acceptability will be based upon strict conformance with the Standard Specifications, Special and Technical Provisions and on providing enough slurry so that complete coverage is obtained. Lumping, balling, unmixed aggregate, draglines, transverse ridges (washboard appearance), streaks such as caused by oversized aggregates, uneven and excessive longitudinal joint widths, rough handwork, and excessive color variations will be cause for rejection of the trial batches. These criteria shall be used for the acceptance or rejection of all slurry seal placed on this project.

If the mix does not produce an acceptable product, additional trial batches shall be prepared and placed using modified mix designs which must be submitted to the Engineer for approval or modified machine calibrations or both until an acceptable product is produced. The Contractor shall cover unaccepted trial batches with a second application of slurry seal at his own expense. If the trial batch and test strip are acceptable, the mix design used for that batch will become the approved mix design.

302-4.7 Aggregate Stockpile. *REVISE to include the following:*

Obtain prior written permission from the property owner and submit it to City Representative at least 48 hours prior to placing materials (stockpiles) or equipment on any private property. Take all necessary precautions to ensure that stockpiles do not become contaminated.

Ensure that all stockpile areas are left in a thoroughly cleaned condition, restored to the pre-stockpiled state, upon completion of slurry operation in the given area.

Throughout the duration of the project, the Contractor shall protect the stockpiled aggregate from contamination by oversized rock, silt, clay, and excessive amount of moisture. Excessively wet aggregate, which exceeds 4% moisture by weight, shall be set aside for drying out to meet the moisture content limit.

Unsuitable or damaged materials shall be removed from the stockpile site within 2 days after notification by the City Representative and disposed of in accordance with California law at Contractor's expense.

The Contractor shall submit to the City Representative quantity and weight certificates of emulsified asphalt and aggregate on the same day of delivery to the stockpile site.

The Contractor shall schedule and coordinate the delivery of emulsified asphalt and aggregate to the stockpile site before 3 p.m. on days when slurry spreading takes place. Advance notification of each delivery shall be given to the City Representative for tracking purposes. Quantity and weight certificates shall be submitted to the City Representative on the same day of delivery.

Before acceptance of the work and final payment, the Contractor shall clean all project sites, the stockpile site, and all grounds occupied by him in connection with the project.

The Contractor shall remove all rubbish, debris, excess materials, temporary structures, and equipment. All parts of the sites and grounds shall be left in a neat and orderly condition.

Full compensation for protection of work and materials and proper maintenance of the stockpile and work sites shall be considered as included in the unit price bid and no additional compensation will be allowed therefore.

302-4.9 Spreading and Application. *ADD the following:*

302-4.9.1.1 Pavement Preparation. Immediately prior to crack sealing the Contractor shall sweep and clean the pavement surfaces of all vegetation, dirt, oil deposits, and other objectionable materials. All pavement cracks 1/4" or wider shall be cleaned using a wand and compressed air. The compressor used shall be a minimum of 90 cfm and equipped with a device to remove moisture from the compressed air. Air cleaning shall be performed immediately before the application of the crack sealant and shall remove all dust, dirt, oil, and other foreign matter.

Crack sealing material shall be Crafc-Polyflex Type 3 (Part No. 34521) or approved equal. Sealant shall be applied at the recommended pour temperature using either a wand equipped with an applicator disk or a squeegee. The joint shall be filled to the top without the formation of voids. Cracks shall be filled flush with the pavement surface surrounding the cracks and any overfill shall be squeegeed so that there is no overband cap above the surface and the width does not extend beyond the crack edges.

The Contractor shall be responsible for determining the extent of the crack sealing. He shall ensure that sufficient crack sealing is performed to prevent reflective cracking through to the new street surface. Prior to any crack sealing to be performed, the Contractor shall meet with the City Representative in the field to discuss the extent and adequacy of the work as well as the street surface preparation to receive crack sealant.

The Contractor shall be responsible for the removal of all previous slurry seal or other materials on the existing gutter or edge of pavement adjacent to the slurry sealed surface. The City Representative shall approve Method of slurry removal, all such work shall be considered as included in the unit price for Slurry Seal, and no additional compensation shall be allowed therefore.

No sooner than the day prior to applying slurry seal, the Contractor shall vacuum sweep and clean the pavement surfaces of all vegetation, dirt, oil deposits, and other objectionable materials. Street sweeping shall also occur on the following day after a street has been slurry sealed without damage to slurry sealed surface to remove all loose aggregates from the street surface and as necessary or directed prior to final acceptance of project.

The Contractor shall be responsible for the removal of raised pavement markers and any existing thermoplastic striping.

The Contractor is to apply a weed killer with a colored dye (pre-emergent) to each visible crack in areas identified to be slurry sealed. The sterilant, systemic weed killer to be used will effectively destroy existing weeds and prevent future seeds for a minimum of two (2) years and a maximum of five (5) years. The Contractor shall submit to the Engineer for approval information literature on the proposed weed killer.

The Contractor is responsible for arranging and ensuring that the City Representative will be present at every location to verify application of weed killer.

Payment for weed killer shall be deemed as included in the bid unit price for slurry seal; in addition, it shall include all necessary work in furnishing and applying the weed killer.

302-4.9.1.2 Slurry Seal Operations. *ADD the following:*

Before slurry sealing, the Contractor shall place and maintain protective, durable covers over manholes, water valves, monuments, other utility covers. Contractor shall take care to ensure a tightly fitted slurry application around these items to prevent water penetration under the new slurry. After the new slurry has cured and before opening the streets for traffic, Contractor shall clean and expose all utility covers and equipment. The Contractor is responsible for any damage to utility covers or equipment due to inadequate protection.

The mixture shall be spread uniformly by means of a conventional surfacing spreader box attached to the mixing machine having a rubber-like material in contact with the surface to prevent unwanted egress of slurry. It shall prevent loss of slurry on varying grades and crown by adjustments to assure uniform spread. An appropriate mechanical device for lateral distribution of the slurry shall be operated within the spreader box. There shall be a steering device, a flexible

strike-off, and a burlap or other approved drag. The spreader box shall be adjustable to widths from eight (8) to fifteen (15) feet to minimize the number of longitudinal joints. Cured slurry seal mixture shall not be allowed to collect in the spreader box or on the flexible strike-off.

The Contractor shall maintain all equipment in proper working condition. Faulty equipment shall be grounds for suspension of slurry spreading. No adjustment of unit price of any items or increase in compensation shall be allowed for the suspension. The days of suspension caused by faulty equipment shall be counted as working days and the contract completion date shall not be extended.

When slurry sealing roadways, the outermost lanes shall be slurry sealed first and the center lanes last. To prevent any lip edges in the application of slurry seal, the Contractor shall feather the edges. Longitudinal joints shall correspond with the edges of existing traffic lanes. A maximum of six (6) inches shall be allowed for overlap of longitudinal lane in line joints. Building paper shall be placed at transverse joints, over previously placed slurry seal to avoid double placement of slurry seal. Ridges or bumps in the finished surface will not be permitted.

The Contractor, as necessary, to perform the work, remove spillage and spread slurry in areas inaccessible to the spreader box, shall provide hand squeegees, shovels, hand burlap bags, and other equipment. Squeegees of all slurry edges require a burlap finish. Any streets with slurry seal overspill onto the gutter shall be cleaned up immediately on the same day as the slurry application.

302-4.9.1.3 Rolling. *REVISE to include the following:*

All types of Slurry Seal applied in this Project shall be rolled with a pneumatic roller (rubber tire roller) conforming to 302-2.7.2, with a minimum of three complete passes over the entire slurry seal area prior to opening the road to traffic. A complete pass shall be the movement of a roller in both directions over the same path.

302-4.9.1.4 Sweeping. *REVISE to include the following:*

The Contractor shall always have a street sweeper at the work site during the Work. The Contractor shall sweep the surface of all slurry sealed streets on at least two (2) occasions (approximately one (1) day and seven (7) days after slurry has been in place) to remove loose aggregate. The sweeps shall also be conducted within forty-eight (48) hours of receiving a Notice to Correct from the Inspector or Engineer. The Contractor shall make complete (curb-to-curb) passes on all scheduled sweeps. The Contractor shall also sweep construction debris and spillage on City streets after each construction day.

302-4.10 Field Sampling and Testing.

302-4.10.1 Field Sampling. *DELETE in its entirety and SUBSTITUTE with the following:*

During the performance of the work, the Contractor shall hire a laboratory capable of performing the applicable ASTM tests; the laboratory shall take at least two field samples, from separate loads, of mixed slurry seal per slurry truck, per day for testing. WTAT specimens shall be cast and struck off within 60 seconds of obtaining the sample. WTAT specimens shall not be transported until the slurry seal has set as defined by ASTM D3910. The test results shall be delivered to the Engineer directly from the laboratory no later than 72 hours after taking field sample.

Field samples shall conform to the requirements shown in Table 302-4.9.1 (A):

	Test Method	Requirements Min. Max.	
Wet Track Abrasion Test, Weight Loss, gm/ft ² All Types of Slurry Seal	ASTM D39101	0	50

Consistency Test (mm)	ASTM D39101	20	40
Extraction Test (Calculated Emulsion Content, %)	D63072 or CT 3822	± 1% of mix Design for EAS	
Water Content (% of Dry Aggregate)	See Note 3	0	Type I, II, and III EAS < 25

1. Modified ASTM D3910 to include No. 4 (4.75mm) aggregate or greater and to be performed using field samples. Subsection 6.4.4.7, ASTM D3910 may be modified to use a microwave oven for drying the specimen after the abrasion cycle is complete and the debris washed off.
2. Modified ASTM 6307 and California Test Method 382 to allow a minimum of 500 ±50-gram sample.
3. Weigh a minimum of 500 grams of homogenized mixed slurry into a previously tared quart can with a friction lid. The lid shall be placed on the can to prevent loss of material during transportation. Place the can with the lid off in an oven and dry to constant mass at 220°F ±10°F (110°C ±5°C).

302-4.11 Measurement. *DELETE in its entirety and SUBSTITUTE with the following:*

The basis of measurement for all types of slurry seal shall be measured and paid for by the square yards of surface area completed and accepted as designated by the City Representative for each type applied. Slurry seal work that has been rejected shall not be measured nor paid for.

302-4.12 Payment. *REVISE to include the following:*

302-4.12.1 Payment Reduction for Non-Compliance.

302-4.12.1.2 Reduction in Payment Based on WTAT. *DELETE in its entirety and SUBSTITUTE with the following:*

If the results of the WTATs performed each day fail to conform to the requirements specified in 302-4.10.1, the Contractor agrees that payment for the Work represented by the failed tests shall be reduced as shown in Table 302-4.12.2.

TABLE 302-4.12.2

WTAT Loss gm/ft ²	Payment Reduction (Percent) All Types of Slurry Seal
0-50	0%
50.1-60	5%
60.1-70	15%
70.1-80	30%
80.1-95	70%
95.1 or greater	95%

1. Slurry seal surfacing with WTAT loss greater than 95 gm/ft² shall be removed by micro-milling, or other method as approved by the City Representative.

For WTAT Loss greater than 80, the City Representative shall have sole discretion in whether to accept slurry seal quantities with payment reductions or shall have the option to reject the work and require the contractor to slurry seal the rejected locations again.

302-4.12.2 Emulsion-Aggregate Slurry Seal Surfacing. *DELETE 1st paragraph and SUBSTITUTE with the following:*

Payment for accepted quantities of **Type I Emulsion Aggregate Slurry** and **Type II Emulsion Aggregate Slurry** complete in place will be paid for at the contract unit price per **Square Yard**

(SY), which price and payment shall be full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work involved in constructing the slurry seal, complete in place, including all testing for field work samples and furnishing the mix design, trial batches and test strips, micro milling, cleaning the surface, rolling, street sweeping, furnishing added water and set-control additives, latex, mixing water with asphaltic emulsion for coating the pavement, application of crack seal material, water, and protecting the seal until it has set, all as shown on the plans, and as specified in the Standard Specifications and the Special and Technical Provisions, and as directed by the City Representative.

Payment for accepted quantities of Crack Sealing complete in place will be included under the contract unit price of Type I and II Emulsion Aggregate Slurry per Square Yard (SY), which price and payment shall be full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work involved in crack sealing, including cleaning of cracks to remove all laitance, vegetation, scale, dirt, dust, oil, providing weed killer, application of weed killer and other foreign materials, complete in place, as specified in the Standard Specifications and the Special and Technical Provisions, and as directed by the City Representative.

302-5 ASPHALT CONCRETE PAVEMENT.

302-5.8 Tack Coat. *DELETE and SUBSTITUTE with the following:*

Tack coat material shall be uniformly applied to the surface of the existing pavement immediately prior to the placement of asphalt concrete (including a succeeding lift when constructing in multiple courses). The contact surfaces of cold pavement joints, curbs, gutters, manholes, and other structures or facilities to be joined shall also be painted with tack coat material immediately prior to the adjoining asphalt concrete being placed.

Tack coat material shall be PG 64-10 paving asphalt conforming to 203-1 or SS-1h emulsified asphalt conforming to 203-3. SS-1h emulsified asphalt shall not be diluted beyond a ratio of 1 part water to 1 part original emulsified asphalt (1:1). A Certificate of Compliance for each truckload of emulsified asphalt or paving asphalt shall be provided to the Engineer before the application of tack coat starts. The Engineer may obtain and retain samples for testing.

The full-width of the surface to receive tack coat shall be cleaned with a self-propelled, truck-mounted sweeper equipped with both power brooms and a vacuum system. Loose dirt, sand, dust, and other objectionable material shall be fully removed. The surface to be treated shall be dry after cleaning and immediately prior to tack coat application.

The minimum rate of application of SS-1h emulsified asphalt shall be that shown in Table 302-5.8 (A), or the application rate necessary for the minimum residual rate shown in Table 302-5.8 (B), whichever is greater. For PG 64-10 paving asphalt, the application rate shall be a minimum of the residual rate shown in Table 302-5.8B. Table 302-5.8 (B) is applicable to both SS-1h emulsified asphalt and PG 64-10 paving asphalt.

TABLE 302-5.8 (A)

Surface Type	Minimum Application (Spray) Rate (gal/yd²)	
	Undiluted (Original) Emulsified Asphalt (SS-1h)	Diluted (1:1) Emulsified Asphalt (SS-1h)
Asphalt Concrete	0.05	0.10
Cold milled or Micro-Milled Asphalt Concrete	0.09	0.18
New Asphalt Concrete (Between Successive Lifts)	0.04	0.08
Portland Cement Concrete	0.05	0.10

TABLE 302-5.8 (B)

Surface Type	Minimum Residual Rate (gal/yd ²) ¹	
	Emulsified Asphalt (SS-1h)	Paving Asphalt (PG 64-10)
Asphalt Concrete	0.03	0.03
Cold milled or Micro-Milled Asphalt Concrete	0.05	0.04
New Asphalt Concrete (Between Successive Lifts)	0.02	0.02
Portland Cement Concrete	0.03	0.03

1. Tack coat application rates shall be based upon the volume of asphalt remaining per square yard after application (residual rate). For SS-1h, this is the volume remaining after the asphalt emulsion has broken and not water remains. For PG 64-10, this is the volume on the roadway immediately after application.

Tack coat material shall be applied by a distributor truck conforming to 302-2.3.2. The distributor truck spray bar shall be pressurized during application and discharge tack coat material in a fan shape from each nozzle. The spray bar shall be set at a height above the existing pavement which results in each interior spray fan overlapping a minimum of twice before coming into contact with the underlying pavement. Streaking or streaked applications will not be accepted.

The Tack coat shall be applied only as far in advance of the placing of the overlying layer as required for that day's operation. Following application, tack coat shall be allowed to cure without being disturbed for the period necessary to permit setting. Treated surfaces shall be protected from damage until the succeeding course of pavement is placed.

Payment for tack coat shall be considered and included in the various unit price bid and no additional compensation shall be provided, therefore. Payment for surface preparation shall be considered and included in the various unit price bid and no additional compensation shall be provided therefore.

302-5.9 Placement.

302-5.9.1 General. *REVISE to include the following:*

The final or surface layer of asphalt concrete shall not be placed until all on-site improvements, including all grading, and all off-site PCC improvements are substantially complete, as determined by the Engineer.

The final or surface layer of asphalt concrete of 0.20-foot thickness or less may be placed in one lift. Asphalt concrete of greater than 0.20-foot thickness shall be placed in a minimum of two lifts. When placed in two lifts, the compacted thickness of the final surface course of asphalt concrete shall not be greater than 0.20 foot or less than 2 inches.

302-5.9.2 Joints. *DELETE the first sentence and SUBSTITUTE with the following:*

Longitudinal joints shall be located on the traffic lane lines.

SECTION 303 - CONCRETE AND MASONRY CONSTRUCTION

303-1 CONCRETE STRUCTURES.

303-1.4 Removal of Forms.

303-1.4.4 Standard Structures.

a) **Standard Catch Basins.** *REVISE to include the following:*

- 1) On all catch basin construction, the following shall be stenciled on top of the curb at the catch basin:

NO DUMPING – DRAINS TO OCEAN

The lettering shall be three (3) inches high and applied with black paint pursuant to Standard Detail No. 385. Payment for conformance to the requirements of this subsection shall be deemed to be included in the price bid for the various items of work and no additional compensation will be allowed therefore.

303-5 CONCRETE CURBS, WALKS, GUTTERS, CROSS GUTTERS, ALLEY INTERSECTIONS, ACCESS RAMPS AND DRIVEWAYS.

303-5.1 Requirements.

303-5.1.1 General. *REVISE to include the following:*

Construction of Curbs and Gutters, Sidewalk, Driveways, Access Ramps and Cross Gutters shall be per Standard Details provided in this Standard Specifications Supplement. As shown on the Standard Plans and exhibits, removal and reconstruction of a minimum of one (1) foot to one and one half (1 ½) foot wide (full depth or as shown on plans/exhibits) of asphalt concrete pavement adjacent to the new PCC item, to ensure that all areas are accessible to mechanical equipment to compact disturbed soil, treated and untreated aggregate base, subgrade, and/or paving materials, is required.

The reconstruction of some infrastructure elements (PCC improvements) on this project is due to the damage caused by tree roots; as a result, extensive tree root systems are expected under existing infrastructure and no additional compensation shall be allowed therefore.

Offending root pruning shall be done using proper equipment to minimize damage or the potential for injury to trees. The use of a backhoe or any other heavy machinery to remove tree root systems will not be permitted. Failure to comply with this special provision, the contractor is responsible for any unnecessary tree removal and replacement of similar. No additional compensation shall be allowed therefore.

303-5.1.2 Drainage Outlets Through Curb. *REVISE to include the following:*

The Contractor shall protect existing curb drain sleeves and parkway drains during construction. It shall be contractor's responsibility to replace per City of Anaheim Standard Details 150-2 & 151-1 if it gets cracked or broken at no additional cost to the City.

303-5.1.3 Driveway Entrances. *REVISE to include the following:*

This item shall be constructed in accordance with City of Anaheim Standard detail no. 114-A and 115-B and delineated in this Standard Specifications Supplement. This shall include driveway construction modifications to match the existing replaced driveway with existing curb radius or modifying curb return radius when and if deemed necessary by the Engineer. Any portion of the driveway approach as shown in the City of Anaheim Standard Details 114-A & 115-B shall be included per the Contract Bid Unit Price. No additional compensation will be allowed therefore.

The Contractor shall maintain safe driveway access open to the residents and/or businesses at all times, except during construction work hours and after notifying the residents and businesses forty-eight (48) hours prior to working on driveway. If applicable, a High Early strength concrete or 7 sack cement mix design shall achieve 2,500 psi within 24 hours to fully open driveways and

driveway approaches within two (2) days, inclusive of demolition and removals. Whenever possible, driveways shall be reconstructed $\frac{1}{2}$ of the width at a time.

Payment for construction of Driveway Approach (Gutter Only) and Driveway Approach including saw cutting, asphalt concrete pavement removal & reconstruction, excavation, expansion joint at back of gutter per City of Anaheim Standard Detail 114-A & 115-B, compaction, grading, removal and disposal (including removal, repairs, and replacement of landscaping, hardscape, and irrigation), preparation of subgrade, maintaining safe driveway access, shall be included per the Contract unit price per SQUARE FOOT of Driveway Approach constructed. No additional compensation will be allowed therefore.

The Contractor shall remove tree root systems as necessary for the construction of Driveway Approach. Payment for removal and disposal of tree root systems (as noted in section 303-5.1.1) including grading, preparation of subgrade, including compaction shall be included per the Contract bid Unit Price per SQUARE FOOT of Driveway Approach (Gutter Only) and Driveway Approach constructed. No additional compensation will be allowed therefore.

303-5.3 Placing Concrete. *REVISE to include the following:*

Concrete curbs, curbs and gutters shall not be constructed monolithically with access ramps. Concrete for access ramps shall not be placed until a minimum of 4 hours after concrete for the adjoining curb or curb and gutter has been placed.

303-5.5 Finishing

303-5.5.2 Curb. *REVISE to include the following:*

This item shall be constructed in accordance with City of Anaheim Standard Detail No. 120, Type A, B, C, D or F, delineated in the Plans, Exhibits, and the Standard Specifications Supplement.

All concrete flow lines shall be water-tested upon completion of finishing, and any irregularities causing water ponding shall be corrected immediately.

Payment for temporary pavement reconstruction adjacent to the curb and cross gutter shall be included in the various items of work and no additional payment will be allowed.

If an existing curb is replaced, and it is painted in a color or has a house address painted on it, the Contractor shall paint it in kind after construction. Payment for this requirement shall be included in the construction bid item for curb & gutter. No additional compensation shall be allowed therefore.

Payment for the removal and reconstruction of curb and curb & gutter shall include saw cutting, asphalt concrete pavement removal and reconstruction, excavation, grading, removal and disposal of existing improvements, preparation of subgrade, including compaction, construction of proposed curb & gutter, transition in curb height, and 0-inch curb height at gutter shall be paid per the contract unit price per Linear Foot. No additional compensation shall be allowed therefore.

The Contractor shall remove tree root systems as necessary for the removal and reconstruction of curb & gutter. Payment for removal and disposal of tree roots including grading, preparation of subgrade (including compaction), shall be included per the Contract Unit Price bid per linear foot of remove and reconstruct curb & gutter. No additional compensation will be allowed therefore.

DELETE the last sentence of the second paragraph and SUBSTITUTE with the following:

The name of the Contractor and the year in which the improvement is constructed shall not be stamped in the completed work.

303-5.5.3 Walk. *REVISE to include the following:*

This item shall be constructed in accordance with City of Anaheim Standard Detail No. 110-B and 112-1 and delineated in the Standard Specifications Supplement. Finish, appearance, score lines and color shall match existing surrounding sidewalk.

Payment for remove and reconstruct PCC sidewalk shall include saw cutting, asphalt concrete pavement removal and reconstruction, excavation, grading, removal, disposal and repair or replacement, of existing improvements (including landscaping, hardscape and irrigation), preparation of subgrade, including compaction shall be included per Contract unit price per square foot of PCC sidewalk constructed. No additional compensation will be allowed, therefore.

The Contractor shall modify existing irrigation system where it conflicts with the proposed sidewalk. Modify, revise, and reconnect irrigation system as necessary to retain the original intent and watering of the irrigation system. Payment for any irrigation modification shall be included per contract unit price bid per square foot of sidewalk removal and reconstruction and no additional compensation will be allowed therefore.

The contractor shall remove tree root systems as necessary for the construction of sidewalk. Payment for removal and disposal of tree roots including grading, preparation of subgrade (including compaction), shall be paid per the Contract Unit Price bid per SQUARE FOOT of PCC sidewalk constructed. No additional compensation will be allowed, therefore.

303-5.5.4 Gutter. *REVISE to include the following:*

This item shall be constructed in accordance with the City of Anaheim Standard Detail Nos. 121-A, 122 and delineated in these Special Provisions. The strength of concrete mix shall be 3,250 psi.

Payment for the removal and reconstruction of cross gutter and spandrel including adjoining portions of gutter, saw cutting, asphalt concrete pavement removal and reconstruction, excavation, grading, removal and disposal of existing improvements, providing steel plates to cover cross gutters for vehicle traffic during construction, preparation of sub grade including compaction, backfill and cleanup, shall be included per the contract unit price per Square Foot of PCC cross gutter constructed. The contract unit price per square foot shall include curb & gutter placed monolithic with the PCC spandrel. No additional compensation will be allowed therefore.

All concrete flow lines shall be water-tested upon completion of finishing, and any irregularities causing water ponding shall be corrected immediately.

The Contractor shall remove tree root systems as necessary for the construction of the gutter. Payment for temporary pavement reconstruction adjacent to the curb and gutter and cross gutter shall be included in the various items of work and no additional payment will be allowed.

303-5.5.5 Alley, Intersections, Access Ramps, and Driveways. *REVISE to include the following:*

Access ramp items shall be constructed in accordance with City Standard Detail No. 111-3 (Type and Case to be determined by the best fit with modifications for each location that will comply with current ADA requirements) including furnishing and installing the cast in place truncated domes without a tactile border around the access ramp and delineated in the Standard Specifications Supplement. Concrete and asphalt concrete shall be sawcut along all removal lines unless they need to remain in place as approved by the Engineer. ADA ramps shall be a minimum four (4) inch thick P.C.C. sidewalk to match existing.

Adjustments of traffic pull boxes, water valves, vaults, conduits and wirings, and any other utility structures within the access ramp to be reconstructed/adjusted to protect in place shall be included per this item, unless otherwise specifically covered by a separate bid item.

Full compensation for conforming to the requirements of this bid item shall be made at the contract unit price per each access ramp with cast in place truncated domes, furnished, constructed and installed in place and shall include saw cutting, excavation, removal and disposal of existing improvements, removal & disposal of existing landscape/hardscape/tree root grinding, subgrade preparation, backfill, compaction and cleanup, reconstruction of PCC sidewalk, reconstruction of PCC curb and gutter, including curb transition, and shall include all labor, materials, tools, equipment, and incidentals necessary to maintain access and complete the work. No additional compensation will be allowed therefore.

The Contractor shall remove tree root systems as necessary for the construction of Access Ramps. Payment for removal and disposal of tree roots including grading, preparation of subgrade (including compaction), shall be included per the Contract Unit Price bid per EACH of PCC Access Ramp constructed. No additional compensation will be allowed, therefore.

The Contractor shall modify existing irrigation system where it conflicts with the proposed access ramps. Modify, revise, and reconnect irrigation system as necessary to retain the original intent and watering of the irrigation system. Contractor shall re-sod at locations as necessary where either existing access ramp needs to be removed or new access ramp is to be constructed and shall match existing type of grass. This work shall be included in the contract bid item of construction of access ramps and no additional compensation shall be allowed thereof.

Concrete signal bases may be exposed where the sidewalk is lowered. In addition, signal pole bases will be above the finished surface in access ramp and will require dry pack per Caltrans Standard Plan ES-7M.

303-5.8 Backfilling and Cleanup. *REVISE to include the following:*

All parkway areas, which will not be covered with new curb and gutters and access ramps (curb ramps) shall be backfilled with clean native soil as directed by the Engineer. Such material will not be considered as Selected Material and shall be paid under various items of work, no additional compensation will be allowed therefore.

ADD the following:

303-9 CONCRETE CUTTING.

303-9.1 General. The concrete cutting and/or grinding method of displacement shall consist of a process used to remove the upper surface of a slab of concrete with hand-held electrically powered equipment capable of cutting and/or grinding at any angle, and capable of completely removing the concrete to all edges of the displacement. All saw cutting and/or grinding shall be taken to the zero point of differential settlement at the adjacent opposing side, and to both edges of the sidewalk to eliminate the displacement over the full width of the sidewalk. This method of displacement removal shall entail cutting of the cement only. Pulverization of the concrete is not acceptable and will not be allowed as a substitute for this process. Removal and disposal of existing asphalt and/or concrete repairs shall be included in the unit price.

Sidewalk and drive approach joints and cracks with vertical offsets between 3/8" inch and 2" inches may be cut and/or ground down. The maximum taper of the cut and/or grind areas shall conform to Americans with Disabilities Act (ADA) requirements and not exceed 8.33% in the

direction of travel. The minimum width shall be 6". The cutting and/or grinding shall include defects running perpendicular to the direction of pedestrian travel, parallel to the direction of travel (primarily at driveways), and those areas at the sidewalk return where the sidewalk is raised above the curb. Where the sidewalk is raised ¾" inch to 2" inches in relation to the curb return, the sidewalk shall be cut and/or ground down. Do not cut and/or grind the top of curb unless specifically directed in writing by the City Representative.

303-9.2 Limits. A day prior to starting any cutting and/or grinding work, the Contractor shall paint the limits of the cutting and/or grinding work he intends to perform on the following day.

The Contractor shall request the City's Representative to review and confirm these limits prior to starting any work.

303-9.3 Finish and Appearance. Offsets shall be tapered in accordance with ADA requirements and shall have a smooth, uniform, and slip resistant appearance and texture closely resembling the appearance of the adjacent concrete. The cut taper shall have a "squared off" geometric shape with straight borders. Sharp edges left by the cutting and/or grinding operations shall be smoothed. Cutting and/or grinding shall be performed so that the sidewalk surface has essentially the same or slightly smoother texture adjacent to either side of the joint or crack. Cutting and/or grinding shall be performed so that the finish product has a rectangular appearance consisting of straight back line with no stray cut and/or grind marks. The adjacent concrete shall remain untouched by the process without scarring or damage.

303-9.4 Demonstration. The Contractor shall demonstrate the sidewalk cutting and/or grinding operation and resulting finish and appearance at three test sites chosen by the City's Representative. Should the Representative deem the quality of the taper to be unacceptable, the Contractor shall modify his methods and/or equipment and proceed to an additional two test sites. This sequence shall be repeated until the acceptable quality is achieved.

Approval of the results shall be obtained prior to the commencement of the full-scale operation. Only the methods and equipment that produced acceptable results shall be employed on the project.

303-9.5 Dust Control and Clean up. Dust Control and clean up shall conform to the provision of Section 3-12.1 of these specifications. Concrete dust shall not be allowed to escape into the air. Equipment shall be equipped with HEPA type filters to collect dust from the cutting operation. All BMP's must be in place.

Debris and concrete dust shall be cleaned from the sidewalk surface as well as surrounding rails, sidewalks, driveways, landscaping, and/or other objects in the vicinity of work.

303-9.6 Payment. Payment for all materials, labor and equipment to complete the concrete cutting trip hazard removal as described herein shall be made at the unit bid price per linear foot.

SECTION 306 – OPEN TRENCH CONDUIT CONSTRUCTION

REVISE as follows:

306-3 TRENCH EXCAVATION.

306-3.1.1 Protection. *REVISE to include the following:*

Any excavation not in a pedestrian or vehicular travel way greater than one (1) foot in depth but less than three (3) feet which will be left open after the completion of the normal work day shall

be protected by a fence or barricade. Any excavation over three (3) feet in depth will be fenced.

All excavations not in a pedestrian or vehicular travel way less than or equal to one (1) foot in depth which will be left open overnight shall have material backfilled and compacted against all vertical cuts within five (5) feet of the traveled way.

All excavations of any depth in a travel way shall be covered with a steel plate during all non-working hours as specified in section 5-7.8

Prior to the start of construction, the Contractor shall submit to the Engineer, for approval, the method of protection to be used.

Payment for compliance with this section shall be deemed to be included in the price bid for the various items of work for which excavation is necessary. No additional compensation will be allowed therefore.

306-6 BEDDING.

306-6.1 General. *REVISE to include the following:*

Bedding shall conform to the following provisions of Part 3 Construction Methods and as shown on the plans.

The cost of providing and installing said bedding material per City Standard Detail or as identified in the Plans or Specifications shall be included in the price bid for pipe and no additional allowance will be made therefore.

306-7.4 Vitrified Clay Pipe (VCP)

ADD the following:

306-7.4.2.1 General. *REVISE to include the following:*

Type "G" joints shall be used on all mains and six (6) inch or larger laterals. Type "D" joints may be used on four (4) inch laterals.

306-13.2 Permanent Resurfacing. *DELETE the first sentence and SUBSTITUTE with the following:*

Unless otherwise specified, surface improvements damaged or removed as a result of the Contractor's operations shall be reconstructed by the Contractor per City Standard Detail 132.

SECTION 314 - TRAFFIC STRIPING, CURB, PAVEMENT MARKINGS, AND PAVEMENT MARKERS

314-1 GENERAL. *REVISE to include the following:*

The Contractor will be responsible for all temporary traffic control until permanent striping is accepted. In the event of existing traffic, stripes and pavement marking legends are identified as a removal from adjacent and/or perpendicular streets or intersections to match new product quality, this will occur by meeting the latest requirements and restrictions by CalEPA.

314-2 REMOVAL OF TRAFFIC STRIPING AND CURB PAVEMENT MARKINGS.

314-2.1 General *DELETE the first sentence and SUBSTITUTE with the following:*

The Contractor shall remove existing traffic striping and pavement markings by wet sandblasting technique, meeting the latest requirements and restrictions by the State Pollution Control Agency. The Contractor shall be responsible for the immediate removal of sandblasting materials by vacuum or mechanical street sweeping devices. Obliteration with black paint or emulsified asphalt will not be allowed.

The Contractor shall apply slurry seal to the impacted area after sandblasting and prior to applying new traffic striping and pavement markings.

314-4 APPLICATION OF TRAFFIC STRIPING AND CURB AND PAVEMENT MARKINGS.

314-4.1 General. *REVISE to include the following:*

All traffic stripes and pavement markings shall be per City of Anaheim Standard Details, MUTCD (latest edition), State Standard Specifications Latest Edition, and any supplement thereto.

The Contractor shall provide all stencils and street marking legend cutouts, all of which shall conform to standards presently in use in the City of Anaheim for the restriping of all existing pavement legends. For all new work, where new legends are required, the Contractor shall use State Standard Plans and Specifications, Latest Edition.

It shall be the Contractor's responsibility at his own expense to correct the work upon notification by the Engineer and if required, provide proper interim traffic control as required by the Engineer.

314-4.2 Control of Alignment and Layout

314-4.2.1 General. *DELETE the second paragraph and SUBSTITUTE with the following:*

Contractor shall furnish and install traffic delineation using paint "Cat tracking", temporary marking tape, or other approved media on the same working day as existing stripes are lost, including bicycle lanes, in locations consistent with the existing striping in place. If temporary marking tape is used, all tape shall be removed prior to installation of permanent striping. Use of permanent tape for a traffic stripe or a pavement marking shall not be permitted.

Existing lines shall be followed in such a manner as to present a uniform, pleasing appearance, and misalignment or disregard to previous painting will not be permitted. Abrupt breaks in alignment between broken segments will not be permitted. The Engineer shall be the sole judge of the accuracy and acceptability of the alignment of the work.

314-4.3 Painted Traffic Striping and Curb and Pavement Markings

314-4.3.1 General. *REVISE to include the following:*

The Contractor shall install traffic striping, marking, arrows and messages pursuant to the plans where provided. All work and materials shall conform to the requirements of the MUTCD, latest edition, and the State Standard Specifications.

The following Details of the Standard Plans shall be used for traffic lines.

Line	Anaheim Detail	Caltrans Detail	Pavement marker Information*
Yellow skip	450 & 460	2	Type D
No passing Zone	453 & 458	22	Type D
Skip White	451 & 459	9 and/or 9A	Type G & C

Two-Way Left-Turn Lane	454	32	Type D
Channelizing Stripe	455	38	Type G & C
Trap Lane Stripe		37B	Type G & C
Median Islands	456	30	Type D

All traffic stripes and pavement markings except arrows, stop bars, yield markings, conventional crosswalks, continental crosswalks, and messages shall be applied with two (2) coats paint. The Contractor shall apply two (2) coats of paint prior to installing raised pavement markers. Raised pavement markers shall be placed on the newly painted line. Glass beads shall be mechanically applied to the surface of each coat of paint. Bike lane messages shall be painted.

All crosswalks shall be painted continental per Standard Detail 477 unless otherwise called out on the plans. Continental crosswalks shall be applied in two (2) coats of paint with a second coat applied three (3) days after application of the first coat.

For all other painted striping and markings, the second coat shall be applied not sooner than seven (7) calendar days and not later than fifteen (15) calendar days from the first coat of paint. Raised pavement markings shall be installed no sooner than seven (7) calendars after the second coat of paint.

The stop legends and bars at all impacted intersections, shall be repainted, or replaced.

All median noses shall be painted with yellow reflective traffic paint from BCR to ECR.

314-4.3.4 Application Equipment.

314-4.3.4.2 Striping Machines. *REVISE to include the following:*

The paint-striping machine used for this contract work shall be inspected by the Engineer prior to starting any paint striping work and shall conform to the following minimum requirements:

- (a) All lines shall be clean and sharp as to dimensions. Ragged ends of segments, foginess along the sides or objectionable dribbling along the unpainted portions of the stripe shall be hydroblasted out to the satisfaction of the Engineer.
- (b) The finished product shall have an opaque, well-painted appearance with no black or other discolorations showing through.
- (c) The Contractor shall take all reasonable precautions to protect the paint during drying time and shall be required to hydro-blast out all objectionable tracking.
- (d) No work shall be done when weather conditions restrict visibility to less than one mile or causes the pavement to be damp, or when determined by the Engineer.

314-4.3.5 Application. *REVISE to include the following:*

The Contractor shall provide all stencils and street marking legend cutouts, all of which shall conform to standards presently in use in the City of Anaheim for the re-striping of all existing pavement legends. For all new work, where new legends are required, the Contractor shall use the California Department of Transportation (MUTCD) and State Standard Specifications, latest Edition.

314-4.4 Thermoplastic Traffic Striping and Pavement Markings.

314-4.4.1 General. *REVISE to include the following:*

The various letters and symbols shall conform to the size and shape outlined in the California Department of Transportation (MUTCD) State Standard Specifications, latest Edition.

All arrows, stop bars, yield markings, conventional crosswalks, and messages, and all other pavement legends except “Bike Lane” shall be installed in thermoplastic. Long life pavement marking legends must be thermoplastic.

The work consists of the furnishing and placement of hot applied thermoplastic reflective pavement marking in the form of stop messages, limit lines and arrows. These markings shall be installed at the locations as specified on the plans/exhibits. The Contractor shall furnish all material, services, labor, and equipment necessary for the required pavement preparation, layout and completing the pavement marking installation.

314-4.4.2 Surface Preparation. *REVISE to include the following:*

The pavement surface to receive pavement markings shall be properly cleaned from all skins, grease, oil, mud, dust, dirt, grass, loose gravel, and other deleterious material prior to the application of the thermoplastic pavement markings and prime sealer.

On all dry pavement surfaces, binder/sealer shall be applied to the area where hot thermoplastic pavement markings are to be placed. The binder/sealer shall be recommended by the manufacturer of the thermoplastic material. The material shall form a continuous film which shall dry rapidly, and which will adhere to the pavement. The material shall not discolor nor cause any noticeable change in the appearance of the pavement outside of the finished pavement markings. All solvents shall have evaporated from the binder/sealer prior to the application of the molten thermoplastic materials.

Application equipment shall be constructed to assure continuous uniformity in the thickness and width of the marking and shall be equipped with a cut-off device remotely controlled, to provide clean, square stripe ends. Longitudinal lines shall be offset at least two (2) inches from longitudinal construction joints of pavement. The bead distribution shall be uniform throughout the width and thickness.

314-4.4.4 Application. *REVISE to include the following:*

Application equipment shall be constructed as to ensure continuous uniformity in the thickness and width of the primer, which shall be applied at least 1” wider than the thermoplastic material application.

If the existing markings are not visible, the Contractor will be required to pre-mark each installation prior to the application of the material. Where no existing markings are in place, the Contractor shall place the new pavement marking where directed by the Engineer.

The Contractor shall protect the markings track free, by placing guarding or warning devices as necessary. In the event any vehicles cross the molten marking, such marking shall be re-applied, and any marking made by the moving vehicle removed by the Contractor at no additional cost to the City.

The Contractor shall be responsible for removing all material spilled upon the road surface in a manner acceptable to the City Representative.

Following of the completion of Work, there will be a 90-day observation period for the pavement markings. During the 90-day observation period, the pavement markings material furnished and

installed under this contract shall be warranted by the Contractor against failure due to blistering, bleeding, excessive cracking, staining, discoloration, oil content of the pavement materials, smearing or spreading under heat, deterioration due to contact to oil or gasoline drippings, chipping, spoiling, poor adhesive resulting from defective materials or methods of applications, loss of reflectivity, damage from traffic and wear.

During the observation period, the Contractor at no expense to the City shall replace any pavement markings that will not perform satisfactorily under traffic due to defective materials and/or workmanship in manufacture and/or application. Both initial marking and replacement markings shall not be applied when pavement temperatures are below 50 degrees F, or when the surface of the pavement contains evidence of moisture.

If existing pavement delineations or pavement marking legends, including traffic thermoplastic stripes, are identified as a removal or disturbed during construction from adjacent streets or intersections, the Contractor will be required to match new product quality on existing pavement delineation; this will occur by meeting the latest requirements and restrictions by CalEPA.

Payment for removal and replacement shall be deemed included in the traffic striping bid items. No additional compensation will be allowed thereof.

314-4.4.5 Measurement. *REVISE to include the following:*

Painted lines (including pavement markers as noted on the itemized bid proposal) shall be included for payment in the Traffic Striping bid item(s).

Full compensation for conforming to the requirement of this section shall be considered as included in the bid items for striping and markers and no additional payment will be made therefore.

314-5 PAVEMENT MARKERS

314-5.1 General. *REVISE to include the following:*

All pavement markers shall be per City of Anaheim Standard Details, MUTCD (latest edition), State Standard Specifications latest Edition, and any supplement thereto.

***NOTE: The City of Anaheim striping Standard Details shall be modified to remove the use of Non-Reflective Pavement Markers, TYPE A and AY.**

The first three (3) raised pavement markers for any white line at an intersection shall be Type C for the opposite direction of travel. See Anaheim Standard Detail No 459.

**PART 4 – EXISTING IMPROVEMENTS
SECTION 400 – PROTECTION AND RESTORATION**

REVISE as follows:

400-1 GENERAL. *DELETE 2nd paragraph and SUBSTITUTE with the following:*

The Contractor shall exercise due care to avoid injury to existing improvements or facilities, utility facilities, adjacent property, and trees and shrubbery that are not to be removed.

The Contractor shall relocate, repair, replace or re-establish all existing improvements within the project limits which are not designated for removal (e.g. curbs, gutters, sidewalks, driveways, fences, walls, irrigation systems, signs, utility installations, pavements, structures, landscaping, etc.) which

are damaged or removed as a result of his operations or as required by the Plans and Specifications. Damaged or removed traffic signal detector loops and or irrigation systems shall be replaced or repaired and returned to service within seventy two (72) hours, unless otherwise directed by the Engineer. Where existing traffic striping, pavement markings, raised pavement markers and curb markings are damaged or the reflectivity reduced by the Contractor's operations, such striping or marking shall also be considered as existing improvements and the Contractor shall repaint or replace such improvements.

Relocations, repairs, replacements or re-establishments shall be at least equal to the existing improvements and shall match such improvements in finish and dimensions unless otherwise specified.

All damage done to existing improvements by the Contractor shall be repaired by him to the satisfaction of the Engineer. Where sidewalks, curbs or gutters are to be repaired, the repairs shall be made by removing and replacing the damaged section to the nearest score lines.

For all existing trees, shrubbery, pole lines, fences, signs, survey markers and monuments, buildings and structures, conduits, pipelines under or above ground, sewer and waterlines, all highway or street facilities, and any other improvements of facilities within or adjacent to the work shall be protected from injury or damage. The Contractor shall provide and install suitable safeguards to protect such objects from injury or damage. If such objects are injured or damaged because of the Contractor's operation, they shall be replaced or restored at the Contractor's expense to a condition as good as when the Contractor entered upon the work or as good as required by the Plans and Specifications if any such objects are a part of the work being performed.

The fact that any such pipe or other underground facility is not shown on the Plans shall not relieve the Contractor of his responsibility under this article. It shall be the Contractor's responsibility to ascertain the existence of any underground improvement or facilities from USA markings or location of laterals which may be subject to damage by reason of his operations.

In addition to any requirements imposed by law, the Contractor shall shore up, brace, underpin, and protect as may be necessary, all foundations and other parts of all existing structures adjacent to and adjoining the site of the work which are in any way affected by the excavations or other operations connected with the performance of the Work. All material used for protection (including sheeting) shall be removed from the project unless it has been approved to remain in place by the Engineer.

Whenever any notice is required to be given by the City or the Contractor to any adjacent or adjoining landowner or other party before commencement of any work, such notice shall be provided by the Contractor at the Contractor's expense.

The Contractor shall take due precautionary measures to protect all public and private properties and improvements to drainage facilities, fence, walls and footings (including adjacent properties) and driveways, water structures, vegetation, and all other improvements and structures encountered during construction. These improvements shall be safely guarded from damage or loss in connection with this contract by the Contractor. Should any property be damaged during operations of the Contractor, he/she shall immediately notify the City of Anaheim City Representative and immediately make repairs to the satisfaction of the City Representative.

All costs to the Contractor for protecting, removing, restoring, relocating, repairing, replacing, re-establishing and/or supporting existing improvements shall be as included in the various Bid Items and no additional compensation will be allowed therefore.

ADD the following:

400-1.1 Video Recording and Photographing of Pre-existing Conditions.

The Contractor shall video record and photograph pre-existing conditions of the project site prior to any construction activities such as, but not limited to,

- a) Property markers
- b) Right of way and easement conditions
- c) Utility markings and USA markings
- d) Existing property damages
- e) Survey conditions
- f) Pavement conditions, markings, and striping
- g) Adjacent property conditions
- h) Sidewalk, median, curb, and gutter conditions
- i) Safety conditions
- j) Unusual conditions or equipment
- k) Existing landscape conditions (including vegetation and irrigation) along the project limit.

The Contractor shall submit recordings/photographs on USB media to the Engineer no later than five (5) Working Days after the Notice to Proceed.

Payment for video recording and photographing services shall be included in the various Bid Items and no additional compensation will be allowed therefore.

SECTION 402 – UTILITIES

REVISE as follows:

402-1 LOCATION.

402-1.1 General. *DELETE the first sentence in the second paragraph and SUBSTITUTE with the following:*

Pursuant to Section 4216, et. Seq. of the Government Code, the Contractor shall contact the appropriate regional notification center, DigAlert (Underground Service Alert of Southern California or USA/SC) and obtain an inquiry identification number at least two (2) Working Days, but not more than fourteen (14) Days prior to commencing any excavation required for the Work. The Identification Number must be given to the Engineer and/or Inspector prior to the start of any Work on the Project. If the Contractor fails to obtain this number, the City reserves the right to stop all work on the Project. No additional compensation or extension or working days shall be allowed for this stoppage.

DELETE the last sentence in the third paragraph and SUBSTITUTE with the following:

The Contractor shall provide the subsurface installation location data to the Engineer within one (1) Working Day.

REVISE to include the following:

Failure of the California Department of Transportation to identify the location of its subsurface installations promptly or accurately, to either the City or the Contractor, shall not be the City's responsibility. The Contractor shall be responsible for locating these subsurface installations

even though the California Department of Transportation has not accurately identified such installations. If no pay item is provided in the contract for this work, full compensation for such work shall be considered as included in the bid price for the other items of work.

Contractor further acknowledges that Government Code Section 4215 states in pertinent part that "...Nothing contained herein shall be deemed to require the public agency to indicate the presence of existing service laterals or appurtenances whenever the presence of such utilities on the side of the construction project can be inferred from the presence of other visible facilities such as buildings, meter and junction boxes, on or adjacent to the site of the construction;..."

402-1.2 Payment. *DELETE the first sentence and SUBSTITUTE with the following:*

Payment for utility location by the Contractor shall be included in the various Bid Items and no additional compensation will be allowed therefore.

402-4 RELOCATION. *REVISE to include the following:*

Any facilities to be relocated by the Contractor, as indicated on the plans, shall be relocated in strict conformance to the Contract Documents. All such work shall be done only at such times which are acceptable to the owner. The Contractor shall schedule his relocation work in cooperation with the owner and shall be responsible for any costs resulting from the Contractor's failure to do the work at times which are acceptable to the owner. The Contractor shall notify owners at least two (2) working days in advance of any work on their utilities.

ADD the following:

402-7 UTILITY CONNECTION.

Upon installing utility connections to City owned facilities, the Contractor shall see that said utilities are put in the City's name.

SECTION 403 – MANHOLE ADJUSTMENT AND RECONSTRUCTION

403-1 GENERAL. *DELETE the first sentence and SUBSTITUTE with the following:*

Utility manhole and vault frames and covers within an area to be paved or graded shall be set and adjusted to finish grade as defined in the plans and specifications. The Contractor shall bear all responsibility to coordinate said adjustments as required to avoid delays in the project schedule. No additional time or payment shall be made for this coordination effort or delays created therefrom.

403-3 MANHOLES IN ASPHALT CONCRETE PAVEMENT.

DELETE in its entirety and SUBSTITUTE with the following:

403-3 MANHOLES, VALVE BOXES, SURVEY MONUMENTS, AND ELECTRICAL VAULTS IN ASPHALT CONCRETE PAVEMENT.

This item shall include adjustment of all manhole frames and cover sets water valve boxes, survey monuments, and electrical vaults to the new finished grades. This item requires lowering the manholes, vaults, valve boxes, and survey monument cans prior to cold milling and/or reconstruction and raising them to finish grade after final paving. The Contractor shall install a temporary steel plate cover over each opening to prevent debris from entering the manhole, vault, valve box, or survey monument can. Adjustment to grade includes sewer and storm drain manholes, water valve box, survey monuments, and electrical vaults.

All surface utility covers (even those to be adjusted to grade by other utility owners) shall be located by the Contractor in the field prior to beginning any work on this project. The Contractor

shall notify all utility owners as soon as they are identified and at least seven (7) calendar days in advance of the need to commence their work required prior to paving operations and again for their work required after paving operations to adjust their facilities to the final surface paving. The Contractor shall remove existing concrete pads or collars that might interfere with the adjustment of the valve cover to the grade of the asphalt concrete surface. Any damage to existing utility systems or appurtenances by the Contractor shall be replaced at the Contractor's expense.

All sewer and storm drain manhole adjustments shall be per City of Anaheim Standard Plans 205, 209, and 630. All water valve box adjustments shall be per Anaheim Public Utilities Standard No. W-150, W-151 & W-152. Survey Monument adjustments shall be per City of Anaheim Standard Detail No. 641-A. Electrical vault adjustments shall be per Anaheim Utilities Standard No. CU 1600-3D. However, only Contractors on the City of Anaheim Pre-qualified Transmission & Distribution Electrical Contractors List shall work on high voltage electrical vaults and manholes.

The following method shall be utilized to adjust sewer and storm drain manhole frames and covers, water valve box, and survey well monument covers.

- a) After the asphalt concrete pavement overlay has been completed, smooth circular holes shall be cut where the existing covers were lowered. The diameter of the circular hole shall be at least eight (8) inches larger than the outer diameter of the cover.
- b) The cover shall then be raised to the finished pavement grade and suitably blocked and concreted in place to the satisfaction of the Engineer.
- c) A PCC collar shall be placed around the cover to an elevation of three (3) inches below finished pavement grade. Said PCC collar shall have a minimum depth of eight (8) inches.
- d) All debris and foreign material shall be removed per 403-1. The top of reset manholes, boxes, cans, and other structures shall meet the smoothness requirement as specified in 302-5.6.2.
- e) After the concrete has cured sufficiently, a tack coat shall be applied to the PCC and vertical surfaces prior to the hot mix asphalt surface course material is placed and compacted to the finished pavement grade.

The Contractor shall also be responsible for coordinating his work with the various utility owners who will be required to adjust their own surface utility covers to grade as noted on the plans. This includes tying out their covers and notifying all utility owners prior to performing any work that will affect their facilities. If the required adjustment of the owner's adjusted utility covers will impact the Contractor's subsequent work then the Contractor shall coordinate his work schedule and/or perform follow up work to ensure that the quality of the final product is not compromised.

403-5-PAYMENT. *DELETE in its entirety and SUBSTITUTE with the following:*

Payment for the asphalt concrete around the manhole covers, valve boxes, survey monuments, and vaults shall be included with the payment for adjusting. Payment shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all work involved as specified above shall be as included in the Manhole, Valve Box, Survey Monument Can, and Vault Adjustment and Reconstruction Bid Items and no additional compensation will be allowed therefore.

SECTION 404 – COLD MILLING

404-1 GENERAL. *DELETE in its entirety and SUBSTITUTE with the following:*

All cold milling shall comply with these provisions:

The pavement removal shall be accomplished by cold milling, or any other method approved by the Engineer and as shown on the Plans and the Contract Documents. It shall be Contractor's responsibility to perform a field review and take inventory of traffic control devices such as striping, curb and street markings, traffic signal loops and home runs on all streets prior to start of cold milling.

The outside lines of the milled pavement shall be uniform.

If during milling, part of base material is exposed, contractor shall re-adjust depth of milling to protect the base material. If the base material is exposed, disturbed, and damaged, the Contractor shall make repairs within the same work day and no additional compensation shall be provided therefore.

The temperature at which the work is performed and the manner of performing the work shall be such that the pavement is not torn, gouged, shoved, broken, or otherwise injured by the cold milling operation.

The Contractor shall remove and dispose of any pavement reinforcing fabric encountered during cold milling. Payment for removal and disposal of pavement reinforcing fabric shall be included in the contract unit price per Square Feet (SF) of Cold Milling and no additional compensation shall be provided therefore.

The Contractor shall cold mill existing pavement as shown on the Plans or project details and as specified in the Standard Specifications Supplement. The type of pavement and depth to be cold milled shall be as shown on the Plans and as specified in the Special and Technical Provisions. The surface after cold milling shall be uniformly grooved or ridged, unless otherwise authorized by the Engineer. The outside lines of the milled pavement shall be neat and uniform.

The presence of PCC pavement within the existing asphalt pavement to be cold milled is not typical; however, these materials may be present in various locations. The presence of these materials within the pavement section shall not be considered a changed condition and shall not be cause for a change order for additional compensation.

The milled pavement shall be true to grade and cross section. When the straightedge specified in Section 302-5.6.2 is laid on the finished surface, the surface shall not vary from the edge of the straightedge more than 3/8 inch at any point, except at intersections or at changes of grade. Any areas that are not within tolerance shall be brought to grade within one (1) working day following initial cold milling.

Cold milling operations shall be performed without damage to the remaining pavement. Whenever cold milling is adjacent to PCC curbs, gutters, pavements or other PCC improvements, the Contractor shall protect these improvements from damage. Any PCC improvement damaged during cold milling operations shall be repaired or replaced as directed by the Engineer at the Contractor's sole expense. Replaced sections of PCC improvements shall be a minimum of five (5) feet in length or to the next joint.

The Contractor shall scan the work area using a metal detector of adequate strength prior to any saw cutting, excavation or cold milling of the existing pavement. Contractor shall be responsible for locating and protecting manhole, water valve, utility access frames and covers or other metal appurtenances buried below the existing pavement surface whether shown on the plans or not.

Contractor shall always provide accessible access and detour for pedestrian facilities and bike lanes when cold milling.

Contractor is to notify the Engineer at least two (2) Working Days prior to and immediately after the cold mill operations so that observations and measurements may be made of areas before the placement of permanent asphalt.

ADD the following:

404-1.1 Cold Milling for Asphalt Concrete Repairs Prior to Slurry Seal.

Contractor shall perform asphalt concrete repairs to various roadways, alleys, parking lots and bike trails identified to receive slurry seal. Asphalt concrete repairs shall be completed prior to slurry seal as shown on the Plans, Exhibits, and the Special and Technical Provisions. The City may provide the Contractor an additional list of approximate locations of areas to be repaired. The City Representative will mark these locations in the field with paint.

Each repair location shall have a minimum area of one hundred (100) SF and minimum width of five (5) feet.

Cold Milling of the existing pavement for road repairs shall be at a consistent depth of two (2) inches (0.17 feet) or as directed by the Engineer. When necessary, the City may direct the Contractor to Cold Mill deeper than two (2) inches. If such request is made, the Contractor shall perform the Cold Milling to the required depth and the area of Cold Milling to be paid for and it shall be measured as per same contract unit price per Square Yard (SY) of Asphalt Concrete Cold Milling and no additional shall be provided therefore.

Contractor shall perform asphalt concrete paving required for Asphalt Concrete Repairs Prior to Slurry Seal within the same workday as the cold milling. Paving shall be in accordance with Section 302-5 and the Standard Specifications Supplement.

404-1.2 Cold Milling Prior to an Asphalt Concrete Overlay.

Cold milling of the existing asphalt concrete pavement in preparation for an Asphalt Concrete Overlay (or other **asphalt concrete lift thickness as required**) **shall be at either a constant depth, to below edge of gutter or at a** variable depth, as delineated in the Plans, Exhibits, and the Standard Specifications Supplement, including tapering from edge of gutter to required width from the edge of gutter, including cul-de-sacs.

During cold milling operations, the Contractor shall be responsible for removal of all previous slurry seal or other materials on the existing gutter or edge of pavement adjacent to the cold milled surface prior to an asphalt concrete overlay. Method of slurry removal shall be approved by the City Representative and all such work shall be considered as included in the unit price for Cold Milling and no additional compensation shall be allowed therefore.

Cold milling shall not be performed more than three (3) days before paving operations. In accordance with Section 403, the Contractor shall lower all manholes, valve boxes, survey monument cans, and vaults.

404-1.3 Temporary Traffic Striping Required After Cold Milling.:

Whenever Cold Milling of the existing pavement results in the obliteration of traffic striping, lane lines, crosswalks, legends or other permanent traffic control installations, the Contractor shall be required to provide temporary traffic striping following cold milling operations.

Temporary traffic striping shall be painted and shall delineate all traffic lane lines, turn pocket lanes, traffic arrows, centerlines, crosswalks and all other traffic control installations necessary to provide a safe travelling environment for the general public during the course of construction.

All temporary striping required after cold milling operations shall be painted and shall be installed per City Standards within the same workday as cold milling operations. The pavement shall be swept clean and shall be free of cold milling debris prior to installation and painting of temporary traffic striping.

All required temporary traffic striping shall be considered paid for under the Temporary Traffic Control Bid Item for which it is required and no additional compensation will be allowed.

404-10 PAVEMENT TRANSITIONS. *REVISE to include the following:*

Where overlays conform on existing pavement, special care shall be taken to rake the edge of the overlay to conform to the existing pavement to affect a smooth, continuous grade, and not construct “gull wings” or other types of grade breaks.

Where overlay conform cuts are shown on side streets, it is understood that the section of the side street from the street being resurfaced to conform shall be resurfaced.

404-12 PAYMENT. *REVISE to include the following:*

Payment for gutter cuts and conform cuts shall be included in the unit price bid for Cold Milling and shall include full compensation for making gutter or conform cuts as specified herein, or as directed by the Engineer including all work involved in grinding, blading, loading, and disposal of the material.

SECTION 405 – MICRO-MILLING

405-3 MILLING OPERATIONS.

ADD the following:

405-3.1 Milling Operations prior to slurry sealing.

The Contractor shall Micro-Mill the edges of the existing asphalt concrete pavement adjacent to the parkway gutter prior to a roadway being slurry sealed. Micro-Milling of the existing asphalt concrete pavement in preparation for Slurry Seal will be five (5) foot wide on average, or as directed by the City Representative and shall be at a straight grade. Elevation of the Micro-Milled asphalt concrete surface shall be 1/8” deep adjacent to the edge of gutter and shall be flush with the asphalt concrete five (5) feet from edge of parkway gutter, including all curb returns and cul-de-sacs.

When necessary, milling operations shall progress from the low side of each roadway barrel or lane and progress towards the high side. Each successive pass of the milling machine shall meet the line and grade of the previous pass. The speed of the milling machine shall be maintained at a rate which results in a uniform pavement texture.

Micro-milling shall result in a grid-patterned textured pavement surface with longitudinal ridges

approximately the same distance apart as the cutting teeth. The ridges shall be consistent in depth, width, and profile. The distance between the top of each ridge and the adjacent valleys shall not exceed 1/8 inch.

The resulting profile and cross slope of the milled pavement surface shall be such that a ten (10) foot long straightedge laid perpendicular or parallel to the centerline will not allow a shim with a width of one (1) inch and a thickness of 3/16 inch to pass under the straightedge at any point. Micro-milled pavement surfaces which do not conform to the requirements above shall be corrected by the Contractor. The Contractor shall prepare and submit to the Engineer for approval a correction plan prior to initiating corrective action.

During micro-milling operations, the cutter teeth shall be regularly checked and replaced as necessary to maintain the tolerances specified in Section 405-2.

During micro-milling operations, the Contractor shall be responsible for removal of all previous slurry seal or other materials on the existing gutter or edge of pavement adjacent to the micro-milled surface prior to slurry sealing. Method of slurry removal shall be approved by the City Representative and all such work shall be considered as included in the unit price for Slurry Seal and no additional compensation shall be allowed therefore.

PART 6 – TEMPORARY TRAFFIC CONTROL

SECTION 600 – ACCESS

REVISE as follows:

600-1 GENERAL. *REVISE to include the following:*

Unless shown on the plans, street closures will not be allowed. If allowed, the Contractor shall prepare a permit application for street closure and shall attach two copies of the proposed traffic control signing, barricading, and/or detour routing including pedestrian detour. The permit application and accompanying attachments shall be submitted to the Public Works Permitting Section through the normal permitting process. The Contractor shall make any required revisions based on review comments provided by the Permitting Section. Upon approval from the Engineer, a no-fee Right of Way Construction Permit will be issued. The Contractor shall provide the project information to the Permitting Section so fees can be properly accounted for and documented. No Street Closure, Lane Closure, Detour, or other Work requiring traffic control shall commence prior to issuance of said permit.

The Contractor shall provide and install barricades, delineators, warning devices and construction signs in accordance with the current MUTCD and maintain such devices in new or like new condition for the duration of the construction project, unless otherwise approved by the Engineer. During adverse weather or unusual traffic or working conditions, additional traffic devices shall be placed as directed by the Engineer.

The Contractor shall notify the Engineer a minimum of five (5) working days prior to closing or restricting left-turn movements. A minimum of forty-eight (48) hours prior to restricting left-turn movements and/or closing left-turn lanes, the Contractor shall post Changeable Message Signs (CMS) in advance of and in the area of the closure or restriction. The CMS, as a minimum, shall notify the public of the date(s) of the closure and the duration.

The Contractor shall relocate, preserve, and maintain the visibility of all existing signs within the project limits which affect the flow of traffic, as directed by the Engineer. Any signs which are

damaged or found to be missing during construction shall be replaced by the Contractor at his expense as directed by the Engineer. All other signs that interfere with the course of work and are not necessary for the safe flow of traffic will be removed by the Contractor. Traffic control signs include Stop Signs, Speed Limit, Parking Restriction, and other regulatory signs.

600-2 VEHICULAR ACCESS. *DELETE in its entirety and SUBSTITUTE with the following:*

Vehicular access to residential driveways shall be maintained to the property line except when necessary, construction precludes such access for reasonable periods. If backfill has been completed to the extent that safe access may be provided, and the street is opened to local traffic, the Contractor shall immediately clear the street and driveways, provide, and maintain access.

Safe, adequate, continuous, and unobstructed vehicular access shall be maintained to fire hydrants, residences, commercial and industrial establishments, churches, schools, parking lots, service stations, motels, fire and police stations, bus stops, hospitals, etc., unless otherwise approved by the Engineer.

The Contractor shall accommodate busses at bus stops or temporary relocated bus stops to allow access in and out of the construction area to pick up and deliver passengers.

During non-working hours or when work is not scheduled, all roadway lanes shall be returned to their full traffic use by backfilling and paving open trenches unless otherwise approved by the Engineer. At the end of the workday, the Contractor shall remove all Traffic Control Devices not in use.

Temporary asphalt concrete shall be placed at all approaches to form a smooth transition between the streets and drive approaches. The Contractor shall maintain the temporary asphalt concrete until such time the permanent pavement is constructed.

600-3 PEDESTRIAN ACCESS. *REVISE to include the following:*

Safe, ADA compliant, adequate, continuous and unobstructed pedestrian access shall be maintained to sidewalks, crosswalks, residences, commercial and industrial establishments, churches, schools, parking lots, service stations, motels, fire and police stations, hospitals, etc.

The Contractor is responsible for providing, developing and maintaining pedestrian ADA access. Contractor shall route pedestrian access and it shall be incorporated into the approved construction drawings; this pedestrian access route(s) shall be incorporated into both Phasing Plans (if project requires Work to be installed/constructed in different phases) and Traffic Control Plans.

ADD the following:

600-4 CONSTRUCTION PARKING CONTROL. The Contractor shall control vehicular parking to preclude interference with public traffic or parking areas, access by emergency vehicles, owners' operations, construction operations, and monitor parking or construction personnel's private vehicles by maintaining free vehicular access to and through parking areas and prohibit parking on or adjacent to access roads or in non-designated areas.

ADD the following:

600-5 PUBLIC NOTIFICATION.

The City of Anaheim will prepare a letter in both English and Spanish versions to be delivered by the Contractor to all businesses and residents adjacent to the Project affected by the Construction

activities, including posting of both English and Spanish versions to locations as required. The letter shall be delivered a minimum of ten (10) calendar days prior to the start of Construction.

Temporary "No Parking-Road Closed" signs, as required, shall be posted at least seventy-two (72) hours in advance of the work on each street. The signs shall be placed no more than one hundred fifty (150) feet apart on each side of the street and at shorter intervals if conditions warrant, as determined by the City Representative. These signs shall never be nailed or stapled to living trees. Signs that are removed by wind, vandals, or other reasons, before the re-opening of the street, shall be re-posted by the Contractor. The Contractor shall provide the signs and will be responsible for adding the dates and hours of closure to the signs, removal of the signs, and furnishing and placing of barricades, if necessary, for posting of the signs as applicable to each location. All signs shall be removed within 24 hours after the work is complete. If temporary no parking must be rescheduled due to weather conditions or other unforeseen circumstances, all signs shall be removed within two (2) hours of notification by the Engineer and reposted per the requirements of this section.

The following information shall appear on each posted "No Parking" sign:

- a) Date sign is in effect. NO STAGGERED MULTIPLE DATES ARE ALLOWED.
- b) Time-period sign is in effect.
- c) Reason for posting (such as cold milling, slurry seal, crack sealing, paving, striping etc.).
- d) Signs shall not be posted on private property.
- e) Signs shall be posted within the parkway area or as close to the roadway as practical.
- f) Signs may be posted on any light standard within the parkway, except that, in the absence of such items, signs shall be attached to traffic barricades.
- g) Time and/or date(s) appearing on the sign shall include only the period during which the operations are to occur. Signs shall not be reused for different locations.
- h) Signs shall have CVC 22651(L) on them.
- i) The Contractor shall take time date stamped photos of the no parking signs for documentation of how long the notice has been posted.

Unnecessary parking restrictions will not be allowed. Contractor shall obtain the City Representative's approval of information on the signs prior to posting.

All costs for posting and maintaining temporary "No Parking" signs shall be included in the various bid items of Work, and no additional compensation will be allowed therefore.

Upon receiving Engineer's approval, existing parking restriction signs (due to street sweeping or parking districts) adjacent to work areas receiving temporary "no parking" signs may be covered to allow affected residence parking closer to their homes.

A minimum of seven (7) calendar days prior to starting scheduled work and re-scheduled work, the Contractor shall distribute to every residence and business affected by the work, an advisory note in the form of an 8-1/2" by 11" flyer. This flyer will be supplied by the City of Anaheim, and Contractor is responsible for printing and reproduction, as needed. Under no circumstances will these fliers be deposited inside the mailboxes used by the United States Postal Service.

The Contractor shall provide the City Representative the list of streets that have received the seven (7)-day advisory note for verification. Residents living on private streets that are tributary to a

public street to receive slurry seal or rehabilitation shall receive ten (10)-day notification per the notification area map.

Forty-eight (48) hours prior to starting scheduled work and re-scheduled work, the Contractor shall also distribute to every resident and business affected by the work an advisory notice in the form of a doorknob card. This notice shall include the date, starting time, approximate completion time, and telephone number of the Contractor's office for citizens' questions related to their on-street parking away from their homes.

Should the City discover that the notice was not distributed in time, the City shall have the right to direct the Contractor to stop work for the balance of the day and remove all traffic control, including uncovering the raised pavement markers. If the Contractor fails to meet the notified schedule, he shall re-schedule the work and re-distribute the advisory notice.

Under no circumstances will these advisory notices be deposited inside the Mailboxes used by the United States Postal Service.

At all entrances to subdivisions where internal circulation is restricted, the Contractor shall post "ROAD CLOSED AHEAD" signs.

The City or its representative may issue a "Stop Notice" at any time if the contractor fails to meet any requirement of this section or any other section of the specifications. In the event City forces or its representative are required to correct any traffic construction signing problems due to the Contractor's failure to adhere to this section, the costs of said work will be determined using overtime rates and shall be deducted from the final payment due the contractor."

Full compensation for conforming to the requirements for Public Notification, including furnishing all labor, tools, equipment, materials and incidentals required for doing all the work involved in furnishing and delivering the notices, as specified in the Standard Specifications Supplement, and as directed by the Engineer, shall be considered as included in the contract price paid for other items of work and no separate compensation will be allowed therefore.

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

REVISE as follows:

601-1 GENERAL. *REVISE to include the following:*

The Contractor shall provide and maintain all construction area traffic controls in accordance with the latest version of the California Manual of Uniform Traffic Control Devices (MUTCD), and Work Area Traffic Control Handbook (WATCH), and the Standard Specifications Supplement.

Cones which conform to the current California Manual of Uniform Traffic Control Devices (MUTCD) shall be spaced as necessary for proper delineation of the travel way. The spacing between cones shall not exceed fifty (50) feet. The minimum lane transitions shall be a 50 to 1 taper unless otherwise shown on the plans.

If the cones are damaged, displaced or are not in an upright position, from any cause, said cones shall immediately be replaced or restored to their original location, in an upright position, by the Contractor.

Where construction detours and signing conflict with existing signing, the Contractor shall cover existing signs in a manner approved by the City's Representative. The Contractor shall also provide temporary traffic delineation at the conclusion of each working day, if not sooner, as directed by the City's Representative, for any centerline, painted median or lane line, which is obliterated by construction.

The Contractor shall provide temporary delineation as directed. Temporary delineation shall include removal of conflicting markings by accepted means; installation and removal of temporary centerlines or lane lines, detour signing, barricading; and replacement of traffic lines and markings in their proper locations upon termination of the detour. The Contractor, as required for traffic control during construction, shall remove conflicting existing and temporary striping, by methods accepted by the Engineer. Blacking out the pavement will not be allowed. Temporary reflective striping tape may be used, except that it shall not be applied to final asphalt surfaces. Tape shall be removed from temporary surfaces prior to placement of additional asphalt.

The Contractor shall maintain a 24-hour emergency service to remove, install, relocate, and maintain warning devices and shall furnish to the City's Representative, names and telephone numbers of three people responsible for this emergency service. In the event the Contractor does not promptly respond when notified, the City may make corrections at Contractor's expense.

Each workday, the Contractor shall ensure traffic control is in place prior to starting construction.

Should the Contractor appear, in the opinion of the Engineer, to be lacking in providing adequate warning devices and protective measures as above provided, the Engineer may direct attention to the existence of a hazard, and the necessary warning and protective measures shall be furnished and installed by the Contractor, at his/her expense. Should the Engineer point out the inadequacy of warning and protective measures, such action on the part of the Engineer shall not relieve the Contractor from responsibility for public safety or abrogate its obligation to furnish and pay for these devices.

The Contractor shall notify the City Representative its intent to begin work at each location at least ten (10) days before work is to begin. The Contractor shall cooperate with local authorities relative to handling traffic through the area.

Work that interferes with public traffic shall only be performed during the hours specified for lane closures in the Special Provisions or shown on the temporary traffic control plan.

The Contractor shall always maintain access to all driveways unless otherwise approved by the Engineer.

The Contractor shall coordinate his weekly construction schedule to avoid conflicts with trash collection. Contact the City Representative for questions regarding trash collection schedules.

The Contractor shall research where schools may be impacted by the project. It shall be Contractor's responsibility to coordinate the work with each school administrative office and to maintain ingress-egress to the school parking area at all times.

The Contractor shall comply with all local sound and noise level rules, regulations, and ordinances, which apply to all aspects of the work, performed pursuant to this contract.

At the pre-construction meeting, the Contractor shall provide the City with samples of the "No Parking-Road Closed" signs to be posted on affected streets.

The Contractor shall notify the occupants of all affected properties at least forty-eight (48) hours prior to any temporary obstruction of access. No overnight closure of any driveway will be allowed except as permitted by the Engineer.

The Contractor shall have all Traffic Control Devices properly installed prior to commencing construction and shall maintain these devices to ensure proper flow and safety of traffic while working in the street.

The Contractor shall be responsible for any additional Traffic Control Devices deemed necessary by the Engineer to assure public safety at all times.

The Contractor shall always maintain reasonable access to all businesses and residents. At least one (1) twelve (12) foot wide traffic lane shall always be provided for each direction of travel on all streets, except as permitted by the Engineer. Multiple lane closures (2 or more) on major corridors within the Resort and Platinum Triangle areas may require night work and are subject to approval by the Engineer. The traffic lanes shall be maintained on pavement and shall remain unobstructed. All lanes must be opened after non-working hours unless otherwise shown in the approved Traffic Control Plans.

The Contractor shall install detour signs per approved Traffic Control Plans. Detour signs posted or attached to power poles, street light structures, utility poles or structures, etc., shall bear the Project Name and Contractor's Name written legibly on the back of each sign posted or installed. At the completion of the project, these detour signs shall be cleared off the area and shall comply with all the provisions of Section 3-12 WORK SITE MAINTENANCE.

Drive approaches shall be opened at the end of the normal recommended concrete curing time for high early strength concrete. A minimum of seven (7) days prior to the start of construction, the Contractor shall install informational signs for the Project, as directed by the Engineer. The informational signs shall be per City Standard Detail 175.

ADD the following:

601-1.1 Working Hours and Lane Requirements

Perform all traffic control shall be within the working hours per Section 6-1 Construction Schedule and Commencement of Work, unless approved in advance by the City Representative. No work shall be performed on weekends and City recognized holidays without written City approval.

Local Streets, Parks, Parking Lots, and Off-Street Bike Trails: Work on residential streets, parks, parking lots and off-street bike trails shall be permitted Monday through Friday between the hours of 7:00 a.m. and 4:00p.m. Installation of traffic control shall start no sooner than 7:00 a.m. Spreading of the last load of slurry seal shall be completed by 1:00 p.m. or as determined by the City Representative. Completion of work and the removal of all traffic control shall be completed by 3:30 p.m.

Arterial and Collector Streets: Work on arterial and collector streets shall be permitted Monday through Friday between the hours of 8:30 a.m. and 3:30 p.m. Installation of traffic control shall start no sooner than 8:00 a.m. Spreading of the last load of slurry seal shall be completed by 1:00 p.m. or as determined by the City Representative. For all other Work, completion of work and the removal of all traffic control shall be completed by 3:30 p.m.

601-1.2 Late Reopening of Closures and Required Contingency Plan.

If a closure is not reopened to public traffic by the specified time, Work shall be suspended in conformance with the provisions in 6-6. No further closures shall be made until the Engineer has accepted a contingency plan, submitted by the Contractor, that will ensure future closures will be reopened to public traffic at the specified time. A detailed contingency plan shall be prepared and submitted to the Engineer within one (1) business day of the Engineer's request. The Engineer will have two (2) Working Days to accept or reject the Contractor's proposed contingency plan. The Contractor will not be entitled to compensation for the suspension of work resulting from the late reopening of closures.

601-1.3 Authority of City Representative.

The provisions of this section may be modified or altered if, in the opinion of the City Representative, public traffic will be better served, and work expedited.

601-1.4 Execution.

The Contractor shall field check all temporary traffic control signs, barricades, and other devices at least three (3) times every day, including Saturdays, Sundays, and holidays to insure their proper maintenance and conformance to the Contract Documents and detailed instructions by the City Representative.

Should the Contractor fail to properly place and/or maintain delineated lane closures or work areas, the City, at its option and at the Contractor's sole cost and expense, may place or maintain delineation, barricades, or other devices, as may be necessary, to protect the public.

601-2.2 Payment. *DELETE the sentence and SUBSTITUTE with the following:*

Full compensation for conforming to the requirements for Traffic Control, including creating and revising permit applications, acquiring an approved permitted traffic control permit, furnishing all labor, tools, equipment, materials and incidentals required for doing all the work involved in all temporary traffic control related work involving placing, removing, storing, maintaining, moving to new locations, replacing and disposing of the components of traffic control system, complete in place, all associated temporary signing and striping; placing temporary asphalt concrete paving as necessary to facilitate traffic control for the project, to accommodate rerouting of both vehicular and pedestrian circulation; flashing arrow signs; portable changeable message signs (PCMS); flagging and/or flagger costs; and project notifications, as specified in the Standard Specifications and the Standard Specifications Supplement, and as directed by the Engineer.

Payment for this item shall be made at the contract lump sum bid price for traffic control plans, furnishing, installing, maintaining and finally removing any necessary traffic control including way-finder signs for pedestrians, temporary railings/barricades where required, temporary traffic signage, striping, detours, road closures, lights, fences, flares, temporary paving, flashing arrow signs, PCMS, flagging, and such other items and services shown on the plans and/or as are necessary to adequately safeguard the public from hazard and unnecessary inconvenience. All such work shall be as provided herein, and/or directed by the Engineer. Payment will be made on a pro rata basis of the price bid will be paid with each payment application based on the value of work completed.

601-3 TEMPORARY TRAFFIC CONTROL (TTC) ZONE DEVICES.

601-3.1 General. *Modify to ADD the following:*

The Contractor shall have all Traffic Control Devices properly installed prior to commencing construction and shall maintain these devices to ensure proper flow and safety of traffic while working in the street.

Furnish, install, and maintain Traffic Control Devices, equipment, materials, and other safeguards to provide safe and effective work areas, and to warn, control, protect and expedite vehicular and pedestrian traffic.

On a daily basis, remove temporary traffic delineation, signage and other devices when no longer required. Restore areas to original or to specified conditions.

The Contractor shall be responsible for any additional Traffic Control Devices deemed necessary by the Engineer to always assure public safety.

Traffic control work and Traffic Control Devices for construction shall conform to the latest edition of:

- a) MUTCD
- b) Work Area Traffic Control Handbook (WATCH manual)
- c) Standard Specifications
- d) O.S.H.A. requirements
- e) California Vehicle Code

601-3.5 Signs and Signage.

601-3.5.1 General. *REVISE to include the following:*

The Contractor shall:

- a) Use only signs that conform to the dimension, color, legend, reflectorization and lighting requirements of the current WATCH, MUTCD and the Contract Documents.
- b) All sign panels shall be the product of a commercial sign manufacturer but need not be new. Used sign panels clean and in good repair, as determined by the Engineer, may be used. Sign panels for portable signs may be metal, cotton drill fabric, flexible industrial nylon fabric or other approved fabric.
- c) Temporary stop signs shall have a minimum clearance of seven (7) ft. from bottom of sign to existing ground or pavement.

601-3.7.2 Flags.

ADD the following:

601-3.7.2.1 Flaggers.

The Contractor shall provide flaggers as required by the Engineer to give adequate warning to traffic or to the public of any dangerous conditions to be encountered, and employ only flaggers trained in flagging fundamentals and procedures referred to in the “Flagger Handbook” available on the Internet at the following web site:

<https://dot.ca.gov/programs/construction/safety-traffic/flagging-handbook>

Payment for flagging is considered as included in the various items of work and no additional compensation will be allowed, therefore.

END OF SECTIONS



CITY OF ANAHEIM

River Park Project

Account No. 471-213-4792-9505

Permit Nos. GRA2025-04067, BLD2025-04799, and SGN2025-00163

SPECIAL PROVISIONS



City of Anaheim

COMMUNITY SERVICES DEPARTMENT

Parks Division

The following Special Provisions modify the specifications in the “Standard Specifications for Public Works Construction,” 2021 Edition, and the Standard Specifications Supplement. These additions, deletions, and amendments shall take precedence in the event of a conflict with any Standard Specifications. The section numbers of these Special Provisions coincide with those of the SSPWC, and only those sections that require additions, deletions, or revisions are included herein.

All Work in this contract shall conform to the following: The Special and Technical Provisions for this Contract, the Construction Plans, the City of Anaheim Standard Specification Supplement and Standard Plans and Details, the Standard Specifications for Public Works Construction (SSPWC, “Green Book”), and any Supplement thereto.

SECTION 1 – GENERAL

1-7 AWARD AND EXECUTION OF CONTRACT

ADD the following:

1-7.5 MATERIAL ORDERS UPON AWARD OF CONTRACT

The Contractor agrees that the following listed Critical Submittals (materials with anticipated long lead times) shall be delivered to the City on or before the 21st calendar day following the Notice of Award of Contract. In the event said submittals are not received by City on or before said Submittal Deadline Date, one (1) working day will be deducted from the number of Contract Completion Days for every day in delay of receipt by City of the submittals beyond the Submittal Deadline Date.

Unless otherwise set forth elsewhere in these Special Provisions, three (3) copies will be submitted for review. Electronic submission may be accepted by permission of the Engineer. All submittal documents must be complete, of good quality and clearly legible. Proposed equipment models shall be clearly identified and highlighted with contrasting colors or outlined with heavy borders.

Critical Submittal Items (current manufacture lead times):

1. Custom Concrete Art (Section 12 93 00): 16-to-18-week lead time
2. Monument Signs (Sections 05 50 00, 26 56 00, and 26 56 19): minimum of 6-to-8-week lead time
3. Shade Structures and Bench Swings (Section 10 73 00.1): 10-to-12-week lead time



City of Anaheim

COMMUNITY SERVICES DEPARTMENT

Parks Division

4. Playground (Section 11 68 13 and Bill of Materials): 12-to-14-week lead time
5. Precast Leaf Bench/benches/picnic tables/trash receptacles (Section 12 93 00): 6-to-7-week lead time
6. Exterior Lighting and LED Exterior Lighting (Sections 26 56 00 and 26 56 19): 12-week lead time minimum
7. Fences and Gates (Section 32 31 00): 6-to-8-week lead time
8. Ornamental Steel Fences and Gates (Section 32 31 19): 6-to-8-week lead time
9. Plants (Section 32 93 00) most of the plants are California Native Plants and they are usually found at specialty nurseries – locating quantities requires time. Listed below are native plant growers in southern California (this is not an all-inclusive list):
 - a. Devil Mountain Wholesale Nursery
 - b. Moosa Creek Nursery
 - c. Fremontia Horticultural
 - d. Native West Nursery
 - e. El Nativo Growers
10. Bronze metal (sundial): 8-to-10-week lead time
11. Electrical meter and irrigation controller stainless steel pedestal: 8-to-10-week lead time
12. Irrigation Controller: 2-week lead time
13. Trash Grate: 8-to-10-week lead time
14. Bollards: 6-to-8-week lead time
15. Bike Racks: 6-to-8-week lead time

Upon notification to the Contractor that the submittals are approved by the City, the Contractor shall order materials within five (5) working days and provide proof of purchase, including delivery date, to the Engineer. No extensions of time for material delays will be allowed without receipt of the purchase order. Storage of the above-mentioned shall be the responsibility of the Contractor. Payment for transporting, storage, or relocation of the abovementioned materials shall be considered to be included in the contract bid price, per lump sum. No additional compensation will be allowed, therefore.

SECTION 2 – SCOPE OF WORK

2-1 WORK TO BE DONE

ADD the following:



City of Anaheim

COMMUNITY SERVICES DEPARTMENT

Parks Division

2-1.1 DESCRIPTION OF WORK

The Work consists of, but not limited to, installing walking paths, concrete plazas, exercise equipment, small amphitheater, GAF Streetbond enhanced asphalt multiuse asphalt path, playground, native landscaping, irrigation, seating, solar security lighting, art (concrete word, canoe, and sundial), six (6) shade structures, two (2) monument signs (one (1) lighted), water retention areas, pedestrian bridges, interpretive signs, two (2) bench swings, drinking fountains, and associated site work including electrical, plumbing and other utility connections.

Note:

- The boulders used on the project are found at the south end of the project within the Orangewood Avenue ROW. These boulders are to be salvaged, stored, and placed on site per the construction documents. All boulders should be used on site and not disposed of.
- Cobble for the retention and infiltration areas shall be placed per construction documents on-site after the boulders are installed and approved by the City of Anaheim Representative. Their color and size are noted on the plans and to be installed per detail. Installation of cobble shall be per the construction documents.
- The Stainless-Steel canoe is located in the bottom floor of the parking structure located at 125 W. Center Street Promenade. The contractor will need to coordinate with City staff to schedule pick-up and must determine the best way to move the canoe art piece without damage to it or any surrounding structures or elements. Any damage to the canoe, parking structure, vehicles, or any other city or private property will be repaired at the contractor's expense. Entry shall be from the Northwest entrance on Lehman Way. The maximum clearance is 6'-10".

The Contractor shall provide all materials, labor, tools, plant, supplies, equipment, transportation, superintendence, temporary construction of every nature, and all other services and facilities necessary to complete the construction of the new park, and including all incidental work described in the contract documents, Addenda, and Specifications regardless of whether noted in the line item bid.

All work shall be in accordance with applicable codes and local regulations that may apply. In case of conflict in or between the Contract Documents and a governing code or ordinance, the more stringent standard as determined by the Engineer shall apply.



City of Anaheim

COMMUNITY SERVICES DEPARTMENT

Parks Division

2-1.2 LOCATION OF WORK

The general location and limits of the work are as follows: River Park, 2445 East Orangewood Avenue, Anaheim CA 92806 (immediately adjacent to the east of the Angel Stadium Parking Lot).

The Contractor shall confine his operations and work area within the River Park property limits. No encroachment into private property will be permitted, except for the work related to installation of a retaining curb if needed, per plan. The City of Anaheim obtained a Temporary Encroachment Permit (TEP) to be able to use the Santa Ana River Trail (SART) for site access on a limited basis.

2-1.3 WORK HOURS

Normal work hours for the project are as follows:

- a) Work within the River Park property limits shall be performed during the hours of 7:00 A.M. to 5:00 P.M, Monday through Friday. Any work that is performed outside of this time will require prior written permission from the City. This will be limited due to the uses of the Angel Stadium property during the baseball season as well as other events held on the property throughout the year. In addition, there will be work on the Orangewood Bridge widening project occurring concurrently with the construction of River Park.
- b) Work within public right-of-way, roads and in areas that restrict vehicular traffic shall be limited to 8:30 A.M. to 3:30 P.M. (unless an afternoon baseball game is scheduled), Monday through Friday, unless otherwise noted on the plans or approved by the City.

If the Contractor elects to perform work at times other than the normal work hours, prior approval from the City is required. No additional compensation will be made by the City if the Contractor elects to work outside normal working hours.

2-1.4 SUBSURFACE DATA

A soils investigation report and copies of the test borings are included in the appendices of these specifications for reference. The information is supplied only for the convenience of the bidders. There is no guarantee, either expressed or implied, that the conditions indicated are representative of those actually existing in any part of this project or that unforeseen developments may not occur. The inclusion of this information shall not be construed to be a waiver of the Contractor's obligation to inspect the soil conditions himself before submitting a bid.



City of Anaheim

COMMUNITY SERVICES DEPARTMENT

Parks Division

2-2 PERMITS

REVISE to include the following:

The Contractor shall obtain all permits and licenses needed to complete this project, including but not limited to, permits from the City of Anaheim, the County of Orange, and business licenses/certificates and Insurance Certificates. Contractor will be responsible for all fees associated with obtaining the permits from the County.

The Contractor shall obtain the following permits, as required, for the Work:

- a) Building Permit, BLD2025-04799
- b) Grading Permit, GRA2025-04067
- c) Sign Permit, SGN2025-00163
- d) Utility Water Management Permit, UWM2025-00102 (*reference only*)
- e) Electrical Service plan number R2350 (*reference only*)

Any new, altered, or repaired plumbing systems on private/public property requires additional coordination and permitting with the Anaheim Building Division and the Anaheim Fire Department. All work where construction takes place within the City's right-of-way requires a separate Right-of-Way Construction permit from the Public Works Department.

2-4 COOPERATION AND COLLATERAL WORK

2-4.1 COORDINATION WITH OTHER OWNERS AND UTILITY AGENCIES

REVISE to include the following:

The following are the utility companies that are known to have facilities within the limits of this project:

Southern California Gas Company	(818) 701-3322
Time Warner Cable/Spectrum	(866) 243-9787
City of Anaheim Public Works (Sewers & Storm Drains)	(714) 765-6834
City of Anaheim Public Works (Street & Sanitation)	(714) 765-6860
City of Anaheim Public Utilities (APU) Water, Stewart Noble	(714) 765-4591
City of Anaheim Public Utilities (APU) Electrical, Jeff Robison	(714) 765-6873



City of Anaheim

COMMUNITY SERVICES DEPARTMENT

Parks Division

Underground Service Alert (USA) / Dig Alert

811

The Contractor is required to contact Underground Service Alert (USA) and agencies a minimum of 48 hours or two (2) working days prior to performing any construction on the project.

Contractor shall coordinate with City of Anaheim Public Utilities to remove, relocate, adjust to grade, salvage, install APU facilities (water valve boxes or electrical pull boxes or vaults) or with other contractors/public utilities in the work indicated on the plans as work to be done by others. This coordination shall be included in the project schedule.

City of Anaheim Public Utilities – Water (APU-W) shall inspect the adjustment to the new grade of the APU-W owned water valve boxes and water meters and abandoned water valve box removal as indicated on the Project's Plans. In addition, Water (APU-W) shall conduct cross-connection inspections. The Contractor shall coordinate these inspections with Stewart Noble at (714) 765-4591 two weeks in advance.

All costs incurred in exposing and locating the existing utilities including all labor, tools, equipment for excavation, backfill, restoring existing surface and site improvements, shall be included in the cost of the various items of work and no additional compensation will be allowed.

ADD the following:

2-4.2 COORDINATION WITH OWNER

The Contractor shall notify the City of Anaheim and the owners of all utilities and structures not less than 48 hours prior to the start of construction.

CITY OF ANAHEIM

Attention:

Ana Straabe, Community Services
Principal Project Planner

(714) 765-4463

Michelle Lee, Public Works
Contract Administrator

(714) 765-4922

SECTION 3 – CONTROL OF WORK



City of Anaheim

COMMUNITY SERVICES DEPARTMENT

Parks Division

3-14 CONTRACT CLOSE-OUT

REVISE to include the following:

A Notice of Substantial Completion will be recorded after the Agency determines acceptance of Work except for the 90 Calendar Day Plant Establishment Period. Once the Plant Establishment Period is completed successfully and approved by the agency, the Notice of Completion (NOC) will be recorded after the Agency determines the acceptance of the Work, including all required submittals and administrative items necessary for Contract Close-Out. Release of retention shall occur after the NOC is filed and recorded.

SECTION 5 – LEGAL RELATIONS AND RESPONSIBILITIES

REVISE to include the following:

5-7.7.2 SECURITY FENCING

Contractor shall provide temporary minimum 6-foot-high fencing with privacy screen around the perimeter of the project site and provide vehicular gate locks/access to City Staff.

5-8 CONTRACTOR'S RESPONSIBILITY FOR THE WORK

ADD the following:

5-8.1 SPECIAL CONDITIONS

- *No smoking, drinking alcoholic beverages, music, radios, and littering will be allowed during any portion of the construction period.*
- *The contractor is to provide construction and/or any other directional signage, as needed, at the park for public awareness and safety.*
- *A sub-contractor with a C-27 license and Southern California Native Plant experience is required for the installation of the landscape and irrigation for this project.*
- *Contractor shall replace-in-kind any and all plant material damaged during construction within 3 business days.*
- *A Tribal Monitor shall be on-site whenever there is major grading work, excavation of footings, trenching, movement of soil, excavation of detention areas and play pit, and excavation of tree planting pits. 72-hour*



City of Anaheim

COMMUNITY SERVICES DEPARTMENT

Parks Division

advanced scheduling and daily updates of these activities will be shared with City of Anaheim and Tribal Monitor.

- *This project includes new irrigation work. There is an old, abandoned irrigation system on site. Any pipe, valves or other subsurface infrastructure that is unearthed as part of the construction activities shall be disposed of in a legal manner at no cost to the City of Anaheim. If any live irrigation lines are found, contractor shall permanently cap and note the location on the as-built plan.*
- *Contractor is to hand dig (no mechanical equipment) within tree drip lines. Before any digging can occur, the contractor is to mark the ground showing the location of the excavation/digging and have a City of Anaheim Representative review and approve the location.*
- *Contractor is responsible for maintaining the site/temporary construction fence regularly. The project site is known for tagging, vandalism, and high winds. Contractor shall promptly replace chain link fence panels and wind screens if/when they are damaged, tagged, or vandalized.*
- *The adjacent Santa Ana River Trail (SART) must remain open and safe for public patrons, as well as maintenance vehicular use, during all hours. The Contractor shall maintain accessible pathways along all public right-of-ways at all times and shall minimize closures or disturbance to the community.*
- *The project site must be cleaned and swept daily. Additionally, streets, Angel Stadium parking lot, and the SART shall be kept free of debris. The Contractor shall conduct cleanup procedures prior to leaving the construction site daily.*
- *Any damage to Orange County Sanitation District or Orange County Water District facilities during the construction process noted to be protected in place shall be repaired or replaced by the contractor, or if required, the full cost born by the contractor for the Districts' repairs, at no cost to the City.*
- *The contractor and employees shall not engage in conversations of any kind with the general public who use the Angel Stadium Parking lot or the SART. All questions shall be forwarded to the City of Anaheim Project Manager for River Park to respond.*

SECTION 6 – PROSECUTION AND PROGRESS OF THE WORK



City of Anaheim

COMMUNITY SERVICES DEPARTMENT

Parks Division

6-1 CONSTRUCTION SCHEDULE AND COMMENCEMENT OF WORK

6-1.1 CONSTRUCTION SCHEDULE

REVISE to include the following:

A Baseline Construction Schedule for the entire project shall be submitted within ten (10) working day after the execution of Contract. The Construction Schedule shall include activities for pre-construction, permitting and material procurement, and shall be approved by the City prior to commencement of the Work. This schedule must be accurate and will be shared with the Tribal Monitor.

When construction commences, the Contractor shall provide a three (3) week Look-Ahead Schedule (delivered to the City one week prior to the first start activity). The Look-Ahead Schedule shall specify the contractor performing the work, the month, description, duration and start and finish dates of each activity.

Refer to the Standard Specifications Supplement Section 6-1.1 for schedule formatting and content provisions.

ADD the following:

6-2.1 SITE WORK PREPARATION

Contractor shall provide an onsite pothole plan or mark any trenching with spray paint, prior to starting any grading, trenching, or excavation work. All utilities shall be identified and the pothole data submitted to the City prior to commencement of work.

Prior to the start of construction activities, a Site Walk will be required with the City's Representative and city arborist to review the tree protection requirements, staging plan, construction sign locations, etc. This site walk will also include discussion and review of the existing easements. Once the tree protection is installed, the City's representative/arborist will review and approve.

Contractor to furnish temporary water, and power, and equipment as required for the work, including a temporary backflow preventer attached to the temporary water meter, and power, complete with connecting piping, wiring, lamps, meters and similar equipment, as required for the work. The Contractor is responsible for paying all monthly electrical/ utility service fees.

Staging facilities for contractor equipment will be discussed during the initial site walk.



City of Anaheim

COMMUNITY SERVICES DEPARTMENT

Parks Division

ADD the following:

6-3.3 COMPLETION OF WORK

All Work under this contract as specified in the Plans and Specifications shall be completed within one hundred twenty (120) Working Days, including the lead times / delivery of materials, plus ninety (90) calendar days for plant establishment. The Working Days schedule will start as noted in the Notice to Proceed (NTP) issued by the City's Contract Administrator.

6-9 LIQUIDATED DAMAGES

REVISE to include the following:

Failure of the Contractor to complete the Work within the time allowed will result in damages being sustained by the City. For each consecutive Work Day in excess of the time specified for completion of Work, the Contractor shall pay to the City, or have withheld from retention monies due, the sum of **\$5,750 per Day**.

No payment, compensation, or adjustment of any kind, other than the extensions of time granted by the City, shall be made to the Contractor for damages due to hindrances or delays from any cause in the progress of the Work.

SECTION 7 – MEASUREMENT AND PAYMENT

REVISE to include the following:

7-3.1 GENERAL

The unit prices and lump sum amounts to be paid for under the bid items listed in the Proposal shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals necessary for the completion of the work and for performing all work contemplated and embraced under the Contract, in accordance with the Plans and Specifications. This shall include the Contractor's costs involved with bonding, insurance, worker's compensation, overhead, financing, obtaining required permits and permit fees, mobilization, traffic control, public convenience and safety, protective barricading/fencing, sanitary facilities, storage of equipment and materials, security against theft and vandalism, project site maintenance, dust and runoff control, clean-up and all other items related to the work. Payment for unit price work shall be made for the actual quantities of Contract Items removed, constructed, or disposed of in accordance with the Plans and these Specifications. Measurement of Unit Price work shall be specified in SSPWC, Section 7-1, and "Measurement of Quantities for Unit Price Work". Payment for Lump Sum work shall be paid for at the price indicated in the Bid, in accordance with SSPWC, Section 7-2, "Lump Sum Work".



City of Anaheim

COMMUNITY SERVICES DEPARTMENT

Parks Division

Payment for all work shall be included in the various bid items. No additional compensation shall be made therefore. Work associated with each bid item shall include, but not be limited to the following description of bid items:

ADD the following:

7-3.1.1 DESCRIPTION OF BID ITEMS (FORTHCOMING)

SECTION 8 – FACILITIES FOR PERSONNEL

8-2.1 CLASS “A” FIELD OFFICE

REVISE to include the following:

The Contractor shall provide a field office on, or immediately adjacent to, the construction site from the time of NTP through project completion. The space shall be provided through construction trailers, mobile homes, temporary housing, etc.

The following items are required to be maintained at the work site or field office at all times: Contractor’s set of current As-Built Plans and Specifications, issued permits and permit cards relevant to the project, and all approved submittals and work drawings.

GREENBOOK SUPPLEMENTARY SPECIAL PROVISIONS

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

1. The **2021 Edition** of the Standard Specifications for Public Works Construction (The “GREENBOOK”).

SPECIAL PROVISIONS

PART 1

SECTION 3 – CONTROL OF THE WORK

SECTION 4 – CONTROL OF MATERIALS

4-6

Trade Names (Add the following):

Substitution Limitations:

1. Substitutions must be approved a minimum of ten (10) business days prior to bid. All approved manufacturers shall be notified on writing before the bid date and shall not be allowed to bid without written notification. Any approval of an alternate manufacturer shall be through and official bid addendum prior to the bid date.
2. Alternate suppliers shall meet the requirements, qualifications and provide proof of certifications listed under Division 10-Specialties, Section 10 73 00.1 Specialties Manufacturer, and Section 1.05 QUALITY ASSURANCE.
3. Alternate suppliers shall provide documentation that the power-coat system being provided meets or exceeds the ICON supplied powder-coat system listed under Section 2.01(c)(8).

CONSTRUCTION MATERIALS

PART 2

SECTION 210 – PAINT AND PROTECTIVE COATINGS

210-1

Paint

ADD:

210-1.1.1

Anti-graffiti Coating at Vertical and Horizontal Surfaces.

Anti-graffiti coating should be non-sacrificial.

1. Anti-graffiti coating for horizontal and vertical surfaces shall be as manufactured by Coval Technologies, 12811 Royal Drive, Suite 110, Stafford, TX 77477 (281)566-4279.

1st Coat: Quick Seal & Enhance

2nd Coat: Concrete Coat – Satin finish

**SECTION 214 – TRAFFIC STRIPING, CURB AND PAVEMENT
MARKINGS AND PAVEMENT MARKERS**

214 -2 Test Reports and Certificates of Compliance.

214-2.1 General [Add the following]:

Existing markings and striping, either permanent or temporary, which are to be temporarily marked out shall be covered by black-out painting or other approved methods. Alternate methods of paint removal require prior approval of the Inspector. All removed traffic striping and pavement markings that were removed for temporary construction traffic control shall be replaced in kind at the completion of the project.

**EXISTING IMPROVEMENTS
PART 4**

SECTION 402 – UTILITIES

402-2 Protection

402-2. 1 [Add the following]:

See GWRS profile U02-C-013. See OCSAN Orangewood Diversion sewer, and Santa Ana River interceptor sewer.

SECTION 403 – MANHOLE ADJUSTMENT AND RECONSTRUCTION

403-3 Manholes in Asphalt Concrete Pavement

403-3.1 [Add the following]:
Manholes in dirt to be protected in place – paint in safety yellow.

**TEMPORARY TRAFFIC CONTROL
PART 6**

SECTION 600 – ACCESS

600-2 Vehicular Access

600-2.1 [Add the following]:

Contractor shall provide access by maintenance personnel and vehicles for Orange County Sanitation District and Orange County Water District. These agencies periodically will need to conduct maintenance and testing during the course of the construction of the park. Currently there is a daisy chain of locks for OCSD, OCWD, City of Anaheim and Fire Department. The daisy chain lock will need to be maintained through turnover of project.

END OF SECTION

CITY OF ANAHEIM, CALIFORNIA

Technical Specifications

for

River Park

**2445 E. ORANGEWOOD AVE.
ANAHEIM, CA 92806**

April 21, 2026

Project Landscape Architect:
JT Barr / Schmidt Design Group, Inc.
1310 Rosecrans Street, Suite G
San Diego, CA 92106
(619) 236-1462

For use in connection with the GREENBOOK Standard Specifications for Public Work Construction, 2021 Edition, the Uniform Building Code, 2022 Edition, and Construction Drawings prepared by the Schmidt Design Group, Inc.

River Park

SUPPLEMENTAL SPECIFICATIONS

GREENBOOK SUPPLEMENTS

PART 1 GENERAL PROVISIONS

SECTION 3 – CONTROL OF WORK

SECTION 4 – CONTROL OF MATERIALS

PART 2 CONSTRUCTION MATERIALS

SECTION 210 – PAINT AND PROTECTIVE COATINGS

SECTION 214 – TRAFFIC STRIPING, CURB AND PAVEMENT MARKINGS

PART 4 – EXISTING IMPROVEMENTS

SECTION 402 – UTILITIES

SECTION 403 – MANHOLE ADJUSTMENT AND RECONSTRUCTION

PART 6 – TEMPORARY TRAFFIC CONTROL

SECTION 600 – ACCESS

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- GWRS PROFILE U02-C-013
- SEWER ALIGNMENT AS BUILT PLANS 2-14-1-0038/39
- STANDARD PLAN 225
- TREE PROTECTION DETAIL

DIVISION 1 – GENERAL REQUIREMENTS

SECTION 01 21 00

ALLOWANCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements governing allowances.
- B. Types of allowances include the following:
 - 1. Lump-sum allowances.
 - 2. Unit-cost allowances.
 - 3. Quantity allowances.
 - 4. Contingency allowances.
 - 5. Testing and inspecting allowances.

1.3 DEFINITIONS

- A. Allowance: A quantity of work or dollar amount included in the Contract, established in lieu of additional requirements, used to defer selection of actual materials and equipment to a later date when direction will be provided to Contractor. If necessary, additional requirements will be issued by Change Order.

1.4 SELECTION AND PURCHASE

- A. At the earliest practical date after award of the Contract, advise Architect of the date when final selection, or purchase and delivery, of each product or system described by an allowance must be completed by the Owner to avoid delaying the Work.
- B. At Architect's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.
- C. Purchase products and systems selected by Architect from the designated supplier.

1.5 ACTION SUBMITTALS

- A. Submit proposals for purchase of products or systems included in allowances in the form specified for Change Orders.

1.6 INFORMATIONAL SUBMITTALS

- A. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.
- B. Submit time sheets and other documentation to show labor time and cost for installation of allowance items that include installation as part of the allowance.
- C. Coordinate and process submittals for allowance items in same manner as for other portions of the Work.

1.7 LUMP-SUM ALLOWANCES

- A. Allowance shall include cost to Contractor of specific products and materials ordered by Owner or selected by Architect under allowance and shall include taxes, freight, and delivery to Project site.
- B. Unless otherwise indicated, Contractor's costs for receiving and handling at Project site, labor, installation, overhead and profit, and similar costs related to products and materials ordered by Owner or selected by Architect under allowance shall be included as part of the Contract Sum and not part of the allowance.
- C. Unused Materials: Return unused materials purchased under an allowance to manufacturer or supplier for credit to Owner, after installation has been completed and accepted.
 - 1. If requested by Architect, retain and prepare unused material for storage by Owner. Deliver unused material to Owner's storage space as directed.

1.8 UNIT-COST ALLOWANCES

- A. Allowance shall include cost to Contractor of specific products and materials ordered by Owner or selected by Architect under allowance and shall include taxes, freight, and delivery to Project site.
- B. Unless otherwise indicated, Contractor's costs for receiving and handling at Project site, labor, installation, overhead and profit, and similar costs related to products and materials ordered by Owner or selected by Architect under allowance shall be included as part of the Contract Sum and not part of the allowance.
- C. Unused Materials: Return unused materials purchased under an allowance to manufacturer or supplier for credit to Owner, after installation has been completed and accepted.
 - 1. If requested by Architect, retain and prepare unused material for storage by Owner. Deliver unused material to Owner's storage space as directed.

1.9 QUANTITY ALLOWANCES

- A. Allowance shall include cost to Contractor of specific products and materials ordered by Owner or selected by Architect under allowance and shall include taxes, freight, and delivery to Project site.
- B. Unless otherwise indicated, Contractor's costs for receiving and handling at Project site, labor, installation, overhead and profit, and similar costs related to products and materials ordered by Owner or selected by Architect under allowance shall be included as part of the Contract Sum and not part of the allowance.

- C. Unused Materials: Return unused materials purchased under an allowance to manufacturer or supplier for credit to Owner, after installation has been completed and accepted.
 - 1. If requested by Architect, retain and prepare unused material for storage by Owner. Deliver unused material to Owner's storage space as directed.

1.10 CONTINGENCY ALLOWANCES

- A. Use the contingency allowance only as directed by Owner.
- B. Contractor's overhead, profit, and related costs for products and equipment ordered by Owner under the contingency allowance are included in the allowance and are not part of the Contract Sum. These costs include delivery, installation, taxes, insurance, equipment rental, and similar costs.
- C. Change Orders authorizing use of funds from the contingency allowance will include Contractor's related costs and reasonable overhead and profit.
- D. At Project closeout, credit unused amounts remaining in the contingency allowance to Owner by Change Order.

1.11 TESTING AND INSPECTING ALLOWANCES

- A. Testing and inspecting allowances include the cost of engaging testing agencies, actual tests and inspections, and reporting results.
- B. The allowance does not include incidental labor required to assist the testing agency or costs for retesting if previous tests and inspections result in failure. The cost for incidental labor to assist the testing agency shall be included in the Contract Sum.
- C. Costs of testing and inspection services not specifically required by the Contract Documents are Contractor responsibilities and are not included in the allowance.
- D. At Project closeout, credit unused amounts remaining in the testing and inspecting allowance to Owner by Change Order.

1.12 ADJUSTMENT OF ALLOWANCES

- A. Allowance Adjustment: To adjust allowance amounts, prepare a Change Order proposal based on the difference between purchase amount and the allowance, multiplied by final measurement of work-in-place where applicable. If applicable, include reasonable allowances for cutting losses, tolerances, mixing wastes, normal product imperfections, required maintenance materials, and similar margins.
 - 1. Include installation costs in purchase amount only where indicated as part of the allowance.
 - 2. If requested, prepare explanation and documentation to substantiate distribution of overhead costs and other markups.
 - 3. Submit substantiation of a change in scope of Work, if any, claimed in Change Orders related to unit-cost allowances.
 - 4. Owner reserves the right to establish the quantity of work-in-place by independent quantity survey, measure, or count.

- B. Submit claims for increased costs due to a change in the scope or nature of the allowance described in the Contract Documents, whether for the purchase order amount or Contractor's handling, labor, installation, overhead, and profit.
 - 1. Do not include Contractor's or subcontractor's indirect expense in the Change Order cost amount unless it is clearly shown that the nature or extent of Work has changed from what could have been foreseen from information in the Contract Documents.
 - 2. No change to Contractor's indirect expense is permitted for selection of higher- or lower-priced materials or systems of the same scope and nature as originally indicated.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine products covered by an allowance promptly on delivery for damage or defects. Return damaged or defective products to manufacturer for replacement.

3.2 PREPARATION

- A. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

3.3 SCHEDULE OF ALLOWANCES

- A. Allowance No. 1: Include an allowance sum of \$58,000.00 to accommodate unknown and unforeseen site conditions as directed by the Cit of Anaheim.
 - 1. This allowance includes material cost receiving, handling, and installation and Contractor overhead and profit.
 - 2. This allowance shall only be used as authorized and directed by City.

END OF SECTION 01 21 00

DIVISION 1 – GENERAL REQUIREMENTS

SECTION 01 56 39

TREE AND PLANT PROTECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes general protection, pruning, and care of existing trees and plants that are affected by execution of the Work, whether temporary or permanent construction.

1.3 DEFINITIONS

- A. Caliper: A tree caliper is a tool used in forestry and landscaping to accurately measure the diameter of tree trunks, typically to determine diameter at breast height (DBH, 4.5 ft).
- B. Tree Caliper: Diameter of a trunk measured by a caliper at a height 6 inches above the ground for trees up to and including 4-inch size at this height and as measured breast height (DBH, 4.5 ft) for trees larger than 4-inch size.
- C. Drip Line: The width of the canopy of the tree as measured by the lateral extent of the foliage on all sides.
- D. Plant-Protection Zone: Area surrounding individual trees, groups of trees, shrubs, or other vegetation to be protected during construction and indicated on Drawings.
- E. Tree-Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction and defined by a circle concentric with each tree with a radius of the drip line unless otherwise indicated.
- F. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

1.4 PREINSTALLATION MEETINGS

- A. The Contractor shall coordinate with Engineer and City Arborist and to accomplish construction as it relates to preservation, protection, and trimming of existing trees.
- B. Preinstallation Conference: Conduct conference at Project site with City Arborist, Engineer, and Contractor, and Contractor's Arborist.
 - 1. Review methods and procedures related to temporary tree and plant protection including, but not limited to, the following:
 - a. Contractor Arborist's responsibilities.
 - b. Tree service firm or landscape contractor
 - c. Quality-control program.

- d. Coordination of Work and equipment movement with the locations of protection zones.
- e. Trenching by hand or with air spade within protection zones.
- f. Field quality control.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings:
 - 1. Include plans, elevations, sections, and locations of protection-zone fencing and signage, showing relation of equipment-movement routes and material storage locations with protection zones for each phase of construction.
 - a. Fencing shall be 72" chain link construction fencing along drip line of tree and or as noted in the tree protection notes on the demolition plan. The notes are for trees in construction and grading zones.
 - 2. Indicate extent of trenching by hand or with air spade within protection zones.
- C. Samples: For each type of the following:
 - 1. Organic Mulch: 1-quart volume of organic mulch; in sealed plastic bags labeled with composition of materials by percentage of weight and source of mulch.
- D. Tree Preservation Schedule: Schedule, written by the Contractor's arborist, detailing scope and extent of work to be performed to preserve and protect existing trees to remain that interfere with or are affected by construction.
 - 1. Species and size of tree.
 - 2. Location of tree on site plan. Include unique identifier for each.
 - 3. Location of protection zone for each tree.
 - 4. If arborist determines pruning is required, provide reason for pruning, description of pruning to be performed, and description of maintenance procedures following pruning.
 - 5. Watering requirements to be performed by Contractor.
- E. No project demolition or excavation may occur until all submittal requirements have been approved and tree protection measures have been inspected and approved by the Engineer and City Arborist.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Contractor provided arborist and tree service firm.
- B. Certification: From arborist, certifying that trees indicated to remain have been protected during construction according to recognized standards and that trees were promptly and properly treated and repaired when damaged.
- C. Maintenance Recommendations: From arborist, for care and protection of trees affected by construction during and after completing the Work.
- D. Existing Conditions: Documentation of existing trees and plantings indicated to remain, which establishes preconstruction conditions that might be misconstrued as damage caused by construction activities.
 - 1. Use sufficiently detailed photographs or video recordings.
 - 2. Include plans and notations to indicate specific wounds and damage conditions of each tree or other plants designated to remain.

- E. Quality-control program.
- F. No project demolition or excavation may occur until all submittal requirements have been approved and tree protection measures have been inspected and approved by the Engineer and City Arborist.

1.7 QUALITY ASSURANCE

- A. Arborist Qualifications: Certified Arborist as certified by the International Society of Arboriculture (ISA) or a Registered Consulting Arborist as designated by ASCA.
- B. Tree Service Firm Qualifications: An experienced tree service firm that has successfully completed temporary tree and plant protection work similar to that required for this Project and that will assign an experienced, qualified arborist to Project site during execution of the Work.
- C. Quality-Control Program: Prepare a written program to systematically demonstrate the ability of personnel to properly follow procedures and handle materials and equipment during the Work without damaging trees and plantings. Include dimensioned diagrams for placement of protection zone fencing and signage, the arborist's and tree-service firm's responsibilities, instructions given to workers on the use and care of protection zones, and enforcement of requirements for protection zones.

1.8 FIELD CONDITIONS

- A. The following practices are prohibited within protection zones:
 - 1. Storage of construction materials, debris, or excavated material.
 - 2. Storage or use of equipment and non-related construction activities including, but not limited to, pipe-cutting machines, tile-cutting machines, and lumber saws.
 - 3. Storage or dumping of deleterious materials harmful to plant growth. Deleterious materials might include, but are not limited to, fuels, oils, other petroleum products, acids, liquids, concrete mix or concrete washout, stucco mix or stucco washout, paint or paint washout, and zinc grindings from working with galvanized products in the field.
 - 4. Soil disturbance or grade change.
 - 5. Moving or parking vehicles or equipment, even temporarily.
 - 6. Foot traffic.
 - 7. Erection of sheds or structures.
 - 8. Drainage changes or impoundment of water.
 - 9. Excavation or other digging unless otherwise indicated.
 - 10. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.
 - 11. The use of a tree as a temporary power pole, backstop, winch support, anchorage, or other similar function.
- B. Do not direct vehicle or equipment exhaust toward protection zones.
- C. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones and organic mulch.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Backfill Soil: Planting soil of suitable moisture content and granular texture for placing around tree; free of stones, roots, plants, sod, clods, clay lumps, pockets of coarse sand, concrete slurry, concrete layers or chunks, cement, plaster, building debris, and other extraneous materials harmful to plant growth.
 - 1. Planting Soil: Fertile, friable, surface soil, containing natural loam and complying with ASTM D 5268. Provide topsoil that is free of stones larger than 1 inch in any dimension and free of other extraneous or toxic matter harmful to plant growth. Obtain topsoil only from well-drained sites where soil occurs in depth of 4 inches or more; do not obtain from bogs or marshes.
- B. Organic Mulch: Free from deleterious materials, animal waste, sludge waste, lumber or C&D wood by-products, trash and debris, and suitable as a top dressing of trees and shrubs.
 - 1. Product: Aguinaga Green Forest Floor Mulch or equal, 0"-2" SB1383 compliant.
 - 2. Or equal
- C. Protection-Zone Fencing: Fencing fixed in position and meeting the following requirements. Previously used materials may be used when approved by Engineer.
 - 1. Chain-Link Protection-Zone Fencing: Galvanized-steel fencing fabricated from minimum 2-inch opening, 0.148-inch-diameter wire chain-link fabric; with pipe posts, minimum 2-3/8-inch-OD line posts, and 2-7/8-inch-OD corner and pull posts; with 0.177-inch-diameter top tension wire and 0.177-inch-diameter bottom tension wire; with tie wires, hog ring ties, and other accessories for a complete fence system.
 - a. Height: 72 inches.
 - 2. Gates: Single-swing access gates matching material and appearance of fencing, to allow for maintenance activities within protection zones; leaf width 36 inches.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Erosion and Sedimentation Control: Examine the site to verify that temporary erosion- and sedimentation-control measures are in place. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.
- B. Prepare written report, authored by arborist, listing conditions detrimental to tree and plant protection.

3.2 PREPARATION

- A. Locate and clearly identify trees, shrubs, and other vegetation to remain or to be relocated. Tie a 1-inch blue vinyl tape around each tree trunk at 54 inches above the ground.
- B. Protect tree root systems from damage caused by runoff or spillage of noxious materials while mixing, placing, or storing construction materials. Protect root systems from ponding, eroding, or excessive wetting caused by dewatering operations.

3.3 PROTECTION ZONES

- A. Protection-Zone Fencing: Install protection-zone fencing along edges of protection zones before materials or equipment are brought on the site and construction operations begin in a manner that will prevent people and animals from easily entering protected areas except by entrance gates. Construct fencing so as not to obstruct safe passage or visibility at vehicle intersections where fencing is located adjacent to pedestrian walkways or in close proximity to street intersections, drives, or other vehicular circulation.

The Contractor may use the existing chain-link fencing as part of the protection zone fencing (Temporary construction fencing) until it hinders the contractors progress to complete the project on time. When the existing fencing is removed, the contractor is still required to maintain protection zone until the project is accepted by the owner. All provisions within Section 3.3 Protection Zones apply until the project is accepted.

1. Chain-Link Fencing: Install to comply with ASTM F 567 and with manufacturer's written instructions.
 2. Posts: Set or drive posts into ground one-third the total height of the fence without concrete footings. Where a post is located on existing paving or concrete to remain, provide appropriate means of post support acceptable to Engineer.
 3. Access Gates: Install; adjust to operate smoothly, easily, and quietly; free of binding, warp, excessive deflection, distortion, nonalignment, misplacement, disruption, or malfunction throughout entire operational range. Confirm that latches and locks engage accurately and securely without forcing or binding.
- B. Protection-Zone Signage: Install protection-zone signage in visibly prominent locations in a manner approved by Engineer. Install one sign spaced approximately every 20 feet on protection-zone fencing, but no fewer than four signs with each facing a different direction.
- C. Maintain protection zones free of weeds and trash.
- D. Maintain protection-zone fencing and signage in good condition as acceptable to Engineer and remove when construction operations are complete and equipment has been removed from the site.
1. Do not remove protection-zone fencing, even temporarily, to allow deliveries or equipment access through the protection zone.
 2. Temporary access is permitted subject to preapproval in writing by arborist if a root buffer effective against soil compaction is constructed as directed by arborist. Maintain root buffer so long as access is permitted.

3.4 EXCAVATION

- A. General: Excavation shall not proceed without approval by the engineer. Contractor shall paint on ground the proposed trenching location and have the alignment approval prior to trenching.
- B. General: Excavate at edge of protection zones and for trenches indicated within protection zones according to requirements in Section 31 20 00 "Earth Moving" unless otherwise indicated.
- C. Trenching within Protection Zones: Where utility trenches are required within protection zones, excavate under or around tree roots by hand or with air spade, or tunnel under the roots by drilling, auger boring, or pipe jacking. Do not cut main lateral tree roots or taproots; cut only smaller roots that interfere with installation of utilities. Cut roots as required for root pruning. If excavating by hand, use narrow-tine spading forks to comb soil and expose roots.

- D. Do not allow exposed roots to dry out before placing permanent backfill. Provide temporary earth cover or pack with peat moss and wrap with burlap. Water and maintain in a moist condition. Temporarily support and protect roots from damage until they are permanently relocated and covered with soil.

3.5 ROOT PRUNING

- A. **Root pruning shall not be attempted by untrained construction personnel, but shall be performed by a qualified tree care professional or a certified tree care worker. Only personnel approved by the arborist shall perform pruning operations.**
- B. Prune tree roots that are affected by temporary and permanent construction. Prune roots as directed by the arborist or as follows. If direction from arborist is different from what is stated below, then direction from arborist governs.
 - 1. Cut roots manually by digging a trench and cutting exposed roots with sharp pruning instruments; do not break, tear, chop, or slant the cuts. Do not use a backhoe or other equipment that rips, tears, or pulls roots.
 - 2. Cut Ends: Treat as directed by arborist perpendicular to the direction of root growth.
 - 3. Temporarily support and protect roots from damage until they are permanently redirected and covered with soil.
 - 4. Cover exposed roots with burlap and water regularly.
 - 5. Backfill as soon as possible according to requirements in Section 31 20 00 "Earth Moving."
- C. Root Pruning at Edge of Protection Zone: Prune tree roots 6 inches outside of the protection zone by cleanly cutting all roots to the depth of the required excavation.
- D. Root Pruning within Protection Zone: Clear and excavate by hand or with air spade to the depth of the required excavation to minimize damage to tree root systems. If excavating by hand, use narrow-tine spading forks to comb soil to expose roots. Cleanly cut roots as close to excavation as possible.

3.6 CROWN PRUNING

- A. Crown pruning shall not be attempted by untrained construction personnel, but shall be performed by a qualified tree care professional or a certified tree care worker. Only personnel approved by the arborist shall perform pruning operations
- B. Prune branches that are affected by temporary and permanent construction. Prune branches as directed by arborist.
 - 1. Prune to remove only injured, broken, dying, or dead branches unless otherwise indicated. Do not prune for shape unless otherwise indicated.
 - 2. Do not remove or reduce living branches to compensate for root loss caused by damaging or cutting root system.
 - 3. Pruning Standards: Prune trees according to ANSI A300 (Part 1).
 - a. Type of Pruning: Cleaning and thinning as directed by arborist.
- C. Unless otherwise directed by arborist and acceptable to Engineer, do not cut tree leaders.
- D. Cut branches perpendicular to the direction of branch growth with sharp pruning instruments; do not break or chop.
- E. Do not paint or apply sealants to wounds.

- F. Provide subsequent maintenance pruning during Contract period as recommended by arborist.
- G. Chip removed branches and dispose of off-site.

3.7 REGRADING

- A. Lowering Grade: Where new finish grade is indicated below existing grade around trees, slope grade beyond the protection zone. Maintain existing grades within the protection zone.
- B. Lowering Grade within Protection Zone: Where new finish grade is indicated below existing grade around trees, slope grade away from trees as recommended by arborist unless otherwise indicated.
 - 1. Root Pruning: Prune tree roots exposed by lowering the grade. Do not cut main lateral roots or taproots; cut only smaller roots. Cut roots as required for root pruning.
- C. Raising Grade: Where new finish grade is indicated above existing grade around trees, slope grade beyond the protection zone. Maintain existing grades within the protection zone.
- D. Minor Fill within Protection Zone: Where existing grade is 2 inches or less below elevation of finish grade, fill with backfill soil. Place backfill soil in a single uncompacted layer and hand grade to required finish elevations.

3.8 FIELD QUALITY CONTROL

- A. Inspections: Engage a qualified arborist to direct plant-protection measures in the vicinity of trees, shrubs, and other vegetation indicated to remain and to prepare inspection reports.

3.9 MAINTENANCE

- A. Where temporary clearance is needed for adjacent access, tree branches shall be temporarily tied back to hold them out of the clearance zone, **with approval by the arborist**. Tied branches shall be protected with burlap or other protective material to prevent wounding and chafing.
- B. Dust Control: Tree shall be maintained in a clean fashion throughout the length of the Work. During periods of demolition, clearing & grubbing, grading activities, post-wind, or simply time, gently spray the foliage, trunks, and branches with clean potable water to remove construction dust. Do not utilize pressure washers, large streams of water with high volumes, or other insensitive methods to clean the foliage.
- C. Area inside the tree protection zone shall be maintained in a neat manner, removing excessive leaf build-up, fallen twigs and branches, or debris deposited by winds or other causes. Do not remove leaf build-up under oak trees.
- D. **When installing concrete adjacent to the tree protection zone, install a plastic vapor barrier behind the concrete to prohibit leaching of lime into the soil and protect from Acid wash.**
- E. Pest and Disease Control: Notify the arborist if any symptoms of pest or disease are observed. Provide appropriate measures to prevent or remedy pests and diseases, as directed by the arborist.

3.10 REPAIR AND REPLACEMENT

- A. General: Repair or replace trees, shrubs, and other vegetation indicated to remain or to be relocated that are damaged by construction operations, in a manner approved by Engineer.

1. Submit details of proposed pruning and repairs.
 2. Perform repairs of damaged trunks, branches, and roots within 24 hours according to arborist's written instructions.
 3. Replace trees and other plants that cannot be repaired and restored to full-growth status, as determined by Engineer.
- B. Trees: Remove and replace trees indicated to remain that are more than 25 percent dead or in an unhealthy condition before the end of the corrections period or are damaged during construction operations that Engineer determines are incapable of restoring to normal growth pattern.
1. Small Trees: Provide new trees of same size and species as those being replaced for each tree that measures 10 inches or smaller in caliper size.
 2. Large Trees: Project Arborist shall determine the tree appraisal value for damage and replacement using the most recent edition of the *Guide for Plant Appraisal*, authored by the Council of Tree and Landscape Appraisers (CTLA), and published by the International Society of Arboriculture (ISA), Champaign, IL. The formula used shall also be noted.
 - a. Species: As selected by Engineer
 3. Plant and maintain new trees as specified in Section 32 93 00 "Plants."
- C. Excess Mulch: Rake mulched area within protection zones, being careful not to injure roots. Rake to loosen and remove mulch that exceeds a 3 inch uniform thickness to remain.
- D. Soil Aeration: Aerate surface soil compacted during construction. Aerate 10 feet beyond drip line and no closer than 36 inches to tree trunk. Drill 2 inch diameter holes a minimum of 12 inches deep at 24 inches o.c. Backfill holes with an equal mix of augured soil and sand.
- 3.11 DISPOSAL OF SURPLUS AND WASTE MATERIALS
- A. Disposal: Remove excess excavated material, displaced trees, trash, and debris and legally dispose of them off City property.
 - B. Contractor to remove mulch used for access roads if used at end of project.

END OF SECTION 01 56 39

DIVISION 2 – EXISTING CONDITIONS
SECTION 02 41 16
DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes demolition and removal of the following:
 - 1. Site improvements including site utilities.
 - 2. Protecting existing trees, shrubs, groundcovers, plants, and grass to remain.
 - 3. Removing existing trees, shrubs, groundcovers, plants, and grass.
 - 4. Clearing and grubbing.
 - 5. Stripping and stockpiling topsoil.
 - 6. Removing above- and below-grade site improvements.
 - 7. Disconnecting and capping or sealing site utilities.
 - 8. Temporary erosion and sedimentation control measures.
- B. See Division 26 Sections for demolishing or relocating site electrical items.

1.2 DEFINITIONS

- A. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged or recycled.
- B. Remove and Salvage: Detach items from existing construction and deliver them to Owner ready for reuse.
- C. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or recycled.

1.3 MATERIALS OWNERSHIP

- A. Historic items, relics, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, antiques, and other items of interest or value to Owner that may be encountered during demolition remain Owner's property. Carefully remove and salvage each item or object in a manner to prevent damage and deliver promptly to Owner. Except for stripped topsoil or other materials indicated to remain Owner's property, cleared materials shall become Contractor's property and shall be removed from Project site.

1.4 SUBMITTALS (Not Applicable)

1.5 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Standards: Comply with ANSI A10.6 and NFPA 241.
- C. Pre-demolition Conference: Conduct conference at Project site.

1.6 PROJECT CONDITIONS

- A. Owner assumes no responsibility for buildings and structures to be demolished.
 - 1. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
- B. Storage or sale of removed items or materials on-site is not permitted.
- C. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.
 - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
 - 2. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.
- D. Salvageable Improvements: Carefully remove items indicated to be salvaged and store on Owner's premises where indicated.
- E. Utility Locator Service: Notify utility locator service for area where Project is located before site clearing.
- G. Do not commence site-clearing operations until temporary erosion and sedimentation control measures are in place.

1.7 COORDINATION

- A. Arrange demolition schedule so as not to interfere with Owner's, building manager's, and other tenants' on-site operations.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Survey existing conditions and correlate with requirements indicated to determine extent of building and site demolition required.
- B. Inventory and record the condition of items to be removed and salvaged.
- C. When unanticipated mechanical, electrical, or structural elements are encountered, investigate and measure the nature and extent of the element. Promptly submit a written report to Architect.

3.2 PREPARATION

- A. Existing Utilities: Locate, identify, disconnect, and seal or cap off indicated utilities to be demolished.
 - 1. Arrange to shut off indicated utilities with utility companies.
 - 2. If utility services are required to be removed, relocated, or abandoned, before proceeding with building demolition provide temporary utilities that bypass buildings and structures to be demolished and that maintain continuity of service to other buildings and structures.
 - 3. Cut off pipe or conduit a minimum of 24 inches below grade. Cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing.
- B. Existing Utilities: Refer to 26 (Electrical) Sections for shutting off, disconnecting, removing, and sealing or capping mechanical or electrical utilities. Do not start demolition work until utility disconnecting and sealing have been completed and verified in writing.
- C. Temporary Shoring: Provide and maintain interior and exterior shoring, bracing, or structural support to preserve stability and prevent unexpected movement or collapse of construction being demolished.
- D. Removed and Salvaged Items: Comply with the following:
 - 1. Clean salvaged items of dirt and demolition debris.
 - 2. Pack or crate items after cleaning. Identify contents of containers.
 - 3. Store items in secure area until delivery to Owner.
 - 4. Transport items to Owner's storage area designated by Owner.
 - 5. Protect items from damage during transport and storage.
- E. Protect and maintain benchmarks and survey control points from disturbance during construction.
- F. Locate and clearly flag trees and vegetation to remain or to be relocated.

- G. Protect existing site improvements to remain from damage during construction. Restore damaged improvements to their original condition, as acceptable to Owner.

3.3 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- A. Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to sediment and erosion control Drawings.
- B. Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
- C. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.4 TREE PROTECTION

- A. Erect and maintain temporary fencing around tree protection zones before starting site clearing. Remove fence when construction is complete.
- B. Do not excavate within tree protection zones, unless otherwise indicated.
- C. Repair or replace trees and vegetation indicated to remain that are damaged by construction operations, in a manner approved by the City.

3.5 PROTECTION

- A. Existing Facilities: Protect adjacent walkways, loading docks, building entries, and other facilities during demolition operations.
- B. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during demolition. When permitted by City, items may be removed to a suitable, protected storage location during demolition and cleaned and reinstalled in their original locations after demolition operations are complete.
- C. Existing Utilities: Maintain utility services indicated to remain and protect them against damage during demolition operations.
 - 1. Do not interrupt existing utilities serving adjacent occupied or operating facilities unless authorized in writing by Owner and authorities having jurisdiction.
 - 2. Provide temporary services during interruptions to existing utilities, as acceptable to Owner and to authorities having jurisdiction.
 - a. Provide at least 72 hours notice to Owner if shutdown of service is required during changeover.

- D. Temporary Protection: Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction and as indicated. Comply with requirements in Division 1 Section "Temporary Facilities and Controls."
1. Protect existing site improvements, appurtenances, and landscaping to remain.
 2. Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
 3. Provide protection to ensure safe passage of people around building demolition area and to and from occupied portions of adjacent buildings and structures.
 4. Protect walls, windows, roofs, and other adjacent exterior construction that are to remain and that are exposed to building demolition operations.

3.6 DEMOLITION, GENERAL

- A. General: Demolish indicated existing structures, and site improvements completely. Use methods required to complete the Work within limitations of governing regulations and as follows:
1. Do not use cutting torches until work area is cleared of flammable materials. Maintain fire watch and portable fire-suppression devices during flame-cutting operations.
 2. Maintain adequate ventilation when using cutting torches.
- B. Engineering Surveys: Perform surveys as the Work progresses to detect hazards that may result from demolition activities.
- C. Site Access and Temporary Controls: Conduct demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
1. Do not close or obstruct streets, walks, walkways, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.
 2. Use water mist and other suitable methods to limit spread of dust and dirt. Comply with governing environmental-protection regulations. Do not use water when it may damage adjacent construction or create hazardous or objectionable conditions, such as ice, flooding, and pollution.

3.7 MECHANICAL DEMOLITION

- A. Remove structures, and site improvements intact when permitted by authorities having jurisdiction.
- B. Remove debris from elevated portions by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
- C. Concrete: Cut concrete full depth at junctures with construction indicated to remain.
- D. Masonry: Cut masonry cleanly at junctures with construction indicated to remain.

- E. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished at junctures with construction indicated to remain, then break up and remove.
- F. Below-Grade Construction: Demolish foundation walls and other below-grade construction as indicated on Contract Documents.
 - 1. Remove below-grade construction, including basements, foundation walls, and footings, as indicated on Contract Documents.
- G. Existing Utilities: Demolish existing utilities and below-grade utility structures as indicated on Contract Documents.
 - 1. Fill abandoned utility structures with satisfactory soil materials according to backfill requirements in Division 31 Section "Earth Moving." Verify structures in field with Owner before proceeding.

3.8 UTILITIES

- A. Locate, identify, disconnect, and seal or cap off utilities indicated to be removed.
 - 1. Arrange with utility companies to shut off indicated utilities.
- B. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
 - 1. Notify Owner not less than two days in advance of proposed utility interruptions.
 - 2. Do not proceed with utility interruptions without Owner's written permission.

3.9 CLEARING AND GRUBBING

- A. Fill depressions caused by clearing and grubbing operations with satisfactory soil material unless further excavation or earthwork is indicated.
- B. Place fill material in horizontal layers not exceeding a loose depth of 8 inches, and compact each layer to a density equal to adjacent original ground.

3.10 TOPSOIL STRIPPING

- A. Remove sod and grass before stripping topsoil.
- B. Strip topsoil to whatever depths are encountered in a manner to prevent intermingling with underlying subsoil or other waste materials.
- C. Stockpile topsoil materials away from edge of excavations without intermixing with subsoil. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust.

3.11 EXPLOSIVE DEMOLITION

- A. Explosives: Use of explosives is not permitted.

3.12 SITE RESTORATION

- A. Below-Grade Areas: Completely fill below-grade areas and voids resulting from building demolition operations with satisfactory soil materials according to backfill requirements in Division 31 Section "Earth Moving."
- B. Site Grading: Uniformly rough grade area of demolished construction to a smooth surface, free from irregular surface changes. Provide a smooth transition between adjacent existing grades and new grades.

3.13 SITE IMPROVEMENTS

- A. Remove existing above- and below-grade improvements as indicated and as necessary to facilitate new construction.

3.14 DISPOSAL

- A. Disposal: Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off Owner's property. Coordinate disposal with LEED Requirements.
- B. Separate recyclable materials produced during site clearing from other nonrecyclable materials. Store or stockpile without intermixing with other materials and transport them to recycling facilities.

3.15 REPAIRS

- A. General: Promptly repair damage to adjacent construction caused by building demolition operations.
- B. Where repairs to existing surfaces are required, patch to restore surface to original or better condition.
- C. Restore exposed finishes of patched areas and extend restoration into adjoining construction in a manner that eliminates evidence of patching and refinishing.

3.16 RECYCLING DEMOLISHED MATERIALS

- A. General: Separate recyclable demolished materials from other demolished materials to the maximum extent possible. Separate recyclable materials by type.

1. Provide containers or other storage method approved by City for controlling recyclable materials until they are removed from Project site.
 2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
 3. Stockpile materials away from demolition area. Do not store within drip line of remaining trees.
 4. Store components off the ground and protect from the weather.
 5. Transport recyclable materials off Owner's property and legally dispose of them.
- B. Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling building demolition materials shall accrue to Owner

3.17 DISPOSAL OF DEMOLISHED MATERIALS

- A. General: Except for items or materials indicated to be recycled, reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill. Coordinate recycling of demolition materials with LEED Requirements.
1. Do not allow demolished materials to accumulate on-site.
 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- B. Burning: Do not burn demolished materials.
- C. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

3.18 CLEANING

- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by building demolition operations. Return adjacent areas to condition existing before building demolition operations began.

END OF SECTION 02 41 16

DIVISION 3 - CONCRETE
SECTION 03 30 00
CAST-IN-PLACE CONCRETE

1.1 GENERAL

A. Submittals:

1. Product data for forming accessories, admixtures, patching compounds, joint systems, curing compounds, and others as requested by Architect.
2. Shop drawings for fabricating, bending, and placing concrete reinforcement.
3. Laboratory test reports or evaluation reports for concrete materials and concrete mix designs.
4. Written report to Project Manager for each proposed concrete mix at least 15 days prior to start of concreting. Do not begin concrete production until Project Manager has reviewed mixes.

B. Quality Assurance: Comply with provisions of ACI 301, "Specifications for Structural Concrete for Buildings," ACI 318, "Building Code Requirements for Reinforced Concrete," and CRSI "Manual of Standard Practice," except where more stringent requirements are indicated.

1. Concrete Testing Service: Engage a testing agency acceptable to Project Manager to perform materials evaluation testing and to design concrete mixes.
 - a. City to engage testing company. Any failed tests shall be retested at the expense of the Contractor.
 - b. Materials certificates signed by concrete producer and the Contractor may be submitted in lieu of materials laboratory testing when acceptable to Project Manager.
2. CONTRACTOR Mock-ups:
 - a. CONTRACTOR shall prepare 4-foot x 4-foot samples for each cast-in-place concrete type indicated on Drawings. If the sample is not approved, the CONTRACTOR in charge of the specific scope of work shall remove and replace another sample for ENGINEER approval. Samples to be removed prior to final.
 - b. Mock-Ups shall be completed to the satisfaction of the ENGINEER including aggregates, texture, color, and finishes.
 - c. These mock-ups will become the standard of quality by which future paving samples and work will be judged.
 - d. Mock-ups to remain on-site and be protected during the course of construction, as a means to compare work in progress. If Mock-ups are damaged or removed, the CONTRACTOR in charge of the specific scope of work shall repair/replace in-kind immediately.
 - e. Mock ups shall be removed prior to installation of irrigation and planting.

2.1 PRODUCTS

A. Form Materials: Furnish form materials with sufficient stability to withstand pressure of placed concrete without bow or deflection.

1. Forms for Exposed Concrete Surfaces: Suitable panel-type material to provide continuous, straight, smooth, exposed surfaces.

B. Reinforcing Materials: As follows:

1. Deformed Reinforcing Bars: ASTM A 615, Grade 60, unless otherwise indicated, with epoxy coating (ASTM A 775).
2. Welded Wire Fabric: ASTM A 185.

- C. Concrete Materials: As follows:
1. Portland Cement: ASTM C 150, Type 1.
 2. Fly Ash: ASTM C 618, Type F.
 3. Aggregates: ASTM C 33, except local aggregates of proven durability may be used when acceptable to Project Manager.
 4. Water: Potable.
- D. Admixtures:
1. Air-Entraining Admixture: ASTM C 260.
 2. Water-Reducing, Retarding, and Accelerating Chemical Admixtures: ASTM C 494.
- E. Additives:
1. Concrete Color: Per plan
 2. Decomposed Granite Color: Per plan
- F. Related Materials: As follows:
1. Absorptive Cover: Burlap cloth made from jute or kenaf, weighing approximately 9 oz. per sq. yd., complying with AASHTO M 182, Class 2.
 2. Moisture-Retaining Cover: Waterproof paper, polyethylene film, or polyethylene-coated burlap, that comply with ASTM C 171.
 3. Membrane-Forming Curing Compound: ASTM C 309, Type I. Moisture loss shall not be more than 0.55 kg/sq. meter when applied at 200 sq. ft./gal.
 4. Evaporation Control: Monomolecular film-forming compound applied to exposed concrete slab surfaces for temporary protection from rapid moisture loss.
- G. Mix Proportions and Design: Proportion mixes complying with mix design procedures specified in ACI 301.
1. Fly ash shall not exceed 25 percent of cement content by weight.
 2. Design mixes for normal weight concrete shall have the following properties:
 - a. Deck Support Columns and Footings - 5000-psi, 28-day compressive strength; water-cement ratio, 0.4 maximum (non-air-entrained), 0.35 maximum (air-entrained).
 - b. Vehicular Concrete Paving - 4000-psi, 28-day compressive strength; water-cement ratio, 0.4 maximum (non-air-entrained), 0.35 maximum (air-entrained).
 - c. Pedestrian Concrete Paving - 3000-psi, 28-day compressive strength; water-cement ratio, 0.4 maximum (non-air-entrained), 0.35 maximum (air-entrained).
 3. The maximum water-cement ratio of concrete exposed to brackish water, or seawater is 0.40.
 4. Slump:
 - a. For Ramps, Slabs, and Sloping Surfaces: Not more than 3 inches.
 - b. For Reinforced Foundation Systems: Not less than 1 inch and not more than 3 inches.
 - c. For Other Concrete: Not more than 4 inches.
 5. Adjust mix designs when material characteristics, job conditions, weather, test results, or other circumstances warrant. Do not use revised concrete mixes until laboratory test data and strength results have been submitted to and reviewed by Project Manager.
- H. Use water-reducing, accelerating, and retarding admixtures that have been tested and accepted in mix designs in strict compliance with manufacturer's directions.
- I. Job-Site Mixing: Use drum-type batch machine mixer, mixing not less than 1-1/2 minutes for 1 cu. yd. or smaller capacity. Increase mixing time at least 15 seconds for each additional cu. yd.

- J. Ready-Mix Concrete: ASTM C 94.
- K. Graffiti-proof coating shall be a non-sacrificial moisture curing, medium speed, two-component polyurethane, satin finish enamel. Manufactures include:
 - 1. Anti-graffiti coating for horizontal and vertical surfaces shall be as manufactured by Coval Technologies, 12811 Royal Drive, Suite 110, Stafford, TX 77477 (281)566-4279.
 - 1st Coat: Quick Seal & Enhance
 - 2nd Coat: Concrete Coat – Satin finish

3.1 EXECUTION

- A. Formwork: Construct formwork so that concrete members and structures are of correct size, shape, alignment, elevation, and position. Select form materials to obtain required finishes.
 - 1. Maintain formwork tolerances and surface irregularities within ACI 347 limits, Class A tolerances for concrete exposed to view and Class C tolerances for other concrete surfaces.
 - 2. Provide openings in formwork to accommodate work of other trades. Accurately place and securely support items built into forms.
 - 3. Clean and adjust forms prior to concrete placement. Apply form-release agents or wet forms as required. Retighten forms during concrete placement, if required, to eliminate mortar leaks.
- B. Reinforcement: Accurately position and support reinforcement, and secure against displacement. Locate and support reinforcement to maintain minimum cover with chairs, runners, bolsters, spacers, and hangers as required. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
 - 1. Install rebar reinforcement per plans.
- C. Joints: Locate and install construction, isolation, and control joints as indicated or required. Locate construction joints so they do not impair strength and appearance of structure. Place isolation and control joints in slabs-on-ground to stabilize differential settlement and prevent random cracking.
- D. Installation of Embedded Items: Set and build anchorage devices and other embedded items required for other work that is attached to or supported by cast-in-place concrete. Use setting diagrams, templates, and instructions provided by others for locating and setting.
- E. Concrete Placement: Comply with ACI 304, "Guide for Measuring, Mixing, Transporting, and Placing Concrete," for placing concrete in a continuous operation within planned joints or sections. Do not begin concrete placement until other affected work is completed.
 - 1. Consolidate placed concrete using mechanical vibrating equipment with hand rodding and tamping so that concrete is worked around reinforcement and other embedded items and into forms.
 - 2. Protect concrete from physical damage or reduced strength due to weather extremes during mixing, placing, and curing.
 - a. In hot weather comply with ACI 305.
- F. Finish of Formed Surface: As follows:

1. Smooth-Formed Finish: Provide a smooth finish for concrete surfaces exposed to view and surfaces to be covered with a coating or covering material applied directly to concrete. Repair and patch defective areas, with fins and other projections completely removed and smoothed.
- G. Monolithic Slab Finishes: As follows:
1. Trowel Finish: Apply trowel finish to monolithic slab surfaces to be exposed to view and slab surfaces to be covered thin film-finish coating systems.
 - a. After floating, begin trowel-finish using a power-driven trowel. Begin final troweling when the surface produces a ringing sound as the trowel is moved over the surface. Finish concrete surface by hand-troweling operation, free of trowel marks, uniform in texture and appearance, and with surface leveled to tolerances of F(F) 20 (slab flatness) and F(L) 17 (slab levelness).
- H. Graffiti-Proof Coating: As follows:
1. All exposed concrete surfaces shall receive graffiti-proof coating
 2. Surfaces must be clean and dry before application
 3. Coating shall be applied per manufacturer specifications.
- I. Curing: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. In hot, dry, and windy weather, apply an evaporation-control compound according to manufacturer's instructions after screeding and bull floating, but before power floating and troweling.
1. Begin curing as soon as free water has disappeared from exposed surfaces.
 2. Continue curing unformed concrete surfaces by water ponding, continuous fog spraying, continuously wetted absorptive cover, or by moisture-retaining cover curing. Cure formed surfaces by moist curing until forms are removed. Keep concrete continuously moist for not less than 72 hours for high-early strength concrete and 7 days for all other concrete.
 3. Apply membrane-forming curing compound to exposed to exterior slabs, walks, and curbs as soon as final finishing operations are complete. Apply uniformly according to manufacturer's directions. Recoat areas subjected to heavy rainfall within 3 hours after initial application. Maintain continuity of coating and repair damage during curing period.
 - a. Use membrane-curing compounds that will not affect surfaces to be covered with finish materials applied directly to concrete.
- J. Field Quality Control: Perform sampling and testing during concrete placement, as follows:
- K. Field Quality Control: The Owner will employ a testing agency to perform tests and to submit test reports. Sampling and testing for quality control during concrete placement may include the following, as directed by Project Manager.
1. Sampling Fresh Concrete: ASTM C 172, except modified for slump to comply with ASTM C 94.
 - a. Slump: ASTM C 143; one test at point of discharge for each day's pour of each type of concrete; additional tests when concrete consistency seems to have changed.
 - b. Air Content: ASTM C 173, volumetric method for lightweight or normal weight concrete; ASTM C 231, pressure method for normal weight concrete; one for each day's pour of each type of air-entrained concrete.
 - c. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F (4 deg C) and below, when 80 deg F (27 deg C) and above, and one test for each set of compressive-strength specimens.

- d. Compression Test Specimen: ASTM C 31; one set of four standard cylinders for each compressive-strength test, unless otherwise directed. Mold and store cylinders for laboratory-cured test specimens except when field-cured test specimens are required.
 - e. Compressive-Strength Tests: ASTM C 39; one set for each day's pour exceeding 5 cu. yd. plus additional sets for each 50 cu. yd. more than the first 25 cu. yd. of each concrete class placed in any one day; one specimen tested at 7 days, two specimens tested at 28 days, and one specimen retained in reserve for later testing if required.
- 2. When frequency of testing will provide fewer than five strength tests for a given class of concrete, conduct testing from at least five randomly selected batches or from each batch if fewer than five are used.
 - 3. When total quantity of a given class of concrete is less than 50 cu. yd., Project Manager may waive strength testing if adequate evidence of satisfactory strength is provided.
 - 4. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing the in-place concrete.
 - 5. Strength level of concrete will be considered satisfactory if averages of sets of two consecutive strength test results equal or exceed specified compressive strength and no individual strength test result falls below specified compressive strength by more than 500 psi.
 - 6. Test results will be reported in writing to Project Manager, ready-mix producer, and Contractor within 24 hours after tests. Reports of compressive strength tests shall contain the project identification name and number, date of concrete placement, name of concrete testing service, concrete type and class, location of concrete batch in structure, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength, and type of break for both 7-day tests and 28-day tests.
 - 7. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted but shall not be used as the sole basis for acceptance or rejection.
 - 8. Additional Tests: The testing agency will make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure. Testing agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed.

END OF SECTION 03300

DIVISION 5 - METALS
SECTION 05 50 00
METAL FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Steel framing and supports for applications where framing and supports are not specified in other Sections.
 - 2. Miscellaneous steel trim.
 - 3. Metal sculptures.
 - 4. Custom metal signage.
- B. Products furnished, but not installed, under this Section:
 - 1. Anchor bolts, steel pipe sleeves, slotted-channel inserts, and wedge-type inserts indicated to be cast into concrete or built into unit masonry.

1.2 PERFORMANCE REQUIREMENTS

- A. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.
 - 1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

1.3 SUBMITTALS

- A. Shop Drawings: Show fabrication and installation details for metal fabrications. Shop drawing to be approved by ENGINEER prior fabrication.
 - 1. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items.
- B. Samples: Submit physical samples of all material colors and finishes for review and approval by ENGINEER.

1.4 INFORMATIONAL SUBMITTALS

- A. Welding certificates.

1.5 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

- B. Contractor Mock-Ups:
- a. CONTRACTOR shall prepare a 24"x24" mock-up of custom metal signage indicated on Drawings, prior to installation. Mock up shall accurately depict each differing laser cut letter size at full size.
 - b. CONTRACTOR shall prepare a 24"x24" mock-up of custom sculpture panel indicated on Drawings, prior to installation. Mock ups shall accurately depict patterns/ shapes at full size.
 - c. Mock-Ups shall be completed to the satisfaction of the ENGINEER including color, and finishes. If mock-up are not satisfactory, additional mockups will be required with the cost borne by the contractor.
 - d. These mock-ups will become the standard of quality by which future paving samples and work will be judged.
 - e. Mock-Ups to remain on-site and be protected during the course of construction, as a means to compare work in progress. If mock-ups are damaged or removed, CONTRACTOR shall repair/replace in-kind immediately.

1.6 PROJECT CONDITIONS

- A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication.

1.7 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.
- B. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

PART 2 - PRODUCTS

2.1 METALS, GENERAL

- A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

2.2 FERROUS METALS

- A. Recycled Content of Steel Products: Post-consumer recycled content plus one-half of pre-consumer recycled content not less than 25 percent.
- B. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- C. Steel Tubing: ASTM A 500, cold-formed steel tubing.
- D. Steel Pipe: ASTM A 53/A 53M, standard weight (Schedule 40) unless otherwise indicated.

- E. Cast Iron: Either gray iron, ASTM A 48/A 48M, or malleable iron, ASTM A 47/A 47M, unless otherwise indicated.

2.3 FASTENERS

- A. General: Unless otherwise indicated, provide Type 304 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.
- B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A; with hex nuts, ASTM A 563; and, where indicated, flat washers.
- C. Stainless-Steel Bolts and Nuts: Regular hexagon-head annealed stainless-steel bolts, ASTM F 593; with hex nuts, ASTM F 594; and, where indicated, flat washers; Alloy Group 1.
- D. Anchor Bolts: ASTM F 1554, Grade 36, of dimensions indicated; with nuts, ASTM A 563; and, where indicated, flat washers.
 - 1. Hot-dip galvanize or provide mechanically deposited, zinc coating where item being fastened is indicated to be galvanized.
- E. Eyebolts: ASTM A 489.
- F. Machine Screws: ASME B18.6.3.
- G. Lag Screws: ASME B18.2.1.
- H. Wood Screws: Flat head, ASME B18.6.1.
- I. Plain Washers: Round, ASME B18.22.1.
- J. Lock Washers: Helical, spring type, ASME B18.21.1.
- K. Cast-in-Place Anchors in Concrete: Either threaded type or wedge type unless otherwise indicated; galvanized ferrous castings, either ASTM A 47/A 47M malleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as needed, all hot-dip galvanized per ASTM F 2329.
- L. Post-Installed Anchors: Torque-controlled expansion anchors.
 - 1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, unless otherwise indicated.
 - 2. Material for Exterior Locations and Where Stainless Steel is Indicated: Alloy Group 1 stainless-steel bolts, ASTM F 593, and nuts, ASTM F 594.

2.4 MISCELLANEOUS MATERIALS

- A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.
- B. Low-Emitting Materials: Paints and coatings shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

- C. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.
 - 1. Use primer containing pigments that make it easily distinguishable from zinc-rich primer.
- D. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.
- E. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.
- F. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

2.5 FABRICATION, GENERAL

- A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- D. Form exposed work with accurate angles and surfaces and straight edges.
- E. Weld corners and seams continuously to comply with the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous.
- G. Fabricate seams and other connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
- H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.
- I. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.
 - 1. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, 1/8 by 1-1/2 inches, with a minimum 6-inch embedment and 2-inch hook, not less than 8 inches from ends and corners of units and 24 inches o.c., unless otherwise indicated.

2.6 MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.
- B. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.
 - 1. Fabricate units from slotted channel framing where indicated.
 - 2. Furnish inserts for units installed after concrete is placed.
- C. Galvanize miscellaneous framing and supports where indicated.
- D. Prime miscellaneous framing and supports with zinc-rich primer where indicated.

2.7 MISCELLANEOUS STEEL TRIM

- A. Unless otherwise indicated, fabricate units from steel shapes, plates, and bars of profiles shown with continuously welded joints and smooth exposed edges. Miter corners and use concealed field splices where possible.
- B. Provide cutouts, fittings, and anchorages as needed to coordinate assembly and installation with other work.
- C. Galvanize exterior miscellaneous steel trim.

2.8 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Finish metal fabrications after assembly.
- C. Finish exposed surfaces to remove tool and die marks and stretch lines, and to blend into surrounding surface.

2.9 STEEL AND IRON FINISHES

- A. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A 153/A 153M for steel and iron hardware and with ASTM A 123/A 123M for other steel and iron products.
 - 1. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.
- B. Shop prime iron and steel items not indicated to be galvanized unless they are to be embedded in concrete, sprayed-on fireproofing, or masonry, or unless otherwise indicated.
 - 1. Shop prime with universal shop primer.
- C. Preparation for Shop Priming: Prepare surfaces to comply with SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."

- D. Shop Priming: Apply shop primer to comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.
 - 1. Stripe paint corners, crevices, bolts, welds, and sharp edges.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.
- C. Field Welding: Comply with the following requirements:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.
- E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.
- F. Corrosion Protection: Coat concealed surfaces of aluminum that will come into contact with grout, concrete, masonry, wood, or dissimilar metals with the following:
 - 1. Cast Aluminum: Heavy coat of bituminous paint.
 - 2. Extruded Aluminum: Two coats of clear lacquer.

3.2 INSTALLING MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.
- B. Anchor supports for operable partitions securely to and rigidly brace from building structure.
- C. Support steel girders on solid grouted masonry, concrete, or steel pipe columns. Secure girders with anchor bolts embedded in grouted masonry or concrete or with bolts through top plates of pipe columns.
 - 1. Where grout space under bearing plates is indicated for girders supported on concrete or masonry, install as specified in "Installing Bearing and Leveling Plates" Article.

- D. Install pipe columns on concrete footings with grouted baseplates. Position and grout column baseplates as specified in "Installing Bearing and Leveling Plates" Article.
 - 1. Grout baseplates of columns supporting steel girders after girders are installed and leveled.

3.3 ADJUSTING AND CLEANING

- A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
 - 1. Apply by brush or spray to provide a minimum 2.0-mil dry film thickness.
- B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

END OF SECTION 05 50 00

DIVISION 6 – WOOD, PLASTICS AND COMPOSITES

SECTION 06 15 33

DECKING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Plastic/composite decking.
 - 2. Preservative treated lumber

1.2 DEFINITIONS

- A. Boards: Lumber of less than 2 inches nominal (38 mm actual) in thickness and 2 inches nominal (38 mm actual) or greater in width.
- B. Dimension Lumber: Lumber of 2 inches nominal (38 mm actual) or greater but less than 5 inches nominal (114 mm actual) in least dimension.
- C. Timber: Lumber of 5 inches nominal (114 mm actual) or greater in least dimension.
- D. Lumber grading agencies, and the abbreviations used to reference them, include the following:
 - 1. NeLMA: Northeastern Lumber Manufacturers' Association.
 - 2. NLGA: National Lumber Grades Authority.
 - 3. WCLIB: West Coast Lumber Inspection Bureau.
 - 4. WWPAA: Western Wood Products Association.

1.3 ACTION SUBMITTALS

- A. Product Data: For preservative-treated wood products, plastic/composite decking and metal framing anchors.
 - 1. For preservative-treated wood products. Include chemical treatment manufacturer's written instructions for handling, storing, installing, and finishing treated material.
 - 2. For plastic/composite decking and metal framing anchors. Include installation instructions.
- B. Samples: For plastic decking, not less than 24 inches (600 mm) long, showing the range of variation to be expected in appearance of decking, including surface texture.

1.4 INFORMATIONAL SUBMITTALS

- A. Material Certificates:
 - 1. For lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by ALSC's Board of Review.
 - 2. For preservative-treated wood products. Indicate type of preservative used and net amount of preservative retained. For products receiving a waterborne treatment, include statement that

moisture content of treated materials was reduced to levels specified before shipment to Project site.

3. For plastic/composite decking. Indicate product and manufacturers installation recommendations.
- B. Certificates of Inspection: Issued by lumber grading agency for exposed wood products not marked with grade stamp.
- C. Evaluation Reports: For the following, from ICC-ES:
 1. Preservative-treated wood products.
 2. Plastic decking.
 3. Expansion anchors.
 4. Metal framing anchors.
 5. Decking fasteners.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store materials under cover and protected from weather and contact with damp or wet surfaces. Stack lumber flat with spacers between each bundle to provide air circulation. Provide for air circulation around stacks and under coverings.
- B. Handle and store plastic lumber to comply with manufacturer's written instructions.

PART 2 - PRODUCTS

2.1 LUMBER, GENERAL

- A. Comply with DOC PS 20 and with grading rules of lumber grading agencies certified by ALSC's Board of Review as applicable. If no grading agency is indicated, comply with the applicable rules of any rules-writing agency certified by ALSC's Board of Review.
 1. Factory mark each item with grade stamp of grading agency.
 2. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry wood products.
 3. Provide dressed lumber, S4S, unless otherwise indicated.
- B. Maximum Moisture Content:
 1. Boards: 15 percent.
 2. Dimension Lumber: 15 percent.
 3. Timber: 19 percent.

2.2 PRESERVATIVE-TREATED LUMBER

- A. Pressure treat boards and dimension lumber with waterborne preservative in accordance with AWP A U1; Use Category UC3b for exterior construction not in contact with the ground, and Use Category UC4a for items in contact with the ground.

- B. Pressure treat timber with waterborne preservative in accordance with AWP A U1; Use Category UC4a.
- C. Pressure treat poles with waterborne preservative in accordance with AWP A U1; Use Category UC4a.
- D. Preservative Chemicals: Acceptable to authorities having jurisdiction.
 - 1. Do not use chemicals containing arsenic or chromium.
- E. Use process for boards and dimension lumber that includes water-repellent treatment.
- F. Use process for boards and dimension lumber that does not include water repellents or other substances that might interfere with application of indicated finishes.
- G. After treatment, redry boards dimension lumber timber to 19 percent maximum moisture content.
- H. Mark treated wood with treatment quality mark of an inspection agency approved by ALSC's Board of Review.
 - 1. For items indicated to receive a stained or natural finish, mark each piece on surface that will not be exposed.
- I. Application: Treat all wood unless otherwise indicated.
 - 1. Framing members.
 - 2. Members in contact with soil masonry or concrete.

2.3 PLASTIC/COMPOSITE DECKING

- A. Plastic Lumber, General: Products acceptable to authorities having jurisdiction with current model code evaluation reports that show compliance with building code in effect for Project for indicated type of construction.
 - 1. Allowable loads and spans, as documented in evaluation reports or in information referenced in evaluation reports, are not to be less than design loads and spans indicated.
- B. Composite Plastic Lumber: Solid shapes made from a mixture of cellulose fiber and polyethylene or polypropylene.
 - 1. Product: Trex Transcend.
 - 2. Decking Size: As indicated on plan.
 - 3. Surface Texture: Woodgrain.
 - 4. Color: As selected by Architect from manufacturer's full range.

2.4 FASTENERS

- A. General: Provide fasteners of size and type indicated, acceptable to authorities having jurisdiction, and that comply with requirements specified in this article for material and manufacture. Provide nails or screws, in sufficient length, to penetrate not less than 1-1/2 inches (38 mm) into wood substrate.
 - 1. Use stainless steel unless otherwise indicated.
 - 2. For pressure-preservative-treated wood, use stainless steel fasteners.
 - 3. For composite plastic wood decking, use stainless steel fasteners.

- B. Nails: ASTM F1667.
- C. Power-Driven Fasteners: ICC-ES AC70.
- D. Wood Screws and Lag Screws: ASME B18.2.1, ASME B18.6.1, or ICC-ES AC233.
- E. Carbon-Steel Bolts: ASTM A307 (ASTM F568M) with ASTM A563 (ASTM A563M) hex nuts and, where indicated, flat washers all hot-dip zinc coated.
- F. Stainless Steel Bolts: ASTM F593, Alloy Group 1 or 2 (ASTM F738M, Grade A1 or Grade A4); with ASTM F594, Alloy Group 1 or 2 (ASTM F836M, Grade A1 or Grade A4) hex nuts and, where indicated, flat washers.

2.5 METAL FRAMING ANCHORS

- A. Allowable Design Loads: Provide products with allowable design loads, as published by manufacturer, that meet or exceed those indicated on Drawings. Manufacturer's published values are to be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.
- B. Galvanized-Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A653/A653M, G185 (Z550) coating designation.
- C. Stainless Steel Sheet: ASTM A240/A240M or ASTM A666, Type 316.
- D. Joist Hangers: As indicated on plans.
- E. Top Flange Hangers: As indicated on plans.
- F. Post Bases: As indicated on plans.
- G. Joist Ties: As indicated on plans.

PART 3 - EXECUTION

3.1 EXAMINATION

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

3.2 PREPARATION

- A. Clean substrates of projections and substances detrimental to application.
- B. Stain wood indicated to be stained, including both faces and edges. Cut to required lengths and stain ends.

3.3 INSTALLATION, GENERAL

- A. Set work to required levels and lines, with members plumb, true to line, cut, and fitted. Fit work to other construction; scribe and cope as needed for accurate fit.
- B. Framing Standard: Comply with AF&PA WCD1 unless otherwise indicated.
- C. Install plastic lumber to comply with manufacturer's written instructions.
- D. Secure decking to framing with screws.
- E. Install metal framing anchors to comply with manufacturer's written instructions.
- F. Do not splice structural members between supports unless otherwise indicated.
- G. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.
- H. Sort and select lumber so that natural characteristics do not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of members or pieces that are too small to use with minimum number of joints or optimum joint arrangement.
- I. Apply copper naphthenate field treatment to comply with AWPA M4, to cut surfaces of preservative-treated lumber.
- J. Securely attach exterior rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
 - 1. ICC-ES AC70 for power-driven fasteners.
 - 2. "Fastening Schedule" in ICC's International Building Code.
 - 3. "Fastener Schedule for Structural Members" and "Alternate Attachments" in ICC's International Residential Code for One- and Two-Family Dwellings.
- K. Use common wire nails unless otherwise indicated. Select fasteners of size that do not fully penetrate members where opposite side is exposed to view. Make tight connections between members. Install fasteners without splitting wood; do not countersink nail heads unless otherwise indicated.
- L. For exposed work, arrange fasteners in straight rows parallel with edges of members, with fasteners evenly spaced and with adjacent rows staggered.

3.4 INSTALLATION OF ELEVATED DECK JOIST FRAMING

- A. General: Install joists with crown edge up and support ends of each member with not less than 1-1/2 inches (38 mm) of bearing on wood or metal, or 3 inches (76 mm) on masonry. Attach floor joists where framed into wood supporting members by using wood ledgers as indicated or, if not indicated, by using metal joist hangers. Do not notch joists.
- B. Frame openings with headers and trimmers supported by metal joist hangers; double headers and trimmers where span of header exceeds 48 inches (1200 mm).
- C. Lap members framing from opposite sides of beams or girders not less than 4 inches (102 mm,) or securely tie opposing members together. Provide solid blocking of 2-inch nominal (38-mm actual) thickness by depth of joist over supports.

- D. Provide solid blocking of 2-inch nominal (38-mm actual) thickness by depth of joist at intervals indicated on plans.

END OF SECTION 06 15 33

DIVISION 9 - FINISHES
SECTION 09 91 13
EXTERIOR PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Primers.
 - 2. Finish coatings.
 - 3. Sealers and paints.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include preparation requirements and application instructions.
 - 2. Indicate VOC content.
- B. Samples for Initial Selection: For each type of topcoat product.
- C. Samples for Verification: For each type of paint system and each color and gloss of topcoat.
 - 1. Submit Samples on rigid backing, 8 inches square.
 - 2. Apply coats on Samples in steps to show each coat required for system.
 - 3. Label each coat of each Sample.
 - 4. Label each Sample for location and application area.
- D. Product Schedule: Use same designations indicated on Drawings to cross-reference paint systems specified in this Section. Include color designations.

1.4 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Paint Products: 5 percent, but not less than 1 gal. of each material and color applied.

1.5 QUALITY ASSURANCE

- A. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
 - 1. COA representative will select one surface to represent surfaces and conditions for application of each paint system.
 - a. Vertical and Horizontal Surfaces: Provide samples of at least 50 sq. ft.
 - b. Other Items: Architect will designate items or areas required.
 - 2. Final approval of color selections will be based on mockups.
 - a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.
 - 3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F (7 deg C).
 - 1. Maintain containers in clean condition, free of foreign materials and residue.
 - 2. Remove rags and waste from storage areas daily.

1.7 FIELD CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F (10 and 35 deg C).
- B. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Dunn Edwards Paints
- B. Source Limitations: Obtain each paint product from single source from single manufacturer.

2.2 PAINT PRODUCTS, GENERAL

A. Material Compatibility:

1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer based on testing and field experience.
2. For each coat in a paint system, provide products recommended in writing by topcoat manufacturer for use in paint system and on substrate indicated.

B. Colors: As indicated on plans

2.3 PRIMERS

- ### A. Solvent-Based Bonding Primer: Pigmented, solvent-based primer formulated for exterior use and to seal substrates and promote adhesion of specified subsequent coatings.

2.4 FINISH COATINGS

- ### A. Exterior 100% Acrylic Latex Paint, Flat: Water-based, pigmented coating; formulated for alkali, mold, microbial, and water resistance and for use on exterior surfaces, such as portland cement plaster, concrete, and primed wood and masonry.

1. Spartashield, Evershield, or Acri-Build by Dunn Edwards
2. Gloss and Sheen: Manufacturer's standard flat finish

PART 3 - EXECUTION

3.1 EXAMINATION

- ### A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- ### B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
1. Concrete: 12 percent.
 2. Fiber-Cement Board: 12 percent.
 3. Masonry (Clay and Concrete Masonry Units): 12 percent.
 4. Wood: 15 percent.
 5. Portland Cement Plaster: 12 percent.
 6. Gypsum Board: 12 percent.
- ### C. Verify suitability of substrates, including surface conditions and compatibility, with finishes and primers.
- ### D. Proceed with coating application only after unsatisfactory conditions have been corrected.
1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions applicable to substrates and paint systems indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
 - 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.
- C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
 - 1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems specified in this Section.
- D. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceeds that permitted in manufacturer's written instructions.

3.3 INSTALLATION

- A. Apply paints in accordance with manufacturer's written instructions.
 - 1. Use applicators and techniques suited for paint and substrate indicated.
 - 2. Paint surfaces behind movable items same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items with prime coat only.
 - 3. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
 - 4. Primers specified in the Exterior Painting Schedule may be omitted on items that are factory primed or factory finished if compatible with intermediate and topcoat coatings and acceptable to intermediate and topcoat paint manufacturers.
- B. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- C. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- D. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:
 - 1. Paint the following work where exposed to view:
 - a. Equipment, including panelboards.
 - b. Uninsulated metal piping.
 - c. Uninsulated plastic piping.
 - d. Pipe hangers and supports.
 - e. Metal conduit.
 - f. Plastic conduit.

3.4 FIELD QUALITY CONTROL

- A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.
 - 1. Contractor shall touch up and restore painted surfaces damaged by testing.
 - 2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written instructions, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written instructions.

3.5 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
 - 1. Do not clean equipment with free-draining water and prevent solvents, thinners, cleaners, and other contaminants from entering into waterways, sanitary and storm drain systems, and ground.
 - 2. Dispose of contaminants in accordance with requirements of authorities having jurisdiction.
 - 3. Allow empty paint cans to dry before disposal.
 - 4. Collect waste paint by type and deliver to recycling or collection facility.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 EXTERIOR PAINTING SCHEDULE, MASONRY SUBSTRATES

- A. Concrete Masonry Unit Substrates:
 - 1. Latex System:
 - a. Prime Coat: Solvent-Based Bonding Primer.
 - b. Intermediate Coat: Matching topcoat.
 - c. Topcoat: Exterior 100% Acrylic latex paint, flat.

END OF SECTION 09 91 13

DIVISION 10– SPECIALTIES
SECTION 10 14 23
SIGNAGE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Signs.

B. Related Requirements:

1. Section 015639 " Tree and Plant Protection" for temporary protection-zone signage.

1.2 DEFINITIONS

A. Accessible: In accordance with the accessibility standard.

B. Illuminated: Illuminated by lighting source integrally constructed as part of the sign unit.

1.3 COORDINATION

A. Furnish templates for placement of sign-anchorage devices embedded in permanent construction.

B. Furnish templates for placement of electrical service embedded in permanent construction by other installers.

1.4 ACTION SUBMITTALS

A. Product Data:

1. Signs.

B. Shop Drawings: Signage.

1. Include fabrication and installation details and attachments to other work.
2. Show sign mounting heights, locations of supplementary supports to be provided by other installers, and accessories.
3. Show message list, typestyles, graphic elements, including raised characters, and layout for each sign at least half size.
4. Show locations of electrical service connections.
5. Include diagrams for power, signal, and control wiring.

C. Samples for Initial Selection: For each type of sign assembly, exposed component, and exposed finish.

1. Include representative Samples of available typestyles and graphic symbols.
 - D. Samples for Verification: For each type of sign assembly showing all components and with the required finish(es), in manufacturer's standard size unless otherwise indicated and as follows:
 1. Panel Signs: Not less than 12 inches (300 mm) square, including corner.
 2. Variable Component Materials: 8-inch (200-mm) Sample of each base material, character (letter, number, and graphic element) in each exposed color and finish not included in Samples above.
 3. Exposed Accessories: Half-size Sample of each accessory type.
 4. Full-size Samples, if approved, will be returned to Contractor for use in Project.
 - E. Product Schedule: For panel signs. Use same designations indicated on Drawings or specified.
- 1.5 INFORMATIONAL SUBMITTALS
- A. Qualification Data: For Installer and manufacturer.
 - B. Sample Warranty: For special warranty.
- 1.6 CLOSEOUT SUBMITTALS
- A. Maintenance Data: For signs to include in maintenance manuals.
- 1.7 QUALITY ASSURANCE
- A. Installer Qualifications: Manufacturer of products An entity that employs installers and supervisors who are trained and approved by manufacturer.
- 1.8 FIELD CONDITIONS
- A. Field Measurements: Verify locations of anchorage devices and electrical service embedded in permanent construction by other installers by field measurements before fabrication, and indicate measurements on Shop Drawings.
- 1.9 WARRANTY
- A. Special Warranty: Manufacturer agrees to repair or replace components of signs that fail in materials or workmanship within specified warranty period.
 1. Failures include, but are not limited to, the following:
 - a. Deterioration of finishes beyond normal weathering.
 - b. Deterioration of embedded graphic image.
 - c. Separation or delamination of sheet materials and components.
 2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SIGNS

- A. Sign with smooth, uniform surfaces; with message and characters having uniform faces, and precisely formed lines and profiles, and size as indicated in plans.
 - 1. Sign-Panel Perimeter: Finish edges smooth.
 - a. Edge Condition:
 - 1) Vertical Edges: As indicated on Drawings.
 - 2) Horizontal Edges: As indicated on Drawings.
 - b. Corner Condition in Elevation: As indicated on Drawings.
 - 2. Frame: As indicated on Drawings.
 - 3. Mounting: As indicated on Drawings.
 - 4. Surface Finish and Applied Graphics:
 - a. Integral Metal Finish: As indicated on Drawings.
 - b. Integral Aluminum Finish: As indicated on Drawings.
 - c. Integral Stainless Steel Finish: As indicated on Drawings.
 - d. Integral Sheet Color: As indicated on Drawings.
 - e. Baked-Enamel or Powder-Coat Finish and Graphics: Manufacturer's standard, in color as indicated by manufacturer's designation as selected by Architect from manufacturer's full range.
 - f. Painted Finish and Graphics: Manufacturer's standard, factory-applied exterior-grade sign paint acrylic polyurethane, in color as indicated by manufacturer's designation matching Architect's sample.
 - g. Photo-Image Graphics: Manufacturer's standard multicolor, 600-dpi halftone or dot-screen image.
 - h. Overcoat: Manufacturer's standard baked-on clear coating.
 - 5. Text and Typeface: Typeface matching Architect's sample variable content as scheduled.
 - 6. Flatness Tolerance: Sign is to remain flat or uniformly curved under installed conditions as indicated on Drawings and within a tolerance of plus or minus 1/16 inch (1.5 mm) measured diagonally from corner to corner.

2.2 SIGN MATERIALS

- A. Materials as indicated on plans.

2.3 ACCESSORIES

- A. Fasteners and Anchors: Manufacturer's standard as required for secure anchorage of signs, noncorrosive and compatible with each material joined, and complying with the following unless otherwise indicated:
1. Use concealed fasteners and anchors unless indicated to be exposed.
 2. For exterior exposure, furnish stainless steel devices unless otherwise indicated.
 3. Exposed Metal-Fastener Components, General:
 - a. Fabricated from same basic metal and finish of fastened metal unless otherwise indicated.
 - b. Fastener Heads: For nonstructural connections, use flathead screws and bolts with tamper-resistant Allen-head slots unless otherwise indicated.
 4. Sign Mounting Fasteners:
 - a. Concealed Studs: Concealed (blind), threaded studs welded or brazed to back of sign material or screwed into back of sign assembly unless otherwise indicated.
 - b. Projecting Studs: Threaded studs with sleeve spacer, welded or brazed to back of sign material or screwed into back of sign assembly, unless otherwise indicated.
 - c. Through Fasteners: Exposed metal fasteners matching sign finish, with type of head indicated, and installed in predrilled holes.
 5. Inserts: Furnish inserts to be set by other installers into concrete or masonry work.

2.4 FABRICATION

- A. General: Provide manufacturer's standard sign assemblies according to requirements indicated.
1. Preassemble signs in the shop to greatest extent possible. Disassemble signs and assemblies only as necessary for shipping and handling limitations. Clearly mark units for reassembly and installation; apply markings in locations concealed from view after final assembly.
 2. Mill joints to a tight, hairline fit. Form assemblies and joints exposed to weather to resist water penetration and retention.
 3. Comply with AWS for recommended practices in welding and brazing. Provide welds and brazes behind finished surfaces without distorting or discoloring exposed side. Clean exposed welded and brazed connections of flux, and dress exposed and contact surfaces.
 4. Conceal connections if possible; otherwise, locate connections where they are inconspicuous.
 5. Internally brace signs for stability, to meet structural performance loading without oil-canning or other surface deformation, and for securing fasteners.
 6. Provide rabbets, lugs, and tabs necessary to assemble components and to attach to existing work. Drill and tap for required fasteners. Use concealed fasteners where possible; use exposed fasteners that match sign finish.

2.5 GENERAL FINISH REQUIREMENTS

- A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- C. Directional Finishes: Run grain with long dimension of each piece and perpendicular to long dimension of finished trim or border surface unless otherwise indicated.

- D. Organic, Anodic, and Chemically Produced Finishes: Apply to formed metal after fabrication but before applying contrasting polished finishes on raised features unless otherwise indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Verify that sign-support surfaces are within tolerances to accommodate signs without gaps or irregularities between backs of signs and support surfaces unless otherwise indicated.
- C. Verify that anchorage devices embedded in permanent construction are correctly sized and located to accommodate signs.
- D. Verify that electrical service is correctly sized and located to accommodate signs.
- E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Install signs using mounting methods indicated and according to manufacturer's written instructions.
 - 1. Install signs level, plumb, true to line, and at locations and heights indicated, with sign surfaces free of distortion and other defects in appearance.
 - 2. Install signs so they do not protrude or obstruct according to the accessibility standard.
 - 3. Before installation, verify that sign surfaces are clean and free of materials or debris that would impair installation.
 - 4. Corrosion Protection: Coat concealed surfaces of exterior aluminum in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.
- B. Accessible Signage: Install in locations on walls as indicated on Drawings.

3.3 ADJUSTING AND CLEANING

- A. Remove and replace damaged or deformed signs and signs that do not comply with specified requirements. Replace signs with damaged or deteriorated finishes or components that cannot be successfully repaired by finish touchup or similar minor repair procedures.
- B. Remove temporary protective coverings and strippable films as signs are installed.
- C. On completion of installation, clean exposed surfaces of signs according to manufacturer's written instructions, and touch up minor nicks and abrasions in finish. Maintain signs in a clean condition during construction and protect from damage until acceptance by Owner.

END OF SECTION 10 14 23

DIVISION 10 - SPECIALTIES

SECTION 10 73 00.1

SPECIALTIES MANUFACTURER OF PROTECTIVE COVERS

PART 1 - GENERAL

1.01 DESCRIPTION OF PRODUCT

- A. Shelter Type: **16'x16' Custom style shelter.**
 - 1. Roof Slope: **0:12**
 - 2. Clear height under Tie Beam (UTB): **9'-6"**. This is the clearance under the tie beam which spans between the columns.
- B. Shelter Type: **16'x16' Custom style shelter.**
 - 1. Roof Slope: **0:12**
 - 2. Clear height under Tie Beam (UTB): **8'-6"**. This is the clearance under the tie beam which spans between the columns
- C. Shelter Type: **12' Entry Arch style shelter with bench swing.**
 - 1. Roof Slope: **0:12**
 - 2. Clear height under Tie Beam (UTB): **8'-0"**. This is the clearance under the tie beam which spans between the columns.

1.02 REFERENCES

- A. REFERENCED STANDARDS
 - 1. AISC – American Institute of Steel Construction
 - a. AISC Steel Construction Manual – 14th edition
 - b. AISC 360-10 Specification for Structural Steel Buildings
 - 2. ASTM – American Society for Testing and Materials
 - a. ASTM A36/A36M – Standard Specification for Carbon Structural Steel; 2008
 - b. ASTM A325 – Standard Specification for Structural Steel Bolts, Heat Treated, 120/105 ksi Minimum Tensile Strength; 2010
 - c. ASTM A563 – Standard Specification for Carbon and Alloy Steel Nuts; 2007a
 - d. ASTM A500 – Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2010a
 - e. ASTM A653/A653M – Standard Specification for Sheet Steel, Zinc-Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvanealed) by the Hot Dip Process; 2010
 - f. ASTM A792/A792M – Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy Coated by the Hot-Dip Process; 2010
 - g. ASTM F1554 – Standard Specification for Anchor Bolts, Steel, 36, 50 and 105 ksi Yield Strength; 2007a
 - 3. AWS – American Welding Society
 - a. D1.1
 - b. D1.3
 - c. D1.8
 - 4. OSHA – Occupational Safety and Health Administration
 - a. Steel Erection Standard 29 CFR 1926.750 Part R
 - 5. SSPC – Steel Structures Painting Council
 - a. SSPC-SP 2 – Hand Tool Cleaning; 2004
 - b. SSPC-SP 10/NACE No. 2 – Near White Blast Cleaning; 2007

6. LEED – Leadership in Energy and Environmental Design
7. ISO – International Organization for Standardization

1.03 SYSTEM DESCRIPTION

- A. The structure shall be a pre-engineered package and shall be shipped as a pre-cut (excluding standing seam roof panels) and pre-fabricated package that shall include the structural framing members, roof panels, fasteners and roof trim as well as job specific installation instructions. The structure will be shipped in an un-assembled package for ease of shipment and minimum shipping charges.

1.04 SUBMITTALS

- A. Submit a minimum of four (4) sets of submittal drawings signed and sealed by a Professional Engineer licensed in the state of California.
- B. PRODUCT DESIGN REQUIREMENTS:
 1. The structure shall meet the following design requirements:
 - a. Building Code: 2019 California Building Code
 - b. Ground Snow Load: 20 p.s.f.
 - c. Live Load: 20 p.s.f.
 - d. Wind Speed: 85 m.p.h. Exp “C”
 - e. Seismic Design Category: D
- C. SUBMITTAL REQUIREMENTS
 1. Calculations:
 - a. Design according to the requirements of the national, state or local building codes as indicated in Section 1.04.B.
 - b. Calculations shall include all member design for each different member type.
 - c. Connection design for each different connection that will determine the design of the bolts, welds, plate thickness and anchorage to the foundation.
 - d. Foundation design shall be for the loads applied, not a generic foundation design, while taking into account all soils information.
 2. Submittal Drawings:
 - a. Anchor bolt layout with all appropriate dimensions for installation.
 - b. Site specific foundation design.
 - c. Isometric as well as elevation and plan views of the framing members along with the member sizes and locations indicated on the drawings.
 - d. Connection details for every connection on the frame.
 - e. Roof panel connections and trim installation details.
 - f. All accessories on the structure shall have an installation detail as well as connection details.
- D. FOUNDATION DESIGN
 1. The foundation design shall be supplied by the manufacturer.
 2. Anchor bolts shall be supplied by the manufacturer.
 3. Foundation materials and labor shall be provided by the structure contractor.
 4. Owner should provide site specific soils information for proper foundation design, if that data is not provided the foundation will be design for the minimum soil values allowed by code.

1.05 QUALITY ASSURANCE

- A. MANUFACTURER QUALIFICATIONS

1. The product shall be designed, engineered and fabricated at a facility operated and directly supervised by the manufacturer.
2. The manufacturer shall have a minimum of 15 years in steel shelter fabrication.
3. Full Time on Staff Quality Assurance Manager.
4. All welders must be AWS certified for welding steel structures.
5. Membership in the American Welding Society (AWS).
6. Membership in the American Institute of Steel Construction (AISC).
7. Full Time on Staff Licensed Engineer.
8. Published Quality Control System manual.
9. Quality Control System must pass an annual audit by a Third Part Agency.
10. ISO 9001 certification for Powder Coating System.

B. MANUFACTURER'S CERTIFICATIONS

1. Clark County, NV Approved Fabricator.
2. City of Riverside, CA Approved Fabricator.
3. City of Houston, TX Approved Fabricator Structural Steel.
4. City of Los Angeles, CA Approved Fabricator Structural Steel

1.06 FIELD OR SITE CONDITIONS

- A. Foundations shall be installed per the ICON installation drawings.
 1. All foundations shall be cast at the same elevation unless specifically noted on the ICON installation drawings.
- B. Anchor bolts shall be placed in the foundation as per the ICON installation drawings utilizing the anchor bolt template supplied with the anchor bolts.
 1. Anchor bolts shall be installed per the dimensions and orientation shown on the drawings.

1.07 MANUFACTURER WARRANTY

- A. Shelter shall have a 10-year limited warranty on the steel framing members.
- B. Shelter shall have a 10-year limited warranty on the powder-coated elements
- C. For all Metal Roofing there will be a pass-through warranty direct from the metal Roofing supplier, warranty shall be provided on request.

2.01 SHELTER SYSTEM AND MATERIALS

A. MANUFACTURERS:

1. Acceptable Manufacturer: ICON Shelter Systems, Inc., 1455 Lincoln Rd., Holland, MI, 49423.
Email: info@iconshelters.com, Website: www.iconshelters.com.
2. Pricing for this specific project and specified shelter can be requested from:
 - 1) Chad Barry
1804 Garnet Avenue 748
San Diego, CA 92109
951-541-8380
cbarry@uniquerecreationinc.com
3. The product shall be designed and fabricated at a facility operated and directly supervised by the manufacturer.

B. PRODUCT REQUIREMENTS AND MATERIALS:

1. GENERAL:

- a. The pre-engineered and pre-fabricated package of parts shall be pre-cut and packaged unless noted otherwise. These packages will include all parts and pieces necessary to field assemble the shelter at the jobsite. The shelter shall be shipped in knocked down format to minimize shipping expenses. Field labor will be kept to a minimum with no on-site welding required.

2. CONCRETE FOR FOUNDATIONS:

- a. Concrete shall have a minimum 28-day compressive strength of 2,500 psi unless noted otherwise on the foundation detail.
- b. Reinforcing steel shall be ASTM A615, Grade 60.

3. COLUMNS:

- a. Hollow Structural Section (HSS) columns shall meet ASTM A500, Grade B with a minimum wall thickness of 3/16" (0.1875").
- b. Unless the columns are direct buried in the foundation the columns shall attach to the foundation with a minimum of four (4) anchor rods and shall meet OSHA Steel Erection Standard 29 CFR 1926.755(a)(1).

4. STRUCTURAL FRAMING:

- a. All Hollow Structural Sections (HSS) shall meet ASTM A500, Grade B. "I" Beams, tapered columns or open channel sections shall not be accepted for primary members.

5. COMPRESSION RINGS:

- a. Compression rings shall be made of ASTM A36 structural plate or of structural channel welded together to form the ring. All connections not requiring compression rings shall use ASTM A500, Grade B HSS sections for these connections.

6. CONNECTION REQUIREMENTS:

- a. Anchor rods shall be ASTM F1554, Grade 36 unless otherwise noted.
- b. Structural fasteners shall be ASTM A325 high strength bolts and A563 nuts.
- c. All structural fasteners shall be hidden within the framing members whenever possible.
- d. No field welding shall be required to finish the construction of the shelter.
- e. Manufacturer shall supply extra fasteners.

7. FACTORY FRAME FINISH:

- a. E-COAT/ POWDERCOAT:
 - 1) The steel shall be shot-blasted to the specification of SSPC-SP10 near white blast cleaning. SSPC-SP2 hand tool cleaning will not be an acceptable alternative.
 - 2) The shot-blasted parts are then washed with zinc-phosphate in an eight (8) stage washer.
 - 3) The steel is then immersed in a liquid epoxy and coated through an electro-deposition process (E-coat), this is coated both inside and out to a uniform cover of 0.7-0.9 mils. The E-coat totally encapsulates the part for superior corrosion protection.
 - 4) The parts are then coated with a color coat of TGIC polyester powder and then one clear coat for a final finish thickness of 8 to 12 mils.

PART 3 - EXECUTION

3.01 STORAGE AND HANDLING

- A. When the shelter arrives at the jobsite protect the products from weather, sunlight and damage.
- B. When unloading, pad the forks and use other precautions to protect the powder-coated finish. Do not use chains to move the materials, use straps. Handle all materials carefully in the field to avoid scratching the powder-coat finish.
- C. Contractor shall store the product elevated from the soil to allow full air circulation around the materials as do not introduce mold, decay, fungi or insects into or on the materials. One end of the

materials shall be elevated higher than the other end if storage will be longer than a few days as to allow the water to run off the materials.

3.02 INSTALLATION OF MATERIALS

- A. The shelter shall be placed on prepared foundations that were designed by the manufacturer (unless otherwise noted). Materials for these foundations are not supplied by ICON but by the foundation installation contractor. Foundation shall be constructed to all local building code requirements and per good construction practices for the specific site conditions.
 - 1. In accordance with OSHA Steel Erection Standard 29 CFR 1926.750 Part R, anchor rods shall be installed for proper column stability and shall have a minimum of four (4) anchor bolts per column. Therefore, no single anchor rod column base connections shall be allowed.
- B. The contractor shall install all parts and pieces per the manufacturer's supplied installation instructions and these specifications.
- C. The interface with other work required is to be coordinated by the customer or the customer's agent. Some design may have electrical or plumbing requirements that are not supplied by ICON.
- D. Tolerances on structural steel members are set according to AISC Code of Standard Practice for Steel Buildings and Bridges and have been used for the fabrication of this product. These tolerances will not and cannot be increased. No field slotting or opening of holes will be allowed without proper guidance from the ICON Engineering Department.

3.03 REPAIR

- A. No field modifications or corrections are allowed without authorization from the ICON Engineering Department.

3.04 SITE QUALITY CONTROL

- A. ICON does not require any on-site inspections or testing but these may be required by local authorities and the local building inspector. Please be aware of any on-site requirements prior to starting installation.

END OF SECTION

DIVISION 11 - EQUIPMENT
SECTION 11 68 13
PLAYGROUND AND FITNESS EQUIPMENT

PART 1-GENERAL

1.01 SCOPE OF WORK

- A. Materials, labor and equipment for complete installation of play equipment as shown on the Plans.

1.02 RELATED SECTIONS

- A. 32 18 16 PLAY SURFACING

1.03 QUALITY ASSURANCE

- A. Licensing: Contractor's license for play equipment installers shall be either "A" or "C61-D34."
- B. Playground and fitness equipment must be installed by a manufacturer certified installer and be installed in accordance with the manufacturer's installation specifications. Installation crew leader must be CPSI certified. A Manufacturer's Representative must inspect the final installation prior to acceptance. Manufacturer's representative must be a Certified Playground Safety Inspector and not employed by the installer.
- C. Contractor shall provide materials, install play equipment, and construct playground areas in accordance with the following standards and guidelines. In case of conflict, the most restrictive-and highest quality standards and guidelines shall apply to the work.
1. "Standard Consumer Safety Performance Specification for Playground Equipment for Public Use," ASTM F1487-98, published by the American Society for Testing and Materials (ASTM).
 2. "Standard Specification for Impact Attenuation of Surface Systems Under and Around Playground Equipment," ASTM F1292-99.
 3. "Standard Specification for Determination of Accessibility of Surface Systems Under and Around Playground Equipment," ASTM F1 951-99.
 4. U.S. Consumer Products Safety Commission, *Handbook for Public Playground Safety*, published by the Consumer Product Safety Commission (CPSC), latest edition.
 5. "Americans with Disabilities Act" Accessibility Guidelines (ADAAG).
 6. All products shall bear the certification seal of the International Play Equipment Manufacturers Association (IPEMA).
 7. All designs shall meet or exceed the Americans with Disabilities Act (ADA) "Final Accessibility Guidelines for Play Areas" regulations as published on October 18, 2000.
 8. All manufacturers must be ISO 9001 certified.
- D. References and Standards
- **CPSC:** Consumer Product Safety Commission
 - **IPEMA:** International Playground Equipment Manufacturers Association
 - **ADA:** Americans with Disabilities Act
 - **ISO:** International Organization for Standardization
- E. Installation of play and fitness equipment and resilient surfacing shall be in full conformance with California Administrative Code Title 24 disabled access requirements.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Play area and fitness equipment and materials shall be ordered and delivered to the job site, and protected from construction operations and vandalism throughout the construction of the project.
- B. Damaged, vandalized or broken equipment and materials shall be cause for rejection as determined by the City's representative.

1.05 GUARANTEES AND WARRANTIES

- A. Contractor shall provide manufacturers' written certification that play equipment, resilient fill, and accessible resilient surfacing have been installed in accordance with manufacturers' recommendations and Contract Documents.
- B. Contractor shall provide the City with manufacturers' written warranties for accessible resilient surfacing and play equipment.
- C. The equipment manufacturer shall warrant material and workmanship against defects, from the date of shipment, for the period of time as follows:
 - 1. Landscape Structures (LSI) Play Structures and Components:
 - a. **100-YEAR LIMITED WARRANTY**
On all PlayBooster®, PlayShaper® and PlaySense® aluminum posts, stainless steel fasteners, clamps, beams and caps, against structural failure due to corrosion/natural deterioration or manufacturing defects, and on PlayBooster, Evos™ and Weevos™ steel posts and arches against structural failure due to material or manufacturing defects.
 - b. **15-YEAR LIMITED WARRANTY**
On all plastic components (including TuffTimbers™ edging), all steel components (except 100-year steel posts), Mobius® climbers, decks and TenderTuff™ coatings (except Wiggle Ladders, Chain Ladders and Swing Chain) against structural failure due to material or manufacturing defects. TuffTurf® tiles against material or manufacturing defects.
 - c. **10-YEAR LIMITED WARRANTY**
On concrete products against structural failure due to natural deterioration or manufacturing defects. Does not cover minor chips, hairline cracks or efflorescence.
 - d. **8-YEAR LIMITED WARRANTY**
On Aeronet™ climbers and climbing cables against defects in materials or manufacturing defects. On CoolToppers® fabric against failure from significant fading, deterioration, breakdown, mildew, outdoor heat, cold or discoloration. This warranty is limited to the design loads as stated in the specifications found in the technical information.
 - e. **3-YEAR LIMITED WARRANTY**
On all other parts, i.e.: CableCore® products, swing seats and hangers, grills, Mobius climber handholds, Wiggle Ladders, Chain Ladders and Swing Chain, Track Ride trolleys and bumpers, all rocking equipment including Sway Fun® gliders, PVC belting material, HealthBeat™ hydraulic cylinders, Seesaws, Wiggle Ring Bridge, etc., against failure due to corrosion/natural deterioration or manufacturing defects.
 - 2. Greenfield Fitness Equipment
 - a. Limited 10-year warranty on main posts and metal structures

- b. Limited 5-year warranty on moving parts, bearings, seats, backrests and HDPE panels
 - c. Limited 3-year warranty on hydraulic pistons
 - d. Limited 2-year warranty on footrests, armrests, rubber parts, belts, chains, rings, other grips, and polyurethane components.
 - e. Limited 1-year warranty on battle ropes, climbing ropes, suspension trainers, and cargo nets.
- D. The Contractor shall guarantee installation workmanship for a period of one year from the date of Substantial Completion of the Project. The Contractor shall be responsible for coordinating manufacturer material warranty items with the manufacturer/distributor and for the installation of replacement material(s) at no additional cost to the owner.
- E. Provide copy of contractor's installation warranty on company letterhead.

1.06 SUBMITTALS

- A. Contractor shall provide the following materials for review and acceptance by the City's representative.
 - 1. Equipment Product Data: The Contractor shall submit within ten (10) calendar days after receipt of Notice to Proceed, five (5) complete sets of the material and equipment submittals, including:
 - a. Equipment Manufacturer and Manufacturer's Representative's name(s) and address(s)
 - b. Plan view drawings with model numbers; descriptive labels (including component names,) deck heights, and notations of compliance with CPSC, ASTM F1487-98 and ADA.
 - c. Detailed component list with model numbers and catalog descriptions
 - d. Color Chart
 - e. Written material specifications for all components
 - f. IPEMA certification certificate from the IPEMA Website
 - g. Copy of Manufacturer Warranty in Certificate format
 - h. Copy of Manufacturer's ISO 9001 Certification
 - 2. Approval of the submittals shall be the Contractor's authorization to order the required material and equipment. There will be no deviation from the approved submittals without the written authorization of the Owner's representative.

1.07 STAKING

- A. Contractor shall provide staking and layout at the site for placement of play equipment. Safety zones shall be evaluated and accepted by the City's and manufacturer's representatives prior to play equipment installation. A building inspector shall review and approve the footing locations prior to installation of the concrete pour for the footings.

1.08 SAFETY

- A. Contractor shall provide for the complete protection and closure of play areas during and after installation, throughout the maintenance period until final acceptance, and at no additional cost to the City. Any injury, claim or vandalism arising from the insufficient closure and protection of the play areas shall be responsibility of the Contractor.

1.09 AVAILABILITY AND ORDERING OF SPECIFIED ITEMS

- A. Availability: Verify prior to bidding that all specified items, including but not limited to play equipment, accessible resilient surfacing, structures, and park furnishings will be available in time for installation during orderly and timely progress of the work.

In the event specified item or items will not be available, notify the City prior to receipt of bids.

- B. Ordering: Specified items shall be ordered within 10 days of receipt of the "Notice To Proceed." Provide written evidence of timely ordering of specified items to the Resident Engineer.

PART 2-PRODUCTS

2.01 FITNESS EQUIPMENT

Fitness equipment shall be in accordance with Construction Legend and Construction plans or approved substitution.

- A. Fitness equipment by Greenfield Fitness shall be as specified on the plans, and shall include the following components.
- Back Extension Model #UBX249
 - Recumbent Bike, Model #UBX249
 - Tricep Press Model #UBX244W
 - 2-Person Accessible Chest Press, Model #SGR048AW
 - Leg Extension and Curl, Model #UBX221
 - Stepper, Model #UBX292
 - Accessible Rower, Model #UBX290W

2.02 PLAYGROUND EQUIPMENT

Play equipment shall be in accordance with Construction Legend and Construction Plans, or approved substitution. The Following Equipment shall include all components from Coast Recreation Quote 1194783-02-09

- A. Material: All materials shall be structurally sound and suitable for safe play. Durability shall be ensured on all steel parts by the use of time-tested coatings such as zinc plating, galvanizing, ProShield® finish, TenderTuff® coating, etc. Colors shall be specified.
- B. Fasteners: Primary fasteners shall be socketed and pinned tamperproof in design, stainless-steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications). All primary fasteners shall include a locking patch type material that will meet the minimum torque requirements of IFI-125. Manufacturer to provide special tools for pinned tamperproof fasteners.
- C. TenderTuff Coating: Metal components to be TenderTuff coated shall be thoroughly cleaned in a hot phosphating wash system, then primed with a water-based thermosetting solution. Primed parts shall be preheated prior to dipping in UV stabilized, liquid polyvinyl chloride (PVC), then salt cured at approximately 400 degrees. The finished coating shall be approximately .080" thick at an 85 durometer with a minimum tensile strength of 1700 psi and a minimum tear strength of 250 lbs/inch. Standard colors are available, all with a matte finish.
- D. ProShield Finish: All metal components with ProShield finish shall be thoroughly cleaned and pretreated through a multi-stage wash system. Parts are then thoroughly dried, preheated and processed through a set of powder spray guns where a minimum .002" of epoxy primer is applied. A minimum .004" of architectural-grade Super Durable polyester TGIC powder is applied. The average ProShield film thickness is .006". ProShield is formulated and tested per the following ASTM standards. Each color must meet or exceed the ratings listed below:
- Hardness (D3363) rating 2H
 - Flexibility (D522) pass 1/8" mandrel

- Impact (D2794) rating minimum 80 inch –pounds
 - Salt Fog resistance (B117 and D1654) 4,000 hours and rating 6 or greater
 - UV Exposure (G154, 340 bulb) 3,000 hours, rating delta E of 2, and 90 percent glass retention*
 - Adhesion (D3359, Method B) rating 5B
- E. The Paint Line shall employ a checkered adhesion test daily. Standard colors are available.
*Certain colors may exceed delta E of 2. Contact Landscape Structures for exceptions.
- F. ProGuard™ Finish: Metal parts with ProGuard™ finish shall be cleaned and have a zinc alloy thermo-diffusion coating applied in accordance with ASTM A1059. It is highly corrosion and abrasion resistant, without flaking, peeling, blistering or chipping. ProGuard is applied standard to all Landscape Structures swing chain.
- G. Belting, Textured: These parts shall be 0.315" thick mini rough top 3-ply rubber belting with polyester fabric layers. Black only.
- H. Cables: These parts shall be made of tightly woven polyester-wrapped, six-stranded galvanized steel cable with either a polypropylene or steel core. Cables will be 20 mm in diameter. Standard colors are available. Some products available only in Black.
- I. DigiFuse® Panels: These panels shall be manufactured from 1/4" thick aluminum sheet. Dye sublimation printed digital artwork is fused onto the powder coated substrate.
- J. GripX Platforms and Panels: These parts shall be manufactured from 3/4" UV-stabilized high-density polyethylene with a stippled pattern that enhances traction and appearance. No color choices; GripX will only be Black or Gray and predetermined for each product
- K. Hot Dipped Galvanized (HDG) Steel: Steel components to be Hot Dipped Galvanized shall be thoroughly cleaned of organic compounds and dirt through complete immersion in a hot alkali solution. Cleaned parts shall undergo acid pickling to remove rust or scale. All parts shall then be fluxed to eliminate surface oxides and promote intermetallic development. Prepped parts shall then be submerged in a bath of molten zinc until the part reaches 840° F and the zinc reacts to form zinc/iron intermetallic layers on all surfaces inside and out. Hot Dipped Galvanized Parts shall be manufactured and inspected according to ASTM A123.
- L. Decks: All decks shall be of modular design and have 5/16" diameter holes on the standing surface. There shall be a minimum of (4) slots in each face to accommodate face mounting of components. Decks shall be manufactured from a single piece of low carbon 12 GA (.105") sheet steel conforming to ASTM specification A-1011. The sheet shall be perforated with a return flange on the perimeter to provide the reinforcement necessary to ensure structural integrity. There shall be no unsupported area larger than 3.5 square feet. The unit shall then be TenderTuff-coated brown or gray only. Decks shall be designed so that all sides are flush with the outside edge of the supporting posts. Not applicable for Evos or Weevos.
- M. Concrete Products: Two processes are used to produce concrete products. (See specific product installation/ specification documents.)
- Glass Fiber Reinforced Concrete (GFRC) Products: Glass fiber is alkali-resistant (AR) with high tensile properties formulated for concrete. GFRC nominal product thickness is 1" with a unit weight of about 12 lbs per square foot and an average ultimate flexural strength of 2,100 psi per ASTM C947. Finish: Exterior latex paint suited for concrete applications.
 - Precast Concrete Products: Wet-cast solid, molded concrete with an average compressive strength of 5,000 psi per ASTM C39. Unit weight range of about 115-145 lbs per cubic foot. Finish: Exterior latex paint suited for concrete applications.

- N. Rotationally Molded Polyethylene Parts: These parts shall be molded using prime natural linear low-density polyethylene having a tensile strength of 2400 psi per ASTM D638. Rotational molding resin is compounded with color and UV-stabilizing additives with a nominal wall thickness typically 1/4" with some variation depending upon product type. Standard colors are available.
- O. Recycled Permalene Parts: These parts shall be manufactured from 3/4" high-density polyethylene that has been specially formulated for optimum UV stability and color retention. Products shall meet or exceed density of .960 G/cc per ASTM D1505, tensile strength of 2400 PSI per ASTM D638. Available in a three-layer product with (2) .100" thick colored exterior layers over a .550" thick recycled Black interior core. Standard colors are available.
- P. Footings: Unless otherwise specified, the bury on all footings shall be 34" below Finished Grade (FG) on all in-ground play events/posts. Other types of anchoring are available upon request.
- Q. Hardware Packages: All shipments shall include individual component-specific hardware packages. Each hardware package shall be labeled with the part number, description, a component diagram showing the appropriate component, package weight, a bar code linking the hardware package to the job number, assembler's name, date and time the package was assembled, work center number and work order number.
- R. Installation Documentation: All shipments shall include a notebook or packet of order-specific, step-by-step instructions for assembly of each component, including equipment assembly diagrams, estimated hours for assembly, footing dimensions, concrete quantity for direct bury components, fall height information, area required information and detailed material specifications.
- S. Packing List: All shipments shall include a packing list for each skid/container, specifying the part numbers and quantities on each skid or within each container.
- T. Packaging: All components shall be individually wrapped or bulk wrapped and placed on skids (pallets) then shrinkwrapped to provide protection during shipment. Small parts and hardware packages will be placed in crates for shipment. Other components shall be individually wrapped or bulk wrapped to provide protection during shipment.
- U. Maintenance Kit: An order-specific maintenance kit shall be provided for each structure order. The kit will include a notebook or packet with a second set of installation documents and order-specific maintenance documentation with recommendations on how often to inspect, what to look for and what to do to keep the equipment in like-new condition. The kit also includes touch-up primer, appropriate color touch-up paint, sandpaper, appropriate color touch-up PVC and additional installation tools for the tamperproof fasteners.
- V. Posts: Post length shall vary depending upon the intended use and shall be a minimum of 42" above the deck height. All posts shall be ProShield finished to specified color. All posts shall have a "finished grade marker" positioned on the post identifying the 34" bury line required for correct installation and the top of the loose fill protective surfacing. Top caps for posts shall be aluminum die cast from 369.1 alloy and ProShield finished to match the post color. All caps shall be factory installed and secured in place with interference fit. A molded low-density polyethylene cap, with drain holes, shall be pressed on to the bottom end of the post to increase the footing area
- W. Steel Posts: All steel PlayBooster posts are manufactured from 5" O.D. tubing with a wall thickness of .120" and shall be galvanized after rolling and shall have both the I.D. and the cut ends sprayed with a corrosion resistant coating.
- Steel Post Mechanical Properties:
 - Yield Strength(min): 50,000 PSI

- Tensile Strength(min): 55,000 PSI
 - Elongation: 25% in 2 inches
 - Modulus of Elasticity: 29.5 x 106 PSI
- X. Aluminum Posts: All aluminum PlayBooster posts are manufactured from 6005A-T61 extruded tubing conforming to ASTM B-221. Posts shall have a 5" outside diameter with a .125" wall thickness.
- Aluminum Post Mechanical Properties:
 - Yield Strength(min): 35,000 PSI
 - Tensile Strength (min): 38,000 PSI
 - Elongation: 10% in 2 inches
 - Modulus of Elasticity: 10 x 106 PSI
- Y. Arch Posts: Aluminum arch posts shall be manufactured from 6063-T6 alloy. The arch shall be formed to a 21" centerline radius to complement the 42" center-to-center module. The arch shall be of one continuous piece construction. There shall be no welds or additional pieces mechanically fastened to manufacture the arch. Each arch shall be designed to provide a minimum of 90 1/2" clear span from the deck to the inside of the arch at the radius peak. Arches shall be ProShield finished to a specified color.
- Z. Clamps: All clamps are ProShield finished and, unless otherwise noted, shall be die cast using a 369.1 aluminum alloy and have the following mechanical properties:
- Ultimate Tensile: 47,000 PSI
 - Yield Strength: 28,000 PSI
 - Elongation: 7% in 2 inches
 - Shear Strength: 29,000 PSI
 - Endurance Limit: 20,000 PSI
- AA. Each functional clamp assembly shall have an appropriate number of half clamps and shall be fastened to mating parts with (2) 3/8" x 1 1/8" pinned buttonhead cap screws (SST) and (2) stainless-steel (SST) recessed "T" nuts. A 1/4" aluminum drive rivet with stainless steel pin is used to ensure a secure fit to the post.
- PlayBooster® clamps have three functional applications and shall be named as follows:
 - Offset hanger clamp assembly
 - Deck hanger clamp assembly
 - Hanger clamp assembly
- BB. GeoPlex® Clamps: All clamps are ProShield finished and, unless otherwise noted, shall be fabricated from 7 GA using .179" (4.54 mm) T316 stainless steel.
- Ultimate Tensile: 84,000 PSI
 - Yield Strength: 25,000 PSI
 - Each functional clamp assembly shall have an appropriate number of locking clamps and shall be fastened to mating parts with (2) 3/8" x 7/8" pinned button head cap screws (SST) with (2) 3/8" SAE flat washers. A 1/4" aluminum drive rivet with stainless steel pin is used to ensure a secure fit to the post.
- CC. Landscape Structures Inc. (Manufacturer) warrants that all play structures and/or equipment sold will conform in kind and in quality to the specifications manual for the products identified in the Acknowledgment of Order and will be free of defects in manufacturing and material.
- Manufacturer further warrants:
- 100-YEAR LIMITED WARRANTY
On all PlayBooster® aluminum posts, stainless steel fasteners, clamps, beams and caps against structural failure due to corrosion/natural deterioration or manufacturing defects, and on PlayBooster steel posts against structural failure due to material or manufacturing defects.
 - 10-YEAR LIMITED WARRANTY
On concrete products against structural failure due to natural deterioration or manufacturing defects. Does not cover minor chips, hairline cracks or efflorescence.

- **8-YEAR LIMITED WARRANTY**
On Aeronet® climbers and climbing cables against defects in materials or manufacturing defects.
- **5-YEAR LIMITED WARRANTY**
On Rhapsody® cables and mallets against defects in materials or manufacturing defects, on polycarbonate panels against defects in materials or manufacturing defects, and on bamboo panels against delamination due to defects in materials or manufacturing defects. Does not cover damage which may be associated with the natural characteristics of bamboo aging, including but not limited to discoloration, splitting, cracking, warping or twisting, nor the formation of algae, mold and other forms of fungal-type bodies on bamboo.
- **3-YEAR LIMITED WARRANTY**
On all other parts, i.e.: Pulse® products, all swing seats and hangers, Mobius climber handholds, Wiggle Ladders, Chain Ladders and ProGuard Swing Chain, Track Ride trolleys and bumpers, all rocking equipment including Sway Fun® gliders, belting material, HealthBeat® resistance mechanism, Seesaws, etc., against failure due to corrosion/ natural deterioration or manufacturing defects.
- The environment near a saltwater coast can be extremely corrosive. Some corrosion and/or deterioration is considered (normal wear) in this environment. Product installed within 500 yards (457 meters) of a saltwater shoreline will only be covered for half the period of the standard product warranty, up to a maximum of five years, for defects caused by corrosion. Products installed in direct contact with saltwater or that are subjected to salt spray are not covered by the standard warranty for any defects caused by corrosion.
- This warranty does not include any cosmetic issues or wear and tear from normal use of the product, or misuse or abuse of the product. It is valid only if the playstructures and/or equipment are erected to conform with Landscape Structures™ installation instructions and maintained according to the maintenance procedures furnished by Landscape Structures Inc.

DD. Material Specifications: 2-12 Year Play Area. PlayBooster® model numbers per plans

- NO: 182503A
Welcome Sign (LSI Provided) Ages 2-5 years Direct Bury
QTY: 1
 - Sign Panel: Panel is fabricated from 1/8" (.125")(3,17 mm) aluminum plate. Finish: ProShield®, gray in color. (Sign) Digital image is transferred to a 1/8" (.125")(3,17 mm) ProShield coated aluminum plate, then infused into the ProShield.
 - Fasteners: Primary fasteners shall be socketed and pinned tamperproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).
 - Post: Weldment comprised 2.375" (60,33 mm) O.D. RS20 (.095-.105) (2,41 mm-2,67 mm) wall galvanized tube, 1/4" (6,35 mm) HRPO steel sheet and aluminum post cap. Finish: ProShield, color specified.

2.03 MANUFACTURER: The layout shown in the plan view is based upon equipment and measurements from Landscape Structures (LSI), and Greenfields Fitness. Acceptable manufacturers for each component are as indicated on the plans or approved equal. Other products may be considered equal if all of the parameters, specifications and design intent of the drawings are met.

Manufacturer:

- 1) Landscape Structures Inc/Coast Recreation
Contact: Mike Eisert (714) 619-0100 x206, or meisert@coastrecreation.net

- 2) Greenfields Outdoors Fitness
Contact: Frank Vasquez (888) 315-9037 x129, or frank@greenfieldsfitness.com

- 2.04** Playground and fitness equipment and modular units submitted for consideration shall be equivalent in design, layout, deck size, post size, clamping/fastening system, deck/slide/climber height, ADA accessibility, appearance, color and construction detail of the playground equipment, structure or modular unit, specified in the drawings. Reasonable variations in size/height (no more than +/- 5%) and manufacturers standard colors may be allowed at the owner's discretion. Color schemes are to match as closely as possible to the original specified colors. Play value and safety features of components must be equal or superior to specified design as judged by the owner or owner's representative.
- 2.05** Any expense of modification, adjustment or revision required to ensure compliance of furnished equipment to specified equipment and playground design shall be the sole expense and responsibility of the Contractor.
- 2.0** Designs and specifications are based upon equipment from Landscape Structures equipment. Equals will be considered against this standard of quality and design and will be determined at the owner's discretion.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Play equipment shall be installed in accordance with manufacturers' recommendations.
- B. Play equipment shall be completely surrounded by unobstructed safety zones as recommended by the manufacturers. Resilient play surfaces only shall be located within safety zones. Play equipment safety zones shall not overlap one another.
- C. Explicit installation instructions shall be provided by the manufacturer, which shall include detailed, scaled plan view; elevations; footing drawings and details; as well as, written instructions to assure proper installation of the playground equipment, structure or modular unit.
- D. Playground equipment must be installed by a manufacturer certified installer and be installed in accordance with the manufacturer's installation specifications. Installation crew leader must be CPSI certified. A Manufacturer's Representative must inspect the final installation prior to acceptance. Manufacturer's representative must be a Certified Playground Safety Inspector and not employed by the installer.
- E. Close Out: Contractor shall provide the owner with one copy of complete manufacturers installation instructions and maintenance kit. Each manufacturer sends at least two sets of installation manuals with each order. Additional sets of install instructions should be purchased from the manufacturer if originals are lost or damaged. It is the contractor's responsibility to secure the installation instructions from the installer.
- F. Clean up: The site shall be kept clean and free of tools, trash, debris and installation materials on a daily basis. Material may be stored on site during installation with appropriate protective measures and approval by the Owner's representative.
1. At substantial completion walk through, playground equipment shall be thoroughly cleaned (dust, dirt, debris and markings) in order to evaluate difference between markings and scratches)
 2. At turnover equipment and surfacing shall be cleaned and ready for use by the public.

3.02 MAINTENANCE

- A. Contractor shall maintain play equipment, resilient fill, and accessible resilient surfaces throughout the maintenance period.
- B. Scratches, dents and other damage to play equipment resulting from Contractor's operations shall be repaired to original condition, or play equipment shall be replaced as determined by the City's representative.

PART 4-MEASUREMENT AND PAYMENT

- 4.01**
- A. Compensation for play equipment materials and installation shall be included in the lump sum bid price for play equipment.
 - B. Payment shall include full compensation for providing labor, materials, tools, equipment, and incidentals for all work including play equipment, resilient surfacing, wood fiber and sand resilient fill, excavation, curb, drainage, staking, installation, certification and warranties as shown on the Plans, as specified in the Special Provisions and directed by the Resident Engineer, and no additional compensation will be allowed.
 - C. Payment will be approved when the playground is inspected and approved by a third party inspector provided by the City of Anaheim.

END OF SECTION 11 68 13

DIVISION 12 - FURNISHINGS

SECTION 12 93 00

SITE FURNISHINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - A. Picnic Tables
 - B. Trash Receptacles
 - C. Benches
 - D. Bicycle Racks
 - E. Drinking Fountains
 - F. Word Art
 - G. Dog Station
 - H. Log Benches
 - I. Canoe Sculpture
 - J. Bollards
- B. Related Requirements:
 - 1. Section 033000 "Cast-in-Place Concrete" for concrete footings.

1.3 ACTION SUBMITTALS

- A. Product Data: Submit copies of manufacturers literature for each type of product.
- B. Shop Drawings: Submit shop drawings of product installation and anchorage.
- C. Exposed product and for each color and texture specified.
- D. Samples for Initial Selection: For units with factory-applied finishes.
- E. Samples for Verification: For each type of exposed finish, not less than 6-inch- (152-mm-) long linear components and 4-inch- square sheet components.
- F. Product Schedule: For site furnishings. Use same designations indicated on Drawings. Contractor shall submit a complete list of materials along with manufacturers' catalog data for all materials proposed for use at the pre-construction conference.

1.4 INFORMATIONAL SUBMITTALS

- A. Material Certificates: For site furnishings.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For site furnishings to include in maintenance manuals.

PART 2 - PRODUCTS

2.1 PICNIC TABLES

- A. Table Ensembles.
 - A. Model numbers: As specified on the plans.
 - B. Materials:
 - a. Precast Concrete
 - C. Finishes: As specified on plans.
 - D. Anti-Graffiti Coating
 - a. Provide Anti-Graffiti Coating/Sealer per Greenbook requirements.
 - E. Mounting:
 - a. Surface mount. Provide anchors and stainless-steel mounting screws.
 - F. Available through QCP Corp or approved equal. 731 Parkridge Avenue, Norco, CA 92860 Phone: (866)-703-3434.

2.2 TRASH RECEPTACLES

- A. Trash Receptacle
 - A. Model number: As specified on plans.
 - B. Materials:
 - a. Body: Precast Concrete.
 - b. Lid: Integral Concrete
 - c. Liners: Plastic
 - C. Finishes: As specified on plans.
 - D. Anti-Graffiti Coating
 - a. Provide Anti-Graffiti Coating/Sealer per Greenbook requirements.
 - E. Installation
 - a. Surface mount with concrete base: provide anchors and stainless-steel mounting screws.
 - F. Available through QCP Corp or approved equal. 731 Parkridge Avenue, Norco, CA 92860 Phone: (866)-703-3434.

2.3 BENCHES

- A. Model number: As specified on plans.
- B. Materials:
 - a. Body: Precast Concrete.
- C. Finishes: As specified on plans.
- D. Anti-Graffiti Coating
 - a. Provide Anti-Graffiti Coating/Sealer per Greenbook requirements.
- E. Installation
 - a. Surface mount with concrete base: provide anchors and stainless-steel mounting screws.
- F. Available through QCP Corp or approved equal. 731 Parkridge Avenue, Norco, CA 92860 Phone: (866)-703-3434.

2.4 BICYCLE RACKS

- A. Model number: As specified on plans.
- B. Materials:
 - a. Body: As specified on plans.
- C. Finishes: As specified on plans.
- D. Anti-Graffiti Coating
 - a. Provide Anti-Graffiti Coating/Sealer per Greenbook requirements.
- E. Installation: As specified on plans.
- F. Available through Dumor or approved equal.

2.5 DRINKING FOUNTAINS

- A. Model number: As specified on plans.
- B. Materials:
 - a. Body: As specified on plans.
- C. Finishes: As specified on plans.
- D. Anti-Graffiti Coating
 - a. Provide Anti-Graffiti Coating/Sealer per Greenbook requirements.
- E. Installation: As specified on plans.
- F. Available through Haws or approved equal.

2.6 WORD ART

- A. Model number: As specified on plans.
- B. Materials:
 - a. Body: As specified on plans.

- C. Finishes: As specified on plans.
- D. Anti-Graffiti Coating
 - a. Provide Anti-Graffiti Coating/Sealer per Greenbook requirements.
- E. Installation: As specified on plans.
- F. Available through Outdoor Creations

2.7 DOG STATIONS

- A. Model number: As specified on plans.
- B. Materials:
 - a. Body: As specified on plans.
- C. Finishes: As specified on plans.
- D. Anti-Graffiti Coating
 - a. Provide Anti-Graffiti Coating/Sealer per Greenbook requirements.
- E. Installation: As specified on plans.
- F. Available through Zero Waste USA or approved equal.

2.8 LOG BENCHES

- A. Model number: As specified on plans.
- B. Materials:
 - a. Body: As specified on plans.
- C. Finishes: As specified on plans.
- D. Anti-Graffiti Coating
 - a. Provide Anti-Graffiti Coating/Sealer per Greenbook requirements.
- E. Installation: As specified on plans.
- F. Available through Columbia Cascade or approved equal.

2.9 CANOE SCULPTURE

- A. Model number: As specified on plans.
- B. Materials:
 - a. Body: As specified on plans.
- C. Finishes: As specified on plans
- D. Anti-Graffiti Coating
 - a. Provide Anti-Graffiti Coating/Sealer per Greenbook requirements.
- E. Installation: As specified on plans.
- F. Available through the City of Anaheim

2.10 BOLLARDS

- A. Model number: As specified on plans.
- B. Materials:
 - a. Body: As specified on plans.
- C. Finishes: As specified on plans.
- D. Anti-Graffiti Coating
 - a. Provide Anti-Graffiti Coating/Sealer per Greenbook requirements.
- E. Installation: As specified on plans.
- F. Available through Dumor or approved equal

2.11 MATERIAL

- A. Steel and Iron: Free of surface blemishes and complying with the following:
 - A. Plates, Shapes, and Bars: ASTM A 36/A 36M.
 - B. Steel Pipe: Standard-weight steel pipe complying with ASTM A 53/A 53M, or electric-resistance-welded pipe complying with ASTM A 135/A 135M.
 - C. Tubing: Cold-formed steel tubing complying with ASTM A 500/A 500M.
 - D. Mechanical Tubing: Cold-rolled, electric-resistance-welded carbon or alloy steel tubing complying with ASTM A 513, or steel tubing fabricated from steel complying with ASTM A 1011/A 1011M and complying with dimensional tolerances in ASTM A 500/A 500M; zinc coated internally and externally.
 - E. Sheet: Commercial steel sheet complying with ASTM A 1011/A 1011M.
 - F. Expanded Metal: Carbon-steel sheets, deburred after expansion, and complying with ASTM F 1267.
 - G. Malleable-Iron Castings: ASTM A 47/A 47M, grade as recommended by fabricator for type of use intended.
 - H. Gray-Iron Castings: ASTM A 48/A 48M, Class 200.
- B. Stainless Steel: Free of surface blemishes and complying with the following:
 - A. Sheet, Strip, Plate, and Flat Bars: ASTM A 666.
 - B. Pipe: Schedule 40 steel pipe complying with ASTM A 312/A 312M.
 - C. Tubing: ASTM A 554.
- C. Nonshrink, Nonmetallic Grout: Premixed, factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107/C 1107M; recommended in writing by manufacturer, for exterior applications.
- D. Erosion-Resistant Anchoring Cement: Factory-packaged, nonshrink, nonstaining, hydraulic-controlled expansion cement formulation for mixing with potable water at Project site to create pourable anchoring, patching, and grouting compound; resistant to erosion from water exposure without needing protection by a sealer or waterproof coating; recommended in writing by manufacturer, for exterior applications.
- E. Galvanizing: Where indicated for steel and iron components, provide the following protective zinc coating applied to components after fabrication:

- A. Zinc-Coated Tubing: External, zinc with organic overcoat, consisting of a minimum of 0.9 oz./sq. ft. of zinc after welding, a chromate conversion coating, and a clear, polymer film. Internal, same as external or consisting of 81 percent zinc pigmented coating, not less than 0.3 mil thick.
- B. Hot-Dip Galvanizing: According to ASTM A 123/A 123M, ASTM A 153/A 153M, or ASTM A 924/A 924M.

2.12 FABRICATION

- A. Metal Components: Form to required shapes and sizes with true, consistent curves, lines, and angles. Separate metals from dissimilar materials to prevent electrolytic action.
- B. Welded Connections: Weld connections continuously. Weld solid members with full-length, full-penetration welds and hollow members with full-circumference welds. At exposed connections, finish surfaces smooth and blended so no roughness or unevenness shows after finishing and welded surface matches contours of adjoining surfaces.
- C. Pipes and Tubes: Form simple and compound curves by bending members in jigs to produce uniform curvature for each repetitive configuration required; maintain cylindrical cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of handrail and railing components.
- D. Preservative-Treated Wood Components: Complete fabrication of treated items before treatment if possible. If cut after treatment, apply field treatment complying with AWP A M4 to cut surfaces.
- E. Exposed Surfaces: Polished, sanded, or otherwise finished; all surfaces smooth, free of burrs, barbs, splinters, and sharpness; all edges and ends rolled, rounded, or capped.
- F. Factory Assembly: Assemble components in the factory to greatest extent possible to minimize field assembly. Clearly mark units for assembly in the field.

2.13 GENERAL FINISH REQUIREMENTS

- A. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.14 ALUMINUM FINISHES

- A. Baked-Enamel, Powder-Coat Finish: Manufacturer's standard, baked, polyester, powder-coat finish complying with finish manufacturer's written instructions for surface preparation, including pretreatment, application, baking, and minimum dry film thickness.

2.15 STEEL AND GALVANIZED-STEEL FINISHES

- A. Baked-Enamel, Powder-Coat Finish: Manufacturer's standard, baked, polyester, powder-coat finish complying with finish manufacturer's written instructions for surface preparation, including pretreatment, application, baking, and minimum dry film thickness.
- B. PVC Finish: Manufacturer's standard, UV-light stabilized, mold-resistant, slip-resistant, matte-textured, dipped or sprayed-on, PVC-plastisol finish, with flame retardant added; complying with coating manufacturer's written instructions for pretreatment, application, and minimum dry film thickness.

2.16 IRON FINISHES

- A. Baked-Enamel, Powder-Coat Finish: Manufacturer's standard, baked, polyester, powder-coat finish complying with finish manufacturer's written instructions for surface preparation, including pretreatment, application, baking, and minimum dry film thickness.

2.17 STAINLESS-STEEL FINISHES

- A. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.
- B. Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.
 - A. Run directional finishes with long dimension of each piece.
 - B. Directional Satin Finish: No 4.
 - C. Dull Satin Finish: No. 6.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for correct and level finished grade, mounting surfaces, installation tolerances, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. Comply with manufacturer's written installation instructions unless more stringent requirements are indicated. Complete field assembly of site furnishings where required.
- B. Unless otherwise indicated, install site furnishings after landscaping and paving have been completed.
- C. Install site furnishings level, plumb, true, and securely anchored at locations indicated on Drawings as recommended by the manufacturer.
- D. Contractor shall stake/mark locations for all site furniture and amenities and obtain acceptance/approval of locations by Engineer prior to commencing excavation for footings or installation.
- E. Concrete: Contractor shall obtain the acceptance of all forming from the Engineer prior to pouring concrete. Foundation holes shall be inspected and accepted by engineer prior to pouring concrete.
- F. Post Setting: Set cast-in support posts in concrete footing with smooth top, shaped to shed water. Protect portion of posts above footing from concrete splatter. Verify that posts are set plumb or at correct angle and are aligned and at correct height and spacing. Hold posts in position during placement and finishing operations until concrete is sufficiently cured.
- G. Posts Set into Voids in Concrete: Form or core-drill holes for installing posts in concrete to depth recommended in writing by manufacturer of site furnishings and 3/4 inch larger than OD of post. Clean holes of loose material, insert posts, and fill annular space between post and concrete with nonshrink,

nonmetallic grout or anchoring cement, mixed and placed to comply with anchoring material manufacturer's written instructions, with top smoothed and shaped to shed water.

- H. Pipe Sleeves: Use steel pipe sleeves preset and anchored into concrete for installing posts. After posts have been inserted into sleeves, fill annular space between post and sleeve with nonshrink, nonmetallic grout or anchoring cement, mixed and placed to comply with anchoring material manufacturer's written instructions, with top smoothed and shaped to shed water.

END OF SECTION 12 93 00

DIVISION 26 - ELECTRICAL
SECTION 26 05 00
COMMON WORK RESULTS FOR ELECTRICAL

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Raceways.
 - 2. Building wire and connectors.
 - 3. Supporting devices for electrical components.
 - 4. Electrical identification.
 - 5. Electricity-metering components.
 - 6. Concrete equipment bases.
 - 7. Electrical demolition.
 - 8. Cutting and patching for electrical construction.
 - 9. Touchup painting.

1.2 DEFINITIONS

- A. EMT: Electrical metallic tubing.
- B. FMC: Flexible metal conduit.
- C. IMC: Intermediate metal conduit.
- D. LFMC: Liquidtight flexible metal conduit.
- E. RNC: Rigid nonmetallic conduit.

1.3 SUBMITTALS

- A. Shop Drawings: Dimensioned plans and sections or elevation layouts of electricity-metering equipment.
- B. Field Test Reports: Indicate and interpret test results for compliance with performance requirements.

1.4 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

- B. Comply with NFPA 70.

1.5 COORDINATION

- A. Coordinate chases, slots, inserts, sleeves, and openings with general construction work and arrange in building structure during progress of construction to facilitate the electrical installations that follow.
 - 1. Set inserts and sleeves in poured-in-place concrete, masonry work, and other structural components as they are constructed.
- B. Sequence, coordinate, and integrate installing electrical materials and equipment for efficient flow of the Work. Coordinate installing large equipment requiring positioning before closing in the building.
- C. Coordinate electrical service connections to components furnished by utility companies.
 - 1. Coordinate installation and connection of exterior underground and overhead utilities and services, including provision for electricity-metering components.
 - 2. Comply with requirements of authorities having jurisdiction and of utility company providing electrical power and other services.
- D. Coordinate location of access panels and doors for electrical items that are concealed by finished surfaces.
- E. Where electrical identification devices are applied to field-finished surfaces, coordinate installation of identification devices with completion of finished surface.
- F. Where electrical identification markings and devices will be concealed by acoustical ceilings and similar finishes, coordinate installation of these items before ceiling installation.

PART 2 - PRODUCTS

2.1 RACEWAYS

- A. EMT: ANSI C80.3, zinc-coated steel, with set-screw or compression fittings.
- B. FMC: Zinc-coated steel.
- C. IMC: ANSI C80.6, zinc-coated steel, with threaded fittings.
- D. LFMC: Zinc-coated steel with sunlight-resistant and mineral-oil-resistant plastic jacket.
- E. RNC: NEMA TC 2, Schedule 40 PVC, with NEMA TC3 fittings.
- F. Raceway Fittings: Specifically designed for the raceway type with which used.

2.2 CONDUCTORS

- A. Conductors, No. 10 AWG and Smaller: Solid copper.
- B. Conductors, Larger Than No. 10 AWG: Stranded copper.
- C. Insulation: Thermoplastic, rated at 75 deg C minimum.
- D. Wire Connectors and Splices: Units of size, ampacity rating, material, type, and class suitable for service indicated.

2.3 SUPPORTING DEVICES

- A. Material: Cold-formed steel, with corrosion-resistant coating acceptable to authorities having jurisdiction.
- B. Metal Items for Use Outdoors or in Damp Locations: Hot-dip galvanized steel.
- C. Slotted-Steel Channel Supports: Flange edges turned toward web, and 9/16-inch- diameter slotted holes at a maximum of 2 inches o.c., in webs.
- D. Pipe Sleeves: ASTM A 53, Type E, Grade A, Schedule 40, galvanized steel, plain ends.
- E. Expansion Anchors: Carbon-steel wedge or sleeve type.
- F. Toggle Bolts: All-steel springhead type.
- G. Powder-Driven Threaded Studs: Heat-treated steel.

2.4 EQUIPMENT FOR UTILITY COMPANY'S ELECTRICITY METERING

- A. Current-Transformer Cabinets: Comply with requirements of electrical power utility company.
- B. Meter Sockets: Comply with requirements of electrical power utility company.
- C. Modular Meter Centers: Factory-coordinated assembly of a main meter center circuit-breaker unit with wireways, tenant meter socket modules, and tenant branch circuit breakers arranged in adjacent vertical sections, complete with interconnecting buses.

2.5 TOUCHUP PAINT

- A. For Equipment: Equipment manufacturer's paint selected to match installed equipment finish.
- B. Galvanized Surfaces: Zinc-rich paint recommended by item manufacturer.

PART 3 - EXECUTION

3.1 ELECTRICAL EQUIPMENT INSTALLATION

- A. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide the maximum possible headroom.
- B. Materials and Components: Install level, plumb, and parallel and perpendicular to other building systems and components, unless otherwise indicated.
- C. Equipment: Install to facilitate service, maintenance, and repair or replacement of components. Connect for ease of disconnecting, with minimum interference with other installations.
- D. Right of Way: Give to raceways and piping systems installed at a required slope.

3.2 RACEWAY APPLICATION

- A. Use the following raceways for outdoor installations:
 - 1. Exposed: IMC.
 - 2. Concealed: IMC.
 - 3. Underground, Single Run: RNC.
 - 4. Underground, Grouped: RNC.
 - 5. Connection to Vibrating Equipment: LFMC.
 - 6. Boxes and Enclosures: NEMA 250, Type 3R or Type 4.
- B. Use the following raceways for indoor installations:
 - 1. Exposed: EMT.
 - 2. Concealed: EMT.
 - 3. Connection to Vibrating Equipment: FMC; except in wet or damp locations, use LFMC.
 - 4. Damp or Wet Locations: IMC.
 - 5. Boxes and Enclosures: NEMA 250, Type 1, unless otherwise indicated.

3.3 WIRING METHODS FOR POWER, LIGHTING, AND CONTROL CIRCUITS

- A. Feeders: Type THHN/THWN insulated conductors in raceway.
- B. Underground Feeders and Branch Circuits: Type THWN or single-wire, Type UF insulated conductors in raceway.
- C. Branch Circuits: Type THHN/THWN insulated conductors in raceway.
- D. Branch Circuits: Type THW or THHN/THWN insulated conductors in raceway where exposed. Metal-clad cable where concealed in ceilings and gypsum board partitions.

3.4 WIRING INSTALLATION

- A. Install splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.

- B. Install wiring at outlets with at least 6 inches of slack conductor at each outlet.
- C. Connect outlet and component connections to wiring systems and to ground. Tighten electrical connectors and terminals, according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A.

3.5 ELECTRICAL SUPPORTING DEVICE APPLICATION

- A. Damp Locations and Outdoors: Hot-dip galvanized materials or nonmetallic, U-channel system components.
- B. Dry Locations: Steel materials.
- C. Support Clamps for PVC Raceways: Click-type clamp system.
- D. Selection of Supports: Comply with manufacturer's written instructions.
- E. Strength of Supports: Adequate to carry present and future loads, times a safety factor of at least four.

3.6 SUPPORT INSTALLATION

- A. Install support devices to securely and permanently fasten and support electrical components.
- B. Install individual and multiple raceway hangers and riser clamps to support raceways. Provide U-bolts, clamps, attachments, and other hardware necessary for hanger assemblies and for securing hanger rods and conduits.
- C. Support parallel runs of horizontal raceways together on trapeze- or bracket-type hangers.
- D. Size supports for multiple raceway installations so capacity can be increased by a 25 percent minimum in the future.
- E. Support individual horizontal raceways with separate, malleable-iron pipe hangers or clamps.
- F. Install 1/2-inch- diameter or larger threaded steel hanger rods, unless otherwise indicated.
- G. Spring-steel fasteners specifically designed for supporting single conduits or tubing may be used instead of malleable-iron hangers for 1-1/2-inch and smaller raceways serving lighting and receptacle branch circuits above suspended ceilings and for fastening raceways to slotted channel and angle supports.
- H. Install metal channel racks for mounting cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices unless components are mounted directly to structural elements of adequate strength.

- I. Install sleeves for cable and raceway penetrations of concrete slabs and walls unless core-drilled holes are used. Install sleeves for cable and raceway penetrations of masonry and fire-rated gypsum walls and of all other fire-rated floor and wall assemblies. Install sleeves during erection of concrete and masonry walls.

3.7 IDENTIFICATION MATERIALS AND DEVICES

- A. Install at locations for most convenient viewing without interference with operation and maintenance of equipment.
- B. Coordinate names, abbreviations, colors, and other designations used for electrical identification with corresponding designations indicated in the Contract Documents or required by codes and standards. Use consistent designations throughout Project.
- C. Self-Adhesive Identification Products: Clean surfaces before applying.
- D. Identify raceways and cables with color banding as follows:
 - 1. Bands: Pretensioned, snap-around, colored plastic sleeves or colored adhesive marking tape. Make each color band **2 inches** wide, completely encircling conduit, and place adjacent bands of two-color markings in contact, side by side.
 - 2. Band Locations: At changes in direction, at penetrations of walls and floors, at **50-foot** maximum intervals in straight runs, and at **25-foot** maximum intervals in congested areas.
 - 3. Colors: As follows:
 - a. Security System: Blue and yellow.
 - b. Telecommunication System: Green and yellow.
- E. Tag and label circuits designated to be extended in the future. Identify source and circuit numbers in each cabinet, pull and junction box, and outlet box. Color-coding may be used for voltage and phase identification.
- F. Install continuous underground plastic markers during trench backfilling, for exterior underground power, control, signal, and communication lines located directly above power and communication lines. Locate 6 to 8 inches below finished grade. If width of multiple lines installed in a common trench or concrete envelope does not exceed 16 inches, overall, use a single line marker.
- G. Color-code 208/120-V system secondary service, feeder, and branch-circuit conductors throughout the secondary electrical system as follows:
 - 1. Phase A: Black.
 - 2. Phase B: Red.
 - 3. Phase C: Blue.
- H. Color-code 480/277-V system secondary service, feeder, and branch-circuit conductors throughout the secondary electrical system as follows:
 - 1. Phase A: Brown.
 - 2. Phase B: Orange.
 - 3. Phase C: Yellow.

- I. Install warning, caution, and instruction signs where required to comply with 29 CFR, Chapter XVII, Part 1910.145, and where needed to ensure safe operation and maintenance of electrical systems and of items to which they connect. Install engraved plastic-laminated instruction signs with approved legend where instructions are needed for system or equipment operation. Install metal-backed butyrate signs for outdoor items.

3.8 DEMOLITION

- A. Protect existing electrical equipment and installations indicated to remain. If damaged or disturbed in the course of the Work, remove damaged portions and install new products of equal capacity, quality, and functionality.
- B. Accessible Work: Remove exposed electrical equipment and installations, indicated to be demolished, in their entirety.
- C. Abandoned Work: Cut and remove buried raceway and wiring, indicated to be abandoned in place, 2 inches below the surface of adjacent construction. Cap raceways and patch surface to match existing finish.
- D. Remove demolished material from Project site.
- E. Remove, store, clean, reinstall, reconnect, and make operational components indicated for relocation.

3.9 CUTTING AND PATCHING

- A. Repair and refinish disturbed finish materials and other surfaces to match adjacent undisturbed surfaces. Install new fireproofing where existing firestopping has been disturbed. Repair and refinish materials and other surfaces by skilled mechanics of trades involved.

3.10 FIELD QUALITY CONTROL

- A. Inspect installed components for damage and faulty work, including the following:
 - 1. Raceways.
 - 2. Building wire and connectors.
 - 3. Supporting devices for electrical components.
 - 4. Electrical identification.
 - 5. Electricity-metering components.
 - 6. Concrete bases.
 - 7. Electrical demolition.
 - 8. Cutting and patching for electrical construction.
 - 9. Touchup painting.

3.11 REFINISHING AND TOUCHUP PAINTING

- A. Refinish and touch up paint.
 - 1. Clean damaged and disturbed areas and apply primer, intermediate, and finish coats

- to suit the degree of damage at each location.
2. Follow paint manufacturer's written instructions for surface preparation and for timing and application of successive coats.
 3. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
 4. Repair damage to PVC or paint finishes with matching touchup coating recommended by manufacturer.

3.12 CLEANING AND PROTECTION

- A. On completion of installation, including outlets, fittings, and devices, inspect exposed finish. Remove burrs, dirt, paint spots, and construction debris.
- B. Protect equipment and installations and maintain conditions to ensure that coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion.

END OF SECTION 260500

DIVISION 26 - ELECTRICAL
SECTION 26 05 26
GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes grounding of electrical systems and equipment. Grounding requirements specified in this Section may be supplemented by special requirements of systems described in other Sections.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Product Data: For the following:
 - 1. Ground rods.
 - 2. Chemical rods.
- C. Qualification Data: For firms and persons specified in "Quality Assurance" Article.
- D. Field Test Reports: Submit written test reports to include the following:
 - 1. Test procedures used.
 - 2. Test results that comply with requirements.
 - 3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.

1.3 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Testing agency as defined by OSHA in 29 CFR 1910.7 or a member company of the InterNational Electrical Testing Association and that is acceptable to authorities having jurisdiction.
 - 1. Testing Agency's Field Supervisor: Person currently certified by the InterNational Electrical Testing Association to supervise on-site testing specified in Part 3.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
 - 1. Comply with UL 467.

- C. Comply with NFPA 70; for overhead-line construction and medium-voltage underground construction, comply with IEEE C2.
- D. Comply with NFPA 780 and UL 96 when interconnecting with lightning protection system.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Grounding Conductors, Cables, Connectors, and Rods:
 - a. Apache Grounding/Erico Inc.
 - b. Boggs, Inc.
 - c. Chance/Hubbell.
 - d. Copperweld Corp.
 - e. Dossert Corp.
 - f. Erico Inc.; Electrical Products Group.
 - g. Framatome Connectors/Burndy Electrical.
 - h. Galvan Industries, Inc.
 - i. Harger Lightning Protection, Inc.
 - j. Hastings Fiber Glass Products, Inc.
 - k. Heary Brothers Lightning Protection Co.
 - l. Ideal Industries, Inc.
 - m. ILSCO.
 - n. Kearney/Cooper Power Systems.
 - o. Korns: C. C. Korns Co.; Division of Robroy Industries.
 - p. Lightning Master Corp.
 - q. Lyncole XIT Grounding.
 - r. O-Z/Gedney Co.; a business of the EGS Electrical Group.
 - s. Raco, Inc.; Division of Hubbell.
 - t. Robbins Lightning, Inc.
 - u. Salisbury: W. H. Salisbury & Co.
 - v. Superior Grounding Systems, Inc.
 - w. Thomas & Betts, Electrical.

2.2 GROUNDING CONDUCTORS

- A. For insulated conductors, comply with Division 16 Section "Conductors and Cables."
- B. Material: Aluminum, copper-clad aluminum, and copper.

- C. Equipment Grounding Conductors: Insulated with green-colored insulation.
- D. Isolated Ground Conductors: Insulated with green-colored insulation with yellow stripe. On feeders with isolated ground, use colored tape, alternating bands of green and yellow tape to provide a minimum of three bands of green and two bands of yellow.
- E. Grounding Electrode Conductors: Stranded cable.
- F. Underground Conductors: Bare, tinned, stranded, unless otherwise indicated.
- G. Bare Copper Conductors: Comply with the following:
 - 1. Solid Conductors: ASTM B 3.
 - 2. Assembly of Stranded Conductors: ASTM B 8.
 - 3. Tinned Conductors: ASTM B 33.
- H. Copper Bonding Conductors: As follows:
 - 1. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG copper conductor, 1/4 inch (6.4 mm) in diameter.
 - 2. Bonding Conductor: No. 4 or No. 6 AWG, stranded copper conductor.
 - 3. Bonding Jumper: Bare copper tape, braided bare copper conductors, terminated with copper ferrules; 1-5/8 inches (42 mm) wide and 1/16 inch (1.5 mm) thick.
 - 4. Tinned Bonding Jumper: Tinned-copper tape, braided copper conductors, terminated with copper ferrules; 1-5/8 inches (42 mm) wide and 1/16 inch (1.5 mm) thick.
- I. Grounding Bus: Bare, annealed copper bars of rectangular cross section, with insulators.

2.3 CONNECTOR PRODUCTS

- A. Comply with IEEE 837 and UL 467; listed for use for specific types, sizes, and combinations of conductors and connected items.
- B. Bolted Connectors: Bolted-pressure-type connectors, or compression type.
- C. Welded Connectors: Exothermic-welded type, in kit form, and selected per manufacturer's written instructions.

2.4 GROUNDING ELECTRODES

- A. Ground Rods: Copper-clad steel.
 - 1. Size: 3/4 by 120 inches (19 by 3000 mm) in diameter.
- B. Chemical Electrodes: Copper tube, straight or L-shaped, filled with nonhazardous chemical salts, terminated with a 4/0 bare conductor. Provide backfill material recommended by manufacturer.
- C. Test Wells: Provide handholes as detailed on construction documents.

PART 3 - EXECUTION

3.1 APPLICATION

- A. Use only copper conductors for both insulated and bare grounding conductors in direct contact with earth, concrete, masonry, crushed stone, and similar materials.
- B. In raceways, use insulated equipment grounding conductors.
- C. Exothermic-Welded Connections: Use for connections to structural steel and for underground connections, except those at test wells.
- D. Equipment Grounding Conductor Terminations: Use bolted pressure clamps.
- E. Ground Rod Clamps at Test Wells: Use bolted pressure clamps with at least two bolts.
- F. Grounding Bus: Install in electrical and telephone equipment rooms, in rooms housing service equipment, and elsewhere as indicated.
 - 1. Use insulated spacer; space 1 inch (25.4 mm) from wall and support from wall 6 inches (150 mm) above finished floor, unless otherwise indicated.
 - 2. At doors, route the bus up to the top of the door frame, across the top of the doorway, and down to the specified height above the floor.
- G. Underground Grounding Conductors: Use tinned- copper conductor, No. 2/0 AWG minimum. Bury at least 24 inches (600 mm) below grade or bury 12 inches (300 mm) above duct bank when installed as part of the duct bank.

3.2 EQUIPMENT GROUNDING CONDUCTORS

- A. Comply with NFPA 70, Article 250, for types, sizes, and quantities of equipment grounding conductors, unless specific types, larger sizes, or more conductors than required by NFPA 70 are indicated.
- B. Install equipment grounding conductors in all feeders and circuits.
- C. Install insulated equipment grounding conductor with circuit conductors for the following items, in addition to those required by NEC:
 - 1. Feeders and branch circuits.
 - 2. Lighting circuits.
 - 3. Receptacle circuits.
 - 4. Single-phase motor and appliance branch circuits.
 - 5. Three-phase motor and appliance branch circuits.
 - 6. Flexible raceway runs.
 - 7. Armored and metal-clad cable runs.
- D. Busway Supply Circuits: Install insulated equipment grounding conductor from the grounding bus in the switchgear, switchboard, or distribution panel to equipment grounding bar terminal on busway.

- E. Isolated Equipment Enclosure Circuits: For designated equipment supplied by a branch circuit or feeder, isolate equipment enclosure from supply raceway with a nonmetallic raceway fitting listed for the purpose. Install fitting where raceway enters enclosure, and install a separate equipment grounding conductor. Isolate equipment grounding conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service, unless otherwise indicated.
- F. Signal and Communication Systems: For telephone, alarm, voice and data, and other communication systems, provide No. 4 AWG minimum insulated grounding conductor in raceway from grounding electrode system to each service location, terminal cabinet, wiring closet, and central equipment location.
 - 1. Service and Central Equipment Locations and Wiring Closets: Terminate grounding conductor on a 1/4-by-2-by-12-inch (6.4-by-50-by-300-mm) grounding bus.
 - 2. Terminal Cabinets: Terminate grounding conductor on cabinet grounding terminal.
- G. Metal Poles Supporting Outdoor Lighting Fixtures: Provide a grounding electrode in addition to installing a separate equipment grounding conductor with supply branch-circuit conductors.
- H. Common Ground Bonding with Lightning Protection System: Bond electrical power system ground directly to lightning protection system grounding conductor at closest point to electrical service grounding electrode. Use bonding conductor sized same as system grounding electrode conductor, and install in conduit.

3.3 COUNTERPOISE

- A. Ground the steel framework of the building with a driven ground rod at the base of every corner column and at intermediate exterior columns at distances not more than 60 feet (18 m) apart. Provide a grounding conductor (counterpoise), electrically connected to each ground rod and to each steel column, extending around the perimeter of the building. Use tinned-copper conductor not less than No. 2/0 AWG for counterpoise and for tap to building steel. Bury counterpoise not less than 18 inches (450 mm) below grade and 24 inches (600 mm) from building foundation.

3.4 INSTALLATION

- A. Ground Rods: Install at least three rods spaced at least one-rod length from each other and located at least the same distance from other grounding electrodes.
 - 1. Drive ground rods until tops are 2 inches (50 mm) below finished floor or final grade, unless otherwise indicated.
 - 2. Interconnect ground rods with grounding electrode conductors. Use exothermic welds, except at test wells and as otherwise indicated. Make connections without exposing steel or damaging copper coating.
- B. Grounding Conductors: Route along shortest and straightest paths possible, unless otherwise indicated. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.

- C. **Bonding Straps and Jumpers:** Install so vibration by equipment mounted on vibration isolation hangers and supports is not transmitted to rigidly mounted equipment. Use exothermic-welded connectors for outdoor locations, unless a disconnect-type connection is required; then, use a bolted clamp. Bond straps directly to the basic structure taking care not to penetrate any adjacent parts. Install straps only in locations accessible for maintenance.
- D. **Metal Water Service Pipe:** Provide insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes by grounding clamp connectors. Where a dielectric main water fitting is installed, connect grounding conductor to street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.
- E. **Water Meter Piping:** Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with grounding clamp connectors.
- F. **Bond each aboveground portion of gas piping system upstream from equipment shutoff valve.**
- G. **Install one test well for each service at the ground rod electrically closest to the service entrance. Set top of well flush with finished grade or floor.**
- H. **Ufer Ground (Concrete-Encased Grounding Electrode):** Fabricate according to NFPA 70, Paragraph 250-81(c), using a minimum of 20 feet (6 m) of bare copper conductor not smaller than No. 4 AWG. If concrete foundation is less than 20 feet (6 m) long, coil excess conductor within the base of the foundation. Bond grounding conductor to reinforcing steel in at least four locations and to anchor bolts. Extend grounding conductor below grade and connect to building grounding grid or to a grounding electrode external to concrete.

3.5 CONNECTIONS

- A. **General:** Make connections so galvanic action or electrolysis possibility is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact will be galvanically compatible.
 - 1. Use electroplated or hot-tin-coated materials to ensure high conductivity and to make contact points closer to order of galvanic series.
 - 2. Make connections with clean, bare metal at points of contact.
 - 3. Make aluminum-to-steel connections with stainless-steel separators and mechanical clamps.
 - 4. Make aluminum-to-galvanized steel connections with tin-plated copper jumpers and mechanical clamps.
 - 5. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.
- B. **Exothermic-Welded Connections:** Comply with manufacturer's written instructions. Welds that are puffed up or that show convex surfaces indicating improper cleaning are not acceptable.
- C. **Equipment Grounding Conductor Terminations:** For No. 8 AWG and larger, use pressure-type grounding lugs. No. 10 AWG and smaller grounding conductors may be terminated with winged pressure-type connectors.

- D. Connections at Test Wells: Use compression-type connectors on conductors and make bolted-and clamped-type connections between conductors and ground rods.
- E. Tighten screws and bolts for grounding and bonding connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A.
- F. Compression-Type Connections: Use hydraulic compression tools to provide correct circumferential pressure for compression connectors. Use tools and dies recommended by connector manufacturer. Provide embossing die code or other standard method to make a visible indication that a connector has been adequately compressed on grounding conductor.
- G. Moisture Protection: If insulated grounding conductors are connected to ground rods or grounding buses, insulate entire area of connection and seal against moisture penetration of insulation and cable.

3.6 FIELD QUALITY CONTROL

- A. Testing: Owner will engage a qualified testing agency to perform the following field quality-control testing:
- B. Testing: Engage a qualified testing agency to perform the following field quality-control testing:
- C. Testing: Perform the following field quality-control testing:
 - 1. After installing grounding system but before permanent electrical circuitry has been energized, test for compliance with requirements.
 - 2. Test completed grounding system at each location where a maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal, and at ground test wells. Measure ground resistance not less than two full days after the last trace of precipitation, and without the soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance. Perform tests, by the fall-of-potential method according to IEEE 81.
 - 3. Provide drawings locating each ground rod and ground rod assembly and other grounding electrodes, identify each by letter in alphabetical order, and key to the record of tests and observations. Include the number of rods driven and their depth at each location and include observations of weather and other phenomena that may affect test results. Describe measures taken to improve test results.
 - a. Equipment Rated 500 kVA and Less: 10 ohms.
 - b. Equipment Rated 500 to 1000 kVA: 5 ohms.
 - c. Equipment Rated More Than 1000 kVA: 3 ohms.
 - d. Substations and Pad-Mounted Switching Equipment: 5 ohms.
 - e. Manhole Grounds: 10 ohms.
 - 4. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Architect promptly and include recommendations to reduce ground resistance.

3.7 GRADING AND PLANTING

- A. Restore surface features, including vegetation, at areas disturbed by Work of this Section. Reestablish original grades, unless otherwise indicated. If sod has been removed, replace it as soon as possible after backfilling is completed. Restore areas disturbed by trenching, storing of dirt, cable laying, and other activities to their original condition. Include application of topsoil, fertilizer, lime, seed, sod, sprig, and mulch.

END OF SECTION 260526

DIVISION 26 - ELECTRICAL
SECTION 26 56 00
EXTERIOR LIGHTING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes exterior lighting units with luminaires, poles/support structures, and accessories.

1.2 DEFINITIONS

- A. Lighting Unit: A luminaire or an assembly of luminaires complete with a common support, including pole, post, or other structure, and mounting and support accessories.
- B. Luminaire (Light Fixture): A complete lighting device designed to distribute light.
1. Solar Specification:
 - a. Manufacturer: SOL by Sunna Design
 - b. Fixture: ATBMic-P104-SOLAR-R2-3K-DDB
 - c. Pole and Arm: 15-STBD-BZ-110-INTARM-SW
 - d. System: EVG2-L-2028-LGSGL-300-15D-BZ-SW
 2. Monument specification:
 - a. Manufacturer: Kelvix
 - b. Fixture part number: SW3S-PER PLANS-30K-VR-B-S-IP68
 - c. Channel part number: SW-K-AL-CH-SR-2M
 - d. Mounting clips: SW-K-CLP-AL-SR
 - e. Side mounting bracket: SW-CLP-RA

1.3 SUBMITTALS

- A. Product Data: For each type of lighting unit indicated, arranged in order of lighting unit designation. Include data on features, accessories, finishes, and the following:
1. Materials and dimensions of luminaires and poles.
 2. Certified results of independent laboratory tests for fixtures and LED's for electrical ratings and photometric data.
 3. Certified results of laboratory tests for fixtures and LED's for photometric performance.
 4. High-intensity-discharge luminaire ballasts.
- B. Shop Drawings:
1. Anchor-bolt templates keyed to specific poles and certified by manufacturer.
- C. Shop drawing from Sunna showing detailed connections between the round steel pole, mast arm, fixture, and tenon-mounted solar panel.

- D. Samples for Verification: For lighting units or luminaires designated for sample submission in the Exterior Lighting Unit Schedule.
 - 1. Light Source: LED
 - 2. Ballast: 120-V model of specified ballast type.
 - 3. Finishes: For each finished metal used in support components.
- E. Product Certificates: Signed by manufacturers of lighting units certifying that products comply with requirements.
- F. Field Test Reports: Indicate and interpret test results for compliance with performance requirements.
- G. Maintenance Data: For lighting units to include in maintenance manuals specified in Division 1.

1.4 QUALITY ASSURANCE

- A. Luminaires and Accessories: Listed and labeled as defined in NFPA 70, Article 100, for their indicated use, location, and installation conditions by a testing agency acceptable to authorities having jurisdiction
- B. Comply with ANSI C2.
- C. Comply with NFPA 70.

1.5 DELIVERY, STORAGE, AND HANDLING OF POLES AND SOLAR PANEL

- A. Package Steel poles for shipping according to ASTM B 660. Protect all components, including mast arms, solar panels and accessories, to prevent damage during transit.
- B. Store poles on decay-resistant treated skids at least 12 inches above grade and vegetation. Support poles to prevent distortion and arrange to provide free air circulation.
- C. Retain factory-applied pole wrappings & solar panel wrappings until just before pole installation. For poles with nonmetallic finishes, handle with web fabric straps.
- D. Inspection: Inspect poles and solar panels upon delivery for damage, corrosion, or deformation. Notify manufacturer and reject items that do not meet specification requirements.

1.6 WARRANTY

- A. General Warranty: 10 warranty specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

- B. Special Warranty: Written warranty, 10 years, signed by manufacturer and Installer agreeing to replace external parts of luminaires and poles exhibiting a failure of finish as specified below. This warranty is in addition to, and not a limitation of, other rights and remedies Owner may have under requirements of the Contract Documents.
 - 1. Protection of Metal from Corrosion Warranty against perforation or erosion of finish due to weathering.
 - 2. Color Retention: Warranty against fading, staining, and chalking due to effects of weather and solar radiation.
 - 3. Warranty Period: Manufacturer's standard, but not less than ten years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the products indicated in the Exterior Lighting Unit Schedule at the end of Part 3.
- B. Products: Subject to compliance with requirements, provide one of the products indicated for each designation in the Exterior Lighting Unit Schedule at the end of Part 3.

2.2 LUMINAIRES

- A. Comply with IESNA RP-8 for parameters of lateral light distribution patterns indicated for luminaires.
- B. Metal Parts: Free from burrs, sharp corners, and edges.
- C. Sheet Metal Components: Corrosion-resistant aluminum, unless otherwise indicated. Form and support to prevent warping and sagging.
- D. Housings: Rigidly formed, weather- and light-tight enclosures that will not warp, sag, or deform in use. Provide filter/breather for enclosed luminaires.
- E. Doors, Frames, and Other Internal Access: Smooth operating, free from light leakage under operating conditions, and arranged to permit relamping without use of tools. Arrange doors, frames, lenses, diffusers, and other pieces to prevent accidental falling during relamping and when secured in operating position. Provide for door removal for cleaning or replacing lens. Arrange to disconnect ballast when door opens.
- F. Exposed Hardware Material: Stainless steel, factory powder-coated bronze to match luminaire and pole finish.

- G. Plastic Parts: High resistance to yellowing and other changes due to aging, exposure to heat, and ultraviolet radiation.
- H. Reflecting Surfaces: Minimum reflectance as follows, unless otherwise indicated:
 - 1. White Surfaces: 85 percent.
 - 2. Specular Surfaces: 83 percent.
 - 3. Diffusing Specular Surfaces: 75 percent.
- I. Lenses and Refractors: Materials as indicated. Use heat- and aging-resistant, resilient gaskets to seal and cushion lens and refractor in luminaire doors.

2.3 LUMINAIRE SUPPORT COMPONENTS

- A. Description: Comply with AASHTO LTS-3 for pole or other support structures, brackets, arms, appurtenances, base, and anchorage and foundation.
- B. Wind-Load Strength of Total Support Assembly: Adequate to carry support assembly plus luminaires at indicated heights above grade without failure, permanent deflection, or whipping in steady winds of 100 mph with a gust factor of 1.3. Support assembly includes pole or other support structures, brackets, arms, appurtenances, base, and anchorage and foundation.
 - 1. Strength Analysis: For each pole type and luminaire combination, multiply the actual equivalent projected area of luminaires and brackets by a factor of 1.1 to obtain the equivalent projected area to be used in pole selection strength analysis.
- C. Finish: Pre-galvanized and zinc powder coated bronze finish for the pole. Match base cover, arm, and fixture head with finish of the pole.
 - 1. Materials: All exposed hardware to be painted to match powder coat of pole.
- D. Mountings, Fasteners, and Appurtenances: Corrosion-resistant items compatible with support components.
 - 1. Materials: Will not cause galvanic action at contact points.
 - 2. Mountings: Correctly position luminaire to provide indicated light distribution.
 - 3. Anchor Bolts, Nuts, and Washers: Hot-dip galvanized after fabrication unless stainless-steel items are indicated. Paint to match bronze finish of pole and luminaire if said hardware is visible.
 - 4. Anchor-Bolt Template: Plywood or steel.
- E. Pole/Support Structure Bases: Anchor type with hold-down or anchor bolts, leveling nuts, and bolt covers.
- F. Pole Bases: Hinged-anchor type with hold-down or anchor bolts, leveling nuts, and bolt covers.
- G. Pole Bases: Embedded type with underground cable entry.

- H. Steel Poles: Tubing complying with ASTM A 500, Grade B, carbon steel with a minimum yield of 46,000 psi; one-piece construction up to 40 feet in length with access handhole in pole wall.
 - 1. Intermediate Handhole and Cable Support: Locate at midpoint of pole height. Weathertight 3-by-5-inch handhole with cover provides access to internal welded attachment lug for electric cable support grip.
 - 2. Grounding Provisions for Steel Pole: Welded 1/2-inch threaded lug, accessible through handhole and listed for copper conductor connection.
- I. Steel Mast Arms: Fabricated from NPS 2 black steel pipe, continuously welded to pole attachment plate with span and rise as indicated.
- J. Pole-Top Tenons: Fabricated to support solar panel. Securely fastened to pole top.
- K. Concrete for Pole Foundations: Comply with Division 3 Section "Cast-in-Place Concrete."
 - 1. Design Strength: 3000-psi, 28-day compressive strength.

2.4 FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Steel: Grind welds and polish surfaces to a smooth, even finish.
 - 1. **Surface Preparation:** Clean surfaces to comply with SSPC-SP 1, "Solvent Cleaning," to remove dirt, oil, grease, and other contaminants that could impair coating adhesion. Prepare steel by abrasive blast cleaning per SSPC-SP 10/NACE No. 2, "Near-White Metal Blast Cleaning," prior to powder coating.
 - 2. **Zinc-Rich Powder-Coated Finish:** Provide zinc-rich primer base with polyester powder coat finish, applied in accordance with manufacturer's recommendations for exterior corrosion protection.
 - 3. **Color:** Bronze to match luminaire, arm and tenon.
 - 4. **Interior:** Apply one coat of bituminous paint on the interior of pole, or otherwise treat to prevent corrosion.
- C. Fixture head: Die-cast aluminum construction with polyester powder coat finish, applied in accordance with manufacturer's standard process for exterior durability and color retention.
 - 1. Color: Bronze, to match pole finish.
 - 2. Corrosion Protection: Clean and pretreat aluminum surfaces per manufacturer's recommendations prior to coating application.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Concrete Foundations: Construct according to Division 3 Section "Cast-in-Place Concrete."
 - 1. Comply with details for reinforcement and for anchor bolts, nuts, and washers. Verify anchor-bolt templates by comparing with actual pole bases furnished.
 - 2. Finish for Parts Exposed to View: Trowel and rub smooth. Comply with Division 3 Section 03 30 00 "Cast-in-Place Concrete" for exposed finish.
- B. Install poles as follows:
 - 1. Use web fabric slings (not chain or cable) to raise and set poles.
 - 2. Mount pole to foundation with leveling nuts, and tighten top nuts to torque level recommended by pole manufacturer.
 - 3. Secure poles level, plumb, and square.
 - 4. Grout void between pole base and foundation. Use nonshrinking caulk cleanly taped and installed in entire void space.
 - 5. Use a short piece of 1/2-inch- diameter pipe to make a drain hole through grout. Arrange to drain condensation from interior of pole.
- C. Luminaire Attachment: Fasten to indicated structural supports.
- D. Lamp luminaires with indicated lamps according to manufacturer's written instructions. Replace malfunctioning lamps.

3.2 CONNECTIONS

- A. Ground equipment.
 - 1. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.
- B. Ground metal poles/support structures according to Division 26 Section "Grounding and Bonding for Electrical Systems."
 - 1. Nonmetallic Poles: Ground metallic components of lighting units and foundations. Connect luminaires to grounding system with No. 6 AWG conductor.

3.3 FIELD QUALITY CONTROL

- A. Inspect each installed unit for damage. Replace damaged units.
- B. Tests and Observations: Verify normal operation of lighting units after installing luminaires and energizing circuits with normal power source, and as follows:

1. Check intensity and uniformity of illumination.
 2. Check excessively noisy ballasts.
- C. Prepare a written report of tests, inspections, observations and verifications indicating and interpreting results.
- D. Malfunctioning Fixtures and Components: Replace or repair, then retest. Repeat procedure until units operate properly.

3.4 CLEANING AND ADJUSTING

- A. Clean units after installation. Use methods and materials recommended by manufacturer.
- B. Adjust amiable luminaires and luminaires with adjustable lamp position to provide required light distributions and intensities.

END OF SECTION 265600

DIVISION 26 - ELECTRICAL
SECTION 26 56 19
LED EXTERIOR LIGHTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Exterior solid-state luminaires that are designed for and exclusively use LED lamp technology.

1.2 DEFINITIONS

- A. CCT: Correlated color temperature.
- B. CRI: Color rendering index.
- C. IP: International Protection or Ingress Protection Rating.
- D. Lumen: Measured output of lamp and luminaire, or both.
- E. Luminaire: Complete lighting unit, including lamp, reflector, and housing.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of luminaire.
- B. Shop Drawings: For nonstandard or custom luminaires.
 1. Include plans, elevations, sections, and mounting and attachment details.
 2. Include details of luminaire assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
 3. Include diagrams for power, signal, and control wiring.

1.4 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Plans, drawn to scale and coordinated.
- B. Seismic Qualification Data: For luminaires, accessories, and components, from manufacturer.
- C. Product Certificates: For each type of the following:
 1. Solar Specification:
 - a. Manufacturer: SOL by Sunna Design

- b. Fixture: ATBMic-P104-SOLAR-R2-3K-DDB
 - c. Pole and Arm: 15-STBD-BZ-110-INTARM-SW
 - d. System: EVG2-L-2028-LGSGL-300-15D-BZ-SW
- 2. Monument specification:
 - a. Manufacturer: Kelvix
 - b. Fixture part number: SW3S-PER PLANS-30K-VR-B-S-IP68
 - c. Channel part number: SW-K-AL-CH-SR-2M
 - d. Mounting clips: SW-K-CLP-AL-SR
 - e. Side mounting bracket: SW-CLP-RA

1.5 CLOSEOUT SUBMITTALS

- A. Operation and maintenance data.
 - 1. Provide a list of all lamp types used on Project. Use ANSI and manufacturers' codes.
 - 2. Provide a list of all photoelectric relay types used on Project; use manufacturers' codes.

1.6 FIELD CONDITIONS

- A. Mark locations of exterior luminaires for approval by Architect prior to the start of luminaire installation.

1.7 WARRANTY

- A. Warranty: Manufacturer and Installer agree to repair or replace components of luminaires that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: 10 year(s) from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Luminaires shall withstand the effects of earthquake motions determined according to ASCE/SEI 7
- B. Seismic Performance: Luminaires and lamps shall be labeled vibration and shock resistant.
 - 1. The term "withstand" means "the luminaire will remain in place without separation of any parts when subjected to the seismic forces specified and the luminaire will be fully operational during and after the seismic event."

2.2 LUMINAIRE REQUIREMENTS

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. NRTL Compliance: Luminaires shall be listed and labeled for indicated class and division of hazard by an NRTL.
- C. FM Global Compliance: Luminaires for hazardous locations shall be listed and labeled for indicated class and division of hazard by FM Global.
- D. UL Compliance: Comply with UL 1598
- E. CRI of minimum 80
- F. L70 Luminaire life of 50,000 hours.
- G. Luminaires dimmable from 100 percent to 10 percent of maximum light output.
- H. Luminaires Rating: Lamp marked for outdoor use
- I. Source Limitations:
 - 1. Obtain luminaires from single source from a single manufacturer.
 - 2. For luminaires, obtain each color, grade, finish, type, and variety of luminaire from single source with resources to provide products of consistent quality in appearance and physical properties.

2.3 MATERIALS

- A. Metal Parts: Free of burrs and sharp corners and edges.
- B. Sheet Metal Components: Corrosion-resistant aluminum or steel. Form and support to prevent warping and sagging.
- C. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position. Doors shall be removable for cleaning or replacing lenses.
- D. Reflecting surfaces shall have minimum reflectance as follows unless otherwise indicated:
 - 1. White Surfaces: 85 percent.
 - 2. Specular Surfaces: 83 percent.
 - 3. Diffusing Specular Surfaces: 75 percent.
- E. Housings:

1. Rigidly formed, weather- and light-tight enclosure that will not warp, sag, or deform in use. Provide filter/breather for enclosed luminaires.

2.4 FINISHES

- A. Variations in Finishes: Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- B. Luminaire Finish: Manufacturer's standard paint applied to factory-assembled and -tested luminaire before shipping. Where indicated, match finish process and color of pole or support materials.
- C. Factory-Applied Finish for Aluminum or Steel Luminaires: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
 1. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
 2. Fixture head: Die-cast aluminum construction with polyester powder coat finish, applied in accordance with manufacturer's standard process for exterior durability and color retention.
- D. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- E. Steel: Grind welds and polish surfaces to a smooth, even finish.
 1. **Surface Preparation:** Clean surfaces to comply with SSPC-SP 1, "Solvent Cleaning," to remove dirt, oil, grease, and other contaminants that could impair coating adhesion. Prepare steel by abrasive blast cleaning per SSPC-SP 10/NACE No. 2, "Near-White Metal Blast Cleaning," prior to powder coating.
 2. **Zinc-Rich Powder-Coated Finish:** Provide zinc-rich primer base with polyester powder coat finish, applied in accordance with manufacturer's recommendations for exterior corrosion protection.
 3. **Color:** Bronze to match luminaire, arm and tenon.
 4. **Interior:** Apply one coat of bituminous paint on the interior of pole, or otherwise treat to prevent corrosion.

PART 3 - EXECUTION

3.1 GENERAL INSTALLATION REQUIREMENTS

- A. Comply with NECA 1.

- B. Use fastening methods and materials selected to resist seismic forces defined for the application and approved by manufacturer.
- C. Install lamps in each luminaire.
- D. Fasten luminaire to structural support.
- E. Supports:
 - 1. Sized and rated for luminaire weight.
 - 2. Able to maintain luminaire position after cleaning and relamping.
 - 3. Support luminaires without causing deflection of finished surface.
 - 4. Luminaire-mounting devices shall be capable of supporting a horizontal force of 100 percent of luminaire weight and a vertical force of 400 percent of luminaire weight.
- F. Coordinate layout and installation of luminaires with other construction.
- G. Adjust luminaires that require field adjustment or aiming.

3.2 CORROSION PREVENTION

- A. Aluminum: Do not use in contact with earth or concrete. When in direct contact with a dissimilar metal, protect aluminum by insulating fittings or treatment.

3.3 FIELD QUALITY CONTROL

- A. Inspect each installed luminaire for damage. Replace damaged luminaires and components.
- B. Perform the following tests and inspections
 - 1. Operational Test: After installing luminaires, switches, and accessories, and after electrical circuitry has been energized, test units to confirm proper operation.
 - 2. Verify operation of photoelectric controls.
- C. Illumination Tests:
 - 1. Measure light intensities at night. Use photometers with calibration referenced to NIST standards. Comply with the following IES testing guide(s):
 - a. IES LM-5.
 - b. IES LM-50.
 - c. IES LM-52.
 - d. IES LM-64.
 - e. IES LM-72.
 - 2. Operational Test: After installing luminaires, switches, and accessories, and after electrical circuitry has been energized, test units to confirm proper operation.
- D. Luminaire will be considered defective if it does not pass tests and inspections.

- E. Prepare a written report of tests, inspections, observations, and verifications indicating and interpreting results. If adjustments are made to lighting system, retest to demonstrate compliance with standards.

3.4 DEMONSTRATION

- A. Train Owner's maintenance personnel to adjust, operate, and maintain luminaires

END OF SECTION 265619

DIVISION 31 - EARTHWORK

SECTION 31 20 00

EARTH MOVING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Preparing subgrades for slabs-on-grade, decomposed granite paths, pavements, , and exterior plants.
2. Drainage course for slabs-on-grade.
3. Deepwell drainage for drinking fountains.
4. Base course for concrete walks and pavements.
5. Base course for asphalt paving.
6. Excavating and backfilling for utility trenches.

1.2 QUALITY ASSURANCE

Standard Specifications: Comply with the Standard Specifications for Public Works Construction (SSPWC), latest edition and supplements for rock materials. The Standard Specifications apply only to performance and materials and how they are to be incorporated into the Work. The legal/contractual relationship sections and the measurement and payment sections do not apply to this document.

1.3 REFERENCES

This specification section has been prepared using the Geotechnical Investigation, dated April 21, 2026, prepared by HE Inc.

1.4 DEFINITIONS

A. Backfill: Soil material used to fill an excavation.

1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
2. Final Backfill: Backfill placed over initial backfill to fill a trench.

B. Base Course: Course placed between the subgrade and hot-mix asphalt or concrete paving.

C. Bedding Course: Course placed over the excavated subgrade in a trench before laying pipe.

D. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.

E. Classified Excavation: Removal and disposal of materials not defined as rock.

- F. Drainage Course: Course supporting the slab-on-grade that also minimizes upward capillary flow of pore water.
- G. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.
 - 1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Architect. Authorized additional excavation and replacement material will be paid for according to Contract provisions changes in the Work.
 - 2. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Architect. Unauthorized excavation, as well as remedial work directed by Architect, shall be without additional compensation.
- H. Fill: Soil materials used to raise existing grades.
- I. Structures: Footings, foundations, retaining walls, slabs, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.
- J. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below base, drainage fill, or topsoil materials.
- K. Unclassified Excavation: Removal and disposal of materials encountered regardless of nature of materials, including rock.
- L. Utilities: On-site underground pipes, conduits, and cables, includes sewer trunk line and GWRS fiber communication cables.

1.5 PROJECT CONDITIONS

- A. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted in writing by Architect and then only after arranging to provide temporary utility services according to requirements indicated.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

- A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.
- B. Satisfactory Soils: Sand, gravel, friable earth, or non-expansive clays, subject to Testing Laboratory's approval. Fill and backfill material shall be free of organic material, slag, cinders, expansive soils, trash or rubble and stones having maximum dimension greater than 4 inches.
- C. Unsatisfactory Soils: Expansive and other soils as defined in the project's geotechnical investigation report.
 - 1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.

- D. Base Course: Material conforming to SSPWC section 200-2.2, Crushed Aggregate Base or SSPWC section 200-2.4 Crushed Miscellaneous Base.
- E. Engineered Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch sieve and not more than 12 percent passing a No. 200 sieve.
- F. Bedding Course: Naturally or artificially graded clean, crushed sand; ASTM D 2940; except with 100 percent passing a 3/8-inch sieve and not more than 8 percent passing a No. 200 sieve.
- G. Drainage Course: Narrowly graded mixture of washed, crushed stone, or crushed or uncrushed gravel; ASTM D 448; coarse-aggregate grading Size 57; with 100 percent passing a 1-1/2-inch sieve and 0 to 5 percent passing a No. 8 sieve.

2.2 ACCESSORIES

- A. Warning Tape: Acid- and alkali-resistant polyethylene film warning tape manufactured for marking and identifying underground utilities, 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility. Color coding shall be according to the American Public Works Association (APWA) standards:
 - 1. Blue – Potable water and fire suppression lines.
 - 2. Green – Sanitary sewer and storm drain lines
 - 3. Orange – Communication, alarm or signal lines
 - 4. Purple – Reclaimed water, irrigation, and slurry lines
 - 5. Red – Electrical power lines, cables, conduit and lighting lines
 - 6. Yellow – Gas, oil, steam, petroleum, or gaseous material lines.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.
- B. Preparation of subgrade for earthwork operations including removal of vegetation, topsoil, debris, obstructions, and deleterious materials from ground surface is specified in Division 2 Section “Demolition”.
- C. Protect and maintain erosion and sedimentation controls, which are specified in Division 2 Section “Demolition,” during earthwork operations.

3.2 EXCAVATION

- A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials,

and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.

1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.

3.3 EXCAVATION FOR STRUCTURES

- A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch. If applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.
 1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.

3.4 EXCAVATION FOR WALKS AND PAVEMENTS

- A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

3.5 EXCAVATION FOR UTILITY TRENCHES

- A. Excavate trenches to indicated gradients, lines, depths, and elevations.
- B. Excavate trenches to uniform widths to provide 6 inch clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit, unless otherwise indicated.
- C. Trench Bottoms: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove projecting stones and sharp objects along trench subgrade.
 1. Excavate trenches 6 inches deeper than elevation required in rock or other unyielding bearing material, 4 inches deeper elsewhere, to allow for bedding course.

3.6 SUBGRADE INSPECTION

- A. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Owner, without additional compensation.

3.7 UNAUTHORIZED EXCAVATION

- A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill, with 28-day compressive strength of 2500 psi, may be used when approved by Owner.

1. Fill unauthorized excavations under other construction or utility pipe as directed by Owner.

3.8 STORAGE OF SOIL MATERIALS

- A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
 1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.9 UTILITY TRENCH BACKFILL

- A. Place backfill on subgrades free of mud, frost, snow, or ice.
- B. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.
- C. Backfill trenches excavated under footings and within 18 inches of bottom of footings with satisfactory soil; fill with concrete to elevation of bottom of footings. Concrete is specified in Division 3 Section Cast-in-Place Concrete.
- D. Provide blanket protection for all utility pipes and conduits under driveways, roadways, parking lots, and other vehicular path of travel per COA Standard Plan 225 where the minimum cover over the pipes and conduits is less than 36".
- E. Place and compact initial backfill of satisfactory soil, free of particles larger than 1 inch in any dimension, to a height of 12 inches over the utility pipe or conduit.
 1. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of utility piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.
- F. Place and compact final backfill of satisfactory soil to final subgrade elevation.
- G. Install warning tape directly above utilities, minimum 6 inches above top of pipe, minimum 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

3.10 SOIL FILL

- A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.
- B. Place and compact fill material in layers to required elevations as follows:
 1. Under planted areas, use satisfactory soil material.
 2. Under walks and pavements, use engineered fill.
 3. Under footings and foundations, use engineered fill.

3.11 SOIL MOISTURE CONTROL

- A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.
 - 1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
 - 2. Remove and replace, or scarify and air dry otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

3.12 COMPACTION OF SOIL BACKFILLS AND FILLS

- A. Place backfill and fill soil materials in thin, loose lifts for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.
- B. Place backfill and fill soil materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.
- C. Compact soil materials to not less than the following percentages of maximum dry unit weight according to ASTM D 1557:
 - 1. Under structures, building slabs, steps, and pavements, scarify and recompact top 12 inches of existing subgrade and each layer of backfill or fill soil material to 95 percent.
 - 2. Under walkways, scarify and recompact top 12 inches below subgrade and compact each layer of backfill or fill soil material to 90 percent.
 - 3. Under lawn or unpaved areas, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material to 85 percent.
 - 4. For utility trenches, compact each layer of initial and final backfill soil material to 85 percent.

3.13 GRADING

- A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
- B. Site Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:
 - 1. Lawn or Unpaved Areas: Plus or minus 1 inch.
 - 2. Walks: Plus or minus 1 inch.
 - 3. Pavements: Plus or minus 1/2 inch.
- C. Grading inside Building Lines: Finish subgrade to a tolerance of 1/2 inch when tested with a 10-foot straightedge.

3.14 BASE COURSES

- A. Place base course on subgrades free of mud, frost, snow, or ice.
- B. On prepared subgrade, place base course under pavements and walks as follows:

1. Shape base course to required crown elevations and cross-slope grades.
2. Compact base course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 95 percent of maximum dry unit weight according to ASTM D 1557.

3.15 DRAINAGE COURSE

- A. Place drainage course on subgrades free of mud, frost, snow, or ice.
- B. On prepared subgrade, place and compact drainage course under cast-in-place concrete slabs-on-grade as follows:
 1. Place drainage course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
 2. Compact each layer of drainage course to required cross sections and thicknesses to not less than 95 percent of maximum dry unit weight according to ASTM D 698.

3.16 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified independent geotechnical engineering testing agency to perform field quality-control testing.
- B. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earthwork only after test results for previously completed work comply with requirements.
- C. Footing Subgrade: At footing subgrades, at least one test of each soil stratum will be performed to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of subgrade with tested subgrade when approved by Architect.
- D. Testing agency will test compaction of soils in place according to ASTM D 1556, ASTM D 2167, ASTM D 2922, and ASTM D 2937, as applicable.
- E. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil to depth required; recompact and retest until specified compaction is obtained.

3.17 PROTECTION

- A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.
- B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.
- C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.
 1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.18 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Disposal: Remove surplus satisfactory soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off Owner's property.

END OF SECTION 31 20 00

DIVISION 32 – EXTERIOR IMPROVEMENTS

SECTION 32 01 13.80

ASPHALT SURFACE COATING

PART 1 – GENERAL

1.1 DESCRIPTION

- A. StreetBond® Advanced Coatings for Asphalt are specifically formulated for application to asphalt pavement and have been confirmed by a certified testing facility to possess a balance of performance properties for a durable and color-fast finish.
- B. A variety of StreetBond® coating colors are available. Please refer to gaf.com to view these. Custom colors are available upon request.
- C. Certain colors of the StreetBond® coatings have been independently verified to have an SRI greater than 29 and therefore can help projects qualify for points in the LEED® program under Heat Island Effect: Non-Roof. Please refer to gaf.com for further information.
- D. Qualifications. Only Accredited StreetBond® Applicators may bid for and perform the imprinted portion of this work. Please refer to Section 1.3 DEFINITIONS.
- E. StreetBond® products are manufactured in ISO 9001:2008 / ISO 14001:2004 facilities to ensure quality products produced in legally-responsible and environmentally-conscious manner
- F. StreetBond® coatings are only available from GAF.

1.2 REFERENCES

- | | |
|----------------------|---|
| A. ASTM D4541 | Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Tester. |
| B. ASTM D4060 | Test Method for Abrasion Resistance of Organic Coatings by the Taber Abraser. |
| C. ASTM D2697 | Standard Test Method for Volume of Nonvolatile Matter in Clear or Pigmented Coatings. |
| D. ASTM D522-93A | Standard Test Method for Mandrel Bend Test of Attached Organic Coatings. |
| E. ASTM D1653 | Standard Test Method for water vapor transmission through organic film coatings. |
| F. ASTM G154 | QUV Accelerated Weathering Environment. Standard Practice for Operating Fluorescent Light Apparatus for UV Exposure of Nonmetallic Materials. |
| G. ASTM D2369 | Weight Solids Standard test method for Volatile Content of Coatings. |
| H. ASTM D1475 | Standard Test Method for Density of Paint, Varnish, Lacquer, Other related products |
| I. ASTM D2240 (2000) | Standard Test Method for Rubber property – Durometer hardness. |
| J. ASTM D5895 | Standard Test Method of drying or curing during film formation of organic coatings using mechanical recorders. |
| K. ASTM D570 | Standard Test Method for water absorption of plastics. |

1.3 DEFINITIONS

- A. “Accredited StreetBond® Applicator” has valid Certification for both Textured (stamped) and Non - Textured (flatwork) as offered by GAF and are reviewed on an annual basis. All Accredited StreetBond® Applicators have been qualified by GAF to perform the Work and offer a product Warranty.

- B. “Approved Applicator” has valid Certification for non - textured (flatwork) application ONLY as offered GAF and are reviewed on an annual basis. Product Warranties may be available to Approved Applicators but require approval and supervision by a GAF Technical Sales Representative.
- C. “Applicator” means the installer of the StreetBond® coatings.
- D. “Owner” means the Owner and refers to the representative person who has decision making authority for the Work.
- E. “TSR” is a GAF Technical Sales Representative who manages the StreetBond® product in a given territory.
- F. “Stamped asphalt pavement” is asphalt pavement that has been subjected to imprinting or texturing in a specific pattern.
- G. “Non - Stamped asphalt pavement” is asphalt pavement that is unstamped and is sometimes referred to as “flatwork”.
- H. The “Work” is the asphalt pavement texturing work contemplated in this bid submission and specification.
- I. “Scuffing” is a “tear” of the asphalt pavement caused by an external force – for example turning the steering wheel of a stationary vehicle. Scuffing is generally the result of poorly designed or improperly installed asphalt and would most - commonly be seen on weaker residential asphalt.
- J. “Layer” is a signal thin pass of coating, applied with a texture spray gun, which is allowed to dry before the next layer is applied.
- K. “Warranty” is a guarantee to the property owner that StreetBond® SB150, when properly applied will not peel, delaminate or show abnormal wear over specific period of time depending on the traffic volumes and number of layers applied. Please contact your local TSR for more details.

1.4 SUBMITTALS

A copy of the Accreditation Certificate, available from the Applicator, is required with submittal. Independent product test results available upon request.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An employer of workers trained and approved by manufacturer of decorative concrete paving systems.
- B. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Build mockups on full-thickness sections of asphalt surface to demonstrate finish, texture, and color; curing; and standard of workmanship.
 - 2. Build mockups of asphalt coloring in the location and of the size indicated or, if not indicated, build mockups where directed by Architect and not less than 96 inches by 96 inches.
 - 3. Mock up shall demonstrate all asphalt colors called out on plans as well as poem stenciling.
 - 4. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 5. Subject to compliance with requirements, approved mockups shall not become part of the completed Work.

PART 2 – PRODUCTS

2.1 MATERIALS - STREETBOND® COATINGS

StreetBond® coatings have been scientifically formulated to provide the optimal balance of performance properties for a durable, long - lasting color and textured finish to asphalt pavement surfaces. Some of these key properties include wear and crack resistance, color retention, adhesion, minimal water absorption and increased friction properties. StreetBond® coatings are environmentally safe and meet EPA requirements for Volatile Organic Compounds (VOC).

- A. StreetBond® SB150 is a two-part premium epoxy - modified, acrylic, waterborne coating specifically designed for application on asphalt pavements. It has a balance of properties to ensure good adhesion and movement on flexible pavement, while providing good durability. StreetBond® SB150 is durable in both dry and wet environments.

- B. StreetBond® Colorant is a highly concentrated, high quality, UV stable pigment blend designed to add color to StreetBond® SB150 coatings. One unit of Colorant shall be used with one pail of StreetBond® coating material. C. Adhesion Promoter: A liquid agent designed to enhance the adhesion of the specified coating over surfaces with polished aggregates.
- D. Sealer Concentrate: A liquid sealer that is applied to a newly completed project to help seal coating and reduce dirt and tire marks.

2.1.1 Properties of Coating

The following tables outline the test results for physical and performance properties of the asphalt surface coating as determined by an independent testing laboratory.

TABLE 1: Typical Physical Properties Coating

Characteristic	Test Specification	SB150
Solids by Volume	ASTM D2697	59.14%
Solids by Weight	ASTM D2369	71.60%
Density	ASTM D1475	13.27 lbs./gal (1.59kg/l)

TABLE 2: Typical Performance Properties of Coatings

Characteristic	Test Specification	SB150
Dry time (To re-coat)	ASTM D5895 23°C; 37% RH	35 min
Taber Wear Abrasion Dry H-10 wheel	ASTM D4060 1 day cure	0.33g/1000 cycles
Taber Wear Abrasion Wet H-10 wheel	ASTM D4060 7 days cure	0.15g/1000 cycles
QUV Accelerate Weathering Environment	ASTM G - 151 ΔE 1,500hrs.	0.53 (Brick)
Hydrophobicity Water Absorption	ASTM D570	7.89%
Shore A Hardness	ASTM D2240	80.8
Mandrel Bend	ASTM D522 - 93A	1/8" @ 23 C
Permeance	ASTM D1653	5.6 perm
VOC	per MSDS	19 g/l
Adhesion	ASTM D4541	>300psi (692psi)
Friction Wet	ASTM E303 British Pendulum Tester	Wet=77.3 Dry=81.3

Certificates of Analysis are available upon request for each of these properties.

2.2 EQUIPMENT FOR ASPHALT SURFACE COATING SYSTEMS APPLICATION

The equipment described has been designed specifically for optimal application of coatings. Other equipment may or may not be suitable and could compromise the performance of the coatings and/or reduce crew productivity.

- A. The SB Flex Sprayer is a proprietary coating sprayer supplied by Intech Equipment and is capable of applying the coatings to the asphalt pavement surface in a thin, controlled film which will optimize the drying and curing time of the coating. A Graco RTX and Rapid Sprayer II sprayer may also be used.
- B. The Coatings Mixer is a motorized mixing device designed to ensure efficient and thorough blending of the asphalt surface coating system components.
- C. Backpack or Hand - Held sprayer to apply the diluted Adhesion Promoter Concentrate.
- D. The Rapid Finisher II is an electric powered broom produced by HUB Surfaces Systems which can be used in the application of coatings to improve productivity. It is especially useful on larger projects.

2.3 ASPHALT STENCIL

Stencils to be provided by asphalt coating manufacturer.

PART 3 – EXECUTION

3.1 GENERAL

Asphalt surface coating systems shall be supplied and applied on non - textured asphalt surface by an Accredited StreetBond Applicator in accordance with the plans and specifications or as directed by the Owner. Do not begin installation without confirmation of an Accreditation Certificate.

3.2 PRE-CONDITIONS

The condition of the asphalt substrate will impact the performance of the coatings. A highly stable asphalt pavement free of defects is recommended.

3.2.1 Prerequisites for New Asphalt Pavement

A durable and stable asphalt pavement mix design installed according to best practices over a properly prepared and stable substrate is a pre - requisite for all long - lasting asphalt pavement surfaces.

3.2.2 Pavement Marking Removal: recommended guidelines

Pavement markings may be removed by sandblasting, water - blasting, grinding, or other approved mechanical methods. The removal methods should, to the fullest extent possible, cause no significant damage to the pavement surface.

The Owner shall determine if the removal of the markings is satisfactory for the application of coatings. Work shall not proceed until this approval is granted.

3.2.3 Surface Preparation

The asphalt pavement surface shall be dry and free from all foreign matter, including but not limited to dirt, dust, de-icing materials, and chemical residue.

3.3 APPLICATION OF COATINGS

3.3.1 Coating Application Guidelines

- A. The Applicator shall use a suitable texture coating sprayer to apply the coatings.
- B. The asphalt pavement surface shall be completely dry and thoroughly cleaned prior to application of the coatings.

- C. The coating application shall proceed as soon as practical upon completion of the imprinting of the asphalt pavement where applicable.
- D. For polished asphalt, StreetBond® Adhesion Promoter should be applied directly to the asphalt and allowed to dry completely prior to the first layers of coating.
- E. For concrete surfaces, a concrete primer shall be applied and allowed to cure prior to the first layers of coating.
- F. The first layer of coating shall be spray applied then broomed to work the coating material into the pavement surface. Subsequent applications shall be sprayed then broomed or rolled. Each application of coating material shall be allowed to dry to the touch before applying the next layer.
- G. The Applicator shall apply the coatings only when the air temperature is 50°F / (10°C) and rising and will not drop below 50°F / (10°C) within 24 hours. No precipitation should be expected within 24 hours.

3.4 COATING COVERAGE & THICKNESS

Coating coverage and thickness is as outlined in TABLE 4 below. Actual coverage may be affected by the texture of the asphalt pavement substrate and the imprint pattern selected. There will be less coverage with the first layer and higher coverage with subsequent layers.

TABLE 4: Coating Coverage & Thickness

	COVERAGE (approx.)		THICKNESS (approx.)			
# OF LAYERS	NON - TEXTURED		WET		DRY	
	sqft/unit*	sqm/unit*	mm	mil	mm	mil
3	200	18.6	0.84	33	0.48	19

**1 unit is a nominal 5 gallon pail comprising Part A, Part B and Colorant (approximately 4.12 gallons). 1 unit when sprayed as a single layer covers approximately 600sqft (55.7 sqm), with an approximate thickness of 6.3mil (0.16mm) dry.*

3.5 RECOMMENDED COATING COVERAGE RATES

Please check with GAF Products in advance to confirm the recommended application for the climate conditions at the project location.

TABLE 5: Recommended Coating Coverage Rates

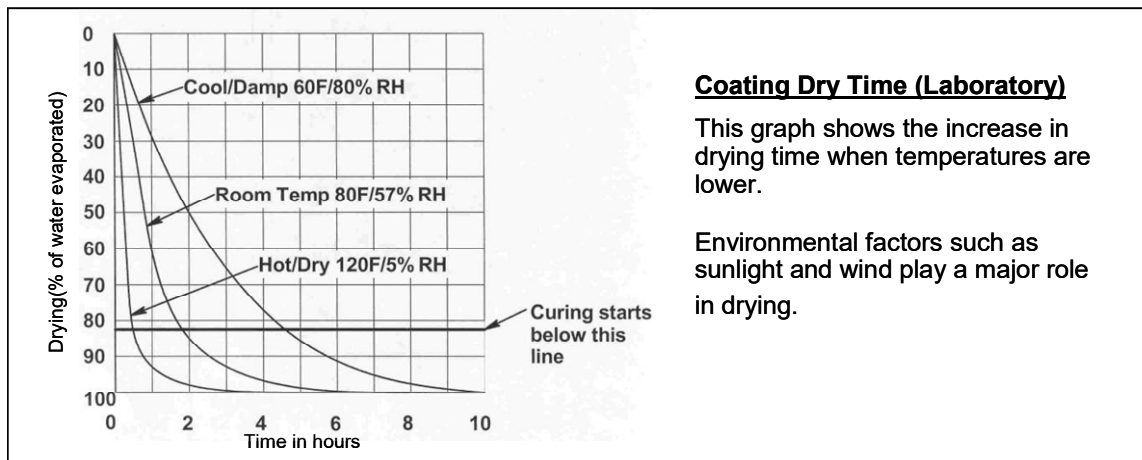
Application	Hot Dry Climate	Temperate/Winter Climate
Pedestrian only	3 layers at 600 ft ² (56m ²) per 5 gallon (20 Litre) unit for a net coverage of 200 ft ² (18.6m ²) per 5 gallon (20 Litre) unit	3 layers at 600 ft ² (56m ²) per 5 gallon (20 Litre) unit for a net coverage of 200 ft ² (18.6m ²) per 5 gallon (20 Litre) unit
Residential driveway	3 layers at 600 ft ² (56m ²) per 5 gallon (20 Litre) unit for a net coverage of 200 ft ² (18.6m ²) per 5 gallon (20 Litre) unit	3 layers at 600 ft ² (56m ²) per 5 gallon (20 Litre) unit for a net coverage of 200 ft ² (18.6m ²) per 5 gallon (20 Litre) unit

1. **Additional layers of StreetBond® SB150** coatings may be used to provide additional build thickness in high wear areas such as vehicle wheel paths and turning areas.
2. A maintenance program may be required for applications exposed to:
 - abrasive materials (such as salt and sand)
 - abrasive equipment (such as snow removal equipment)

3.6 OPENING TO TRAFFIC

Minimally, StreetBond® SB150 coating must be 100% dry and sufficient curing time must be allowed before traffic is permitted on the surface

TABLE 6: COATING DRY TIMES (TYPICAL)



If coatings are applied when moisture cannot evaporate, then the coating will not dry. The drying and curing of coatings have a direct impact on performance.

3.6 PROTECTING AND CLEANING

- A. Protect pavement markings from damage and wear during remainder of construction period.
- B. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

PART 4 – MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

The measured area is the actual area of asphalt pavement where StreetBond® has been applied, measured in place. No deduction will be made for the area(s) occupied by manholes, inlets, drainage structures, bollards or by any public utility appurtenances within the area.

4.2 PAYMENT

Payment will be full compensation for all work completed as per conditions set out in the contract. For unit price contracts, the payment shall be calculated using the measured area as determined above.

END OF SECTION 32 01 13.80

DIVISION 32 – EXTERIOR IMPROVEMENTS
SECTION 32 13 13
CONCRETE PAVING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes exterior cement concrete pavement for the following:
 - 1. Driveways and roadways.
 - 2. Curbs and gutters.
 - 3. Walkways.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated, including admixtures.
- B. Design Mixtures: For each concrete pavement mixture.

1.3 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Manufacturer of ready-mixed concrete products who complies with ASTM C 94/C 94M requirements for production facilities and equipment.
- B. ACI Publications: Comply with ACI 301, "Specification for Structural Concrete," unless modified by requirements in the Contract Documents.
- C. All work to be performed and materials to be used shall be in accordance with the Standard Specifications for Public Works Construction, latest edition and supplements.
- D. The Contractor shall have one copy of the Standard Specifications at the job site.
- E. The Standard Specifications apply only to performance and materials and how they are to be incorporated into the Work. The legal/contractual relationship sections and the measurement and pavement sections do not apply to this document.

PART 2 - PRODUCTS

2.1 STEEL REINFORCEMENT

- A. Plain-Steel Welded Wire Reinforcement: ASTM A 185, fabricated from as-drawn steel wire into flat sheets.
- B. Reinforcing Bars: ASTM A 615/A 615M, Grade 60; deformed.
- C. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars, welded wire reinforcement, and dowels in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice."

2.2 CONCRETE MATERIALS

- A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source throughout the Project:
 - 1. Portland Cement: ASTM C 150, Type II, low alkali. Supplement with the following:
 - a. Pozzolan: ASTM C 618, Class F or N Fly Ash, 100 pounds maximum per cubic yard, containing one percent or less carbon. Fly ash shall not be used in excess of 15 percent by weight of total cement quantity.
- B. Combined Aggregates: Gradation "C" conforming to SSPWC Section 201-1.3.2.
- C. Water: ASTM C 94/C 94M.

2.3 CURING MATERIALS

- A. Liquid Curing Compound: ASTM C 309, fugitive dye dissipating type, complying with Rule II 13 of the South Coast Air Quality Management District and Federal Air Quality Regulation 40 CFR 52.254.
- B. Moisture-Retaining Cover (Curing Sheet): ASTM C 171, non-staining polyethylene film or white burlap-polyethylene sheet.
- C. Water: Potable.
- D. Evaporation Retarder: Waterborne, monomolecular film forming; manufactured for application to fresh concrete.

2.4 RELATED MATERIALS

- A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber.

- B. Color Pigment: ASTM C 979, synthetic mineral-oxide pigments or colored water-reducing admixtures; color stable, free of carbon black, nonfading, and resistant to lime and other alkalis.
- C. Slip-Resistive Aggregate Finish: Factory-graded, packaged, rustproof, nonglazing, abrasive aggregate of fused aluminum-oxide granules or crushed emery with emery aggregate containing not less than 50 percent aluminum oxide and not less than 20 percent ferric oxide; unaffected by freezing, moisture, and cleaning materials.
- D. Pavement-Marking Paint: Latex, waterborne emulsion, lead and chromate free, ready mixed, complying with Caltrans Standard Specifications - Section 84 (Federal Specification No. TT-P-1952 for Blue, Red and Green paint; and State of California Standard Specification No. PTWB-01 for White, Yellow and Black paint) with drying time of less than 45 minutes.

2.5 CONCRETE MIXTURES

- A. Prepare design mixtures, proportioned according to ACI 301, with the following properties:
 - 1. Compressive Strength (28 Days): Pedestrian 2,500 psi, Vehicular 3250 psi
 - 2. Maximum Water-Cementitious Materials Ratio at Point of Placement: 0.45
 - 3. Slump Limit: 4 inches, plus or minus 1 inch.
- B. Color Pigment: Add color pigment to concrete mixture according to manufacturer's written instructions.

2.6 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Furnish batch certificates to Architect for each batch discharged and used in the Work.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Proof-roll prepared subbase surface below concrete pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding.

3.2 EDGE FORMS AND SCREED CONSTRUCTION

- A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides for pavement to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.
- B. Clean forms after each use and coat with form-release agent to ensure separation from concrete without damage.

3.3 STEEL REINFORCEMENT

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

3.4 JOINTS

- A. General: Form construction, isolation, and control joints, saw cut and tool edgings true to line with faces perpendicular to surface plane of concrete. Construct all joints at right angles to centerline, unless otherwise indicated.
- B. Cold/Construction Joints: Set construction joints at side and end terminations of pavement and at locations where pavement operations are stopped for more than one-half hour unless pavement terminates at isolation joints.
- C. Expansion/Isolation Joints: Form isolation joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, walks, other fixed objects, and where indicated.
- D. Score/Control Joints: Form weakened-plane control joints, sectioning concrete into areas as indicated. Construct control joints for a depth equal to at least one-fourth of the concrete thickness to match jointing of existing adjacent concrete pavement.
- E. Edging: Tool edges of pavement, gutters, curbs, and joints in concrete after initial floating with an edging tool to a 1/4-inch radius. Repeat tooling of edges after applying surface finishes. Eliminate tool marks on concrete surfaces.

3.5 CONCRETE PLACEMENT

- A. Moisten subbase to provide a uniform dampened condition at time concrete is placed.
- B. Comply with ACI 301 requirements for measuring, mixing, transporting, and placing concrete.
- C. Deposit and spread concrete in a continuous operation between joints. Do not push or drag concrete into place or use vibrators to move concrete into place.
- D. Screed pavement surfaces with a straightedge and strike off.
- E. Commence initial floating using bull floats or darbies to impart an open textured and uniform surface plane before excess moisture or bleed water appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading surface treatments.

3.6 FINISHING

- A. General: Do not add water to concrete surfaces during finishing operations.

- B. Trowel Finish: Apply a hard trowel finish to surfaces indicated and to floor and slab surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin film-finish coating system.
- C. Trowel and Fine-Broom Finish: Apply a partial trowel finish, stopping after second troweling, to surfaces indicated and to surfaces where ceramic or quarry tile is to be installed by either thickset or thinset methods. Immediately after second troweling, and when concrete is still plastic, slightly scarify surface with a fine broom.
- D. Slip-Resistive Broom Finish: Apply a slip-resistive finish to surfaces indicated and to exterior concrete platforms, steps, and ramps. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route.

3.7 CONCRETE PROTECTION AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
- B. Comply with ACI 306.1 for cold-weather protection.
- C. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturers written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- D. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.
- E. Curing Methods: Cure concrete by moisture curing, moisture-retaining-cover curing, curing compound or a combination of these methods.

3.8 PAVEMENT TOLERANCES

- A. Comply with tolerances as follows
 - 1. Elevation: 1/4 inch
 - 2. Thickness: Plus 3/8 inch minus 1/4 inch
 - 3. Surface: Gap below 10-foot-long, unlevelled straightedge not to exceed 1/4 inch.
 - 4. Joint Spacing: 3 inches.
 - 5. Contraction Joint Depth: Plus 1/4 inch no minus.
 - 6. Joint Width: Plus 1/8 inch, no minus.

3.9 PAVEMENT MARKING

- A. Do not apply pavement-marking paint until layout, colors, and placement have been verified with Architect.

- B. Allow concrete pavement to cure for 28 days and be dry before starting pavement marking.
- C. Sweep and clean surface to eliminate loose material and dust.
- D. Apply paint with mechanical equipment to produce pavement markings of dimensions indicated with uniform, straight edges. Apply at manufacturer's recommended rates to provide a minimum wet film thickness of 15 mils.

3.10 REPAIRS AND PROTECTION

- A. Remove and replace concrete pavement that is broken, damaged, or defective or that does not comply with requirements in this Section.
- B. Protect concrete from damage. Exclude traffic from pavement for at least 14 days after placement.
- C. Maintain concrete pavement free of stains, discoloration, dirt, and other foreign material. Sweep concrete pavement not more than two days before date scheduled for Substantial Completion inspections.

END OF SECTION 32 13 13

DIVISION 32 – EXTERIOR IMPROVEMENTS
SECTION 32 13 16
DECORATIVE CONCRETE PAVING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes colored and textured concrete paving.

1.2 PREINSTALLATION MEETINGS

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

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each type of exposed color, pattern, aggregate or texture indicated for enhanced concrete paving.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: An employer of workers trained and approved by manufacturer of decorative concrete paving systems.
- B. Ready-Mix-Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
- C. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Build mockups of full-thickness sections of concrete paving to demonstrate typical joints; surface finish, texture, and color; curing; and standard of workmanship.
 - 2. Build mockups of concrete paving in the location and of the size indicated or, if not indicated, build mockups where directed by Architect and not less than 96 inches by 96 inches.
 - 3. Mock up shall demonstrate all decorative concrete finishes called out on plans.
 - 4. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 5. Subject to compliance with requirements, approved mockups shall not become part of the completed Work.

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

- A. ACI Publications: Comply with ACI 301 unless otherwise indicated.

2.2 FORMS

- A. Form Materials: Plywood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight, and smooth exposed surfaces.

2.3 STEEL REINFORCEMENT

- A. Plain-Steel Welded-Wire Reinforcement: ASTM A 1064/A 1064M, fabricated from as-drawn steel wire into flat sheets.
- B. Reinforcing Bars: ASTM A 615/A 615M, Grade 60; deformed.
- C. Steel Bar Mats: ASTM A 184/A 184M; with ASTM A 615/A 615M, Grade 60 deformed bars; assembled with clips.
- D. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars, welded-wire reinforcement, and dowels in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete of greater compressive strength than concrete specified, and as follows:

2.4 CONCRETE MATERIALS

- A. Cementitious Materials:
 - 1. Portland Cement: ASTM C 150/C 150M, gray portland cement Type II.
 - 2. Fly Ash: ASTM C 618, Class C or F.
 - 3. Slag Cement: ASTM C 989/C 989M, Grade 100 or 120.
 - 4. Blended Hydraulic Cement: ASTM C 595/C 595M, Type IS, portland blast-furnace slag cement.
- B. Normal-Weight Aggregates: ASTM C 33/C 33M, Class 4S, uniformly graded. Provide aggregates from a single source with documented service-record data of at least 10 years' satisfactory service in similar paving applications and service conditions using similar aggregates and cementitious materials.
 - 1. Maximum Coarse-Aggregate Size: 3/8" inch nominal.
 - 2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- C. Decorative Aggregates: ASTM C 33/C 33M, Class 4S, uniformly graded. Provide aggregates from a single source with documented service-record data of at least 10 years' satisfactory service in similar paving applications and service conditions using similar aggregates and cementitious materials.
 - 1. Maximum Coarse-Aggregate Size: 1/4"-3/8" inch nominal.

2. Color: Birds Eye Brown
 3. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- D. Air-Entraining Admixture: ASTM C 260/C 260M.
- E. Chemical Admixtures: Admixtures certified by manufacturer to be compatible with other admixtures and to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material.
- F. Color Pigment: ASTM C 979/C 979M, synthetic mineral-oxide pigments or colored water-reducing admixtures; color stable, free of carbon black, nonfading, and resistant to lime and other alkalis.
- G. Water: Potable and complying with ASTM C 94/C 94M.

2.5 CURING MATERIALS

- A. Evaporation Retarder: Waterborne, monomolecular, film forming, manufactured for application to fresh concrete.
- B. Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type I, Class B, manufactured for colored concrete.
1. For integrally colored concrete, curing compound shall be pigmented type approved by coloring admixture manufacturer.
 2. For concrete indicated to be sealed, curing compound shall be compatible with sealer.

2.6 RELATED MATERIALS

- A. Joint Fillers: ASTM D 1751, asphalt-saturated cellulosic fiber or ASTM D 1752, cork or self-expanding cork in preformed strips.
- B. Polyethylene Film: ASTM D 4397, 1 mil thick, clear.

2.7 CONCRETE MIXTURES

- A. Prepare design mixtures, proportioned according to ACI 301.
- B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
1. Fly Ash or Pozzolan: 25 percent.
 2. Slag Cement: 50 percent.
 3. Combined Fly Ash or Pozzolan, and Slag Cement: 50 percent, with fly ash or pozzolan not exceeding 25 percent.
- C. Add air-entraining admixture at manufacturer's prescribed rate to result in normal-weight concrete at point of placement having an air content as follows:
1. Air Content: 5-1/2 percent plus or minus 1.5 percent.
- D. Chemical Admixtures: Use admixtures according to manufacturer's written instructions.
- E. Synthetic Fiber: Uniformly disperse in concrete mixture at manufacturer's recommended rate, but not less than 1.0 lb/cu. yd..

- F. Integral Color Pigment: Add integral color pigment to concrete mixture according to manufacturer's written instructions and to result in hardened concrete color consistent with approved mockup.
- G. Concrete Mixtures: Normal-weight concrete.
 - 1. Compressive Strength (28 Days): As indicated.
 - 2. Maximum W/C Ratio at Point of Placement: 0.50.
 - 3. Slump Limit: 4 inches, plus or minus 1 inch.

2.8 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M and ASTM C 1116/C 1116M. Furnish batch certificates for each batch discharged and used in the Work.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Proof-roll prepared subbase surface below decorative concrete paving to identify soft pockets and areas of excess yielding.

3.2 PREPARATION

- A. Remove loose material from compacted subbase surface immediately before placing concrete.

3.3 EDGE FORMS AND SCREED CONSTRUCTION

- A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.

3.4 STEEL REINFORCEMENT INSTALLATION

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

3.5 JOINTS

- A. General: Form construction, isolation, and contraction joints and tool edges true to line, with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline unless otherwise indicated.
- B. Cold/Construction Joints: Set construction joints at side and end terminations of paving and at locations where paving operations are stopped for more than one-half hour unless paving terminates at isolation joints.

- C. Expansion/Isolation Joints: Form isolation joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, walks, other fixed objects, and where indicated.
- D. Score/Contraction Joints: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of the concrete thickness.
- E. Edging: After initial floating, tool edges of paving, gutters, curbs, and joints in concrete with an edging tool to a 1/8-inch radius. Repeat tooling of edges after applying surface finishes. Eliminate edging-tool marks on concrete surfaces.

3.6 CONCRETE PLACEMENT

- A. Moisten subbase to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.
- B. Comply with ACI 301 requirements for measuring, mixing, transporting, and placing concrete.
- C. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.
- D. Screed paving surface with a straightedge and strike off.
- E. Commence initial floating using bull floats or darbies to impart an open-textured and uniform surface plane before excess moisture or bleedwater appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading surface treatments.

3.7 FLOAT FINISHING

- A. General: Do not add water to concrete surfaces during finishing operations.
- B. Float Finish: Begin the second floating operation when bleedwater sheen has disappeared and concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats or by hand floating if area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots and fill low spots. Refloat surface immediately to uniform granular texture.

3.8 INTEGRALLY COLORED CONCRETE FINISH

- A. Integrally Colored Concrete Finish: After final floating, apply the following finish:
 - 1. Medium-to-Fine-Textured Broom Finish: Draw a soft-bristle broom across float-finished concrete surface, perpendicular to line of traffic, to provide a uniform, fine-line texture.
 - 2. Top Cast, or approved equal finish: As indicated and prescribed by manufacturers specifications.
 - 3. Medium Sandblast Finish: Provide consistent even sandblast finish after initial curing period.

3.9 CONCRETE PROTECTION AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
- B. Comply with ACI 306.1 for cold-weather protection.

- C. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete but before float finishing.
- D. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.
- E. Curing Compound: Apply immediately after final finishing. Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating, and repair damage during curing period.
 - 1. Cure integrally colored concrete with a curing compound.
 - 2. Cure concrete finished with pigmented mineral dry-shake hardener with a curing compound.

3.10 PAVING TOLERANCES

- A. Comply with tolerances in ACI 117.

3.11 REPAIR AND PROTECTION

- A. Remove and replace decorative concrete paving that is broken or damaged or does not comply with requirements in this Section. Remove work in complete sections from joint to joint unless otherwise approved by Architect.
- B. Detailing: remove concrete "squeeze" left from tool placement during concrete placement and curing. Color coat areas with slurry of color hardener mixed with water and bonding agent to fill any voids or imperfections. Remove excess release agent with high-velocity blower.
- C. Protect decorative concrete paving from damage. Exclude traffic from paving for at least 14 days after placement. When construction traffic is permitted, maintain paving as clean as possible by removing surface stains and spillage of materials as they occur.
- D. Maintain decorative concrete paving free of stains, discoloration, dirt, and other foreign material. Sweep paving not more than two days before date scheduled for Substantial Completion inspections.

END OF SECTION 32 13 16

DIVISION 32 – EXTERIOR IMPROVEMENTS
SECTION 32 15 40
DECOMPOSED GRANITE SURFACING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes decomposed granite (DG) surfacing.

1.3 DEFINITIONS

- A. Decomposed Granite (DG): Non-stabilized aggregate surfacing materials as specified herein.
- B. Stabilized DG: DG that is stabilized by adding binder to the aggregate mixture.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples for Color Verification: For all proposed aggregates:
 - 1. Quantity: 5 pounds
- C. Samples for Analysis and Verification: For aggregates proposed for use in stabilized DG surfacing areas:
 - 1. After color verification samples have been approved, submit two identical samples: One to Architect and the other to binder manufacturer.
 - 2. Quantity: 5 pounds.
 - 3. Include aggregate supplier's sieve analysis for grading.
 - 4. Allow two weeks processing time for binder manufacturer to perform additional analysis to determine blending formula.
 - 5. Submit binder manufacturer's blending formula to Engineer for approval.
- D. Sample Mock-up: Provide 4 ft. x 4 ft. x 4 inch thick sample mock-up with header for each color of stabilized decomposed granite.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For installer.

- B. Manufacturer Certificates: Material Certificates: Signed by suppliers certifying that each material complies with requirements.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For stabilized DG surfacing to include in maintenance manuals.

1.7 QUALITY ASSURANCE

- A. Stabilized DG Surfacing Installer Qualifications: Installer shall have five years successful experience with projects of similar scope and design.
- B. Stabilized DG Surfacing Mockup:
 - 1. Build mockup to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
 - 2. Construction of mock-up shall be the same as construction indicated on Drawings and in specifications.
 - 3. Size: Approximately four feet by four feet by full thickness, including base.
 - 4. Include edging.
 - 5. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Engineer specifically approves such deviations in writing.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Bulk Materials:
 - 1. Accompany each delivery of bulk materials with appropriate certificates.
 - 2. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
 - 3. Do not move or handle materials when they are wet.
 - 4. Protect bulk materials from erosion. Provide erosion-control measures to prevent erosion or displacement of bulk materials, discharge of soil-bearing water runoff and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
- B. Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, name and address of manufacturer, and compliance with state and Federal laws if applicable.

1.9 FIELD CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit DG and stabilized DG surfacing to be installed according to manufacturer's written instructions. Do not install during rainy conditions or when temperature is below 40 degrees Fahrenheit and falling.

PART 2 - PRODUCTS

2.1 AGGREGATE MATERIALS

- A. Igneous rock which has weathered in place or any sedimentary material principally derived from igneous rock.
- B. Provide washed material free of organic material and other deleterious substances.
- C. C-35, crushed 3/8" minus or 1/4" minus conforming to the following gradation as determined by ASTM C 136:

<u>Sieve Size</u>	<u>Percent Passing</u> (by weight)
3/8 inch	100
No. 4	100
No. 8	93
No. 16	65
No. 30	44
No. 50	28
No. 100	16
No. 200	8.7
Resistance "R" value 82%	
Sand equivalent value 61%	

2.2 BINDER

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. PX300 Soil Stabilizer by Integrated 8A Solutions.
- B. Description: Colorless, odorless, non-toxic, organic polymer k, in concentrated form.

2.3 EDGING

- 1. Concrete curb per plans.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas to receive DG surfacing, with Installer present, for compliance with requirements and conditions affecting installation and performance of the Work.
 - 1. Where surfacing is indicated to fit with other construction, verify dimensions of other construction by field measurements before proceeding with the Work.
 - 2. Verify that subgrade is dry and in suitable condition to support surfacing and imposed loads.
 - 3. Verify that no foreign or deleterious material has been deposited within DG surfacing area. Such materials include paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, acid.
- B. If contamination by foreign or deleterious material or liquid is present within DG surfacing area, remove the contamination as directed by Engineer and replace with new uncontaminated sub-grade materials.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. General: Proof-roll subgrade using heavy, pneumatic-tired rollers to locate areas that are unstable or that require further compaction.

3.3 INSTALLATION OF BASE AT STABILIZED DG SURFACING

- A. Provide compacted layer of specified base material per plan.
- B. Pre-soak base material with water and compact to 95% per ASTM D 1557.
- C. Compaction testing to be performed by City testing agency prior to installation of stabilized DG surfacing.

3.4 INSTALLATION OF EDGINGS

- 1. Concrete curb per plan.

3.5 INSTALLATION OF STABILIZED DG SURFACING

- A. Binder manufacturer's technical representative shall visit site at start of stabilized DG surfacing installation to verify installer understands correct installation methods.
- B. Placing Aggregate
 - 1. Do not place aggregate on filter fabric.
 - 2. Place aggregate directly on prepared base.
 - 3. Depth of aggregate: 4 inches minimum or as indicated on Drawings.
 - 4. Place in equal thickness lifts not exceeding 3 inches per lift. (For example, two 2-inch lifts for 4-inch total; two 2-1/2 inch lifts for 5-inch total, etc.)
 - 5. Level to grades and cross-sections indicated on Drawings.
- C. Applying Stabilizer
 - 1. Combine project with water per manufacturer's recommendation.

- a. Pedestrian paths: 1 gallon/40 square feet
 - b. Vehicular: 1 gallon/30 square feet.
2. Spray mixture over placed aggregate heavily for even, full-depth moisture penetration of aggregate. Apply 25 to 45 gallons of water per ton of aggregate to achieve saturation. Perform random moisture depth tests using manufacturer recommended probing device which reaches full depth.
3. Do not compact until stabilized aggregate is able to accept compaction from a 2-5 ton roller without separation, plowing or any other physical compromise of aggregate. Obtain approval from Project Inspector.

D. Compaction

1. Complete compaction within 72 hours of after placing aggregate. Do not begin compaction if pumping or pancaking of the surface occurs.
2. Perform compaction using 2-5 ton double drum roller, making 3-4 passes. Do not use vibratory plate compactor or vibration feature on roller.
3. Compact stabilized aggregate to 90% relative compaction.
4. Carefully compact areas near planting and irrigation systems using 8-inch or 10-inch hand tamp.
5. Let cure 24 hours and then spray topical application. Remain off treated areas for 3-5 days.

3.6 INSTALLATION TOLERANCES

A. Thickness: Compact to produce the thickness indicated within the following tolerances:

1. Surfacing Course: Plus 1/4 inch, no minus.

B. Surface Smoothness: Compact to produce a surface smoothness within the following tolerances as determined by using a 10-foot straightedge applied transversely or longitudinally to surfaced areas:

1. Surfacing Course: 1/4 inch max.

3.7 INSPECTION

- A. General: Finished compacted surface shall be smooth and uniform, firm throughout profile, with no spongy areas.
- B. Stabilized DG Surfacing: Finished surface shall have no evidence of chipping or cracking. Loose material shall not be present on surface after installation.
- C. Repair irregularities in surfacing to approval of Engineer.

3.8 REPAIRS

- A. Excavate damaged area to depth of aggregate and square off edgings or adjacent pavements. If area is dry, moisten damaged portion lightly.
- B. Stabilized DG Surfacing: Replace with matching aggregate and binder as recommended by binder manufacturer. . Install aggregate in excavated area to match finish grade and profile indicated on Drawings. Spray stabilizer on material to achieve full moisture.
- C. Compact with an 8-inch or 10-inch hand tamp or 250-300 pound roller.

3.9 FIELD QUALITY CONTROL

- A. Testing Agency: City will engage a qualified testing agency to perform the following tests and inspections:
 - 1. Compaction of base material at stabilized DG surfacing areas according to ASTM D 1557; one test per 1,000 square feet of base.

3.10 CLEANUP AND PROTECTION

- A. Cleanup: Promptly and carefully remove debris and excess excavated materials created by DG surfacing work. Debris includes paper, grass clippings, organic material. Remove by gentle mechanical blowing or hand raking. Legally dispose of materials off City property.
- B. Protection
 - 1. Erect temporary fencing or barricades and warning signs as required to protect newly installed DG surfacing areas from traffic and public access. Maintain fencing in place for 72 hours minimum after completion of installation. Drying period might take longer due to weather conditions.
 - 2. Do not permit vehicular traffic on finished surfacing.
 - 3. Alert Engineer to nearby landscape irrigation that could possibly create damaging conditions during and after installation. Damaging conditions include standing water on or adjacent to surfacing.

3.11 MAINTENANCE SERVICE FOR STABILIZED DG SURFACING

- A. Stabilized DG Surfacing Maintenance Service: Provide 90 day full maintenance by skilled employees of stabilized DG surfacing installer.
- B. Coordinate start of stabilized DG surfacing maintenance period with start of landscape maintenance period to end at the same time.

END OF SECTION 32 15 40

DIVISION 32 – EXTERIOR IMPROVEMENTS
SECTION 32 18 16
PLAY SURFACING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes:
 - 1. Engineered wood fiber play surfacing
 - 2. Excavation for playground surfacing.

1.2 REFERENCES

- A. APPLICABLE STANDARDS ASTM International:
 - 1. ASTM C1028 Standard Test Method for Determining the Static Coefficient of friction of Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer Pull Meter Method – This standard replaces ASTM D2047 02/2019.
 - 2. ASTM E303 Standard Test Method for Measuring Surface Frictional Properties using the British Pendulum Tester
 - 3. ASTM F1292-18 Standard Specification for Impact Attenuation of Surfacing Materials within the Use Zone of Playground Equipment
 - 4. ASTM F1951 Standard Specification for Determination of Accessibility of Surface Systems under and around Playground Equipment
 - 5. ASTM F2479-12 Standard Specification for Purchase, Installation and Maintenance

1.3 SYSTEM DESCRIPTION

- A. Performance Requirements: Provide engineered wood fiber play surface, manufactured and installed to meet the following criteria:
 - 1. Shock Attenuation (ASTM F1292-09):
 - a. Gmax: Peak deceleration of no more than 200 G-max
 - b. Head Injury Criteria: No more than 1,000 for a head-first fall from the highest accessible portion of play equipment being installed as shown on drawings.
 - c. Water Permeability: 0.4 gal/yd²/second.
 - d. Accessibility: Comply with requirements of ASTM F1951.

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's product data and installation instructions.
- B. Verification Samples: Submit manufacturer's standard verification samples.
- C. Quality Assurance/Control Submittals: Submit the following:
 - 1. Certificate of qualifications of the playground surfacing installer.
 - 2. Manufacturer's Written Warranty.
 - 3. Closeout Submittals: Warranty documents.

1.5 QUALITY ASSURANCE

- A. Area Safety: Engineered wood fiber within playground equipment use zones shall meet or exceed the performance requirements of the CPSC, ADA and Fall Height Test ASTM F1292-18. IPEMA certification is required. (ASTM F1292-18 section 4.3.3: The laboratory test used to determine critical fall

height shall have been conducted on surfacing material samples identical in design, materials, components, and thickness and manufactured as the installed playground surface).

- B. Accessibility: NOTE: Children's outdoor play areas shall be in compliance with the Uniform Federal Accessibility Standards 9UFAS) FED-STD-795 and the Architectural and Engineer Instructions (9AEI) Design Criteria. The requirements of the Americans with Disabilities Act Accessibility Guidelines (ADAAG) 28 CFR Part 36 that provide equal or greater accessibility than the requirements of UFAS must also be met in children's outdoor play areas.
 - C. (EWF) Playground Surfacing intended to serve as accessible paths of travel for persons with disabilities shall be firm, stable, and slip resistant, and shall meet the requirements of ASTM F195-14 and ASTM F1292-18.
 - D. Certifications: Certified Installers should be under the installers employ for a minimum of 180 days.
- 1.6 DELIVERY, STORAGE & HANDLING
Delivery and Storage: Deliver and store in accordance with manufacturers recommendations.
- 1.7 PROJECT/SITE CONDITIONS
- A. Engineered wood fiber must be installed on a dry subsurface, with no prospect of rain within the initial installation period, and within the recommended temperature range of the manufacturer..
- 1.8 WARRANTY
- A. Warranty: Engineered wood fiber surfacing shall maintain required impact attenuation characteristics and be guaranteed against defects in workmanship and materials. Warranty will be specific to maintenance requirements and performance standards of completed product.
 - B. Proper drainage is critical to the longevity of the surfacing system. Inadequate drainage will cause premature breakdown of the system in affected areas.

PART 2 - PRODUCTS

- 2.1 ENGINEERED WOOD FIBER PLAYGROUND SURFACING SYSTEM
- A. Engineered wood fiber shall be clean, engineered wood fiber, manufactured specifically for play areas.
 - B. Engineered wood fiber manufacturer shall provide testing certification by an independent testing agency that the results comply with CPSC guidelines and ASTM standards.
 - C. Engineered wood fiber shall meet the following requirements: ASTM F1951-99 (ADA Compliance Test) and ASTM F 1292-96 (Shock Absorbency).
 - D. Manufacturer shall provide a Certificate of Insurance that shall provide coverage for products liability with the limit of liability not less than \$1,000,000.
 - E. The manufacturer shall also provide written guarantee for three (3) years from the date of installation against decay and biochemical degradation calling for replacement of defective materials during the guarantee period.

- F. Manufacturer certifies that the engineered wood fiber has been installed in not less than three (3) sites for periods of not less than three (3) years demonstrating the claims made with regard to these Specifications.
- G. Manufacturer: Turboscape, or approved equal.
Contact: 866.887.2672
Manufacturers Website: <https://turboscape.com/>

PART 3 - EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

- A. Comply with the instructions and recommendations of the playground surfacing manufacturer.

3.2 PREPARATION

- A. Finished Grade/Slope: Verify that finished elevations of adjacent areas are as indicated on the architectural or site plans, that the appropriate sub-grade elevation has been established for the particular safety surface to be installed, and that the subsurface has been installed per architectural, site or equipment plans while meeting accessibility and use zones requirements.
- B. Sub Base: Sub base shall be prepared per grading plans.

3.3 INSTALLATION

- A. Engineered wood fiber shall be installed per manufacturer's recommendations.
- B. Thickness: Construction methods, such as the use of measured screeds or guides shall be employed to ensure that full depth or specified surfacing material is installed. Surfacing system thickness throughout the playground equipment use zone shall be as required to meet the impact attenuation requirements specified herein. The manufacturer's representative shall supervise the installation to ensure that the system meets the impact attenuation requirements as specified herein.
- C. Security & Waste Disposal: Surface installation crew shall be responsible for the protection of surface during the installation process while on site only. Owner or general contractor shall be responsible for having a dumpster on site for all waste and debris. Failure to provide security and a dumpster will result in additional cost.
- D. Utilities & Access: The general contractor shall be responsible for transporting materials from delivering carrier to the installation site.

3.4 PROTECTION

- A. Protect the installed playground surface from damage resulting from subsequent construction activity on the site.
- B. Protect playground area and keep surfacing free of any trash or debris.

END OF SECTION 32 18 16

DIVISION 32 – EXTERIOR IMPROVEMENTS

SECTION 32 31 00

FENCES AND GATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions.

1.2 SUMMARY

- A. This Section includes the following:

- 1. Fencing system complete with all hardware, posts, rails, gates, and accessories necessary for a structurally integrated and aesthetically balanced installation.
- 2. Swinging gates and related hardware
- 3. Concrete foundation for posts
- 4. Salvaged gates and hardware

- B. Related Sections

- 1. 03 30 00 Cast in Place Concrete
- 2. 31 00 00 Earthwork

1.3 REFERENCES

- A. American Society for Testing and Materials:

- 1. ASTMA53 Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
- 2. ASTM A123 Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
- 3. ASTM A500 Specification for Cold-Form Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
- 4. ASTM A501 Standard Specification for Hot-Form Welded and Seamless Carbon Steel Structural Tubing
- 5. ASTM B117 Standard Practice for Operating Salt Spray (Fog) Apparatus
- 6. ASTM B221 Standard Specifications for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles and Tubes
- 7. ASTM B633 Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel
- 8. ASTM C33 Standard Specification for Concrete Aggregates
- 9. ASTM C150 Standard Specification for Portland cement
- 10. ASTM C207 Standard Specification for Hydrated Lime for Masonry Purposes
- 11. ASTM D1654 Standard Test Method for Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments
- 12. ASTM D2248 Standard Practice for Detergent Resistance of Organic Finishes
- 13. ASTM D2794 Standard Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation
- 14. ASTM D3359 Standard Test Methods for Measuring Adhesion by Tape Test
- 15. ASTM D3363 Standard Test Method for Film Hardness by Pencil Test
- 16. ASTM D4141 Standard Practice for Conducting Black Box and Solar Concentrating Exposures of Coatings

17. ASTM F1043 Standard Specifications for Strength and Protective Coating on Metal Industrial Chain-Link Fence Framework
18. ASTM F2453 Standard Specifications for Welded Wire Mesh Fence Fabric
19. ASTM F2781-15 Standard Specifications for Testing Forced Entry, Ballistic and Low Impact Resistance of Security Fence Systems
20. ASTM F2458 Standard Specifications for Expanded Metal Fence Systems for Security Purposes

1.4 SYSTEM DESCRIPTION

- A. The Manufacturer shall supply a Fencing System complete with all hardware, posts, plate unions, security mesh panels, gates and accessories necessary for a complete and aesthetically balanced installation.
- B. Design Requirements: Fencing system, foundation and installation shall be engineered to withstand 90 mph wind load.

1.5 SUBMITTALS

- A. Product Data: For each product indicated, for each product indicated, include manufacturer's product literature, shop drawings, and product performance data indicating compliance with this specification.
- B. Installation Drawings: Show layout, locations, components, materials, dimensions, sizes, weights, finishes of components, installation and operational clearances, gate swings, post sizes, spacing, gate details/dimensions, details of post anchorage, and post attachment/bracing.
- C. Samples: Provide color selections and samples for finishes on fence and accessories if requested by the specifier. (RAL number required)

1.6 QUALITY ASSURANCE

- A. The contractor shall provide laborers and supervisors who are thoroughly familiar with the type of construction involved and the materials and techniques specified. Review and follow manufacturer's installation instructions.
- B. Provide fence system and gates, as a complete unit produced by a single manufacturer, including necessary erection accessories, fittings and fastenings.
- C. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with a minimum of 10 years documented experience.
- D. Field Quality Control to be conducted by Owner's Project Manager.

1.7 DELIVERY, HANDLING, AND STORAGE

- A. Deliver fence materials, gates, posts, and accessories to project site, completely pre-finished. Upon receipt at the job site, all materials shall be checked to ensure that no damages occurred during shipping. Materials shall be handled and stored properly to protect against damage and theft.
- B. Handle fence components to protect finish coating from any scuffs, abrasion or other damage during unloading and installation. Excessive damage to factory applied coatings will be cause for rejection.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Acceptable Products and Manufacturer:

1. Securifor 4D Fence System, Betafence, Ennis, TX 75119, fax: 972-878-4703, [888-650-4766](tel:888-650-4766) Nick Dobson 619-214-9115

2. Approved equal

2.2 MATERIAL

A. Fencing System Subject to the performance and design requirement specified herein, fence and gates shall be manufactured from the following materials:

1. Fence Framework:

a. Squares

- i. Steel Posts to be per ASTM F2408 with minimum yield strength to 45,000psi
- ii. Material greater than 3/16" thickness and larger than 6 inch O.D. shall be formed per ASTM A53, ASTM A500 Grade B, or ASTM A501, with minimum yield strength of 46,000 psi and shall be hot dipped galvanized in accordance with ASTM A123.

2. Panels:

a. Security Mesh

- i. 4D Infill panels shall be made from round 8ga alternating horizontal welded wires at 1/2" on center. Alternating horizontal wires are welded to 8ga round vertical wires at 3" on center. The alternating pattern of horizontal wires results in a 750% more ridged panel than a standard flat panel. Wire mesh panels shall be powder coated to match fence posts and fittings.
- ii. Sheets, rails and posts to be cut, sized, and located as indicated in the certified and approved submittal/installation Drawings per manufactures standard dimensions.

3. Fence Framework

- a. Post Caps: Shall be of press on the type steel caps zinc plated to ASTM B633, Service class II or malleable steel caps galvanized to ASTM A123 finished to match fence system.
- b. Panel / Post Attachments / Brackets: Shall be stainless steel or galvanized steel with stainless, galvanized or zinc plated fasteners. All brackets shall be finished to match fence finish and color.

4. Swing Gates: Design of gates shall be shown on the submittals. Reinstall salvaged swing gates complete, functioning, etc.

- a. Gate Frames and Mesh Infill Panels: Materials as described herein above.

- b. Frame Members: Shall be MIG welded. If necessary, truss rods or cables to be used to prevent gate sag and allow for future adjustment.

- c. Gate Posts and Foundation: Size as determined by Engineer, based on gate size, local wind loading requirements, and installation type.
- d. Hinges: Manufacturer's standard hinges, structurally capable of supporting gate leaf and allow opening and closing without binding. Non-lift-off type hinge design shall permit gate to swing 180° (degrees). Hinge pins shall be non-removable
- e. Latch: Capable of retaining gate in closed position and have provision for padlock.
- f. Keeper: Provide keeper for each gate leaf over 5 feet wide. Gate keeper shall consist of mechanical device for securing free end of gate when in fully open position.

2.3 POWDER COATED FACTORY FINISH

- A. Coating Material: Posts, post caps, rails, pales, brackets and security mesh shall be finished with a factory applied TGIC polyester powder coating of the "Super-Durable" class. Powder coated finish shall meet or exceed the following performance criteria. Color shall be Black.
- B. Applicable Requirements to Validate the Coating Process:
 - 1. Adhesion Resistance: ASTM D3359, Measuring Adhesion by Tape Test, Method B.
 - a. Minimum Performance Requirement: Coating retention of not less than 95%.
 - 2. Impact Resistance: ASTM D2794, Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact).
 - a. Minimum Performance Requirement: resistance to impact – Pass, 9 N m.
 - 3. Film Hardness ASTM D3363, Film Hardness by Pencil Test
 - a. Minimum Performance Requirement – Minimum Hardness: 2H.
 - 4. Solar Concentration Exposure: ASTM D4141, Conducting Black Box and Solar Concentrating Exposures of Coatings, Method C. (Equivalent to EMMAQUA NTW)
 - a. Minimum Performance Requirement - coating must test to a minimum of 50% Gloss Retention at 1,400 MJ/m² with no film failure, chalking, cracking or checking and no more than 10% fading.
 - 5. Film Thickness: ASTM G12, 2.0 min.
 - 6. Flexibility: ASTM D-1737-89, No breaks, flakes or cracks on Q-panel 5B (100% adhesion to the substrate).
 - 7. Gloss 60 angle: ASTM D-523-89. 50- 60
 - 8. Abrasion Resistance: ASTM D1044, 90-95 mg weight loss
 - 9. Accelerated Weathering: ASTM G-23, 1000 hours (70% gloss retention, ΔE: <2.0).
 - 10. Humidity: ASTM D2247, 1000 hours – No blisters

11. Thickness: Provide film thickness of 2-4 mils as measured by manufacturer's standard powder coat measurement and inspection procedures.
12. Pretreatment: The fence sheeting and framework shall be prepared using a 7 stage Zinc Phosphate wash line. The pre-treatment cleaning system will remove foreign material and to properly prepare the surface to achieve the coating system requirements specified above.
13. Curing: Heat cure in accordance with powder manufacturer's prescribed cure schedule to properly crosslink and bond finish to metal substrate.
14. Chemical Resistance: ASTM B117
 - a. Corrosion Resistance:
 - 1) Procedure: Preparation of Test Specimens- Perform a single scribe the length of the specimen, within one inches of any edge and deep enough to expose the base metal. Expose the specimen for 1,000 hours according to ASTM B117-07 using a 5% salt solution and 95°F operational temperature. After exposure, remove specimens and wipe dry. Immediately apply tape (Permacel 99 or equal) over scribed are by pressing down firmly against the coating. Sharply pull the tape off at a right angle to the surface being tested.
 - a) Performance: The required is a minimum of seven on the scribed edge and minimum blister rating of eight within the test specimen field in accordance with tables in ASTM D1654.

2.4 CONCRETE FOOTINGS

- A. General: Comply with ACI 301 for cast-in-place concrete; materials consisting of Portland cement complying with ASTM C150, aggregates complying with ASTM C33, and potable water.
- B. Concrete Mixes: Normal-weight concrete air entrained with not less than 3000-psi (20.7- MPa) compressive strength (28 days), 3-inch (75-mm) slump, and 1-inch (25-mm) maximum size aggregate.
- C. Footings: Footings shall be minimum 3,000 psi after twenty-eight (28) days concrete. Footing sizes shall be determined by Engineer.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Verify areas to receive fencing.
- B. Coordinate fence installation with work of other sections listed in these specifications.
- C. Examine conditions under which fencing and gates are to be installed. Notify Contractor of unsatisfactory conditions. Do not proceed with work until conditions are satisfactory to the installer.

3.2 INSTALLATION

- A. Install fence and gates in accordance with manufacturer's instructions and approved installation drawings. Install fencing to withstand wind load as specified.
- B. Handle fence components to protect finish coating from any scuffs, abrasion or other damage during installation. Excessive damage to factory applied coatings will be cause for rejection.
- C. Space posts at dimensions indicated in the installation drawings. Attach fence rails to posts using stainless steel panel hanger brackets supplied by manufacturer. Field welding of panels to posts is unacceptable as it will cause significant damage to the galvanizing and powder coat protective finishes.
- D. Concrete Footings: Place concrete around posts and vibrate or tamp for consolidation. Verify that posts are set plumb, aligned, and at correct height and spacing, and stabilized in position during placement and finishing operations until concrete is sufficiently cured. Protect portion of posts above ground from concrete splatter.
- E. Install gates level, plumb, and secure for full opening without interference. Attach hardware using tamper-resistant or concealed means. Install ground-set items in concrete for anchorage. Adjust gate to operate smoothly, easily, and quietly throughout entire operational range. Confirm that latches and locks engage accurately and securely without forcing or binding.
- F. Avoid unnecessary cutting, drilling and welding of pre-finished fence components. If necessary, to cut drill, weld or otherwise modify product due to field conditions.
- G. Touch-up any necessary areas by lightly sanding; apply a zinc-rich cold galvanizing primer followed by a high-quality acrylic lacquer paint to match finish. (Touch-up paint available from manufacturer) Note: field applied touch-up cannot match the performance of factory applied finishes and should be limited in use.

3.3 CLEANING

- A. Fence contractor shall remove packing materials and unused product and level uneven areas due to excavations created by fence installations.

END OF SECTION 32 31 00

DIVISION 32 - EXTERIOR IMPROVEMENTS
SECTION 32 31 19
DECORATIVE METAL FENCES AND GATES

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Decorative Steel Panel Fencing
- B. Decorative Steel Gates

1.02 RELATED WORK

- A. Section 03 30 00: Cast-in-Place Concrete: Concrete post footings.
- B. Section 05 50 00: Metal Fabrications

1.03 SYSTEM DESCRIPTION

- A. Furnish, install, make adjustments, and test complete fencing system where shown, including appurtenant footings, hardware, mountings, or connections required for compliance with Manufacturer's installation requirements and in compliance with the project plans, additional specification sections listed above, and applicable building codes and standards.

1.04 Quality Assurance

- A. Use adequate numbers of skilled workmen trained and experienced in necessary trades and crafts and completely familiar with specified requirements and methods for proper performance of Work of this section.
- B. Qualifications:
 - 1. Manufacturer:
 - (a) 5 years' experience manufacturing components similar to or exceeding requirements of project.
 - (b) Having sufficient capacity to produce and deliver required materials without causing delay in work.
 - (c) Capable of providing field service representation during construction.
 - 2. Licensed Professional: A Professional Structural Engineer, experienced in security fencing design, and licensed in the State in which the Project is located.
 - 3. Installer: Acceptable to the manufacturer, experienced in performing work of this section and has specialized in installation of work similar to that required for this project.
- C. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

1.05 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate with work of other trades for proper time and sequence to avoid construction delays.
- B. Conduct preinstallation meeting one week prior to commencing work of this Section and on-site installations to verify project requirements, substrate conditions and coordination with other building subtrades, and to review manufacturer's installation instructions and manufacturer's warranty requirements.

1.06 REFERENCES

- A. ASTM International (ASTM):
 - 1. ASTM A36 Standard Specification for Carbon Structural Steel.

2. ASTM A53 Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
3. ASTM A653 Standard Specification for Steel Sheet, Zinc-Coated Galvanized or Zinc-Iron Alloy-Coated Galvannealed by the Hot-Dip Process.
4. ASTM B117 Standard Practice for Operating Salt Spray (Fog) Apparatus.
5. ASTM D3359 Standard Test Methods for Measuring Adhesion by Tape Test.
6. ASTM F626 Standard Specification for Fence Fittings.
7. ASTM G26 Practice for Operating Light Exposure Apparatus (Xenon Arc Type) With and Without Water for Exposure of Nonmetallic Materials (Withdrawn 2000).
8. ASTM G53 Practice for Operating Light and Water Exposure Apparatus (Fluorescent UV Condensation Type) for Exposure of Nonmetallic Materials (Withdrawn 2000).

1.07 SUBMITTALS

- A. Furnish the following submittals in accordance with Contract Conditions.

submittal	description
ACTION	
Product Data	1. Manufacturer's product data. 2. Catalog pages illustrating products to be incorporated into project. 3. Material Safety Data Sheets (MSDS).
Shop Drawings	1. Layout of fencing, including post location, types and locations of gates. 2. Footing details. 3. Fastening details, gate details, and relationships to adjacent construction. 4. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items
Material Samples	Submit full size physical samples of all materials, colors and finishes for review and approval by ENGINEER Samples can be returned to Contractor for incorporation in work/project.
Design Data	Submit engineering data illustrating compliance with specified design and performance criteria. Have submittal signed and sealed by the Licensed Professional.
INFORMATION	
	Welding certificates.
Test and Evaluation Reports	Certified test reports showing compliance with specified performance characteristics and physical properties.
Manufacturer's Instructions	Submit manufacturer's storage and installation instructions and requirements.
Source Quality Control	Submit documentation verifying that components and materials specified in this Section are from single manufacturer.
Manufacturer's Field Reports	Submit manufacturer's field reports.

submittal	description
Qualification Letters or Certificates	Required for Manufacturer, Licensed Professionals, and Installers performing work on this project. Also submit certifications of procedure qualifications for each procedure used.
CLOSEOUT	
Operation and Maintenance Data	Submit operation and maintenance data for installed products in accordance with Section [01 78 23 - Operation and Maintenance Data]. Include: Manufacturer's instructions detailing maintenance requirements. Parts catalog giving complete list of available parts. Replacement parts with cuts and identifying numbers.

1.08 PROJECT CONDITIONS

Field Measurements: Verify actual locations of walls, mow curbs, paving, and other construction contiguous with metal fabrications and fences by field measurements before fabrication

1.09 DELIVERY, STORAGE, AND HANDLING

A. Delivery and Acceptance Requirements:

1. Deliver material in accordance with Section [01 61 00 - Common Product Requirements] and in accordance with manufacturer's written instructions.
2. Deliver materials in manufacturer's original packaging with identification labels intact and in sizes to suit project.

B. Storage and Handling Requirements

1. Store materials protected from exposure to harmful weather conditions and at temperature conditions recommended by manufacturer.

PART 2 PRODUCTS

2.01 MANUFACTURER

- A. Single Source Responsibility: Provide components and materials specified in this section from a single manufacturer.
- B. Substitution Limitations: Substitutions: In accordance with Contract Conditions.
- C. Acceptable Manufacturer include the following or equal:
 1. Manufacturer: Artisan Panels Inc, (714) 351-3234.

2.02 DESCRIPTION

- A. Compatibility: Ensure components and materials are compatible with specified accessories and adjacent materials.

2.03 MATERIALS/COMPONENTS/FINISHES: Per Plans

A. Finishes

1. Galvanize: Hot-dip galvanize in accordance with ASTM A653.
2. Finish: Manufacturer's standard Marine Fusion Bond Coating.
 - (a) Performance:
 - (1) Loss of Adhesion (ASTM D3359): Zero loss.
 - (2) Corrosion: (ASTM B117): Under-film scribe tested for 1000 hours: 0–0.5 mm.

- (3) Salt Resistance (ASTM B117): 20,000 hours with no blistering, cracking, corrosion or flaking.
 - (4) UV Performance (ASTM G26 and G53): No appreciable loss of color, gloss or mechanical properties for 2000 hours or five years in California at 45 degrees by the sea in the sun.
3. Color: as indicated on the drawings

2.04 SOURCE QUALITY CONTROL

- A. Contractor to describe each test to be conducted that is required by fence manufacture. Include test method, sampling requirements, observation by independent authorities (if any) and reporting requirements. Describe each inspection to be conducted, including method, personnel and reporting requirements.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verification of Conditions: Verify that conditions of substrates previously installed under other sections or contracts are acceptable for product installation in accordance with manufacturer's instructions prior to security fencing and gate installation.
 - 1. Inform general contractor of unacceptable conditions immediately upon discovery.
 - 2. Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval from engineer.

3.02 PREPARATION

- A. Surface Preparation: Prepare surface in accordance with manufacturer's written recommendations and coordinate with Section.

3.03 INSTALLATION

- A. Coordinate fencing and gate work with work of other trades for proper time and sequence to avoid construction delays.
- B. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.
- C. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- D. Install fencing and gates plumb and level.
- E. Accurately fit, align, securely fasten and install free from distortion or defects.
- F. Furnish and install fencing and gate materials at locations shown on Submittals.
- G. The following installation standards shall be followed:
 - 1. Applicable OSHA and Cal OSHA regulations
 - 2. Applicable building and fire code requirements
 - 3. Manufacturer's installation and warranty requirements
- H. Refer variances between above documents and Contract Documents to the Engineer.
- I. Install fencing and gates according to Manufacturer's installation and warranty requirements.
- J. Fencing and gate materials shall be furnished and installed by Contractor at locations shown on Submittals.

- K. Install fencing and gate materials to tolerances recommended by Manufacturer. Unless otherwise shown, install fencing true, plumb, and level using precision gauges and levels.
- L. Built-up parts shall be free of warp.

3.04 ADJUSTING

- A. Adjust components and systems for correct function and operation in accordance with manufacturer's written instructions.
- B. Lubricate moving parts to operate smoothly and fit accurately.

3.05 FIELD QUALITY CONTROL

- A. Field testing shall include the following:

Item	Test for	Test Standard (ASTM or Other Test Standard)	Frequency	First Test Paid for by	Retests Paid for by
Ornamental Steel Fences	No bends, twists or open joints No projecting edges or corners at intersections	Visual inspection	All fencework and gates	Contractor	Contractor
	Field Performance	Demonstrate compliance to Contract Documents and Manufacturer's printed literature	1 test	Contractor	Contractor
	Warranty Inspection	Demonstrate compliance to Contract Documents and Manufacturer's printed literature	1 test	Contractor	Contractor

3.06 CLEANING

- A. Waste Management:
 - 1. Contractor to follow Best Management Practices for waste removal.
 - 2. Collect recyclable waste and dispose of or recycle field generated construction waste created during demolition, construction or final cleaning.
 - 3. Remove recycling containers and waste bins from site.

3.07 PROTECTION

- A. Protect installed product from damage during construction.
- B. Repair damage to adjacent materials caused by installation of decorative metal fence and gates system

END OF SECTION 32 31 19

DIVISION 32 – EXTERIOR IMPROVEMENTS
SECTION 32 84 00
PLANTING IRRIGATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Pipes, tubes, and fittings.
2. Encasement for piping.
3. Manual valves.
4. Pressure-reducing valves.
5. Automatic control valves.
6. Automatic drain valves.
7. Transition fittings.
8. Dielectric fittings.
9. Miscellaneous piping specialties.
10. Quick couplers.
11. Drip irrigation specialties.
12. Controllers.
13. Boxes for automatic control valves.

1.2 DEFINITIONS

- A. **Circuit Piping:** Downstream from control valves to sprinklers, specialties, and drain valves. Piping is under pressure during flow.
- B. **Drain Piping:** Downstream from circuit-piping drain valves. Piping is not under pressure.
- C. **ET Controllers:** EvapoTranspiration Controllers. Irrigation controllers, which use some method of weather-based adjustment of irrigation. These adjusting methods include use of historical monthly averages of ET, broadcasting of ET measurements, or use of on-site sensors to track ET.
- D. **Main Piping:** Downstream from point of connection to water distribution piping to, and including, control valves. Piping is under water-distribution-system pressure.
- E. **Low Voltage:** As defined in NFPA 70 for circuits and equipment operating at less than 50 V or for remote-control, signaling power-limited circuits.

1.3 ACTION SUBMITTALS

A. Product Data:

1. Pipes, tubes, and fittings.

2. Manual valves.
3. Pressure-reducing valves.
4. Automatic control valves.
5. Automatic drain valves.
6. Transition fittings.
7. Dielectric fittings.
8. Miscellaneous piping specialties.
9. Sprinklers.
10. Quick couplers.
11. Drip irrigation specialties.
12. Controllers.
13. Boxes for automatic control valves.
14. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

B. Wiring Diagrams: For power, signal, and control wiring.

1.4 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Irrigation systems, drawn to scale, on which components are indicated and coordinated with each other, using input from Installers of the items involved. Also include adjustments necessary to avoid plantings and obstructions, such as signs and light standards.
- B. Zoning Chart: Indicate each irrigation zone and its control valve.
- C. Controller Timing Schedule: Indicate timing settings for each automatic controller zone.
- D. Field Quality-Control Submittals:
 1. Field quality-control reports.
- E. Qualification Statements: For Installer.
- F. Delegated design engineer qualifications.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For sprinklers, controllers, and automatic control valves to include in operation and maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Extra Stock Material: Furnish extra materials to Owner that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 1. Bubblers: Equal to 5 percent of amount installed for each type indicated, but no fewer than 5 units.
 2. Drip-Tube System Tubing: Equal to 5 percent of total length installed for each type and size indicated, but not less than 500 ft. (152 m).

- B. Schedule of maintenance material items.

1.7 QUALITY ASSURANCE

A. Qualifications:

1. Installers: Entity that employs a Certified Irrigation Designer - Landscape qualified by the Irrigation Association, Professional Class member of the American Society of Irrigation Consultants, Professional Technical Class member of the American Society of Irrigation Consultants.

- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver piping with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe-end damage and entrance of dirt, debris, and moisture.
- B. Store plastic piping protected from direct sunlight. Support piping to prevent sagging and bending.

1.9 FIELD CONDITIONS

- A. Interruption of Existing Water Service: Do not interrupt water service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary water service according to requirements indicated:
 1. Notify Owner no fewer than two days in advance of proposed interruption of water service.
 2. Do not proceed with interruption of water service without Owner's written permission.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Irrigation Zone Control: Automatic operation with controller and automatic control valves.
- B. Location of Sprinklers and Specialties: Design location is approximate. Make minor adjustments necessary to avoid plantings and obstructions, such as signs and light standards. Maintain 100 percent irrigation coverage of areas indicated.

2.2 PIPES, TUBES, AND FITTINGS

- A. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, and fitting materials, and for joining methods for specific services, service locations, and pipe sizes.
- B. Hard Copper Tube: ASTM B88, Type L (ASTM B88M, Type B), and ASTM B88, Type M (ASTM B88M, Type C), water tube, drawn temper.
 - 1. Copper Pressure Fittings: ASME B16.18, cast-copper-alloy or ASME B16.22, wrought-copper solder-joint fittings. Furnish wrought-copper fittings if indicated.
 - 2. Bronze Flanges: ASME B16.24, Class 150, with solder-joint end.
 - 3. Copper Unions: MSS SP-123, cast-copper-alloy, hexagonal-stock body, with ball-and-socket, metal-to-metal seating surfaces and solder-joint or threaded ends.
- C. PVC Pipe: ASTM D1785, PVC 1120 compound, Schedules 40 and 80.
 - 1. PVC Socket Fittings: ASTM D2466, Schedules 40 and 80.
 - 2. PVC Threaded Fittings: ASTM D2464, Schedule 80.
 - 3. PVC Socket Unions: Construction similar to that of MSS SP-107, except both headpiece and tailpiece shall be PVC with socket ends.
- D. PVC Pipe, Pressure Rated: ASTM D2241, PVC 1120 compound, SDR 21 and SDR 26.
 - 1. PVC Socket Fittings: ASTM D2467, Schedule 80.
 - 2. PVC Socket Unions: Construction similar to that of MSS SP-107, except both headpiece and tailpiece shall be PVC with socket or threaded ends.

2.3 PIPING JOINING MATERIALS

- A. Pipe-Flange Gasket Materials: AWWA C110, rubber, flat face, 1/8 inch (3 mm) thick unless otherwise indicated; full-face or ring type unless otherwise indicated.
- B. Metal, Pipe-Flange Bolts and Nuts: ASME B18.2.1, carbon steel unless otherwise indicated.
- C. Brazing Filler Metals: AWS A5.8/A5.8M, BCuP Series, copper-phosphorus alloys for general-duty brazing unless otherwise indicated.
- D. Solder Filler Metals: ASTM B32, lead-free alloys. Include water-flushable flux in accordance with ASTM B813.
- E. Solvent Cements for Joining PVC Piping: ASTM D2564. Include primer in accordance with ASTM F656.
- F. Plastic, Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer unless otherwise indicated.

2.4 MANUAL AND SHUT-OFF VALVES

- A. Bronze Gate Valves:

1. Description:

- a. Standard: MSS SP-80, Type 2.
- b. Class: 125.
- c. CWP Rating: 200 psig (1380 kPa).
- d. Body Material: ASTM B62 bronze with integral seat and screw-in bonnet.
- e. Ends: Threaded or solder joint.
- f. Stem: Bronze, nonrising.
- g. Disc: Solid wedge; bronze.
- h. Packing: Asbestos free.
- i. Handwheel: Malleable iron, bronze, or aluminum.

2.5 AUTOMATIC CONTROL VALVES

- A. As noted on the irrigation legend and plans.
- B. Bronze, Automatic Control Valves:
 - 1. Description: Cast-bronze body, normally closed, diaphragm type with manual-flow adjustment, and operated by 24 V ac solenoid.
- C. Plastic, Automatic Control Valves:
 - 1. Description: Molded-plastic body, normally closed, diaphragm type with manual-flow adjustment, and operated by 24 V ac solenoid.

2.6 AUTOMATIC DRAIN VALVES

- A. Description: Spring-loaded-ball type of corrosion-resistant construction and designed to open for drainage if line pressure drops below 2-1/2 to 3 psig (17 to 20 kPa). To be installed in-line on lateral line to alleviate low head drainage conditions as necessary.

2.7 TRANSITION FITTINGS

- A. General Requirements: Same size as, and with pressure rating at least equal to and with ends compatible with, piping to be joined.
- B. Transition Couplings:
 - 1. Description: AWWA C219, metal sleeve-type coupling for underground pressure piping.
- C. Plastic-to-Metal Transition Fittings:
 - 1. Description: PVC one-piece fitting with manufacturer's Schedule 80 equivalent dimensions; one end with threaded brass insert and one solvent-cement-socket or threaded end.
- D. Plastic-to-Metal Transition Unions:
 - 1. Description: MSS SP-107, PVC four-part union. Include one brass or stainless steel threaded end, one solvent-cement-joint or threaded plastic end, rubber O-ring, and union nut.

2.8 DIELECTRIC FITTINGS

- A. General Requirements: Assembly of copper alloy and ferrous materials or ferrous material body with separating nonconductive insulating material suitable for system fluid, pressure, and temperature.
- B. Dielectric Unions:
 - 1. Description: Factory-fabricated union, NPS 2 (DN 50) and smaller.
 - a. Pressure Rating: 150 psig (1035 kPa) minimum.
 - b. End Connections: Solder-joint copper alloy and threaded ferrous; threaded ferrous.
- C. Dielectric Flanges:
 - 1. Description: Factory-fabricated, bolted, companion-flange assembly, NPS 2-1/2 to NPS 4 (DN 65 to DN 100) and larger.
 - a. Pressure Rating: 150 psig (1035 kPa) minimum.
 - b. End Connections: Solder-joint copper alloy and threaded ferrous; threaded solder-joint copper alloy and threaded ferrous.
- D. Dielectric-Flange Kits:
 - 1. Description: Nonconducting materials for field assembly of companion flanges, NPS 2-1/2 (DN 65) and larger.
 - a. Pressure Rating: 150 psig (1035 kPa) minimum.
 - b. Gasket: Neoprene or phenolic.
 - c. Bolt Sleeves: Phenolic or polyethylene.
 - d. Washers: Phenolic with steel backing washers.
- E. Dielectric Couplings:
 - 1. Description: Galvanized-steel coupling.
 - a. Pressure Rating: 300 psig (2070 kPa) at 225 deg F (107 deg C).
 - b. End Connections: Female threaded.
 - c. Lining: Inert and noncorrosive, thermoplastic lining.
- F. Dielectric Nipples:
 - 1. Description: Electroplated steel nipple complying with ASTM F1545.
 - a. Pressure Rating: 300 psig (2070 kPa) at 225 deg F (107 deg C).
 - b. End Connections: Male threaded or grooved.
 - c. Lining: Inert and noncorrosive, propylene.

2.9 MISCELLANEOUS PIPING SPECIALTIES

- A. Water Hammer Arresters: ASSE 1010 or PDI WH 201, with bellows or piston-type pressurized cushioning chamber and in sizes complying with PDI WH 201, Sizes A to F.
- B. Pressure Gages: ASME B40.1. Include 4-1/2-inch- (115-mm-) diameter dial, dial range of two times system operating pressure, and bottom outlet.

2.10 SPRINKLERS

A. Plastic, Pop-up, Gear-Drive Rotary Sprinklers or Bubblers:

1. As noted on the irrigation legend and plans.
2. Description:
 - a. Body Material: ABS.
 - b. Nozzle: ABS.
 - c. Retraction Spring: Stainless steel.
 - d. Internal Parts: Corrosion resistant.
3. Capacities and Characteristics:
 - a. As noted on the irrigation legend and plans. :

2.11 QUICK COUPLERS

- A. As noted on the irrigation legend and plans.
- B. Description: Factory-fabricated, bronze or brass, two-piece assembly. Include coupler water-seal valve; removable upper body with spring-loaded or weighted, rubber-covered cap; hose swivel with ASME B1.20.7, 3/4-11.5NH threads for garden hose on outlet; and operating key.
 1. Locking-Top Option: Vandal-resistant locking feature. Include one matching key(s).

2.12 DRIP IRRIGATION SPECIALTIES

- A. As noted on the irrigation legend and plans.
- B. Drip Tubes with Remote Discharge:
 1. Tubing: Flexible PE or PVC with plugged end.
 2. Emitters: Devices to deliver water at approximately 20 psig (138 kPa).
 - a. Body Material: PE or vinyl, with flow control.
 - b. Mounting: Inserted into tubing at set intervals.
- C. Application Pressure Regulators: Brass or plastic housing, NPS 3/4 (DN 20), with corrosion-resistant internal parts; capable of controlling outlet pressure to approximately 20 psig (138 kPa).
- D. Air Relief Valves: Brass or plastic housing, with corrosion-resistant internal parts.
- E. Vacuum Relief Valves: Brass or plastic housing, with corrosion-resistant internal parts.

2.13 CONTROLLERS

A. Description:

1. Controller Stations for Automatic Control Valves: Each station is variable from approximately 5 to 60 minutes. Include switch for manual or automatic operation of each station.
2. Exterior Control Enclosures: As noted on the electrical plans. NEMA 3R, UL 508A, weatherproof, with locking cover and two matching keys; include provision for grounding.
 - a. Body Material: Stainless steel sheet metal.
 - b. Mounting: Freestanding type for concrete base.
3. Control Transformer: 24 V secondary, with primary fuse.
4. Timing Device: Adjustable, 24-hour, 14-day clock, with automatic operations to skip operation any day in timer period, to operate every other day, or to operate two or more times daily.
 - a. Manual or Semiautomatic Operation: Allows this mode without disturbing preset automatic operation.
 - b. Nickel-Cadmium Battery and Trickle Charger: Automatically powers timing device during power outages.
 - c. Surge Protection: Metal-oxide-varistor type on each station and primary power.
5. Smart Controllers: As noted on the irrigation legend and plans. Calsense or approved equal. ET based, tested in accordance with IA SWAT Climatological Based Controllers 8th Draft Testing Protocol and compliant with ASHRAE 189.1.
6. Wiring: UL 493, Type UF multiconductor, with solid-copper conductors; insulated cable; suitable for direct burial.
 - a. Feeder-Circuit Cables: No. 12 AWG minimum, between building and controllers.
 - b. Low-Voltage, Branch-Circuit Cables: No. 14 AWG minimum, between controllers and automatic control valves; color-coded different from feeder-circuit-cable jacket color; with jackets of different colors for multiple-cable installation in same trench.
 - c. Splicing Materials: Manufacturer's packaged kit consisting of insulating, spring-type connector or crimped joint and epoxy resin moisture seal; suitable for direct burial.
7. Concrete Base: Reinforced precast concrete not less than 36 by 24 by 4 inches (900 by 600 by 100 mm) thick, and 6 inches (150 mm) greater in each direction than overall dimensions of controller. Include opening for wiring.
8. The city to have Calsense representative on site to review installation once complete. Contractor to be onsite during inspection to address any issues at time of inspection or within one day of the inspection.

2.14 BOXES FOR AUTOMATIC CONTROL VALVES

A. Concrete Boxes:

1. Description: Christy's or approved equal. Box and cover, with open bottom and openings for piping; designed for installing flush with grade.
 - a. Size: As required for valves and service.
 - b. Shape: Rectangular.
 - c. Sidewall Material: Concrete.
 - d. Cover Material: Cast Iron bolt down/lockable, or concrete bolt down/lockable.
- 1) Lettering: Spray Paint Yellow vis Stencil. See irrigation notes for valve box designations as required.
- B. Drainage Backfill: Cleaned gravel or crushed stone, graded from 3/4 inch (19 mm) minimum to 3 inches (75 mm) maximum.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine field conditions with installer present prior to beginning the work of this Section. Grading operations shall be completed and approved prior to beginning work.
- B. Verify all sleeve locations prior to beginning work of this Section. Flag all existing sleeves and conduits installed by other trades.
- C. Verify location of existing underground utilities, valves, manholes, catch basins, and other appurtenances that will affect the layout of the sprinkler system. Verify location of existing trees, new specimen trees, and other obstructions that will affect the layout of the sprinkler system. Verify location of stub outs and points of connection to the water supply system. Verify location of all new and existing architectural elements.

3.2 PREPARATION

- A. Locations of piping and equipment indicated on Drawings is diagrammatic and approximate and shall be adjusted as necessary and as directed to meet existing conditions and obtain complete water coverage.
- B. Preserve and protect all existing trees, plants, monuments, structures, hardscape and architectural elements to remain from damage due to work in this section. In the event that damage does occur to inanimate objects and structures, repair or replace such damage to the satisfaction of the City. Contractor, at Contractor's expense, shall replace damaged or injured living plant material. See Section 01 56 39 "Temporary Tree and Plant Protection".
- C. Irrigation lines shall have a minimum clearance of 12 inches from each other and from other utility lines. Do not install parallel lines directly over one another.
- D. Construct irrigation system to the sizes and grades at the locations indicated. Mark with powdered agricultural gypsum or marking paint routing of pressure supply line and stake the location of each spray head, rotor, flush valve assembly, electric control valve and other related

equipment for the first three zones. Project Inspector shall review staking with Contractor and direct any necessary changes prior to proceeding to other zones. This review does not in any way alleviate Contractor from the responsibilities associated with proper uniformity and distribution of head placement after staking.

- E. Install sleeves to accommodate pipes and wires under paving, hardscape areas, sidewalks, and paths prior to asphalt and concrete operations. Compact backfill around sleeves to 95 percent Modified Proctor Density within 2 percent of optimum moisture content in accordance with ASTM D1557. Where not yet utilized, close sleeve ends with cloth duct tape.
- F. Install landscape headers, sidewalks, roadways, curbs, walls, concrete bands, mowing strips, and other permanent hardscape elements before installation of sprinkler system.
- G. Plant specimen trees 24-inch box and larger before installation of the irrigation system.

3.3 EXCAVATION AND BACKFILLING OF TRENCHES FOR IRRIGATION

- A. Follow layout indicated on Drawings as closely as possible in excavating trenches. Trenches shall be straight in alignment and support pipe continuously on bottom of trench. Remove rocks and debris greater than 1-inch in diameter. Over excavate as required for bedding material.
- B. Specified depths of pressure supply lines, laterals and pitch of pipes as stated in this Section are minimums. Settlement of trenches lower than grades indicated on Drawings is cause for removal of finish grade treatment, refilling trenches, re-compacting and repairing of finish grade treatment.
- C. Trenching or other work required in this section under the limb spread of existing trees shall be done by hand or by other methods so as to prevent damage or harm to limbs, branches, and roots.
- D. Trenching in areas where root diameter of existing trees exceeds 1-inch shall be done by hand. Exposed roots of this size shall be heavily wrapped with moistened burlap to avoid scarring or excessive drying. Where a trenching machine is operated in proximity to roots that are less than 1-inch, the wall of the trench shall be hand trimmed, making clean cuts through roots.
- E. Trenches adjacent to or under existing trees shall be closed within 24 hours. When this is not possible, the side of trench closest to the tree or trees affected shall be covered with moistened burlap.
- F. Protect, maintain, and coordinate work with other contracts, trades, and utilities. Exercise extreme care in excavating and working in areas where utilities exist. Repair damaged caused by Contractor operations at no cost to the City.
- G. Use caution where trenches and piping cross existing roadways, sidewalks, hardscape, paths, or curbs. Repair damaged caused by Contractor operations at no cost to the City.
- H. Depth of Trench in Landscape Areas (unless indicated otherwise on Drawings):
 - 1. Pressure Supply Line: 18-inch from top of pipe to finish grade.
 - 2. Non-Pressure Line (for all rotor sprinkler heads and 12-inch pop-up heads): 18-inch from top of pipe to finish grade.

3. Non-Pressure Line (for all non-rotor sprinkler heads and 6-inch pop-up heads): 12-inch from top of pipe to finish grade.
 4. Control Wiring: Directly at side and bottom of pressure supply line.
 5. Communication Cable: Opposite side of control wiring.
 6. Pressure Supply line Locator Tape: 6-inch above top of pipe, at a maximum depth of 12-inch below finish grade.
- I. Depth of Trench Under Asphalt Paving or Concrete, With Pipe or Wires in Sleeves (unless indicated otherwise on Drawings):
1. Pressure Supply Line: 36-inch from top of finish grade to top of sleeve.
 2. Non-Pressure Line: 36-inch from top of finish grade to top of sleeve.
 3. Control Wiring: 36-inch from top of finish grade to top of sleeve.
 4. Communication Cable: 36-inch from top of finish grade to top of sleeve.
 5. Pressure Supply Line Locator Tape: 6-inch above top of pipe, at a maximum depth of 30-inch below finish grade.
 6. Non-pressure Supply Line Locator Tape: 6-inch above top of pipe, at a maximum depth of 30-inch below finish grade.
 7. Piping located under asphalt paving or concrete shall be installed with the appropriate sized sleeve. Backfill with sand bedding (6-inch below pipe and 6-inch above pipe.)
- J. Width of Trench (unless indicated otherwise on Drawings):
1. Pipe greater than 3-inch: 14-inch minimum.
 2. Pipe less than 3-inch: 7-inch minimum.
- K. Distance Between Trenches:
1. Irrigation trench to irrigation trench: 6-inch minimum.
 2. Irrigation trench to other trade trenches: 12-inch minimum.
- L. Sleeves:
1. Provide specified sized sleeves for piping located under asphalt paving or concrete.
 2. Consult with COA/Engineer representative for direction when sleeve runs exceed 100 feet in length.
- M. Boring: Boring is only permitted where pipe must pass under an obstruction that cannot be avoided or removed. Backfill shall match surrounding soil density and grain. Boring under existing paving, sidewalks, or hardscape shall be permitted at Contractor's risk. Contractor shall repair all damage to such items caused by Contractor operations at its own expense.
- N. Backfilling: Backfilling of trenches shall not be done until all required testing for the irrigation system has been completed:
1. Material: Excavated material is generally considered to be adequate for backfilling operations. Before beginning the backfilling operation, insure that backfill material is free from debris and rocks greater than 1-inch in diameter, and is not mixed with topsoil. Legally dispose of these materials after being separated from backfill.
 2. Bed pressure supply line with construction grade sand 6-inch above and 6-inch below pipe. Remaining backfill shall be as described above.
 3. Bed all electrical control wire and communication cable wire, trenched separate from pressure supply line, with construction grade sand 6-inch above and 6-inch below wires.
 4. Bed all sleeves with sand bedding with construction grade sand 6 inches above and 6 inches below pipe sleeves.

5. Set in place, cap and pressure test piping in the presence of the Project Inspector prior to backfilling.
6. Compact backfill to a 90 percent maximum density in accordance with ASTM D1557 with a mechanical tamper. Do not leave trenches open for a period greater than 48 hours. Open trenches shall be protected in accordance with current OSHA regulations. Slightly mound filled trenches for settlement after backfilling is compacted.
7. Smooth trenches to match surrounding finish grade prior to requesting inspection for Substantial Completion.

3.4 INSTALLATION OF PIPING

- A. Location and Arrangement: Drawings indicate location and arrangement of piping systems. Install piping as indicated unless deviations are approved on Coordination Drawings.
- B. Install piping at minimum uniform slope of 0.5 percent down toward drain valves.
- C. Install piping free of sags and bends.
- D. Install groups of pipes parallel to each other, spaced to permit valve servicing.
- E. Install fittings for changes in direction and branch connections.
- F. Install unions adjacent to valves and to final connections to other components with NPS 2 (DN 50) or smaller pipe connection.
- G. Install flanges adjacent to valves and to final connections to other components with NPS 2-1/2 (DN 65) or larger pipe connection.
- H. Install underground thermoplastic piping in accordance with ASTM D2774.
- I. Install expansion loops in control-valve boxes for plastic piping.
- J. Lay piping on solid subbase, uniformly sloped without humps or depressions.
- K. Install ductile-iron piping in accordance with AWWA C600.
- L. Install PVC piping in dry weather when temperature is above 40 deg F (5 deg C). Allow joints to cure at least 24 hours at temperatures above 40 deg F (5 deg C) before testing.
- M. Install water regulators with shutoff valve and strainer on inlet and pressure gage on outlet. Install shutoff valve on outlet. Install aboveground or in control-valve boxes.
- N. Water Hammer Arresters: Install between connection to building main and circuit valves aboveground or in control-valve boxes.
- O. Install piping in sleeves under parking lots, roadways, and sidewalks.
- P. Install sleeves made of Schedule 40, PVC pipe and socket fittings, and solvent-cemented joints.
- Q. Install transition fittings for plastic-to-metal pipe connections according to the following:

1. Underground Piping:
 - a. NPS 1-1/2 (DN 40) and Smaller: Plastic-to-metal transition fittings.
 - b. NPS 2 (DN 50) and Larger: AWWA transition couplings.
 2. Aboveground Piping:
 - a. NPS 2 (DN 50) and Smaller: Plastic-to-metal transition fittings and unions.
 - b. NPS 2 (DN 50) and Larger: Use dielectric flange kits with one plastic flange.
- R. Install dielectric fittings for dissimilar-metal pipe connections according to the following:
1. Underground Piping:
 - a. NPS 2 (DN 50) and Smaller: Dielectric coupling or dielectric nipple.
 - b. NPS 2-1/2 (DN 65) and Larger: Prohibited except in control-valve box.
 2. Aboveground Piping:
 - a. NPS 2 (DN 50) and Smaller: Dielectric union.
 - b. NPS 2-1/2 to NPS 4 (DN 65 to DN 100): Dielectric flange.
 - c. NPS 5 (DN 125) and Larger: Dielectric flange kit.
 3. Piping in Control-Valve Boxes:
 - a. NPS 2 (DN 50) and Smaller: Dielectric union.
 - b. NPS 2-1/2 to NPS 4 (DN 65 to DN 100): Dielectric flange.
 - c. NPS 5 (DN 125) and Larger: Dielectric flange kit.

3.5 JOINT CONSTRUCTION

- A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
- C. Threaded Joints: Thread pipe with tapered pipe threads in accordance with ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
 1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.
- D. Flanged Joints: Select rubber gasket material of size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.
- E. Ductile-Iron Piping Gasketed Joints: Comply with AWWA C600 and AWWA M41.

- F. Copper-Tubing Brazed Joints: Construct joints in accordance with CDA's "Copper Tube Handbook," using copper-phosphorus brazing filler metal.
- G. Copper-Tubing Soldered Joints: Apply ASTM B813 water-flushable flux to tube end unless otherwise indicated. Construct joints in accordance with ASTM B828 or CDA's "Copper Tube Handbook," using lead-free solder alloy (0.20 percent maximum lead content) complying with ASTM B32.
- H. PE Piping Fastener Joints: Join with insert fittings and bands or fasteners in accordance with piping manufacturer's written instructions.
- I. PE Piping Heat-Fusion Joints: Clean and dry joining surfaces by wiping with clean cloth or paper towels. Join in accordance with ASTM D2657.
 - 1. Plain-End PE Pipe and Fittings: Use butt fusion.
 - 2. Plain-End PE Pipe and Socket Fittings: Use socket fusion.
- J. PVC Piping Solvent-Cemented Joints: Clean and dry joining surfaces. Join pipe and fittings in accordance with the following:
 - 1. Comply with ASTM F402 for safe-handling practice of cleaners, primers, and solvent cements.
 - 2. PVC Pressure Piping: Join schedule number, ASTM D1785, PVC pipe and PVC socket fittings in accordance with ASTM D2672. Join other-than-schedule-number PVC pipe and socket fittings in accordance with ASTM D2855.
 - 3. PVC Non-pressure Piping: Join in accordance with ASTM D2855.

3.6 BACKFLOW PREVENTION DEVICE AND ENCLOSURE INSTALLATION

- A. Install backflow prevention device and associated equipment as close as possible to the water meter or point-of-connection. Verify exact location in the field with the Project Inspector prior to layout and installation.
- B. Coordinate installation with local governing codes and ordinances. No pressure regulator shall be installed unless supplied pressure exceeds 80 psi. Install Y-strainer after the backflow device per City of Anaheim Regulations.
- C. Install backflow prevention device and enclosure per manufacturer's recommendations. Install keyed lock.

3.7 FLOW SENSOR INSTALLATION

- A. Install flow sensors as indicated in Drawings and per manufacturer's recommendations. Install with a minimum of 2 feet or 10 times the pipe diameter, whichever is greater, straight pipe without fittings prior to the sensor. Install with a minimum of 1-foot or 5 times the pipe diameter, whichever is greater, straight pipe without fittings after the sensor. Install with a cover of 6-inch minimum and 12-inch maximum over top of the flow sensor. Fit each valve with a rectangular valve box, set over 3/4-inch gravel with filter fabric.

- B. Flow sensor wire may be extended to a maximum distance of 2,000 feet from the location of the assembly to which it is connected. Wire shall be installed in a 1-1/4-inch gray PVC Schedule 40 pipe.
- C. Connection of flow sensor wires shall only be within the valve box of the flow sensor. Wire connections on the cable shall be made with wire splice kit, installed per manufacturer's specifications. No splices shall be allowed without prior written approval of the Project Inspector.
- D. Install flow sensor cable and normally open master valve cable in same conduit and apart from all other wires. Connection of these cables to the controller terminals shall be by equipment supplier during their certification of equipment installation.

3.8 MASTER VALVE INSTALLATION

- A. Install normally open master valve per Drawings and manufacturer's instructions. Install after the backflow assembly and prior to the flow sensor. Install with a cover of 4-inch minimum and 8-inch maximum over top of flow control stem. Fit each valve with a rectangular valve box, set over 3/4-inch gravel with filter fabric.
- B. Install normally open master valve cable in same conduit with flow sensor cable and apart from all other wires. Connection of these cables to the controller terminals shall be by equipment supplier during their certification of equipment installation.
- C. Connection of master valve wires shall only be within the valve box of the master valve. Wire connections on the cable shall be made with wire splice kit, installed per manufacturer's specifications. No splices shall be allowed without prior written approval of the Project Inspector.

3.9 INSTALLATION OF VALVES

- A. Underground Curb Valves: Install in curb-valve casings with tops flush with grade.
- B. Underground Iron Gate Valves, Resilient Seat: Comply with AWWA C600 and AWWA M44. Install in valve casing with top flush with grade.
 - 1. Install valves and PVC pipe with restrained, gasketed joints.
- C. Aboveground Valves: Install as components of connected piping system.
- D. Pressure-Reducing Valves: Install within boxes for automatic control valves or aboveground between shutoff valves. Install full-size valved bypass.
- E. Throttling Valves: Install in underground piping in boxes for automatic control valves.
- F. Drain Valves: Install in underground piping in boxes for automatic control valves.

3.10 INSTALLATION OF DRIP IRRIGATION SPECIALTIES

- A. Install freestanding emitters on pipe riser to mounting height indicated.
- B. Install manifold emitter systems with tubing to emitters. Plug unused manifold outlets. Install emitters on off-ground supports at height indicated.
- C. Install multiple-outlet emitter systems with tubing to outlets. Plug unused emitter outlets. Install outlets on off-ground supports at height indicated.
- D. Install drip tubes with direct-attached emitters on ground.
- E. Install drip tubes with remote discharge on ground with outlets on off-ground supports at height indicated.
- F. Install off-ground supports of length required for indicated mounted height of device.
- G. Install application pressure regulators and filter units in piping near device being protected, and in control-valve boxes.
- H. Install air relief valves and vacuum relief valves in piping, and in control-valve boxes.

3.11 VALVE BOX INSTALLATION

- A. Install valve boxes with each type of irrigation equipment so that top of valve box is above finish grade as shown on details. Valve box extensions are not acceptable except for mainline isolation gate valves.
- B. Place filter fabric below and around each valve box prior to installing valve box as specified on the detail drawings. Place gravel inside valve box, to a minimum 4-inch depth, allowing full access in and around all fittings. Valve box shall be fully supported by brick supports.
- C. Brand the valve box lid of associated equipment as follows:
 - 1. Electric remote control valve box lid with "Controller Letter and Station Number."
 - 2. Quick coupling valve box lid with the letters "QC."
 - 3. Isolation gate valve box lid with the letters "GV."
 - 4. Manifold Isolation ball valve box lid with the letters "BV."
 - 5. Spare Wire box lids with the letters "SW."
 - 6. Wire Splice box lid with the letters "WS."
 - 7. Communication cable splice box lid with the letters "COMM."
 - 8. Grounding rod valve box lid with the letters "GR."
 - 9. Air release valve box lid with the letters "ARV."
 - 10. Check valve box lid with the letters "CV".
- D. Letter and number size of brands shall be no less than 1-inch and no greater than 1-1/2-inch in height and shall be 1/8-inch maximum in depth. Submit sample branding to the Project Inspector prior to commencement of work. Coordinate with Project Inspector for any non-listed equipment box identification required.

- E. Inspection for Substantial Completion shall not be allowed until all branding is complete and approved by Project Inspector.
- F. Secure plastic valve box covers with a stainless steel locking bolt mechanism.

3.12 AUTOMATIC CONTROLLER UNIT INSTALLATION

- A. Verify electrical power at location of automatic controller unit prior to its installation. Control unit shall have a dedicated separate circuit on the panel. Electrical panel and circuit number serving the irrigation control equipment shall be labeled inside the controller enclosure.
- B. Hardwire controller to the on/off switch and existing power source. Controller shall not be plugged into socket provided for other equipment.
- C. Equipment Mounting: Install automatic controller unit where indicated on Drawings on custom poured-in-place concrete base, plumb and true per manufacturer's requirements. Verify exact location in the field with the Project Inspector.
 - 1. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 2. Install anchor bolts to elevations required for proper attachment to supported equipment.
- D. Controller shall be tested with complete electrical connections.
- E. Connect electric remote control valve assembly wiring to controller unit in the same numerical sequence as indicated on the Drawings, or as directed by the Project Inspector in the field.
- F. Connect flow sensing and master valve wiring to controller unit into proper terminals for their purpose.
- G. Install a separate ground wire for each controller unit as indicated on the Drawings and per manufacturer's requirements. Each Cluster Control Unit, Satellite Controller, and decoder shall be grounded as required by the California Electrical Code and the manufacturer's written instructions. Provide 8-foot long grounding rod. No solder connections will be allowed. Resistance to ground shall be no greater than 5 ohms.
- H. Above ground conduit shall be rigid galvanized pipe with the appropriate fittings. Below ground conduit shall be PVC SCH 40 electrical conduit with appropriate sweeps and fittings. Conduit sweeps shall extend a minimum of 3-inch above concrete controller base.
- I. Label each automatic controller unit with the letter or number designated on the drawings. Letter or number shall be located in a visible location on the inside panel cover with 3-inch high vinyl letters.
- J. Each automatic controller unit shall be completely operable and sequence tested prior to scheduling an inspection for Substantial Completion.

3.13 CONNECTIONS

- A. Comply with requirements for exterior water service piping, water meters, protective enclosures, and backflow preventers per plans. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install piping adjacent to equipment, valves, and devices to allow service and maintenance.
- C. Connect wiring between controllers and automatic control valves.

3.14 IDENTIFICATION

- A. Identify system components.
- B. Equipment Nameplates and Signs: Install engraved plastic-laminate equipment nameplates and signs on each automatic controller.
 - 1. Text: In addition to identifying unit, distinguish between multiple units, inform operator of operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations.
- C. Warning Tapes: Arrange for installation of continuous, underground, detectable warning tapes over underground piping during backfilling of trenches. See Section 312000 "Earth Moving" for warning tapes.

3.15 CONTROL EQUIPMENT FIELD TESTING

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust electrical components, assemblies, and equipment installations, including connections, as follows:
 - 1. Test each circuit for continuity.
 - 2. Test each circuit for leaks to ground with an ohmmeter after each interconnect circuit has been installed and connections have been made. No circuit checking lower than 1 megohm will be acceptable.
 - 3. Test the grounding system with a meter. System resistance shall not measure more than 5 ohms.
 - 4. Perform operational test and demonstrate that each and every part of the system functions as specified. Do not start operational test without written approval to do so from the COA/Engineer representative.
 - a. The operational test for each new or modified electrical system shall consist of not less than five days of continuous, satisfactory operation. If unsatisfactory performance of the system develops, the condition shall be corrected and the test shall be repeated until the five days of continuous satisfactory operation are obtained.
 - b. Shutdown caused by factors beyond the Contractor's control shall not constitute discontinuity of the operational test.
 - 5. Any material revealed by these tests to be faulty shall be replaced or corrected, and the same test shall be repeated until no fault is evident.
 - 6. Record results of circuitry tests and submit to COA/Engineer representative.

3.16 CONTROL EQUIPMENT SUPPLIER SUPPORT

- A. Engage control equipment supplier to provide the following field support services:
 - 1. Conduct on-site system familiarization meeting for Contractor and City personnel to insure that all personnel understand the system installation technique.
 - 2. Provide on-site technical assistance during installation period when requested by Contractor or COA/Engineer representative.
 - 3. Test grounding system to verify that equipment is properly grounded.
 - 4. Perform continuity and resistance test on communication wire to insure that proper voltage will be delivered to the equipment on line.
 - 5. Hook-up communication and sensor wire to the proper terminals inside the enclosures to ensure that good connections are made.
 - 6. Certify that equipment conforms to and is installed in accordance with plans, specifications and manufacturers recommendations.
 - 7. Address satellites and decoders.
 - 8. Test system components for proper operation.
 - 9. Verify system flow range and calibrate pulse transmitter.

3.17 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections. All tests and inspections are required to be performed in the presence of the Project Inspector, who may delegate authority to the City Landscape Inspector. Provide three days' notice to the Project Inspector prior to performing tests and requiring inspections.
 - 1. Hydrostatic Pressure Testing the Pressure Supply Line: After backfilling, flushing, and prior to the installation of each electric remote control valve, isolation ball valve, quick coupling valve, and manual drain valve, pressure test the irrigation system utilizing the following procedure:
 - a. Pressurize the irrigation system to 40 psi greater than the designated static pressure or 150 psi whichever is greater for a period of no less than 4 hours. The pressure gauge used for the pressure test shall not exceed readings greater than 300psi. Pressure pump and other equipment necessary for the test shall be furnished by Contractor.
 - b. Test is acceptable if no leakage occurs within the system for the duration of the testing period.
 - c. If leaks occur, repair said leaks and begin pressure test again. Repeat this operation until no leaks occur in the irrigation system.
 - d. Before requesting a walk through for Substantial Completion, the entire irrigation system shall remain under pressure for a period of no less than 48 hours.
 - 2. Inspections: Inspection will be performed by the Project Inspector at the following times:
 - a. Upon installation and testing of main lines and lateral lines; when pipes are laid and are to be submitted to pressure tests. Do not cover lines until they have been inspected and approved.
 - b. Upon installation and testing of valves, quick couplers, backflow preventer device, automatic controllers, control valves, and wires.
 - c. When the system is completed, perform a coverage test, in the presence of the Project Inspector, to determine if the coverage is complete and adequate. Furnish materials and perform construction required to correct inadequacies in the coverage.

- d. Final inspection and performance test shall be at the same time as the final inspection of the landscape construction.
3. Flushing: Center-load all piping prior to flushing. After all new irrigation piping and risers are in place and connected and all necessary diversion work has been completed and prior to the installation of sprinkler heads and quick coupling valves, thoroughly flush piping system under full head of pressure. After the furthestmost riser from the point of connection begins to flush, continue flushing for duration of five minutes. After the system is thoroughly flushed, cap all risers.
4. Walk-Through for Substantial Completion:
 - a. Before requesting a walk-through for Substantial Completion the following requirements must be entirely satisfied:
 - 1) The entire irrigation system shall be completely installed, flushed and satisfactorily pressure tested.
 - 2) All valve boxes shall be branded.
 - 3) All automatic controllers or field satellite units are fully operable, control equipment has been certified and operation tested for interface with the City's Irrigation Central Control System (through City's Irrigation Control System Specialist).
 - b. Once the above requirements have been met a walk-through for Substantial Completion shall be requested. The following procedures shall be used during the walk-through:
 - 1) Contractor shall have two personnel available with radio communication for the entire length of the walk-through.
 - 2) All valve box lids shall be removed from valve boxes and placed faced up adjacent to the valve box prior to beginning the walk through.
 - 3) The scheduling of each walk through type will be divided over several days as needed to provide adequate time to complete the review of all zones. The walk through will be divided into two sections and proceed as follows:
 - a) Visual Walk Through: This will consist of walking through the entire irrigation system and examining all components of the system without turning on zones. A punch list will be developed identifying deficiencies in the construction and workmanship of the system when compared to the requirements of the Contract Documents.
 - b) Operational Walk-Through: This will consist of walking through the entire irrigation system observing each zone in a fully operable condition. Valves must be activated from the automatic controller unit. Manual bleeding of individual electric remote control valves are not acceptable. A punch list will be developed identifying deficiencies in the operation of each zone in the system evaluating, but not limited to: head spacing, row spacing, nozzle sizing, correct radius of throw, correct stationing, and flushing operation of zones when compared to the requirements of the Contract Documents.
 - c) Once the Walk-Through for Substantial Completion has been completed, a copy of the punch list will be forwarded to the Contractor who shall repair, replace, and adjust all items on the punch list prior to requesting a final walk-through.
5. Final Walk-Through
 - a. Before requesting a final walk-through, the following requirements must be entirely satisfied:

- 1) Each item on the Substantial Completion punch list shall have been thoroughly addressed and resolved by Contractor.
- 2) Controller charts for each automatic controller unit shall have been completed, installed, and submitted to the City.
- b. Once the above requirements have been met, a final walk-through shall be requested. The following procedures will be used during the walk-through:
 - 1) Contractor shall have two personnel available with radio communication for the entire length of the walk-through.
 - 2) Only those valve box lids shall be removed from valve boxes as indicated on the Substantial Completion punch list. The valve box lids shall be placed face up adjacent to the valve box prior to beginning the final walk-through.
 - 3) The final walk-through shall be divided into two sections and proceed as follows:
 - a) Visual Walk-Through: This will consist of walking through the punch list items created at the time of the walk-through for Substantial Completion, examining all components of the system without turning on zones. Any remaining deficiencies in the construction and workmanship of the irrigation system when compared to the Substantial Completion punch list and Contract Documents will be noted.
 - b) Operational Walk-Through: This will consist of walking through the Substantial completion punch list items and observing each zone in a fully operable condition. Valves shall be activated from the automatic controller unit. Manual bleeding of individual electric remote control valves will not be acceptable. Any remaining deficiencies in the operation of each zone in the system including but not limited to head spacing, row spacing, nozzle sizing, correct radius of throw, correct stationing, and flushing operation of zones, when compared to the Substantial Completion punch list and Contract Documents, will be noted.
6. Any additional walk-throughs required due to Contractor's inability to address all issues on the punch lists described above shall be provided at Contractor's expense, including costs of City's consultants.

3.18 DEMONSTRATION

- A. Train City's maintenance personnel to adjust, operate, and maintain equipment, sprinklers, specialties, and accessories.

END OF SECTION 32 84 00

DIVISION 32 – EXTERIOR IMPROVEMENTS
SECTION 32 91 13
SOIL PREPARATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes planting soils specified by composition of the mixes.

1.3 DEFINITIONS

- A. DG: Decomposed aggregate surfacing materials as specified in section 32 15 40.
- B. Soil Type 1: General Planting
- C. Uniformly Smooth Soil Surface: A soil surface that has a consistent slope or elevation with no more than a 1/2" deviation within a 1,000 sq. ft. (10'x10') area. Soil surface shall be free of depressions, pits, and high spots.

1.4 BASIS OF DESIGN

- A. The planting soil design is to be based on agricultural field testing recommendations of on-site soils and imported soils.
 - 1. When products are identified by manufacturer name with no additional notation, the use of that manufacturer name and product name is not intended to limit the selection of equal products by other manufacturers.

1.5 DEFINITIONS

- A. Backfill: The earth used to replace or the act of replacing earth in an excavation. This can be amended or unamended soil as indicated.
- B. CEC: Cation exchange capacity.
- C. Compost: The product resulting from the controlled biological decomposition of organic material that has been sanitized through the generation of heat and stabilized to the point that it is beneficial to plant growth.

- D. Duff Layer: A surface layer of soil, typical of forested areas, that is composed of mostly decayed leaves, twigs, and detritus.
- E. Imported Soil: Soil that is transported to Project site for use.
- F. Layered Soil Assembly: A designed series of planting soils, layered on each other, that together produce an environment for plant growth.
- G. Manufactured Soil: Soil produced by blending soils, sand, stabilized organic soil amendments, and other materials to produce planting soil.
- H. NAPT: North American Proficiency Testing Program. An SSSA program to assist soil-, plant-, and water-testing laboratories through interlaboratory sample exchanges and statistical evaluation of analytical data.
- I. Organic Matter: The total of organic materials in soil exclusive of undecayed plant and animal tissues, their partial decomposition products, and the soil biomass; also called "humus" or "soil organic matter."
- J. Planting Soil: On-site soil, imported soil, or manufactured soil that has been modified as specified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.
- K. RCRA Metals: Hazardous metals identified by the EPA under the Resource Conservation and Recovery Act.
- L. Subgrade: Surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.
- M. Subsoil: Soil beneath the level of subgrade; soil beneath the topsoil layers of a naturally occurring soil profile, typified by less than 1 percent organic matter and few soil organisms.

1.6 PREINSTALLATION MEETINGS

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

1.7 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include recommendations for application and use.
 - 2. Include test data substantiating that products comply with requirements.
 - 3. Include sieve analyses for aggregate materials.
 - 4. Material Certificates and Laboratory Testing Results: Submit within 4 weeks of Notice to Proceed: For each type of imported soil bioretention soil soil amendment and fertilizer and organic soil amendment before delivery to the site, according to the following:
 - a. Manufacturer's qualified testing agency's certified analysis of standard products.
 - b. Analysis of fertilizers, by a qualified testing agency, made according to AAPFCO methods for testing and labeling and according to AAPFCO's SUIP #25.

- c. Analysis of nonstandard materials, by a qualified testing agency, made according to SSSA methods, where applicable.
- d. Organic Soil Amendments
 - 1) Analysis of organic soil amendments by a qualified testing agency.
 - 2) Results of organic soil amendment tests conducted within 120 days prior to delivery date to the project site.
 - 3) Grain size analysis results performed in accordance with ASTM D 422, Standard Test Method for Particle Size Analysis of Soils.
 - 4) Agricultural soil analysis results performed in accordance with ASTM D 422, Standard Test Method for Particle Size Analysis of Soils.
 - 5) Compost: Submit the past 3 inspection reports from the local CalRecycle enforcement agency verifying compliance with specified Title 14 requirements.
- B. Samples: For each bulk-supplied material, 1-quart volume of each in sealed containers labeled with content, source, and date obtained. Each Sample shall be typical of the lot of material to be furnished; provide an accurate representation of composition, color, and texture.

1.8 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For each testing agency.
- B. Preconstruction Test Reports: For preconstruction soil analyses specified in "Preconstruction Testing" Article.
- C. Field quality-control reports.

1.9 QUALITY ASSURANCE

- A. Testing Agency Qualifications: An independent, state-operated, or university-operated laboratory; experienced in soil science, soils testing, and plant nutrition; with the experience and capability to conduct the testing indicated; and that specializes in types of tests to be performed.
 - 1. Laboratories: Subject to compliance with requirements, provide testing by one of the following:
 - a. Way Point Laboratory, Inc., 4741 East Hunter Ave., Suite A, Anaheim, CA 92807.
 - b. Wallace Laboratories, 365 Coral Circle, El Segundo, CA 90245.

1.10 PRECONSTRUCTION TESTING

- A. Preconstruction Testing Service: Engage a qualified testing agency to perform preconstruction soil analyses on on-site soil and imported soil.
 - 1. Notify Construction Manager seven days in advance of the dates and times when laboratory samples will be taken.
- B. Preconstruction Soil Analyses: For each unamended soil type, perform testing on soil samples and furnish soil analysis and a written report containing soil-amendment and fertilizer

recommendations by a qualified testing agency performing the testing according to "Soil-Sampling Requirements" and "Testing Requirements" articles.

1. Have testing agency identify and label samples and test reports according to sample collection and labeling requirements.

1.11 SOIL-SAMPLING REQUIREMENTS

- A. General: Extract soil samples according to requirements in this article.
- B. Sample Collection and Labeling: Have samples taken and labeled by Contractor in presence of Project Inspector under the direction of the testing agency.
 1. Number and Location of Samples: Minimum of three total for shrub areas representative soil samples from varied locations for each soil to be used or amended for landscaping purposes.
 2. Procedures: A representative sample shall consist of a composite of multiple sub-samples taken from the area under investigation, combined and then submitted. Discard the top inch of soil to avoid including debris that might contaminate the sample. Equipment for sampling may be a soil sampling tube, soil auger, spade, shovel, and/or trowel. Soil sampling tools shall be clean and not rusty. Do not sample if the soil is muddy, or excessively wet. Seal soil samples shall be sealed in airtight plastic bags.
 3. Depth of Core Samples Soils:
 - a. Import Soils:
 - 1) At off-site stock pile – 12” to 18” depth
 - 2) After placement – 6” to 8” depth
 - b. On-Site Soils:
 - 1) In place at grade – 8”-10” depth
 - 2) After amending and fine grading – 6” to 8” depth
 4. Labeling
 - a. On-Site Soils: Label each sample with the date, location keyed to a site plan or other location system, visible soil condition, and sampling depth for on-site soils or source of material and suppliers name for all import soils.
 - b. Import Soils: Label each sample with the date, source of material, and suppliers name,
 5. Packaging and Shipping: Ship samples as directed by testing agency.
 6. Reference Plant List: Provide a list of plants proposed for installation as indicated on the Drawings, and a copy of these specifications, to the testing agency.

1.12 TESTING REQUIREMENTS

- A. General: Perform tests on soil samples according to requirements in this article.
 1. Conduct soils tests for on-site soil a minimum of two (2) times.

- a. First Soils Test: Test in place on-site or stockpiled on-site soil to determine the condition of on-site soils. Provide three test locations for every acre of turf and one test location for every 10,000 sq. ft of plant bed (maximum of three). If on-site soils cannot meet the requirements of topsoil as defined herein, provide import topsoil as specified below.
 - b. Second Soils Test: If the on-site soils can be amended to meet the requirements of topsoil as specified herein, complete a second series of soils testing after the soil has been amended and leached per the recommendation of the first soils test. If testing results are not in compliance with specifications, additional testing may be required as directed by the City of Anaheim Construction Manager in collaboration with the Landscape Architect, at no additional cost to the City of Anaheim.
2. Conduct soils tests for imported topsoil a minimum of three (3) times.
 - a. First Time Soils Tests: Test stockpiled soil at the providers supply yard to determine necessary treatment to meet imported soil requirements. Conduct a minimum of three separate soils tests to provide the most accurate analysis of stockpiled soils. A representative sample shall consist of a composite of multiple sub-samples taken from the area under investigation, combined and then submitted.
 - b. Second Time Soils Tests: Complete a second series of three (3) soils tests after the soil has been amended per the recommendation of the first soils tests. Perform these tests prior to delivery of imported soil. If the test results indicate additional soil amendments are necessary, continue to amend the soil and retest until the soil meets the specification requirements.
 - c. Third Time Soils Tests: Complete a third series of three (3) soils tests after the imported topsoil is placed on-site. Complete and verify all additional soil amendment recommendations prior to planting. If testing results are not in compliance with specifications, additional testing may be required as directed by the District Construction Manager in collaboration with the Landscape Architect, at no additional cost to the District.

B. Physical Testing:

1. Soil Texture: Soil-particle, size-distribution analysis by the following method according to SSSA's "Methods of Soil Analysis - Part 1-Physical and Mineralogical Methods":
 - a. Hydrometer Method: Report percentages of sand, silt, and clay. Report percentage of gravel, if present.
2. Total Porosity: Calculate using particle density and bulk density according to SSSA's "Methods of Soil Analysis - Part 1-Physical and Mineralogical Methods."
3. Water Retention: According to SSSA's "Methods of Soil Analysis - Part 1-Physical and Mineralogical Methods."
4. Saturated Hydraulic Conductivity: According to SSSA's "Methods of Soil Analysis - Part 1-Physical and Mineralogical Methods"; at 85% compaction according to ASTM D 698 (Standard Proctor).

C. Chemical Testing:

1. CEC: Analysis by sodium saturation at pH 7 according to SSSA's "Methods of Soil Analysis - Part 3- Chemical Methods."
 2. Clay Mineralogy: Analysis and estimated percentage of expandable clay minerals using CEC by ammonium saturation at pH 7 according to SSSA's "Methods of Soil Analysis - Part 1- Physical and Mineralogical Methods."
 3. Metals Hazardous to Human Health: Test for presence and quantities of RCRA metals including aluminum, arsenic, barium, copper, cadmium, chromium, cobalt, lead, lithium, and vanadium. If RCRA metals are present, include recommendations for corrective action.
 4. Phytotoxicity: Test for plant-available concentrations of phytotoxic minerals including aluminum, arsenic, barium, cadmium, chlorides, chromium, cobalt, copper, lead, lithium, mercury, nickel, selenium, silver, sodium, strontium, tin, titanium, vanadium, and zinc.
- D. Fertility Testing: Soil-fertility analysis according to standard laboratory protocol of SSSA, including the following:
1. Percentage of water in saturation extract.
 2. Electrical conductivity (ECe).
 3. Soil reaction (acidity/alkalinity pH value).
 4. Buffered acidity or alkalinity.
 5. Nitrogen ppm.
 6. Phosphorous ppm.
 7. Potassium ppm.
 8. Manganese ppm.
 9. Manganese-availability ppm.
 10. Molybdenum ppm.
 11. Iron ppm.
 12. Sulfur ppm.
 13. Boron ppm.
 14. Zinc ppm.
 15. Zinc availability ppm.
 16. Copper ppm.
 17. Chloride ppm.
 18. Sodium ppm and sodium absorption ratio (SAR).
 19. Soluble-salts ppm.
 20. Presence and quantities of problem materials including salts and metals cited in the Standard protocol. If such problem materials are present, provide additional recommendations for corrective action.
 21. Other deleterious materials, including their characteristics and content of each.
- E. Organic-Matter Content: Analysis using loss-by-ignition method according to SSSA's "Methods of Soil Analysis - Part 3- Chemical Methods."
- F. Recommendations: Based on the test results, testing agency shall provide interpretation of data and written recommendations for soil treatments, soil amendments to be incorporated, and required leaching, to produce satisfactory planting soil suitable for healthy, viable plants as indicated on Drawings. Include, at a minimum, recommendations for nitrogen, phosphorous, and potassium fertilization, and for micronutrients. Include results of the soil texture and percent by dry weight of soil organic matter. Include recommendations for remediation of phytotoxicity elements and deleterious materials. Include amount and length of time to perform leaching operations, if required.

1. Fertilizers and Soil Amendment Rates: State recommendations in weight or volume per 1000 sq. ft. for 6-inch depth of soil and in weight or volume per cu. yd. of backfill mix.
2. Soil Reaction: State the recommended liming rates for raising pH or sulfur for lowering pH according to the buffered acidity or buffered alkalinity in weight or volume per 1000 sq. ft. for 6-inch depth of soil and in weight or volume per cu. yd. of backfill mix.

1.13 DELIVERY, STORAGE, AND HANDLING

- A. Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and compliance with state and Federal laws if applicable.
- B. Bulk Materials:
 1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
 2. Provide erosion-control measures to prevent erosion or displacement of bulk materials, discharge of soil-bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
 3. Do not move or handle materials when they are wet or frozen.
 4. Accompany each delivery of bulk fertilizers and soil amendments with appropriate certificates.

PART 2 - PRODUCTS

2.1 PLANTING SOILS SPECIFIED BY COMPOSITION

- A. General: Soil amendments, fertilizers, and rates of application specified in this article are guidelines that may need revision based on testing laboratory's recommendations after preconstruction soil analyses are performed.
- B. On-Site Planting-Soil Type 1 – General Planting: On-site soil, with the duff layer, if any, retained; modified to produce viable planting soil.
 1. Amended Soil Composition: For bidding purposes blend unamended on-site soil with the following soil amendments and fertilizers in the following quantities to produce planting soil (actual quantities will be determined by soils test recommendations):
 - a. Ratio of Loose Compost to Soil: 4 cu. yd. per 1000 sq. ft. per 6 inches, or part thereof, of amended soil depth.
 - b. Weight of Soil Sulfur: 20 lbs. per 1000 sq. ft. per 6 inches, or part thereof, of amended soil depth.
 - c. Weight of Iron Sulfate: 20 lbs. 1000 sq. ft. per 6 inches, or part thereof, of amended soil depth.
 - d. Weight of Agricultural Gypsum: 100 lbs. per 1000 sq. ft. per 6 inches, or part thereof, of amended soil depth.
 - e. Weight of Superphosphate: 8 lbs. per 1000 sq. ft. per 6 inches, or part thereof, of amended soil depth.

- f. Weight of Commercial Fertilizer: 200 lbs. per 1000 sq. ft. per 6 inches, or part thereof, of amended soil depth.
 - g. Weight of Slow-Release Fertilizer: 20 lbs. per 1000 sq. ft. per 6 inches, or part thereof, of amended soil depth.
 - h. Sand as required to increase infiltration rate to acceptable levels.
2. Additional Properties of on-site soil after amending and leaching:
- a. Soil reaction of pH 6 to 8 as measured in the saturation extract (Method 21a, USDA Handbook Number 60)
 - b. Percent Organic Matter By Dry Weight
 - 1) Type 1 – General Planting areas and Type 2 - General Turf areas Soils: 3 to 5 percent after leaching.
 - c. Salinity: The salinity range measured in the saturation extract (Method 3a, USDA Handbook Number 60) shall be 3.0 or less dS/m. If calcium and sulfate ions both exceed 20 milliequivalents per liter in the saturation extract, the maximum salinity shall be 5.0 dS/m.
 - d. Chloride: The maximum concentration of soluble chloride in the saturation extract (Method 3a, USDA Handbook Number 60) shall be 150 mg/l (parts per million) for ornamental planting and cool season turf, and 500 mg/l (parts per million) for warm season turf.
 - e. Boron: The maximum concentration of soluble boron in the saturation extract (Method 3a, USDA Handbook Number 60) shall be 1 mg/l (parts per million).
 - f. Sodium Absorption Ratio (SAR): The maximum SAR shall be 5 measured per Method 20b, USDA Handbook Number 60.
 - g. Carbon: Nitrogen ratio shall be less than 20:1
 - h. Aluminum: Available aluminum measured with the Ammonium Bicarbonate/DTPA Extraction shall be less than 5 parts per million.
 - i. Calcium Carbonate Content: Free calcium carbonate (limestone) shall not be present.
 - j. Phytotoxic Constituent, Herbicides, Hydrocarbons: Germination and growth of monocots and dicots shall not be restricted more than 10 percent compared to the reference soil. Total petroleum hydrocarbons shall not exceed 50 mg/kg dry soil measured per the modified EPA Method No. 8015. Total aromatic volatile organic hydrocarbons (benzene, toluene, xylene and ethylbenzene) shall not exceed 0.5 mg/kg dry soil measured per EPA Methods No. 8020.
 - k. Heavy Metals: The maximum permissible elemental concentration in the soil shall not exceed the following:
 - 1) Total Threshold Concentration Limit (Ammonium Bicarbonate/DTPA Extraction TTLC Level) parts per million (mg/kilogram) dry weight basis:
 - a) Antimony: 150 ppm.
 - b) Arsenic: 50 ppm.
 - c) Barium: 1,000 ppm.
 - d) Beryllium: 7.5 ppm.
 - e) Cadmium: 10 ppm.
 - f) Chromium: 50 ppm.
 - g) Cobalt: 800 ppm
 - h) Copper: 250 ppm

- i) Lead: 50 ppm.
- j) Mercury: 2 ppm.
- k) Molybdenum: 3,500
- l) Nickel: 200 ppm.
- m) Selenium: 10 ppm.
- n) Silver: 50 ppm.
- o) Thallium: 70 ppm.
- p) Vanadium: 240 ppm.
- q) Zinc: 2,500 ppm.

- 2) If the soil pH is between 6 and 7, the maximum permissible elemental concentration shall be reduced 50 percent. No more than three metals shall be present at 50 percent or more of the above values.

- 1. Total Porosity: Calculate using particle density and bulk density according to SSSA's "Methods of Soil Analysis - Part 1-Physical and Mineralogical Methods."

- 1) Type 1 – General Planting areas Soils: Minimum 0.5” up to 5” per hour infiltration rate

- 3. Unacceptable Properties: Clean soil of the following:

- a. Unacceptable Materials: Concrete slurry, concrete layers or chunks, cement, plaster, building debris, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, acid, and other extraneous materials that are harmful to plant growth.
- b. Unsuitable Materials: Stones exceeding 1/2-inch in any direction, roots, plants, sod, clay lumps, and pockets of coarse sand.

- C. Imported Planting-Soil Type 1 – General Planting: Imported, naturally formed soil from off-site sources and consisting of sandy loam or loamy sand soil according to USDA textures; and modified to produce viable planting soil. Acceptable soil texture is as follows: gravel content less than 10% by weight, clay less than 15%, and clay and silt together make up less than 35%.

- 1. Type 1 – General Planting:

- 1) Gravel over 2mm: Less than 10% by weight.
- 2) Sand 75-85%
- 3) Silt 20% Maximum
- 4) Clay 15% Maximum
- 5) Silt plus Clay: Less than 35%

- 2. Sources: Take imported, unamended soil from sources that are naturally well-drained sites where topsoil occurs at least 12 inches deep, not from agricultural land, bogs, or marshes; and that do not contain undesirable organisms; disease-causing plant pathogens; or obnoxious weeds and invasive plants including, quackgrass, Johnsongrass, poison ivy, nutsedge, nimblewill, Canada thistle, bindweed, bentgrass, wild garlic, ground ivy, perennial sorrel, and brome grass.

3. Amended Soil Composition: Blend imported, unamended soil based on the results and recommendations of the soil analysis to produce planting soil.
4. Additional Properties of Imported Soil after Amending:
 - a. Soil reaction of pH 6 to 8 as measured in the saturation extract (Method 21a, USDA Handbook Number 60).
 - b. Percent Organic Matter By Dry Weight
 - 1) Type 1 – General Planting areas Soils: 3 to 5 percent after leaching.
 - c. Salinity: The salinity range measured in the saturation extract (Method 3a, USDA Handbook Number 60) shall be 3.0 or less dS/m. If calcium and sulfate ions both exceed 20 milliequivalents per liter in the saturation extract, the maximum salinity shall be 5.0 dS/m.
 - d. Chloride: The maximum concentration of soluble chloride in the saturation extract (Method 3a, USDA Handbook Number 60) shall be 500 mg/l (parts per million).
 - e. Boron: The maximum concentration of soluble boron in the saturation extract (Method 3a, USDA Handbook Number 60) shall be 1 mg/l (parts per million).
 - f. Sodium Absorption Ratio (SAR): The maximum SAR shall be 5 measured per Method 20b, USDA Handbook Number 60.
 - g. Carbon:nitrogen ratio shall be less than 20:1
 - h. Aluminum: Available aluminum measured with the Ammonium Bicarbonate/DTPA Extraction shall be less than 5 parts per million.
 - i. Calcium Carbonate Content: Free calcium carbonate (limestone) shall not be present.
 - j. Phytotoxic Constituent, Herbicides, Hydrocarbons: Germination and growth of monocots and dicots shall not be restricted more than 10 percent compared to the reference soil. Total petroleum hydrocarbons shall not exceed 50 mg/kg dry soil measured per the modified EPA Method No. 8015. Total aromatic volatile organic hydrocarbons (benzene, toluene, xylene and ethylbenzene) shall not exceed 0.5 mg/kg dry soil measured per EPA Methods No. 8020.
 - k. Heavy Metals: The maximum permissible elemental concentration in the soil shall not exceed the following:
 - 1) Total Threshold Concentration Limit (Ammonium Bicarbonate/DTPA Extraction TTLC Level) parts per million (mg/kilogram) dry weight basis:
 - a) Antimony: 150 ppm.
 - b) Arsenic: 50 ppm.
 - c) Barium: 1,000 ppm.
 - d) Beryllium: 7.5 ppm.
 - e) Cadmium: 10 ppm.
 - f) Chromium: 50 ppm.
 - g) Cobalt: 800 ppm
 - h) Copper: 250 ppm
 - i) Lead: 50 ppm.
 - j) Mercury: 2 ppm.
 - k) Molybdenum: 3,500
 - l) Nickel: 200 ppm.
 - m) Selenium: 10 ppm.

- n) Silver: 50 ppm.
- o) Thallium: 70 ppm.
- p) Vanadium: 240 ppm.
- q) Zinc: 2,500 ppm.

- 2) If the soil pH is between 6 and 7, the maximum permissible elemental concentration shall be reduced 50 percent. No more than three metals shall be present at 50 percent or more of the above values.

- 1. Total Porosity: Calculate using particle density and bulk density according to SSSA's "Methods of Soil Analysis - Part 1-Physical and Mineralogical Methods."

- 1) Type 1 – General Planting areas and Soils: Minimum 0.5” up to 5” per hour infiltration rate

2)

- 5. Unacceptable Properties: Clean soil of the following:

- a. Unacceptable Materials: Concrete slurry, concrete layers or chunks, cement, plaster, building debris, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, acid, and other extraneous materials that are harmful to plant growth.
- b. Unsuitable Materials: Stones exceeding 1/2-inch in any direction, roots, plants, sod, clay lumps, and pockets of coarse sand.

2.2 INORGANIC SOIL AMENDMENTS

- A. Lime: ASTM C 602, agricultural liming material containing a minimum of 80 percent calcium carbonate equivalent and as follows:

- 1. Class: T, with a minimum of 99 percent passing through a No. 8 sieve and a minimum of 75 percent passing through a No. 60 sieve.
- 2. Class: O, with a minimum of 95 percent passing through a No. 8 sieve and a minimum of 55 percent passing through a No. 60 sieve.
- 3. Form: Provide lime in form of ground calcitic limestone or ground mollusk shells.

- B. Sulfur: Granular, biodegradable, and containing a minimum of 90 percent elemental sulfur, with a minimum of 99 percent passing through a No. 6 sieve and a maximum of 10 percent passing through a No. 40 sieve.

- C. Iron Sulfate: Granulated ferrous sulfate containing a minimum of 20 percent iron and 10 percent sulfur, and conforming to requirements of the California Food and Agricultural Code.

- D. Perlite: Horticultural perlite, soil amendment grade.

- E. Agricultural Gypsum: Minimum 90 percent calcium sulfate, finely ground with 90 percent passing through a No. 50 sieve.

- F. Sand: Clean, washed, natural or manufactured, free of toxic materials.

1. Sand finer than 100 mesh (0.15 mm): Less than 15%
2. Sand finer than 60 mesh (0.25 mm): Less than 40%
3. Sand larger than 32 mesh (0.5 mm): Minimum 15%

2.3 ORGANIC SOIL AMENDMENTS

- A. Compost: Well decomposed, stable, and weed-free organic matter produced by composting feedstock, and bearing USCC's "Seal of Testing Assurance," and as follows:
1. Compost shall be produced at a facility inspected and regulated by the Local Enforcement Agency for CalRecycle.
 2. Comply with Title 14 requirements of the Process to Further Reduce Pathogens (PFRP), Fecal coliform and Salmonella testing and pathogen and EPA, 40 CFR 503 regulations
 3. Feedstock limited to leaves and plant parts only; includes straw and alfalfa.
 4. Mushroom, manures, peat mosses, green waste and food waste composts are acceptable.
 5. Composted wood products are conditionally acceptable (stable humus must be present). Wood products based on redwood or cedar are not acceptable. Wood derivatives, including sawdust and chipped construction waste are not acceptable.
 6. Sewage sludge and animal waste are not acceptable.
 7. Compost shall have a dark brown color and a soil like odor.
 8. Compost exhibiting a sour or putrid smell, containing recognizable grass or leaves, or is hot (120°F) upon delivery or rewetting is not acceptable.
 9. Comply with Title 14 requirements of the Process to Further Reduce Pathogens (PFRP), Fecal coliform and Salmonella testing and pathogen and EPA, 40 CFR 503 regulations.
 10. Particle Size: The maximum particle size shall be 0.5-inch
 11. Calcium carbonate shall not be present if to be applied on alkaline soils.
 12. The salt content shall be less than 6 millimho/cm @ 25° C. (ECe less than 6) in a saturated paste extract.
 13. Additional Properties:

Property	Method	Requirement
pH, Units	Saturation Paste	5.5 to 8
Soluble-Salt Concentration		Less than 5 dS/m
SAR		Less than 5
Chloride	Method 3a, USDA	Less than 1000 mg/l

EC, dS/m	Saturation Extract	0 to 10
Boron, ppm	Saturation Extract	less than 1
Silicone Content (Acid insoluble ash)		Less than 50%
Moisture content by weight, %	Gravimetric	35-55%
Bulk Density, lbs/cubic yard		500 to 1100
Organic Matter, % of Dry Weight	Loss on Ignition	50-65%
Carbon to Nitrogen Ratio		Less than 20:1
Maturity	Solvita	5 or above
Stability	Solvita	5 or above
Particle Size	Sieve Analysis	
Pass 3/4 inch sieve		98%
Pass 1/2-inch sieve		90%-100%
Pass #4 screen		80% or more
CA Title 22 Metals	Title 22	
Antimony (Sb)		Less than 150 ppm
Arsenic (As)		Less than 50 ppm
Barium (Ba)		Less than 1,000 ppm
Beryllium (Be)		Less than 7.5 ppm
Cadmium (Cd)		Less than 10 ppm
Chromium (Cr)		Less than 50 ppm
Cobalt (Co)		Less than 800 ppm
Copper (Cu)		Less than 250 ppm
Lead (Pb)		Less than 50 ppm
Mercury (Hg)		Less than 2 ppm
Molybdenum (Mo)		Less than 3,500 ppm
Nickel (Ni)		Less than 200 ppm
Selenium (Se)		Less than 10 ppm
Silver (AG)		Less than 50 ppm
Thallium (TI)		Less than 70 ppm

Vanadium (V)		Less than 240 ppm
Zinc (Zn)		Less than 2,500 ppm
Pathogen		
Salmonella	Title 14	< 3 MPN per 4 gms
Fecal Coliform		<1000 MPN per 1 gm
Physical contaminants		
Plastic Metal and Glass, % > 4mm	% by Weight	< 1
Sharps, % > 4mm	% by Weight	0

- B. Sphagnum Peat: Partially decomposed sphagnum peat moss, finely divided or of granular texture with 100 percent passing through a 1/2-inch sieve, a pH of 3.4 to 4.8, and a soluble-salt content measured by electrical conductivity of maximum 5 dS/m.

2.4 FERTILIZERS

- A. Superphosphate: Commercial, phosphate mixture, water soluble; a minimum of 20 percent available phosphoric acid.
- B. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, minimum 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition:
1. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified testing agency.
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) Gro-Power.
 - 2) Wilbur-Ellis Agribusiness.
 - 3) Kellogg Garden Products.
 - 4) Or Equal.
- C. Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:
1. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified testing agency.
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) Gro-Power.

- 2) Wilbur-Ellis Agribusiness.
 - 3) Kellogg Garden Products.
 - 4) Or Equal.
- D. Chelated Iron: Commercial-grade FeEDDHA for dicots and woody plants, and commercial-grade FeDTPA for ornamental grasses and monocots.

PART 3 - EXECUTION

3.1 GENERAL

- A. Place planting soil and fertilizers according to requirements in this section.
- B. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in planting soil.
- C. Proceed with placement only after unsatisfactory conditions have been corrected.

3.2 PLACING AND MIXING TYPE 1 – GENERAL PLANTING SOIL OVER EXPOSED SUBGRADE

- A. General: Apply and mix unamended on-site soil import topsoil with amendments on-site to produce required planting soil. Do not apply materials or till if on-site soil or subgrade is frozen, muddy, or excessively wet.
- B. Mixing: Spread unamended soil to total depth of 12 inches, but not less than required to meet finish grades after mixing machine rototill with amendments and natural settlement. Do not spread if soil or subgrade is muddy or excessively wet.
 1. Amendments: Apply soil amendments, compost, and fertilizer, if required, evenly on surface, and thoroughly blend them with unamended soil by machine rototill to produce planting soil. Machine rototill a minimum of two alternating passes, crossing at 90 degree angles.
 - a. Mix fertilizer with planting soil no more than seven days before planting.
- C. Compaction: Compact each blended lift of planting soil to 80 percent minimum to 85 percent maximum of maximum Standard Proctor density according to ASTM D 698 except where a different compaction value is indicated on Drawings.
- D. Leaching: Leach amended soils with a minimum of 6" of water over a 2 week period or as determined by the soils test recommendations to reduce SAR, ECE, and Sodium to acceptable levels as determined by the soils test recommendations.

3.3 BLENDING TYPE 1 – GENERAL PLANTING SOIL

- A. General: Mix amendments with in-place, unamended on-site soil to produce required planting soil. Do not deep rip, apply materials, or rototill if on-site soil or subgrade is frozen, muddy, or excessively wet.
- B. Mixing: Apply soil amendments, compost, and fertilizer, if required, evenly on surface, and thoroughly blend them into full depth of unamended, in-place soil with machine rototill. Rototill a minimum of two alternating passes to a minimum depth of 6 inches, crossing at 90 degree angles to produce planting soil.
 - 1. Mix fertilizer with planting soil no more than seven days before planting.
- C. Compaction: Compact blended planting soil to 75 to 80 percent of maximum Standard Proctor density according to ASTM D 698 except where a different compaction value is indicated on Drawings.
- D. Leaching: Leach amended soils with a minimum of 6" of water over a 2 week period or as determined by the soils test recommendations to reduce SAR, ECE, and Sodium to acceptable levels as determined by the soils test recommendations.

3.4 FINISH GRADING

- A. Finish Grading: Grade planting soil to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake to remove ridges, and fill depressions to meet finish grades. Rake out and remove all rocks and material 1/2-inch size and larger. Prior to approval, remove ridges greater than 1/2" and fill depressions greater than 1/2" within a 1,000 sq. ft. (10'x10') area.
- B. Finish grades shall be as indicated on the Drawings.
- C. Finish grades shall be measured at the top surface of surface materials.
- D. Molding and rounding of the grades shall be provided at all changes of slope.
- E. Take every precaution to protect and avoid damage to new and existing sprinkler heads, irrigation lines, and other underground utilities during grading and conditioning operations.
- F. Finish grades shall be acceptable to Project Inspector before planting operations begin.
- G. Finish grade shall ensure positive drainage of the site with all surface drainage away from buildings, other structures, and walls with flow towards storm drains and catch basins.
- H. Planting surfaces shall be graded with no less than 2 percent surface slope for positive drainage.
- I. Sports Fields turf areas shall be graded with a 1% minimum and 1.5% maximum surface slope for positive drainage unless indicated otherwise on the drawings.

3.5 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform the following tests and inspections.
 - 1. Compaction: Test planting-soil compaction after placing each lift and at completion using a densitometer or soil-compaction meter calibrated to a reference test value based on laboratory testing according to ASTM D 698. Space tests at no less than one for each 1000 sq. ft. of in-place soil or part thereof.
- B. Soil will be considered defective if it does not pass tests and inspections.
- C. Prepare test and inspection reports.
- D. Label each sample and test report with the date, location keyed to a site plan or other location system, visible conditions when and where sample was taken, and sampling depth.

3.6 PROTECTION

- A. Protection Zone: Identify protection zones according to Section 01 56 39 "Temporary Tree and Plant Protection."
- B. Protect areas of in-place soil from additional compaction, disturbance, and contamination. Prohibit the following practices within these areas except as required to perform planting operations:
 - 1. Storage of construction materials, debris, or excavated material.
 - 2. Parking vehicles or equipment.
 - 3. Vehicle traffic.
 - 4. Foot traffic.
 - 5. Erection of sheds or structures.
 - 6. Impoundment of water.
 - 7. Excavation or other digging unless otherwise indicated.
- C. If planting soil or subgrade is overcompacted, disturbed, or contaminated by foreign or deleterious materials or liquids, remove the planting soil and contamination; restore the subgrade as directed by Landscape Architect and replace contaminated planting soil with new planting soil.

3.7 CLEANING

- A. Protect areas adjacent to planting-soil preparation and placement areas from contamination. Keep adjacent paving and construction clean and work area in an orderly condition.
- B. Remove surplus soil and waste material including excess subsoil, unsuitable materials, trash, and debris and legally dispose of them off District's property unless otherwise indicated.

END OF SECTION 32 91 13

DIVISION 32 – EXTERIOR IMPROVEMENTS
SECTION 32 93 00

PLANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:

- 1. Plants.
- 2. Fertilizers
- 3. Mulches
- 4. Erosion Control Materials
- 5. Weed Control Materials
- 6. Pesticides
- 7. Tree stabilization.
- 8. Landscape edgings.

- B. Related Requirements:

- 1. Section 01 56 39 "Temporary Tree and Plant Protection" for protecting, trimming, pruning, repairing, and replacing existing trees to remain that interfere with, or are affected by, execution of the Work.
- 2. Section 31 20 00 "Earth Moving" for earthworks, trenching, and backfilling not specified in this Section.
- 3. Section 32 84 00 "Planting Irrigation" for coordinating installation of irrigation systems with plantings.
- 4. Section 32 91 13 "Soil Preparation" for planting soils specified by composition of mixes.

1.3 ALLOWANCES

- A. Allowances for plants are specified in Section 01 21 00 "Allowances."

1.4 UNIT PRICES

- A. Work of this Section is affected by unit prices specified in Section 01 22 00 "Unit Prices."

1.5 DEFINITIONS

- A. **Agricultural Soil Testing Lab:** An independent, state-operated, or university-operated laboratory; experienced in soil science, soils testing, and plant nutrition; with experience and capability to conduct testing indicated; and that specializes in types of tests to be performed.
- B. **Backfill:** Earth used to replace, or the act of replacing, earth in an excavation. This can be amended or unamended soil as indicated.
- C. **Balled and Burlapped Stock:** Plants dug with firm, natural balls of earth in which they were grown, with a ball size not less than diameter and depth recommended by ANSI Z60.1 for type and size of plant required; wrapped with burlap, tied, rigidly supported, and drum laced with twine with root flare visible at surface of ball as recommended by ANSI Z60.1.
- D. **Bare-Root Stock:** Plants with a well-branched, fibrous-root system developed by transplanting or root pruning, with soil or growing medium removed, and with not less than the minimum root spread according to ANSI Z60.1 for type and size of plant required.
- E. **Caliper:** Diameter of a trunk measured by a diameter tape at a height of 12 inches (300 mm) above ground.
- F. **Compost:** Product resulting from controlled biological decomposition of organic material that has been sanitized through generation of heat and stabilized to the point that it is beneficial to plant growth.
- G. **Container-Grown Stock:** Healthy, vigorous, well-rooted plants grown in a container, with a well-established root system reaching sides of container and maintaining a firm ball when removed from container. Container shall be rigid enough to hold ball shape and protect root mass during shipping and be sized according to ANSI Z60.1 for type and size of plant required.
- H. **Finish Grade:** Elevation of finished surface of planting soil.
- I. **Imported Soil:** Soil that is transported to Project site for use.
- J. **Organic Matter:** Total of organic materials in soil exclusive of undecayed plant and animal tissues, their partial decomposition products, and soil biomass; also called "humus" or "soil organic matter."
- K. **Pesticide:** A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. Pesticides include insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. They also include substances or mixtures intended for use as a plant regulator, defoliant, or desiccant.
- L. **Pests:** Living organisms that occur where they are not desired or that cause damage to plants, animals, or people. Pests include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted mammals (rabbits, etc.), unwanted plants (weeds), fungi, bacteria, and viruses.
- M. **Planting Area:** Areas to be planted.
- N. **Planting Soil:** Existing, on-site soil; imported soil; or manufactured soil that has been modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth. See Section 32 91 13 "Soil Preparation" for drawing designations for planting soils.
- O. **Plant; Plants; Plant Material:** These terms refer to vegetation in general, including trees, shrubs, vines, ground covers, ornamental grasses, bulbs, corms, tubers, or herbaceous vegetation.
- P. **Root Flare:** Also called "trunk flare." Area at base of plant's stem or trunk where stem or trunk broadens to form roots; area of transition between root system and stem or trunk.

- Q. Stem Girdling Roots: Roots that encircle stems (trunks) of trees below soil surface.
- R. Subgrade: Surface or elevation of subsoil remaining after excavation is complete, or top surface of a fill or backfill before planting soil is placed.
- S. Subsoil: Soil beneath level of subgrade; soil beneath topsoil layers of a naturally occurring soil profile, typified by less than 1 percent organic matter and few soil organisms.
- T. Surface Soil: Soil that is present at top layer of existing soil profile. In undisturbed areas, surface soil is typically called "topsoil"; but in disturbed areas such as urban environments, surface soil can be subsoil.

1.6 PREINSTALLATION MEETINGS

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

1.7 INSTALLATION REVIEW MEETINGS

- A. Installation review meetings are required to confirm that installed Work is in accordance with Drawings and Specifications.
- B. Conduct all installation review meetings at Project site.
- C. Notify Construction Manager a minimum of seven working days prior to each meeting.
- D. Installation review meetings are required for the following portions of work as a minimum:
 1. Completion of fine grading and prior to installation of plant materials.
 2. Delivery of plant materials, tree layout, and sample shrub/ground cover layout plan.
 3. After installation of one tree.
 4. Pre-Establishment Period walkthrough.
 5. Pre-final acceptance walkthrough.
 6. Final acceptance walkthrough.

1.8 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 1. Plant Materials: Include quantities, sizes, quality, and sources for plant materials.
 2. Plant Photographs: Include clear color photographs in digital format of each required species and size of plant material as it will be furnished to Project. Stock photos of plant materials will not be acceptable for submittals, photos must be of actual plant materials at nursery. Take photographs from an angle depicting true size and condition of typical plant to be furnished. Include a scale rod or other measuring device in each photograph. For species where more than 20 plants are required, include a minimum of three photographs showing average plant, best quality plant, and worst quality plant to be furnished. Identify each photograph with full scientific name of plant, plant size, and name of growing nursery.
- B. Samples for Verification: For each of the following:
 1. Organic Mulch: 1-quart volume of each organic mulch required; in sealed plastic bags labeled with composition of materials by percentage of weight and source of mulch. Each Sample shall be

- typical of the lot of material to be furnished; provide an accurate representation of color, texture, and organic makeup.
- 2. Fill Sand: 1-quart volume of each fill sand in sealed plastic bag labeled with source of sand.
- 3. Weed Control Barrier: 12-by-12 inches.
- 4. Edging Materials and Accessories: Manufacturer's standard size, to verify color selected.
- 5. Root Barrier: Width of panel by 12 inches.

1.9 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For landscape Installer. Include list of similar projects completed by Installer demonstrating Installer's capabilities and experience. Include project names, addresses, and year completed, and include names and addresses of Owner's contact persons.
- B. Product Certificates: For each type of manufactured product, from manufacturer, and complying with the following:
 - 1. Manufacturer's certified analysis of standard products.
 - 2. Analysis of other materials by a recognized laboratory made according to methods established by the Association of Official Analytical Chemists, where applicable.
- C. Pesticides and Herbicides: Product label and manufacturer's application instructions specific to Project.
- D. Sample Warranty: For special warranty.

1.10 CLOSEOUT SUBMITTALS

- A. Establishment Data: Recommended procedures to be established by City for establishment of plants during a calendar year. Submit before expiration of required establishment periods.

1.11 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified landscape installer whose work has resulted in successful establishment of plants.
 - 1. Professional Membership: Member in good standing of either the Professional Landcare Network or the American Nursery and Landscape Association.
 - 2. Experience: Five years' experience in landscape installation.
 - 3. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when work is in progress.
 - 4. Field Supervisor Personnel Certifications: Certified in the following category from the Professional Landcare Network:
 - a. Landscape Industry Certified Technician - Exterior.
 - 5. Pesticide Applicator: State licensed, commercial.
- B. Provide quality, size, genus, species, and variety of plants indicated, complying with applicable requirements in ANSI Z60.1.
 - 1. City Construction Manager and Landscape Architect will select plants purchased under allowances.

- C. Measurements: Measure according to ANSI Z60.1. Do not prune to obtain required sizes.
 - 1. Trees and Shrubs: Measure with branches and trunks or canes in their normal position. Take height measurements from or near top of root flare for field-grown stock and container-grown stock. Measure main body of tree or shrub for height and spread; do not measure branches or roots tip to tip. Take caliper measurements 6 inches above root flare for trees up to 4-inch caliper size, and 12 inches above root flare for larger sizes.
 - 2. Other Plants: Measure with stems, petioles, and foliage in their normal position.
- D. Plant Material Observation: Project Inspector (who may delegate authority to City Landscape Inspector) may observe plant material either at place of growth or at site before planting for compliance with requirements for genus, species, variety, cultivar, size, and quality. Project Inspector may also observe trees and shrubs further for size and condition of balls and root systems, pests, disease symptoms, injuries, and latent defects and may reject unsatisfactory or defective material at any time during progress of work. Remove rejected trees or shrubs immediately from Project site.
 - 1. COA engineer or representative shall review pictures for the initial submittal of plants first, prior to purchase, if not too far, City of Anaheim to review and tag plants and trees at the nursery and will inspect the plant material when it is delivered. COA or representative has the option to reject if damaged - wind-blown etc.
 - 2. Notify City Construction Manager of sources of planting materials seven days in advance of delivery to site.

1.12 DELIVERY, STORAGE, AND HANDLING

- A. Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of compliance with state and Federal laws if applicable.
- B. Bulk Materials:
 - 1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
 - 2. Provide erosion-control measures to prevent erosion or displacement of bulk materials; discharge of soil-bearing water runoff; and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
 - 3. Do not move or handle materials if they are wet.
 - 4. Accompany each delivery of bulk materials with appropriate certificates.
- C. Do not prune trees and shrubs before delivery. Protect bark, branches, and root systems from sun scald, drying, wind burn, sweating, whipping, and other handling and tying damage. Do not bend or bind-tie trees or shrubs in such a manner as to destroy their natural shape. Provide protective covering of plants during shipping and delivery. Do not drop plants during delivery and handling.
- D. Handle planting stock by root ball.
- E. Store bulbs, corms, and tubers in a dry place at 60 to 65 deg F until planting.
- F. Wrap trees and shrubs with burlap fabric over trunks, branches, stems, twigs, and foliage to protect from wind and other damage during digging, handling, and transportation.
- G. Deliver plants after preparations for planting have been completed, and install immediately. If planting is delayed more than six hours after delivery, set plants and trees in their appropriate aspect (sun, filtered sun, or shade), protect from weather and mechanical damage, and keep roots moist. Only plant what can

be irrigated with the irrigation system by the end of the day or plant after irrigation system is installed and approved.

1. Set balled stock on ground and cover ball with soil, peat moss, sawdust, or other acceptable material.
2. Do not remove container-grown stock from containers before time of planting.
3. Water root systems of plants stored on-site deeply and thoroughly with a fine-mist spray. Water as often as necessary to maintain root systems in a moist, but not overly wet condition.
4. Container plant material shall be watered (root ball) thoroughly soaked the night before planting.

1.13 FIELD CONDITIONS

- A. Field Measurements: Verify actual grade elevations, service and utility locations, irrigation system components, and dimensions of plantings and construction contiguous with new plantings by field measurements before proceeding with planting work.
- B. Interruption of Existing Water Service: Do not interrupt water service to facilities occupied by City or others unless permitted under the following conditions and then only after arranging to provide temporary water service according to requirements indicated:
 1. Notify City Construction Manager no fewer than seven business days in advance of proposed interruption of water service.
 2. Do not proceed with interruption of water service without City Construction Manager's written permission.
 3. Obtain City Construction Manager's written approval of exact length of time for each shut-off or work session.
- C. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions and warranty requirements.
- D. Thoroughly water plant material immediately after it is installed.

1.14 WARRANTY

- A. Special Warranty: Installer agrees to repair or replace plantings and accessories that fail in materials, workmanship, or growth within specified warranty period.
 1. Failures include:
 - a. Death and unsatisfactory growth, except for defects resulting from abuse, lack of adequate establishment, or neglect by City.
 - b. Structural failures including plantings falling or blowing over.
 - c. Faulty performance of tree stabilization, and edgings..
 - d. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 2. Warranty Periods: From date of Substantial Completion.
 - a. Trees, Shrubs, Vines, and Ornamental Grasses: 12 months.
 - b. Ground Covers and Other Plants: 12 months.
 3. Include the following remedial actions as a minimum:

- a. Immediately remove dead plants and replace unless required to plant in succeeding planting season.
- b. Replace plants that are more than 25 percent dead or in an unhealthy condition on a monthly basis.
- c. A limit of one replacement of each plant is required except for losses or replacements due to failure to comply with requirements.
- d. Provide extended warranty for period equal to original warranty period, for replaced plant material.

PART 2 - PRODUCTS

2.1 PLANT MATERIAL

- A. General: Furnish nursery-grown plants true to genus, species, variety, cultivar, stem form, shearing, and other features indicated in Plant List, Plant Schedule, or Plant Legend indicated on Drawings and complying with ANSI Z60.1; and with healthy root systems developed by transplanting or root pruning. Provide well-shaped, fully branched, healthy, vigorous stock, densely foliated when in leaf and free of disease, pests, eggs, larvae, and defects such as knots, sun scald, injuries, abrasions, and disfigurement.
 1. Trees with damaged, crooked, or multiple leaders; tight vertical branches where bark is squeezed between two branches or between branch and trunk ("included bark"); crossing trunks; cut-off limbs more than 3/4-inch in diameter; or with stem girdling roots are unacceptable.
 2. Collected Stock: Do not use plants harvested from the wild, from native stands, from an established landscape planting, or not grown in a nursery unless otherwise indicated.
- B. Provide plants of sizes, grades, and ball or container sizes complying with ANSI Z60.1 for types and form of plants required. Plants of a larger size may be used if acceptable to Project Inspector, with a proportionate increase in size of roots or balls.
- C. Root-Ball Depth: Furnish trees and shrubs with root balls measured from top of root ball, which begins at root flare according to ANSI Z60.1. Root flare shall be visible before planting.
- D. Labeling: Label at least one plant of each variety, size, and caliper with a securely attached, waterproof tag bearing legible designation of common name and full scientific name, including genus and species. Include nomenclature for hybrid, variety, or cultivar, if applicable for plant.
- E. If formal arrangements or consecutive order of plants is indicated on Drawings, select stock for uniform height and spread, and number labels to assure symmetry in planting.
- F. Ground Cover Plants Grown in Flats: Provide healthy, disease-free plants of species and variety indicated on Drawings, with established root systems. Provide only plants that are acclimated to outdoor conditions before delivery. Ground cover plants grown in flats shall remain in original flats until transplanting.

2.2 FERTILIZERS

- A. Planting Tablets: Tightly compressed chip-type, long-lasting, slow-release, commercial-grade planting fertilizer in tablet form. Tablets shall break down with soil bacteria, converting nutrients into a form that can be absorbed by plant roots.
 1. Size: 5-gram and 21-gram tablets.
 2. Nutrient Composition: 12 percent nitrogen, 8 percent phosphorous, and 8 percent potassium, by weight plus micronutrients.

2.3 MULCHES

- A. Organic Bark Mulch: Free from deleterious materials, animal waste, sludge waste, lumber or C&D wood by products, trash and debris, and suitable as a top dressing of trees and shrubs, consisting of one of the following:
1. Type: Ground tree trimming, wood, and bark.
 2. Size Range: 1/2-inch to 2-inch.
 3. Color: Natural, no dyes.
 4. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. Agriservice, Inc.
 - b. Plant's Choice, Inc.
 - c. Whittier Fertilizer.
 - d. Or Equal.

2.4 TREE-STABILIZATION MATERIALS

- A. Trunk-Stabilization Materials:
1. Upright Stakes: Rough-sawn, sound, new Lodgepole Pine or Douglas Fir cores with alkaline copper quaternary (ACQ) wood pressure-preservative treatment, no chromated copper arsenate (CCA) treatment, free of knots, holes, cross grain, and other defects, 2-by-2-inch nominal by length indicated, pointed at one end.
 2. Rigid Twist Braces: Round threaded metal rod, 1/2-inch size, encased in U.V. black vinyl tubing placed at center portion of rod. Rod shall be bent in a 360 degree circle.
 3. Flexible Ties: Manufactured of virgin flexible vinyl meeting ASTM D-412 standards for tensile and elongation strength, black for ultraviolet resistance, manufactured with a double back locking configuration. Flexible ties shall elongate with tree growth while preventing damage to tree.
 4. Proprietary Staking-and-Guying Devices: Proprietary stake or anchor and adjustable tie systems to secure each new planting by plant stem; sized as indicated and according to manufacturer's written recommendations.
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) Arborbrace.
 - 2) J. R. Partners.
 - 3) Villa Root Barrier.
 - 4) Or Equal.

2.5 LANDSCAPE EDGINGS

- A. Concrete Edging: Of sizes indicated on Drawings:
1. 2500 PSI Concrete

2.6 MISCELLANEOUS PRODUCTS

- A. Wood Pressure-Preservative Treatment: AWP A U1, Use Category UC4a; acceptable to authorities having jurisdiction, and containing no arsenic or chromium.

- B. Root Barrier: Black, molded, modular panels 24 inches high (deep), 85 mils thick, and with vertical root deflecting ribs protruding 3/4-inch out from panel surface; manufactured with minimum 50 percent recycled polyethylene plastic with UV inhibitors. Panels shall have an integrated, self-interlocking joining system that slide into each other.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. DeepRoot Green Infrastructure, LLC.
 - b. NDS Inc.
 - c. Villa Root Barrier.
 - d. Or Equal.
- C. Burlap: Non-synthetic, biodegradable.
- D. Planter Drainage Gravel: Washed, sound crushed stone or gravel complying with ASTM D 448 for Size No. 8.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas to receive plants, with Installer present, for compliance with requirements and conditions affecting installation and performance of the Work.
 - 1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area.
 - 2. Verify that plants and vehicles loaded with plants can travel to planting locations with adequate overhead clearance.
 - 3. Suspend planting operations during periods of excessive soil moisture until moisture content reaches acceptable levels to attain required results.
 - 4. Uniformly moisten excessively dry soil that is not workable or which is dusty.
- B. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove soil and contamination as directed by City Construction Manager and replace with new planting soil.
- C. Do not proceed with installation of plants without written notification from City Construction Manager that irrigation coverage test was approved and all unsatisfactory conditions have been corrected.
- D. Locate all existing underground utilities and obstructions prior to excavating. Notify City Construction Manager any interferences found.

3.2 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities and existing plants from damage caused by planting operations.
 - 1. Protect grade stakes set by others until directed to remove them.

- B. Install erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.
- C. Unacceptable Materials: Remove from soil all concrete slurry, concrete layers or chunks, cement, plaster, building debris, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, acid, and other extraneous materials that are harmful to plant growth.
- D. Lay out individual tree and shrub locations and areas for multiple plantings. Stake locations, outline areas, adjust locations when requested, and obtain City Construction Manager's acceptance of layout before excavating or planting. Make minor adjustments as required.
- E. Prior to excavating planting holes, locate underground utilities and structures in area of excavations. Repair or replace existing utilities damaged by Contractor.

3.3 PLANTING AREA ESTABLISHMENT

- A. General: Prepare planting area for blending planting soil in place and mix planting soil according to Agricultural Soil Testing Lab Recommendations and Section 32 91 13 "Soil Preparation."
- B. Planting Soil: Blend planting soil in place according to Section 32 91 13 "Soil Preparation."
- C. Before planting, obtain Project Inspector's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.

3.4 WEED ERADICATION PROCEDURES FOR ALL PLANTING AREAS

- A. Manually remove existing vegetation as directed by COA representative and dispose of off-site.
- B. Do not remove existing trees.
- C. Fertilize all planting areas. Add any soil amendments required per soil analysis. Begin watering process to activate fertilizer and additive chemicals and germination of weed seeds.
- D. First Watering
 - 1. Water all planting areas thoroughly and continuously for a period of two weeks or until a dense weed cover is evident.
 - 2. Discontinue watering process for two days, and then manually remove germinated weeds.
- E. Second Watering
 - 1. Water all planting areas thoroughly and continuously for a period of 2-4 weeks.
 - 2. Discontinue watering process for two days, and then manually remove germinated weeds.
- F. Manually remove weeds.
- G. Do not proceed forward without written notification by City Construction Manager that weed control is successful.

3.5 FINISH GRADING

- A. Provide finish grading in accordance with Section 32 91 13 "Soil Preparation."

3.6 PREPARATION FOR EROSION-CONTROL MATERIALS

- A. Slopes: Provide Erosion Control material on all slopes steeper than 3:1.
- B. Moisten prepared area before planting if surface is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

3.7 EXCAVATION FOR TREES AND SHRUBS

- A. Planting Pits and Trenches: Excavate circular or square planting pits to match container shape.
 - 1. Excavate planting pits with sides or roughened surface sloping inward at a 45-degree angle. Excavations with vertical sides are unacceptable. Do not further disturb base. Ensure that root ball will sit on undisturbed base soil to prevent settling. Scarify sides of planting pit smeared or smoothed during excavation.
 - 2. Excavate to minimum sizes indicate on Drawings for container-grown stock. Excavated pits shall be, in all cases, large enough to permit handling and planting without injury or breakage of roots or root ball.
 - 3. Do not excavate deeper than depth of root ball, measured from root flare to bottom of root ball.
 - 4. If area under plant was initially dug too deep, add soil to raise it to correct level and thoroughly tamp added soil to prevent settling.
 - 5. Excavation shall include stripping and stacking of all acceptable soil encountered within areas to be excavated for planting pits and planter areas. Protect all areas that are to be trucked over and upon. Temporarily stack soil in these areas pending re-use for filling of planting pits and planter areas.
 - 6. Spread excess soil generated from planting pits on site as directed by City Construction Manager. Remove from City property all excess soil that is not spread on site.
 - 7. Maintain angles of repose of adjacent materials to ensure stability. Do not excavate subgrades of adjacent paving, structures, hardscapes, or other new or existing improvements.
 - 8. Maintain supervision of excavations during working hours.
 - 9. Keep excavations covered or otherwise protected when unattended by Installer's personnel.
- B. Backfill Soil: Subsoil and topsoil removed from plant pit excavations may be used as backfill soil unless otherwise indicated.
- C. Obstructions: Notify City Construction Manager if unexpected rock or obstructions detrimental to trees or shrubs are encountered in excavations.
- D. Hardpan Layer: Drill 6-inch-diameter holes, 24 inches apart, into free-draining strata or to a depth of 10 feet, whichever is less, and backfill with free-draining material.
- E. Drainage: Notify City Construction Manager if subsoil conditions evidence water seepage or retention in tree or shrub planting pits.

3.8 TREE, SHRUB, ORNAMENTAL GRASS, AND VINE PLANTING

- A. Inspection: At time of planting, verify that root flare is visible at top of root ball according to ANSI Z60.1. If root flare is not visible, remove soil in a level manner from root ball to where top-most root emerges from trunk. After soil removal to expose root flare, verify that root ball still meets size requirements.

- B. Roots: Remove stem girdling roots and kinked roots. Remove injured roots by cutting cleanly; do not break. Plant will not be accepted if rootball is broken or cracked, either before, during or after installation process.
- C. Container-Grown Stock: Set each plant plumb and in center of planting pit or trench with root flare 1 inch above adjacent finish grades.
 - 1. Backfill: Planting soil.
 - 2. Carefully remove root ball from container without damaging root ball or plant.
 - 3. Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.
 - 4. Place planting tablets equally distributed around each planting pit when pit is approximately one-half filled. Place tablets beside root ball about 1 inch from root tips; do not place tablets in bottom of hole.
 - a. Quantity:
 - 1) One 5 gram tablet per liner and flat size plant.
 - 2) One 21 gram tablet per gallon container.
 - 3) Three 21 gram tablets per 5-gallon container.
 - 4) Four 21 gram tablets per 15-gallon container.
 - 5) One 21 gram tablet per each 4-inch of box size.
 - 5. Continue backfilling process. Water again after placing and tamping final layer of soil.
- D. Slopes: When planting on slopes, set plant so root flare on uphill side is flush with surrounding soil on slope; edge of root ball on downhill side will be above surrounding soil. Apply enough soil to cover downhill side of root ball.
- E. Accept responsibility for all surface and subsurface drainage required that may affect the warranty of plant materials.

3.9 TREE, SHRUB, AND VINE PRUNING

- A. Remove only dead, dying, or broken branches. Do not prune for shape.
- B. Prune, thin, and shape trees, shrubs, and vines as directed by City Construction Manager and Landscape Architect.
- C. Prune, thin, and shape trees, shrubs, and vines according to ANSI A300 “Tree, Shrub, and Other Woody Plant Establishment – Standard Practices (Pruning)” and current standard professional horticultural and arboricultural practices. Unless otherwise directed by City Construction Manager, do not cut tree leaders; remove only injured, dying, or dead branches from trees and shrubs; and prune to retain natural character. Prune to provide necessary physical clearances and horizontal sight clearances (pedestrian and vehicular).
- D. Remove unwanted sucker growth from base of tree as directed by City Construction Manager.
- E. Do not apply pruning paint to wounds.

3.10 TREE STABILIZATION

- A. General: Tree stabilization shall be accomplished in such a manner as to ensure proper and healthy growth, and safety of plants, property, and public.
- B. Trunk Stabilization by Upright Staking and Tying: Install trunk stabilization as follows unless otherwise indicated:
 - 1. Upright Staking and Tying: Stake trees 5-gallon size and larger as indicated on Drawings. Set stakes securely in vertical position (plumb) and space to avoid penetrating root balls or root masses.
 - 2. Flexible Tree Ties: Support trees with bands of flexible ties. Fasten ties to each tree and stake by looping figure 8's with inside diameter of tie at 2 or 3 times diameter of tree and by tacking back of tie to stake. Allow enough slack to avoid rigid restraint of tree.
 - 3. Rigid Twist Braces: Spread meeting points of rod apart permitting brace to be placed on tree by holding it parallel to tree trunk, with open part of circle on either side of trunk. Enclose tree trunk in circle as brace is twisted at right angles to trunk. Insert threaded ends through drilled holes in stakes or poles and secure with stainless steel nuts, lock washers, and flat washers.
 - 4. Proprietary Staking Device: Install staking system sized and positioned as recommended by manufacturer unless otherwise indicated and according to manufacturer's written instructions.

3.11 ROOT-BARRIER INSTALLATION

- A. Prior to installing root barrier verify location with COA representative and obtain approval. Root barriers are for new trees only.
- B. Install root barrier where trees are planted within 120 inches (10 feet) of paving or other hardscape elements, such as walls, curbs, and walkways, unless otherwise indicated on Drawings.
- C. Align root barrier vertically with bottom edge angled at 20 degrees away from paving or other hardscape element, and run it linearly along and adjacent to paving or other hardscape elements to be protected from invasive roots.
- D. Install root barrier continuously for a distance of 120 inches (10 feet) in each direction from tree trunk, for a total distance of 20 feet per tree. If trees are spaced closer, use a single continuous piece of root barrier.
 - 1. Position top of root barrier 1/2-inch above adjacent finish grade.
 - 2. Overlap root barrier a minimum of 12 inches at joints.
 - 3. Do not distort or bend root barrier during construction activities.
 - 4. Do not install root barrier surrounding root ball of tree.

3.12 GROUND COVER PLANTING

- A. Set out and space ground cover and plants other than trees, shrubs, and vines as indicated on Drawings in even rows with triangular spacing. To be reviewed by COA representative prior to installing the plant material.
- B. Use planting soil for backfill.
- C. Dig holes large enough to allow spreading of roots.
- D. Install planting tablet in each ground cover planting hole.

1. Quantity:

- a. One 5 gram tablet per liner and flat size plant.
- b. One 21 gram tablet per gallon container.

- E. For rooted cutting plants supplied in flats, plant each in a manner that minimally disturbs root system but to a depth not less than two nodes.
- F. Work soil around roots to cover completely and eliminate air pockets. Leave a slight saucer berm around plants to hold water.
- G. Hand-smooth finish grade of ground cover planting area after planting to provide an even, smooth surface.
- H. Water thoroughly immediately after planting, taking care not to cover plant crowns with wet soil.
- I. Protect plants from hot sun and wind; remove protection if plants show evidence of recovery from transplanting shock.

3.13 PLANTING AREA MULCHING

- A. Mulch backfilled surfaces of planting areas and other areas indicated.
 - 1. Organic Mulch in Planting Areas: Apply 3-inch average thickness of organic mulch over whole surface of planting area, and finish level with adjacent finish grades. Do not place mulch within 2 inches of trunks or stems.
 - 2. Do not apply organic mulch in planter areas that exceed 3:1 slope.
 - 3. Apply only 1-inch of mulch under existing trees.

3.14 EDGING INSTALLATION

- A. Concrete Edging: Install edging where indicated on Drawings in accordance with Section 32 13 13 "Concrete Paving" Section 03 30 00 "Cast-In-Place Concrete".

3.15 CONTRACCTOR PROVIDED 90 DAY PLANT ESTABLISHMENT PERIOD ESTABLISHMENT TASKS

- A. Begin establishment immediately after plants are installed.
- B. Maintain plantings by pruning, cultivating, watering, weeding, fertilizing, mulching, restoring planting saucers, adjusting and repairing tree-stabilization devices, resetting to proper grades or vertical position, and performing other operations as required to establish healthy, viable plantings. Provide for special needs of various species.
- C. Weed removal: Establishment period will start over if weeds are not removed weekly and the plants are not watered, and if more than 5% of plants die and are not replaced.
- D. Maintain planting areas in a manner that presents a professionally landscaped appearance at all times.
- E. Prune trees, shrubs, vines, and ornamental grasses in a way that follows natural growth characteristics of each specific plant. Do not trim in a formal, geometric, or topiary shapes unless otherwise directed by City Construction Manager.

- F. Prune in accordance with “Tree, Shrub, and Vine Pruning” article.
- G. Ground Covers: Do not permit ground covers to grow into trees, shrubs, ornamental grasses, or vines. In areas where ground covers and other vegetation are adjacent, do not allow ground cover to grow onto or otherwise dominate planter area. Do not permit ground covers to touch or grow onto fences (both sides), ditches, gutters, paved areas, sidewalks, buildings, walls (except CMU walls), and storm drains. Allow ground covers to grow onto CMU walls, unless otherwise directed by City Construction Manager.
- H. Vines: Maintain attachment methods that secure to walls as indicated on Drawings. Maintain vines so that growth will not exceed 6 inches out from wall. Do not allow vines to become ground cover unless otherwise directed by City Construction Manager. Do not allow vines to grow on any other objects including fences, buildings and other structures, trees, shrubs, light poles, etc.
- I. Continuously maintain a minimum 3-inch depth of bark mulch in planting areas.
- J. Fill in, as necessary, soil subsidence that may occur because of settling or other processes. Replace mulch materials damaged or lost in areas of subsidence.
- K. Apply treatments as required to keep plant materials, planted areas, and soils free of pests and pathogens or disease. Use integrated pest management practices when possible to minimize use of pesticides and reduce hazards. Treatments include physical controls such as hosing off foliage, mechanical controls such as traps, and biological control agents.
- L. Frequency of On-Site Plant Establishment Services: As necessary to comply with requirements, but no less than once each week.

3.16 REPAIR AND REPLACEMENT

- A. General: Repair or replace existing or new trees and other plants that are damaged by construction operations, in a manner approved by City Construction Manager.
 - 1. Submit details of proposed pruning and repairs.
 - 2. Perform repairs of damaged trunks, branches, and roots within 24 hours, if approved.
 - 3. Replace plant materials that cannot be repaired and restored to healthy, long term full-growth status, as determined by City Construction Manager, within 14 days after notification, at no additional cost to City.
- B. Remove and replace plant materials that are more than 25 percent dead or in an unhealthy condition before end of establishment period or are damaged during construction operations that City Construction Manager determines are incapable of restoring to normal growth pattern, at no additional cost to City.
 - 1. Provide new plant materials of same size as those being replaced.
 - 2. Species of Replacement Plant Materials: Same species, variety, and/or cultivar being replaced.

3.17 CLEANING AND PROTECTION

- A. During planting, keep adjacent paving and construction clean and work area in an orderly condition. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.
- B. Remove surplus soil and waste material including excess subsoil, unsuitable soil, trash, and debris and legally dispose of them off City's property.

- C. Protect plants from damage due to landscape operations and operations of other contractors and trades. Maintain protection during installation and establishment periods. Treat, repair, or replace damaged plantings.
- D. After installation and before Substantial Completion, remove nursery tags, nursery stakes, tie tape, labels, wire, burlap, and other debris from plant material, planting areas, and Project site.

3.18 CONTRACTOR PROVIDED ESTABLISHMENT SERVICE PERIODS

- A. Plant "Establishment Period" will start as soon as irrigation system coverage test has been accepted and all plants and hydroseed have been placed and punch list has been generated by the design and construction team.
- B. Plant "Establishment Period" will start after all punch list items have been completed, but not less than 30 days from date of planting.
- C. Establishment Service: Provide full establishment by skilled employees of landscape Installer. Maintain as required in Part 3 Plant Establishment. Begin establishment immediately after each area is planted and continue until plants are established, but for not less than the following periods:
 - 1. Plants: 90 day establishment period.
 - 2. The 90 day establishment period will begin once all trees, plants and mulch is installed.
- D. Extended Establishment Period: When, in the opinion of the City Construction Manager, there is improper establishment, and/or unhealthy or poor condition of plant materials, provide additional on-going establishment at no additional cost to City until all work is deemed acceptable by City Construction Manager.
 - 1. End of Establishment Period: Acceptance by City Construction Manager in writing determines actual completion of Establishment Period.

END OF SECTION 32 93 00

DIVISION 33 - UTILITIES
SECTION 33 11 00
WATER UTILITY DISTRIBUTION PIPING

PART 1 - GENERAL

1.1 SUMMARY

- A. Requirements: Provide water distribution system, complete, as indicated on the Drawings or inferable therefrom and/or as specified in accordance with the Contract Documents.

1.2 SUBMITTALS

- A. Product Data: Submit copies of manufacturer's specifications and installation instructions for each material. Include certification or other data verifying compliance with required characteristics. Indicate by transmittal form that copy of each has been distributed to the Installer.
- B. Shop Drawings: Submit layout and shop drawings as required under Section Submittals. Include details of reinforced concrete structures.
- C. Test Reports: Submit certified Test Reports showing compliance of the following items in accordance with Section General Conditions.
1. Laboratory test for bedding and trench stabilization materials.
 2. Concrete design mix.
 3. Compression tests.
 4. Water Test Reports: Submit results of water sample tests by State or local health authorities

1.3 QUALITY ASSURANCE

- A. Regulatory Requirements:
1. Comply with requirements of City of Anaheim supplying water. Include tapping of water mains and backflow prevention.
 2. All work to be performed and materials to be used shall be in accordance with the Standard Specifications for Public Works Construction, latest edition and supplements.
 3. The Contractor shall have one copy of the Standard Specifications at the job site.
 4. The Standard Specifications apply only to performance and materials and how they are to be incorporated into the Work. The legal/contractual relationship sections and the measurement and pavement sections do not apply to this document.
- B. Piping materials shall bear label, stamp, or other markings of specified testing agency.
- C. NSF Compliance:

1. Comply with NSF 14 for plastic potable-water-service piping.
2. Comply with NSF 61 for materials for water-service piping and specialties for domestic water.

D. California Health and Safety Code:

1. Per Section 116875 subparagraphs a through d, effective January 1, 2010 as specified in SB 1334, Stat. 2008, c.580 – all domestic water systems have to use lead-free pipes, fixtures, solder or flux.

1.4 PROJECT CONDITIONS

- A. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
1. Notify OWNER’S REPRESENTATIVE not less than two days in advance of proposed utility interruptions.
 2. Do not proceed with utility interruptions without OWNER’S REPRESENTATIVE written permission.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Prevent damage to materials during loading, transportation, and unloading. Store equipment with moving parts off ground on platforms or skids.

1.6 COORDINATION

- A. Coordinate connection to water main with utility company.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.
 2. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 PIPE AND FITTINGS

- A. PVC, Schedule 40 (NPS 1/8 to NPS 3 1/2): ASTM D 1785. Suitable for potable water distribution and manufactured in compliance with NSF Standards.
 - 1. Fittings: PVC, Schedule 40 Socket Fittings: ASTM D 2466.
- B. PVC, AWWA Pipe (NPS 4 to NPS 12): AWWA C900, Class 200 DR 14, with bell-and-spigot or double-bell ends.
 - 1. PVC to PVC Fittings: Push-on-Joint, PVC Fittings, ASTM 3139, with elastomeric gasket bell ends, conforming to ASTM D2122 for bell measurements.
 - 2. PVC to Metal Fittings, Valves, and Accessories: Mechanical-Joint, Ductile-Iron Fittings: AWWA C110, ductile- or gray-iron standard pattern or AWWA C153, ductile-iron compact pattern.
 - a. Glands, Gaskets, and Bolts: AWWA C111, ductile- or gray-iron glands, rubber gaskets, and steel bolts. Use corrosion resistant, high strength, low alloy steel, bolts and nuts where in contact with corrosive soil ASTM A 325.

2.3 VALVES

- A. AWWA, UL/FM Cast-Iron, Gate Valves:
 - 1. Nonrising-Stem, Resilient-Seated Gate Valves: AWWA C509 and UL/F.M. approved, gray- or ductile-iron body and bonnet; with bronze or gray- or ductile-iron gate, resilient seats, bronze stem, and stem nut.
 - a. Minimum Working Pressure: 200 psig.
 - b. End Connections: Flanged, push-on rubber gasketed, or mechanical joint, as required.
 - c. Interior Coating: Complying with AWWA C550.

2.4 GATE VALVE ACCESSORIES AND SPECIALTIES

- A. Valve Boxes: Comply with AWWA M44 for concrete valve boxes. Include top section, adjustable extension of length required for depth of burial of valve, plug with lettering "WATER," bottom section with base of size to fit over valve, and approximately five-inch diameter barrel. Fabricate valve box cover to fit snugly to prevent displacement by traffic.
 - 1. Operating Wrenches: Steel tee-handle with one pointed end, stem of length to operate deepest buried valve, and socket matching valve operating nut.
- B. Vertical-Type Indicator Posts: UL 789, FM-approved, cast-iron body with operating wrench, extension rod, and adjustable cast-iron barrel of length required for depth of burial of valve with tamperproof electrical supervisory switch for connection to the fire alarm control panel system.

2.5 VALVE APPLICATION

- A. General Application: Use mechanical-joint-end valves for NPS 3 and larger underground installation. Use threaded- or flanged-end valves for installation in vaults. Use UL/FM, nonrising-stem gate valves for installation with indicator posts. Use corporation valves and curb valves with ends compatible with piping, for NPS 2 and smaller installation.

1. Where specific valve types are not indicated, the following requirements apply:

- a. Underground Valves, NPS 3 and Larger: AWWA, cast-iron, nonrising-stem, resilient-seated, gate valves with valve box.
- b. Underground Valves, NPS 4 and Larger, for Vertical-Type Indicator Posts: UL/FM, Cast-iron, nonrising-stem gate valves with indicator post.

2.6 CORROSION-PROTECTION ENCASUREMENT FOR PIPING

- A. Polyethylene Encasement for Underground Ductile-Iron Pipe and Fittings: Polyethylene encasement of eight mils thickness shall conform to AWWA C105. Joint tape shall be self sticking PVC or polyethylene, eight mils thick.
- B. Fusion-Bonded Epoxy Coatings for Ductile-Iron and Gray-Iron Fittings: Epoxy coating shall conform to AWWA C116.

2.7 WATER METERS

- A. Water meter(s) indicated on drawings shall be installed by the local water purveyor for the area, unless noted otherwise.

2.8 BACKFLOW-PREVENTION DEVICES

- A. General: FM Approved, AWWA, UL Classified, Approved by the Foundation for Cross Connection Control and Hydraulic Research at the University of Southern California.
 - 1. Working Pressure: 175 psi minimum, unless otherwise indicated.
 - 2. Interior Components: Corrosion-resistant materials.
 - 3. Exterior Components: Assembly shall be provided with flanged connections, galvanized cast-iron or epoxy coated construction.
- B. Reduced-Pressure-Detector Assembly Backflow Preventers: Suitable for continuous pressure application. Include outside screw and yoke gate valves on inlet and outlet, and strainer on inlet. Include test cocks; pressure-differential relief valve with ASME A112.1.2, air-gap fitting located between two positive-seating check valves; and bypass with displacement-type water meter, valves, and reduced-pressure backflow preventer. Include tamperproof electrical supervisory switch for connection to tie the fire alarm control panel system.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Examination: Examine substrates, adjoining construction and conditions under which Work is to be installed. Do not proceed with Work until unsatisfactory conditions have been corrected

3.2 PREPARATION

- A. Field Measurements: Verify dimensions before proceeding with Work. Obtain field measurements for work required to be accurately fitted to other construction. Be responsible for accuracy of such measurements and precise fitting and assembly of finished work.

3.3 JOINT CONSTRUCTION

- A. Make pipe joints according to the following:
 - 1. Copper Tubing Soldered Joints: ASTM B 828. Use flushable flux and lead-free solder.
 - 2. PVC Piping Gasketed Joints: Use joining materials according to AWWA C900. Construct joints with elastomeric seals and lubricant according to ASTM D 2774 or ASTM D 3139 and pipe manufacturer's written instructions.
 - 3. Dissimilar Materials Piping Joints: Use adapters compatible with both piping materials, with OD, and with system working pressure.

3.4 PIPING INSTALLATION

- A. Bury piping with depth of cover over top at least 36 inches, unless otherwise indicated.
- B. Install copper tube and fittings according to CDA's "Copper Tube Handbook."
- C. Install PVC, AWWA pipe according to AWWA M23 and ASTM F 645.
- D. Install underground piping with restrained joints at horizontal and vertical changes in direction. Use restrained-joint piping, thrust blocks, anchors, tie-rods and clamps, and other supports for all lines NPS 3 or greater.
- E. Water Main Connection: Arrange and pay for tap in the water main, water meter, and all associated fees from the water purveyor.

3.5 CLEARANCE OF WATER LINE

- A. Building or Structure: Two feet minimum horizontal separation.
- B. Sewer crossing:
 - 1. Typical Conditions: Lay water mains over sanitary sewers to provide vertical separation minimum three feet.
 - 2. Unusual Conditions: If above separation cannot be met, for sewers less than three feet below the water pipe, use the following:

- a. Install water line with all joints located at least four feet from each side of the sewer pipe.
 - b. Sewer pipe encased in six inches concrete around pipe, and extend four feet either side of water main.
- C. Parallel to Sewer Line: Water line shall not be installed in a common trench with the sanitary sewer unless both of the following requirements are met:
 - 1. The bottom of the water pipe, at all points, shall be at least 12 inches above the top of the sewer.
 - 2. The water pipe shall be placed on a solid shelf excavated at one side of the common trench with a minimum clear horizontal distance of at least 12 inches from the sewer.

3.6 ANCHORAGE INSTALLATION

- A. Install anchorages for tees, plugs and caps, bends, crosses, valves, and hydrant branches for all lines NPS 3 or greater. Include anchorages for the following piping systems:
 - 1. Gasketed-Joint, PVC Water-Service Piping: According to AWWA M23.
 - 2. Fire-Service-Main Piping: According to NFPA 24.
 - 3. Apply full coat of asphalt or other acceptable corrosion-resistant material to surfaces of installed ferrous anchorage devices.

3.7 VALVE INSTALLATION

- A. Gate Valves: Comply with AWWA C600 and AWWA M44. Install each underground valve with stem pointing up and with valve box.
- B. Vertical-Type Indicator Post Gate Valves: Comply with NFPA 24. Install each underground valve and valves in vaults with stem pointing up and with vertical cast-iron indicator post. Include tamperproof electrical supervisory switch for connection to tie the fire alarm control panel system.

3.8 BACKFLOW-PREVENTER INSTALLATION

- A. Install backflow preventers of type, size, and capacity indicated. Include valves and test cocks. Install according to requirements of plumbing and health department and authorities having jurisdiction.
- B. Do not install backflow preventers with relief drain in vault or other space subject to flooding.
- C. Do not install bypass piping around backflow preventers.
- D. Support three-inch and larger backflow preventers, valves, and piping near floor and on brick or concrete piers.

- E. Access and clearance shall be provided for the required testing, maintenance and repair. Access and clearance shall require a minimum of one foot between the lowest portion of the assembly and grade or platform.
- F. Include tamperproof electrical supervisory switch for connection to tie the fire alarm control panel system.

3.9 IDENTIFICATION

- A. Install continuous underground detectable warning tape during backfilling of trench for underground water-service piping. Locate below finished grade, directly over piping. Refer to Division 31 Section "Earth Moving" for tape specifications.

3.10 FIELD QUALITY CONTROL

- A. Piping Tests: Conduct piping tests before joints are covered and after thrust blocks have hardened sufficiently. Fill pipeline 24 hours before testing and apply test pressure to stabilize system. Use only potable water.
- B. Hydrostatic Tests: The piping shall be subjected for a minimum of two hours to a pressure of one and one-half times the working pressure, but in no case less than 150 psi. Examine all exposed pipe, joints, fittings and accessories during the test period. Replace or repair defective portions of the system, and repeat tests until results are satisfactory.
 - 1. Allowable leakage shall be as specified in AWWA C-600, Table 3.
- C. Prepare reports of testing activities.

3.11 CLEANING

- A. Clean and disinfect water-distribution piping as follows:
 - 1. Purge new water-distribution piping systems and parts of existing systems that have been altered, extended, or repaired before use.
 - 2. Use purging and disinfecting procedure prescribed by authorities having jurisdiction or, if method is not prescribed by authorities having jurisdiction, use procedure described in AWWA C651 or as described below:
 - a. Fill system or part of system with water/chlorine solution containing at least 50 ppm of chlorine; isolate and allow to stand for 24 hours, or
 - b. Drain system or part of system of previous solution and refill with water/chlorine solution containing at least 200 ppm of chlorine; isolate and allow to stand for three hours.
 - c. After standing time, flush system with clean, potable water until no chlorine remains in water coming from system.
 - d. Submit water samples in sterile bottles to authorities having jurisdiction. Repeat procedure if biological examination shows evidence of contamination.

- B. Prepare reports of purging and disinfecting activities.

END OF SECTION 33 11 00

April 21, 2026

Mrs. Naomi Gruenthal, Associate Project Planner
CITY OF ANAHEIM
COMMUNITY SERVICES DEPARTMENT
200 S. Anaheim Boulevard, Suite 433
Anaheim, CA 92805

Subject: GRA2025-04067

**Revised and Updated Preliminary Geotechnical Engineering
Investigation and Infiltration Study for the City of Anaheim's
Community Services Department, Anaheim River Park Project.**
HGEI Project 21-ANA-0491

References:

- 1) HGEI Proposal No. P-5630, April 16, 2021.**
Project Work Order- Notice to Proceed, April 27, 2021.
**Preliminary Geotechnical Engineering Investigation and Infiltration
Study for the City of Anaheim's Community Services Department,
Anaheim River Walk Project, HGEI Project 21-ANA-0491, July 21,
2021.**
- 2) Updated Preliminary Geotechnical Engineering Investigation and
Infiltration Study for the City of Anaheim's Community Services
Department, Anaheim River Park Project, dated October 28, 2024.**

HGEI Project 21-ANA-0491


Dear Mrs. Gruenthal:

Pursuant to your E-mail request dated March 24, 2026, and as authorized by the above-referenced proposal and project work order, HGEI has completed the updated geotechnical report.

Based on analysis and evaluation of the data we have concluded that construction of the project is feasible from a geotechnical engineering standpoint provided the recommendations presented herein are incorporated into site development and design/construction of the project.

Thank you for this opportunity to be of service again. If you have any questions concerning this report, or if we can be of further assistance, please call at your convenience.

Very truly yours,
HARRINGTON GEOTECHNICAL ENGINEERING, INC.



Mehrab Jesmani, Ph.D., P.E., G.E.
Senior Geotechnical Engineer



Carlos A. Ariza
Staff Geologist

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Distribution: File

Addressee- Via E-mail

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INTRODUCTION

This report presents the results of a geotechnical investigation of the subject site. The purposes of the investigation were to: 1) determine the types and condition of the soil at the site; 2) establish static physical and limited chemical properties of the materials; 3) determine groundwater conditions; and 4) provide recommendations for grading the site and designing and constructing the proposed improvements.

SCOPE OF SERVICES

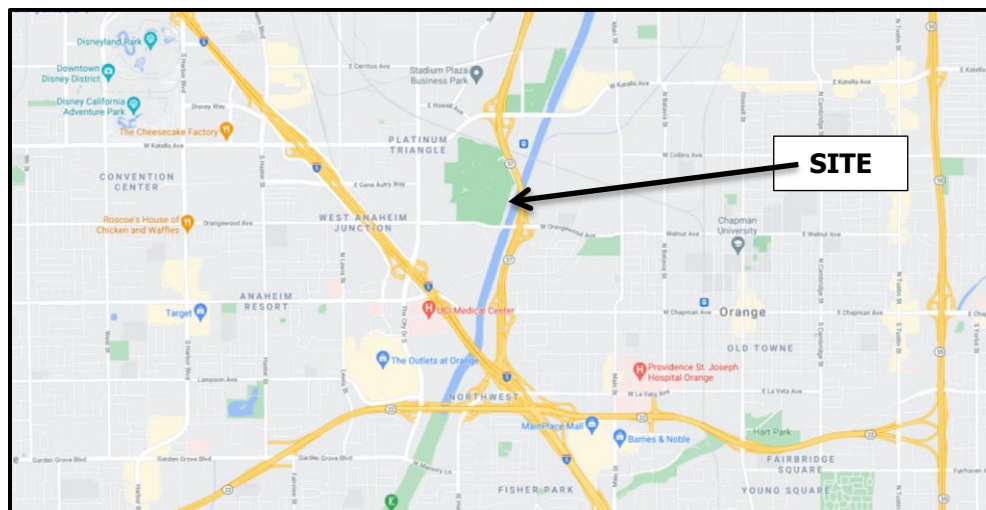
In order to develop site-specific information, subsurface conditions and prepare a preliminary geotechnical report the following investigation was conducted:

- Review at the City of Anaheim for any previously available geotechnical information of the site.
- Excavate and log two borings up to 20 feet deep and two borings up to 50 feet deep. Additionally, two 10-foot borings and two 5-foot borings were drilled in order to conduct an Infiltration Study.
- Selected samples were tested in our laboratory to develop data necessary for analysis of subsurface conditions. Geotechnical testing for this project included Direct Shear, Consolidation, Soluble Sulfate, Hydrometer, and Sieve Analysis.
- The site is located within a Liquefaction zone as mapped by CGS hazards map. Due to the nature of the intended land use, a limited liquefaction analysis was conducted.
- Upon completion of testing the laboratory and field data was evaluated, engineering calculations performed and a written report prepared. The report describes the findings and results of the investigation and presents recommendations for the proposed development stated above.
- Based on the available information, we are not able to provide an exact response to this comment. A detailed and an accurate answer requires more detailed information regarding the layout of the structures, the applied loads and other project components, along with additional supporting data. However, as a general opinion, typically very light structures, pavements, playgrounds, may not have a significant impact to the adjacent Santa Ana River Levee Embankment.

SITE LOCATION AND DESCRIPTION

The site is bound on the west by the Angel's Stadium parking lot, a storage area on the north, the Santa Ana River on the east, and East Orangewood Avenue on the south in Anaheim, California, as shown on the Vicinity Map, Figure 1, and Aerial Photograph, Figure 2, which follow. There is currently a paved bike trail trending north south along the top of the Santa Ana River Channel and adjacent to the eastern side of the Angel's Stadium Parking lot. The area of proposed development contains scattered trees up to 24" in diameter, minor ground vegetation, various manholes/stormwater basins, and minor asphalt paved trails.

Vicinity Map - Figure 1





SUBSURFACE CONDITIONS

The borings encountered alluvial deposits consisting primarily of gravelly sand, fine to coarse sand and medium sand. Details of materials encountered are provided on boring logs in Appendix A.

The descriptions represent the prevalent soil types and different material may be present within the major groupings. Also, the transition from one soil type or condition to another may be gradual rather than abrupt as implied, and differing conditions may exist in unexplored areas.

Groundwater

Groundwater was not encountered in the 50-foot-deep borings drilled for this investigation however perched water was encountered at a depth of approximately 22.5 feet below the ground surface. The historically highest groundwater depth is 20 feet at this site (Reference 1).

Cave-ins

Cave-ins did not occur in the borings due to the type of auger used. However, considering the sandy soils encountered in the upper 20 feet, and particularly below the groundwater to approximately 35 feet, cave-ins should be expected during construction and in excavations. The regulations of Cal/OSHA and City of Anaheim should be complied with during performance of all underground construction.

Water-Soluble Sulfate

A surface soil sample was submitted to eurofins/Calscience for testing for water-soluble sulfate content. The result is presented in Appendix B.

Expansion Potential

The expansion index for the surface soil is 0 which is considered to be non-expansive and consequently no special recommendations are necessary.

Consolidation

Samples of soil were loaded in increments from 400 to 6400 pounds per square foot (psf) at their overburden pressure and were saturated to evaluate their hydro-collapse potential (Plates B-1 to B-5 Appendix B). All five samples showed minor hydro-collapse potential.

REGIONAL GEOLOGIC SETTING

The subject site is situated along the northwesterly portion of the Peninsular Ranges Geomorphic Province of Southern California in the southeasterly section of the Los Angeles sedimentary basin. The Peninsular Ranges Geomorphic Province is characterized by elongated northwest to southeast trending ridges and valleys subparallel to faults branching from the San Andreas Fault. Published maps (Reference 4) have been used to identify the geologic unit underlying the property. As shown on Figure 3, these maps indicate that the property is underlain at depth by young alluvial fan deposits of Holocene to late Pleistocene geologic age.



Faulting

The site is situated approximately 4.8 km from the nearest active fault, the Peralta Hills Fault and 14 km from the next nearest fault, the Whittier Fault.

Thus the likelihood of surface rupture at the site is considered low.

Seismically-Induced Liquefaction and Dry Sand Settlements

The site is in a liquefaction hazard zone as shown on the California Seismic Hazard Zones Map, Anaheim Quadrangle Sheet (Reference 2), and a liquefaction/dry sand settlement assessment was performed though not required under the act since it does not meet the criteria of a project.

The analysis was performed using a design mean magnitude of 6.62 based on USGS disaggregation evaluation (<https://earthquake.usgs.gov>) and a peak ground acceleration of 0.68g based on the updated ASCE Design Hazards Report (Appendix C); together with a design in-situ groundwater level of 22.5 feet, and a design historic high groundwater of 20 feet.

The results showed a maximum seismically-induced settlement of 2.74" (includes an estimated dry sand settlement of 0.46" above the historic high groundwater level) at B-2; and 2.47" (include a dry sand settlement of 0.23") at B-3. These amounts are less than the usually allowed settlement of 4 inches. In addition, this is based on a factor of safety of 1.1 and actual settlement would likely be even less. Seismically-induced differential settlement on the order of ¼" could occur over 100 feet. The results of the analyses are presented in Appendix D.

CONCLUSIONS AND RECOMMENDATIONS

Based on conditions encountered/established during this investigation, it is our conclusion that currently planned site development is feasible from a geotechnical engineering standpoint provided the recommendations which follow are implemented.

Following our evaluation of conditions encountered in the borings (Appendix A) and analyses of laboratory test data (Appendix B), we recommend the following input for design and construction of the project. These recommendations are subject to confirmation of site conditions during construction.

Additional recommendations may be provided in the course of work if warranted by conditions encountered. It is also recommended that plans/details be reviewed by the geotechnical engineer and any additional recommendations deemed necessary provided in a review letter.

Site Preparation & Grading

Is it recommended that grading of the site be carried out in accordance with applicable sections of the Earthwork Specifications presented in Appendix E and the following site-specific recommendations.

All areas to support asphalt pavement should be graded so as to provide at least two feet of compacted soil for subgrade support. This may consist of processed and compacted in situ soil, compacted fill, or a combination of in situ soil and fill. Replacement fill material should be spread in thin, loose lifts, moisture conditioned to near optimum and compacted to a minimum relative compaction of 90% based on the results of compaction tests performed in accordance with ASTM Test Method D1557-12^{ε1}.

Shaded plazas, children's play areas, fitness zones, walking paths, various art pieces should be supported on at least 12 inches of compacted fill consisting of site material and/or approved import if needed.

Any fill required should be spread in thin lifts (8 inch maximum) moisture conditioned to approximate optimum moisture content and compacted to at least 90 percent of maximum density performed in accordance with ASTM Test Method D1557-12^{ε1}.

Additional and/or revised recommendations may be provided after project plans have been reviewed by this office.

Foundation and Slab-On-Grade Design

The following recommendations for foundation and slab-on-grade design are tentatively recommended until final plans are provided.

An allowable dead load plus live load bearing pressure of 2000 pounds per square foot is recommended for design of lightly loaded shade structures and children's play areas. The footings should be at least 12 inches deep and 12 inches wide. A passive bearing pressure of 250 pounds per square foot per foot of embedment and friction coefficient of 0.4 are recommended for resisting lateral loads.

A one-third increase in bearing may be assumed for short-duration wind or seismic load in combination with gravity loads.

Miscellaneous concrete slabs should be a nominal 4-inches-thick and reinforced with No. 3 bars spaced not more than 24 inches apart in both directions.

Slabs that will be subjected to occasional maintenance truck traffic should be a full 4-inches-thick and reinforced with deformed bars as previously stated.

One No. 4 bar, top and bottom, is recommended for spread footings unless otherwise required by structured design.

Note: According to the email from: Ms. [Naomi Gruenthal \(Associate Project Planner| Parks Division\)](#) dated March 24, 2026, the design team for River Park confirmed that they do not need piles in this project.

Settlement

Nominal settlement of foundations designed and constructed as recommended is anticipated and does not require special consideration in design.

Seismic Design

The provisions of Chapter 16, Section 1613, of the 2022 California Building Code and the Structural Engineer Associates of California guidelines are considered appropriate for design of the project.

Earthquake factors determined using the ASCE Hazards Online Tool website and Chapter 16 requirements are presented in Appendix C.

Pavement Structural Sections

It is preliminarily recommended that bicycle lanes (T.I. =4.5) and (R value =50) be paved with a minimum of 3-inches of asphalt concrete and 4-inches Class II aggregate base compacted to a minimum relative compaction of 95%, placed on a minimum of 2-feet of soil compacted to a minimum relative compaction of 90%. Asphalt concrete should be placed in accordance with the California Highway Design Manual, Chapter 630.

It is preliminarily recommended that the parking area (T.I. =5) and (R value =50) be paved with a minimum of 3½ -inches of asphalt concrete and 6-inches Class II aggregate base compacted to a minimum relative compaction of 95%, placed on a minimum of 2-feet of soil compacted to a minimum relative compaction of 90%. Asphalt concrete should be placed in accordance with the California Highway Design Manual, Chapter 630.

Consideration should be given to increasing the asphalt concrete thickness by 1/2 inch in impact areas (drive entrances/exits and at trash enclosures) to avoid premature distress at these locations. The stated thicknesses are minimum; the paving contractor must exercise care to ensure against thickness deficiency.

Unless otherwise specified by others, aggregate base and asphalt concrete should conform to Standard Specifications for Public Works Construction (Green Book) Sections 200-2 and 203.

Aggregate base should be compacted to at least 95% relative compaction and the 2-feet of subgrade should be compacted to at least 90% relative compaction, both based upon the maximum density determined by ASTM D1557 D1557-12ε1. The Contractor should follow the Grading Specifications presented in Appendix E.

The pavement section discussed above is considered preliminary and should be verified subsequent to rough grading.

Concrete Quality

A negligible amount of water-soluble sulfate is indicated for the prevalent surface material and special sulfate-resistant concrete will not be required on this project. The exposure class (ACI 318-19, Table 19.3.1.1) is S0. Concrete may contain Type II cement and should comply with the requirements set forth in ACI 318-19, Table 19.3.2. 1.

Temporary Excavations

Temporary excavations should be laid back no steeper than a 1½:1 (h:v) gradient. As there appears to be adequate room to follow these guidelines, we do not anticipate that shoring will be necessary. Temporary cuts should be monitored during grading/construction by a representative of this office in order to confirm these recommendations.

Due to the presence of sandy soils, cave-ins, sloughing, and raveling should be expected in excavations. The regulations of Cal/OSHA and City of Anaheim should be followed during performance of all subsurface work and concrete should be placed as soon as possible to minimize this occurrence.

Miscellaneous Backfills

Backfill for structural excavations and utility trenches associated with this project should consist of site material (the use of imported sand is not recommended) that must be adequately compacted to preclude detrimental settlement. It is recommended, therefore, that backfills placed below the building foundation and to a distance of five feet outside thereof, and/or below concrete flatwork, be placed in appropriate lifts (8"), moisture conditioned and mechanically compacted to at least 90 percent of maximum dry density.

Plan Review

It is recommended that final project plans, details and specifications be submitted to this office for geotechnical review for compliance with the findings and recommendations of this report. Additional recommendations can then be provided if necessary.

Observations and Testing

Grading and compaction operations, foundation construction and trench backfills should be observed and tested by members of our staff so that anticipated soil conditions can be confirmed and the recommendations contained herein validated. If deemed necessary as a result of changed conditions supplemental recommendations may then be provided. Results of those observations and tests should be provided in the final report which should include a statement by the geotechnical engineer concerning the adequacy of the completed work.

Pre-Grade/Construction Meeting

A pre-grade/construction meeting should be attended by the owner or their representative, members of the design team, general and grading contractors, district IOR, and a representative from HGEI at the site to review the findings and recommendations of this report and project plans and specifications prior to starting work on the project.

GENERAL COMMENTS

The services provided under the purview of this report have been performed in accordance with generally accepted geotechnical engineering principles and standards of practice for this area. The comments and recommendations presented are professional opinions based on observations and our best estimation of project conditions and requirements as indicated by presently available information and data. No further warranty, express or implied, is intended by issuance of this report.

This investigation did not include: 1) detailed study of geologic or seismic conditions or 2) sampling, field measurements or laboratory tests for the presence of any toxic/hazardous substances in the earth materials at the site. However, this does not imply that the site subject to any known geologic, seismic or environmental hazard.

This report has been developed for the sole use of the client and/or clients authorized representative. These conclusions and recommendations should be verified by a qualified geotechnical engineer based in part upon additional subsurface information obtained during grading and/or construction of the project. No part of the report should be taken out of context, nor utilized without full knowledge and awareness of its intent.

This report is issued on condition that HGEI will be retained to observe the grading and foundation construction operations. If another firm provides this service then that firm must review and accept this report, or provide alternate recommendations, and assume responsibility

for the project. This report will be valid for a period of one year from date issue and will then require updating.

REFERENCES

1. California Department of Conservation, Division of Mines and Geology, 1997, Seismic Hazard Zone Report for the Anaheim and Newport Beach 7.5 Minute Quadrangles, Orange County, California, Seismic Hazard Zone Report 03.
2. California Department of Conservation, California Geological Survey, State of California, Seismic Hazard Zones, Earthquake Zones of Required Investigation, Anaheim 7.5 Minute Quadrangle, April 15, 1998, Scale 1:24,000.
3. California Department of Conservation, California Geological Survey, Earthquake Zone App, <https://maps.conservation.ca.gov/cgs/EQZApp/>
4. USGS, 1999, Morton, D.M., Hauser, Bovard, Kelly R., and Alvarez, Rachel M. , 2004, "Preliminary Digital Geologic Map of the Santa Ana 30' x 60' Quadrangle, Southern California," version 2.0: U.S. Geological Survey Open-File Report 99-0172.
5. Earthquake Hazards Program, 2013, "Earthquake Ground Motion Parameters," Version 3.1.0, dated 7/11/13.
6. Blake, Thomas F., 1993, EQFAULT and EQSEARCH, Computer Programs for calculating the site to fault distances, Deterministic peak horizontal ground accelerations for a Maximum Magnitude Earthquake, and historic seismicity for an area from selected known faults in the southern California region (Rev. 1999).
7. International Code Council (ICC), 2019, California Building Code, California Code of Regulations, Title 24, Part 2, Volume 2 of 2.
8. ASCE Design Hazards Report, <https://ascehazardtool.org/>, October 24, 2024.
9. American Concrete Institute (ACI), 2019, ACI 318-19, Building Code Requirements for Structural Concrete and Commentary.
10. California Geologic Survey, 2008, Guidelines for Evaluating and Mitigating Seismic Hazards in California: Special Publication 117A.
11. California Department of Transportation, Highway Design Manual, Caltrans, 2012.

APPENDIX A

FIELD INVESTIGATION

Subsurface exploration consisted of sampling and logging four borings drilled to depths of 20 and 50 feet with a drill rig equipped with 8-inch-diameter, hollow-stem augers. The borings

were backfilled with soil cuttings immediately upon completion of sampling. Approximate boring locations are shown on Plate A. Four additional borings to depths of 5 and 10 feet were drilled as part of the infiltration study.

Perched water was encountered below 22.5 feet in the 50-foot deep borings.

A representative of the geotechnical engineer observed the drilling, collected soil samples and prepared field logs by visual/tactile examination of the materials. The samples were subsequently examined by the geotechnical engineer/engineering geologist in the laboratory and the classifications confirmed or modified on the basis of laboratory test results. Samples were obtained using a core barrel loaded with 2.42-in.-I.D.x 1-in.-long, thin-walled, brass rings. The samples were placed in plastic bags immediately upon removal from the samplers to conserve moisture, labeled for identification, and brought to our laboratory for testing.

Logs of the borings, including moisture and density data, are presented on Plates A-1 through A-4.

Unified soil classification system symbols/descriptions are presented on Plate A-5.

LOG OF BORING B-1

Project: Anaheim Riverwalk
 Job No.: Ana-0491
 Location: Anaheim
 Coordinates:

Surface Elev.:
 Top of Casing Elev.:
 Drilling Method: Hollow Stem Auger
 Sampling Method: Ring

Elevation, feet	Depth, feet	Sample No.	Sampler Graphics Symbol / USCS	Recovery %	MATERIAL DESCRIPTION	Blow Counts	Dry Unit Weight, lb/cu ft.	Water Content %
0	0				ALLUVIUM (Qal): Gravelly Sand (SW) , tan/brown, moist, loose to medium dense, coarse grained, angular			
	5					14	103	4
						13	102	1
	10					16	100	2
					@ 12.5' increased grain size	26	104	2
	15				Sand (SP) , tan, moist, medium dense, medium to very fine grained	21	98	2
						21	105	8
	20					22	101	3

Completion Depth: 21.5
 Date Boring Started: 6/2/21
 Date Boring Completed: 6/2/21
 Logged By: SBM
 Drilling Contractor: OWD

Remarks:
 Groundwater was not encountered. No caving due to type of auger used.

The stratification lines represent approximate boundaries. The transition may be gradual.

LOG OF BORING B-2

Project: Anaheim Riverwalk
 Job No.: Ana-0491
 Location: Anaheim
 Coordinates:

Surface Elev.:
 Top of Casing Elev.:
 Drilling Method: Hollow Stem Auger
 Sampling Method: Ring

Elevation, feet	Depth, feet	Sample No.	Sampler Graphics Symbol / USCS	Recovery %	MATERIAL DESCRIPTION	Blow Counts	Dry Unit Weight, lb/cu ft.	Water Content %
0	0				ALLUVIUM (Qal): Sand (SW) , brown/tan, moist, loose to medium dense, coarse to fine grained, angular			
	5				@ 5' decreased moisture	10	102	3
						15	99	3
						24	102	3
	10					17	101	2
					Silty Sand (SM) , olive/brown/gray, moist to wet, medium dense, minor oxidation	17	88	26
	15				Sand (SW) , tan/light brown, damp to moist, medium dense, medium grained, angular	27	111	4
						38	99	1
	20					31	102	5
					Sand (SW) , brown/olive, saturated, medium dense, medium to fine grained	26	102	21
	25				Sand (SW) , brown/olive, saturated, loose, very fine grained, minor oxidation	13	102	24
	30					11	102	24
	35				Clayey Sand (SC) with gravel, olive/brown, saturated, dense, large well round gravel and cobbles	50/6"	115	19
	40							

Completion Depth: 51.5
 Date Boring Started: 6/2/21
 Date Boring Completed: 6/2/21
 Logged By: SBM
 Drilling Contractor: OWD

Remarks:
 Perched water at 22.5'. No caving due to type of auger used.

The stratification lines represent approximate boundaries. The transition may be gradual.

LOG OF BORING B-2

Project: Anaheim Riverwalk
 Job No.: Ana-0491
 Location: Anaheim
 Coordinates:

Surface Elev.:
 Top of Casing Elev.:
 Drilling Method: Hollow Stem Auger
 Sampling Method: Ring

Elevation, feet	Depth, feet	Sample No.	Sampler Graphics Symbol / USCS	Recovery %	MATERIAL DESCRIPTION	Blow Counts	Dry Unit Weight, lb/cu ft.	Water Content %
	40				Sandy Silt (ML) , olive/brown, saturated, stiff	50/2"	93	39
	45				Silty Sand (SM) , olive/brown, moist dense	50/3"	114	13
	50					50/5"	125	10

Completion Depth: 51.5
 Date Boring Started: 6/2/21
 Date Boring Completed: 6/2/21
 Logged By: SBM
 Drilling Contractor: OWD

Remarks:
 Perched water at 22.5'. No caving due to type of auger used.

The stratification lines represent approximate boundaries. The transition may be gradual.

LOG OF BORING B-3

Project: Anaheim Riverwalk
 Job No.: Ana-0491
 Location: Anaheim
 Coordinates:

Surface Elev.:
 Top of Casing Elev.:
 Drilling Method: Hollow Stem Auger
 Sampling Method: Ring

Elevation, feet	Depth, feet	Sample No.	Sampler Graphics Symbol / USCS	Recovery %	MATERIAL DESCRIPTION	Blow Counts	Dry Unit Weight, lb/cu ft.	Water Content %
0	0				ALLUVIUM (Qal): Silty Sand (SM) , tan/brown/black, moist, medium dense, fine to very fine grained, angular	32	98	16
	5					28	88	2
	10				Gravelly Sand (SW) , tan/brown, damp, medium dense, coarse grained, large angular gravel	30	98	2
	15					27	111	2
	20				@ 12.5' Clayey Sand (SC) lenses	24	94	11
	25				Clayey Sand (SC) , brown/light brown, wet medium dense, very fine grained	23	93	21
	30				Silty Sand (SM) , tan/light brown, moist, medium dense, fine grained, angular	39	99	2
	35					34	100	10
	40				Clayey Sand (SC) , light brown/olive, wet, medium dense, very fine grained, minor oxidation	16	95	24
	45					15	102	23
	50					16	94	25
	55				Clayey Sand (SC) , red/orange, moist, dense, angular gravel, well oxidized	52	128	7

Completion Depth: 51.5
 Date Boring Started: 6/2/21
 Date Boring Completed: 6/2/21
 Logged By: SBM
 Drilling Contractor: OWD

Remarks:
 Perched water at 22.5'. No caving due to type of auger used.

The stratification lines represent approximate boundaries. The transition may be gradual.

LOG OF BORING B-3

Project: Anaheim Riverwalk
 Job No.: Ana-0491
 Location: Anaheim
 Coordinates:

Surface Elev.:
 Top of Casing Elev.:
 Drilling Method: Hollow Stem Auger
 Sampling Method: Ring

Elevation, feet	Depth, feet	Sample No.	Sampler Graphics Symbol / USCS	Recovery %	MATERIAL DESCRIPTION	Blow Counts	Dry Unit Weight, lb/cu ft.	Water Content %
	40				Silty Sand (SM), red/orange, moist, dense	44	121	8
	45					50/4"	131	5
	50					50/4"	113	6

Completion Depth: 51.5
 Date Boring Started: 6/2/21
 Date Boring Completed: 6/2/21
 Logged By: SBM
 Drilling Contractor: OWD

Remarks:
 Perched water at 22.5'. No caving due to type of auger used.

The stratification lines represent approximate boundaries. The transition may be gradual.

LOG OF BORING B-4

Project: Anaheim Riverwalk
 Job No.: Ana-0491
 Location: Anaheim
 Coordinates:

Surface Elev.:
 Top of Casing Elev.:
 Drilling Method: Hollow Stem Auger
 Sampling Method: Ring

Elevation, feet	Depth, feet	Sample No.	Sampler Graphics Symbol / USCS	Recovery %	MATERIAL DESCRIPTION	Blow Counts	Dry Unit Weight, lb/cu ft.	Water Content %
	0				ALLUVIUM: (Qal) Sand (SW) , tan/light brown, damp, medium dense, medium to fine grained, angular			
	5				@ 5' less dense	24	103	5
						11	97	2
						15	99	2
	10					17	101	2
					Clayey Sand (SC) , olive/brown, wet, loose, very fine grained, minor oxidation	11	82	33
	15				Sand (SW) , tan/light brown, damp, medium dense, medium to fine grained, angular, minor oxidation	35	103	3
						21	94	2
	20					28	101	3

Completion Depth: 21.5
 Date Boring Started: 6/2/21
 Date Boring Completed: 6/2/21
 Logged By: SBM
 Drilling Contractor: OWD

Remarks:
 Groundwater was not encountered. No caving due to type of auger used.

The stratification lines represent approximate boundaries. The transition may be gradual.

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SAND, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	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
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50			MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

APPENDIX B

LABORATORY TEST RESULTS

Samples collected during the field investigation were examined and classified in the laboratory by the project geotechnical engineer/engineering geologist using the visual/tactile method and samples were selected for testing. The following is a description of the laboratory testing performed and presents the results which are incorporated in previous sections of the report.

Moisture and Density Determination (ASTM D4564-08^{e1})

The core samples were trimmed and weighed and the dry densities and field moisture contents of the material calculated. Moisture and density data are presented on the boring logs in Appendix A.

Water Soluble Sulfate Test (EPA 300.0)

A water-soluble sulfate test was performed on a sample considered representative of the surface material at the site. Test results are presented in Table 1.

Consolidation Tests (ASTM D2435/2435M-11)

Consolidation tests were conducted on five samples to determine the settlement characteristic of the materials. Water was added to the samples during the tests to determine the effect of increased moisture. Refer to Plates B-1 through B-5 for the results.

Direct Shear Test (ASTM D3080/3080M-11)

Direct shear tests were performed on five “undisturbed” samples to determine the static strength of the soil. The tests were performed at increased moisture contents and at various confining pressures using a displacement rate of 0.00125 in./min. to establish peak and ultimate strength parameters under adverse conditions of moisture. Refer to Plates B-6 through B-10 for results.

Particle Size Distribution (Gradation) of Soils Using Sieve Analysis D6913

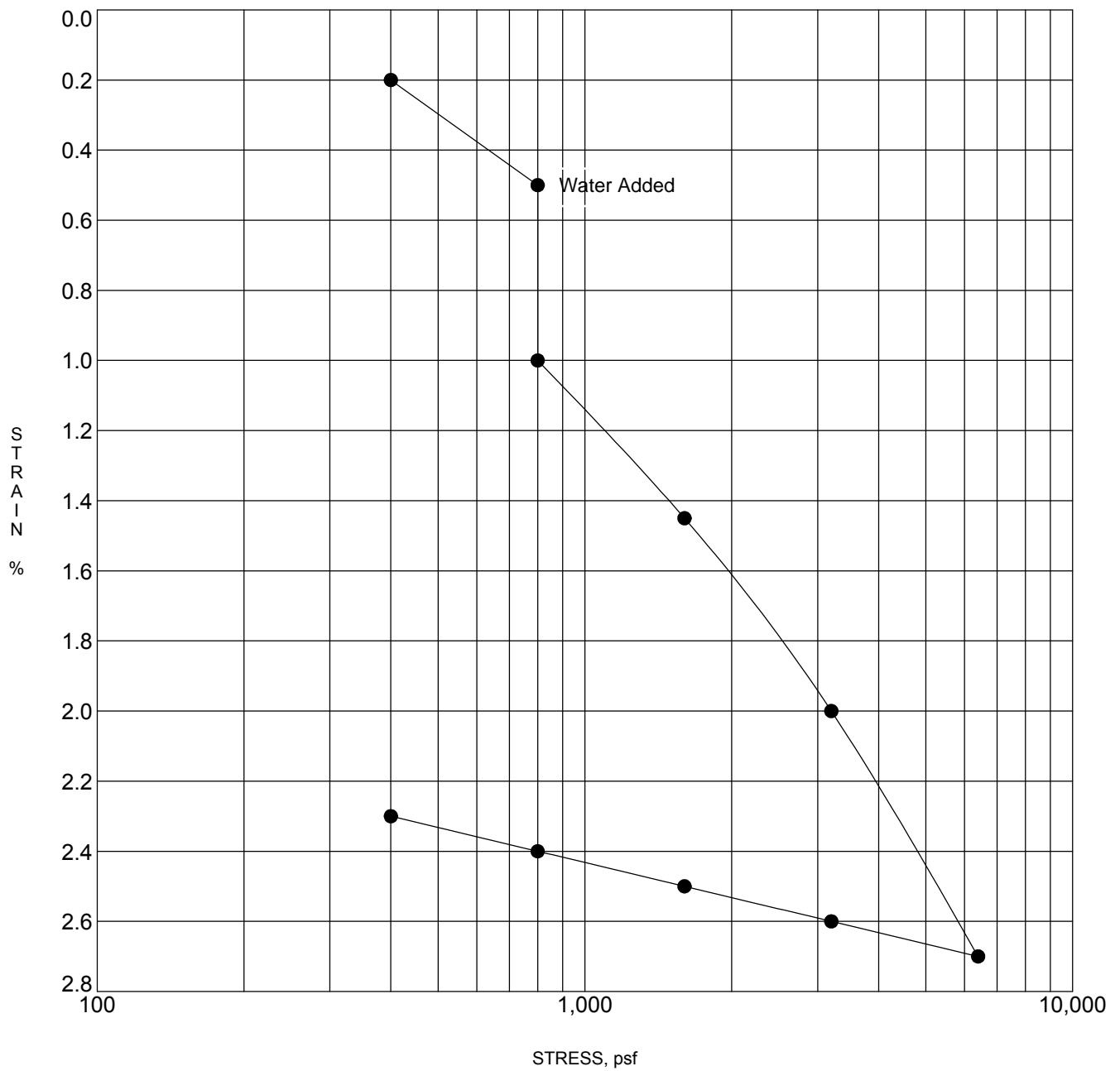
A grain size analysis was performed on several samples for data needed for the liquefaction analyses. The results are shown on Plates B-11 through B-13.

TABLE 1	
Water-Soluble Sulfate (EPA 300.0)	
Sample ID	Water-Soluble Sulfate (%)
B-2 @ 0'-2.5'	ND

ND non-detectable

SAMPLE STORAGE

Soil samples presently stored in our laboratory will be discarded 30 days after the date of this report unless this office receives a written request to retain the samples for a longer period. Note that prolonged storage will result in sample degradation and may render them unsuitable for testing.



Specimen Identification			Classification	DD	MC%
●	B-1	7.5	Gravelly Sand (SW)	97	5

PROJECT **Anaheim Riverwalk - Anaheim**

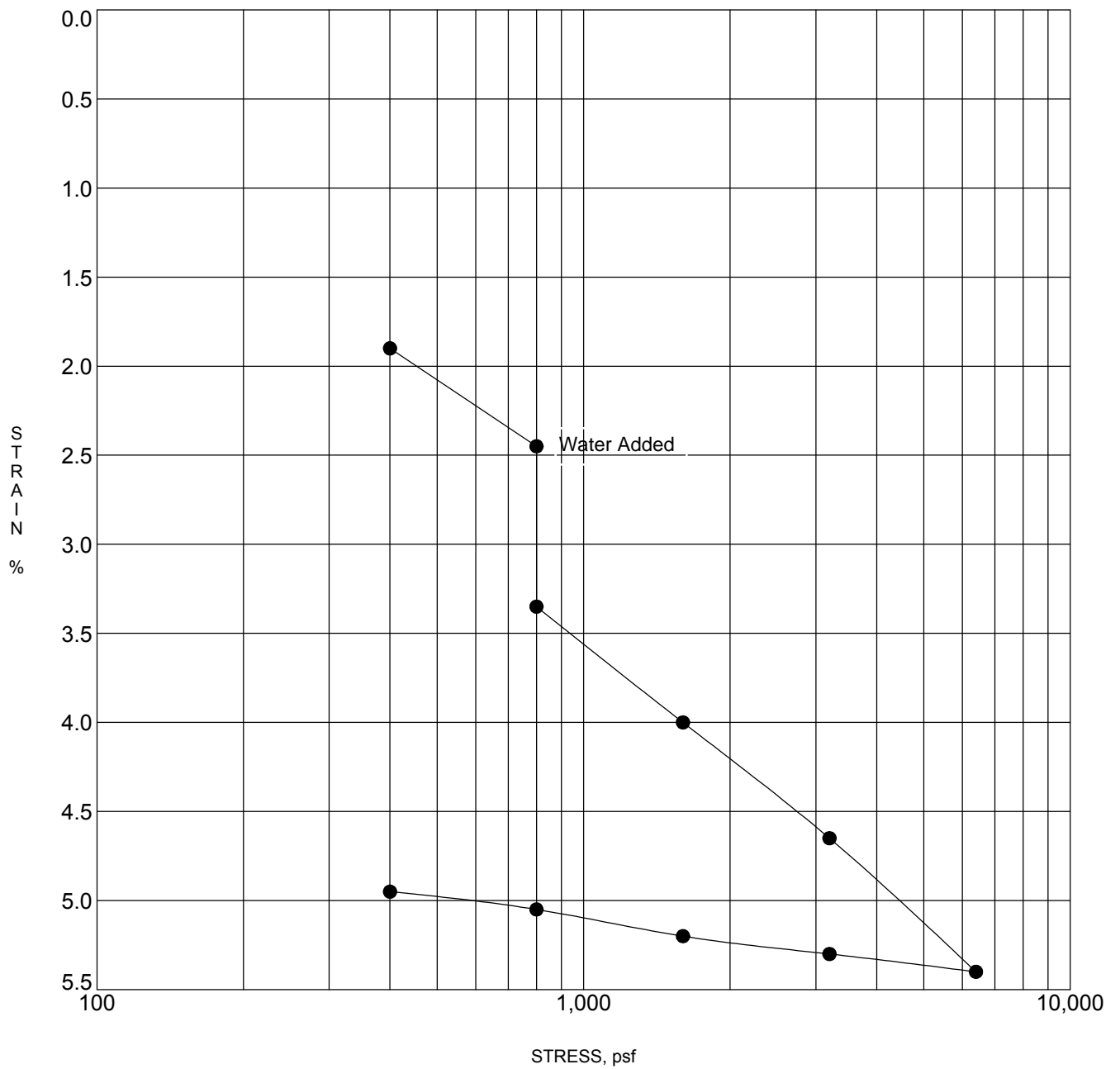
JOB NO. **0491-1**

DATE **7/19/21**

CONSOLIDATION TEST

Harrington
Geotechnical
Engineering, Inc. _____

PLATE B-1



Specimen Identification			Classification	DD	MC%
●	B-1	20.0	Medium Sand (SP)	96	5

PROJECT **Anaheim Riverwalk - Anaheim**

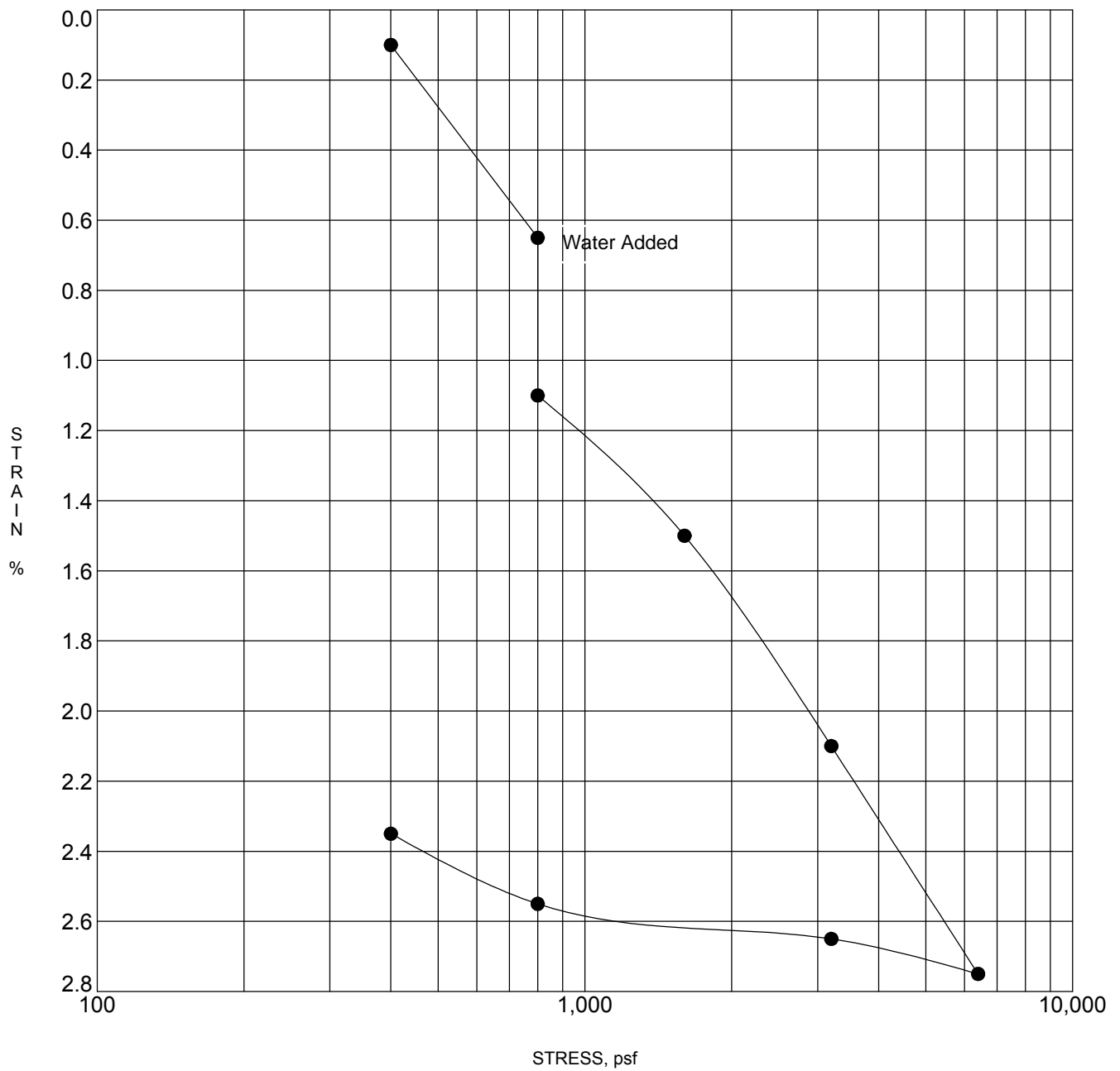
JOB NO. **0491-1**

DATE **7/19/21**

CONSOLIDATION TEST

Harrington
Geotechnical
Engineering, Inc. _____

PLATE B-2



Specimen Identification			Classification	DD	MC%
●	B-2	5.0	Fine to Coarse Sand (SW)	97	4

PROJECT **Anaheim Riverwalk - Anaheim**

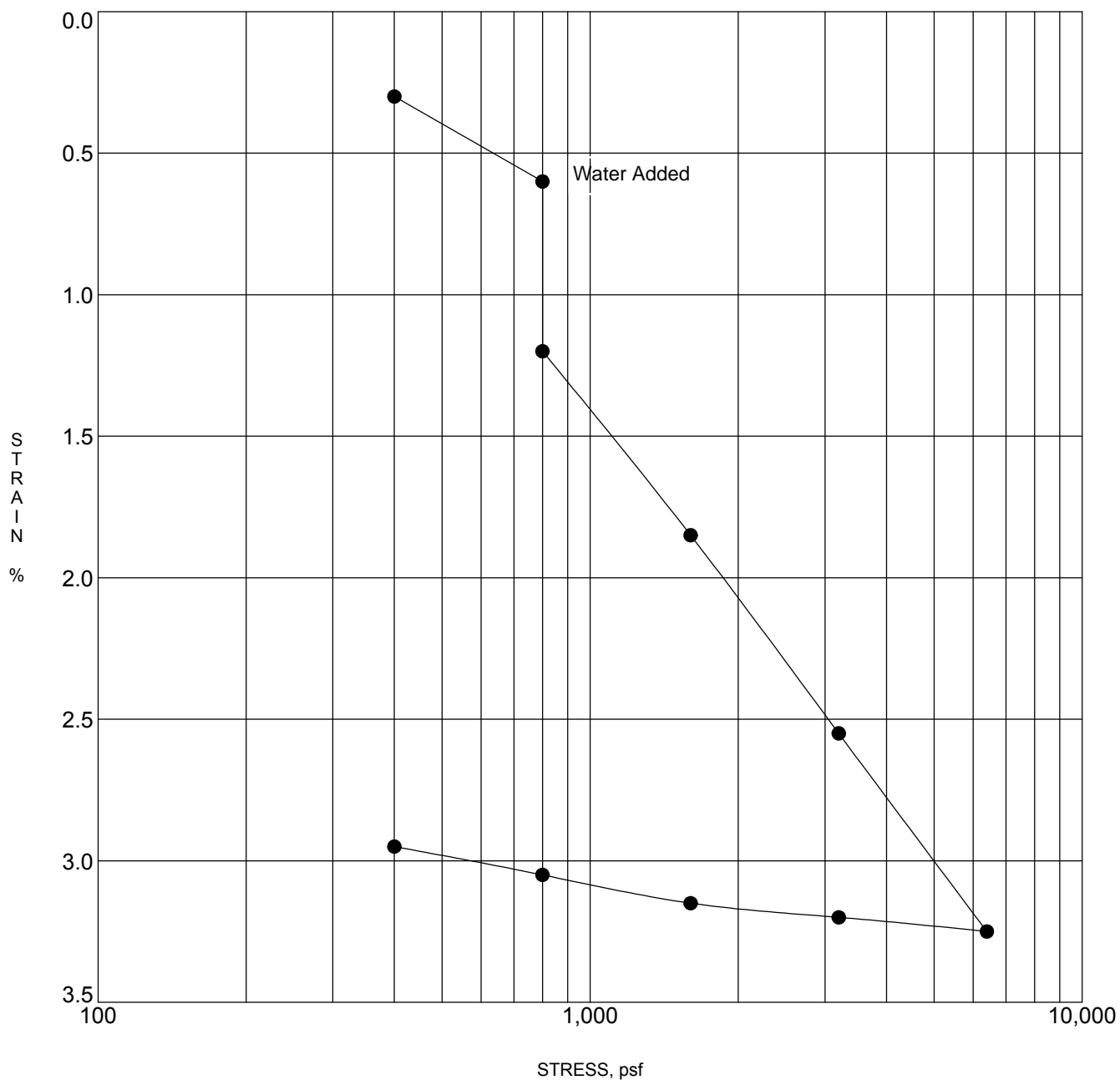
JOB NO. **0491-1**

DATE **7/19/21**

CONSOLIDATION TEST

Harrington
Geotechnical
Engineering, Inc. _____

PLATE B-3



Specimen Identification			Classification	DD	MC%
●	B-3	5.0	Silty Sand (SM)	94	4

PROJECT **Anaheim Riverwalk - Anaheim**

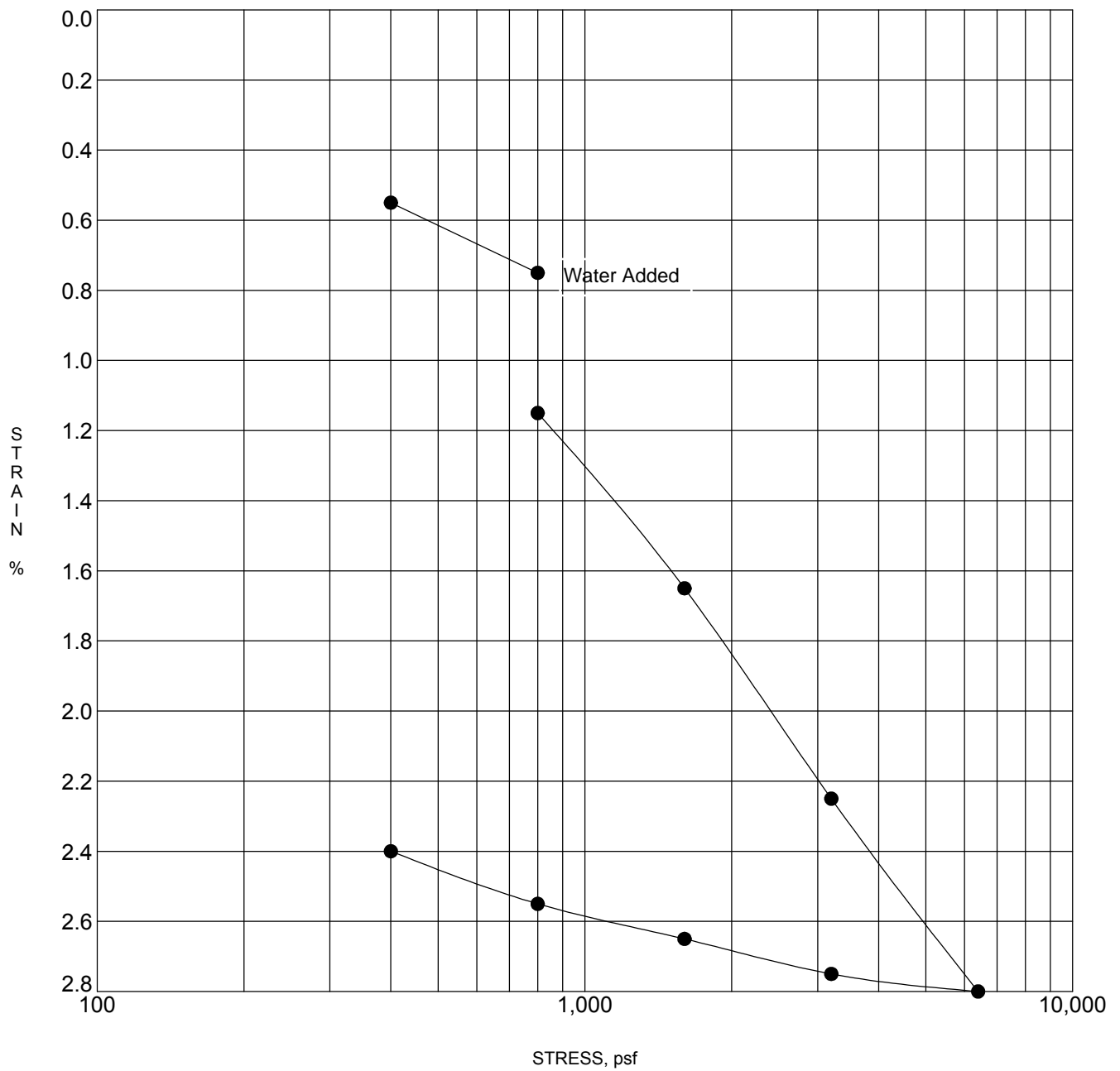
JOB NO. **0491-1**

DATE **7/19/21**

CONSOLIDATION TEST

Harrington
Geotechnical
Engineering, Inc. _____

PLATE B-4



Specimen Identification			Classification	DD	MC%
●	B-4	7.5	Fine to Medium Sand (SW)	99	5

PROJECT **Anaheim Riverwalk - Anaheim**

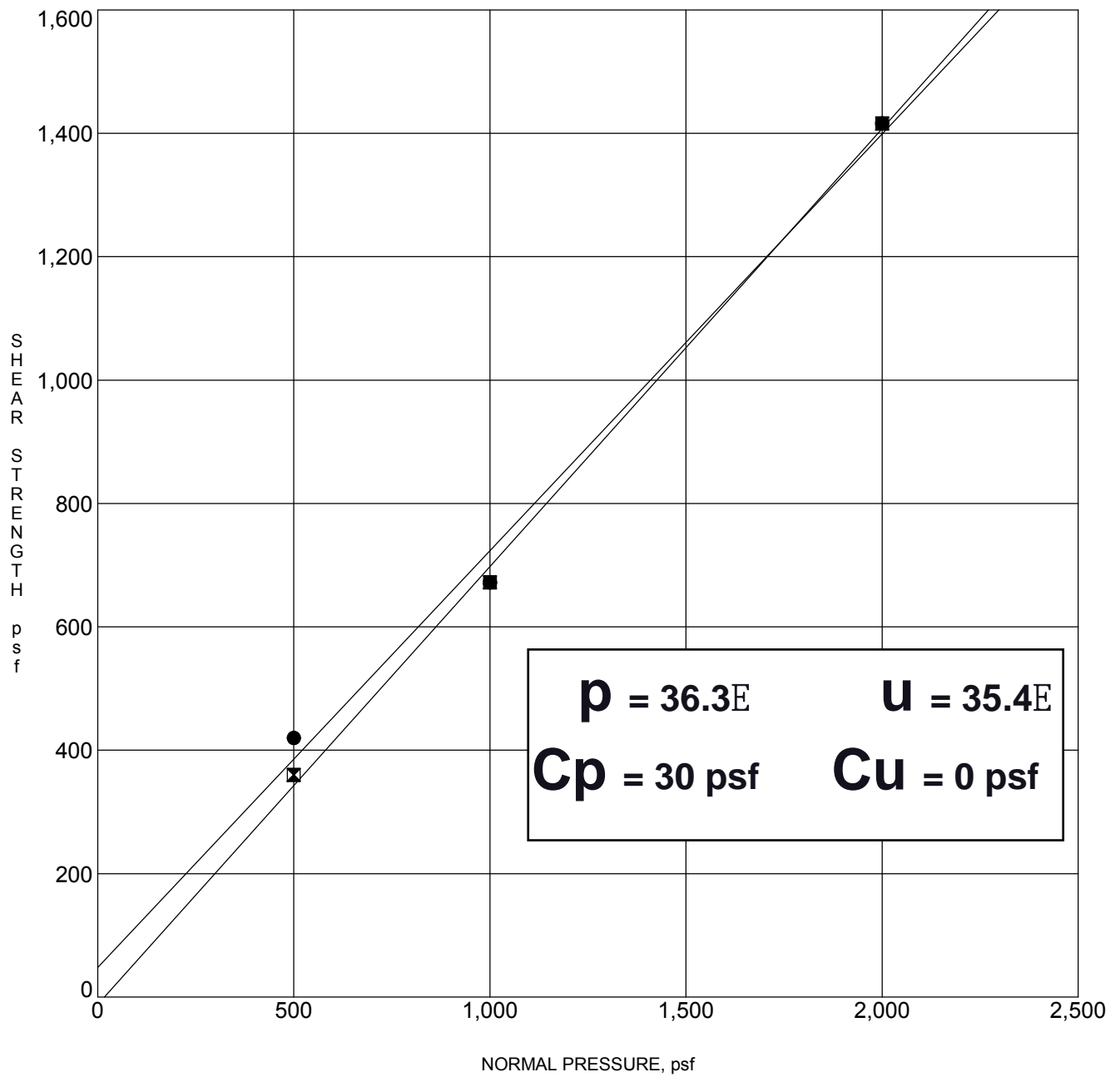
JOB NO. **0491-1**

DATE **7/19/21**

CONSOLIDATION TEST

Harrington
Geotechnical
Engineering, Inc. _____

PLATE B-5



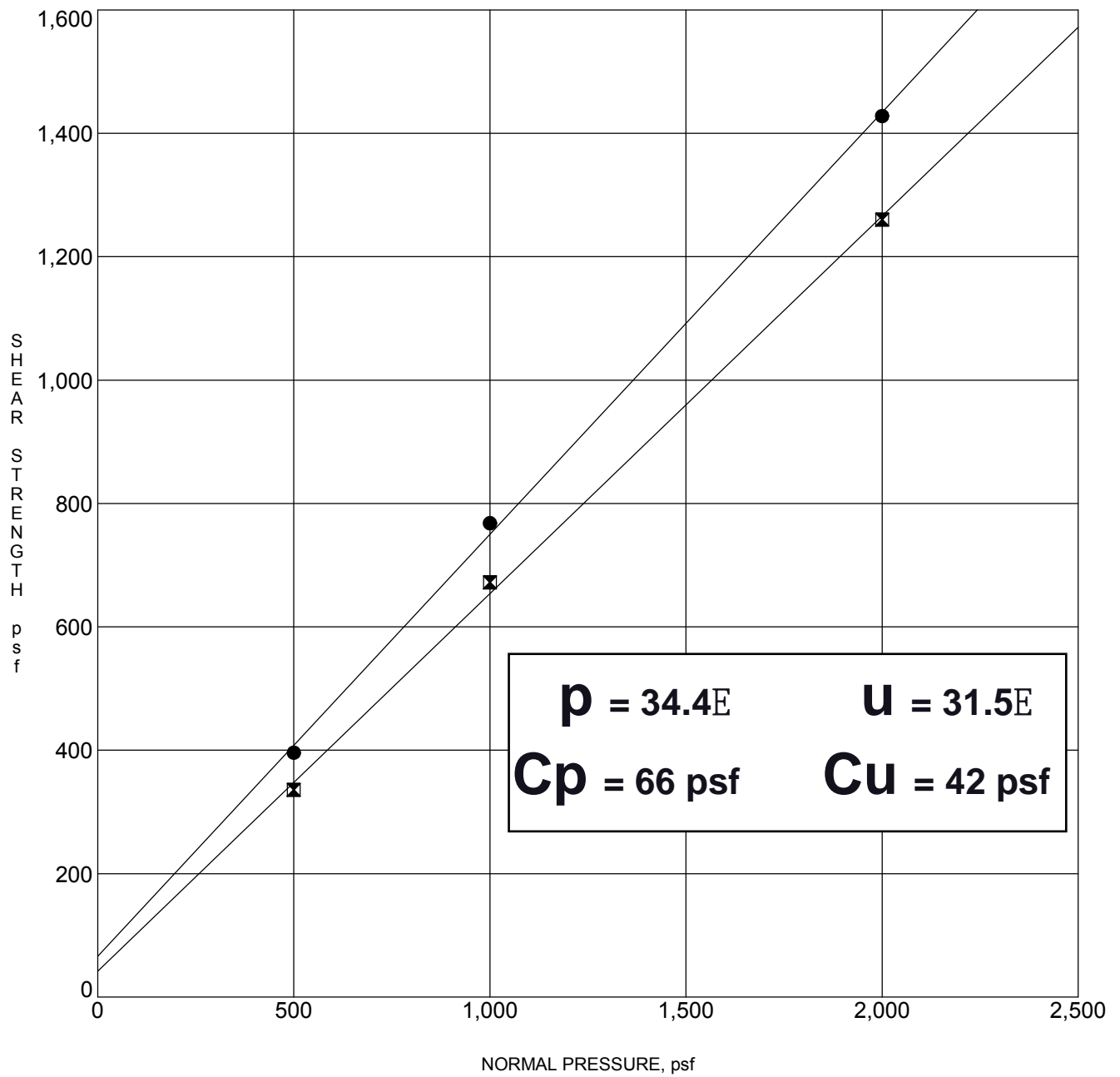
Specimen Identification			Classification	DD	MC%
●	B-1	5.0	Gravelly Sand (SW), (Peak)	95	10
☒	B-1	5.0	(Ultimate)		

PROJECT Anaheim Riverwalk - Anaheim JOB NO. 0491-1
DATE 7/21/21

SHEAR TEST DIAGRAM

Harrington
Geotechnical Engineering, Inc. _____

PLATE B-6



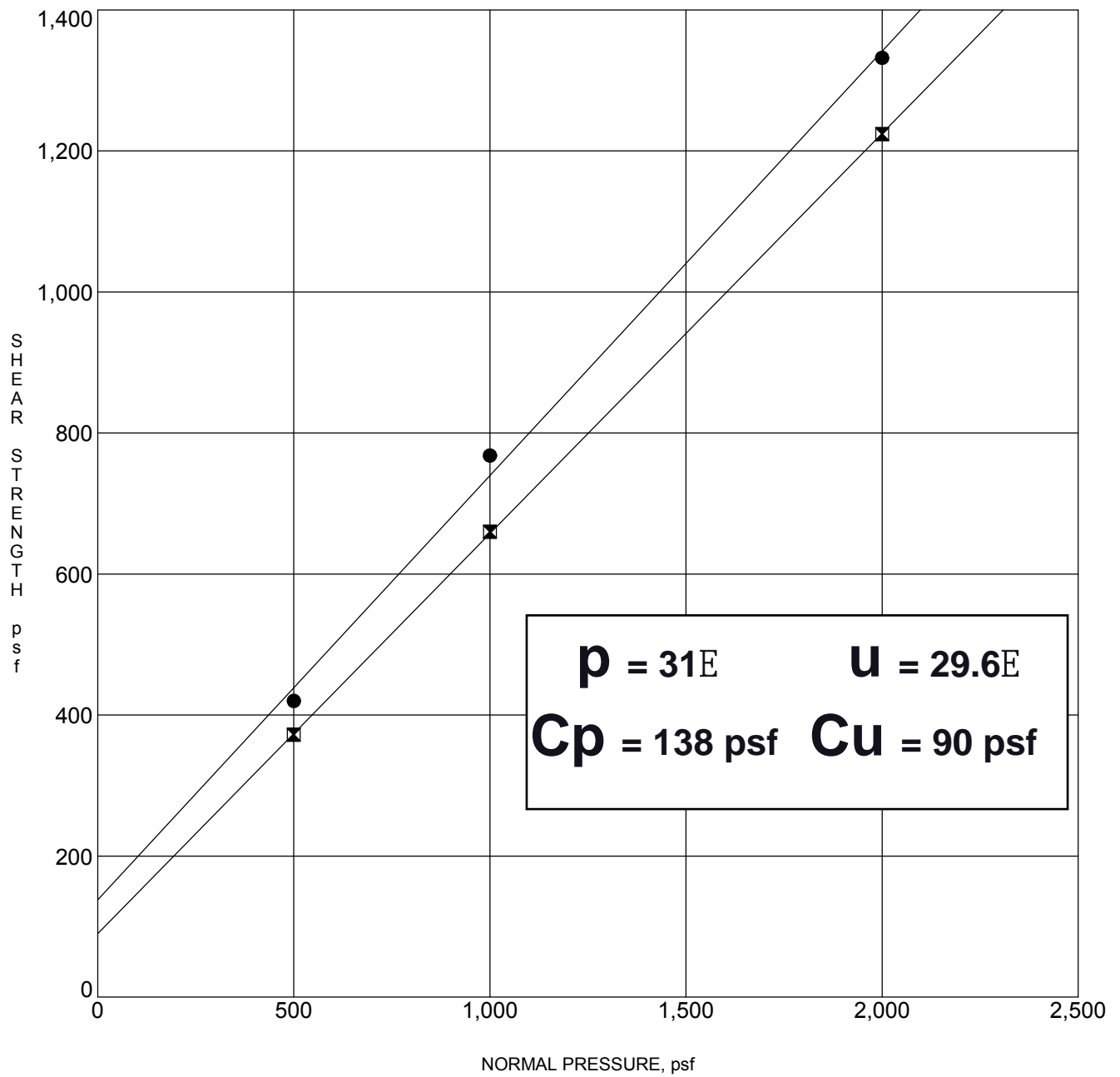
Specimen Identification			Classification	DD	MC%
●	B-1	17.5	Medium Sand (SP), (Peak)	97	19
⊠	B-1	17.5	(Ultimate)		

PROJECT Anaheim Riverwalk - Anaheim JOB NO. 0491-1
DATE 7/21/21

SHEAR TEST DIAGRAM

Harrington
Geotechnical
Engineering, Inc. _____

PLATE B-7



Specimen Identification			Classification	DD	MC%
●	B-2	2.5	Fine to Coarse Sand (SW), (Peak)	102	19
⊗	B-2	2.5	(Ultimate)		

PROJECT Anaheim Riverwalk - Anaheim

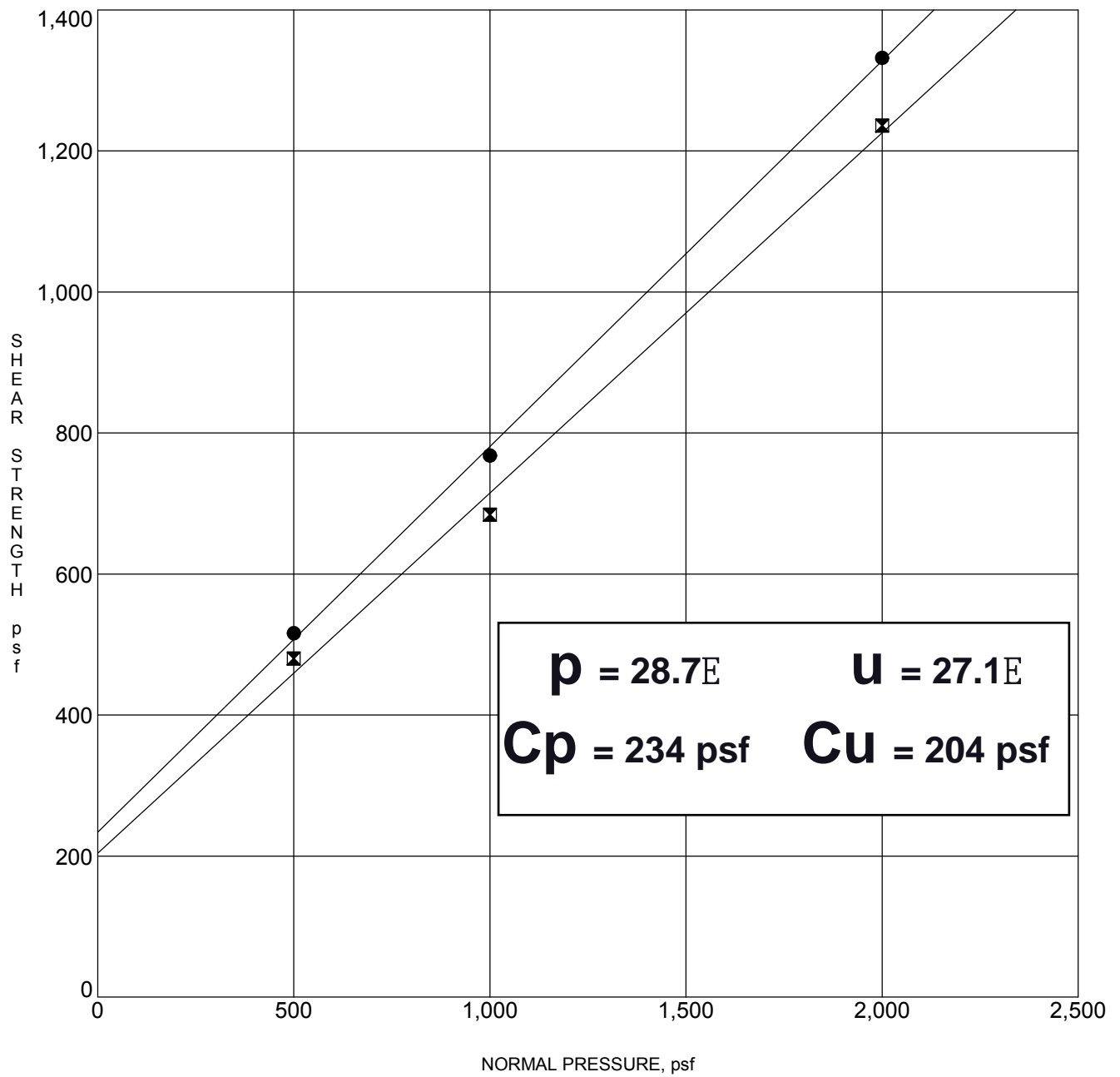
JOB NO. 0491-1

DATE 7/21/21

SHEAR TEST DIAGRAM

Harrington
Geotechnical
Engineering, Inc. _____

PLATE B-8



Specimen Identification			Classification	DD	MC%
●	B-3	2.5	Silty Sand (SM), (Peak)	102	8
☒	B-3	2.5	(Ultimate)		

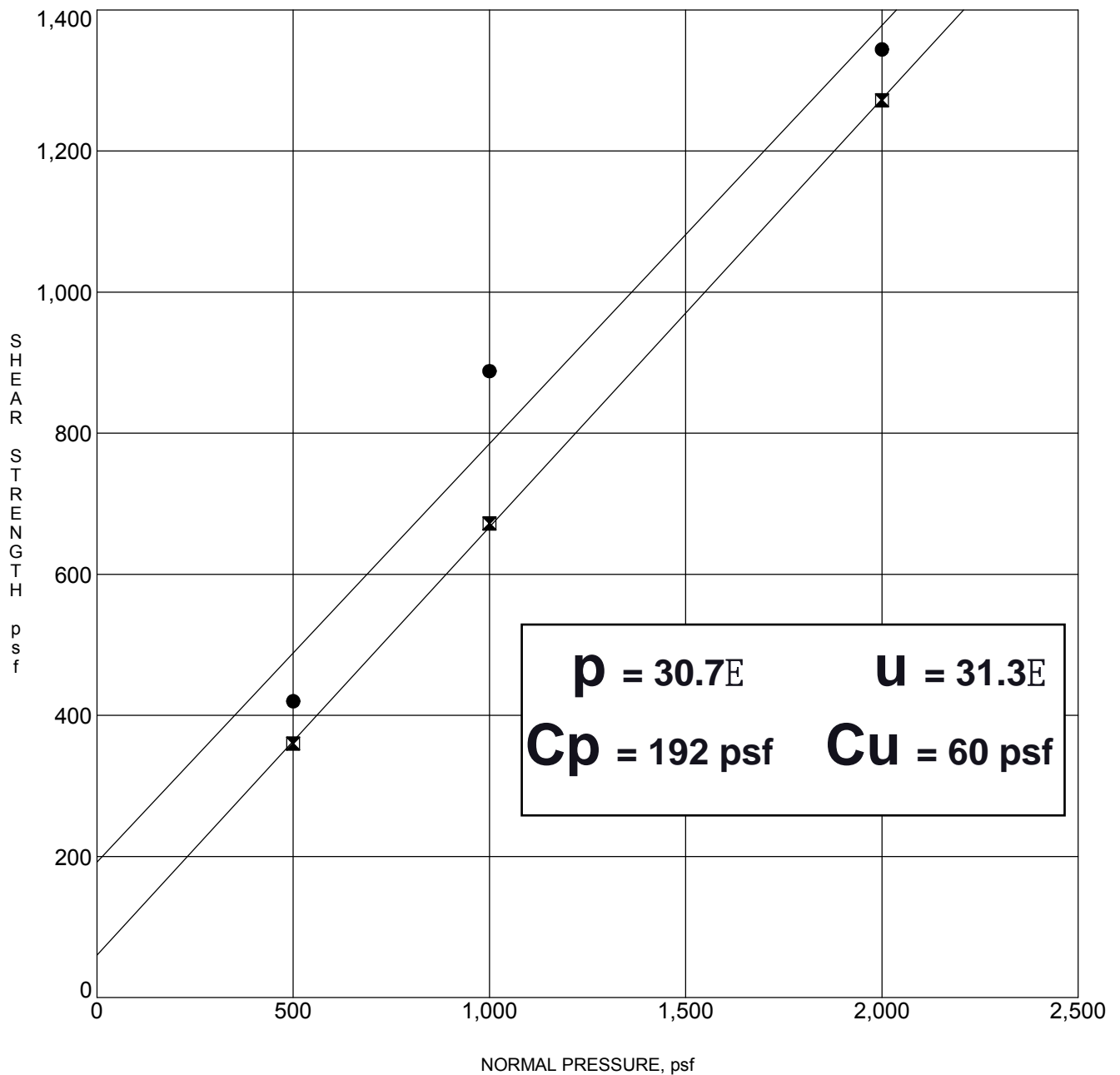
PROJECT **Anaheim Riverwalk - Anaheim**

JOB NO. **0491-1**
DATE **7/21/21**

SHEAR TEST DIAGRAM

Harrington
Geotechnical
Engineering, Inc. _____

PLATE B-9



Specimen Identification			Classification	DD	MC%
●	B-4	5.0	Fine to Medium Sand (SW), (Peak)	93	7
☒	B-4	5.0	(Ultimate)		

PROJECT **Anaheim Riverwalk - Anaheim**

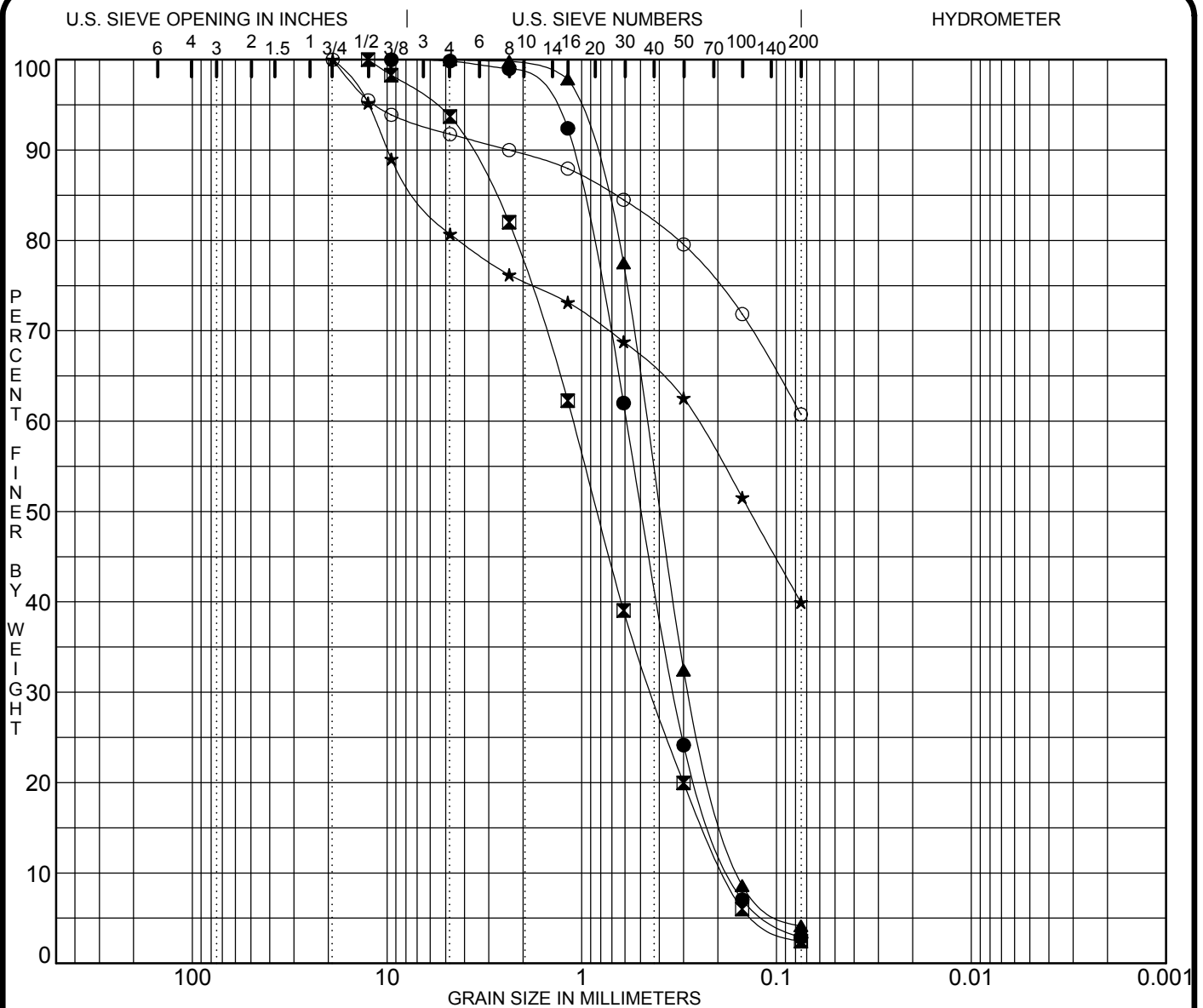
JOB NO. **0491-1**

DATE **7/21/21**

SHEAR TEST DIAGRAM

Harrington
Geotechnical
Engineering, Inc. _____

PLATE B-10



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification			Classification			MC%	LL	PL	PI	Cc	Cu
●	B-1	10.0	Sand (SW)			2				1.13	3.5
⊠	B-2	10.0	Sand (SW)			2				0.94	6.0
▲	B-2	20.0	Sand (SW)			5				1.08	3.0
★	B-2	35.0	Clayey Sand (SC)			19					
○	B-2	40.0	Sandy Silt (ML)			39					
Specimen Identification			D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay	
●	B-1	10.0	9.50	0.59	0.335	0.1691	0.2	97.0	2.9		
⊠	B-2	10.0	12.50	1.11	0.436	0.1830	6.3	91.2	2.5		
▲	B-2	20.0	4.75	0.46	0.279	0.1562	0.0	95.9	4.2		
★	B-2	35.0	19.00	0.26			19.3	40.7	40.0		
○	B-2	40.0	19.00				8.3	31.0	60.8		

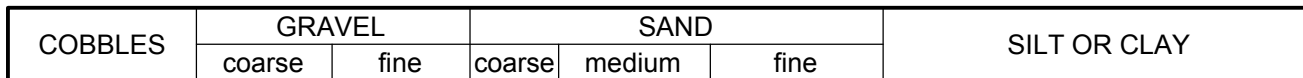
PROJECT Anaheim Riverwalk - Anaheim

JOB NO. Ana-0491
DATE 7/21/21

GRADATION CURVES

Harrington Geotechnical Engineering, Inc. _____

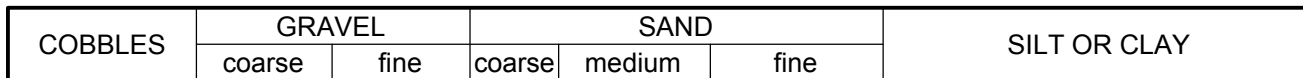
PLATE B-11



PROJECT	Anaheim Riverwalk - Anaheim	JOB NO.	Ana-0491
		DATE	7/21/21

Harrington Geotechnical Engineering, Inc. _____

PLATE B-12



PROJECT	Anaheim Riverwalk - Anaheim	JOB NO.	Ana-0491
		DATE	7/21/21

Harrington Geotechnical Engineering, Inc. _____

PLATE B-13

APPENDIX C

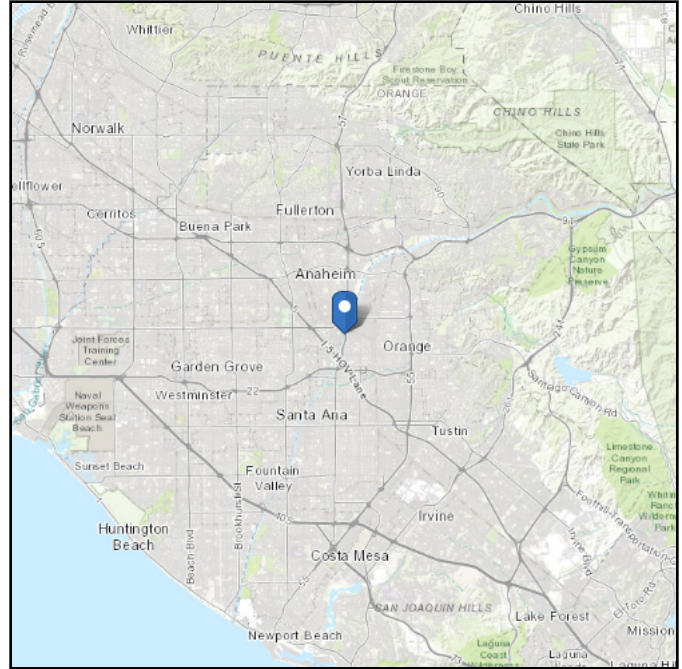
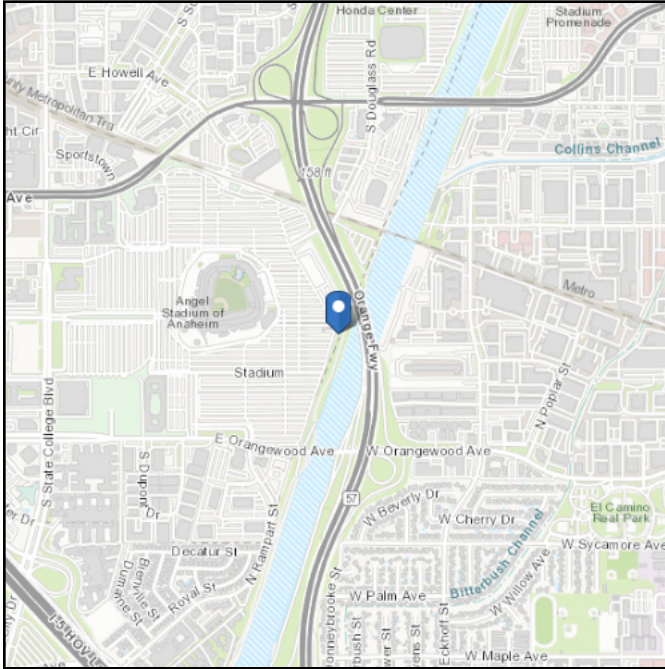
ASCE DESIGN HAZARDS REPORT

ASCE Hazards Report

Address:
No Address at This Location

Standard: ASCE/SEI 7-22
Risk Category: III
Soil Class: D - Stiff Soil

Latitude: 33.7992
Longitude: -117.8788
Elevation: 153.08680986596937 ft (NAVD 88)

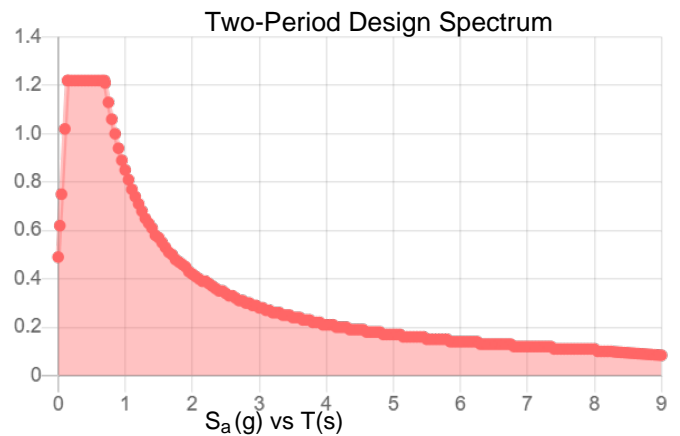
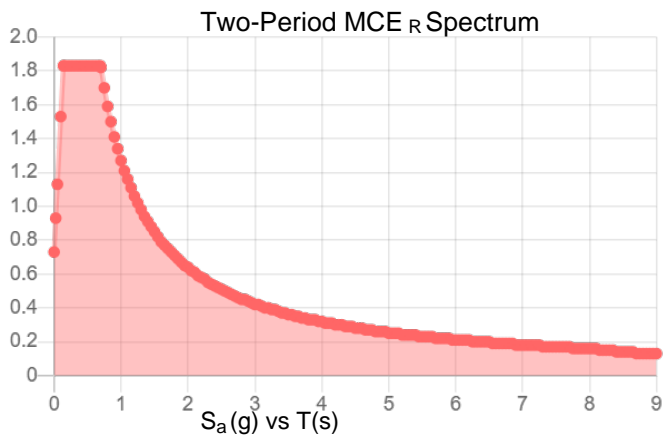
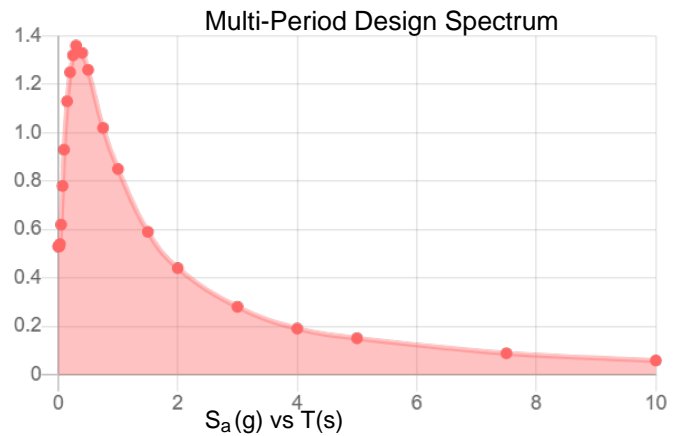
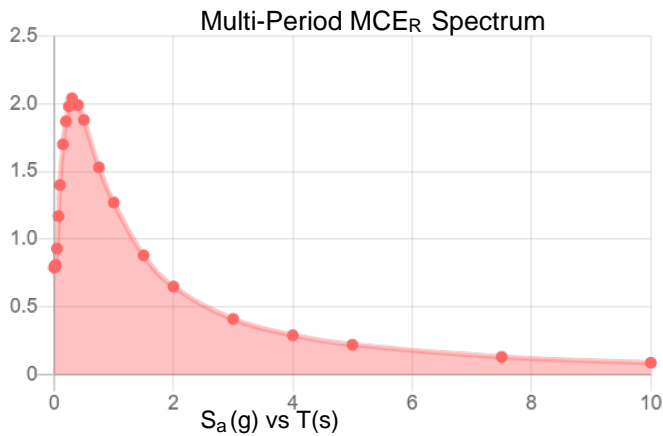


Site Soil Class: D - Stiff Soil

Results:

PGA _M :	0.68	T _L :	8
S _{MS} :	1.83	S _S :	1.58
S _{M1} :	1.27	S ₁ :	0.56
S _{DS} :	1.22	V _{S30} :	260
S _{D1} :	0.85		

Seismic Design Category: D



MCE_R Vertical Response Spectrum
Vertical ground motion data has not yet been made available by USGS.

Design Vertical Response Spectrum
Vertical ground motion data has not yet been made available by USGS.

Data Accessed: Thu Oct 24 2024

Date Source:

USGS Seismic Design Maps based on ASCE/SEI 7-22 and ASCE/SEI 7-22 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-22 Ch. 21 are available from USGS.

The ASCE Hazard Tool is provided for your convenience, for informational purposes only, and is provided “as is” and without warranties of any kind. The location data included herein has been obtained from information developed, produced, and maintained by third party providers; or has been extrapolated from maps incorporated in the ASCE standard. While ASCE has made every effort to use data obtained from reliable sources or methodologies, ASCE does not make any representations or warranties as to the accuracy, completeness, reliability, currency, or quality of any data provided herein. Any third-party links provided by this Tool should not be construed as an endorsement, affiliation, relationship, or sponsorship of such third-party content by or from ASCE.

ASCE does not intend, nor should anyone interpret, the results provided by this Tool to replace the sound judgment of a competent professional, having knowledge and experience in the appropriate field(s) of practice, nor to substitute for the standard of care required of such professionals in interpreting and applying the contents of this Tool or the ASCE standard.

In using this Tool, you expressly assume all risks associated with your use. Under no circumstances shall ASCE or its officers, directors, employees, members, affiliates, or agents be liable to you or any other person for any direct, indirect, special, incidental, or consequential damages arising from or related to your use of, or reliance on, the Tool or any information obtained therein. To the fullest extent permitted by law, you agree to release and hold harmless ASCE from any and all liability of any nature arising out of or resulting from any use of data provided by the ASCE Hazard Tool.

APPENDIX D

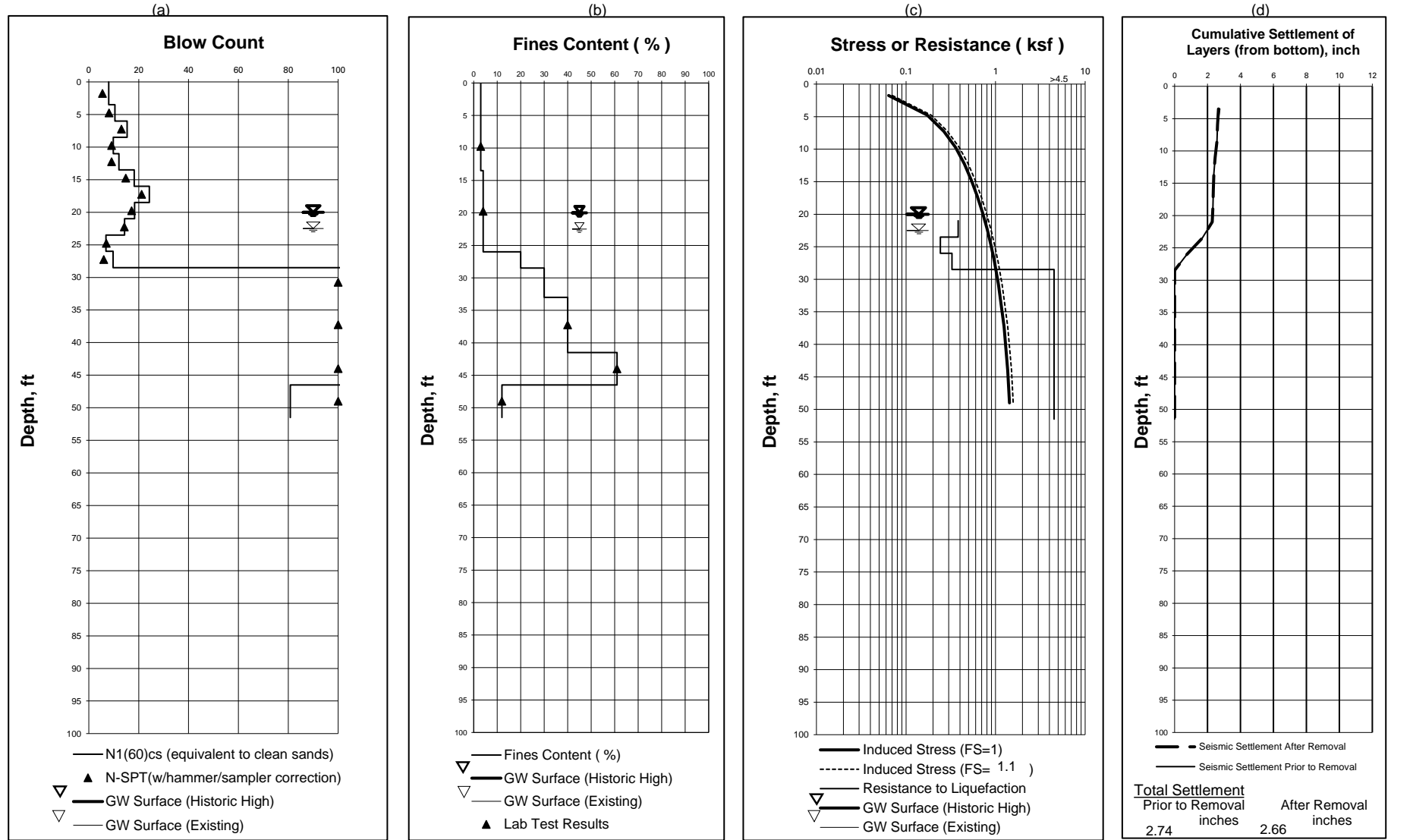
SOIL LIQUEFACTION POTENTIAL ANALYSIS

COMPUTER PROGRAM: EQLique&Settle"2"

Location..... **B-2**

Elevation (MSL) (ft) 153

NOTE: If the total settlement is very small (e.g. <0.05"), it will not be seen due to the scale used, and should be reported as "negligible".



PROJECT: Anaheim River Walk
Anaheim, Orange County, California

Community Services Department, City of Anaheim

Weighted Ground Accel. (M=7.5) = 0.49 g

Site Magnitude = 6.6

Liquefaction Potential and Seismic Settlements Based on Boring Data

HARRINGTON GEOTECHNICAL INC
Geotechnical Engineering Consultants

Job No.: 21-Ana-4091

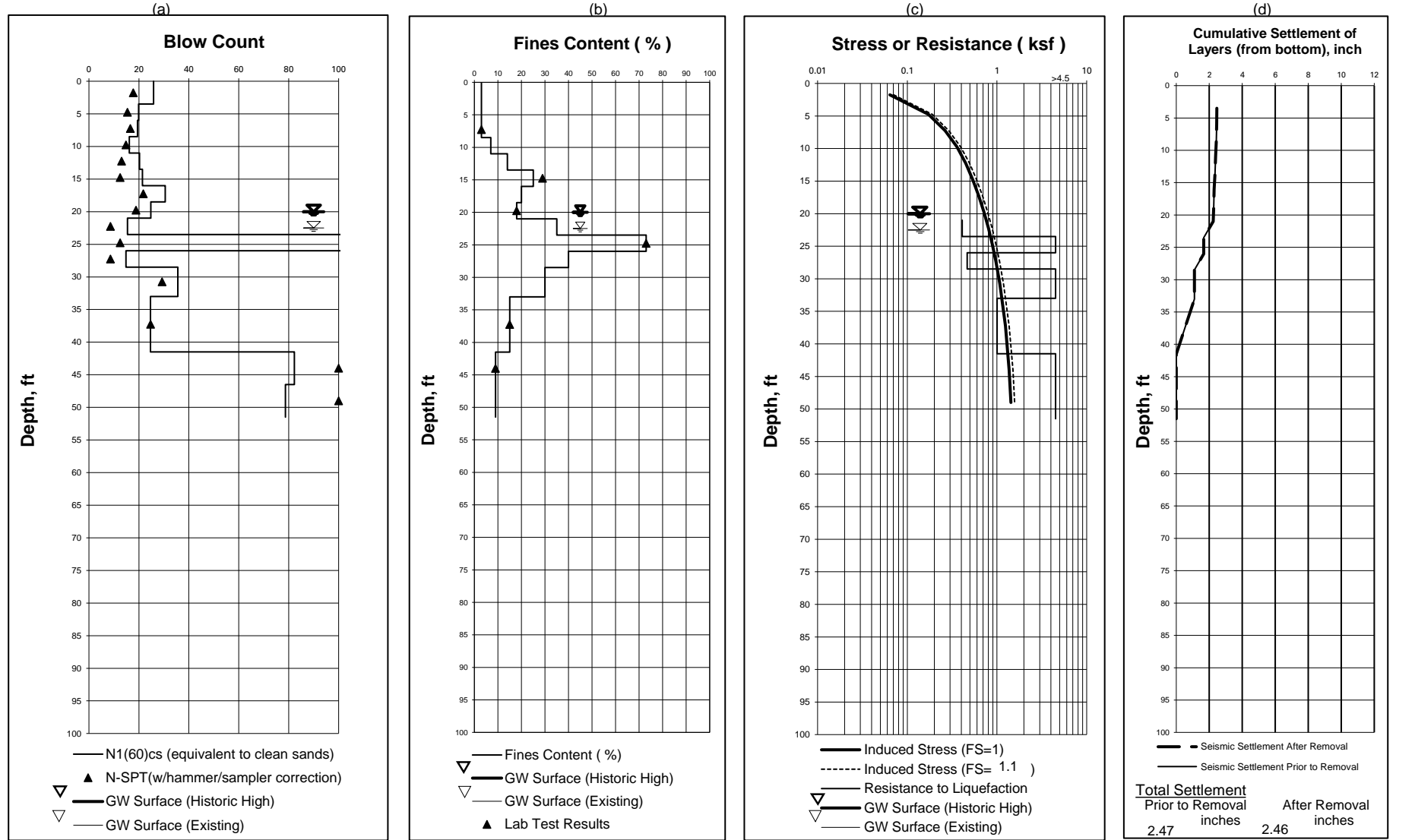
Date: 7-9-2021

Figure No. 2

COMPUTER PROGRAM: EQLique&Settle"2"

Location..... **B-3**
Elevation (MSL) (ft) 153

NOTE: If the total settlement is very small (e.g. <0.05"), it will not be seen due to the scale used, and should be reported as "negligible".



PROJECT: Anaheim River Walk
Anaheim, Orange County, California

Community Services Department, City of Anaheim

Weighted Ground Accel. (M=7.5) = 0.49 g

Site Magnitude = 6.6

Liquefaction Potential and Seismic Settlements Based on Boring Data

HARRINGTON GEOTECHNICAL INC
Geotechnical Engineering Consultants

Job No.: 21-ANA-0491

Date: 7-9-2021

Figure No. 2

APPENDIX E

STANDARD GRADING SPECIFICATIONS

These specifications present generally accepted standards and minimum grading (earthwork) requirements for the development of the subject project. These specifications shall be the project guidelines for earthwork except where specifically superseded in the geotechnical report(s) for the subject project; including the approved grading plan; and/or approved grading permit.

The Project Geotechnical Engineer and Project Engineering Geologist should be properly notified for an opportunity to review the following recommendations in order to comment on the suitability of the recommendations for the proposed development.

General

- 1.1. The Contractor shall be responsible for the satisfactory completion of all earthwork (including grading of constructed fills and cuts) in accordance with the project plans and specifications.
- 1.2. The Project Geotechnical Engineer and Project Engineering Geologist or their authorized representatives shall perform observations, testing services and geotechnical consultation throughout the duration of the project.
- 1.3. It is the Contractor's responsibility to prepare the ground surface to receive the fill to the satisfaction of the Project Geotechnical Engineer and to place, spread, mix and compact the fill materials in accordance with the project specifications and as required by the Project Geotechnical Engineer. The Contractor shall also remove all material considered by the Project Geotechnical Engineer to be unsuitable for use in the construction of compacted fills.
- 1.4. The Contractor shall have suitable and sufficient equipment in operation to handle the volume of fill material being placed and provide support equipment to properly compact the material in accordance with project specifications. When necessary, equipment will be shut down temporarily in order to permit proper compaction of fills by support equipment.

Site Preparation

- 1.5. Excessive vegetation and all deleterious material shall be removed from the fill areas and disposed of offsite of the grading operation. Existing earth materials determined by the Project Geotechnical Engineer as being unsuitable (incompatible) for placement in compacted fill areas shall be removed and disposed of offsite of the grading

operation. When applicable, the Contractor may obtain the approval of the Project Geotechnical Engineer and the controlling authorities for the project to dispose of the above-described materials, or a portion thereof, in designated areas onsite.

- 1.6. The exposed surfaces in areas to receive fill shall be scarified to a depth specified by the geotechnical report or a nominal 6 inches as determined by the Project Geotechnical Engineer; moisture conditioned as necessary; and compacted. In areas where it is necessary to obtain the approval of the controlling agency prior to placing fill, it will be the Contractor's responsibility to arrange the required inspections.
- 1.7. Any underground structures, e.g. cesspools, cisterns, septic tanks, wells, pipelines, etc., encountered during the grading operation are to be removed or relocated and the ground prepared for fill (cut) in a proper manner as recommended by the Project Geotechnical Engineer and/or the controlling agency for the project.

Subdrains

- 1.8. All subdrains should be constructed below the fill areas. Horizontal subdrains should be constructed below sloping fill areas at approximate 30 feet vertical intervals. Typical subdrains (less than 300 linear feet in length) should be constructed of 4-inch-diameter, perforated, Schedule 40 PVC pipe surrounded by one cubic foot per linear foot of gravel and filter fabric. Canyon subdrains should consist of 8-inch-diameter, perforated, Schedule 40 PVC pipe surrounded by nine cubic feet per linear foot of approved gravel wrapped with filter fabric.

Compacted Fills/Fill Slopes

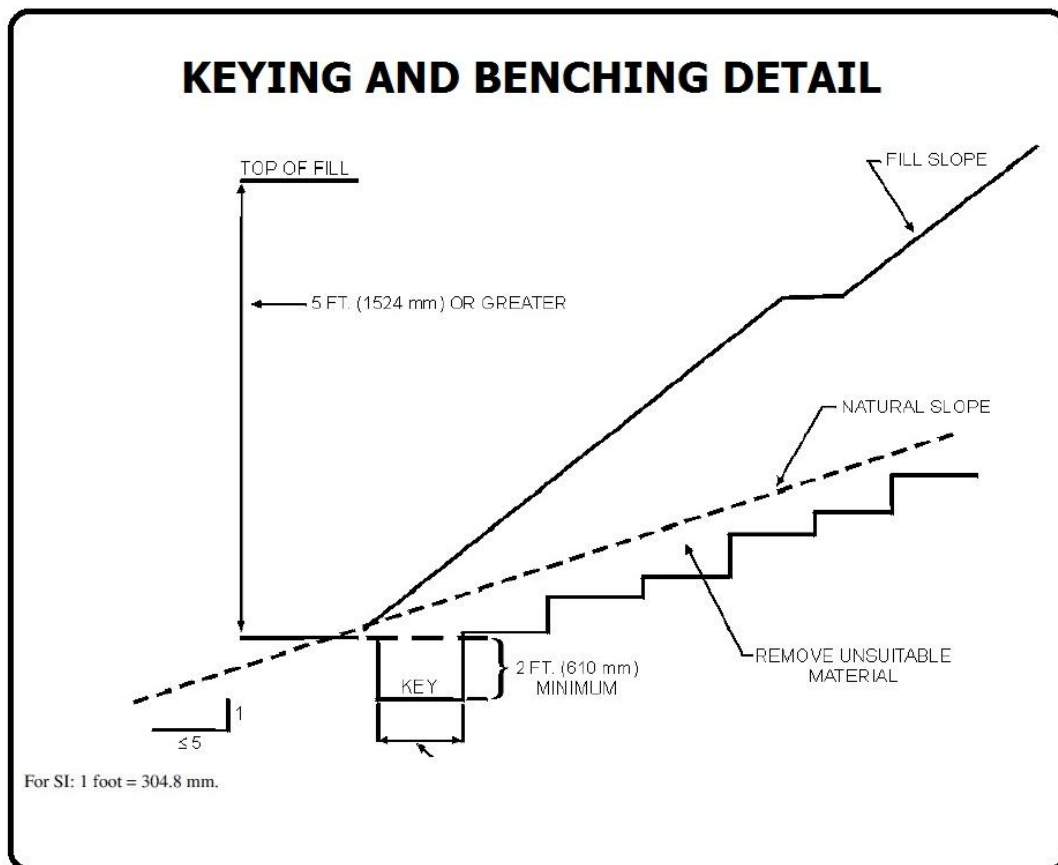
- 1.9. All material imported to the grading operation should be reviewed by the Project Geotechnical Engineer for compatibility prior to placement as fill. Laboratory testing of import materials may be required as recommended by the Project Geotechnical Engineer. Import materials deemed unacceptable for placement of fill should be removed from the fill areas and disposed of offsite of the grading operation.
- 1.10. All rock or rock fragments less than 8 inches in size should be incorporated into fill in a manner which will prevent nesting and the rock/rock fragments are completely surrounded with compacted fill.
- 1.11. All rocks greater than 8 inches in size shall be removed from the project site or placed in accordance with the recommendations of the Project Geotechnical Engineer and controlling agency code in areas designated as suitable for rock disposal.

- 1.12. All fill materials shall be placed in thin loose lifts, moisture conditioned as necessary and compacted in accordance with project specifications. Each layer shall be spread evenly and shall be thoroughly mixed during the spreading to obtain a nearly uniform moisture condition and a nearly uniform blend of materials.
- 1.13. All wet materials proposed for placement in fill areas should be moisture conditioned as necessary (either air dried or mechanically mixed). The Project Geotechnical Engineer may recommend removal of materials deemed too wet for placement of fill.
- 1.14. All fills shall be compacted to minimum project standards in compliance with the testing methods specified in the geotechnical report and in accordance with recommendations of the Project Geotechnical Engineer. Unless otherwise specified, the compaction standard shall be ASTM D1557 (latest approved standard).
- 1.15. All proposed slopes receiving fill (or ground sloping in excess of a ratio of five horizontal to one vertical), the fill shall be keyed and benched through all unsuitable topsoil, colluvium, alluvium, or creep-prone material into competent bedrock in accordance with the recommendations and approval of the Project Geotechnical Engineer or Project Engineering Geologist.
- 1.16. All drainage terraces for proposed fill slopes shall be constructed in compliance with the approved Grading Plan and/or the recommendations of the Project Civil Engineer. The preparation of the ground for construction of the drainage terraces should be reviewed for suitability by the Project Geotechnical Engineer.
- 1.17. All fill slopes (including buttresses and stabilization fills) shall be graded to a ratio not to exceed two horizontal to one vertical. The Contractor shall be required to obtain the specified minimum relative compaction out to the proposed finish slope face of slope. This may be achieved by both overbuilding the slope and cutting back to expose the compacted core, or by direct compaction of the slope face with suitable equipment, or by any other procedure which produces the designated result.

Keying and Benching

- 1.18. All fill-over-cut slopes shall be properly keyed through topsoil, colluvium or creep-prone material into bedrock or other firm material, and the transition shall be stripped of all unsuitable materials prior to placing fill. See the Keying and Benching

Detail, Figure 1. The cut portion should be completed and then evaluated by the Project Engineering Geologist prior to placement of fill. The minimum dimensions of the key should be determined by the Project Engineering Geologist. All keys should include a subdrain as specified in Section 3.



Cut Slopes

- 1.19. All cut slopes shall be inspected by the Project Engineering Geologist. The Contractor should notify the Project Engineering Geologist when cut slopes are started. If, during the course of grading, previously unforeseen and/or unanticipated adverse or potentially adverse geologic conditions are encountered, the Engineering Geologist and Geotechnical Engineer shall investigate, analyze and make recommendations for mitigation of these conditions.

FIGURE 1

- 1.20. All cut slopes shall be graded to a ratio not to exceed two horizontal to one vertical.
- 1.21. All drainage terraces for proposed cut slopes and shall be constructed in compliance with the approved Grading Plan and/or the recommendations of the Project Civil Engineer. The preparation of the ground for construction of the drainage terraces should be reviewed for suitability by the Project Geotechnical Engineer.

Retaining Wall Backfill

- 1.22. Retaining wall backfill should include a 12" wide blanket of granular soil (with a sand equivalent of at least 30) above a constructed subdrain and extend to within 3 feet of finished grade. The top 3 feet of backfill should consist of site material compacted to at least 90 percent relative compaction to impede surface water infiltration. Benches at least 2 feet wide should be cut into the excavation slope (backcut) at 2-foot vertical intervals during backfill placement.
- 1.23. The subdrain should consist of a 3-inch-diameter, perforated, Schedule 40 PVC or ABS SDR-35 pipe surrounded by one cubic foot/foot of 3/4-inch gravel wrapped in Mirafi 140 N geofabric or similar product. An adequate outlet for the subdrain should be provided and the location of the subdrain outlet should be reviewed by the project geotechnical engineer (engineering geologist) for suitability.

Utility Trench Backfills

- 1.24. Backfill for utility trenches should consist of site material that must be adequately compacted to preclude detrimental settlement. It is recommended, therefore, that backfills placed below the building foundation and to a distance of five feet outside thereof, and/or below concrete flatwork, be placed in appropriate lifts, moisture conditioned as necessary and mechanically compacted as to at least 90 percent of maximum dry density. Import materials (including sand) should be reviewed by the Project Geotechnical Engineer for suitability.

Grading Observations

- 1.25. Grading operations shall be observed by the Project Geotechnical Engineer (Geotechnical Technician) and where required, the Project Engineering Geologist.
- 1.26. All field density tests shall be made by the Geotechnical Technician to establish the relative compaction and moisture content of the fill in accordance with project

specifications. Density tests shall generally be performed at (minimum) intervals not to exceed of 2 vertical feet or 1,000 cubic yards of material placed.

- 1.27. All field density testing of fill placed during the grading operation shall conform to the minimum project specifications. When test results indicate that the density of any layer of fill, or portion thereof, is below the required relative compaction (or outside the acceptable moisture range); the fill shall be reworked until the required density and/or moisture content has been attained; or the material shall be removed. No additional fill shall be placed over an area until the last placed lift of fill has been tested and found to meet the density and moisture requirements and that lift has been approved by the Project Geotechnical Engineer.

APPENDIX F

INFILTRATION STUDY

Scope of Services

In order to establish infiltration rates, the following was conducted:

- Equipment and personnel were provided to conduct four borehole infiltrometer tests at the locations shown on Plate A in accordance with Orange County Technical Guidance Document Appendix VII.
- The tests were conducted at depth of approximately 5 and 10 feet below ground surface on June 2, 2021.
- Upon completion of the testing, the data was analyzed, appropriate engineering calculations were performed, and this report was prepared.

Infiltration Rate

Our interpretation of the results indicate a design infiltration rate of 1.56 in/hr. for P-1 at a depth of 10 feet, a design infiltration rate of 3.27 in/hr. for P-2 at a depth of 5 feet, a design infiltration rate of 5.06 in/hr. for P-3 at a depth of 10 feet and a design infiltration rate of 1.39 in/hr. for P-4 at a depth of 5 feet. The design infiltration rate needs to exceed 0.3 in/hr. for the area to be considered potentially feasible. Therefore P-1 through P-4 are all considered to be feasible locations for an infiltration BMP.

Soil Types

The materials are mainly medium sand (SP) to fine to coarse sand (SW) and gravelly sand (SG).

Groundwater

Perched water was encountered in the 50 deep borings below 22.5 feet for the geotechnical investigation conducted in June 1, 2021. The historically highest groundwater depth at the site is anticipated to be 20 feet which can be used as the seasonally high groundwater. The minimum separation from the bottom of the invert of the BMP to the seasonally high groundwater is 10 feet. All four locations also meet this requirement.

Important Notes:

In the referenced soil report (Reference 2), and in general, the Los Angeles County Procedure has applied during the data presentation and applying the factor of safety. However, in

accordance to the " Review No.1, By TETRA TECH: GEOTECHNICAL, GEOLOGY, AND SEISMICI REVIEW SHETT, October 7, 2025), Comments No. 6 and 7, please be informed that:

- Based on our understanding and information, the perforated pipe and gravel pack were used in general conformance with county guidelines.
- The other information like borehole diameter and depth and trial tests results were provided in the data/calculation sheets.
- Per our review, the conducted infiltration tests were found to be in general conformance with County of Orange Guidelines, Appendix VII: (Figure VII.16.Test Pit for Deep Percolation Test, Figure VII.17.Photo of Percolation Test Pit, Use of perforated PVC pipe is a variation).
- Also, the data sheet that was used in the calculation and report is in conformance with Figure VII.18. Sample Test Data Form for Percolation Test.
- Based on the available information and using the procedure presented by Orange County Guidelines, the estimated safety factor could be on the order of 3, which is less than the safety factor of 4.5 that was used in the report. So, the recommended infiltration rates seems to be reasonable.

TECHNICAL GUIDANCE DOCUMENT APPENDICES

Worksheet H: Factor of Safety and Design Infiltration Rate and Worksheet

Table:
VII.3
Table:
VII.4

Factor Category		Factor Description	Assigned Weight (w)	Factor Value (v)	Product (p) $p = w \times v$
A	Suitability Assessment	Soil assessment methods	0.25	2	0.5
		Predominant soil texture	0.25	1	0.25
		Site soil variability	0.25	2	0.5
		Depth to groundwater / impervious layer	0.25	1	0.25
		Suitability Assessment Safety Factor, $S_A = \Sigma p$			
B	Design	Tributary area size	0.25	2	0.5
		Level of pretreatment/ expected sediment loads	0.25	2	0.5
		Redundancy	0.25	2	0.5
		Compaction during construction	0.25	2	0.5
		Design Safety Factor, $S_B = \Sigma p$			
Combined Safety Factor, $S_{Total} = S_A \times S_B = 1.5 \times 2 = 3 \rightarrow$ which is less than the assumed safety factor in the report which has been: 4.5					
		Observed Infiltration Rate, inch/hr, $K_{Observed}$ (corrected for test-specific bias)			
		Design Infiltration Rate, in/hr, $K_{DESIGN} = K_{Observed} / S_{Total}$			

Please note that determining the exact factor values based on the importance of the condition is not feasible at this time. These values depend on the condition of the final design and construction conditions. However, based on the current level of available information to us, an effort has been made to select values that seems reasonable and conservative.

Orange County Infiltration Evaluation; Falling Head, Porchet Conversion Test Procedure

Project:	Anaheim River Walk	Project No:	ANA-0491	Date:	06/02/21
Test Hole:	P-1	Tested By:	SBM / CM		
Depth of Test Hole (Ft):	10	USCS Soil Classification	Sand (SP)		
Test Hole Dimensions (Inches)				Length	Width
Diameter (In.)	8	Sides (In.)	-	-	

Sandy Soil Criteria Test*

Trial No.	Start Time	Stop Time	Time Interval (Min)	Initial Depth To Water (In.)	Final Depth To Water (In.)	Change In Water Level (In.)	Greater Than Or Equal To 6" (Y / N)
1	08:15:00 AM	08:40:00 AM	25	40.2	86.44	46.24	Y
2	08:40:00 AM	09:05:00 AM	25	41.04	87.6	46.56	Y

*If two consecutive measurements show that six inches of water seeps away in less than 25 minutes the test shall be run for an additional hour with measurements taken every 10 minutes. Otherwise, pre-soak (fill) overnight. Obtain at least twelve measurements per hole over at least six hours (approximately 30 minute intervals) with a precision of at least 0.25".

Trial No.	Start Time	Stop Time	Time Interval (Min)	Initial Depth To Water (In.)	Final Depth To Water (In.)	Change In Water Level (In.)	Infiltration Rate (In./Hr.)
1	09:13:00 AM	09:23:00 AM	10	67.2	90.24	23.04	6.388
2	09:25:00 AM	09:35:00 AM	10	60	88.44	28.44	7.143
3	09:37:00 AM	09:47:00 AM	10	57	87.24	30.24	7.275
4	09:49:00 AM	09:59:00 AM	10	54.12	86.04	31.92	7.378
5	10:01:00 AM	10:11:00 AM	10	52.68	84.84	32.16	7.249
6	10:13:00 AM	10:23:00 AM	10	55.92	85.8	29.88	7.011
7							
8							
9							
10							
11							
12							
13							
14							
15							

Comments:

$$RF = RF_t * RF_v * RF_s$$

$$Design\ Infiltration\ Rate = Measured\ Percolation / RF$$

$$RF_t [Boring\ Percolation] = 2$$

$$RF_v \& RF_s = 1.5$$

$$DIR = 7.011 / 4.5 = 1.558\ In/Hr$$

$$RF = 2 * 1.5 * 1.5 = 4.5$$

Orange County Infiltration Evaluation; Falling Head, Porchet Conversion Test Procedure

Project:	Anaheim River Walk	Project No:	ANA-0491	Date:	06/02/21
Test Hole:	P-2	Tested By:	SBM / CM		
Depth of Test Hole (Ft):	5	USCS Soil Classification	Sand (SP)		
Test Hole Dimensions (Inches)				Length	Width
Diameter (In.)	8	Sides (In.)	-	-	

Sandy Soil Criteria Test*

Trial No.	Start Time	Stop Time	Time Interval (Min)	Initial Depth To Water (In.)	Final Depth To Water (In.)	Change In Water Level (In.)	Greater Than Or Equal To 6" (Y / N)
1	10:00:00 AM	10:25:00 AM	25	17.28	48.24	30.96	Y
2	10:25:00 AM	10:50:00 AM	25	15.48	47.64	32.16	Y

*If two consecutive measurements show that six inches of water seeps away in less than 25 minutes the test shall be run for an additional hour with measurements taken every 10 minutes. Otherwise, pre-soak (fill) overnight. Obtain at least twelve measurements per hole over at least six hours (approximately 30 minute intervals) with a precision of at least 0.25".

Trial No.	Start Time	Stop Time	Time Interval (Min)	Initial Depth To Water (In.)	Final Depth To Water (In.)	Change In Water Level (In.)	Infiltration Rate (In./Hr.)
1	10:51:00 AM	11:01:00 AM	10	13.8	58.68	44.88	20.907
2	11:03:00 AM	11:13:00 AM	10	21.6	54.6	33	16.569
3	11:14:00 AM	11:24:00 AM	10	24.72	54.96	30.24	16.375
4	11:25:00 AM	11:35:00 AM	10	19.92	53.28	33.36	15.761
5	11:36:00 AM	11:46:00 AM	10	21.12	52.92	31.8	15.276
6	11:48:00 AM	11:58:00 AM	10	17.64	51.36	33.72	14.714
7							
8							
9							
10							
11							
12							
13							
14							
15							

Comments:

$$RF = RF_t * RF_v * RF_s$$

$$Design\ Infiltration\ Rate = Measured\ Percolation / RF$$

$$RF_t [Boring\ Percolation] = 2$$

$$RF_v \& RF_s = 1.5$$

$$DIR = 14.714 / 4.5 = 3.270\ In/Hr$$

$$RF = 2 * 1.5 * 1.5 = 4.5$$

Orange County Infiltration Evaluation; Falling Head, Porchet Conversion Test Procedure

Project:	Anaheim River Walk	Project No:	ANA-0491	Date:	06/02/21
Test Hole:	P-3	Tested By:	SBM / CM		
Depth of Test Hole (Ft):	10	USCS Soil Classification	Sand (SP)		
Test Hole Dimensions (Inches)				Length	Width
Diameter (In.)	8	Sides (In.)	-	-	

Sandy Soil Criteria Test*

Trial No.	Start Time	Stop Time	Time Interval (Min)	Initial Depth To Water (In.)	Final Depth To Water (In.)	Change In Water Level (In.)	Greater Than Or Equal To 6" (Y / N)
1	01:05:00 PM	01:30:00 PM	25	40.2	86.64	46.44	Y
2	01:30:00 PM	01:55:00 PM	25	41.04	87.6	46.56	Y

*If two consecutive measurements show that six inches of water seeps away in less than 25 minutes the test shall be run for an additional hour with measurements taken every 10 minutes. Otherwise, pre-soak (fill) overnight. Obtain at least twelve measurements per hole over at least six hours (approximately 30 minute intervals) with a precision of at least 0.25".

Trial No.	Start Time	Stop Time	Time Interval (Min)	Initial Depth To Water (In.)	Final Depth To Water (In.)	Change In Water Level (In.)	Infiltration Rate (In./Hr.)
1	02:06:00 PM	02:16:00 PM	10	68.4	120.72	52.32	22.880
2	02:18:00 PM	02:28:00 PM	10	83.04	120.96	37.92	22.752
3	02:30:00 PM	02:40:00 PM	10	85.44	120.96	35.52	22.672
4	02:41:00 PM	02:51:00 PM	10	92.52	120.96	28.44	22.364
5	02:52:00 PM	03:02:00 PM	10	82.56	120.96	38.4	22.767
6	03:03:00 PM	03:13:00 PM	10	89.4	120.96	31.56	22.516
7							
8							
9							
10							
11							
12							
13							
14							
15							

Comments:

$$RF = RF_t * RF_v * RF_s$$

$$Design\ Infiltration\ Rate = Measured\ Percolation / RF$$

$$RF_t [Boring\ Percolation] = 2$$

$$RF_v \& RF_s = 1.5$$

$$DIR = 22.516 / 4.5 = 5.004\ In/Hr$$

$$RF = 2 * 1.5 * 1.5 = 4.5$$

Orange County Infiltration Evaluation; Falling Head, Porchet Conversion Test Procedure

Project:	Anaheim River Walk	Project No:	ANA-0491	Date:	06/02/21
Test Hole:	P-4	Tested By:	SBM / CM		
Depth of Test Hole (Ft):	5	USCS Soil Classification	Sand (SP)		
Test Hole Dimensions (Inches)				Length	Width
Diameter (In.)	8	Sides (In.)	-	-	

Sandy Soil Criteria Test*

Trial No.	Start Time	Stop Time	Time Interval (Min)	Initial Depth To Water (In.)	Final Depth To Water (In.)	Change In Water Level (In.)	Greater Than Or Equal To 6" (Y / N)
1	11:35:00 AM	12:00:00 PM	25	16.92	48.12	31.2	Y
2	12:00:00 PM	12:25:00 PM	25	16.2	47.04	30.84	Y

*If two consecutive measurements show that six inches of water seeps away in less than 25 minutes the test shall be run for an additional hour with measurements taken every 10 minutes. Otherwise, pre-soak (fill) overnight. Obtain at least twelve measurements per hole over at least six hours (approximately 30 minute intervals) with a precision of at least 0.25".

Trial No.	Start Time	Stop Time	Time Interval (Min)	Initial Depth To Water (In.)	Final Depth To Water (In.)	Change In Water Level (In.)	Infiltration Rate (In./Hr.)
1	12:37:00 PM	12:47:00 PM	10	17.76	40.32	22.56	8.214
2	12:49:00 PM	12:59:00 PM	10	10.44	30.72	20.28	5.875
3	01:00:00 PM	01:10:00 PM	10	18.48	35.76	17.28	5.945
4	01:11:00 PM	01:21:00 PM	10	13.56	31.8	18.24	5.567
5	01:22:00 PM	01:32:00 PM	10	13.8	34.08	20.28	6.394
6	01:33:00 PM	01:43:00 PM	10	15.48	34.68	19.2	6.241
7							
8							
9							
10							
11							
12							
13							
14							
15							

Comments:

$$RF = RF_t * RF_v * RF_s$$

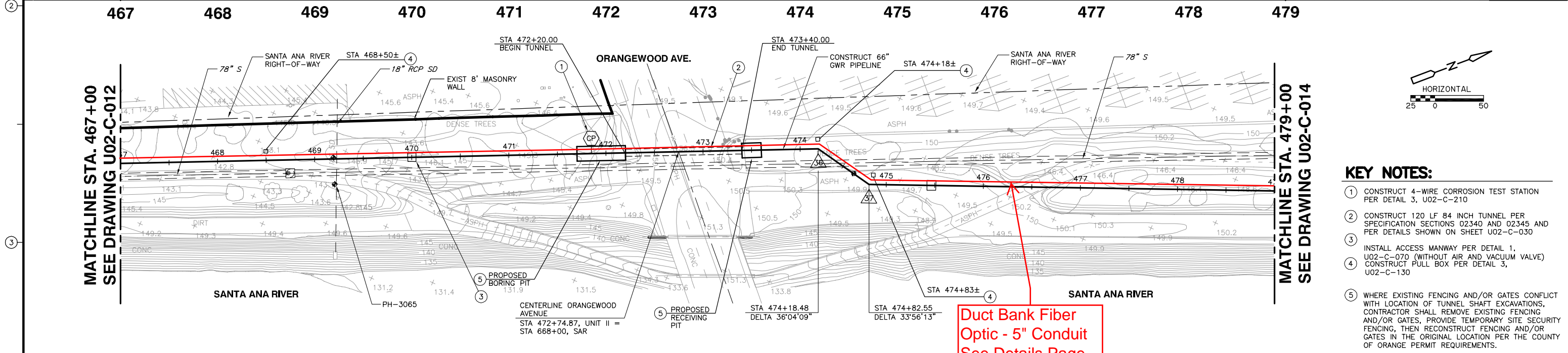
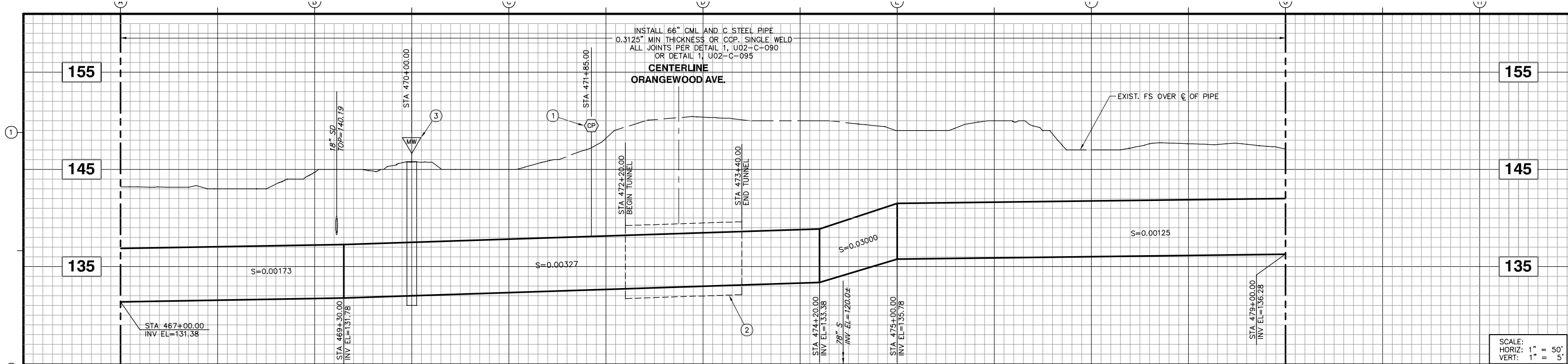
$$Design\ Infiltration\ Rate = Measured\ Percolation / RF$$

$$RF_t [Boring\ Percolation] = 2$$

$$RF_v \& RF_s = 1.5$$

$$DIR = 6.241 / 4.5 = 1.387\ In/Hr$$

$$RF = 2 * 1.5 * 1.5 = 4.5$$



- KEY NOTES:**
1. CONSTRUCT 4-WIRE CORROSION TEST STATION PER DETAIL 3, U02-C-210
 2. CONSTRUCT 120 LF 84 INCH TUNNEL PER SPECIFICATION SECTIONS 02340 AND 02345 AND PER DETAILS SHOWN ON SHEET U02-C-030
 3. INSTALL ACCESS MANWAY PER DETAIL 1, U02-C-070 (WITHOUT AIR AND VACUUM VALVE) CONSTRUCT PULL BOX PER DETAIL 3, U02-C-130
 4. WHERE EXISTING FENCING AND/OR GATES CONFLICT WITH LOCATION OF TUNNEL SHAFT EXCAVATIONS, CONTRACTOR SHALL REMOVE EXISTING FENCING AND/OR GATES, PROVIDE TEMPORARY SITE SECURITY FENCING, THEN RECONSTRUCT FENCING AND/OR GATES IN THE ORIGINAL LOCATION PER THE COUNTY OF ORANGE PERMIT REQUIREMENTS.



BROWN AND CALDWELL

REV. NO.	DATE	DRWN	CHKD	REMARKS
06/07	AC	DM		REVISED FOR RECORD
09/03	JPC	GG		ADDENDUM NO.1

DESIGNED BY: C. LUCIE
DRAWN BY: T. BLALOCK
SHEET CHK'D BY: D. MCCARTNEY
CROSS CHK'D BY:
APPROVED BY:
DATE: OCT. 2003

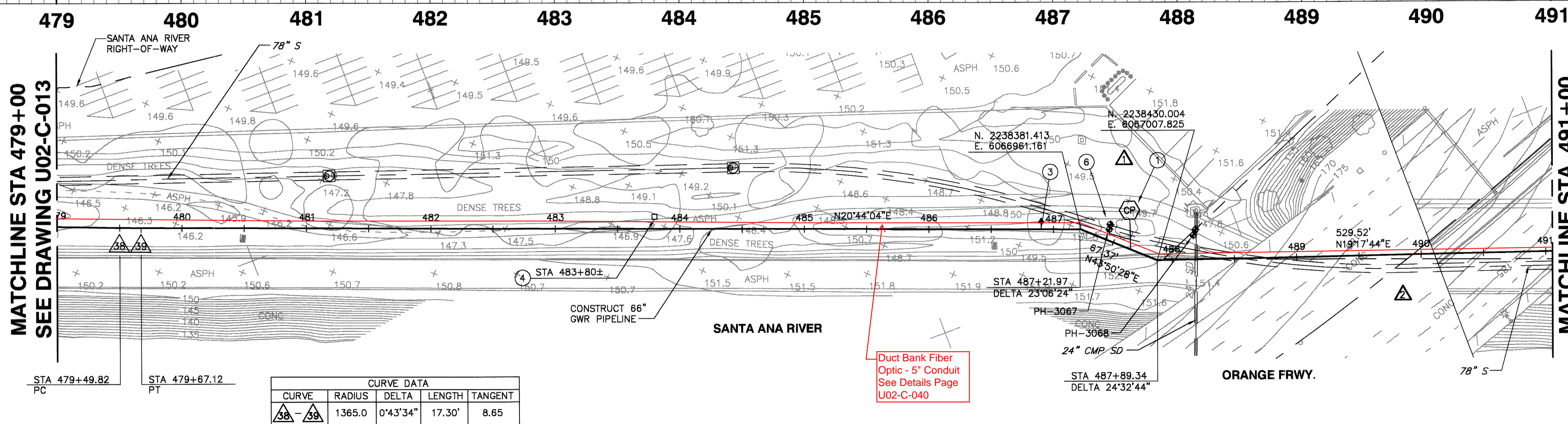
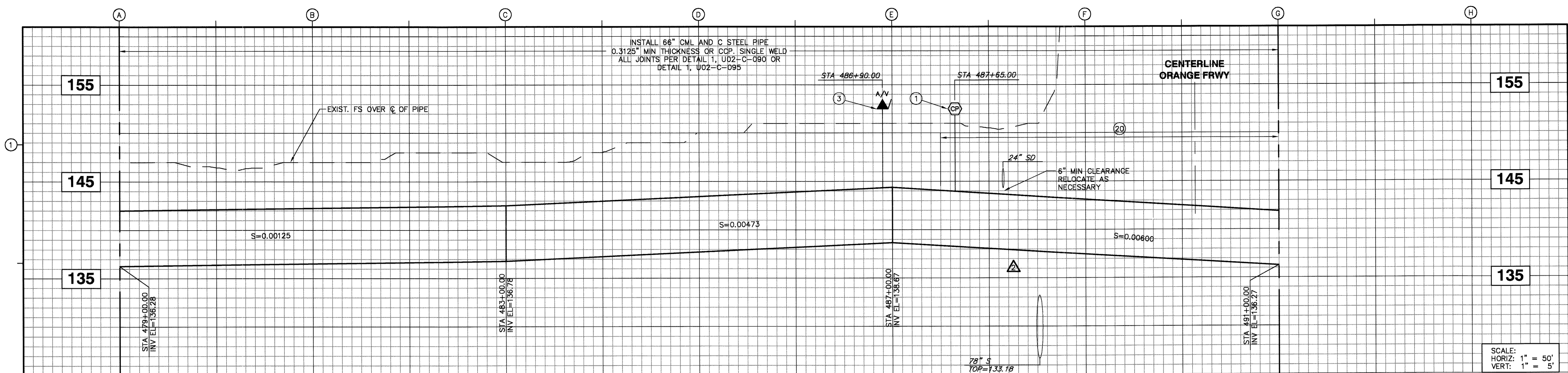
Camp Dresser & McKee Inc. in association with
Brown and Caldwell and Tetra Tech
18581 Teller Avenue, Suite 200
Irvine, California 92612
Tel: (949) 752-5452
Fax: (949) 752-1307

Groundwater Replenishment System
An Orange County Water District and Orange County Sanitation District Joint Project

66 INCH GWR PIPELINE - UNIT II
PLAN AND PROFILE
FROM STA. 467+00 TO 479+00

RECORD DRAWING
THIS RECORD DRAWING WAS PREPARED USING INFORMATION REPORTED TO THE DESIGN ENGINEERS AND CONTAINS ONLY THE STANDARD AND CUSTOMARY LEVEL OF DETAIL. THE INFORMATION WAS NOT INDEPENDENTLY FIELD VERIFIED. THERE IS NO ONGOING PROGRAM TO UPDATE THE DRAWINGS TO REFLECT CHANGES SUBSEQUENT TO THE DATE INDICATED. THEREFORE, THIS DRAWING CANNOT BE RELIED UPON AS AN EXACT REPRESENTATION OF ACTUAL CONDITIONS.

SHEET 19
OF 62 SHEETS
DRAWING NO. U02-C-013



CURVE DATA				
CURVE	RADIUS	DELTA	LENGTH	TANGENT
38-39	1365.0	0°43'34"	17.30'	8.65



BROWN AND CALDWELL

REV. NO.	DATE	DRWN	CHKD	REMARKS
06/07	AG	DM		REVISED FOR RECORD
09/27	DS	DM		PLAN CLARIFICATION 9/27/05
09/03	JPC	GG		ADDENDUM NO.1

DESIGNED BY:	L. JONES
DRAWN BY:	T. BLALOCK
SHEET CHK'D BY:	D. MCCARTNEY
CROSS CHK'D BY:	
APPROVED BY:	
DATE:	OCT 2003

Camp Dresser & McKee Inc. In association with
Brown and Caldwell and Tetra Tech
18581 Teller Avenue, Suite 200
Irvine, California 92612
Tel: (949) 752-5452
Fax: (949) 752-1307

Groundwater Replenishment System
An Orange County Water District and Orange County Sanitation District Joint Project

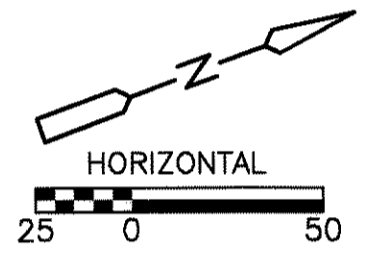
66 INCH GWR PIPELINE - UNIT II
PLAN AND PROFILE
FROM STA. 479+00 TO 491+00

SHEET 20 OF 62 SHEETS
DRAWING NO. U02-C-014

RECORD DRAWING
THIS RECORD DRAWING WAS PREPARED USING INFORMATION REPORTED TO THE DESIGN ENGINEERS AND CONTAINS ONLY THE STANDARD AND CUSTOMARY LEVEL OF DETAIL. THE INFORMATION WAS NOT INDEPENDENTLY FIELD VERIFIED. THERE IS NO ONGOING PROGRAM TO UPDATE THE DRAWINGS TO REFLECT CHANGES SUBSEQUENT TO THE DATE INDICATED. THEREFORE, THIS DRAWING CANNOT BE RELIED UPON AS AN EXACT REPRESENTATION OF ACTUAL CONDITIONS.

KEY NOTES:

- 1 CONSTRUCT 2-WIRE CORROSION TEST STATION PER DETAIL 3, U02-C-210
- 2 NOT USED
- 3 INSTALL 6 INCH AIR AND VACUUM VALVE PER DETAIL 2, U02-C-070
- 4 CONSTRUCT PULL BOX PER DETAIL 3, U02-C-130
- 5 NOT USED
- 6 WHERE EXISTING FENCING AND/OR GATES CONFLICT WITH LOCATION OF TUNNEL SHAFT EXCAVATIONS, CONTRACTOR SHALL REMOVE EXISTING FENCING AND/OR GATES, PROVIDE TEMPORARY SITE SECURITY FENCING, THEN RECONSTRUCT FENCING AND/OR GATES IN THE ORIGINAL LOCATION PER THE COUNTY OF ORANGE REQUIREMENTS.
- 20 CLSM BACKFILL IN PIPE ZONE.



BROWN AND
CALDWELL

REV. NO.	DATE	DRWN	CHKD	REMARKS
06/07	AG	DM		REVISED FOR RECORD
09/27	DS	DM		PLAN CLARIFICATION 9/27/05
09/15	DS	DM		PLAN CLARIFICATION 9/26/05
09/03	JPC	GG		ADDENDUM NO.1

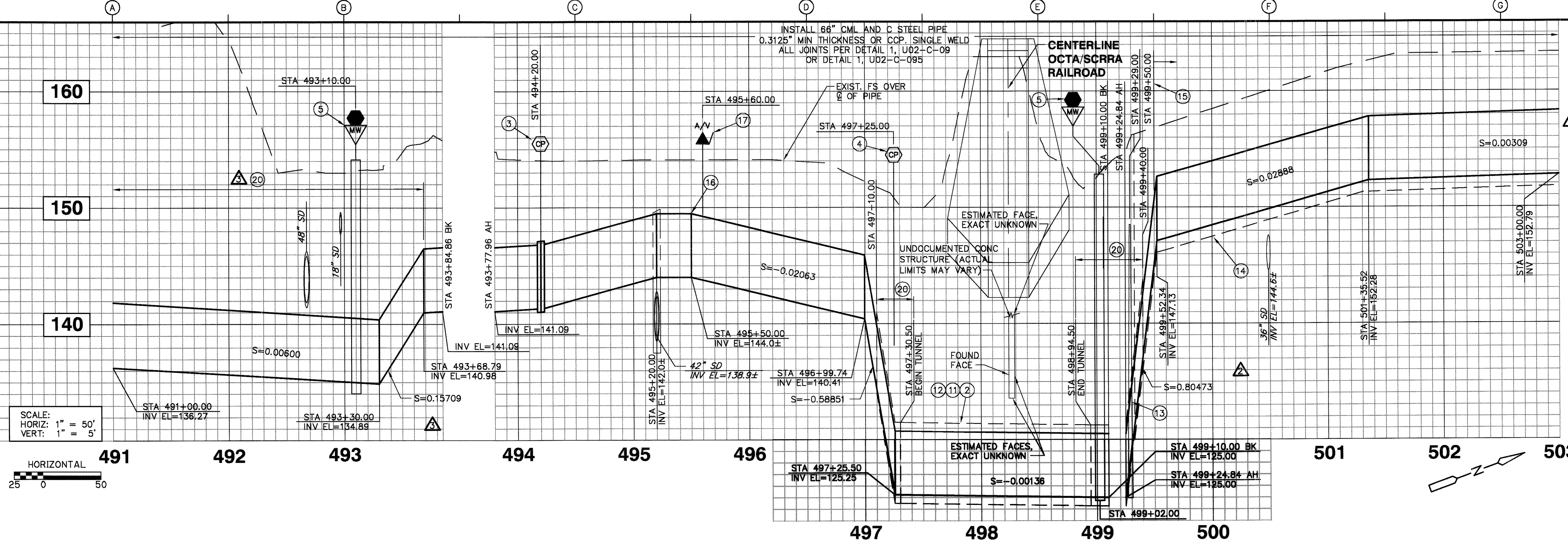
DESIGNED BY:	L. JONES
DRAWN BY:	T. BLALOCK
SHEET CHK'D BY:	D. MCCARTNEY
CROSS CHK'D BY:	
APPROVED BY:	
DATE:	OCT 2003

Camp Dresser & McKee Inc. *in association with*
Brown and Caldwell and Tetra Tech
18581 Teller Avenue, Suite 200
Irvine, California 92612
Tel: (949) 752-5452
Fax: (949) 752-1307

 **Groundwater
Replenishment System**
An Orange County Water District and Orange County Sanitation District Joint Project

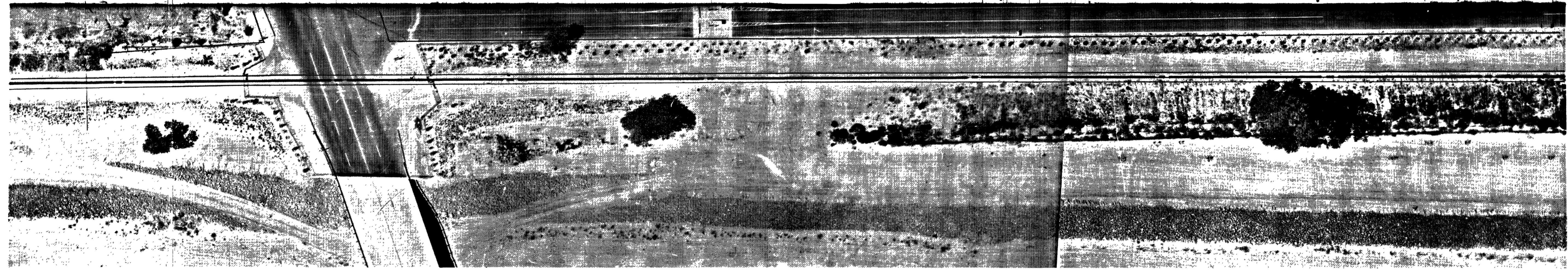
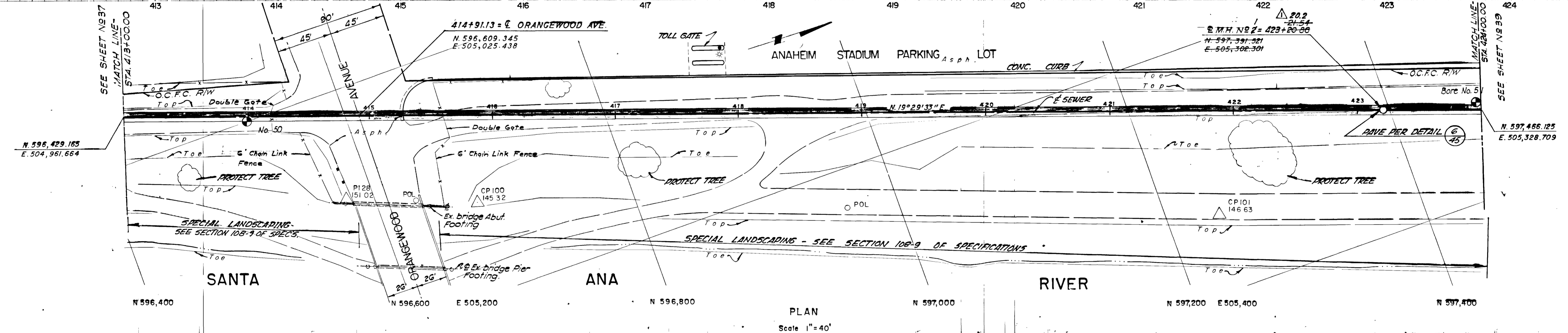
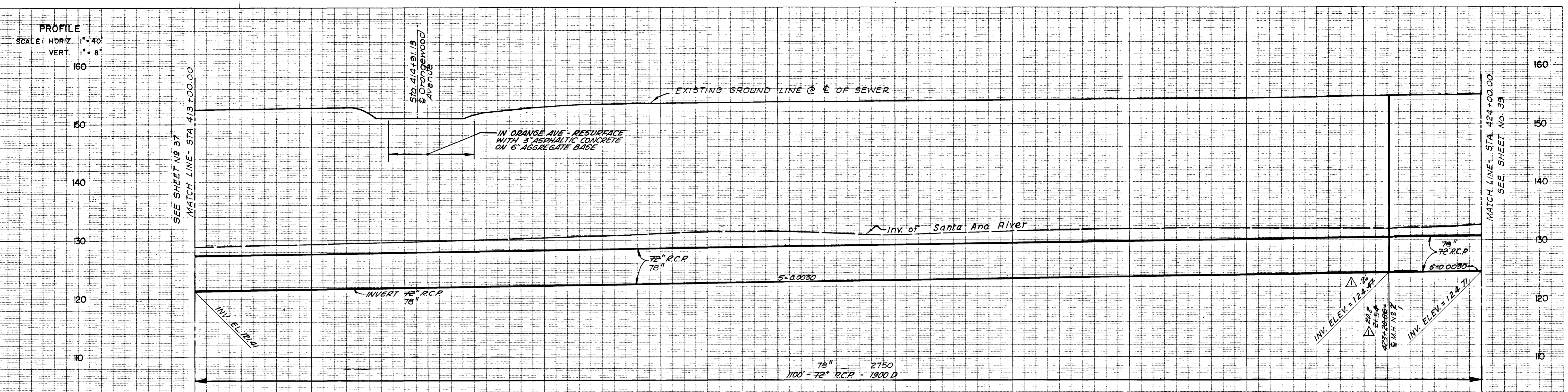
**66 INCH GWR PIPELINE - UNIT II
PLAN AND PROFILE
FROM STA. 491+00 TO 503+00**

SHEET
21
OF 62 SHEETS
DRAWING NO.
U02-C-015

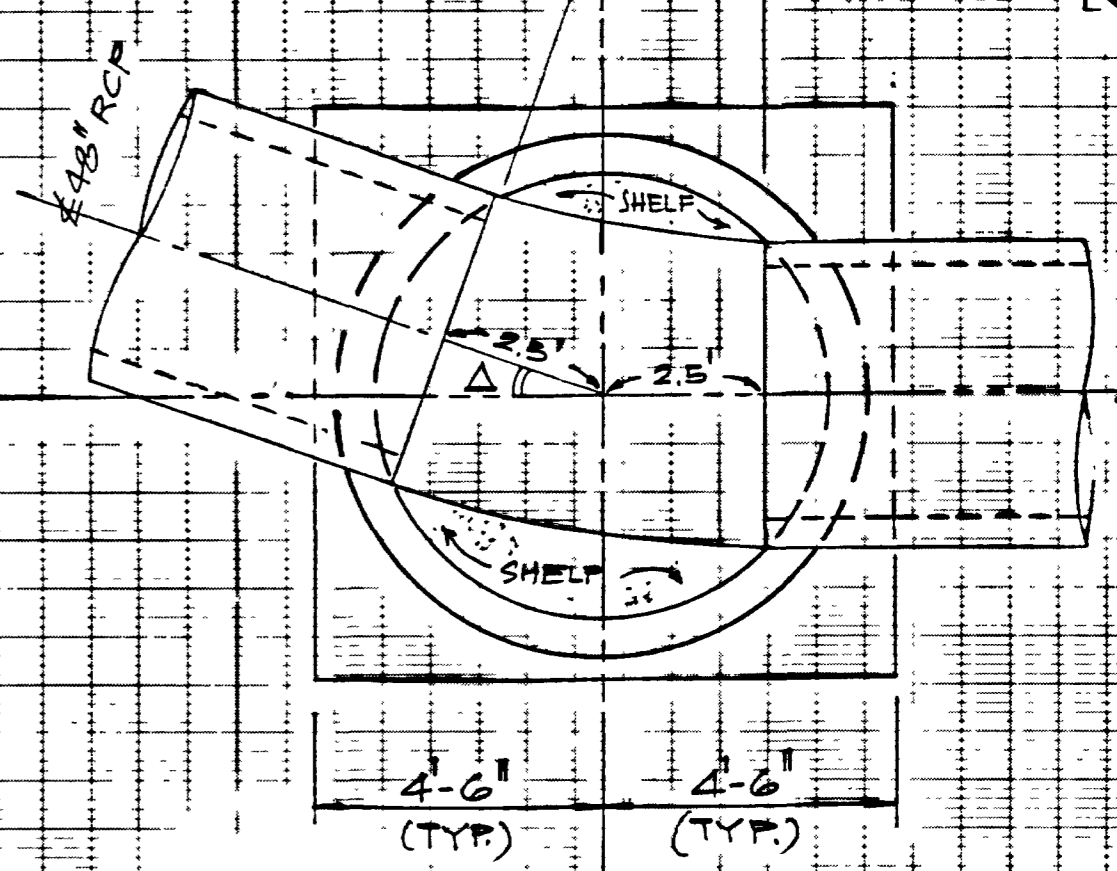
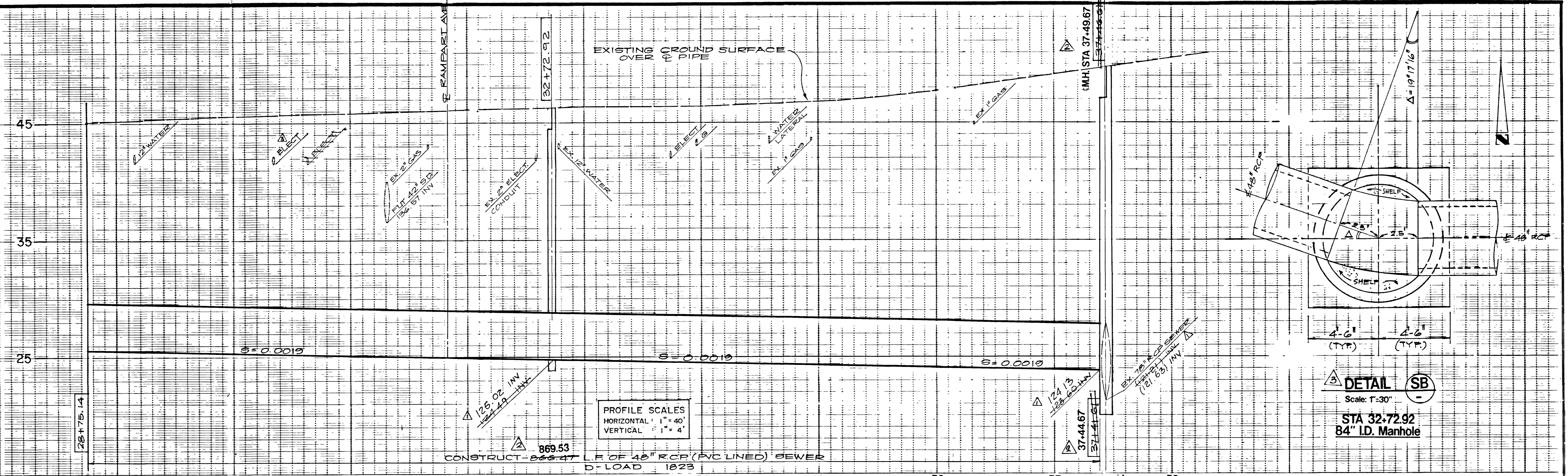


- KEY NOTES:**
- NOT USED
 - CONSTRUCT 164 LF 84 INCH TUNNEL PER SPECIFICATION SECTIONS 02340 AND 02345 AND PER DETAILS 3 OR 6 AS SHOWN ON SHEET U02-C-030
 - INSTALL 66 INCH FLANGED CONNECTION. CONSTRUCT 8-WIRE BURIED INSULATING FLANGE TEST STATION PER DETAIL 1, U02-C-210
 - CONSTRUCT 4-WIRE CASING TEST STATION PER DETAIL 3, U02-C-210
 - INSTALL BLOWOFF WITH ACCESS MANWAY PER DETAIL 1, U02-C-060 (MODIFIED)
 - EXISTING RETAINING WALL APPROXIMATELY 5 FEET TALL (PROTECT IN PLACE). APPROXIMATE BEGINNING STA 499+53, ENDING STA 508+00
 - EXISTING RETAINING WALL APPROXIMATELY 3 FEET TALL (PROTECT IN PLACE). APPROXIMATE BEGINNING STA 493+52, ENDING STA 494+05
 - EXISTING RETAINING WALL APPROXIMATELY 2 FEET TALL (PROTECT IN PLACE). APPROXIMATE BEGINNING STA 491+06, ENDING STA 493+46. OR REMOVE AND REPLACE IN KIND AS NECESSARY.
 - EXISTING RETAINING WALL APPROXIMATELY 5 FEET TALL (PROTECT IN PLACE). APPROXIMATE BEGINNING STA 495+96, ENDING STA 498+05
 - EXISTING RETAINING WALL APPROXIMATELY 5 FEET TALL (PROTECT IN PLACE). APPROXIMATE BEGINNING STA 498+52, ENDING STA 501+14
 - SEE U02-C-038 FOR TYPICAL SECTION.
 - CONTRACTOR SHALL NOTIFY ORANGE COUNTY TRANSPORTATION AUTHORITY (OCTA/SCRRRA) (2 WEEKS MINIMUM) PRIOR TO COMMENCING TUNNELING WORK
 - INSTALL ANTI-SEEP COLLAR PER DETAIL 2, U02-C-040
 - INSTALL LEAK DETECTION PIPING PER DETAIL 2, U02-C-040
 - VERTICAL TRENCH WITH SHORING IS REQUIRED BETWEEN STATIONS 499+50.00 AND 510+00.00 TO PROTECT EXISTING IMPROVEMENTS
 - INSTALL PIPE BRIDGE SUPPORT PER DETAILS, U02-C-110
 - INSTALL 6 INCH AIR RELEASE AND VACUUM VALVE PER DETAIL 2, U02-C-070
 - CONSTRUCT PULL BOX PER DETAIL 3, U02-C-130
 - WHERE EXISTING FENCING AND/OR GATES CONFLICT WITH LOCATION OF TUNNEL SHAFT EXCAVATIONS, CONTRACTOR SHALL REMOVE EXISTING FENCING AND/OR GATES, PROVIDE TEMPORARY SITE SECURITY FENCING, THEN RECONSTRUCT FENCING AND/OR GATES IN THE ORIGINAL LOCATION PER THE COUNTY OF ORANGE REQUIREMENTS.
 - CLSM BACKFILL IN PIPE ZONE.
 - 66" PIPE ABANDONED IN PLACE, FILL WITH SLURRY.

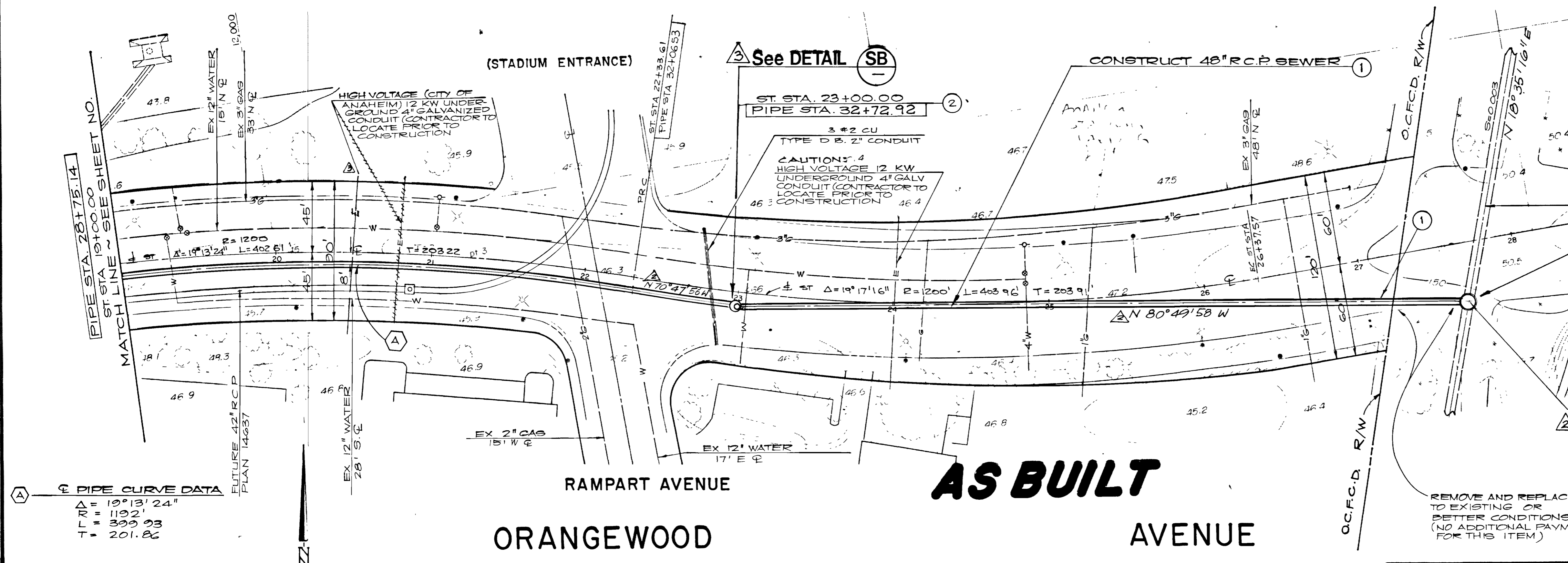
RECORD DRAWING
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REVISIONS		REFERENCES		BENCH MARK:		LOWRY & ASSOCIATES-CIVIL ENGINEERS 121 EAST WASHINGTON AVENUE SANTA ANA, CALIFORNIA 92701		COUNTY SANITATION DISTRICT NO. 2 OF ORANGE COUNTY, CALIFORNIA		CONTRACT NO. 2-14-1	
AS BUILT		11-11-74		ORANGE COUNTY SURVEYOR B.M. 231-C-69 R.C.E. 7872, S.W. Corner Orangewood Blvd. Elev. 151.446		DESIGNED BY JMK DRAWN BY D&W CHECKED BY SL HB		PLAN AND PROFILE SANTA ANA RIVER INTERCEPTOR SEWER STA. 413+00 TO STA. 424+00		Sheet No. 38 of 71 Sheets	



DETAIL SB
Scale: 1"=30"
STA 32+72.92
84" I.D. Manhole



CONSTRUCTION NOTES

1. CONSTRUCT 48-INCH RCP (PVC LINED) PER BEDDING DETAIL CS.DOC. STD. DWG. NO. S-21-1
2. CONSTRUCT 84-INCH MANHOLE PER CS.DOC. STD. DWG. NO. S-25-1 AND PER DETAIL SB
3. CONSTRUCT 120-INCH MANHOLE PER CS.DOC. STD. DWG. NO. S-25-1.

NOTE:
ANY DAMAGE TO BIKE TRAILS, FENCES AND GATES SHALL BE REPLACED TO EXISTING OR BETTER CONDITIONS PER O.C.F.C.D. STANDARDS (SEE PERMIT FOR SPECIAL PROVISIONS). NO ADDITIONAL PAYMENT FOR THIS ITEM.

NOTICE TO ALL CONTRACTORS
PROTECT ALL EXISTING UTILITIES THAT ARE PERPENDICULAR TO AND IN CLOSE PROXIMITY OF PROPOSED SEWER MAIN CONSTRUCTION PER CS.DOC. STANDARD DRAWING NO. S-37-1. EXISTING UTILITIES THAT ARE PARALLEL TO AND IN CLOSE PROXIMITY OF PROPOSED SEWER SHALL BE PROTECTED IN PLACE. CONTRACTOR SHALL SUBMIT TO ENGINEER THE PROPOSED METHOD OF SUPPORT.

UTILITIES CROSSING THE PROPOSED SEWER CONSTRUCTION SHALL BE LOCATED AND EXPOSED PRIOR TO EXCAVATION FOR SEWER

PIPE CURVE DATA
 $\Delta = 10^\circ 13' 24''$
 $TR = 119.2'$
 $TS = 399.93$
 $PT = 201.86$

HYDRAULIC DATA									
SHT. NO.	STA TO STA	10' PEAK (cfs)	20' PEAK (mgd)	d (ft)	D (ft)	D/D	Slope	n	V (fps)

SCALE: 1"=40'

AS BUILT
AVENUE

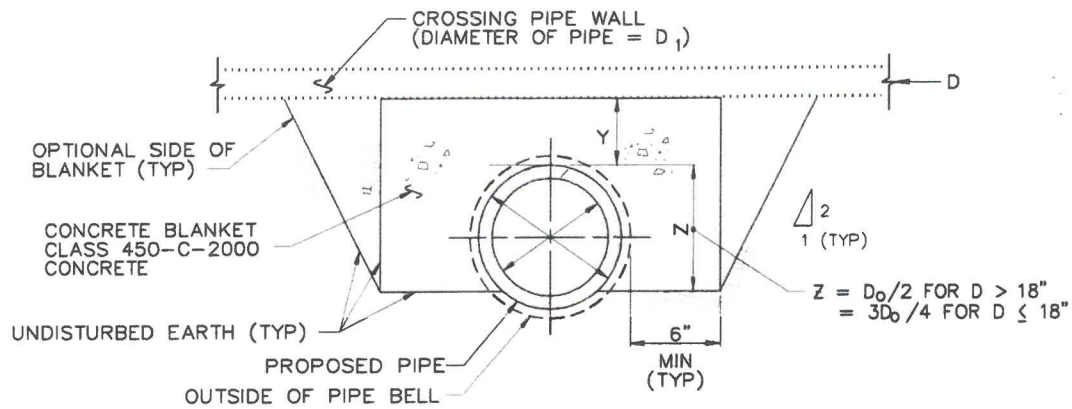
NO.	DESCRIPTION	APPROVED	DATE

CONTRACT NO. 2-29
COUNTY SANITATION DISTRICTS OF
ORANGE COUNTY, CALIFORNIA
DISTRICT NO. _____
CONSTRUCTION PLANS FOR
ORANGEWOOD DIVERSION SEWER
FROM STA. 28+75.14 TO STA. 37+46.67

WILLDAN ASSOCIATES
ENGINEERS • PLANNERS
290 S ANAHEIM BLVD. SUITE 100 ANAHEIM CA 92805
(714) 774-5740 (213) 924-1631

DESIGNED BY: *Paul S. Carter*
CHECKED BY: *Paul S. Carter*
DRAWN BY: *Paul S. Carter*
DATE: *5/3/92*

SHEET **5** OF 9 SHEETS



CONCRETE BLANKET (FOR EXISTING PIPES CROSSED UNDER BY A NEW PIPE)

NOTES:

1. CONCRETE BLANKET IS REQUIRED WHEN THE CLEARANCE BETWEEN THE TOP OF THE NEW PIPE AND THE BOTTOM OF THE CROSSING PIPE IS LESS THAN 18", $D \geq 6"$ AND $Y \leq 18"$.
2. THE ENTIRE TOP SURFACE OF THE BLANKET SHALL BE RAISED TO MAKE CONTACT WITH THE LOWER 90° OF THE CROSSING PIPE.
3. THE BLANKET SHALL EXTEND LONGITUDINALLY TO THE FIRST BELL AND SPIGOT JOINT BEYOND THE TRENCH EXCAVATION AT EACH END OF THE BLANKET, EXCEPT THAT THE BLANKET NEED NOT BE EXTENDED MORE THAN 4' BEYOND THE TRENCH.
4. WHENEVER A PIPE BELL IS ENCOUNTERED WITHIN THE LIMITS OF THE BLANKET, ALL DIMENSIONS SHALL REFER TO THE BELL.

BLANKET PROTECTION FOR PIPES



REVISIONS			
No.	DATE	No.	DATE

CITY ENGINEER

9/27/23
DATE

DIRECTOR OF PUBLIC WORKS

10/12/23
DATE

STANDARD DETAIL

225

SHEET 2 OF 2

DEPARTMENT OF PUBLIC WORKS

1- See ☐ ec ☐ to or ☐ dd ☐ tree
☐ protect ☐ re ☐ re ☐ et

3- No ☐ ☐ ☐ ☐ ☐ ☐ e ☐ r ☐ o ☐ r ☐ e ☐ d ☐ e ☐ c ☐e ☐t
☐ ☐ ☐ ☐ r ☐o ☐e ☐d ☐ r ☐o ☐r ☐t.

5- See the reference pages or the
 code to the Tree Protection
 rule.

dated 8th o.c.

—12" t c
er o c.

— M t e
r de f t e tree
; r o t e c t o e c e
e o t e r e
d c t e d o t e
e

1. **What is the purpose of the study?**
 2. **What are the research objectives?**
 3. **What is the research methodology?**
 4. **What are the results of the study?**
 5. **What are the conclusions of the study?**
 6. **What are the limitations of the study?**
 7. **What are the implications of the study?**
 8. **What are the future research directions?**
 9. **What are the acknowledgments?**
 10. **What are the references?**

4-0"

KEEP OUT
TREE
PROTECTION
AREA

SECTION VIEW



Public Works



PROJECT NAME

PROJECT DESCRIPTION/ LIMITS

SEASON YEAR - SEASON YEAR

Department
Logo

CITY OF ANAHEIM

Mayor Andy Anaheim

Council Member Andy Anaheim, District 4

Funding
Logo

Anaheim.net/ProjectFinder (714) 765-5079 or 311

NOTES:

1. SIGN DIMENSIONS SHALL BE HEIGHT OF 5' AND WIDTH OF 7'.
2. THE SIGN IS TO BE FABRICATED ON A MINIMUM $\frac{1}{8}$ " THICK CLEAR ANODIZED ALUMINUM OR AN ALTERNATE MATERIAL APPROVED BY THE ENGINEER.
3. THE SIGNS ARE TO BE NON-REFLECTING WITH A WHITE BACKGROUND AND BLACK LETTERING UNLESS OTHERWISE SHOWN.
4. THE CITY WILL PROVIDE THE CONTRACTOR THE ELECTRONIC FILE OF THE SIGN GRAPHIC TO ORDER THE SIGN.
5. THE SIGN IS TO BE SKID MOUNTED (PER CALTRANS RS1 & RS2) AND TO BE WEIGHED DOWN TO PREVENT TIPPING OVER AND MUST BE MOBILE.
6. THE BOTTOM ON THE SIGN MUST PROVIDE A MINIMUM VERTICAL HEIGHT CLEARANCE OF 7-FEET
7. SIGNS SHALL BE PLACED AT LEAST 7-DAYS BEFORE START OF CONSTRUCTION.
8. SIGNS SHALL BE PLACED 100-FEET IN ADVANCE OF BEGINNING OF WORK OR DIRECTED BY ENGINEER. TWO SIGNS ARE REQUIRED IF WORK INVOLVES BOTH SIDES OF THE STREET.
9. CONSTRUCTION INFORMATION SIGNS SHALL BE REQUIRED ON ALL PROJECTS EXCEPT PERMIT PROJECTS.
10. SEE PAGE #2 FOR STYLE GUIDE.

SEASON	MONTHS
WINTER	DECEMBER - FEBRUARY
SPRING	MARCH - MAY
SUMMER	JUNE - AUGUST
FALL	SEPTEMBER - NOVEMBER

CONSTRUCTION INFORMATION SIGN



REVISIONS			
No.	DATE	No.	DATE

CITY ENGINEER

9/28/2021
DATE

DIRECTOR OF PUBLIC WORKS

9/28/2021
DATE


STANDARD DETAIL

175


SHEET 1 OF 2

DEPARTMENT OF PUBLIC WORKS

PROJECT SIGN STYLE SHEET



Public Works



UNDERGROUND CONVERSION
DISTRICT NO. 65. Phase II
 Santa Ana Canyon Road
 from Lakeview Ave to Imperial Hwy
 SPRING 2021 - FALL 2022

Public Utilities

CITY OF ANAHEIM
 Mayor Andy Anaheim
 Council Member Andy Anaheim, District 6

Anaheim.net/ProjectFinder (714) 765-5079 or 311

Arial Black
 432 pt.
 88% condensed

Banners:
 Use provided
 high-res jpgs

Arial regular
 288 pt

Header:
 Arial Black
 240 pt.

 Text:
 Arial Narrow
 216 pt.

Department
 Logos

Arial
 192 pt.

Blue
 R: 1
 G: 32
 B: 95

First Line:
 Mayor Andy Anaheim

 Second Line:
 Council Member Andy Anaheim, District 1-6


DEPARTMENT LOGOS (TO BE ADDED ON LOWER LEFT CORNER)



CONSTRUCTION INFORMATION SIGN



REVISIONS			
No.	DATE	No.	DATE



 CITY ENGINEER

9/28/2021
 DATE



 DIRECTOR OF PUBLIC WORKS

9/28/2021
 DATE

STANDARD DETAIL
175
 SHEET 2 OF 2

DEPARTMENT OF PUBLIC WORKS