

CONTRACT DOCUMENTS  
FOR

# McKinleyville BMX and Park Project

**BID OPENING:**

May 6th, 2024 at 3:00pm

MCSO Office  
1656 Sutter Road  
McKinleyville, CA 95519

**NON-MANDATORY PRE-BID MEETING:**

April 10th, 2024

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**CONTRACT DOCUMENTS**  
**MARCH 2024**

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**ADVERTISEMENT FOR BIDS**

McKinleyville Community Services District  
Owner

P.O. Box 2037 1656 Sutter Road  
McKinleyville, CA 95519  
Address

Separate sealed bids will be received for the McKinleyville BMX Track & Park Project

A conditional or qualified bid will not be accepted if it modifies the Plans or Specifications or method of work.

A non-mandatory pre-bid meeting will be held to familiarize potential bidders with the project and is scheduled for 10:00 a.m., April 10th, 2024, at the McKinleyville Community Services District Office, 1656 Sutter Road, McKinleyville, California.

The work for this project generally includes, but is not limited to, miscellaneous demolition; clearing and grubbing, earthwork, water service distribution pipe, sewer connection to mainline, storm drain systems, placement and compaction of asphalt, traffic control, cleanup, coordination with BMX Track Builder for construction of BMX track and all appurtenances, purchase and installation of all park features including restroom, furniture, play equipment, fencing and gates, planting, irrigation and all other Work required to complete the modifications as shown in the Contract Drawings and described in the Specifications.

Bids will be received by the General Manager of the McKinleyville Community Services District at the District office, 1656 Sutter Road, McKinleyville, California, 95519 until May 6, 2024 @ 3:00pm and then at said office publicly opened and read aloud. If forwarded by mail, the sealed envelope containing the bid must be enclosed in another envelope labeled "Bid For: McKinleyville BMX Track & Park Project" addressed to the Owner at McKinleyville Community Services District, PO Box 2037, McKinleyville, CA 95519 and must be delivered to the District office by the above referenced time and date.

The Contract Documents are available and may be examined at the following locations:

MCSD web site: <http://mckinleyvillecsd.com/>  
Humboldt Builders Exchange, Eureka  
Shasta Builders Exchange, Redding  
Sacramento Builders Exchange, Sacramento  
North Coast Builders Exchange, Santa Rosa

Each proposal must be submitted on the prescribed form and accompanied by a certified check or Bid Bond in an amount of not less than 10 percent of the bid amount. Successful bidders will be required to furnish both a Payment Bond and Performance Bond in the full amount of the Contract Price upon receipt of the Notice of Award. In accordance with Public Contract Code Section 10263, the Contractor will be allowed to substitute securities for monies normally withheld by the Owner to insure performance under this contract.

California State prevailing wage rates will be required on this project. This project is subject to compliance monitoring and enforcement by the Department of Industrial Relations, State of California. The general prevailing wage rates applicable to the work are set by the Director of the Department of Industrial Relations.

The District requires that all contractors and subcontractors working on this project keep certified payroll records in accordance with Labor Code 1776 and submit copies to the District. All contractors and subcontractors must also furnish electronic certified payroll records directly to the Labor Commissioner (Division of Labor Standards Enforcement).

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It shall be mandatory upon the contractor herein and upon any subcontractors to pay not less than the said specified rates to all laborers, workers and mechanics employed by them in the execution of the Agreement pursuant to CA Labor Code 1774. The Contractor will be required to comply with any changes in these wage rates as they are updated by the State government at no cost to the Owner.

Attention is directed to the provisions in section 1777.5 and sections 1777.6 of the Labor Code concerning the requirement to employ apprentices by the contractor or any subcontractor under it.

Pursuant to Senate Bill 854, all contractors bidding on public works projects must register with the Department of Industrial Relations. Contractors are subject to a registration and annual renewal fee. No contractor or subcontractor may be listed on a bid proposal for a public works project (submitted on or after March 1, 2015) unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5 [with limited exceptions from this requirement for bid purposes only under Labor Code section 1771.1(a)]. Accordingly, all Prime and Subcontractors contained in a bid must provide valid Department of Industrial Relations registration number(s). Failure to provide valid DIR registration numbers in the bid documents shall disqualify the bid.

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President  
McKinleyville Community Services District

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Date



## INFORMATION FOR BIDDERS

Project: McKinleyville BMX Track and Park Project

Bids will be received by McKinleyville Community Services District (herein called the "Owner"), at 1656 Sutter Road, McKinleyville, CA 95519 until the time listed in the Advertisement for Bids, and then at said office publicly opened and read aloud.

Each bid must be submitted in a sealed envelope, addressed to McKinleyville Community Services District, 1656 Sutter Road, P.O. Box 2037, McKinleyville, CA 95519. Each sealed envelope containing a bid must be plainly marked on the outside as BID FOR: McKinleyville BMX Track and Park Project, and the envelope shall bear on the outside the name of the bidder, their address, Contractor's license number, and DIR registration number. If forwarded by mail, the sealed envelope containing the bid must be enclosed in another envelope addressed to the Owner at McKinleyville Community Services District, PO Box 2037, McKinleyville, CA 95519.

Bids received by the Owner after the time specified for bid opening will not be considered. The Bidder is solely responsible for timely delivery of their bid.

A non-mandatory, but highly recommended, pre-bid conference/site visit will be held to familiarize potential Bidders with the project. See the Advertisement for Bids for location, date, and time.

It is assumed that by submitting a bid, the Contractor is fully familiar with the existing site conditions and proposed work and change orders for changed site conditions will not be considered, unless mutually agreed upon by the Owner and Contractor.

All bids must be made on the required bid form. All blank spaces for bid prices must be filled in, in ink or type written, and the bid form must be fully completed and executed when submitted. Only one copy of the bid form is required.

The Owner may waive any informalities or minor defects or reject any and all bids. Any bid may be withdrawn prior to the above scheduled time for the opening of bids or authorized postponement thereof. Any bid received after the time and date specified shall not be considered. No Bidder may withdraw a bid within three (3) months after the actual date of the opening thereof. Should there be reasons why the Contract cannot be awarded within the specified period, the time may be extended by mutual agreement between the Owner and the Bidder.

Bidders must satisfy themselves of the accuracy of the estimated quantities in the bid schedule by examination of the site and a review of the Specifications including addenda. After bids have been submitted, the Bidder shall not assert that there was a misunderstanding concerning the quantities of Work or of the nature of the Work to be done.

The Contract Documents contain the provisions required for the design and construction of the project. Information obtained from an officer, agent, or employee of the Owner or any other person shall not affect the risks or obligations assumed by the Contractor or relieve the Contractor from fulfilling any of the conditions of the Contract.

Each bid must be accompanied by a bid bond payable to the Owner, for ten percent of the total amount of the bid. As soon as the bid prices and firm qualifications have been compared, the Owner will return the bonds of all except the three lowest responsible bidders. When the Agreement is executed, the bonds of the two remaining unsuccessful bidders will be returned. The bid bond of the successful Bidder(s) will be retained until the payment bond and performance bond have been executed and approved, after which it will be returned. A certified check may be used in lieu of a bid bond.

A performance bond and a payment bond, each in the amount of 100 percent of the contract price, with a

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corporate surety approved by the Owner, will be required for the faithful performance of the Contract.

Attorneys-in-fact who sign bid bonds or payment bonds and performance bonds must file with each bond a certified and effective dated copy of their power of attorney.

The party to whom the Contract is awarded will be required to execute the Agreement and obtain the performance bond, payment bond, and required insurance certificates within twenty-one (21) calendar days from the date when Notice of Award is delivered to the Bidder. The Notice of Award shall be accompanied by the necessary Agreement and bond forms. In case of failure of the Bidder to execute the Agreement, the Owner may consider the Bidder in default, in which case the bid bond accompanying the proposal shall become the property of the Owner.

The Owner, within twenty-one (21) calendar days of receipt of an acceptable performance bond, payment bond and Agreement signed by the party to whom the Agreement was awarded shall sign the Agreement and return to such party an executed duplicate of the Agreement. Should the Owner not execute the Agreement within such period, the Bidder may submit a written notice to withdraw the signed Agreement. Such notice of withdrawal shall be effective upon receipt of the notice by the Owner.

The Notice to Proceed shall be issued within twenty-one (21) calendar days of the execution of the Agreement by the Owner. Should there be reasons why the Notice to Proceed cannot be issued within such period, the time may be extended by mutual agreement between the Owner and Contractor.

If the Notice to Proceed has not been issued within the twenty-one (21) day period or within the period mutually agreed upon, the Contractor may terminate the Agreement without further liability on the part of either party.

The Owner may make such investigations as they deem necessary to determine the ability of the Bidder to perform the Work, and the Bidder shall furnish to the Owner all such information and data for this purpose as the Owner may request. The Owner reserves the right to reject any bid if the evidence submitted by, or investigation of, such Bidder fails to satisfy the Owner that such Bidder is properly qualified to carry out the obligations of the Agreement and to complete the Work contemplated therein.

A conditional or qualified bid will not be accepted if it modifies the Plans or Specifications or method of Work. The intent is to award the entire job (all Schedules thereunder) to such Contractor or Contractors that will result in the lowest overall total cost to the Owner.

Awards will be made to the lowest responsive, responsible, qualified Bidder(s). The lowest bid will be evaluated based on the total cost provided in the Base Bid Schedule.

All applicable laws, ordinances, rules, and regulations of all Federal, State and local authorities having jurisdiction over construction of the project shall apply to the Contract throughout.

The Bidder shall supply the names, addresses, and valid Department of Industrial Relations (DIR) registration numbers of major subcontractors, material suppliers (greater than 10% of total contract document) and/or fabricators with the bid.

The Contract Documents under which it is proposed to execute the Work consist of the Contract, Plans and Specifications and all material bound herewith as well as any addenda issued as part of the bid process and any change orders or field work directives issued as part of the Work. These Contract Documents are intended to be mutually cooperative and to provide all details reasonably required for the execution of the proposed Work. Any person contemplating the submission of a Bid shall have thoroughly examined all of the various parts of these Documents and should there be any doubt as to the meaning or intent of said Contract Documents, the Bidder shall request of the Owner, in writing at least ten (10) working days prior to bid opening, an interpretation thereof. Any interpretation or change in said Contract Documents will be made only in writing, in the form of addenda to the Documents and will be furnished to all Bidders receiving a set of the Documents, issued no later than 72 hours prior to bid opening, who shall

submit, or indicate receipt of all addenda with their proposals. The Owner will not be responsible for any other explanation or interpretations of said Documents.

Questions regarding the Plans and Specifications shall be submitted in writing to Owner: Pat Kaspari at pkaspari@mckinleyvillecsd.com, with a copy to Lesley Frisbee at lesley@mckinleyvillecsd.com. Replies to such inquiries will be in the form of addenda or clarifications that will be sent to all plan holders.

Copies of Contract Plans and Specifications may be obtained as specified in the Advertisement for Bids.

Portions of these Contract Documents may contain standard preprinted material. The Bidder's attention is called to the General Conditions of the Contract, which may modify and add to the preprinted material contained herein. Sentences in the Contract Documents which are phrased in mandatory language, but which include no explicit reference to the party who has responsibility for performing the mandated duty, shall be interpreted as imposing responsibility for performance of the duty described on the Contractor. For example, a directive that "the site shall be kept clean" would impose the duty of keeping the site clean on the Contractor.

Each proposal must be submitted on the prescribed form and be accompanied by a certified check or Bid Bond in an amount of not less than 10 percent of the amount bid. Successful bidders will be required to furnish both a Payment Bond and Performance Bond in the full amount of the Contract Price. In accordance with Public Contract Code Section 10263, the Contractor will be allowed to substitute securities for monies normally withheld by the owner to insure performance under this contract.

Where the Bid Proposal is to be submitted on a unit price basis, unit prices will be accepted on all items of Work set forth in the Bid, except those designated to be paid for as a lump sum. The estimate of quantities of Work to be done is tabulated in the Bid and, although stated with as much accuracy as possible, is approximate only and is assumed solely for the basis of calculation upon which the award of Contract shall be made. Payment to the Contractor will be made on the measurement of the Work actually performed by the Contractor as specified in the Contract Documents. The Owner reserves the right to increase or diminish the amount of any class of Work as may be deemed necessary.

When the Bid Proposal is to be submitted on a lump sum basis, a single lump sum price shall be submitted in the appropriate place. The total amount to be paid the Contractor shall be the amount of the lump sum in the Bid, as adjusted for additions or deletions resulting from changes in construction. After award of Contract, the Contractor may be required to break down the lump sum Bid into unit prices for the various portions to be completed.

All blank spaces in the Bid form must be filled in, in ink, in both words and figures where required. No changes shall be made in the phraseology of the forms. Written amounts shall govern in cases of discrepancy between the amounts stated in writing and the amounts stated in figures. In case of discrepancy between unit prices and totals, unit prices will prevail.

Any Bid Proposal shall be deemed informal which contains omissions, erasures, alterations, or additions of any kind, or prices uncalled for, or in which any of the prices are obviously unbalanced, or which in any manner shall fail to conform to the conditions of the published Advertisement for Bids and associated Contract Documents.

The Bidder shall sign the Bid Proposal in the blank space provided therefore. If Bidder is a corporation, the legal name of the corporation shall be set forth above, together with the signature of the officer or officers authorized to sign contracts on behalf of the corporation. Bid proposals signed by a non-corporate officer shall be invalid. If Bidder is a co-partnership, the true name of the firm shall be set forth above, together with the signature of the general partner or general partners authorized to sign contracts on behalf of the co-partnership. If signature is by an agent, other than an officer of a corporation or a member of a partnership, a Power of Attorney must be on file with the Owner prior to opening of Proposals or submitted with the Proposal, otherwise the Proposal will be regarded as not properly

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authorized.

State and local sales and use taxes, as required by the laws and statutes of the State and its political subdivisions, shall be paid by the Contractor. Prices quoted in the Proposal shall include sales tax unless provision is made in the Bid Proposal form to separately itemize the tax.

Any Bidder may modify their bid by telegraphic or written communication at any time prior to the scheduled closing time for receipt of bids, provided such communication is received by the Owner prior to the closing time. The telegraphic or written communication should not reveal the bid price but should state the addition or subtraction or other modification so that the final prices or terms will not be known by the Owner until the sealed bid is opened.

Each Bidder must inform themselves of the conditions relating to the execution of the Work, and it is assumed that Bidders will inspect the site, site access limitations, existing electrical and communications infrastructure and capacity, historical energy use and facility load requirements, and make themselves thoroughly familiar with all the Contract Documents. Failure to do so will not relieve the successful Bidder of the obligation to enter into a Contract and complete the contemplated Work in strict accordance with the Contract Documents. The Bidder's attention is called to the General Conditions of the Contract Documents with regard to the Bidder's obligation to verify for themselves and to their complete satisfaction all information concerning site and contract conditions, and Notice requirements.

No contractor or subcontractor may be listed on a bid proposal for a public works project (submitted on or after March 1, 2015) or be awarded a contract for public work on a public works project (awarded on or after April 1, 2015) unless registered with the State of California Department of Industrial Relations pursuant to Labor Code section 1725.5 [with limited exceptions from this requirement for bid purposes only under Labor Code section 1771.1(a)]. This project is subject to compliance monitoring and enforcement by the State of California Department of Industrial Relations. Accordingly, all Prime and Subcontractors contained in a bid must provide valid Department of Industrial Relations registration number(s). Failure to provide valid DIR registration numbers in the bid documents shall disqualify the bid.

The successful bidder and its Subcontractor(s) must possess the California contractor's license(s) in the classification(s) required by law to perform the Work.

Any bid protest must be in writing and received by the Owner, at 1656 Sutter Road, McKinleyville, CA 95519 before 5:00 p.m. no later than three working days following bid opening (the "Bid Protest Deadline") and must comply with the following requirements:

Only a bidder who has actually submitted a Bid Proposal is eligible to submit a bid protest against another bidder. Subcontractors are not eligible to submit bid protests. A bidder may not rely on the bid protest submitted by another bidder but must timely pursue its own protest. If required by Owner, the protesting bidder must submit a nonrefundable fee in the amount specified by Owner, based upon Owner's reasonable costs to administer the bid protest. Any such fee must be submitted to Owner no later than the Bid Protest Deadline, unless otherwise specified.

The bid protest must contain a complete statement of the basis for the protest and all supporting documentation. Material submitted after the Bid Protest Deadline will not be considered. The protest must refer to the specific portion or portions of the Contract Documents upon which the protest is based. The protest must include the name, address, email address, and telephone number of the person representing the protesting bidder.

A copy of the protest and all supporting documents must be concurrently transmitted by email, by or before the Bid Protest Deadline, to the protested bidder and any other bidder who has a reasonable prospect of receiving an award depending upon the outcome of the protest.

The protested bidder may submit a written response to the protest, provided the response is received by Owner before 5:00 p.m., within three working days after the Bid Protest Deadline or after actual

receipt of the bid protest, whichever is sooner (the "Response Deadline"). The response must include all supporting documentation. Material submitted after the Response Deadline will not be considered. The response must include the name, address, email address, and telephone number of the person representing the protested bidder.

A copy of the response and all supporting documents must be concurrently transmitted by fax or by email, by or before the Response Deadline, to the protesting bidder and any other bidder who has a reasonable prospect of receiving an award depending upon the outcome of the protest.

The procedure and time limits set forth in this section are mandatory and are the bidder's sole and exclusive remedy in the event of bid protest. A bidder's failure to comply with these procedures will constitute a waiver of any right to further pursue a bid protest, including filing a Government Code Claim or initiation of legal proceedings.

Owner reserves the right to award the Contract to the bidder it has determined to be the responsible qualified bidder submitting a proposal that demonstrates the best value based on the sole findings of the District, and to issue a notice to proceed with the Work notwithstanding any pending or continuing challenge to its determination.

California State prevailing wage rates will be required on this project. The general prevailing wage rates applicable to this work are set by the Director of the Department of Industrial Relations. The Contractor will be required to comply with any changes in these wage rates as they are updated by the State government at no cost to the Owner.

All contractors and subcontractors must furnish electronic certified payroll records directly to the Labor Commissioner (Division of Labor Standards Enforcement), electronic Certified Payroll Reporting (eCPR) at the DIR, and also directly submit certified payroll and supporting documents to the McKinleyville Community Services District. The contact information for the District is:

Address:	MCS Attn: Pat Kaspari PO Box 2037 McKinleyville, CA 95519
Business Phone:	(707) 839-3251
Email:	pkaspari@mckinleyvillecsd.com

During the performance of this contract, the contractor agrees as follows:

(a) The contractor will not discriminate against any employee or applicant for employment because of race, creed, color, or national origin. The contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, creed, color, or national origin. Such action shall include, but not be limited to the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the contracting officer setting forth the provisions of this nondiscrimination clause.

(b) The contractor will, in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive consideration for employment without regard to race, creed, color, or national origin.

(c) The contractor will send to each labor union or representative of workers with which he or she has a collective bargaining agreement or other contract or understanding, a notice, to be provided by the agency contracting officer, advising the labor union or workers' representative of the contractor's

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commitments under Section 202 of Executive Order No. 11246 of September 24, 1965, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

(d) The contractor will comply with all provisions of Executive Order No. 11246 of Sept. 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.

(e) The contractor will furnish all information and reports required by Executive Order No. 11246 of September 24, 1965, and by the rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his or her books, records, and accounts by the contracting agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

(f) In the event of the contractor's noncompliance with the nondiscrimination clauses of this contract or with any of such rules, regulations, or orders, this contract may be cancelled, terminated or suspended in whole or in part and the contractor may be declared ineligible for further Government contracts in accordance with procedures authorized in Executive Order No. 11246 of Sept 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order No. 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

(g) The contractor will include the provisions of Paragraphs (a) through (g) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to Section 204 of Executive Order No. 11246 of Sept. 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The contractor will take such action with respect to any subcontract or purchase order as the contracting agency may direct as a means of enforcing such provisions including sanctions for noncompliance: Provided, however, that in the event the contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the contracting agency, the contractor may request the United States to enter into such litigation to protect the interests of the United States.

Bidders shall inform themselves of, and the Bidder awarded a Contract shall comply with, Federal, State and local laws, statutes, and ordinances relative to the execution of the Work. This requirement includes but is not limited to applicable regulations concerning employment of labor, protection of public and employee safety and health, environmental protection, the protection of natural resources, fire protection, burning and non-burning requirements, permits, fees, and similar subjects.

**BIDDERS' CHECKLIST**

This checklist has been prepared and furnished to aid bidders in including all necessary supporting information with their bid. Bidders' submittals should include, but are not limited to the following:

<u>ITEM</u>	<u>PAGE</u>	<u>CHECKED</u>
1. Bid Proposal	1-9 through 1-14	_____
2. List of Subcontractors (Subcontractor Details)	1-15	_____
3. Bid Bond	1-16 through 1-17	_____
4. Authority to Sign Bid Proposal (if applicable)	(Attached to Bid Bond)	_____
5. Power of Attorney	(Attached to Bid Bond)	_____
6. Non-Collusion Affidavit	1-18	_____
7. Workers Compensation Certification	1-19	_____
8. Anti-Lobbying Certification	1-20	_____
9. Qualifications Statement that meets the requirements described in part <b>1.05 F</b> of <b>Section 03300 of the Special Provisions</b>	(Attached to Bid)	_____

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**BID PROPOSAL**

Proposal of \_\_\_\_\_  
(hereinafter called "Bidder"), organized and existing under the laws of the State of California,  
doing business as \_\_\_\_\_\*.

To the McKinleyville Community Services District, (hereinafter called "Owner").

In compliance with your Advertisement for Bids, Bidder hereby proposes to perform all Work for the McKinleyville BMX Track and Park Project in strict accordance with the Contract Documents, within the time set forth therein, and at the prices stated below.

In the event of a difference between a price quoted in words and a price quoted in figures for the same quotation, the words shall be the amount bid. In the event that the product of a unit price and an estimated quantity does not equal the extended amount quoted, the unit price shall govern and the corrected product of the unit price and the estimated quantity shall be deemed to be the amount bid. If the sum of two or more items in a bidding schedule does not equal the total amounts quoted, the individual items amounts shall govern and the corrected total shall be deemed to be the amount bid.

By submission of this bid, each Bidder certifies, and in the case of a joint bid, each party certifies as to its own organization, that the bid has been arrived at independently, without consultation, communication, or agreement as to any matter relating to this bid with any other Bidder or with any competitor.

Bidder hereby agrees to commence Work under this Contract on or before a date to be specified in the Notice to Proceed and to fully complete the project and pay the liquidated damages as provided in Articles III and IV of the General Conditions.

\*Insert "a corporation," "a partnership," or "an individual" as applicable.

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Bidder agrees to perform all the Work described in the Contract Documents for the following prices. Bidder is advised to carefully review all sections of the Contract Documents to completely understand the Work and all constraints, including the schedule and material requirements.

The work for this project generally includes, but is not limited to, miscellaneous demolition; clearing and grubbing, earthwork, water service distribution pipe, sewer connection to mainline, storm drain systems, placement and compaction of asphalt, traffic control, cleanup, coordination with BMX Track Builder for construction of BMX track and all appurtenances, purchase and installation of all park features including furniture, play equipment, fencing and gates, planting, irrigation and all other Work required to complete the modifications as shown in the Contract Documents.

The following tables have been provided for the Bidder's convenience to assist Bidder in quantifying the major components of the Work and shall in no way be interpreted to be comprehensive. The bid shall be comprehensive and shall include all work associated with the project, including all necessary labor, materials, equipment, supervision, sales tax, and all other applicable taxes and fees.

**Bid Schedule**

This Bid Schedule must be completed in ink and included with the sealed Bid Proposal. Pricing must be provided for each Bid Item as indicated. Items marked "(SW)" are Specialty Work that must be performed by a qualified Subcontractor. The lump sum or unit cost for each item must be inclusive of all costs, whether direct or indirect, including profit and overhead. The sum of all amounts entered in the "Extended Total Amount" column must be identical to the Base Bid price entered in Section 1 of the Bid Proposal form.

AL = Allowance      CF = Cubic Feet      CY = Cubic Yard      EA = Each      LB = Pounds  
 LF = Linear Foot      LS = Lump Sum      SF = Square Feet      TON = Ton (2000 lbs)

<b>BID ITEM NO.</b>	<b>ITEM DESCRIPTION</b>	<b>EST. QTY.</b>	<b>UNIT</b>	<b>UNIT COST</b>	<b>EXTENDED TOTAL AMOUNT</b>
1	Mobilization	1	LS	\$	\$
2	Erosion Control	1	LS	\$	\$
3	Clearing and Grubbing	1	LS	\$	\$
4	Demolition	1	LS	\$	\$
5	Earthwork	3,575	CY	\$	\$
6	Export Soil (Allowance)	193	CY	\$	\$
7	Bio-Retention Areas	1425	SF	\$	\$
8	Self-Retaining Areas	966	SF	\$	\$
9	Sanitary Sewer Service	1	LS	\$	\$
10	Water Utility Distribution Piping and Connection	1	LS	\$	\$
11	6" Storm Drain	974	LF	\$	\$
12	8" Storm Drain	483	LF	\$	\$

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<b>BID ITEM NO.</b>	<b>ITEM DESCRIPTION</b>	<b>EST. QTY.</b>	<b>UNIT</b>	<b>UNIT COST</b>	<b>EXTENDED TOTAL AMOUNT</b>
13	Channel Drain	88	LF	\$	\$
14	Storm Drainage Inlets	28	EA	\$	\$
15	Class II Aggregate Base	888	TN	\$	\$
16	Pavement Marking & Signs	1	LS	\$	\$
17	Gate – Steel Parking Barrier (Double Swing)	2	EA	\$	\$
18	Concrete Driveway Aprons	1055	SF	\$	\$
19	Concrete Sidewalk	210	SF	\$	\$
20	Concrete Curb and Gutter	392	LF	\$	\$
21	Pedestrian Ramp	1775	SF	\$	\$
22	Asphalt Paving – Park	235	TON	\$	\$
23	Electrical System	1	LS	\$	\$
24	Lighting	1	LS	\$	\$
25	BMX Track (SW)	1	LS	\$	\$
26	Fence – 4’ H – Chain Link, Galvanized	927	LF	\$	\$
27	Gate – 14’W Rolling, 4’ H – Chain Link, Galvanized	2	EA	\$	\$
28	Fence – 6’ H – Chain Link, Galvanized	180	LF	\$	\$
29	Gate – 6’ H – Chain Link, Galvanized	2	EA	\$	\$
30	Fence – Wood (3 Rails)	400	LF	\$	\$
31	Decomposed Granite	3,290	SF	\$	\$
32	Filter Fabric	3,290	SF	\$	\$
33	Bike Rack	1	EA	\$	\$
34	Concrete Picnic Tables	2	EA	\$	\$
35	Trash/Recycle Receptacle	6	EA	\$	\$
36	Fall Material – Pour-In-Place Rubber	1,019	SF	\$	\$
37	Fall Material – Engineered Wood Fiber	79	CY	\$	\$
38	Pressure Treated Lumber Edge	145	LF	\$	\$

**McKinleyville Community Services District**  
 McKinleyville BMX Track and Park Project

<b>BID ITEM NO.</b>	<b>ITEM DESCRIPTION</b>	<b>EST. QTY.</b>	<b>UNIT</b>	<b>UNIT COST</b>	<b>EXTENDED TOTAL AMOUNT</b>
39	Berliner Combination Play Equipment	1	LS	\$	\$
40	Pickleball Nets & Posts	1	EA	\$	\$
41	Court Painting & Striping	1	LS	\$	\$
42	Concrete Benches	1	EA	\$	\$
43	Basketball Hoop – Post, Backboard, Rim, Net	1	LS	\$	\$
44	Drinking Fountain	1	EA	\$	\$
45	Restroom Pad	1	LS	\$	\$
46	Landscape Planting	1	LS	\$	\$
47	Turf Sod (No Mow)	205	SF	\$	\$
48	Irrigation Point of Connection (Back Flow, Master Valve, Flow Sensor)	1	LS	\$	\$
49	Irrigation Controller and Accessories	1	LS	\$	\$
50	Irrigation	1	LS	\$	\$

TOTAL BASE BID: Items 1 through 50 inclusive: \$\_\_\_\_\_

**Additive Alternative Bid Schedule**

A1	Asphalt Paving – Parking Lot	1	TN	\$	\$
A2	Pavement Marking and Signs	1	LS	\$	\$
A3	Restroom	1	LS	\$	\$
A4	Import Fill	1	TN	\$	\$
A5	Concrete Benches	1	EA	\$	\$
A6	Berliner Terranova.179	1	EA	\$	\$
A7	LSI Sensory Play Wall	1	EA	\$	\$
A8	LSI Cozy Dome	1	EA	\$	\$
A9	LSI Cycler	1	EA	\$	\$
A10	Interpretive Panel	1	EA	\$	\$

TOTAL ADDITIVE BID: Items A1 through A10 inclusive: \$\_\_\_\_\_

**TOTAL BID:**                      **Items 1 through A10 inclusive: \$**\_\_\_\_\_

*Note: The amount entered as the "Total Bid" should be identical to the Base Bid amount entered in Section 1 of the Bid Proposal form.*

**BIDDER NAME:** \_\_\_\_\_

END OF BID SCHEDULE

The low bidder shall be determined based on the Total of Base Bid.

Receipt of the following Addenda is acknowledged:

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---

---

**McKinleyville Community Services District**  
McKinleyville BMX Track and Park Project

The representations made herein are made under penalty of perjury.

Respectfully submitted:

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Title

\_\_\_\_\_  
License Number

\_\_\_\_\_  
Date

\_\_\_\_\_  
License Expiration Date

\_\_\_\_\_  
DIR Registration Number

(SEAL - If Bid is by Corporation)



**BID BOND**

KNOW ALL PERSONS BY THESE PRESENTS, that we, the undersigned,

\_\_\_\_\_ as Principal, and

\_\_\_\_\_, as Surety, are hereby held and firmly bound unto

McKinleyville Community Services District \_\_\_\_\_, as  
Owner, in the penal sum of \_\_\_\_\_ for the payment of which, well and truly to  
be made, we hereby jointly and severally bind ourselves, successors and assigns.

Signed this \_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

The Condition of the above obligation is such that whereas the Principal has submitted to  
\_\_\_\_\_ a certain bid, attached hereto and hereby made a part hereof to enter into  
a contract in writing, for the:

\_\_\_\_\_ McKinleyville BMX Track and Park Project \_\_\_\_\_

NOW, THEREFORE,

- (a) If said bid shall be rejected, or
- (b) If said bid shall be accepted and the Principal shall execute and deliver a contract in the Form of Contract attached hereto (properly completed in accordance with said Bid), and shall furnish a bond for the faithful performance of said contract, and for the payment of all persons performing labor or furnishing materials in connection therewith, and shall in all other respects perform the agreement created by the acceptance of said bid, then this obligation shall be void, otherwise the same shall remain in force and effect; it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall, in no event, exceed the penal amount of this obligation as herein stated.

The Surety, for value received, hereby stipulates and agrees that the obligations of said Surety and its bond shall be in no way impaired or affected by any extension of the time within which the Owner may accept such bid; and said Surety does hereby waive notice of any such extension.



IN WITNESS WHEREOF, the Principal and Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year first set forth above.

SEAL:

\_\_\_\_\_  
Principal

By: \_\_\_\_\_

Title: \_\_\_\_\_

\_\_\_\_\_  
Surety

By: \_\_\_\_\_

Title

IMPORTANT - Surety companies executing bonds must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the state where the project is located.

NOTE: Bidder shall provide current "Power of Attorney" for Attorney-in-fact who signs Bid Bond.

**NONCOLLUSION AFFIDAVIT**

TO BE EXECUTED BY BIDDER AND SUBMITTED WITH BID

The undersigned declares:

I am the \_\_\_\_\_ of \_\_\_\_\_, the party making the foregoing bid.

The bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation. The bid is genuine and not collusive or sham. The bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid. The bidder has not directly or indirectly colluded, conspired, connived, or agreed with any bidder or anyone else to put in a sham bid, or to refrain from bidding. The bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the bid price of the bidder or any other bidder, or to fix any overhead, profit, or cost element of the bid price, or of that of any other bidder. All statements contained in the bid are true. The bidder has not, directly or indirectly, submitted his or her bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, to any corporation, partnership, company, association, organization, bid depository, or to any member or agent thereof, to effectuate a collusive or sham bid, and has not paid and will not pay, any person or entity for such purpose.

This declaration is intended to comply with California Public Contract Code Section 7106 and Title 23 U.S.C Section 112.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct and that this declaration is executed on \_\_\_\_\_ [date], at \_\_\_\_\_ [city], \_\_\_\_\_ [state].

s/ \_\_\_\_\_

\_\_\_\_\_  
Name and Title [print]

**CONTRACTOR'S CERTIFICATION REGARDING WORKERS'  
COMPENSATION INSURANCE**

**State of California**

County of \_\_\_\_\_

I am aware of the provisions of Section 3700 of the Labor Code which require every employer to be insured against liability for workers' compensation or to undertake self-insurance in accordance with the provisions of that code, and I will comply with such provisions before commencing the performance of the work of this Contract.

\_\_\_\_\_  
(Name of Contractor)

by: \_\_\_\_\_

\_\_\_\_\_  
(Signature of Contractor)

Date: \_\_\_\_\_

### **ANTI-LOBBYING CERTIFICATION**

The contractor certifies, by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:

1. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.
2. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure of Lobbying Activities," in conformance with its instructions.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by Section 1352, Title 31, U.S. Code.

The contractor also agrees by submitting his or her bid or proposal that he or she shall require that the language of this certification be included in all lower tier subcontracts that exceed \$100,000 and that all such subrecipients shall certify and disclose accordingly.

Notes: Providing false information may result in criminal prosecution or administrative sanctions. The above certification is part of the Bid. Signing this Bid on the signature portion thereof shall also constitute signature of this Certification.

**CONTRACT AGREEMENT**

THIS AGREEMENT, MADE THIS \_\_\_\_\_ DAY OF \_\_\_\_\_, 20\_\_\_\_, by and  
between the McKinleyville Community Services District, hereinafter called "Owner," and

\_\_\_\_\_ ,  
doing business as \_\_\_\_\_, hereinafter called "Contractor"  
(insert "a corporation," "a partnership," or "an individual" as applicable).

WITNESSETH: That for and in consideration of the payments and agreements hereinafter mentioned:

1. The Contractor will commence and complete the:  
McKinleyville BMX Track and Park Project
2. The Contractor will furnish all the materials, supplies, tools, equipment, labor and other services necessary for the construction and completion of the project described herein.
3. The Contractor will commence the Work required by the Contract Documents within \_\_\_\_\_  
21 calendar days after the date of the Notice to Proceed and will complete the same within the time provided in Section B-35 of the General Conditions, unless the period for completion is extended otherwise by the Contract Documents.
4. The Contractor agrees to perform all of the Work described in the Contract Documents and comply with terms therein for the sum of \$\_\_\_\_\_, or as shown in the Bid Proposal.
5. The Contract Documents consist of the Bid Requirements, Contract Forms, General Conditions, the Specifications, and the Plans, including all modifications thereof incorporated into the documents before their execution, and including all other requirements incorporated by specific reference thereto. These form the Contract.
6. The Owner will pay to the Contractor in the manner and at such times as set forth in the General Conditions such amounts as required by the Contract Documents.
7. This Agreement shall be binding upon all parties hereto and their respective heirs, executors, administrators, successors, and assigns.

IN WITNESS WHEREOF, the parties hereto have executed, or caused to be executed by their duly authorized officials, this Agreement in quadruplicate, each of which shall be deemed an original on the date first above written.

\_\_\_\_\_  
Owner  
  
Title \_\_\_\_\_  
  
Date \_\_\_\_\_

\_\_\_\_\_  
Contractor  
  
Title \_\_\_\_\_  
  
Date \_\_\_\_\_

*This page left blank intentionally.*

**PERFORMANCE BOND**

KNOW ALL PERSONS BY THESE PRESENTS: that

\_\_\_\_\_  
(Name of Contractor)

\_\_\_\_\_  
(Address of Contractor)

a \_\_\_\_\_, hereinafter  
(Corporation, Partnership, or Individual)

called Principal, and \_\_\_\_\_  
(Name of Surety)

\_\_\_\_\_  
(Address of Surety)

hereinafter called Surety, are held and firmly bound unto

\_\_\_\_\_  
McKinleyville Community Services District  
(Name of Owner)

\_\_\_\_\_  
P.O. Box 2037, 1656 Sutter Road, McKinleyville, CA 95519  
(Address of Owner)

hereinafter called Owner, in the penal sum of

\_\_\_\_\_ Dollars  
(\$ \_\_\_\_\_)

in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, successors, and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas, the Principal entered into a certain Contract with the Owner, dated \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, a copy of which is hereto attached and made a part hereof for the construction of:

\_\_\_\_\_  
McKinleyville BMX Track and Park Project

NOW, THEREFORE, If the Principal shall well, truly and faithfully perform its duties, all the undertaking, covenants, terms, conditions, and agreements of said Contract during the original term thereof, and any extensions thereof which may be granted by the Owner, with or without notice to the Surety and during one year (minimum) guaranty period, and if he shall satisfy all claims and demands incurred under such Contract, and shall fully indemnify and save harmless the Owner from all costs and damages which it may suffer by reason of failure to do so, and shall reimburse and repay the Owner all outlay and expense which the Owner may incur in making good any default, then this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the said Surety for value received 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 of 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, alteration or addition to the terms of the Contract or to the Work or to the Specifications.

PROVIDED, FURTHER, that no final settlement between the Owner and the Contractor shall abridge the

**McKinleyville Community Services District**  
McKinleyville BMX Track and Park Project

right of any beneficiary hereunder, whose claim may be unsatisfied.

IN WITNESS WHEREOF, this instrument is executed in 4 counterparts, each one of which shall be deemed an original, this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

ATTEST:

\_\_\_\_\_  
(Principal) Secretary

\_\_\_\_\_  
Principal

By \_\_\_\_\_

\_\_\_\_\_  
Address

\_\_\_\_\_  
Witness as to Principal

\_\_\_\_\_  
Address

\_\_\_\_\_  
Surety

ATTEST:

\_\_\_\_\_  
Witness as to Surety

By \_\_\_\_\_  
Attorney-in-Fact

\_\_\_\_\_  
Address

\_\_\_\_\_  
Address

NOTE: Date of Bond must not be prior to date of Contract. If Contractor is Partnership, all partners should execute Bond.

IMPORTANT: Surety companies executing Bonds must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the State where the project is located.



**PAYMENT BOND**

KNOW ALL PERSONS BY THESE PRESENTS: that

\_\_\_\_\_  
(Name of Contractor)

\_\_\_\_\_  
(Address of Contractor)

a \_\_\_\_\_, hereinafter  
(Corporation, Partnership, or Individual)

called Principal, and \_\_\_\_\_  
(Name of Surety)

\_\_\_\_\_  
(Address of Surety)

hereinafter called Surety, are held and firmly bound unto

\_\_\_\_\_  
McKinleyville Community Services District  
(Name of Owner)

\_\_\_\_\_  
1656 Sutter Road, McKinleyville, CA 95519  
(Address of Owner)

hereinafter called Owner, in the penal sum of

\_\_\_\_\_ Dollars  
(\$ \_\_\_\_\_)

in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, successors, and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas, the Principal entered into a certain Contract with the Owner, dated \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, a copy of which is hereto attached and made a part hereof for the construction of:

\_\_\_\_\_  
McKinleyville BMX Track and Park Project

NOW, THEREFORE, if the Principal shall promptly make payment to all persons, firms, Subcontractors, and corporations furnishing materials for or performing labor in the prosecution of the Work provided for in such Contract, and any authorized extension or modification thereof, including all amounts due for materials, lubricants, oil, gasoline, coal and coke, repairs on machinery, equipment and tools, consumed or used in connection with the construction of such Work, and all insurance premiums of said Work, and for all wages and fringe benefits of labor, performed in such Work, whether by Subcontractor or otherwise, then this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the said Surety for value received hereby stipulated 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 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, alteration or addition to the terms of the Contract or to the Work or to the Specifications.

PROVIDED, FURTHER, that no final settlement between the Owner and the Contractor shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

**McKinleyville Community Services District**  
McKinleyville BMX Track and Park Project

IN WITNESS WHEREOF, this instrument is executed in  4  counterparts, each one of which shall be deemed an original, this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_.

ATTEST:

\_\_\_\_\_  
(Principal) Secretary

\_\_\_\_\_  
Principal

By \_\_\_\_\_

\_\_\_\_\_  
Address

\_\_\_\_\_  
Witness as to Principal

\_\_\_\_\_  
Address

\_\_\_\_\_  
Surety

ATTEST:

\_\_\_\_\_  
Witness as to Surety

By \_\_\_\_\_  
Attorney-in-Fact

\_\_\_\_\_  
Address

\_\_\_\_\_  
Address

NOTE: Date of bond must not be prior to date of Contract. If Contractor is Partnership, all partners should execute bond.

IMPORTANT: Surety companies executing bonds must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the State where the project is located.

**NOTICE OF AWARD**

TO: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

PROJECT: McKinleyville BMX Track and Park Project

The Owner has considered the bid submitted by you for the above-described work in response to its Advertisement for bids dated \_\_\_\_\_ and Information for Bidders.

You are hereby notified that your bid has been accepted for items in the amount of

\_\_\_\_\_ Dollars  
(\$ \_\_\_\_\_)

You are required by the Information for bidders to execute the Agreement and furnish the required Contractor's certificates of insurance within twenty-one (21) calendar days from the date this Notice is received by you.

If you fail to execute said Agreement and to furnish said insurance within twenty-one (21) calendar days from the date of receipt of this Notice, said Owner will be entitled to consider all your rights arising out of the Owner's acceptance of your bid as abandoned and as a forfeiture of your bid bond. The Owner will be entitled to such other rights as may be granted by law.

You are required to return an acknowledged copy of this Notice of Award to the Owner.

Dated this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

Owner: McKinleyville Community Services District

By: \_\_\_\_\_ Title: General Manager

**ACCEPTANCE OF NOTICE**

Receipt of the above Notice of Award is hereby acknowledged by:

\_\_\_\_\_  
(Name of Contractor)

Dated this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

By: \_\_\_\_\_ Title: \_\_\_\_\_

**NOTICE TO PROCEED**

TO: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

PROJECT: McKinleyville BMX Track and Park Project

You are hereby notified to commence Work in accordance with the Agreement on or before the \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, and you are to complete the Work within the time provided in Section B-35 of the General Conditions.

The date of completion of all Work is therefore \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

You are required to return an acknowledged copy of this Notice to Proceed to the Owner.

Dated this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

Owner: McKinleyville Community Services District

By: \_\_\_\_\_ Title: General Manager

---

**ACCEPTANCE OF NOTICE**

Receipt of the above Notice to Proceed is hereby acknowledged by:

\_\_\_\_\_  
(Name of Contractor)

Dated this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

By: \_\_\_\_\_ Title: \_\_\_\_\_

**GENERAL CONDITIONS  
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**SECTION A  
DEFINITIONS AND TERMS**

A-1 General

Wherever the following abbreviations and terms, or pronouns in place of them, are used in these Conditions and other Contract Documents of which these Conditions are a part, the intent and meaning shall be interpreted as provided below.

A-2 Abbreviations

The following abbreviations may be used in the Contract Documents:

AA	Aluminum Association
AASHO	American Association of State Highway Officials
ABMA	American Boiler Manufacturer's Association
ACI	The American Concrete Institute
AGA	American Gas Association
AGC	Associated General Contractors
AGMA	American Gear Manufacturer's Association
AI	The Asphalt Institute
AIA	American Institute of Engineers
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
ALSC	American Lumber Standards Committee
ANSI	American National Standards Institute, Inc.
API	American Petroleum Institute
APWA	American Public Works Association
AREA	American Railway Engineering Association
ASCE	American Society of Civil Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWPA	American Wood Preservers' Association
AWS	American Welding Society
AWWA	American Water Works Association
BHMA	Builders Hardware Manufacturers Association
CCMTC	California Concrete Masonry Technical Committee
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CRSI	Concrete Reinforcement Steel Institute
CWSRF	Clean Water State Revolving Fund
DFPA	Douglas Fir Plywood Association
DIR	Department of Industrial Relations
ETL	Electrical Testing Laboratory
FEMA	Federal Emergency Management Agency
FS	Federal Specification
HMGP	Hazard Mitigation Grant Program
ICBO	International Conference of Building Officials
IEEE	The Institute of Electrical and Electronics Engineers
IES	Illuminating Engineering Society
IPCEA	Insulated Power Cable Engineers Association
MCSD	McKinleyville Community Services District
MBMA	Metal Building Manufacturer's Association
MSS	Manufacturers Standardization Society of the Valve and Fitting Industry Standards

**McKinleyville Community Services District**  
McKinleyville BMX Track and Park Project

NBFU	National Board of Fire Underwriters
NBS	National Buildings Standards
NEC	National Electrical Code
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
NPDES	National Pollution Discharge Elimination System
OSHA	Occupational Safety and Health Act of 1970
PCA	Portland Cement Association
SMACNA	Sheet Metal and Air Conditioning Contractor's National Association
SSPC	Steel Structures Painting Council
SSPWC	Standard Specifications for Public Works Construction
SWRCB	State Water Resources Control Board
UBC	Uniform Building Code
USPHS	United States Public Health Service
UL	Underwriter's Laboratory
UMC	Uniform Mechanical Code
UPC	Uniform Plumbing Code
USAS	The United States of America Standard Institute
USBR	United States Bureau of Reclamation
WCLIB	West Coast Lumber Inspection Bureau
WIC	Woodwork Institute of California

"Bureau" - United States Bureau of Reclamation

"State" - State of California

"State Standard Specifications" - Standard Specifications issued by the State of California Business and Transportation Agency, Department of Transportation, latest edition, unless a specific edition is referenced.

A-3 Definitions

- a) Acceptance - The formal written acceptance by the DISTRICT of the entire Contract which has been completed in all respects in accordance with the Specifications and any approved modifications.
- b) Addenda - Written or graphic instruments issued prior to the execution of the Agreement which modify or interpret the Contract Documents, Drawings and Specifications by additions, deletions, clarifications or corrections.
- c) As Approved - The words "as approved" unless otherwise qualified, shall be understood to be followed by the words "by the Engineer."
- d) Bid - The offer of the Bidder for the Work when made out and submitted on the prescribed bid form, properly signed and guaranteed. A Bid is also known as a Proposal.
- e) Bid Bond - The cash, cashier's check, certified check, or bidder's bond accompanying the Bid submitted by the bidder, as a guarantee that the Bidder will enter into a Contract with the DISTRICT for the performance of work herein described.
- f) Bidder - Any individual, firm, partnership or corporation submitting a bid for the work contemplated, and acting directly or through a duly authorized representative.
- g) Change Orders - A written order to the Contractor authorizing an addition, deletion, or revision in the work within the general scope of the Contract Documents or authorizing adjustment in the Contract price or Contract time.



- h) Claim - A separate demand by the Contractor for (i) a time extension, (ii) payment of money or damages arising from work done by or on behalf of the Contractor pursuant to the Contract for a public work and payment of which is not otherwise expressly provided for or the claimant is not otherwise entitled to, or (iii) an amount the payment of which is disputed by the DISTRICT.
- i) Contract - The written agreement covering the performance of the work and the furnishing of labor, materials, tools and equipment in the construction of the Work. The Contract shall include all Contract Documents and supplemental agreements amending or extending the work contemplated which may be required to complete the Work in a substantial and acceptable manner. Supplemental agreements are written agreements covering alterations, amendments or extensions to the Contract and include Addenda and Contract Change Orders.
- j) Contract Documents - The Contract Documents are any or all of the documents listed in the Contract Agreement.
- k) Contract Price - Total monies payable to the Contractor under the terms and conditions of the Contract Documents.
- l) Contract Time - The numbers of days stated in the Contract Documents for the completion of the Work.
- m) Contractor - The person or persons, firm, partnership or corporation or other entity that has entered into the Contract with the DISTRICT to perform the Work.
- n) Contract Drawings - "Contract Drawings" or "drawings" means and includes:
  - (i) all drawings which have been prepared on behalf of the DISTRICT and which are included in the Contract Documents and all modifying drawings issued by addenda thereto;
  - (ii) all drawings submitted pursuant to the terms of the Contract by the Contractor with his proposal and by the Contractor to the DISTRICT during the progress of the Work when accepted by the Engineer. Except where a specific type of drawing is indicated, the terms "Drawings" and "Plans" are used interchangeably throughout the Contract Documents and the Plans are Drawings as defined above.
- o) County - County of Humboldt, California.
- p) Date of Execution of the Contract - The date on which the Contract is signed by the DISTRICT's authorized representative.
- q) Datum - The figures given in the Specifications or upon the Drawings after the word "Elevation" or an abbreviation of it shall mean NAVD 88 datum unless noted otherwise.
- r) Days - Unless otherwise designated, days as used in the Contract Documents shall mean calendar days.
- s) District - The MCKINLEYVILLE COMMUNITY SERVICES DISTRICT, may also be referred to as the DISTRICT or OWNER.
- t) Engineer - Wherever in these documents the word "Engineer" appears, it shall be understood to mean Melton Design Group, Inc. The Engineer will have final authority with regards to contract administration, field inspection, and related items.
- u) Field Order - A written order effecting a change in the Work not involving an adjustment in the Contract Price or an extension of Contract Time, issued by the Engineer to the Contractor during construction.

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- v) His - "His" shall include "her" and "its".
- w) Install - "Install" wherever and in whatever manner used shall mean the installation, complete in place of an item.
- x) Notice of Award - The written notice of the acceptance of the Bid from the DISTRICT to the successful Bidder.
- y) Notice to Proceed - Written communication issued by the DISTRICT to the Contractor authorizing him to proceed with the Work and establishing the date of commencement of the Work.
- z) Or Equal - The terms "or equal" or "approved equal" shall be understood to indicate that the "equal" product be the same or better than the product named in function, performance, reliability, quality and general configuration. Determination of equality in reference to the project design requirement will be made by the Engineer.
- aa) District Project Representative – The authorized representative of the DISTRICT who is assigned to the project site or any part thereof.
- bb) Plans or Specification Drawings - The term "Plans or Specification Drawings" refers to the official Plans, profiles, cross sections, elevations, details, and other working drawings and supplementary drawings, or reproductions thereof, signed by the Engineer, which show the location, character, dimensions, and details of the work to be performed. Plans may either be bound in the same book as the balance of the Contract Documents or bound in separate sets, and are a part of the Contract Documents, regardless of the method of binding.
- cc) Project - The undertaking performed as provided by the Contract Documents.
- dd) Provide - "Provide" wherever and in whatever manner used shall be understood to mean furnish and install.
- ee) Project Geotechnical Engineer – LACO Associates, Inc. Report Date: 06/26/2023
- ff) Resident Project Representative - Authorized representative of the Engineer who is assigned to the Project or any part thereof.
- gg) Service of Notice - Any notice from 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 thereof. Any such notice shall not be effective for any purpose whatsoever unless service in the following manner:
  - (i) If the notice is given to the DISTRICT by personal delivery thereof, the DISTRICT'S Project Representative or by depositing the notice in the U.S. mail, enclosed in a sealed envelope addressed to McKINLEYVILLE COMMUNITY SERVICES DISTRICT, P.O. Box 2037, 1656 Sutter Road, McKinleyville, CA 95519, postage prepaid, by certified mail return receipt requested.
  - (ii) If the notice is given to the Contractor, by personal delivery to the Contractor or its duly authorized representative at the project site or by depositing in the U.S. mail, enclosed in a sealed envelope address to the Contractor on the Contract Form, postage prepaid, by certified mail, return receipt request.
  - (iii) If the notice is given to the Surety or any other person, by personal delivery to such Surety or other person by personal delivery to such Surety or other person by depositing in the U.S. mail, enclosed in a sealed envelope, addressed to the surety or other person at the address of such Surety or other person last communicated to the party giving the notice, postage prepaid, by certified mail return receipt requested.

- hh) Shall or Will - "Shall," or "Will," whenever used to stipulate anything, means shall or will be done or be performed by either the Contractor or the DISTRICT and means that the Contractor or the DISTRICT has thereby entered into a covenant with the other party to do or perform the same.
- ii) Shop Drawing - All drawings, diagrams, illustrations, brochures, schedules and other data which are prepared by the Contractor, a Subcontractor, manufacturer, supplier or distributor, which illustrate how specific portions of the Work shall be fabricated or installed.
- jj) Shown - "Shown," "indicated," "detailed," and words of like import, wherever and in whatever manner used, with or without reference to the drawings, means shown, indicated or detailed on the Drawings or Plans.
- kk) Specifications - A part of the Contract Documents consisting of written descriptions of a technical nature of materials, equipment, construction systems, standards and workmanship, including the General Conditions.
- ll) Specified - "Specified," "described," or "noted," wherever and in whatever manner used, means as specified, described or noted in the Contract Documents.
- mm) Subcontractors - The term "Subcontractor", as employed herein, includes only those having a direct contract with the Contractor and it includes one who furnishes material worked to a special design according to the Plans or Specifications of this Work, but does not include one who merely furnishes material not so worked and would be considered a supplier only.
- nn) Substantial Completion - That date as certified by the Engineer when the construction of the Project or a specified part thereof is sufficiently completed, in accordance with the Contract Documents, so that the Project or specified part can be utilized for the purposes for which it is intended.
- The Engineer may, at its sole discretion, issue a written notice of substantial completion for the purpose of establishing the starting date for specific equipment guarantees, and to establish the date that the DISTRICT will assume the responsibility for the cost of operating such equipment. Said notice shall not be considered as final acceptance of any portion of the Work or relieve the Contractor from completing the remaining work within the specified time and in full compliance with the Contract Documents.
- oo) Sufficient - "Sufficient," "necessary," or "proper," "acceptable," "satisfactory," "desirable," and words of like import, wherever and in whatever manner used, with or without reference to the Engineer, means sufficient, necessary, proper, acceptable, satisfactory and desirable in the judgment of the Engineer.
- pp) Supplementary Conditions (not included for this project) - Modifications to General Conditions required by a Federal Agency for participation in the PROJECT and approved by the Agency in writing prior to inclusion in the Contract Documents, or such requirements that may be imposed by applicable State laws.
- References to "Supplemental General Conditions" in the General Conditions and elsewhere in the Contract Documents shall be construed to read "Supplementary Conditions."
- qq) Supplier - Any person or organization who supplies materials or equipment for the Work, including that fabricated to a special design, but who does not perform labor at the site.
- rr) Time Limits - All time limits stated in the Contract Documents are of the essence of the Contract.
- ss) Work - All the work specified, indicated, shown or contemplated in the Contract to construct the improvements, including all alterations, amendments or extensions thereto made by Contract

Change Order or other written orders of the Engineer.

- tt) Written Notice - "Written Notice" shall be deemed to have been duly served when delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended or if delivered at or sent by registered mail to the last business address known to it who gives the notice, or sent by email.
- uu) Whenever in the Specifications or upon the Drawings the words DIRECTED, REQUIRED, PERMITTED, ORDERED, DESIGNATED, PRESCRIBED, or words of like import are used, it shall be understood that the direction, requirement, permission, order, designation or prescription of the Engineer is intended, and similarly the words APPROVED, ACCEPTABLE, SATISFACTORY, or words of like import, shall mean approved or acceptable to, or satisfactory to the Engineer, unless otherwise expressly stated.

## **SECTION B GENERAL CONDITIONS**

### ARTICLE I. SCOPE OF WORK

#### B-1 Intent of Contract Documents

The intent of the Contract Documents is to prescribe the details for the construction and completion of the Work which the Contractor undertakes to perform in accordance with the terms of the Contract. Where the Specifications and Plans describe portions of the Work in general terms, but not in complete detail, it is understood that only the best general practice is to prevail and that only materials and workmanship of the first quality are to be used. Unless otherwise specified, the Contractor shall furnish all labor, materials, tools, equipment and incidentals and do all the work involved in performing the Contract in a satisfactory and workmanlike manner, ready for use occupancy or operation by the DISTRICT.

The technical provisions are presented in sections for convenience. However, this presentation does not necessarily delineate trades or limits of responsibility. All sections of the Specifications and Plans are interdependent and applicable to the Project as a whole.

The Contract Documents are complementary, and what is called for in any one shall be as binding as if called for in all.

Anything shown on the Drawings and not mentioned in the Specifications or mentioned in the Specifications and not shown on the Drawings shall have the same effect as if shown or mentioned respectively in both. Any work shown on one drawing shall be construed to be shown in all drawings and the Contractor will coordinate the Work and the Drawings. If any portion of the Contract Documents shall be in conflict with any other portion, the various documents comprising the Contract Documents shall govern in the following order of precedence: The DISTRICT-Contractor Contract; the Bid; any Supplementary or Special Conditions; Instructions to Bidders; the General Conditions; the Specifications; the Drawings. Technical Specifications take priority over general Specifications and detail Drawings take precedence over general Drawings. As between schedules and information given on Drawings, the Schedules shall govern. As between figures given on Drawings and the scaled measurements, the figures shall govern. As between large-scale Drawings and small-scale Drawings, the larger scale shall govern. Any conflict or inconsistency between or in the Drawings shall be submitted to the Engineer through the DISTRICT'S Project Representative or Resident Project Representative in writing. Work done by the Contractor after discovery of such discrepancies, inconsistencies or ambiguities shall be done at the Contractor's own risk.

#### B-2 Contractor's Understanding

It is understood and agreed that the Contractor has, by careful examination, satisfied themselves as to the

nature and location of the Work, the conformation of the ground, the character, quality and quantity of the materials to be encountered, the character of equipment and facilities needed preliminary to and during the prosecution of the Work, the general and local conditions, and all other matters which can in any way affect the Work under this Contract. No verbal agreement or conversation with any officer, agent or employee of the DISTRICT, either before or after the execution of this Contract, shall affect or modify any of the terms or obligations herein contained.

Contractor shall comply with all Federal, State, and Local laws and regulations applicable to this scope of work and said project, as well as all permits and environmental conditions established for this project (see section B-13). Contractor is responsible for obtaining all necessary permits for construction except for those permits already obtained by the DISTRICT prior to construction. If a Contractor materially fails to comply with any term of this award, whether stated in a Federal statute or regulation, an assurance, in a State plan or application, a notice of award, or elsewhere, the DISTRICT may take one or more of the actions outlined in 2 CFR Section 200.338, including termination of the project. Project awards may be terminated for convenience through the procedures outlined in 2 CFR Section 200.339.

### B-3 Changes in the Work

The DISTRICT may, at any time, by written order make changes in the Work including but not limited to: (a) changes in the Specifications or Drawings; (b) changes in the sequence, method or manner of performance of the Work; (c) changes in the owner-furnished facilities, equipment, materials, services or site; or (d) changes directing acceleration of the Work. If such changes cause an increase or decrease in the Contractor's cost of, or time required for, performance of the Contract an equitable adjustment will be made and the Contract modified in writing accordingly.

Such modification will be in the form of a Contract Change Order which will set forth the work to be done or the method by which the change and cost adjustment, if any, will be determined, and the time of completion of the Work.

To comply with the California Environmental Quality Act (CEQA), material additions or amendments to this scope of work (SOW) may have to be reviewed by all government agencies participating in the CEQA process. CEQA compliance for all SOW additions or amendments is essential before the revised SOW can be approved or implemented by the DISTRICT. Any construction activities associated with a SOW change, prior to DISTRICT approval, may be ineligible for reimbursement. The Contractor shall obtain approval in writing from the DISTRICT prior to proceeding with any changes of work.

The compensation to be paid for any extra work or change shall be determined in one or more of the following ways or at DISTRICT's sole election:

- a) By unit prices previously approved (unit prices previously approved shall be used in all cases for similar units unless mutually agreed that for some reason they are not applicable);
- b) By estimate and acceptance of an agreed upon lump sum; or
- c) On a time and materials basis involving the actual necessary expenses and other services necessary to complete the Work. In addition, there shall be added an amount to be agreed upon but not to exceed fifteen (15) percent of the actual necessary expense to cover the cost of general overhead, general superintendence, other expenses and profit. In the events that items (a) and (b) above are not applicable, then this latter method (c) shall be used. Markup by Subcontractors on their work shall not exceed fifteen percent. Contractor's markup on Subcontractor's work shall not exceed five (5) percent.

The Contractor shall keep full and complete records of the actual cost of such work in the form and manner prescribed by the Engineer and shall permit the Engineer to have access to such records as may be necessary to assist in the determination of the compensation payable for such work.

The Engineer also may at any time by issuing a Field Order make changes in the details of the Work. The Contractor shall proceed with the performance of any change in the Work so ordered by the Engineer unless the Contractor believes that such Field Order entitles it to a change in the Contract Price or Time, or both in which event the Contractor shall give the Engineer written notice thereof within seven (7) calendar days after the receipt of the ordered change. The Contractor shall not execute such changes pending the receipt of an executed change order or further instruction from the DISTRICT.

If the Contractor is delayed in completing by reason of any change made pursuant to this section, the time for completion of the Work shall be extended by change order for a period agreed to, commensurate with such delay. The Contractor shall not be subjected to any claim for liquidated damages for this period of time, but the Contractor shall have no claim for any other compensation for any such delay.

**B-4 Procedures and Allowable Costs on Changes**

- a) All changes which affect the cost or time of the construction of the project must be authorized by means of a Change Order. The Change Order will include extra work, work for which quantities have been altered from those shown in the bidding schedule, as well as decreases or increases in the quantities of installed units which are different than those shown in the bidding schedule because of final measurements. All changes should be recorded on a Change Order as they occur. Each Change Order must contain complete and detailed justification for all items addressed by the Change Order.
- b) If the change in or addition to the Work will result in an increase in the contract sum, the DISTRICT shall have the right to require the performance thereof in any of the following ways, at DISTRICT's sole election:
  - (i) By unit prices previously approved (unit prices previously approved shall be used in all cases for similar units unless mutually agreed that for some reason they are not applicable);
  - (ii) By estimate and acceptance of an agreed upon lump sum; or
  - (iii) On a time and materials basis involving the actual necessary expenses and other services necessary to complete the work. In addition, there shall be added an amount to be agreed upon but not to exceed fifteen (15) percent of the actual necessary expense to cover the cost of general overhead, general superintendence, other expenses and profit. In the events that items (a) and (b) above are not applicable, then this latter method (c) shall be used. Markup by Subcontractors on their work shall not exceed fifteen percent. Contractor's markup on Subcontractor's work shall not exceed five percent (5%).
- c) If the DISTRICT elects to have the Change in the Work performed on a lump sum basis, such election shall be based on a lump sum proposal which shall be submitted by the Contractor within ten (10) calendar days of the DISTRICT's request therefor. Request for a lump sum proposal shall not be deemed an election to have the Work performed on a lump sum basis. The Contractor's proposal shall be itemized and segregated by labor and materials for the various components of the change (no aggregate labor total will be acceptable) and shall be accompanied by signed proposals of any Subcontractors which will perform any portion of the change, and of any persons who will furnish materials or equipment for incorporation therein. The proposal shall also include the Contractor's estimate of the time required to perform said changes or additional work.

The portion of the proposal relating to labor, whether by the Contractor's forces or the forces of any of its Subcontractors, may include reasonably anticipated gross wages of Job Site labor, including foremen, who will be directly involved in the Change in the Work (for such time as they will be so involved), plus payroll costs (including premium costs of overtime labor, if overtime is anticipated, social security, Federal or State unemployment insurance taxes and fringe benefits required by collective bargaining agreements entered into by the Contractor or any such Subcontractor in connection with such labor) and up to fifteen percent (15%) of such anticipated gross wages, but not payroll costs, as overhead and profit for the Contractor or any such

Subcontractor, as applicable (such overhead and profit to include all supervision except foremen.)

The portion of the proposal relating to materials may include the reasonably anticipated direct costs to the Contractor or to any of its Subcontractors of materials to be purchased for incorporation in the Change in the Work, plus transportation and applicable sales or use taxes and up to fifteen percent (15%) of said direct material costs as overhead and profit for the Contractor or any such Subcontractor (such overhead and profit to include all small tools), and may further include the Contractor's and any of its Subcontractors' reasonably anticipated rental costs in connection with the Change in the Work (either actual rates or discounted local published rates), plus up to five percent (5%) thereof as overhead and profit for the Contractor or any such Subcontractors, as applicable. If any of the items included in the lump sum proposal are covered by unit prices contained in the Contract Document, the DISTRICT may, if it requires the Change in the Work to be performed on a lump sum basis, elect to use these unit prices in lieu of the similar items included in the lump sum proposal in which event and appropriate deduction will be made in lump sum amount prior to the application of any allowed overhead and profit percentages. No overhead and profit shall be applied to any unit prices.

The lump sum proposal may include up to five percent (5%) of the amount which the Contractor will pay to any of its Subcontractors for the Change in the Work as a commission to the Contractor.

- d) In the event that the Contractor fails to submit its proposal within the designated period, the Engineer may direct the Contractor to proceed with the Change or Addition to the Work and the Contractor shall so proceed. The Engineer shall determine the reasonable costs and time to perform the Work in question, which determination when approved by DISTRICT shall be final and binding upon the Contractor.
- e) In the event that the parties are unable to agree as to the reasonable costs and time to perform the change in or addition to the Work based upon the Contractor's proposal and the Engineer and DISTRICT do not elect to have the change in the Work performed on a time and material basis, the Engineer and DISTRICT shall make a determination of the reasonable cost and time to perform the Change in the Work, based upon their own estimates, the Contractor's submission or combination thereof. A Change Order shall be issued for the amount of costs and time determined by the Engineer and the DISTRICT and shall become binding upon the Contractor unless the Contractor submits its protest in writing to the DISTRICT within thirty (30) calendar days of the issuance of the Change Order. The DISTRICT has the right to direct the Contractor in writing to perform the Change in the Work which is the subject of the Change Order. Failure of the parties to reach agreement regarding the costs and time of the performing the Change in the Work and/or any pending protest shall not relieve the Contractor from performing the Change in the Work promptly and expeditiously.
- f) If the DISTRICT elects to have the Change in the Work performed on a time and material basis, the same shall be performed, whether by the Contractor's forces or the forces of any of its Subcontractors or Sub-subcontractors, at actual costs to the entity or entities performing the Change in the Work (without any charge for administration, clerical expense, supervision or superintendence of any nature whatsoever, including foremen, or the costs, use or rental of tools or plant), plus fifteen percent (15%) thereof as the total overhead and profit to the entity or entities actually performing the change (except that this fifteen percent (15%) shall not be applied against any payroll costs, defined herein with respect to lump sum proposals). If the entity or entities actually performing the work are Subcontractors or Sub-subcontractors, the Contractor shall be allowed five percent (5%) of the total charge of the performing entity or entities (including mark-up) as Contractor's mark-up. No other mark-ups shall be allowed hereunder. The Contractor shall submit to the DISTRICT daily work and material tickets, to include the identification number assigned to the Change in the Work, the location and description of the Change in the Work, the

classification of labor employed (and names and social security numbers), the material used, the equipment rented (not tools) and such other evidence of cost as the DISTRICT may require. The DISTRICT may require authentication of all time and material tickets and invoices by persons designated by the DISTRICT for such purpose. The failure of the Contractor to secure any required authentication shall, if the DISTRICT elects to treat it as such, constitute a waiver by the Contractor of any claim for the cost of that portion of the Change in the Work covered by a non-authenticated ticket or invoice; provided, however, that the authentication of any such ticket or invoice by the DISTRICT shall not constitute an acknowledgment by the DISTRICT that the items thereon were reasonably required for the Change in the Work.

- g) No overhead and profit will be paid by the DISTRICT on account of a Change in the Work except as specifically provided in this Section B-4. Overhead and Profit, as allowed under this paragraph, shall be deemed to include all costs and expenses which the Contractor or any of its Subcontractors may incur in the performance of the Change in the Work and which are not otherwise specifically recoverable by them pursuant to this paragraph.
- h) The Contractor shall not be entitled to any amount for indirect costs, damages or expenses of any nature, including, but not limited to, so-called "impact" costs, labor inefficiency, wage, material or other escalations beyond the prices upon which the proposal is based and to which the parties have agreed pursuant to the provisions of this section, and which the Contractor, its Subcontractors and Sub-subcontractors or any other person may incur as a result of delays, interferences, suspensions, changes in sequence or the like, for whatever cause, whether reasonable or unreasonable, foreseeable or unforeseeable, or avoidable or unavoidable, arising from the performance of any and all Changes in the Work performed pursuant to this section. It is understood and agreed that the Contractor's sole and exclusive remedy in such event shall be recovery of its direct costs as compensable hereunder and an extension of the time of the Contract, but only in accordance with the provisions of the Contract Documents.

The Contractor agrees that it shall not be entitled to claim damages for anticipated profits on any portion of work that may be deleted. The amount of any adjustment for work deleted shall be estimated at the time deletion of work is ordered and the estimated adjustment will be deducted for the subsequent monthly pay estimates.

The DISTRICT reserves the right to contract with any person or firm other than the Contractor for any or all extra work.

#### B-5 Unilateral Change in or Addition to the Work

Notwithstanding the above, the DISTRICT, directly or through the Engineer, may direct the Contractor in writing to perform changes in or additions to the scope of the Contract. The Contractor shall perform such work and the parties shall proceed pursuant to the provisions of Section B-4.

#### B-6 Differing Site Conditions

The Contractor shall promptly, and before the following conditions are disturbed, notify the DISTRICT in writing of any:

- a) Material that the Contractor believes may be material that is hazardous waste, as defined in Section 25118 of the Health and Safety Code, that is required to be removed to a Class I, Class II, or Class III disposal site in accordance with provisions of existing law; or
- b) Subsurface or latent physical conditions at the site differing from those indicated in the Contract Documents; or
- c) Unknown conditions at the site of any unusual nature, different materially from those ordinarily



encountered and generally recognized as inherent in work of the character provided for in the Contract.

The Engineer shall thereupon promptly investigate the conditions. If the Engineer finds that they do involve hazardous waste, or do materially differ and cause any decrease or increase in the Contractor's cost or time of performance, it will issue a Change Order as appropriate. Any increase or decrease in the cost of the Work or the time for performance shall be adjusted in the manner provided herein for adjustments as to extra and/or additional work and changes. The procedures applicable to claims per extra costs shall then apply.

In accordance with 36 CFR Part 800, in the event a potential historic property or cultural resource is discovered during construction activities, the Contractor must cease work in the vicinity of the discovery and take all reasonable measures to avoid or minimize harm to the discovered property/resource. Construction activities in the area of the discovery shall not resume until the DISTRICT concludes consultation with the State Historic Preservation Officer (SHPO) for treatment of the discovery.

**B-7 Claims for Extra Costs**

- a) The Plans for Work show the conditions as they are supposed or believed by the Engineer to exist, but it is neither intended nor to be inferred that the conditions as shown thereon constitute a representation by the DISTRICT or its officers that such conditions are universally existent nor shall the DISTRICT or any of its officers or representatives be liable for any loss sustained by the Contractor as a result of any variance between conditions as shown on the Plans and alternate conditions revealed during the progress of the Work, or otherwise.
- b) The DISTRICT assumes no responsibility for any representations made by any of its officers or agents during or prior to the execution of this Contract, unless (1) such representations are expressly stated in the Contract, and (2) the Contract expressly provides that the responsibility therefor is assumed by the DISTRICT.
- c) It is hereby mutually agreed that the Contractor shall not be entitled to the payment of any additional compensation for any cause, including any act, or failure to act, by the Engineer or the DISTRICT, or the happening of any event, thing or occurrence, unless the Contractor shall have given the Engineer due written notice of potential claims as hereinafter specified.
- d) The written notice of potential claims shall set forth the reasons for which the Contractor believes additional compensation will or may be due, the nature of the costs involved, and, insofar as possible, the amount of the potential claim. Except as provided in Section B-6, the notice as above required shall be given to the Engineer at least 48 hours prior to the time that the Contractor commences performance of the work giving rise to the potential claim for additional compensation. If such notice is not given, the Contractor shall be barred from making any such claim for extra compensation.
- e) The Contractor may submit a claim to the Engineer concerning any matter for which a protest under Section B-3 or a notice of potential claim is filed within sixty (60) calendar days following the submission of said protest or notice, unless, due to the nature of the claim or the uncompleted state of the work, it is impracticable to determine the amount or the extent of the claim within such period, in which case a claim may be submitted at the earliest time thereafter that such determination can be made, but in no event later than the final release by the Contractor provided for in Section B-71. The claims shall set forth clearly and in detail, for each item of additional compensation claimed, the reasons for the claim, reference to applicable provisions of the Specifications, the nature and the amount of the cost involved, the computations used in determining such costs, and all pertinent factual data. The Contractor shall maintain complete and accurate records of the cost or any portion of the Work for which additional compensation is

claimed, and shall provide the Engineer with copies thereof, as required.

- f) The Engineer will, within a reasonable time after submission of the Contractor's claim, make decisions in writing on all claims of the Contractor. All such decisions of the Engineer shall be final unless the Contractor shall within ten (10) calendar days after receipt of the Engineer's decision, file with the Engineer a written protest, stating clearly and in detail the basis thereof. Such protest will be forwarded promptly by the Engineer to the DISTRICT, which will issue a decision upon each such protest, and the DISTRICT's decision will be final. Pending such decision, the Contractor shall proceed with its work in accordance with the determination or instructions of the Engineer. It is hereby agreed that the Contractor's failure to protest the Engineer's determination or instructions, within ten (10) calendar days from and after the Engineer's determinations or instructions, shall constitute a waiver by the Contractor of all its rights to further protest, judicial or otherwise.
- g) It is the intention of this Section that the differences between the parties, arising under and by virtue of the Contract, be brought to the attention of the Engineer at the earliest possible time in order that such matters may be settled, if possible or other appropriate action promptly taken. The Contractor hereby agrees that it shall have no right to additional compensation for any claim that may be based on any act, failure to act, event, thing or occurrence for which no written notice of potential claim as herein required was timely filed.
- h) In the event of an emergency endangering life or property, the Contractor shall act as stated in Section B-62 herein, and after execution of the emergency work shall present an accounting of labor, materials and equipment in connection therewith. The procedure for any payment that may be due for emergency work will be as specified in Section B-3 herein.

#### B-8 Disputes

Except as otherwise specifically provided in the Contract Documents, the Engineer will initially decide all claims of the Contractor and all disputes arising under and by virtue of the Contract. Such claim or dispute will be processed and decided by the Engineer as soon as practicable after its submission and the submission or availability of any additional information necessary to its decision. If the Contractor is dissatisfied with the Engineer's decision, the Contractor may, within 15 calendar days from the date of the Engineer's decision, follow the procedures set forth in Section B-55. If the Contractor fails to follow the procedures set forth in Section B-55 within the 15 calendar day period, then the Engineer's decision shall be final, conclusive, and binding on the Contractor.

#### B-9 Guarantee

- a) In addition to warranties, representations and guarantees stated elsewhere in the Contract Documents, the Contractor unconditionally guarantees all materials and workmanship furnished hereunder, and agrees to replace at its sole cost and expense, and to the satisfaction of the Engineer and the DISTRICT, any and all materials which may be defective or improperly installed.
- b) The Contractor shall repair or replace to the satisfaction of the Engineer any or all such work that may prove defective in workmanship or materials, ordinary wear and tear excepted, together with any other work which may be damaged or displaced in so doing.
- c) In the event of failure to comply with the above stated conditions within a reasonable time, the DISTRICT is authorized to have the defect repaired and made good at the expense of the Contractor who will pay the costs and charges therefor immediately upon demand, including any reasonable management and administrative costs, and engineering, legal and other consultant fees incurred to enforce this section.
- d) The signing of the Contract by the Contractor shall constitute execution of the above guarantees.

Except as otherwise provided in this Contract, the guarantees and warranties shall remain in effect through the one-year maintenance warranty period specified in the Performance Bond.

ARTICLE II. CONTROL OF WORK

B-10 Authority of the Engineer

- a) The Engineer is the representative of the DISTRICT and has full authority to interpret the Contract Documents, to conduct the construction review and inspection of the Contractor's performance, and to decide questions which arise during the course of the work and its decisions on these matters shall be final and conclusive. The Engineer has the authority to reject all work and materials which do not conform to the Contract Documents, and has the authority to stop the work whenever such stoppage may be necessary to ensure the proper execution of the Contract.

If at any time the Contractor's work force, tools, plant or equipment appear to the Engineer to be insufficient or inappropriate to secure the required quality of work or the proper rate of progress, the Engineer may order the Contractor to increase their efficiency, improve their character, to augment their number or to substitute other personnel, new tools, plant or equipment, as the case may be, and the Contractor shall comply with such order.

- b) Neither the failure of the Engineer to demand such increase of efficiency, number, or improvement, nor the compliance by the Contractor with the demand, shall relieve the Contractor of its obligation to provide quality work at the rate of progress necessary to complete the Work within the specified time.
- c) The Engineer shall have the authority to make minor changes in the Work, not involving extra costs, and not inconsistent with the purposes of the Work.
- d) Any order given by the Engineer, not otherwise required by the Contract Documents to be in writing shall, on request of the Contractor, be given or confirmed by the Engineer in writing.
- e) Whenever work, methods of procedure, or any other matters are made subject to direction or approval, such direction or approval will be given by the Engineer.
- f) The Engineer shall not be responsible for the construction means, controls techniques, sequences procedures or construction safety.
- g) It is expressly agreed and understood that Melton Design Group, Inc. will have no liability whatsoever resulting from the obligations entered into under the Contract except as provided in any scope of work agreement between Melton Design Group, Inc. and the DISTRICT; that the DISTRICT must look solely to the Contractor for the furnishing of the Work; that the Contractor must look solely to the DISTRICT for payment; and that the DISTRICT and the Contractor must look solely to each other for the enforcement of any claims or liabilities arising under or by reason of the Contract.

B-11 Drawings

- a) Drawings furnished herewith are for bidding purposes. The Engineer will furnish the Contractor additional copies of the Contract Documents and full-size plans. Additional copies may be obtained by paying the actual cost of reproduction. The Contractor shall have no claim for excusable delay on account of the failure of the Engineer to deliver such drawings unless the Engineer shall have failed to deliver the same within fourteen (14) calendar days after receipt of written demand therefor from the Contractor. The Contractor shall keep one copy of said drawings, in good order, available to the Engineer and its representatives, and convenient to the working site. The Contractor shall maintain on the job site and make available to the Engineer on request, one current full-sized marked-up set of design drawings which accurately indicate all variations in the completed work that differ from the design information shown on the Plans. If the Contractor, in the course of the Work, finds any discrepancy between the Drawings and the physical condition of

the locality, or any errors or omissions in the Drawings, or in the layout as given by points and instructions, it shall be the Contractor's duty to inform the Engineer in writing, and the Engineer will promptly verify the same. Any work done after such discovery, until authorized, will be done at the Contractor's risk. All Drawings, Specifications, and copies thereof furnished by the Engineer are the property of the Engineer and shall not be reused on other work and, with the exception of the signed Contract sets, are to be returned to the Engineer, on request, at the completion of the Work. All models are the property of the DISTRICT. The Contractor may be furnished additional instructions and detail drawings by the Engineer as necessary to carry out the work required by the Contract Documents.

The additional drawings and instructions thus supplied, will become part of the Contract Documents. The Contractor shall carry out the Work in accordance with the additional detail drawings and instructions.

- b) The Drawings shall be supplemented by such shop drawings prepared by the Contractor as are necessary to adequately control the Work. No changes shall be made by the Contractor in any shop drawings after they have been reviewed by the Engineer.
- c) Shop Drawings for any structure shall include, but not be limited to: stress sheets, anchor bolt layouts, shop details, and erection plans, which shall be reviewed and accepted by the Engineer before any such work is performed.
- d) Contractor agrees that shop drawings processed by the Engineer are not Contract Change Orders; that the purpose of shop drawings submitted by the Contractor is to demonstrate to the Engineer that the Contractor understands the design concept, that it demonstrates its understanding by indicating which equipment and material it intends to furnish and by detailing the fabrication methods it intends to use.
- e) It is expressly understood, however, that favorable review of the Contractor's shop drawings shall not relieve the Contractor of any responsibility for accuracy of dimensions and details, or for mutual agreements of dimensions and details. It is mutually agreed that the Contractor shall be responsible for agreement and conformity of its shop drawings with the Specifications. Contractor further agrees that if deviations, discrepancies or conflicts between shop drawings and Specifications are discovered either prior to or after shop drawings are processed by the Engineer, the Specifications shall control and shall be followed.
- f) Unless otherwise stated, the Engineer shall have thirty (30) calendar days from the date of receipt of shop drawings for review.
- g) Full compensation for furnishing all submittals and shop drawings shall be considered as included in the prices paid for the Contract items of Work to which such drawings relate and no additional compensation will be allowed therefor. Any cost related to the Engineer's review of any particular set of submittals or shop drawings more than twice, due to incompleteness or unacceptability, shall be borne by the Contractor, and the DISTRICT reserves the right to withhold such costs from payments due the Contractor.
- h) When submitted for the Engineer's review, Shop Drawings shall bear the Contractor's certification that he has reviewed, checked and approved the Shop Drawings and that they are in conformance with the requirements of the Contract Documents.
- i) That portion of the Work requiring a shop drawing or sample submission shall not begin until the shop drawing or submission has been approved by the Engineer. A copy of each approved shop drawing and each approved sample shall be kept in good order by the Contractor at the site and shall be available to the Engineer.

- j) Acceptance by the Engineer of any drawing, method of work, or any information regarding materials and equipment the Contractor proposes to furnish shall not relieve the Contractor of responsibility for any errors therein and shall not be regarded as an assumption of risks or liability by the Engineer or DISTRICT, or any officer or employee thereof, and the Contractor shall have no claim under the Contract on account of the failure or partial failure or inefficiency or insufficiency of any plan or method or work or material and equipment so accepted. Such acceptance shall be considered to mean merely that the Engineer has no objection to the Contractor using, upon his own full responsibility, the plan or method of work proposed, or furnishing the materials and equipment proposed.

**B-12 Construction Staking and Surveys**

The Contractor shall furnish land surveys deemed necessary for locating the principal component parts of the Work.

**B-13 Permits and Regulations**

Permits, licenses, and easements of a temporary or permanent nature, necessary for the prosecution of the Work shall be secured and paid for by the Contractor, except as noted in Section B-32, and herein.

The Contractor shall give all notices and comply with all laws, ordinances, rules and regulations bearing on the conduct of the Work as shown on the Plans and described in the Specifications. The Contractor shall promptly notify the Engineer in writing of any specification at variance therewith and any necessary changes shall be adjusted as provided in the Contract for Changes in the Work. If the Contractor performs any work knowing it to be contrary to such laws, ordinances, rules, and regulations and without such notice to the Engineer, it shall bear all costs arising therefrom.

**B-14 Conformity with Contract Documents and Allowable Deviations**

Work and materials shall conform to the lines, grades, cross sections, dimensions and material requirements, including tolerances, shown on Contract Documents. Although measurement, sampling, and testing may be considered evidence as to such conformity, the Engineer shall be the sole judge as to whether the work or materials deviate from the Specifications and Plans, and its decision as to any allowable deviations therefrom shall be final and conclusive.

Whenever a material, article or piece of equipment is identified on the Drawings or Specifications by reference to brand name or catalogue number, it shall be understood that this is referenced for the purpose of defining the performance or other salient requirements and that other products of equal capacities, quality and function shall be considered as described in Section B-28. The Contractor may recommend the substitution of a material, article, or piece of equipment of equal substance and function for those referred to in the Contract Documents by reference to brand name or catalogue number, and if, in the opinion of the Engineer, such material, article, or piece of equipment is of equal substance and function to that specified, the Engineer may approve its substitution and use by the Contractor. Any cost differential shall be deductible from the Contract Price and the Contract Documents shall be appropriately modified by Change Order. The Contractor warrants that if substitutions are approved, no major changes in the function or general design of the Project will result. Incidental changes or extra component parts required to accommodate the substitution will be made by the Contractor without a change in the Contract Price or Contract Time.

**B-15 Coordination and Interpretation of Contract Documents**

- a) The Contract Documents are complementary and a requirement occurring in one is as binding as though occurring in all.
- b) In the event of conflict between the Plans and the Technical Specifications, the Technical

Specifications shall govern, except that, where items are shown on the Plans and are not specifically included in the Technical Specifications, the Plans shall govern.

- c) Should it appear that the work to be done or any of the matters relative thereto are not sufficiently detailed or explained in the Specifications or Plans, the Contractor shall apply to the Engineer for such further explanations as may be necessary and shall conform to them as part of the Contract. In the event of any doubt or question arising respecting the true meaning of the Specifications and Plans, reference shall be made to the Engineer, whose decision thereon shall be final and conclusive.
- d) In the event of any discrepancy between any plans and the figures written thereon, the figures shall be taken as correct. Detailed drawings shall prevail over general drawings.
- e) Any reference made in these Specifications or on the plans to any Specification, standard, method, or publication of any scientific or technical society or other organization shall, in the absence of a specific designation to the contrary, be understood to refer to the Specification, standard, method, or publication in effect as of the date that the Work is advertised for Bids.

#### B-16 Subcontracts

- a) In accordance with 2 CFR Section 200.213, the Contractors must not make any award or permit any award (subgrant or contract) at any tier to any party which is debarred or suspended or is otherwise excluded from or ineligible for participation in Federal assistance programs under Executive Order 12549, "Debarment and Suspension."
- b) The attention of the Contractor is directed to the provisions of Public Contract Code sections 4100-4113, regarding subcontracting and said provisions are by this reference incorporated herein and made a part hereof.
- c) Each Subcontract shall contain a suitable provision for the suspension or termination thereof should the Work be suspended or terminated or should the Subcontractor neglect or fail to conform to every provision of the Contract Documents insofar as such provisions are relevant. No Subcontractor or supplier will be recognized as such, and all persons engaged in work will be considered as employees of the Contractor, and the Contractor will be held responsible for their work, which shall be subject to the provisions of the Contract Documents. The Contractor shall be fully responsible to the DISTRICT for the acts or omissions of its Subcontractors and of the persons either directly or indirectly employed by him. Nothing contained in the Contract Documents shall create any contractual relationship between any Subcontractor and the DISTRICT. If a legal action, including arbitration and litigation, against the DISTRICT is initiated by a Subcontractor or Supplier, the Contractor shall reimburse the DISTRICT for the amount of legal, engineering and all other expenses incurred by the DISTRICT in defending itself in said action.
- d) The DISTRICT and the Engineer reserve the right to approve all Subcontractors. Such approval shall be a consideration to the awarding of the Contract and unless notification to the contrary is given to the Contractor prior to the signing of the Contract, the list of Subcontractors which is submitted with its proposal will be deemed to be acceptable.

#### B-17 Cooperation of Contractors

- a) Should construction be under way by other forces or by other contractors within or adjacent to the limits of the work specified or should work of any other nature be under way by other forces within or adjacent to said limits, the Contractor shall cooperate with all such other contractors or other forces to the end that any delay or hindrance to their work will be avoided. The right is reserved to perform other or additional work at or near the site (including material sources) at any time, by the use of other forces.

- b) When two or more contractors are employed on related or adjacent work, each shall conduct their operation in such a manner as not to cause any unnecessary delay or hindrance to the other. Each contractor shall be responsible to the other for all damage to work, to persons or property caused to the other by its operations, and for loss caused the other due to its unnecessary delays or failure to finish the Work within the time specified for completion.

**B-18 Superintendence**

- a) The Contractor shall designate in writing before starting work an individual as authorized representative who shall have the authority to represent and act for the Contractor. This authorized representative shall be present at the site of the work at all times while work is actually in progress on the Contract. When work is not in progress and during periods when work is suspended, arrangements acceptable to the Engineer shall be made for any emergency work which may be required.
- b) The Contractor is solely responsible, at all times, for the superintendence of the Work and for its safety and progress.
- c) Whenever the Contractor or its authorized representative is not present on any particular part of the Work where it may be desired to give direction, orders will be given by the Engineer, which shall be received and obeyed by the superintendent or foreman who may have charge of the particular work in reference to which the orders are given.
- d) Any order given by the Engineer, not otherwise required by the Specifications to be in writing, will on request of the Contractor, be given or confirmed by the Engineer in writing.

**B-19 Inspection of Work**

- a) Unless otherwise provided, all equipment, materials, and work shall be subject to inspection and testing by the Engineer. The Engineer will observe the progress and quality of the Work and determine, in general, if the Work is proceeding in accordance with the intent of the Contract Documents. The Engineer shall not be required to make comprehensive or continuous inspections to check the quality of the Work, and it shall not be responsible for construction means, methods, techniques, sequences, or procedures, or for safety precautions and programs in connection with the Work. Visits and observations made by the Engineer shall not relieve the Contractor of its obligation to conduct comprehensive inspections of the Work and to furnish proper materials, labor, equipment and tools, and perform acceptable work, and to provide adequate safety precautions, in conformance with the intent of the Contract.
- b) Whenever the Contractor varies the period during which work is carried on each day, it shall give due notice to the Engineer so that proper inspection may be provided. Any work done in the absence of the Engineer shall be subject to rejection. Proper facilities for safe access for inspection to all parts of the Work shall at all times be maintained for the necessary use of the Engineer and other agents of the DISTRICT, and agents of the Federal, State, or Local governments at all reasonable hours for inspection by such agencies to ascertain compliance with laws and regulations.
- c) One or more inspectors may be assigned to observe the Work and to act in matters of construction under this Contract. It is understood that inspectors shall have the power to issue instructions and make decisions within the limitations of the authority of the Engineer. Such inspection shall not relieve the Contractor of its obligation to conduct comprehensive inspections of the work, to furnish proper materials, labor, equipment and tools, and perform acceptable work, and to provide adequate safety precautions in conformance with the intent of the Contract.
- d) The Engineer and its representatives and the DISTRICT and its representatives shall at all times



have access to the Work wherever it is in preparation or progress, and the Contractor shall provide safe and convenient facilities for such access and for inspection. If the Specifications, the Engineer's instructions, laws, ordinances, or any public authority require any material, equipment or work to be specifically tested or approved, the Contractor shall give the Engineer timely notice of its readiness for inspection, and if the inspection is by an authority other than the DISTRICT, of the time fixed for inspection. Inspections by the Engineer will be made promptly and, where practicable, at the source of supply.

- e) Work performed without inspection may be required to be removed and replaced under proper inspection and the entire cost of removal and replacing, including the cost of DISTRICT-furnished materials used in the Work, shall be borne by the Contractor, regardless of whether or not the Work exposed is found to be defective. Examination of questioned work, other than that installed without inspection, may be ordered by the Engineer and, if so ordered, the work must be uncovered by Contractor. If such work is found to be in accordance with the Contract Documents, the DISTRICT will pay the cost of re-examination and replacement. If such work is found to be not in accordance with the Contract Documents, the Contractor shall pay such cost.
- f) The inspection of the Work shall not relieve the Contractor of its obligation to fulfill the Contract as herein prescribed, or in any way alter the standard of performance provided by the Contractor, and defective work shall be made good and unusable materials may be rejected, notwithstanding that such work and materials have been previously overlooked by the Engineer and accepted or estimated for payment. If the Work or any part thereof shall be found defective, Contractor shall, within ten (10) calendar days, make good such defect in a manner satisfactory to the Engineer. If the Contractor shall fail or neglect to make ordered repairs of defective work or to remove the condemned materials from the Work within ten (10) calendar days after direction by the Engineer in writing, the DISTRICT may make the ordered repairs, or remove the condemned materials, and deduct the cost thereof from any monies due the Contractor.
- g) The Contractor shall furnish promptly without additional charge all facilities, labor and materials reasonably needed by the Engineer for performing all inspection and tests. Contractor shall be charged with any additional cost of inspection when material and workmanship are not ready at the time specified by the Contractor for its inspection.
- h) Where any part of the Work is being done under an encroachment permit or building permit, or is subject to Federal, State, County or City codes, laws, ordinances, rules or regulations, representatives of the government agency shall have full access to the Work and shall be allowed to make any inspection or tests in accordance with such permits, codes, laws, ordinances, rules, or regulations. If advance notice of the readiness of the Work for inspection by the governing agency is required, the Contractor shall furnish such notice to the appropriate agency.
- i) The Engineer may inspect production of the 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 or its authorized representative 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 DISTRICT assumes no obligation to inspect materials at the source of supply.
- j) Forty-eight (48) hours prior to work being accomplished, the Contractor will notify the Engineer of the proposed working hours to accomplish the work for that day. Overtime and shift work may be established as a regular procedure by the Contract and with the written permission of the Engineer. Such permission may be revoked at any time. No work other than overtime and shift work established as a regular procedure shall be done between the hours of 7 p.m. and 7 a.m., nor on Sundays or legal holidays, unless if such work as is necessary for the proper care and protection of the work already performed, or in case of an emergency.

All costs for the overtime inspection, including those occurring as a result of overtime and shift work established as a regular procedure, shall be paid for by the Contractor. Overtime inspection shall include inspection required during holidays, Saturdays, Sundays, and any weekday between the hours of 6 p.m and 7 a.m. Such costs will include, but will not necessarily be limited to, engineering, inspection, general supervision and other expenses which are directly chargeable to the overtime work. All such charges shall be deducted by the DISTRICT from payment due the Contractor.

- k) A prefinal inspection of the Work will be made by the DISTRICT and the Engineer. This inspection shall be made as soon as practical after Contractor has notified the DISTRICT in writing that the Work is ready for this inspection. The prefinal inspection shall be made prior to acceptance of any portion of the Work as being substantially complete and prior to filing the Notice of Completion.

A final inspection of all the Work will be made by the DISTRICT, Engineer, and Contractor.

#### B-20 Tests

The DISTRICT shall perform or witness all tests specified or required by the Technical Specifications. The responsibility for payment for these tests is also outlined in the Technical Specifications. In general, and unless explicitly stated otherwise, the Contractor is responsible for the performance of all tests required, and the payment for such tests is to be included in the Bid Item to which it relates. No additional payment will be made for the required testing. The Engineer will direct the Contractor to perform such tests as it deems necessary to determine the quality of work or compliance with Contract Documents. The Contractor shall furnish promptly without additional charge all facilities, labor, and material reasonably required for performing safe and convenient tests as may be required by the Engineer. The Contractor shall not be required to reimburse the DISTRICT for tests performed by the DISTRICT or Engineer above and beyond those outlined in the plans or specifications. If samples of materials are submitted which fail to pass the specified tests, the Contractor shall pay for all subsequent tests.

#### B-21 Removal of Rejected and Unauthorized Work and Materials

- a) All work or materials which have been rejected shall be remedied, or removed and replaced by the Contractor in an acceptable manner and no compensation will be allowed it for such removal, replacement, or remedial work.
- b) Any work done beyond the lines and grades shown on the plans or established by the Engineer or any extra work done without written authority will be considered as unauthorized work and will not be paid for. Upon order of the Engineer, unauthorized work shall be remedied, removed, or replaced at the Contractor's expense.
- c) Upon failure of the Contractor to comply with any order of the Engineer made under this Section, the DISTRICT may cause rejected or unauthorized work to be remedied, removed or replaced, and may deduct the costs therefor from any monies due or to become due the Contractor.
- d) If following the installation of any equipment furnished hereunder, defects requiring correction by the Contractor are found, the DISTRICT shall have the right to operate such unsatisfactory equipment and make reasonable use thereof until the equipment can be shut down for correction of defects without injury to the DISTRICT.

#### B-22 Deductions for Uncorrected Work

If the Engineer deems it inexpedient to correct work damaged or not done in accordance with the Contract, an equitable deduction from the Contract price shall be made therefor, and such sum may be withheld by DISTRICT from Contractor's payment.

B-23 Equipment and Plants

- a) If equipment is acquired by the contractor under this project and paid for by the DISTRICT, the use and disposition of the equipment shall be in compliance with 2 CFR Section 200.313.
- b) Only equipment and plants suitable to produce the quality of work and materials required will be permitted to operate on the project.
- c) Plants will be designed and constructed in accordance with general practice for such equipment and shall be of sufficient capacity to ensure the production of sufficient material to carry the Work to completion within the time limit.
- d) The Contractor shall provide adequate and suitable equipment and plants to meet the above requirements, and when ordered by the Engineer, shall remove unsuitable equipment from the Work and discontinue the operation of unsatisfactory plants.
- e) The Contractor shall identify each piece of its equipment, other than hand tools, by means of an identifying number plainly stenciled or stamped on the equipment at a conspicuous location, and shall furnish to the Engineer a list giving the description of each piece of equipment and its identifying number. In addition, the make, model number and empty gross weight of each unit of compacting equipment shall be plainly stamped or stenciled in a conspicuous place on the unit. The gross weight shall be either the manufacturer's rated weight or the scale weight.
- f) In the case of termination of this Contract before completion from any cause whatever, the Contractor, if notified to do so by the DISTRICT, shall promptly remove any part or all of its equipment and supplies from the property of the DISTRICT. If the Contractor fails to do so, the DISTRICT shall have the right to remove such equipment and supplies at the expense of the Contractor.

B-24 Character of Worker

The Contractor shall employ only competent Subcontractors or skillful workers to do the work. If any Subcontractor, or person employed by the Contractor or any Subcontractor shall fail or refuse to carry out the directions of the DISTRICT or its agents or shall appear to the DISTRICT or its agents to be incompetent or to act in a disorderly or improper manner, they shall be removed from the project Work immediately on the requisition of the DISTRICT or its agents, and such person shall not again be employed on the Work. Such discharge shall not be the basis for any claim for compensation or damages against the DISTRICT, or any of its officers or agents.

B-25 Separate Contracts

The DISTRICT reserves the right to let other contracts in connection with this work. The Contractor shall afford other contractors reasonable opportunity for the introduction and storage of their materials and the execution of their work, and shall properly connect and coordinate its work with the other contractor's work.

If any part of the Contractor's work depends for proper execution or results upon the work of any other contractor, the Contractor shall inspect and promptly report to the Engineer any defects in such work that render it unsuitable for such proper execution and results. The Contractor's failure to inspect and report shall constitute an acceptance of the other contractor's work as fit and proper for the reception of its work, except as to defects which may develop in the other contractor's work after the execution of its work.

To ensure the proper execution of its subsequent work, the Contractor shall measure work already in place and shall at once report to the Engineer any discrepancy between the executed work and the Drawings.

The DISTRICT may perform additional Work related to the Project itself, or it may let other contracts containing provisions similar to these. The Contractor will afford the other contractors who are parties to such contracts (or the DISTRICT, if the DISTRICT is performing the additional Work itself), reasonable opportunity for the introduction and storage of materials and equipment and the execution of Work and shall properly connect and coordinate his Work with theirs.

If the performance of additional Work by other contractors or the DISTRICT is not noted in the Contract Documents prior to the execution of the Contract, written notice thereof shall be given to the Contractor prior to starting any such additional Work. If the Contractor believes that the performance of such additional Work by the DISTRICT or others involves him in additional expense or entitles him to an extension of the Contract Time, he may make a claim therefore as provided in Section B-7 of this Contract.

**B-26 Materials, Services and Facilities**

- a) Unless otherwise specifically stated in the Contract Documents, the Contractor shall furnish all materials, labor, tools, equipment, water, light, power, transportation, supervision, temporary construction of any nature on all of the facilities necessary for the execution and completion of the Work. Unless otherwise specified, all materials shall be new and shall be manufactured, handled, and installed in a workmanlike manner to ensure completion of the Work in accordance with the Contract Documents. The Contractor shall, upon request of the Engineer, furnish satisfactory evidence as to the kind and quality of materials.
- b) Where materials are to be furnished by the DISTRICT, the type, size, quantity and location at which they are available will be stated in the Contract Documents.
- c) Manufacturers' warranties, guarantees, instruction sheets and parts listed, which are furnished with certain articles or materials incorporated in the Work, shall be delivered to the Engineer before acceptance of the Contract.
- d) Manufactured articles, materials and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned as directed by the manufacturer.
- e) Materials, supplies and equipment shall be in accordance with samples submitted by the Contractor and approved by the Engineer.
- f) Materials, supplies or equipment to be incorporated into the Work shall not be purchased by the Contractor or the Subcontractor subject to a chattel mortgage or under a conditional sale contract or other agreement by which an interest is retained by the seller.
- g) The completed Work shall include all necessary permanent safety devices, such as machinery guards and similar ordinary safety items required by the State and Federal (OSHA) industrial safety authorities and applicable local and national codes. Further, any features of the Work subject to such safety regulations shall be fabricated, furnished, and installed in compliance with these requirements. Prior to performing Work specified herein, the Contractor shall request an inspection by a State Industrial Safety representative for the purpose of determining that the facilities provided are in compliance with the State and Federal safety requirements. Any facilities which are deemed necessary by official response following the above safety inspection shall be added or corrected as required as a part of the Contract Work. However, no payment will be made to the Contractor for such changes or additions to equipment furnished under this Contract since it is a requirement of these Specifications that such equipment be manufactured or fabricated in such a manner as to be in conformance with all Federal, State, and local safety requirements. The Contractor shall notify all manufacturers, equipment suppliers, and Subcontractors of the provisions of this article.

- h) In approving equipment for installation in the project, the DISTRICT and Engineer assume no responsibility for injury or claims resulting from failure of the equipment to comply with applicable National, State, and local safety codes or requirements, or the safety requirements of a recognized agency, or failure due to faulty design concepts, or defective workmanship and materials.
- i) All materials incorporated into the job shall be new, especially purchased for the project unless otherwise specified or agreed in writing. Unless otherwise noted, any equipment offered shall be current modifications which have been in successful regular operation under comparable conditions for a period sufficient to determine the reliability of the product. This time requirement, however, does not apply to minor details nor to thoroughly demonstrated improvements in design or in materials of construction.
- j) Whenever the Contractor shall furnish materials or manufactured articles or shall do work for which no detailed specifications are set forth, the materials or manufactured articles shall be of the best grade in quality and workmanship obtainable in the market from firms of established good reputation, or, if not ordinarily carried in stock, shall conform to the usual standards of first-class materials or articles of the kind required with due consideration of the use to which they are to be put. In general, the work performed shall be in full conformity and harmony with the intent to secure the best standard of construction and equipment of the work as a whole or in part.
- k) If there is a residual inventory of unused supplies exceeding \$5,000 in total fair market value upon completion of the Project, the Contractor shall notify the DISTRICT and provide unused supplies to the location and at the time arranged, for unloading and storage. The DISTRICT shall compensate the grant awarding agency for its share (2 CFR Section 200.314).

**B-27 Storage of Materials**

Materials shall be so stored as to ensure the preservation of their quality and fitness for the Work. When considered necessary, they shall be placed on wooden platforms or other hard, clean surfaces, and not on the ground, and they shall be placed under cover. Stored materials shall be located so as to facilitate prompt inspection. Private property shall not be used for storage purposes without the written permission of the owner or lessee.

Electrical equipment, devices, and motors shall be placed in dry and warm storage as approved by the Engineer.

All equipment and materials which are not to be painted (such as aluminum and stainless steel) and all factory finished or coated equipment and materials which are not to be painted, that are installed prior to completion of adjacent work, shall be completely covered and protected.

Articles or materials to be incorporated in the Work shall be stored in such a manner as to ensure the preservation of their quality and fitness for the Work, and to facilitate inspection.

**B-28 Trade Names and Alternatives**

For convenience in designation in the Specifications and Plans, certain articles or materials to be incorporated in the Work may be designated under a trade name or the name of a manufacturer and its catalog information. The use of an alternative article or material which is of equal quality and of the required characteristics for the purpose intended will be permitted, subject to the following requirements:

- a) The burden of proof as to the quality and suitability of alternatives shall be upon the Contractor and it shall furnish all information necessary as required by the Engineer. The Engineer shall be the sole judge as to the quality and suitability of alternative articles or materials and its decision shall be final.
- b) Whenever the Specifications and Plans permit the substitution of a similar or equivalent material

or article, no tests or action relating to the approval of such substitute material or article will be made until the request for substitution is made in writing by the Contractor accompanied by complete data as to the equality of the material or article proposed. Such request by the Contractor must be made within thirty-five (35) calendar days after award of Contract.

**B-29 Certificate of Compliance**

- a) A Certificate of Compliance shall be furnished prior to the use of any materials for which the Technical Specifications require that such a certificate be furnished. In addition, when so authorized in the Specifications, the Engineer may permit the use of certain materials or assemblies prior to sampling and testing if accompanied by a Certificate of Compliance. The Certificate shall be signed by the manufacturer of the material or the manufacturer of assembled materials and shall state that the materials involved comply in all respects with the requirements of the Contract. A Certificate of Compliance shall be furnished with each lot of material delivered to the Work and the lot so certified shall be clearly identified in the Certificate.
- b) All materials used on the basis of a Certificate of Compliance may be sampled and tested at any time. The fact that material is used on the basis of a Certificate of Compliance shall not relieve the Contractor of responsibility for incorporating material in the Work which conforms to the requirements of the Contract Documents and any such material not conforming to such requirements will be subject to rejection whether in place or not.
- c) The DISTRICT reserves the right to refuse to permit the use of material on the basis of a Certificate of Compliance.
- d) The form of the Certificate of Compliance and its disposition shall be as directed by the Engineer.

**B-30 Assignment**

The Contractor shall not assign the Contract or sublet it as a whole or in part without the prior written consent of the DISTRICT, nor shall the Contractor assign any monies due, or to become due to it hereafter, without the prior written consent of the DISTRICT.

**B-31 Use of Completed Portions, Right to Operate Unsatisfactory Equipment or Facilities**

- a) The DISTRICT may, at any time, and from time to time, during the performance of the Work, enter the work site for the purpose of installing any necessary work by the DISTRICT labor or other contracts, and for any other purpose in connection with the installation of facilities. In doing so, the DISTRICT shall endeavor not to interfere with the Contractor and the Contractor shall not interfere with other work being done by or on behalf of the DISTRICT.
- b) If, prior to completion and final acceptance of all the Work, the DISTRICT takes possession of any structure or facility (whether completed or otherwise) comprising a portion of the Work with the intent to retain possession thereof (as distinguished from temporary possession contemplating the return to the Contractor), then, while the DISTRICT is in possession of the same, the Contractor shall be relieved of liability for loss or damage to such structure other than that resulting from the Contractor's fault or negligence. Such taking of possession by the DISTRICT shall not relieve the Contractor from any provisions of this Contract respecting such structure, other than to the extent specified in the preceding sentence, nor constitute a final acceptance of such structure or facility.
- c) If, following installation of any equipment or facilities furnished by the Contractor, defects requiring correction by the Contractor are found, the DISTRICT shall have the right to operate such unsatisfactory equipment or facilities and make reasonable use thereof until the equipment or facilities can be shut down for correction of defects without injury to the DISTRICT.

B-32 Lands for Work, Right-of-Way Construction Roads

- a) The DISTRICT will provide the lands, easements, and/or rights-of-way necessary or other rights to enter and work on lands necessary for the performance of the Work, except that it is the responsibility of the Contractor to finalize the Humboldt County Encroachment Permit. Other permits and licenses are addressed by sections B-13 and B-49. Should the Contractor find it advantageous to use any additional land for any purpose whatsoever, the Contractor shall provide for the use of such land at its expense. The Engineer shall be furnished with a copy of written agreements or otherwise be notified in writing of additional working space which is acquired. Nothing herein contained and nothing marked on the Plans shall be interpreted as giving the Contractor exclusive occupancy of the territory provided by the DISTRICT. When two or more contracts are being executed at one time on the same or adjacent land in such a manner that work on one contract may interfere with that on another, the Engineer shall decide which contractor shall cease work, and which shall continue, or whether the work on both contracts shall progress at the same time and in what manner, and the decision of the Engineer shall be final and binding. When the territory of one contract is the necessary or convenient means of access for the performance of another contract, such privilege of access or any other reasonable privilege may be granted by the Engineer to the contractor so desiring, to the extent, amount, in the manner, and at the time permitted. No such decision as to the method or time of conducting the work or the use of territory shall be the basis of any claim for delay or damage.
- b) The Contractor shall construct and maintain all roads necessary to reach the various parts of the Work and for the transportation thereto of construction material and personnel. The cost of constructing and maintaining such roads shall be borne by the Contractor.

B-33 District's Right to Audit and Preservation of Records

- a) The DISTRICT is responsible for obtaining audits in accordance with the Single Audit Act of 1996, in compliance with 2 CFR Section 200 Subpart F. The Contractor shall facilitate the completion of such an audit as it relates to the Contractor's work on this project.
- b) The Contractor shall maintain books, records and accounts of all costs in accordance with generally accepted accounting principles and practices. The DISTRICT, the Comptroller General of the United States, State of California, and its authorized representatives shall have the right to audit the books, records and accounts of the Contractor under any of the following conditions:
- (i) The Contract is terminated for any reason in accordance with the provisions of the Contract Documents in order to arrive at equitable termination costs;
  - (ii) In the event of a disagreement between the Contractor and the DISTRICT over the amount due the Contractor under the terms of the Contract;
  - (iii) To check or substantiate any amounts invoiced or paid which are required to reflect the costs of the Contractor, or the Contractor's efficiency or effectiveness under this Contract or in connection with extras, changes, claims, additions, backcharges, or others, as may be provided for in this Contract; and/or
  - (iv) If it becomes necessary to determine the DISTRICT's rights and the Contractor's obligations under the Contract or to ascertain facts relative to any claim against the Contractor which may result in a charge against the DISTRICT;
  - (v) To determine any difference in cost occasioned by a permissible substitution;
  - (vi) To make audits, examinations, excerpts, and transcriptions pertinent to the loan financing on this project.
  - (vii) For any other reason in the DISTRICT's sole judgment.
- c) If any of the conditions stated in paragraph B-33(b) are satisfied, Contractor shall provide the

DISTRICT (or its representatives), unlimited, reasonable access during working hours to the Contractor's books and records under the conditions stated above. The DISTRICT's audit rights shall be liberally construed in the DISTRICT's favor.

- d) The Contractor, from the effective date of final payment or termination hereunder, shall preserve and make available to the DISTRICT for a period of three (3) years thereafter, at all reasonable times at the office of the Contractor (but without any charge to the DISTRICT), all its books, records, documents, photographs, micro-photographs, and other evidence bearing on the costs and expenses of the Contractor under this Contract and relating to the Work hereunder.
- e) The DISTRICT will make all payments required of it under this Contract subject to audit, under circumstances stated above, which audit may be performed at the DISTRICT's option, either during the Contract time period or during the record retention time period. Regardless of authorization, approval or acceptance, signatures or letters which are given by the DISTRICT and are part of the DISTRICT's control systems or are requested by the Contractor, the payments made under this Contract shall not constitute a waiver or agreement by the DISTRICT that it accepts as correct the billings, invoices or other charges on which the payments are based. If the DISTRICT's audit produces a claim against the Contractor, the DISTRICT may pursue all its legal remedies even though it has made all or part of the payments required by this Contract.
- f) If any audit by the DISTRICT or its representative discloses an underpayment by the DISTRICT pursuant to the terms of the Contract Documents, the DISTRICT shall have the duty to pay any amount found by the audit to be owed to the Contractor. If such audit discloses an overpayment, the Contractor shall have the obligation to reimburse the DISTRICT for the amount of the overpayment. The DISTRICT's right to claim reimbursement from the Contractor of any overpayment shall not be terminated or waived until three years after the completion of the DISTRICT's audit or upon the termination of audit rights under subparagraph B-33(d), whichever date is later. The obligation of the Contractor to make reimbursements hereunder shall not terminate except as provided by law.

The DISTRICT's right to audit and the preservation of records shall terminate at the end of three (3) years after the date final payment is made or termination of the Contract. The Contractor shall include this "Right to Audit and Preservation of Records" clause in all subcontracts issued by it shall require the same to be inserted by all lower tier Subcontractors in their subcontracts, for any portion of the Work. Should Contractor fail to include this clause in any such contract or lower tier contract, or otherwise fail to ensure the DISTRICT's rights hereunder, Contractor shall be liable to the DISTRICT for all costs, expenses and attorney's fees which the DISTRICT may have to incur obtaining or attempting to obtain an audit or inspection of or the restoration of records which otherwise have been available to the DISTRICT from said persons under this clause. Such audit may be conducted by the DISTRICT or its authorized representative.



ARTICLE III. PROGRESS AND COMPLETION OF WORK

B-34 Progress Schedule

The Contractor shall submit to the DISTRICT such schedules of quantities and costs, progress schedules, payrolls, reports, estimates, records and other data, where applicable, as are required by the Contract Documents for the Work to be performed.

Prior to the first partial payment estimate, the Contractor shall submit construction progress schedules showing the order in which it proposes to carry on the Work, including dates at which it will start the various parts of the Work, estimated date of completion of each part and as applicable:

- a) The dates at which special detail drawings will be required; and
- b) Respective dates for submission of shop drawings, the beginning of manufacture, the testing and the installation of materials, supplies, and equipment.
- c) The Contractor shall also submit a schedule of payments that it anticipates it will earn during the course of the Work.

The progress schedules shall be submitted regularly and shall cover a time period satisfactory to the Engineer. The Contractor shall also forward to the Engineer, with the request for progress payment each month, a summary report of the progress of the various parts of the Work under the Contract in the shops and in the field, stating the existing status, rate of progress, estimated time of completion, and cause of delay, if any. If the Work is behind the submitted schedule, the Contractor shall submit in writing a plan acceptable to the DISTRICT and Engineer for bringing the Work up to schedule.

B-35 Commencement and Progress of the Work and Time of Completion

Prior to the start of construction, the DISTRICT will conduct a preconstruction conference. At the conference, the DISTRICT will review the planned development with the Engineer, Contractor, and other interested parties. Items to be reviewed include materials, equipment, rights-of-way, schedules and all arrangements for prosecuting the Work.

The Contractor shall begin work within twenty-one (21) calendar days after receiving a Notice to Proceed and shall diligently prosecute the work to completion within one hundred eighty (180) calendar days after beginning work. Engineer shall have the right to specify the locations where Contractor shall start and proceed with the Work.

B-36 Suspension of Work

- a) The Engineer may at any time, by notice in writing to the Contractor, suspend any part of the Work for such period of time as may be necessary to prevent improper execution of the Work on the project by the Contractor, its Subcontractors or agents, and the Contractor shall have no claim for damages or additional compensation on account of any such suspension.
- b) The DISTRICT may at any time suspend any part or all of the Work upon ten (10) calendar days written notice to the Contractor, who shall thereupon discontinue all Work suspended except for all operations to prevent loss or damage to Work already executed as may be directed by the Engineer. In the event a part of the Work is suspended, the Contractor, if the suspension is not through its fault or the fault of its Subcontractors or agents, shall be paid on the same basis as Extra Work for costs of work performed in accordance with such orders of the Engineer during such suspension, provided that this shall not include any cost pertaining to Work not suspended by said notice. Work shall be resumed by the Contractor after such suspension on written notice from the DISTRICT. In the event of suspension of the entire Work by the DISTRICT, the Contractor, if the suspension is not through fault of the Contractor or the fault of its Subcontractors or agents,

shall be paid the sum of \$500.00 for each calendar day during which the entire Work shall have been suspended. Said sum is hereby mutually agreed upon as fixed and liquidated damages in full settlement of all costs and expenses, losses and damages resulting to the Contractor from such suspension. Work shall be resumed by the Contractor after such suspension on written notice from the DISTRICT.

- c) In the event of any suspension of the Work in whole or in part under subsection (b) above, the Contractor shall be entitled to an extension of time wherein to complete the Work to the extent of the delay caused the Contractor thereby.
- d) In the event the entire Work shall be suspended by order of the DISTRICT, as hereinabove provided, and shall remain so suspended for a period of sixty (60) consecutive calendar days, through no fault of the Contractor, and notice to resume the Work shall not have been served on the Contractor as hereinabove provided, Contractor may, at its option, by written notice to the DISTRICT, terminate the Contract in the same manner as if the termination had been initiated by the DISTRICT, and the DISTRICT shall have no claim for damages because of such termination of the Contract.
- e) If, through no act or fault of the Contractor, the Work is suspended for a period of more than ninety (90) calendar days by the DISTRICT or under an order of Court or other public authority, or the Engineer fails to act on any request for payment within thirty (30) calendar days after it is submitted, or the DISTRICT fails to pay the Contractor substantially the sum approved by the Engineer or any final award by arbitration or litigation within sixty (60) calendar days of its approval and presentation, then the Contractor may, after ten (10) calendar days from delivery of a written notice to the DISTRICT and the Engineer, terminate the Contract and recover from the DISTRICT payment for all Work executed and all expenses sustained.

In addition and in lieu of terminating the Contract, if the Engineer has failed to act on a request for payment or if the DISTRICT has failed to make any payment as aforesaid, the Contractor may upon ten (10) calendar days written notice to the DISTRICT and the Engineer stop the Work until he has been paid all amounts then due, in which event and upon resumption of the Work, Change Orders shall be issued for adjusting the Contract Price or extending the Contract Time or both to compensate for the costs and delays attributable to the stoppage of the Work.

If the performance of all or any portion of the Work is suspended, delayed, or interrupted as a result of a failure of the DISTRICT or Engineer to act within the time specified in the Contract Documents, or if no time is specified, within a reasonable time, an adjustment in the Contract Price or an extension of the Contract Time, or both, shall be made by Change Order to compensate the Contractor for the costs and delays necessarily caused by the failure of the DISTRICT or Engineer.

If the Contractor intends to file a claim for additional compensation for a delay caused by the DISTRICT or Engineer at a particular time, the Contractor shall file a Notice of Claim with the DISTRICT within seven (7) calendar days of the beginning of the occurrence. The Notice of Claim shall be in duplicate, in writing, and shall state the circumstances and the reasons for the Claim, but need not state the amount. No Claim for additional compensation will be considered unless a Notice of Claim has been filed with the DISTRICT within the time and in the manner stated above. Contractor's failure to file a claim shall constitute a waiver.

**B-37 Termination For Default - Damages For Delay - Timely Extension**

- a) The Contractor shall at all times employ such force, plant, materials, and tools as will be sufficient, in the opinion of the Engineer, to prosecute the Work at not less than the rates fixed under the terms of the Contract and to complete the Work or any part thereof within the time limits fixed therein. If the Contractor refuses or fails to prosecute the Work, or any separable part

thereof, with such diligence as will ensure the completion within the time specified in the Contract, or any extension thereof, or fails to complete said Work within such time, the DISTRICT may, after giving ten (10) calendar days written notice to the Contractor, terminate its right to proceed with the Work or such part of the Work as to which there has been delay.

- b) The Contractor's right to proceed shall not be so terminated nor the Contractor charged with resulting damage if:
  - (i) The delay in the completion of the Work arises from unforeseeable causes beyond the control and without the fault or negligence of the Contractor, including but not restricted to Acts of God, acts of the public enemy, acts of the DISTRICT, acts of another contractor in the performance of a Contract with the DISTRICT, fires, floods, excluding site flooding due to groundwater, epidemics, quarantine restrictions, unusually severe weather, as determined by the Engineer; and
  - (ii) The Contractor shall, within 48 hours of the start of the occurrence, give notice to the DISTRICT of the cause of the potential delay and an estimate of the possible time extension involved. The Contractor, within seven (7) calendar days from the beginning of any such delay (unless the Engineer grants further period of time before the date of final payment under the Contract), notifies the Engineer in writing of the causes of delay and requests an extension of time.
  - (iii) The Engineer shall ascertain the facts and the extent of the delay and extend the time for completing the Work when, in its judgment, the findings of fact justify such an extension, and its findings of fact shall be final and conclusive on the parties.
- c) A request for an extension of time, or the granting of an extension of time, shall not constitute a basis for any claim against the DISTRICT for additional compensation or damages unless caused by the DISTRICT or another contractor employed by the DISTRICT.
- d) If the Contractor should be adjudged bankrupt, or if it should make a general assignment for the benefit of its creditors, or if a receiver should be appointed for the Contractor on account of its insolvency and not be discharged within ten (10) calendar days after its appointment, or if the Contractor should fail to make prompt payments to Subcontractors or suppliers, or should it persistently disregard laws, ordinances, or the instructions of the Engineer, or otherwise commit a substantial violation of any provisions of the Contract, the DISTRICT may, after giving ten (10) calendar days written notice to the Contractor, terminate the Contract and the Contractor's right to proceed with the Work.
- e) No extension of time will be considered for time lost due to weather conditions normal to the area. Unusual weather conditions, if determined by the Engineer to be of a severity that could not be predicted, may be considered as cause for an extension of Contract completion time.
- f) Delays in delivery of equipment or material purchased by the Contractor or his Subcontractors shall not be considered as a just cause for delay. The Contractor shall be fully responsible for the timely ordering, scheduling, expediting delivery, and installation of all equipment and materials.
- g) The rights and remedies of the DISTRICT provided in this section are in addition to any of the rights and remedies provided by law or under this Contract.
- h) In addition to the DISTRICT's rights under this section, if at any time before completion of the work under the Contract, it shall be determined by the DISTRICT that reasons beyond the control of the parties hereto render it impossible or against the interests of the DISTRICT to complete the Work, or if the Work shall be stopped by an injunction of a court of competent jurisdiction or by order of any competent authority, the DISTRICT may, upon ten (10) calendar days written notice to the Contractor, discontinue the Work and terminate the Contract. Upon service of such notice of termination, the Contractor shall discontinue the Work in such manner, sequence, and at such

times as the Engineer may direct. The Contractor shall have no claim for damages for such discontinuance or termination, nor any claim for anticipated profits on the Work thus dispensed with, nor any other claim except for the Work actually performed up to the time of discontinuance, including any extra work ordered by the Engineer to be done, nor for any claim for liquidated damages in accordance with the provisions of Section B-39.

**B-38 Rights of DISTRICT Upon Termination**

- a) In the event the right of the Contractor to proceed with the Work, or any portion thereof, has been terminated because of the fault of the Contractor and the Contractor has been given ten (10) calendar days' notice to cure such fault and has not done so, the DISTRICT may take over the Work and prosecute the same to completion by contract or any other method the DISTRICT deems expedient, and may take possession of and utilize in completing the Work such materials, appliances, equipment and plant as may be on the site of the Work and necessary therefor. Whether or not the Contractor's right to proceed with the Work is terminated, it and its sureties shall be liable for all damages including costs of managerial and administrative services, engineering, legal and other consultant fees, sustained or incurred by the DISTRICT in enforcing the provisions of Section B-37 and in completing or causing to complete the Contract Work.
- b) Upon termination the Contractor shall not be entitled to receive any further payment until the Work is finished. If upon completion of the Work the total cost to the DISTRICT, including engineering, legal and other consultant fees, costs of managerial and administrative services, construction costs, and liquidated damages shall be less than the amount which would have been paid if the Work had been completed by the Contractor in accordance with the terms of the Contract, then the difference shall be paid to the Contractor in the same manner as the final payment under the Contract. If the total cost incurred by the DISTRICT on account of termination of the Contract and subsequent completion of the Work by the DISTRICT by whatever method the DISTRICT may deem expedient shall exceed said amount which the Contractor would otherwise have been paid, the Contractor and its sureties shall be liable to the DISTRICT for the full amount of such excess expense.
- c) The rights and remedies of the DISTRICT provided in this section are in addition to any of the rights and remedies provided by the law or under this Contract.

**B-39 Failure to Complete the Work in the Time Agreed Upon - Liquidated Damages**

- a) Liquidated Damages - It is agreed by the parties to the Contract that time is of the essence; and that in case all the Work is not completed before or upon the expiration of the time limit as set in the Bid, Contract and Progress Schedule, or within any time extensions that may have been granted, damage will be sustained by the DISTRICT; and that it may be impracticable to determine the actual amount of damage by reason of such delay; and it is, therefore, agreed that the Contractor shall pay to the DISTRICT as damages the amount of \$750.00 per day for each and every day's delay in finishing the Work in excess of the number of days specified. The parties expressly agree that this liquidated damage clause is reasonable under the circumstances existing at the time the Contract was made. The DISTRICT shall have the right to deduct the amount of liquidated damages from any money due or to become due the Contractor.
- b) In addition, the DISTRICT shall have the right to charge to the Contractor and to deduct from the final or progress payments for the Work the actual cost to the DISTRICT of legal, engineering, inspection, superintendence, and other expenses, which are directly chargeable to the Contract and which accrue during the period of such delay, except that the cost of final inspection and preparation of the final estimate shall not be included in the charges.
- c) Exclusions - Notwithstanding the provisions of subsection (a), the Contractor shall not be liable for liquidated damages or delays caused by the removal or relocation of utilities when such

removal or relocation is the responsibility of the DISTRICT or the owner of the utility under Government Code Section 4215.

B-40 Clean-up

During the progress of the Work, the Contractor shall maintain the site and related structures and equipment in a clean, orderly condition and free from unsightly accumulation of rubbish. Upon completion of Work and before the final estimate is submitted, the Contractor shall at its own cost and expense remove from the vicinity of the Work all plants, buildings, rubbish, unused work materials, concrete forms, and temporary bridging and other like materials, belonging to it or used under its direction during the construction, and in the event of its failure to do so, the same may be removed by the DISTRICT after ten (10) calendar days' notice to the Contractor, such removal to be at the expense of the Contractor. Where the construction has crossed yards or driveways, they shall be restored by the Contractor to the complete satisfaction of the Engineer, at the Contractor's expense.

ARTICLE IV. LEGAL RELATIONS AND RESPONSIBILITY

B-41 Compliance with Laws - Permits, Regulations, Taxes

Contractor is an independent contractor and shall at its sole cost and expense comply with all laws, rules, ordinances and regulations of all governing bodies having jurisdiction over the Work, obtain all necessary permits and licenses therefor, pay all manufacturers' taxes, sales taxes, use taxes, processing taxes, and all Federal and State taxes, insurance and contributions for social security and unemployment which are measured by wages, salaries or any remuneration paid to Contractor's employees, whether levied under existing or subsequently enacted laws, rules, or regulations. Contractor shall also pay all property tax assessments on materials or equipment used until acceptance by the DISTRICT. If any discrepancy or inconsistency is discovered in the Plans or Specifications, or in this Contract in relation to any such law, rule, ordinance, regulation, order or decree, the Contractor shall forthwith report the same to the Engineer in writing. It shall also protect and indemnify the DISTRICT, the Engineer, and all of the DISTRICT's officers, agents, and servants against any claim or liability arising from or based upon the violation of any such law, rule, ordinance, regulation, order or decree, whether by the Contractor itself or by its employees. Particular attention is called to the following:

- a) Without limitation, materials furnished and performance by Contractor hereunder shall comply with Safety Orders of the Division of Industrial Safety, State of California, Federal Safety regulations of the Bureau of Labor, Department of Labor; and any other applicable Federal regulations.

The Contractor, upon request, shall furnish evidence satisfactory to the DISTRICT and Engineer that any or all of the foregoing obligations have been or are being fulfilled. The Contractor warrants to the DISTRICT that it is licensed by all applicable governmental bodies to perform this Contract and will remain so licensed throughout the progress of the Work, and that it has, and will have, throughout the progress of the Work, the necessary experience, skill and financial resources to enable it to perform this Contract.

Government code section references shall be interpreted to be the most recent applicable version.

B-42 Prevailing Wage

- a) The Contractor shall forfeit as penalty to the DISTRICT the sum of Two Hundred Dollars (\$200) for each calendar day or portion thereof for each worker (whether employed by the Contractor or Subcontractor) paid less than the stipulated prevailing rates for any Work done under the Contract in violation of the provisions of the Labor Code and in particular, Section 1775.
- b) The DISTRICT will not recognize any claims for additional compensation because of the payment of the wages set forth in the Contract Documents. The possibility of wage increases is one of the elements to be considered by the Contractor in determining its proposal, and will not under any circumstances be considered as the basis of a claim against the DISTRICT or the Engineer.
- c) The Contractor shall at all times keep posted at the jobsite current wage rates in effect for this Work.
- d) This is a Public Works Project, and California State prevailing wage rates will be required on this project. The DISTRICT requires that all contractors and subcontractors working on this project keep certified payroll records in accordance with California Labor Code 1776 and submit copies to the DISTRICT.
  - (i) In accordance with the provisions of section 1720 et seq. of the Labor Code, the Division of Labor Standards and Research has determined the general prevailing rates or wages and employer payments for health and welfare, pension, vacation, travel time, and subsistence pay

as provided for in section 1773.8.

- (ii) It shall be mandatory upon the Contractor herein and upon any Subcontractor to pay not less than the said specified rates to all laborers, workers and mechanics employed by them in the execution of the Agreement pursuant to CA Labor Code 1774.
- (iii) Attention is directed to the provisions in section 1777.5 and sections 1777.6 of the Labor Code concerning the requirement to employ apprentices by the Contractor or any Subcontractor under it. The Contractor shall submit documentation to the DISTRICT confirming compliance with these requirements.
- (iv) The Contractor shall comply with and shall cause his subcontractors to comply with all laws and regulations governing the contractor's and subcontractor's performance on this project including, but not limited to: anti-discrimination laws, workers' compensation laws, and prevailing wage laws as set forth in CA Labor Code, Sections 1720-1861 et seq. and licensing laws, as well as Federal Labor Standards set forth in the Davis-Bacon Act (40 USC 276(a-a5), the Copeland "Anti-Kickback" Act (40 USC 276(c); and the Contract Work Hours and Safety Standards Act (CWHSSA) (40 USC 327-333). The contractor is required to include the prevailing wage language in all subcontracts pursuant to CA Labor Code 1775(E)(b)(1). The Contractor shall post, at appropriate conspicuous points on the site of the Project, a schedule showing all the determined general prevailing wage rates.
- (v) The Contractor agrees to comply with Labor Code Section 1775 (Payment of the Prevailing Wage Rates) and Labor Code 1776 (keeping accurate records) and Labor Code 1777.5, placing responsibility for compliance with the statutory requirements for all apprenticeable occupations on the prime contractor. The Contractor shall comply with the requirements imposed by the California Labor Code Sections 1720 through 1861 regarding public works projects and prevailing wage laws and sections 16000-16800 of the CA Code of Regulations.
- (vi) Each worker needed to execute the work must be paid travel and subsistence payments as defined in the applicable collective bargaining agreements filed in accordance with Labor Code Section 1773.8.
- (vii) Holiday and overtime work when permitted by law shall be paid for at a rate of at least one and one-half times the above specified rate of per diem wages, unless otherwise specified.
- (viii) Contractors and any Subcontractors shall be assessed penalties for violating the following labor codes; CA Labor Code 1813 for overtime, 1775 for underpayment of the prevailing wage, and 1776 for inaccurate or incomplete payroll records.

#### B-43 Labor Compliance and Discrimination

Pursuant to Labor Code section 1771.4, the Contract for this Project is subject to compliance monitoring and enforcement by the California Department of Industrial Relations.

- a) On each job site that is subject to compliance monitoring and enforcement by the Department of Industrial Relations under this subchapter, the prime contractor shall post a Notice containing the following language:

"This public works project is subject to monitoring and investigative activities by the Division of Labor Standards Enforcement (DLSE), Department of Industrial Relations, State of California. This Notice is intended to provide information to all workers employed in the execution of the contract for public work and to all contractors and other persons having access to the job site to enable the DLSE to ensure compliance with and enforcement of prevailing wage laws on public works projects."

"The prevailing wage laws require that all workers be paid at least the minimum hourly wage as determined by the Director of Industrial Relations for the specific classification (or type of work) performed by workers on the project. These rates are listed on a separate job site posting of minimum prevailing rates required to be maintained by the public entity which awarded the public works contract. Complaints concerning nonpayment of the required minimum wage rates to

**McKinleyville Community Services District**  
McKinleyville BMX Track and Park Project

workers on this project may be filed with the DLSE.”

Local Office Contact Information:

Telephone Number: 844-522-6734  
Address: BOFE – Public Works  
Attn: Complaints Unit  
2031 2031 Howe Ave, Suite 100  
Sacramento, CA 95825

“Complaints should be filed in writing immediately upon discovery of any violations of the prevailing wage laws due to the short period of time following the completion of the project that the DLSE may take legal action against those responsible.”

“Complaints should contain details about the violations alleged (for example, wrong rate paid, not all hours paid, overtime rate not paid for hours worked in excess of 8 per day or 40 per week, etc.) as well as the name of the employer, the public entity which awarded the public works contract, and the location and name of the project.”

“For general information concerning the prevailing wage laws and how to file a complaint concerning any violation of these prevailing wage laws, you may contact any DLSE office. Complaint forms are also available at the Department of Industrial Relations website found at [www.dir.ca.gov/dlse/PublicWorks.html](http://www.dir.ca.gov/dlse/PublicWorks.html).”

Attention is directed to Section 1735 of the Labor Code, which reads as follows:

- a) No discrimination shall be made in the employment of persons upon public works because of the race, religious creed, color, national origin, ancestry, physical disability, mental disability, medical condition, genetic information, marital status, sex, gender, gender identity, gender expression, age, sexual orientation, or military and veteran status of such persons, except as provided in Section 12940 of the Government Code, and every Contractor for public works violating this section is subject to all the penalties imposed for a violation of this chapter.

Federal Equal Opportunity Clauses from 41 CFR 60 1.4(b) also apply. See Part 4 for detailed outline of Federal requirements. See Part 5 for required Non-discrimination Form.

**B-44 Eight-Hour Day Limitation**

- a) In accordance with the provisions of the Labor Code, and in particular, Sections 1810 to 1815 thereof, inclusive, eight hours labor shall constitute a day's work, and no worker, in the employ of said Contractor, or any Subcontractor, doing or contracting to do any part of the Work contemplated by this Contract, shall be required or permitted to work more than eight (8) hours in any one calendar day and forty (40) hours in any one calendar week in violation of those provisions; provided that subject to Labor Code Section 1815, a worker may perform work in excess of either eight (8) hours per day or forty (40) hours during any one week upon compensation for all hours worked in excess of eight (8) hours per day or forty (40) hours during any one week at not less than one and one-half times the basic rate of pay.
- b) The Contractor and each Subcontractor shall also keep an accurate record showing the names, addresses, social security numbers, work classifications, straight time and overtime hours worked each day and week, and the actual per diem wages paid to each journeyman, apprentice, worker, or other employee employed by the Contractor and by the Subcontractor in connection with the work specified herein, which record shall be open at all reasonable hours to the inspection of the DISTRICT, State and Federal officers and agents; and it is hereby further agreed that, except as



provided in (a) above, the Contractor shall forfeit as a penalty to the DISTRICT the sum of one hundred dollars (\$100) for each worker employed in the performance of this Contract by it or by any Subcontractor under it for each calendar day during which such worker is required or permitted to labor more than eight (8) hours in any one calendar day and forty (40) hours in any one calendar week in violation of Sections 1810 through 1815.

**B-45 Compliance with State Requirements for Employment of Apprentices**

The Contractor's attention is directed to Section 1777.2 through 1777.5 of the Labor Code; provisions of those Sections pertaining to employment of registered apprentices are hereby incorporated by reference into these Specifications. As applicable, the Contractor or any Subcontractor employed by it in the performance of the Contract work shall take such actions as necessary to comply with the provisions of Section 1777.5. Contractor shall provide the DISTRICT copies of applicable forms or equivalent: DAS 140 – Public Works Contract Award Information; CAC2 – Training Fund Contributions; and any other communications relating to apprentices on public works projects. Contractor shall be solely liable for any and all fines assessed by the DIR or other agency or entity for non-compliance with any prevailing wage requirements.

**B-46 Underground Utilities**

In accordance with Government Code Section 4215, the Contractor shall be compensated for the costs of locating, repairing damage not due to the failure of the Contractor to exercise reasonable care, and removing or relocating existing main or trunkline utility facilities not indicated in the Contract Plans and Specifications with reasonable accuracy, and for the equipment on the project necessarily idled during such work; provided that the Contractor shall first notify the Engineer before commencing work on locating, repairing damage to, removing or relocating such utilities.

**B-47 Water Pollution**

The Contractor shall exercise every reasonable precaution to protect streams, lakes, reservoirs, and other waters of the state and/or United States from pollution with fuels, oils, bitumens, calcium chloride, and other harmful materials and shall conduct and schedule its operations so as to avoid or minimize muddying and silting of said streams, lakes, reservoirs, and water bodies. Care shall be exercised to preserve vegetation beyond the limits of construction. The Contractor shall comply with Section 5650 of the California Fish and Wildlife Code, the National Pollution Discharge Elimination System (NPDES), State of California Construction General Permit, and all other applicable statutes and regulations relating to the prevention and abatement of water pollution.

**B-48 Payment of Taxes**

The Contract prices paid for the Work shall include full compensation for all taxes which the Contractor is required to pay, whether imposed by Federal, State, or local governments.

**B-49 Permits and Licenses**

Except as otherwise provided in this Contract, the Contractor shall procure all permits and licenses, pay all charges and fees, and give all notices necessary and incident to the lawful prosecution of the Work.

Procurement procedures shall be in conformance with 2 CFR Section 200.320.

**B-50 Patents**

The Contractor shall pay all applicable royalties and license fees and assume all costs arising from the use of patented materials, equipment and devices. The Contractor shall defend all suits or claims for infringement of any patent rights and save the DISTRICT and Engineer and their duly authorized representatives harmless from loss on account thereof, except that the DISTRICT shall be responsible for

any such loss when a particular process, design, or the product of a particular manufacturer or manufacturers is specified; however if the Contractor has reason to believe that the design, process or product specified is an infringement of a patent, he shall be responsible for such loss unless he promptly gives such information to the Engineer.

**B-51 Public Convenience**

- a) This section defines the Contractor's responsibility with regard to convenience of the public and public traffic in connection with its operations.
- b) The Contractor shall so conduct its operations as to offer the least possible obstruction and inconvenience to the public and it shall have under construction no greater length or amount of work than it can prosecute properly with due regard to the rights of the public.
- c) Unless otherwise provided in the Contract Documents, all public traffic shall be permitted to pass through the Work with as little inconvenience and delay as possible.
- d) Spillage resulting from hauling operations along or across any publicly traveled way shall be removed immediately by the Contractor at the Contractor's expense.
- e) Construction operations shall be conducted in such a manner as to cause as little inconvenience as possible to abutting property owners.
- f) Convenient access to driveways, houses and buildings along the line of the Work shall be maintained and temporary approaches to crossings or intersecting highways shall be provided and kept in good condition. When the abutting property owner's access across the right-of-way line is to be eliminated, or to be replaced under the Contract by other access facilities, the existing access shall not be closed until the replacement access facilities are usable.
- g) Water shall be supplied if ordered by the Engineer for the alleviation or prevention of dust nuisance as provided in the Contract Documents.
- h) In order to expedite the passage of public traffic through or around the Work and where ordered by the Engineer, the Contractor shall install signs, lights, flares, barricades, and other facilities for the sole convenience and direction of public traffic. Also, where directed by the Engineer, the Contractor shall provide and station competent flagpersons whose sole duties shall consist of directing the movement of public traffic through or around the Work. The cost of furnishing and installing such signs, lights, flares, barricades, and other facilities, and the cost of providing and stationing such flagpersons, all for the convenience and direction of public traffic, will be considered as included in the Contract price and no additional compensation will be allowed.
- i) Flagpersons and guards, while assigned to traffic control, shall perform their duties and shall be provided with the necessary equipment in accordance with the current "Instructions to Flagmen" of the California Department of Transportation. The equipment shall be furnished and kept clean and in good repair by the Contractor at its expense.

**B-52 Safety**

- a) General - The Contractor shall be solely and completely responsible for the conditions of the job site, including safety of all persons and property during performance of the Work. This requirement shall apply continuously and not be limited to normal working hours. Safety provisions shall conform to all applicable Federal, State, and local laws, ordinances, and codes, and to the rules and regulations established by the California Division of Industrial Safety, and to other rules of law applicable to the Work.
- b) The services of the Engineer in conducting construction review of the Contractor's performance is

not intended to include review of the adequacy of the Contractor's work methods, equipment, bracing or scaffolding or safety measures, in, on, or near the construction site, and shall not be construed as supervision of the actual construction nor make the Engineer or the DISTRICT responsible for providing a safe place for the performance of work by the Contractor, Subcontractors, or suppliers; or for access, visits, use work, travel or occupancy by any person.

- c) The Contractor shall carefully instruct all personnel working in potentially hazardous work areas as to the potential dangers and shall provide such necessary safety equipment and instruction as is necessary to prevent injury and damage to property. The Contractor shall appoint for the duration of this Contract, a qualified supervisor employee to develop and/or supervise the Contractor's job safety program that will effectively implement the safety provisions of the above agencies.
- d) The Contractor, as a part of its safety program, shall maintain at its office or other well-known place at the job site, safety equipment applicable to the Work as prescribed by the aforementioned authorities, all articles necessary for giving first aid to the injured, and shall establish the procedure for the immediate removal to a hospital or a doctor's care of persons (including employees) who may be injured on the job site.
- e) If death or serious injuries or serious damages are caused, the accident shall be reported immediately by telephone or messenger to both the Engineer and the DISTRICT. In addition, the Contractor must promptly report in writing to the Engineer all accidents whatsoever arising out of, or in connection with, the performance of the Work whether on, or adjacent to, the site, giving full details and statements of witnesses.
- f) If any claim is made by anyone against the Contractor or any subcontractor on account of any accident, the Contractor shall promptly report the facts in writing to the Engineer, giving full details of the claim.
- g) All work and materials shall be in strict accordance with all applicable State, Federal, and local laws, rules, regulations, and codes.
- h) Nothing in this Contract is to be construed to permit work not conforming to governing law. When Contract Documents differ from governing law, the Contractor shall furnish and install the higher standards called for without extra charge. All equipment furnished shall be grounded and provided with guards and protection as required by safety codes. Where vapor-tight or explosion-proof electrical installation is required by law, this shall be provided.
- i) Shoring and Trench Safety Plan - Attention is directed to Section 832 of the Civil Code of the State of California relating to lateral and subjacent support, and the Contractor shall comply with this law.
- j) Trenching and Worker Protection - In accordance with Section 6705 of the State Labor Code, the Contractor shall submit to the DISTRICT specific plans to show details of provisions for worker protection from caving ground. Not less than thirty (30) calendar days before beginning excavation for any trench or trenches five (5) feet or more in depth required under this Contract, the Contractor shall furnish to the Engineer working drawings of its trench safety plan. The trench safety plan working drawings shall be detailed plans showing the design of shoring, bracing, sloping or other provisions to be made for worker protection from the hazard of caving ground. If such plan varies from the shoring system standards established by the Construction Safety Orders of the California Department of Industrial Relations or the Federal Safety and Health Regulations for Construction of the Occupational Safety and Health Administration, Department of Labor, the plan shall be prepared by a registered civil or structural engineer. In no event shall the Contractor use a shoring, sloping, or protective system less effective than that required by said Construction Safety Orders, or less effective than that required by said Federal Safety and Health Regulations

for Construction. Submission of this plan in no way relieves the Contractor from the requirement to maintain safety in all operations performed by it or its Subcontractors.

- k) Hazardous Wastes and Unforeseen Conditions - In accordance with Section 7104 of the State Public Contract Code, if the Work contemplated hereunder involves digging trenches or other earthwork activities, the Contractor shall promptly, and before the following conditions are disturbed, notify the DISTRICT, in writing, of any: (i) material that the Contractor believes may be material that is hazardous waste, as defined in Section 25117 of the Health and Safety Code, that is required to be removed to a Class I, Class II, or Class III disposal site in accordance with provisions of existing law; (ii) Subsurface or latent physical conditions at the site differing from those indicated; or (iii) unknown physical conditions at the site of any unusual nature, different materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract. The DISTRICT shall promptly investigate the conditions, and if it finds that the conditions do materially so differ, or do involve hazardous waste, and cause a decrease or increase in the Contractor's cost of, or the time required for, performance of any part of the Work shall issue a change order under the procedures described herein. In the event that a dispute arises between the DISTRICT and the Contractor whether the conditions materially differ, or involve hazardous waste, or cause a decrease or increase in the Contractor's cost of, or time required for, performance of any part of the Work, the Contractor shall not be excused from any scheduled completion date provided for herein, but shall proceed with all Work to be performed hereunder. The Contractor shall retain any and all rights provided either by contract or by law which pertain to the resolution of disputes and protests between the DISTRICT and Contractor.
- l) The Contractor shall perform all Work in a fire-safe manner. The Contractor shall supply and maintain onsite adequate firefighting equipment capable of extinguishing incipient fires. The Contractor shall comply with applicable Federal, State, and local fire prevention regulations and where the regulations do not cover, with applicable parts of the National Fire Prevention Standard for "Safeguarding Building Construction Operations," (NFPA No. 241).

**B-53 Protection of Person and Property**

- a) The Contractor shall take whatever precautions are necessary to prevent damage to all existing improvements, including above ground and underground utilities, trees, shrubbery that is not specifically shown to be removed, fences, signs, mailboxes, survey markers and monuments, buildings, structures, the DISTRICT's property, adjacent property, and any other improvements or facilities within or adjacent to the Work. If such improvements or property are injured or damaged by reason of the Contractor's operations, they shall be replaced or restored, at the Contractor's expense, to a condition at least as good as the condition they were in prior to the start of the Contractor's operations.
- b) The Contractor shall adopt all practical means to minimize interference to traffic and public inconvenience, discomfort or damage. The Contractor shall protect against injury any pipes, conduits or other structures, crossing the trenching or encountered in the Work and shall be responsible for any injury done to such pipes or structures, or damage to property resulting therefrom. The Contractor shall support or replace any such structures without delay and without any additional compensation to the entire satisfaction of the Engineer. All obstructions to traffic shall be guarded by barriers illuminated at night. The Contractor shall be responsible for all damage to persons and property directly or indirectly caused by its operations and, under all circumstances, the Contractor must comply with the laws and regulations of the County and the State of California relative to safety of persons and property and the interruption of traffic and the convenience of the public within the respective jurisdictions.
- c) The Contractor is cautioned that it must replace all improvements in rights-of-way and within the public streets to a condition equal to what existed prior to the Contractor's entry onto the job.

- d) Type and time of construction required at any road subject to interference by Contract work will be determined by those authorities responsible for maintenance of said road. It shall be the responsibility of the Contractor to determine the nature and extent of all such requirements, including provision of temporary detours as required. As required at any road crossing, the Contractor shall provide all necessary flagpersons, guardrails, barricades, signals, warning signs and lighting to provide for the safety of existing roads and detours. Immediately after the need for temporary detours ceases, or when directed, the Contractor shall remove such detours and perform all necessary cleanup work, including replacement of fences, and removal of pavement. Included shall be all necessary replacement of existing roadway appurtenances, grading work, soil stabilization and dust control measures, as required and directed. The cost of all work specified under this Section shall be borne by the Contractor.
- e) The Contractor shall examine all bridges, culverts, and other structures over which it will move its materials and equipment, and before using them, it shall properly strengthen such structures where necessary. The Contractor shall be responsible for any and all injury or damage to such structures caused by reason of its operations.

**B-54 Responsibility for Repair of Facilities**

All public or private facilities, including but not limited structures, telephone cables, roadways, parking lots, private drives, levees and embankments disturbed during construction of the Work shall be repaired and/or replaced by the Contractor to match facilities existing prior to construction. In addition, the Contractor shall be responsible for any settlement damage to such facilities or adjoining areas for a period of one year after acceptance of such required facilities.

**B-55 Resolution of Construction Claims**

- a) For any claim arising under this Contract, the following procedures will apply:
  - (i) The claim must be in writing and include the documents necessary to substantiate the claim. Claims must be filed on or before the day of final payment. Nothing in this subsection is intended to extend the time limit or supersede notice requirements for the filing of claims as set forth elsewhere in this Contract.
  - (ii) The parties shall attempt to resolve the claim according to procedures outlined in Public Contract Code § 9204.
- b) The Contractor shall proceed with the Work in accordance with the Plans and Specifications and determinations and instructions of the Engineer during the resolution of any claims disputes.

**B-56 DISTRICT's Repair**

In the event the Contractor refuses or neglects to make good any loss or damage for which the Contractor is responsible under this Contract, the DISTRICT may itself, or by the employment of others, make good any such loss or damage, and the cost and expense of doing so, including any reasonable engineering, legal and other consultant fees, and any costs of administrative and managerial services, shall be charged to the Contractor. Such costs and expenses may be deducted by the DISTRICT from claims for payment made by the Contractor for Work completed or remaining to be completed.

**B-57 Antitrust Claim Assignment**

In entering into a public works contract or a subcontract to supply goods, services, or materials pursuant to this Contract, the Contractor and all subcontractors shall offer and agree to assign to the DISTRICT all rights, title, and interest in and to all causes of action it may have under Section 4 of the Clayton Act (15 U.S.C. Sec. 15) or under the Cartwright Act (Chapter 2 (commencing with Section 16700) of Part 2 of Division 7 of the Business and Professions Code), arising from purchases of goods, services or materials

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pursuant to the public works contract or subcontract. This assignment shall be made and become effective at the time the DISTRICT tenders final payment to the Contractor, without further acknowledgement by the parties.

**B-58 Waiver of Right to Rescind For Material Breach**

The Contractor agrees that it can be adequately compensated by money damages for any breach of this Contract which may be committed by the DISTRICT and hereby agrees that no default, act, or omission of the DISTRICT or the Engineer, except for failure to make progress payments as a required by Section B-67, shall constitute a material breach of the Contract entitling the Contractor to cancel or rescind the provisions of this Contract or (unless the DISTRICT shall so consent or direct in writing) to suspend or abandon performance of all or any part of the Work. The Contractor hereby waives any and all rights and remedies to which it might otherwise be or become entitled, save only its right to money damages.

**B-59 Contractor's License Notice**

Contractors are required by law to be licensed and regulated by the Contractors' State License Board which has jurisdiction to investigate complaints against contractors of a complaint if filed within three (3) years of the date of the alleged violation. Any questions concerning a contractor may be referred to the Registrar, Contractors' State License Board, 9835 Goethe Road, Sacramento, California. Mailing address: P.O. Box 26000, Sacramento, California 95826.

ARTICLE V. INSURANCE AND LIABILITY

B-60 Insurance

- a) Neither the Contractor nor any Subcontractors shall commence any work until all required insurance has been obtained at their own expense. Such insurance must have the approval of the DISTRICT as to limit, form, and amount, and shall be placed with insurers with a current A.M. Best's rating of no less than A:VII.
- b) Any insurance bearing on adequacy of performance shall be maintained after completion of the project for the full guarantee period.
- c) Prior to execution of the Contract, the Contractor shall furnish the DISTRICT with original endorsements effecting coverage for all policies required by the Contract. The Contractor shall not permit any Subcontractor identified in the Designation of Subcontractors form to commence work on this project until such Subcontractor has furnished the DISTRICT with original endorsements effecting coverage for all insurance policies required by the Contract. The endorsements shall be signed by a person authorized by the insurer to bind coverage on its behalf. The Contractor's insurer shall provide complete, certified copies of all required insurance policies, including endorsements affecting the coverage required by this paragraph. The Contractor agrees to furnish one copy of each policy to the DISTRICT, and additional copies as requested in writing, certified by an authorized representative of the insurer.
- d) All of the Contractor's policies shall contain an endorsement providing that written notice shall be given to the DISTRICT at least sixty (60) calendar days prior to termination, cancellation, or reduction of coverage in the policy.
- e) Any policy or policies of insurance that the Contractor elects to carry as insurance against loss or damage to its construction equipment and tools shall include a provision therein providing a waiver of the insurer's right to subrogation against the DISTRICT and the Engineer.
- f) The requirements as to the types, limits, and the DISTRICT's approval of insurance coverage to be maintained by the Contractor are not intended to and shall not in any manner limit or qualify the liabilities and obligations assumed by the Contractor under the Contract.
- g) In addition to any other remedy the DISTRICT may have, if the Contractor or any of the Subcontractors fails to maintain the insurance coverage as required in this Section, the DISTRICT may obtain such insurance coverage as is not being maintained, in form and amount substantially the same as required herein, and the DISTRICT may deduct the cost of such insurance from any amounts due or which may become due the Contractor under this Contract.
- h) The Contractor and all Subcontractors shall, at their expense, maintain in effect at all times during the performance of work under the Contract not less than the following coverage and limits of insurance, which shall be maintained with insurers and under forms of policy satisfactory to the DISTRICT. The maintenance by the Contractor and all Subcontractors of the following coverage and limits of insurance is a material element of this Contract. The failure of the Contractor or any Subcontractor to maintain or renew coverage or to provide evidence of renewal may be treated by the DISTRICT as a material breach of this Contract.
  - (i) Worker's Compensation and Employer's Liability Insurance.
    - a. Worker's Compensation – The Contractor shall Provide, during the life of this Contract, workers' compensation insurance for all of the employees engaged in Work under this Contract, on or at the Project site, and, in case any of sublet Work, the Contractor shall require each subcontractor similarly to provide workers' compensation insurance for all the latter's employees as prescribed by State law. Any class of employee or employees not

covered by a subcontractor's insurance shall be covered by the Contractor's insurance. In case any class of employees engaged in work under this Contract, on or at the Project site, is not protected under the Workers' Compensation Statutes, the Contractor shall provide or shall cause a subcontractor to provide, adequate insurance coverage for the protection of such employees not otherwise protected. The Contractor is required to secure payment of compensation to his employees in accordance with the provisions of Section 3700 of the Labor Code. The Contractor shall file with the DISTRICT certificates of its insurance protecting workers and shall provide certificates at any time upon request. Company or companies providing insurance coverage shall be acceptable to the DISTRICT, if in the form and coverage as set forth in the Contract Documents.

- b. Contractor shall assume the immediate defense of and indemnify and save harmless the DISTRICT and its officers and employees, agents, and consultants from all claims, loss, damage, injury, and liability of every kind, nature, and description brought by any person employed or used by Contractor, or any subcontractor, to perform the Work under this contract regardless of responsibility or negligence. Contractor hereby agrees to waive rights of subrogation which any insurer of Contractor may acquire from Contractor by virtue of the payment of any loss. Contractor agrees to obtain any endorsement that may be necessary to effect this waiver of subrogation. The Workers' Compensation Policy shall be endorsed with a waiver of subrogation in the favor of the DISTRICT for all work performed by the Contractor, its employees, agents and subcontractors.
  - c. The Contractor and all Subcontractors shall maintain insurance to protect the Contractor or Subcontractor from all claims under Worker's Compensation and Employer's Liability Acts, including Longshoremen's and Harbor Worker's Act. Such coverage shall be maintained, in type and amount, in strict compliance with all applicable State and Federal statutes and regulations. The Contractor shall execute a certificate in compliance with Labor Code Section 1861.
- (ii) Claims Against DISTRICT - If an injury occurs to any employee of the Contractor or any of the Subcontractors for which the employee or its dependents, in the event of its death, may be entitled to compensation from the DISTRICT under the provisions of the said Acts, or for which compensation is claimed from the DISTRICT, there will be retained out of the sums due the Contractor under this Contract, an amount sufficient to cover such compensation as fixed by said Acts, until such compensation is paid or it is determined that no compensation is due. If the DISTRICT is required to pay such compensation, the amount so paid will be deducted and retained from such sums due, or to become due the Contractor.
- (iii) Commercial General Liability and Automobile Liability Insurance - the Contractor shall provide and maintain the following commercial general liability and automobile liability insurance:
- a. Coverage – coverage for commercial general liability and automobile liability insurance shall be at least as broad as the following:
    - i. Insurance Services Office (ISO) Commercial General Liability Coverage (Occurrence Form CG 0001)
    - ii. Insurance Services Office (ISO) Business Auto Coverage (Form CA 0001), covering Symbol 1 (any auto)
  - b. Limits – the Contractor shall maintain limits no less than the following:
    - i. General Liability - Five million dollars (\$5,000,000) per occurrence or the full per occurrence limits of the policies available, whichever is greater for bodily injury, personal injury and property damage. If Commercial General Liability Insurance or other form with a general aggregate limit or products-completed operations aggregate limit is used, either the general aggregate limit shall apply separately to the project/location (with the ISO CG 2503, or ISO CG 2504, or insurer's equivalent endorsement provided to DISTRICT) or the general aggregate limit and products-completed operations aggregate limit shall be twice the required occurrence limit.
    - ii. Automobile Liability - One million dollars (\$1,000,000) for bodily injury and property damage each accident limit.



- c. Required Provisions - the general liability, auto liability and excess liability policies are to contain, or be endorsed to contain, the following provisions:
- i. The DISTRICT, its directors, officers, employees, and authorized volunteers are to be given insured status at least as broad as ISO endorsement CG 2010 11 85; or both CG 20 10 10 01 and CG 20 37 04 13 (or the CG 20 10 04 13 (or earlier edition date) specifically naming all of the DISTRICT parties required in this agreement, or using language that states "as required by contract"). All Subcontractors hired by Contractor must also have the same forms or coverage at least as broad; as respects (via CG 20 38 04 13): liability arising out of activities performed by or on behalf of the Contractor; products and completed operations of the Contractor; premises owned, occupied or used by the Contractor; and automobiles owned, leased, hired or borrowed by the Contractor. The coverage shall contain no special limitations on the scope of protection afforded to the DISTRICT, its directors, officers, employees, or authorized volunteers.
  - ii. It is understood and agreed to by the parties hereto and the insurance company(s), that the Certificate(s) of Insurance and policies shall so covenant and shall be construed as primary, and the DISTRICT insurance and/or deductibles and/or self-insured retentions or self-insured programs shall not be construed as contributory using the ISO endorsement CG 20 01 04 13 or coverage at least as broad.
  - iii. Any failure to comply with reporting or other provisions of the policies including breaches of warranties shall not affect coverage provided to the DISTRICT, its directors, officers, employees, or authorized volunteers.
  - iv. The Contractor's insurance shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the limits of the insurer's liability.
  - v. Each insurance policy required above shall provide that coverage shall not be canceled, except with notice to the DISTRICT.
- d. Such liability insurance shall indemnify the Contractor and his/her sub-contractors against loss from liability imposed by law upon, or assumed under contract by, the Contractor or his/her sub-contractors for damages on account of such bodily injury (including death), property damage, personal injury, completed operations, and products liability.
- e. The general liability policy shall cover bodily injury and property damage liability, owned and non-owned equipment, blanket contractual liability, completed operations liability, explosion, collapse, underground excavation, and removal of lateral support.
- f. The automobile liability policy shall cover all owned, non-owned, and hired automobiles.
- g. All of the insurance shall be provided on policy forms and through companies satisfactory to the DISTRICT.
- h. The comprehensive general and automobile liability insurance coverage shall also include the following:
- i. Provision or endorsement naming the DISTRICT, the Engineer and its consultants, and each of their officers, employees, and agents, each as additional insureds in regards to liability arising out of the performance of any work under the Contract and providing that such insurance is primary insurance as respects the interest of the DISTRICT and Engineer and that any other insurance maintained by the DISTRICT and Engineer is excess and not contributing insurance with the insurance required hereunder.
  - ii. "Cross Liability" or "Severability of Interest" clause.
  - iii. Provision or endorsement stating that such insurance, subject to all of its other terms and conditions, applies to the liability assumed by the Contractor under the Contract, including, without limitation, that set forth in Section B-61, Indemnity and Litigation Costs.
  - iv. Provision or endorsement stating that any failure to comply with reporting or

other provisions of the policies including breaches of warranties shall not affect coverage provided to the DISTRICT, its officers, officials, employees, or volunteers.

- i) Deductibles and Self-Insured Retentions - Insurance deductibles or self-insured retentions must be declared by the Contractor, and such deductibles and retentions shall have the prior written consent from the DISTRICT. At the election of the DISTRICT the Contractor shall either 1) reduce or eliminate such deductibles or self-insured retentions, or 2) procure a bond which guarantees payment of losses and related investigations, claims administration, and defense costs and expenses. Policies containing any self-insured retention (SIR) provision shall provide or be endorsed to provide that the SIR may be satisfied by either the named or additional insureds, co-insurers, and/or insureds other than the First Named Insured.
- j) Acceptability of Insurers - Any insurance carrier providing insurance coverage required by the Contract Documents shall be admitted to and authorized to do business in the State of California unless waived, in writing, by the DISTRICT Risk Manager. Carrier(s) shall have an A.M. Best rating of not less than an A-: VII or better.
- k) Responsibility for Work - Until the completion and final acceptance by the DISTRICT of all the work under and implied by this agreement, the work shall be under the Contractor's responsible care and charge. The Contractor shall rebuild, repair, restore and make good all injuries, damages, re-erections, and repairs occasioned or rendered necessary by causes of any nature whatsoever.
  - a. The Contractor shall provide and maintain builder's risk insurance (or installation floater) covering all risks of direct physical loss, damage or destruction to the work in the amount specified in the General Conditions, to insure against such losses until final acceptance of the work by the DISTRICT. Such insurance shall insure at least against the perils of fire and extended coverage, theft, vandalism and malicious mischief, and collapse. The DISTRICT, its directors, officers, employees, and authorized volunteers shall be named insureds on any such policy. The making of progress payments to the Contractor shall not be construed as creating an insurable interest by or for the DISTRICT or be construed as relieving the Contractor or his/her subcontractors of responsibility for loss from any direct physical loss, damage or destruction occurring prior to final acceptance of the work by the DISTRICT.
  - b. The Contractor shall waive all rights of subrogation against the DISTRICT, its directors, officers, employees, or authorized volunteers.
- l) Evidences of Insurance - Prior to execution of the agreement, the Contractor shall file with the DISTRICT a certificate of insurance (Acord Form 25 or equivalent) signed by the insurer's representative evidencing the coverage required by this agreement. Such evidence shall include an additional insured endorsement signed by the insurer's representative and evidence of waiver of rights of subrogation against the DISTRICT (if builder's risk insurance is applicable). Such evidence shall also include (1) attached additional insured endorsements with primary & non-contributory wording, (2) Workers' Compensation waiver of subrogation, and (3) a copy of the CGL declarations or endorsement page listing all policy endorsements, and confirmation that coverage includes or has been modified to include Required Provisions 1-5 above. The DISTRICT reserves the right to obtain complete, certified copies of all required insurance policies, at any time. Failure to continually satisfy the Insurance requirements is a material breach of contract.
- m) Continuation of Coverage - The Contractor shall, upon demand of the DISTRICT deliver evidence of coverage showing continuation of coverage for at least (10) years after completion of the project. Contractor further waives all rights of subrogation under this agreement. When any of the required coverages expire during the term of this agreement, the Contractor shall deliver the renewal certificate(s) including the general liability additional insured endorsement and evidence of waiver of rights of subrogation against the DISTRICT (if builder's risk insurance is applicable) to the

DISTRICT at least ten (10) days prior to the expiration date.

- n) Subcontractors - In the event that the Contractor employs other contractors (Subcontractors) as part of the work covered by this agreement, it shall be the Contractor's responsibility to require and confirm that each sub-contractor meets the minimum insurance requirements specified above. The Contractor shall, upon demand of the DISTRICT, deliver to the DISTRICT copies such policy or policies of insurance and the receipts for payment of premiums thereon.
- o) The Contractor's insurance shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the limits of the insurer's liability.
- p) The DISTRICT reserves the right to modify these insurance requirements, including limits, based on the nature of the risk, prior experience, insurer, coverage or other circumstances.

**B-61 Indemnity and Litigation Cost**

- a) Promptly upon execution of the Contract, the Contractor specifically obligates itself and hereby agrees to protect, hold free and harmless, defend and indemnify the DISTRICT, the Engineer and its consultants, and each of their officers, officials, employees and agents, from and against any and all liability, penalties, costs, losses, damages, expenses, causes of action, claims or judgments, including without limitation attorneys' fees and other costs of litigation, which arise out of or are in any way connected with the Contractor's, or its Subcontractors' or suppliers', performance of Work under this Contract or failure to comply with any of the obligations contained in the Contract. This indemnity shall not extend, however, to attorney fees and costs incurred by the DISTRICT in prosecuting or defending against the Contractor in any proceeding under Section B-8, and shall imply no reciprocal right of the Contractor in any action on the contract pursuant to California Civil Code section 1717 or section 1717.5. To the extent legally permissible, this indemnity and hold harmless agreement by the Contractor shall apply to any acts or omissions, whether active or passive, on the part of the Contractor or its agents, employees, representatives, or Subcontractor's agents, employees and representatives, resulting in liability, irrespective of whether or not any acts or omissions of the parties to be indemnified hereunder may also have been a contributing factor to the liability, except such loss or damage which was caused by the active negligence, sole negligence or willful misconduct of the DISTRICT.
- b) In any and all claims against the DISTRICT or the Engineer and its consultants, and each of their officers, employees and agents by any employee of the Contractor, any Subcontractor, anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable, the indemnification obligation under this Section shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the Contractor or any Subcontractor under Worker's Compensation statutes, disability benefit statutes or other employee benefit statutes.
- c) Each party to this Contract has been represented by counsel in the negotiation and execution of this Contract.

**B-62 Protection of Work**

- a) The Contractor shall be responsible for the care of all work until completion and final acceptance; and the Contractor shall, at its own expense replace damaged or lost material and repair damaged parts of the Work or the same may be done at the Contractor's expense by the DISTRICT and the Contractor and its sureties shall be liable therefore. The Contractor shall make its own provisions for properly storing and protecting all material and equipment against theft, injury, or damage from any and all causes. Damaged material and equipment shall not be used in the Work. The Contractor shall take all risks from floods and casualties except as provided by law, and shall make no charge for the restoration of such portions of the Work as may be destroyed or damaged

by flood or other casualties or because of danger from flood or other casualties or for delays from such causes. The Contractor may, however, be allowed a reasonable extension of time on account of such delays, subject to the conditions hereinbefore specified. The Contractor shall not be responsible for the cost, in excess of five percent (5%) of the contracted amount, of repairing or restoring damage to the Work, if the damage was proximately caused by an earthquake in excess of a magnitude of 3.5 on the Richter Scale or by tidal waves; provided that the Work damaged was built in accordance with accepted and applicable building standards, and the Plans and Specifications of the DISTRICT.

- b) The Contractor shall effectively secure and protect adjacent property and structures, livestock, crops, and other vegetation. If applicable, the Contractor shall open fences on or crossing the right-of-way and install temporary gates of sound construction thereon so as to prevent the escape of livestock. Adjacent fence posts shall be adequately braced to prevent the sagging or slackening of the wire. Before such fences are opened, the Contractor shall notify the owner or tenant of the property and, where practicable, the opening of the fence shall be in accordance with the wishes of said owner or tenant. The Contractor shall be responsible that no loss or inconvenience shall accrue to the owner or tenant by virtue of its fences having been opened or the gate not having been either shut or attended at all times. Where special types of fences are encountered, the Contractor shall install temporary gates made of similar materials and of suitable quality to serve the purposes of the original fences. In all cases where the Contractor removes fences to obtain work room, it shall provide and install temporary fencing as required, and on completion of construction shall restore the original fence to the satisfaction of the Engineer. All costs of providing, maintaining and restoring gates and fencing shall be borne by the Contractor. The Contractor shall provide and maintain all passageways, guard fences, lights and other facilities for protection required by public authority or local conditions.
- c) The Contractor shall use extreme care during construction to prevent damage from dust to crops and adjacent property. The Contractor, at its own expense, shall provide adequate dust control for the right-of-way and take other preventive measures as directed by the Engineer.
- d) The Contractor shall be responsible for all damage to any property resulting from trespass by the Contractor or its employees in the course of their employment, whether such trespass was committed with or without the consent or knowledge of the Contractor.
- e) The Contractor shall see that the work site is kept drained and free of all ground water and any other water which may impede the progress or execution of the Contract work.
- f) The Contractor shall be responsible for any damage caused by drainage or water runoff from construction areas and from construction plant areas. In an emergency affecting the safety of life, or of the Work, or of adjoining property, the Contractor, without special instruction or authorization from the Engineer, is hereby permitted to act at the Contractor's discretion to prevent such threatened loss or injury, and it shall so act without appeal if so instructed or authorized. Any compensation claimed by the Contractor on account of emergency work shall be determined as specified under Section B-3. Should the Engineer deem an emergency condition to exist, the Contractor shall immediately do those things and take those steps ordered by the Engineer. The decision of the Engineer in this respect shall be final and conclusive. Any claims for compensation made by the Contractor on account of emergency work shall be determined as specified under Section B-3.
- g) Except as provided by Government Code Section 4215, the Contractor shall be responsible for the removal, relocation and protection of all public and private utilities, including irrigation facilities in the nature of utilities, located on the site of the construction project if and to the extent that the same are identified in the Contract Documents, and the Contractor shall not be entitled to any extension of time or claim for damages for extra compensation in connection therewith. If and to the extent that such utilities or facilities are not identified in the Contract Documents, as between

the Contractor and the DISTRICT, the DISTRICT will be responsible for the cost of their removal, relocation or protection, as the case may be, but the Contractor shall perform any such work in conformance with applicable provisions of Sections B-3 and B-4, if so directed by the Engineer and in such situation the Contractor shall not be responsible for delay in completion of the project caused by the failure of the DISTRICT or the owner of the utility to provide for such removal or relocation. If the Contractor, while performing the Contract, discovers utility or irrigation facilities not identified by the DISTRICT in the Contract Documents, it shall immediately notify the Engineer in writing.

- h) Subject to the provisions of this Section, where the Work to be performed under the Contract crosses or otherwise interferes with existing streams, watercourses, canals, farm ditches, pipelines, drainage channels, or water supplies, the Contractor shall provide for such watercourse or pipelines and shall perform such construction during the progress of the Work so that no damage will result to either public or private interests, and the Contractor shall be liable for all damage that may result from failure to so provide during the progress of the Work.

**B-63 No Personal Liability**

Neither the DISTRICT, the Engineer, nor any of their other officers, agents, or employees nor any other public office shall be personally responsible for any liability arising under the Contract, except such obligations as are specifically set forth herein.

ARTICLE VI. MEASUREMENT AND PAYMENT

B-64 Measurement of Quantities

- a) Where the Contract provides for payment on a lump sum price basis, the Contractor shall submit a price breakdown to the Engineer immediately after award of the Contract. The price breakdown as agreed upon between the Contractor and the Engineer shall be used for preparing future estimates for partial payments to the Contractor and shall list the major items of Work and a price for each item. Overhead and other general costs and profit shall be prorated to each item so that the total of all items equals the lump sum price. The price breakdown shall be subject to the approval of the Engineer and Contractor may be required to verify the prices for any or all items.

Where the Contract provides for payment on a unit price basis, the quantities of work performed will be computed by the Engineer on the basis of measurements taken by the Engineer.

- b) Whenever the estimated quantities of Work to be done and materials to be furnished under this Contract are shown in any of the documents including the Proposal, they are given for use in comparing bids and the right is especially reserved, except as herein or otherwise specifically limited, to increase or diminish them as may be deemed reasonably necessary or desirable by the DISTRICT to complete the Work contemplated by this Contract and such increase or diminution shall in no way violate this Contract, nor shall any such increase or diminution give cause for claims, liability for damage or adjustment to the Contract time or bid price.

B-65 Scope of Payment

- a) The Contractor shall accept the compensation provided in the Contract as full payment for furnishing all labor, materials, tools, equipment, and incidentals necessary to the completed Work and for performing all Work contemplated and embraced under the Contract; also for loss or damage arising from the nature of the Work, or from the action of the elements, or from any unforeseen difficulties which may be encountered during the prosecution of the Work until the acceptance by the DISTRICT and for all risks of every description connected with the prosecution of the Work, also for all expenses incurred in consequence of the suspension or discontinuance of the Work as provided in the Contract; and for completing the Work according to the Specifications and Plans. Neither the payment of any estimate nor of any retained percentage shall relieve the Contractor of any obligation to make good any defective work or material.
- b) No compensation will be made in any case for loss of anticipated profits. Increased or decreased work involving supplemental agreements will be paid for as provided in such agreements.

B-66 Progress Estimate

At the end of each month where work was performed, the Contractor will submit to the Engineer a partial payment estimate filled out and signed by the Contractor covering the Work performed during the period covered by the partial pay estimate and supported by such data as the Engineer may reasonably require. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at or near the site, the partial payment estimate shall also be accompanied by such supporting data, satisfactory to the DISTRICT, as will establish the DISTRICT'S title to the material, and equipment and protect its interest therein, including, applicable insurance. The Engineer will within seven (7) calendar days after receipt of each partial payment estimate either recommend payment to the DISTRICT or return the estimate to the Contractor indicating in writing its reasons for refusing to approve payment. In the latter case, the Contractor may make the necessary corrections and resubmit the partial pay estimate.

Payroll certification forms provided by the Contractor and fully executed shall be filed with the Engineer at the time of submission of each partial payment estimate and also when the claim for final payment is

submitted. Wage Report forms shall be completed and submitted as set forth in Parts 4 and 5.

**B-67 Progress Payments**

- a) The Contractor is made aware that the DISTRICT is responsible for approving all partial payments.
- b) Upon receipt of an undisputed, properly submitted progress estimate from the Contractor, recommended by the Engineer, the DISTRICT shall act in accordance with the following:
  - (i) Each payment request shall be reviewed by the DISTRICT as soon as practicable after receipt for the purpose of determining that the progress estimate is a proper payment request.
  - (ii) Any payment request determined not to be a proper payment request suitable for payment shall be returned to the Contractor as soon as practicable but not later than seven (7) calendar days after receipt. A request returned pursuant to this paragraph shall be accompanied by a document setting forth in writing the reasons why the payment request is not proper.
- c) The number of days available to the DISTRICT to make a payment without incurring interest pursuant to this section shall be reduced by the number of days by which the DISTRICT exceeds the ten-day return requirement set forth herein.
- d) The DISTRICT will pay the Contractor ninety-five percent (95%) of the amount of each progress estimate within sixty (60) calendar days after receipt of an undisputed, properly submitted progress estimate from the Contractor, recommended by the Engineer. If the DISTRICT fails to pay an undisputed progress estimate within the allotted sixty (60) calendar days, the DISTRICT shall pay interest to the Contractor equivalent to the legal rate set forth in subdivision (s) of Section 685.010 of the Code of Civil Procedures. Five percent (5%) of each estimate shall be retained by the DISTRICT until final completion and acceptance of all Work under Contract.
- e) When, in the judgment of the Engineer, the work is not proceeding in accordance with the provisions of the Contract, or when in the Engineer's judgment the total amount of the work done since the last estimate amounts to less than \$1,000, no pay estimate will be prepared and no progress payment will be made.
- f) No progress estimate or payment shall be considered to be an approval or acceptance of any work, materials, or equipment. Estimated amounts and values of work done and materials and equipment furnished will be confirmed with actual amounts and values as they become available in subsequent progress estimates, progress payments and the final estimate and payment. All estimates and payments will be subject to correction in subsequent progress estimates and payments and the final estimate and payment.
- g) The DISTRICT requires that any payments due to Subcontractors for a portion of the Work satisfactorily completed shall be made by Contractor to Subcontractors within thirty (30) calendar days of DISTRICT's payment to Contractor. Failure to make such payments in a timely fashion may result in the DISTRICT issuing future progress payments by joint check to the Contractor and Subcontractors.
- h) It is mutually agreed between the parties to the Contract that no payments made under the Contract, including progress payments and the final payment, shall be evidence of the performance of the Contract, either wholly or in part, and no payment shall be construed to be an acceptance of any defective or incomplete work or improper materials.

**B-68 Liens and Stop Notices**

The Contractor agrees to keep the Work, the site of the Work and all monies held by the DISTRICT free and clear of all liens and stop notices related to labor and materials furnished in connection with the

Work, if permitted by law. Furthermore, the Contractor waives any right it may have to file any type of lien or stop notice in connection with the Work. Notwithstanding anything to the contrary contained in the Contract documents, if any such lien or stop notice is filed or there is evidence to believe that lien or stop notice may be filed at any time during the progress of the Work or within the duration of this Contract, the DISTRICT may refuse to make any payment otherwise due the Contractor or may withhold any payment due the Contractor a sum sufficient in the opinion of the DISTRICT to pay all obligations and expenses necessary to satisfy such lien or stop notice. The DISTRICT may withhold such payment unless or until the Contractor, within ten (10) calendar days after demand therefor by the DISTRICT, shall furnish satisfactory evidence that the indebtedness and any lien or stop notice in respect thereof has been satisfied, discharged and released of record, or that the Contractor has legally caused such lien or stop notice to be released of record pending the resolution of any dispute between the Contractor and any person or persons filing such lien or stop notice. If the Contractor shall fail to furnish such satisfactory evidence within ten days of the demand therefor, the DISTRICT may discharge such indebtedness and deduct the amount thereof, together with any and all losses, costs, damages and attorney's fees suffered or incurred by the DISTRICT from any sum payable to the Contractor under the Contract documents, including but not limited to final payment and retained percentage. This Section shall be specifically included in all Subcontracts and purchase orders entered into by the Contractor.

**B-69 Final Acceptance and Date of Completion**

Whenever the Contractor shall deem all Work under this Contract to have been completed in accordance therewith, it shall so notify the Engineer in writing, and the Engineer shall promptly ascertain whether the Work has been satisfactorily completed and, if not, shall advise the Contractor in detail and in writing of any additional work required. When all the provisions of the Contract have been fully complied with to the satisfaction of the Engineer, the Engineer shall proceed with all reasonable diligence to determine accurately the total value of all Work performed by the Contractor at the prices set forth in the Contract or fixed by Change Orders, and the total value of all extra work, all in accordance with the Contract. The Engineer will then certify to said final estimate and to the completion of the Work, and will file copies thereof with the DISTRICT and the Contractor. The date of completion shall be the date upon which the DISTRICT makes its formal written acceptance of the Work.

**B-70 Final Payment**

Within ten (10) calendar days after the date of completion, the DISTRICT will file in the Office of the County Recorder, a Notice of Completion of the Work herein agreed to be done by the Contractor. On the expiration of thirty-five (35) calendar days after the recordation of such Notice of Completion the difference between said final estimate and all payments theretofore made to the Contractor shall be due and payable to the Contractor, subject to any requirements concerning the furnishings of a maintenance bond, and excepting only such sum or sums as may be withheld or deducted in accordance with the provisions of this Contract. All prior certifications upon which partial payments may have been made, being merely estimates, shall be subject to correction in the final certificate.

**B-71 Final Release**

Final payment to the Contractor in accordance with the final estimate is contingent upon the Contractor furnishing the DISTRICT with a signed written release of all claims against the DISTRICT arising by virtue of the Contract. Disputed Contract claims in stated amounts may be specifically excluded by the Contractor from the operation of the release. The release shall be in substantially the following form:



WAIVER AND RELEASE UPON FINAL PAYMENT

The undersigned has been paid in full by the McKinleyville Community Services District (District) for all labor, services, equipment and material furnished to the District for the McKinleyville BMX Track and Park Project located in Humboldt County, California, and does hereby waive and release the District, its officers, agents, and employees, from all claims and liability to the Contractor arising out of, or in any way connected with, the Contract, except for the disputed contract claims specified below:

Notice of Disputed Claim

Amount of Claim

\$ \_\_\_\_\_

Dated: \_\_\_\_\_

\_\_\_\_\_  
(Name of Contractor)

By: \_\_\_\_\_  
(Title)

Any payment, however, final or otherwise shall not release the Contractor or its sureties from obligations under the Contract Documents or Performance and Payment Bonds.

B-72 Right to Withhold Payments

- a) In addition to all other rights and remedies of the DISTRICT hereunder and by virtue of the law, the DISTRICT may withhold or nullify the whole or any part of any partial or final payment to such extent as may reasonably be necessary to protect the DISTRICT from loss on account of:
  - (i) Defective work not remedied, irrespective of when any such work be found to be defective;
  - (ii) Claims or liens filed or reasonable evidence indicating probable filing of claims or liens including, but not limited to claims under Sections 1775, 1776, or 1777.7 of the Labor Code;
  - (iii) Failure of the Contractor to make payments properly for labor, materials, equipment, or other facilities, or to Subcontractors and/or suppliers;
  - (iv) A reasonable doubt that the Work can be completed for the balance then unearned;
  - (v) A reasonable doubt that the Contractor will complete the Work within the agreed time limits;
  - (vi) Costs to the DISTRICT resulting from failure of the Contractor to complete the Work within the proper time; or
  - (vii) Damage to Work or property.
  - (viii) Damage to another Contractor.
  - (ix) Performance of Work in violation of the Terms of the Contract Documents.
  - (x) Where work on unit items is substantially complete, but lacks cleanup and/or other corrections ordered by the Engineer, amounts shall be deducted from the unit prices in partial payment estimates to amply cover such cleanup and correction.
  - (xi) Failure to file required Equal Opportunity and Affirmative Action forms.
- b) Whenever the DISTRICT shall, in accordance herewith, withhold any monies otherwise due the Contractor, written notice of the amount withheld and the reasons therefore will be given the Contractor. After the Contractor has corrected the enumerated deficiencies, the DISTRICT will promptly pay to the Contractor the amount so withheld. When monies are withheld to protect the DISTRICT against claims or liens of mechanics, material men, Subcontractors, etc., the DISTRICT

**McKinleyville Community Services District**  
McKinleyville BMX Track and Park Project

may at its discretion permit the Contractor to deliver a surety bond in terms and amount satisfactory to the DISTRICT, indemnifying the DISTRICT against any loss or expense, and upon acceptance thereof by the DISTRICT, the DISTRICT shall release to the Contractor monies so withheld.

B-73 Waiver of Interest

The DISTRICT shall have no obligation to pay and the Contractor hereby waives the right to recover interest with regard to monies which the DISTRICT is required to withhold by reason of judgment, order, statute or judicial process.

B-74 Satisfaction of Claims and Liens

Neither the final payment nor any part of the retained percentage shall become due until the Contractor, if required, shall deliver to the DISTRICT, a complete release of all liens and claims arising out of this Contract, or receipts in full in lieu thereof and, if required in either case, an affidavit that so far as it has knowledge or information the releases and receipts include all the labor and material for which a lien or claim could be filed; but the Contractor may, if any Subcontractor refuses to furnish a release or receipt in full, furnish a bond satisfactory to the Engineer, to indemnify the DISTRICT against any lien or claim. If any lien or claim remains unsatisfied after all payments are made, the Contractor shall refund to the DISTRICT all monies that the latter may be compelled to pay in discharging such a lien, or claim, including all costs and reasonable attorney's fees.

SECTION 01 20 00

MEASUREMENT AND PAYMENT

PART 1 GENERAL

1.1 GENERAL

- A. Unless otherwise specified in other individual sections of these Specifications, quantities of Work shall be determined from measurements or dimensions in horizontal planes.
- B. Units of measurement shall be in accordance with U.S. Standard Measures.
- C. See Section VI of the General Conditions for special provisions related to progress payments and payment schedule to the contractor.
- D. The Work has been organized into bid items for convenience to assist the Contractor in quantifying the major components of the Work and shall in no way be interpreted to be comprehensive. The bid shall be comprehensive and shall include all work associated with the project as specified in the Contract Documents, including all necessary labor, materials, equipment, supervision, sales tax, and all other applicable taxes and fees.

1.2 MEASUREMENT AND PAYMENT

- A. The measurement and payment items are listed below:
  - 1. The payments to the Contractor are based on the following items. It is the intent that the scope of the description of the following items encompasses the entire scope of the Work as specified in the Contract Documents. The bid amounts shall be for complete in place installations.

**BASE BID SCHEDULE**

**1. Mobilization**

The contract price paid for MOBILIZATION shall be paid for on a LUMP SUM (LS) basis and shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved, and as specified in Section 01 71 13 of the Contract Documents, and as directed and approved by the Engineer.

MOBILIZATION shall not be more than 5% of overall Bid price. Payments shall be made as follows:

50% of Bid Price upon completion of establishment of safe construction zone.

80% of Bid Price upon completion of mass grading and utility work.

100% of Bid Price upon Demobilization.

## 2. Erosion Control

The contract price paid for EROSION CONTROL shall be paid for on a LUMP SUM (LS) basis and shall include full compensation for furnishing all labor, materials, tools, equipment, SWPPP Design and inspection professional services, and incidentals and for doing all the work involved, and specified in the Contractor provided Storm Water Pollution Prevention Plan (SWPPP), Contract Plans, and Section 31 25 00 – Erosion and Sediment Control as specified in the Contract Documents, and as directed and approved by the Engineer, including traffic control, installation & maintenance of storm water BMP's as called out in Contractor provided SWPPP and as directed and approved by Engineer or Inspector. Contractor's SWPPP consultant shall be responsible for sampling, reporting, updating Contractor provided SWPPP as required by SWPPP and Engineer. Payment will be based upon the percentage of project completion. Full Payment for this item will not be paid until project completion.

Contractor shall be responsible for EROSION CONTROL for the duration of the project, regardless of project duration.

## 3. Clearing and Grubbing

The contract price paid for CLEARING AND GRUBBING shall be paid for on a LUMP SUM (LS) basis and shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved, as specified in Section 02 30 00 – SITE CLEARING, as specified in the Contract Documents, and as directed and approved by the Engineer, including traffic control, dust control, construction water, vegetation, tree and brush removal, stump grinding, hauling, disposal fees, and coordination with utilities.

## 4. Demolition

The contract price paid for DEMOLITION shall be paid for on a LUMP SUM (LS) basis and shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved, as specified in Section 02 10 00 DEMOLITION, as specified in the Contract Documents, and as directed and approved by the Engineer; including traffic control, sawcutting, removal of hardscape, removal of fencing, hauling, disposal fees, dust control, permits, and permit fees.

## 5. Earthwork

The contract price paid for EARTHWORK shall be paid for on a CUBIC YARD (CY) basis and shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved, as specified in the Contract Documents, including, but not limited to plans sheets GRADING PLAN, UTILITY PLANS, and all associated section and detail plans, as directed and approved by the Engineer, including traffic control, excavation, temporary stockpiling, placement, compaction, dust control, construction water, subgrade preparation, overexcavation & recompaction, geotechnical fabrics (if applicable), and import of any select fill as necessary.

Earthwork is considered a Final Pay (F) item per CalTrans9-1.02C Final Pay Item Quantities. The Owner shows a bid item quantity as a final pay item for payment purposes only. Payment for

this item shall not be issued for quantities exceeding Bid Item List quantity, regardless of the actual quantity used, unless dimensions are changed by the Engineer.

Handling, stockpiling, and placing of utility trench spoils, or any other activities generating earth spoils shall be considered incidental to the item of work. Contractor shall plan finished grades accordingly to incorporate utility trench spoils, or other earth spoils into their earthwork.

Earthwork for construction of BMX Track shall be paid separately under Pay Item 25

## **6. Export Soil (Allowance)**

The contract price paid for Export Soil shall be paid on a Cubic Yard (CY) basis and shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved, as specified in the Contract Documents, and as directed and approved by the Engineer including traffic control, temporary stockpiling, additional handling, loading, trucking, dump fees.

Prior to exporting soil, the Contractor shall meet with Engineer to discuss quantity of export and get authorization. Measurement shall be based on contractors licensed survey of pre and post Earthwork quantities as verified by engineer.

Export Soil is an allowance to be used at the Engineer's discretion and approval. The Contractor is only entitled to compensation for this item with written authorization from the Engineer.

## **7. Bio-Retention Areas**

The contract price paid for BIO-RETENTION AREAS shall be paid for on a SQUARE FOOT (SF) basis and shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved, as specified in the Contract Documents, and as directed and approved by the Engineer, including traffic control, excavation and disposal of native soil, purchase, stockpiling, placing bio-retention soil, fabrics, impermeable materials, drainage structures within the bioretention areas, drainage piping, connection to new or existing drainage structures.

All soil excavated from bioretention areas shall be considered the property of the Contractor. Soils may be re-used on site as fill. Disposal or placement of bioretention spoils shall not be considered part of "Export Soil" or "Earthwork".

## **8. Self-Retaining Areas**

The contract price paid for SELF-RETAINING AREAS shall be paid for on a SQUARE FOOT (SF) basis and shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved, as specified in the Contract Documents, and as directed and approved by the Engineer including excavation and disposal of native soil, purchase, stockpiling, impermeable materials, drainage piping, connection to new or existing drainage structures.

All soil excavated from self-retaining areas shall be considered the property of the Contractor.

Soils may be re-used on site as fill. Disposal or placement of self-retaining spoils shall not be considered part of “Export Soil” or “Earthwork”.

### **9. Sanitary Sewer Service**

The contract price paid for SANITARY SEWER SERVICE shall be paid for on a LUMP SUM (LS) basis, including full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in , as specified in the Contract Documents, and as directed and approved by the Engineer, including traffic control, all fees, shoring, notifications, cleanouts, sawcutting, concrete removal, excavation, backfill, bedding, stockpiling, paving, replacing concrete, striping and signage replacement, and testing.

### **10. Water Utility Distribution Piping and Connection**

The contract price paid for WATER UTILITY DISTRIBUTION PIPING AND CONNECTION shall be paid for on a LUMP SUM (LS) basis and include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved, as specified in the Contract Documents, and as directed and approved by the Engineer, including traffic control, all fees, shoring, notifications, tie-ins, meter boxes, lids, spacers, appurtenances, hot taps, sawcutting, concrete removal, excavation, backfill, bedding, stockpiling, paving, replacing concrete, striping and signage replacement, testing, and capping.

### **11. 6” Storm Drain**

The contract price paid for 6” STORM DRAIN shall be paid for on a LINEAL FOOT (LF) basis including full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved, as specified in the Contract Documents, and as directed and approved by the Engineer; including traffic control, and as directed and approved by the Engineer, including tie ins to existing structures, existing structure repair, excavation, shoring, backfill, bedding, stockpiling, replacing concrete.

### **12. 8” Storm Drain**

The contract price paid for 8” STORM DRAIN shall be paid for on a LINEAL FOOT (LF) basis including full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved, as specified in the Contract Documents, and as directed and approved by the Engineer; including traffic control, and as directed and approved by the Engineer, including tie ins to existing structures, existing structure repair, excavation, shoring, backfill, bedding, stockpiling, replacing concrete.

### **13. Channel Drain**

The contract price paid for CHANNEL DRAIN shall be paid for on a LINEAL FOOT (LF) basis including full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved, as specified in the Contract Documents, and as directed and approved by the Engineer; including traffic control, and as directed and approved by the Engineer, including tie ins to existing structures, existing structure repair, excavation, shoring, backfill, bedding, stockpiling, replacing concrete.

#### **14. Storm Drain Inlets**

The contract price paid for STORM DRAIN INLETS shall be paid for on an EACH (EA) basis including full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved, and as specified in the Contract Documents, and as directed and approved by the Engineer, including traffic control, excavation, shoring, backfill, bedding, stockpiling.

#### **15. Class II Aggregate Base**

The contract price paid for CLASS II AGGREGATE BASE shall be paid for on a per TON (TN) basis, including full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved, as specified in the Contract Documents, and as directed and approved by the Engineer, including traffic control, transportation, handling, stockpiling, subgrade preparation, placement, moisture conditioning, compaction, testing, grading, and clean up. Contractor to provide certified weight tickets to Owner's Representative for all Class II Aggregate Base.

Class II Aggregate base used for utility trench backfill shall be paid for under separate pay items.

#### **16. Pavement Markings and Signs**

The contract price paid for PAVEMENT MARKING AND SIGNS shall be paid for at the unit price LUMP SUM (LS) including full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved, as specified in the Contract Documents, and as directed and approved by the Engineer, including traffic control, cleaning, layout, striping, curb painting, purchase and placement of signs, sign appurtenances, concrete coring, sign foundations, concrete wheel stops.

#### **17. Gate – Steel Parking Barrier (Double Swing)**

The contract price paid for GATE – STEEL PARKING BARRIER (DOUBLE SWING) shall be paid for at the unit price EACH (EA) and include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved, as specified in the Contract Documents, and as directed and approved by the Engineer.

#### **18. Concrete Driveway Aprons**

The contract price paid for CONCRETE DRIVEWAY APRONS shall be paid for on a SQUARE FOOT (SF) basis including full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved, as specified in the Contract Documents, and as directed and approved by the Engineer including traffic control, setting grades, forming, pouring, stripping, curing, cleanup, sidewalk within limits of driveway tapers.

Curb and gutter within adjacent to CONCRETE DRIVEWAY APRONS shall be paid under CONCRETE CURB AND GUTTER

### **19. Concrete Sidewalk**

The contract price paid for CONCRETE SIDEWALK shall be paid for on a SQUARE FOOT (SF) basis including full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved, as specified in the Contract Documents, and as directed and approved by the Engineer, including traffic control, setting grades, forming, pouring, stripping, curing, scoring, expansion joints, cleanup, adjusting utility boxes and rims to finished grade.

CONCRETE SIDEWALK within the limits of CONCRETE DRIVEWAY APRONS shall be paid under CONCRETE DRIVEWAY APRONS.

### **20. Concrete Curb and Gutter**

The contract price paid for CONCRETE CURB AND GUTTER shall be paid by the unit price per LINEAL FOOT (LF) including full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved, as specified in the Contract Documents, and as directed and approved by the Engineer, including traffic control, setting grades, forming, pouring, stripping, scoring, expansion joints, curing, cleanup.

### **21. Pedestrian Ramp**

The contract price paid for PEDESTRIAN RAMP shall be paid by the unit price SQUARE FOOT (SF) including full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved, as specified in the Contract Documents, and as directed and approved by the Engineer including traffic control, setting grades, forming, pouring, stripping, scoring, expansion joints, curing, cleanup, setting truncated domes.

### **22. Asphalt Paving – Park**

The contract price paid for ASPHALT PAVING – PARK shall be paid for at the unit price per TON (TN) including full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved, as specified in the Contract Documents, and as directed and approved by the Engineer, including traffic control, transportation, tack oil, handling, placement, raking, grading, compaction, AC plug, edge grind, and overlay conform. Additional payment shall not be paid for excess asphalt placed beyond approved dimensions or wasted.

Asphalt Paving installed for parking lot (if applicable) shall be paid for under bid alternate item A1 – ASPHALT PAVING – PARKING LOT

### **23. Electrical System**

The contract price paid for ELECTRICAL SYSTEM shall be paid for at the unit price LUMP SUM (LS) including full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved, as specified in the Contract Documents, and as directed and approved by the Engineer.



#### **24. Lighting**

The contract price paid for LIGHTING shall be paid for at the unit price LUMP SUM (LS) including full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved, as specified in the Contract Documents, and as directed and approved by the Engineer.

#### **25. BMX Track (SW - Contractor to Coordinate with BMX Track Installer)**

The contract price paid for BMX TRACK shall be paid for on a LUMP SUM (LS) basis and include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for completing all the work involved, as specified in the Contract Documents, and as directed by the Engineer, including coordination, excavation, temporary stockpiling, on-site mining or import of "Clay Track Mix", placement, survey staking, computer modeling, compaction, dust control, construction water, subgrade preparation, overexcavation & recompaction, geotechnical fabrics (if applicable), and import of any select fill as necessary. The BMX TRACK is designated SPECIALTY WORK (SW) and must be performed by a qualified subcontractor.

Earthwork associated with this pay item shall be considered incidental to BMX TRACK. Contractor is responsible for coordinating any imports, exports, or special soil requirements associated with BMX Track during initial site work. No additional allowances will be made after completion of Earthwork, underground utilities, or subsequent Landscaping work.

#### **26. Fence – 4’ H – Chain Link, Galvanized**

The contract price paid for FENCE – 4’ H – CHAIN LINK, GALVANIZED shall be measured and paid for LINEAR FEET (LF) and include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved, as specified in the Contract Documents, and as directed and approved by the Engineer.

#### **27. Gate – 14’ W Rolling, 4’ H - Chain Link, Galvanized**

The contract price paid for GATE – 14’ ROLLING, 4’ H – CHAIN LINK, GALVANIZED shall be measured and paid for EACH (EA) and include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved, as specified in the Contract Documents and as directed and approved by the Engineer.

#### **28. Fence – 6’ H – Chain Link, Galvanized**

The contract price paid for FENCE – 6’ H – CHAIN LINK, GALVANIZED shall be measured and paid for LINEAR FEET (LF) and include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved, and as specified in the Contract Documents, and as directed and approved by the Engineer.

#### **29. Gate – 6’ H – Chain Link, Galvanized**

The contract price paid for GATE – 6’ H – CHAIN LINK, GALVANIZED shall be measured

and paid for EACH (EA) and include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved, as specified in the Contract Documents, and as directed and approved by the Engineer.

**30. Fence – Wood (3 Rails)**

The contract price paid for FENCE – WOOD (3 RAILS) shall be measured and paid for LINEAR FEET (LF) and include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved, as specified in the Contract Documents, and as directed and approved by the Engineer.

**31. Decomposed Granite**

The contract price paid for DECOMPOSED GRANITE shall be measured and paid for on a SQUARE FOOT (SF) basis and include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved, as specified in the Contract Documents, and as directed and approved by the Engineer.

**32. Filter Fabric**

The contract price paid for FILTER FABRIC shall be measured and paid for on a SQUARE FOOT (SF) basis and include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved, as specified in the Contract Documents, and as directed and approved by the Engineer.

**33. Bike Rack**

The contract price paid for BIKE RACK shall be measured and paid for EACH (EA) and include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved, as specified in the Contract Documents, and as directed and approved by the Engineer.

**34. Concrete Picnic Tables**

The contract price paid for CONCRETE PICNIC TABLES shall be measured and paid for EACH (EA) and include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved, as specified in the Contract Documents, and as directed and approved by the Engineer.

**35. Trash/Recycle Receptacle**

The contract price paid for TRASH/RECYCLE RECEPTACLE shall be measured and paid for Each (EA) and include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved, as specified in the Contract Documents, and as directed and approved by the Engineer.

**36. Fall Material – Pour-In-Place Rubber**

The contract price paid for FALL MATERIAL – POUR-IN-PLACE RUBBER shall be

measured and paid for on a SQUARE FOOT (SF) basis and include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved, as specified in the Contract Documents, and as directed and approved by the Engineer including subgrade preparation, geotechnical fabrics (if applicable), concrete (if applicable), setting grades, fine grading, forming, pouring, curing, and cleanup.

### **37. Fall Material – Engineered Wood Fiber**

The contract price for FALL MATERIAL – ENGINEERED WOOD FIBER will be measured and paid for CUBIC YARDS (CY) and include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved, as specified in the Contract Documents, and as directed and approved by the Engineer including subgrade preparation, setting grades, fine grading, geotechnical fabrics, placement, and cleanup.

### **38. Pressure Treated Lumber Edge**

The contract price paid for PRESSURE TREATED LUMBER EDGE shall be measured and paid for LINEAR FEET (LF) and include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved, as specified in the Contract Documents, and as directed and approved by the Engineer.

### **39. Berliner Combination Play Equipment**

The contract price paid for BERLINER COMBINATION PLAY EQUIPMENT shall be measured and paid for LUMP SUM (LS) and include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved, as specified in the Contract Documents, and as directed and approved by the Engineer.

### **40. Pickleball Nets and Posts**

The contract price paid for PICKLEBALL NETS AND POSTS shall be measured and paid for EACH (EA) including full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved, as specified in the Contract Documents, and as directed and approved by the Engineer. Asphalt shall be paid for separately under item 22.

### **41. Court Painting and Striping**

The contract price paid for COURT PAINTING AND STRIPING be measured and paid for LUMP SUM (LS) including full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved, and as specified in the Contract Documents, and as directed and approved by the Engineer. This item includes all courts on site.

### **42. Concrete Benches**

The contract price paid for CONCRETE BENCHES shall be measured and paid for EACH (EA) including full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved, and as specified in the Contract Documents, and as directed and approved by the Engineer.

#### **43. Basketball Hoop – Post, Backboard, Rim, Net**

The contract price paid for BASKETBALL HOOP – POST, BACKBOARD, RIM, NET shall be measured and paid for LUMP SUM (LS) including full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved, as specified in the Contract Documents, and as directed and approved by the Engineer. Asphalt shall be paid for separately under item 22.

#### **44. Drinking Fountain**

The contract price paid for DRINKING FOUNTAIN shall be paid for on a EACH (EA) basis and include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved, as specified in the Contract Documents, and as directed and approved by the Engineer.

#### **45. Restroom Pad**

The contract price paid for RESTROOM PAD shall be measured and paid for LUMP SUM (LS) including full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved, as specified in the Contract Documents, and as directed and approved by the Engineer.

#### **46. Landscape Planting**

The contract price paid for LANDSCAPE PLANTING shall be measured and paid for LUMP SUM (LS) including full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved, as specified in the Contract Documents, and as directed and approved by the Engineer including subgrade preparation, soil testing, soil reports, soil amendments, fertilizers, setting grades, fine grading, landscape fabrics (where applicable), placement, bark mulch, and cleanup.

#### **47. Turf Sod (No Mow)**

The contract price paid for TURF SOD (NO MOW) shall be measured and paid for on a SQUARE FOOT (SF) basis including full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved, as specified in the Contract Documents, and as directed and approved by the Engineer.

#### **48. Irrigation Point of Connection (Back Flow, Master Valve, Flow Sensor)**

The contract price paid for IRRIGATION POINT OF CONNECTION (BACK FLOW, MASTER VALVE, FLOW SENSOR) shall be measured and paid for LUMP SUM (LS) including full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved, as specified in the Contract Documents, and as directed and approved by the Engineer.

#### **49. Irrigation Controller and Accessories**

The contract price paid for IRRIGATION CONTROLLER AND ACCESSORIES shall be measured and paid for LUMP SUM (LS) including full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved, as specified in the Contract Documents, and as directed and approved by the Engineer.

#### **50. Irrigation**

The contract price paid for IRRIGATION shall be measured and paid for LUMP SUM (LS) including full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved, as specified in the Contract Documents, and as directed and approved by the Engineer.

### **Additive Alternative Bid Items**

#### **A1 – Asphalt Paving – Parking Lot**

The contract price paid for ASPHALT PAVING – PARKING LOT shall be paid for at the unit price per TON (TN) including full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved, as specified in the Contract Documents, and as directed and approved by the Engineer, including traffic control, transportation, tack oil, handling, placement, raking, grading, compaction, AC plug, edge grind, and overlay conform.

#### **A2 – Pavement Marking and Signs**

The contract price paid for PAVEMENT MARKING AND SIGNS shall be paid for at the unit price LUMP SUM (LS) including full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved, as specified in the Contract Documents, and as directed and approved by the Engineer, including traffic control, cleaning, layout, striping, curb painting, purchase and placement of signs, sign appurtenances, concrete coring, sign foundations, concrete wheel stops.

#### **A3 – Restroom**

The contract price paid for RESTROOM shall be measured and paid for LUMP SUM (LS) including full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved, as specified in the Contract Documents, and as directed and approved by the Engineer including coordination of purchase and installation with vendor (if applicable).

#### **A4 – Import Fill**

The contract price paid for IMPORT FILL shall be measured and paid for per TON (TN) and include full compensation for furnishing all labor, materials, tools, equipment, and incidentals

and for doing all the work involved, as specified in the Contract Documents, and as directed and approved by the Engineer. Contractor to provide certified weight tickets to Owner's Representative for all Import Fill.

#### **A5 – Concrete Benches**

The contract price paid for CONCRETE BENCHES shall be measured and paid for EACH (EA) and include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved, and as specified in the Contract Documents, as specified in the Standard Specifications, technical specifications, and as directed and approved by the Engineer.

#### **A6 – Berliner Terranova.179**

The contract price paid for BERLINER TERRANOVA.179 shall be measured and paid for EACH (EA) and include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved, as specified in the Contract Documents, and as directed and approved by the Engineer.

#### **A7 – LSI Sensory Play Wall**

The contract price paid for LSI SENSORY PLAY WALL shall be measured and paid for EACH (EA) and include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved, as specified in the Contract Documents, and as directed and approved by the Engineer.

#### **A8 - LSI Cozy Dome**

The contract price paid for LSI COZY DOME shall be paid for EACH (EA) and include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved, as specified in the Contract Documents, and as and approved directed by the Engineer.

#### **A9 - LSI Cyclor**

The contract price paid for LSI CYCLER shall be measured and paid for EACH (EA) and include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved, as specified in the Contract Documents, and as directed and approved by the Engineer.

#### **A10 – Interpretive Panel**

The contract price paid for INTERPRETIVE PANEL shall be measured and paid for EACH (EA) and include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved, as specified in the Contract Documents, and as directed and approved by the Engineer.

END OF SECTION

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**THESE SPECIAL PROVISIONS SUPERCEDE THE TECHNICAL SPECIFICATIONS IN WORK DESIGNATED AS PURVIEW OF "BMX TRACK," BMX TRACK BUILDER," BMX TRACK SPECIALTY SHAPER," "BMX TRACK CONTRACTOR," "USA BMX AUTHORIZED BUILDER," AND AS SPECIFIED IN THE CONTRACT DOCUMENTS.**

Where work is designated as such, it is understood that said work is included in the General Contractor's bid.

The General Contractor is responsible for coordinating work directly with USA BMX for all racetrack construction.



**PART 1-GENERAL**

1.01 RELATED INFORMATION

Related information and requirements are included in the General and Supplementary Conditions with regard to existing underground utilities.

1.02 INFORMATION ON SITE CONDITIONS

- A. All information obtained from the Owner regarding site conditions, subsurface information, groundwater elevations, existing constructions of site facilities, and existing underground utilities and similar data are shown on the plans or provided herein.
- B. Information derived from inspection of topographic maps, or from plans showing locations of utilities and structures will not in any way relieve Contractor from any risk, or from properly examining the site and making such additional investigations as he may elect, or from properly fulfilling all the terms of the contract documents.

1.03 CONTRACTOR'S RESPONSIBILITIES

- A. The Contractor shall satisfy himself as to the nature and location of the work and the general and local conditions.
- B. The contractor further shall satisfy himself as to the character, quality, and quantity of surface and subsurface materials to be encountered by performing site inspections, reviewing soils report (if applicable) and reviewing any other pertinent information. Any new exploratory work must be approved by the owner. Failure of the contractor to acquaint himself with the site and all available information will not relieve him of the responsibility for properly estimating the difficulty or cost of completing the work.
- C. The Contractor shall anticipate underground obstructions such as utility lines, concrete, water table and variation hereof due to rainfall, soil conditions and debris. No extra payment will be allowed for the removal, replacement, repair or possible increased cost caused by underground obstructions. Any such lines or obstructions indicated on the map show only the approximate location and must be verified in the field by the Contractor. The Owner and Engineer will endeavor to familiarize the contractor with all known underground obstructions, but this will not relieve the Contractor from full responsibility in anticipating and locating all underground obstructions.
- D. **ADDITIONAL INFORMATION**  
  
Prior to bidding, bidders may make their own subsurface investigations subject to time schedules and arrangements approved in advance by the Owner. Before any subsurface test holes are excavated, obtain permits from governing agency to perform such work.

**END OF SECTION 02010**

SECTION 02700  
**STORM DRAINAGE**

**PART 1 - GENERAL**

1.01 SCOPE

Provide storm water drainage system catch basins, tie-ins on locations shown within the BMX Racetrack (BT construction document sheets). Drain lines will be installed prior to track construction and BMX track builder to install catch basins and designated elevations shown on the construction documents.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 02200-Earthwork
- B. Section 02230-Sub-Grade Preparation & Base Material
- B. Section 03100-Concrete

1.03 PROTECTIONS

Protect all existing tree roots, shrubs, paving and utilities from damage due to drainage excavations. Re-route piping if necessary to avoid excessive damage to existing conditions as directed by the owner's representative to avoid damage. Provide protective barrier from all open trenches per city requirements.

1.04 COORDINATION

Coordinate all work affected by drainage operations.

**PART 2 - PRODUCTS**

2.01 CATCH BASINS

- A. Catch Basins shall be 12" Drain Basins as manufactured by Nyloplast, a division of Advanced Drainage Systems, Inc., or approved equal.
- B. Catch Basins shall be provided with a 24" minimum sump.
- C. Grates shall be 12" standard ductile iron grates per ASTM A536 Grade 70-50-05.
  - 1. Frame and Grate shall be square cast iron.

2.02 TRENCH DRAINS

- A. ACO Drain Klassik 100 System or equal. High density impact plastic with grip surface only.

**PART 3 - EXECUTION**

3.01 Provide as recommended by manufacturer.

3.02 CLEAN UP:

- A. Clean site daily of trash and debris resulting from construction operations.

Special Provisions

- B. Upon completion of the work, remove spoil piles, surplus material, and equipment from the site. Restore ground surface to original condition.

**END OF SECTION 02700**

SECTION 02741  
**BITUMINOUS PAVEMENT**

**PART 1 – GENERAL**

1.01 GENERAL PROVISIONS

- A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 01 - GENERAL REQUIREMENTS which are hereby made a part of this Section of the Specifications.

1.02 DESCRIPTION OF WORK

- A. Work Included: Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:
  - 1. Bituminous concrete paving
  - 2. Repairs to existing pavements as indicated.

1.03 SUBMITTALS

- A. Product Information: Provide manufacturer's data showing installation and limitations in use. Supply Certificates of Compliance for all materials required for fabrication and installation. Work includes but is not limited to the following items:
  - 1. Bituminous Concrete - mix data.

1.04 QUALITY ASSURANCE

- A. Paving work, base course etc., shall be done only after excavation and construction work which might injure them has been completed. Damage caused during construction shall be repaired before acceptance.
- B. Repair and replace existing paving areas damaged and removed during this Project. Workmanship and materials for such repair and replacement shall match those employed in existing work, except as otherwise noted.
- C. Pavement subbase shall not be placed on a muddy or frozen subgrade.
- D. Existing pavement under state or local jurisdiction shall, if damaged or removed during the course of this project, be repaired or replaced under this section of the specification in conformance with applicable codes, standards, and practices.
- E. Codes and standards: Perform site improvement work in compliance with applicable requirements of governing authorities having jurisdiction.
- F. Qualifications of workers: Use adequate numbers of skilled workers who are trained in the necessary crafts and who are completely familiar with the specified requirements and methods needed for proper performance of the work of this Section.
- G. Layout and Grading: After staking and laying out the work, and before beginning final construction, obtain the Owner's Representative's approval of layout and grades. Contractor shall make minor adjustments as determined by the Owner's Representative.

- H. The Contractor and his Subcontractors shall inspect all subbases for unstable, unsuitable or improperly prepared areas. Do not begin work over unacceptable areas. Beginning work means the Contractor and his Subcontractors accept the subbase, previous work and conditions and shall be held responsible for any corrections required to properly implement the Construction Documents.

#### 1.05 PROJECT CONDITIONS

- A. Environmental Requirements: The Subcontractor shall verify site conditions to assure that the requirements for installation procedures conform to the following:
  - 1. Paving shall not be placed when the ambient temperature is below 40 degrees Fahrenheit or when there is frost in the base or any other time when weather conditions are unsuitable for the type of material being placed.
  - 2. After final rolling of bituminous pavement, no vehicular traffic of any kind shall be permitted until it has cooled and hardened for at least 24 hours.
- B. Site Information: Data on indicated grades, utilities and other existing conditions are not intended as representations or warranties of accuracy.
- C. Existing Utilities: Locate existing utilities in areas of work. If utilities are to remain in place, provide adequate means of protection during installation of site improvements.
- D. Protection: The Contractor shall use all means necessary to protect the materials of this Section before, during and after installation. In the event of damage, make all repairs and replacements necessary to approval of the Owner's Representative and at no additional cost to the Owner. All work shall be executed in such a manner as to prevent any damage to existing streets, curbs, paving to remain, existing plant materials, and adjoining properties.
- E. The Contractor shall remove all debris, construction equipment and scrap material from areas within the limit of work prior to inspection for acceptance.
- F. The Drawings indicate, in general, the alignment and finished grade elevations. The Owner's Representative, however, may make minor adjustments in grades and alignment as are found necessary.

#### PART 2 – PRODUCTS

##### 2.01 BASE COURSE

- A. Gravel: Refer to Section 02300, Earthwork.
- B. Asphalt: Refer to Section 02721 Aggregate Base Course
- C. Submit to the Owner's Representative a sieve analysis by an independent recognized testing laboratory of the material he intends to utilize. No material shall be placed until approved by the Owner's Representative in writing.

##### 2.02 BITUMINOUS CONCRETE

- A. Bituminous Concrete: Standard plant-mixed, hot-laid paving material for road work, consisting of clean, crushed rock aggregate, mineral filler, and asphalt conforming to Contract Documents

1. Binder or bottom course paving for roadways and parking lots and sidewalks shall have maximum aggregate size passing 1 in. sieve.
2. Top or wearing course paving for roadways and parking lots shall have maximum aggregate size passing 5/8 in. sieve.
3. Top or wearing course paving for sidewalks shall conform to composition for "Dense Mix".

## 2.03 BITUMINOUS MATERIALS

- A. Bituminous material for prime coat shall be one of the following:
  1. Cut-back asphalt (rapid-curing type) conforming to AASHTO M81, Grade RC-70 or
  2. Emulsified asphalt rapid-setting type conforming to AASHTO M140, Grade RS-1.
- B. Bitumen shall be a rapid-setting type emulsified asphalt conforming to AASHTO M 140, Grade RS-1.
- C. Bituminous crack sealer shall be a hot-applied bituminous sealer conforming to Fed. Spec. SS-S-1401.

## PART 3 – EXECUTION

### 3.01 GRADING

- A. Areas to be paved will be compacted and brought approximately to subgrade elevation before work of this section is performed. Final fine grading, filling, and compaction of subgrade to receive paving, as required to form a firm, uniform, accurate, and unyielding subgrade at required elevations and to required lines, shall be done under this Section.
  1. Refer to Section 02300, Earthwork for grading requirements and procedures.
  2. Refer to Contract Documents for grading requirements and procedures.
- B. Existing subgrade material which will not readily compact as required shall be removed and replaced with satisfactory materials. Additional materials needed to bring subgrade to required line and grade and to replace unsuitable material removed shall be material conforming to this Section.
- C. Subgrade of areas to be paved shall be re-compacted as required to bring top 8 in. of material immediately below gravel base course to a compaction of at least 90% of maximum density, as determined by ASTM D 1557, Method D. Subgrade compaction shall extend for a distance of at least 1 ft. beyond pavement edge.
- D. Excavation required in pavement subgrade shall be completed before fine grading and final compaction of subgrade are performed. Where excavation must be performed in completed subgrade or subbase subsequent backfill and compaction shall be performed as directed by the Owner's Representative and as specified in other Division 2 Sections. Completed subgrade after filling such areas shall be uniformly and properly graded.

- E. Areas being graded or compacted shall be kept shaped and drained during construction. Ruts greater than or equal to 2 in. deep in subgrade, shall be graded out, reshaped as required, and re-compacted before placing pavement.
- F. Materials shall not be stored or stockpiled on subgrade.
- G. Disposal of debris and other material excavated and/or stripped under this section, and material unsuitable for or in excess of requirements for completing work of this Section shall be legally disposed of off-site.
- H. Prepared subgrade will be inspected by the Owner's Representative. Subgrade shall be approved by the Owner's Representative before installation of paving base course. Disturbance to subgrade caused by inspection procedures shall be repaired under this Section of the specification.

### 3.02 BASE COURSE

- A. Aggregate and reclaimed base course for paving and the spreading, grading, and compaction methods employed shall conform to Contract Documents
- B. Compaction of base course shall be to 95% of maximum density as determined by ASTM D 1557, Method D. Stone greater than 2-1/2 in. shall be excluded from course.
- C. Width of base course shall be greater than the width of pavement surface, if continuous lateral support is provided during rolling, and shall extend at least 2 x base thickness beyond edge of the course above, if not so supported.
- D. Aggregate and reclaimed material shall be applied in lifts less than or equal to 6 in. thick, compacted measure. Each lift shall be separately compacted to specified density, using a minimum of four coverages of tires of a ten wheel truck, having a gross weight of 70,000 lb. or using an approved equivalent.
  - 1. Material shall be placed adjacent to wall, manhole, catch basin, and other structures only after they have been set to required grade and level.
  - 2. Rolling shall begin at sides and progress to center of crowned areas, and shall begin on low side and progress toward high side of sloped areas. Rolling shall continue until material does not creep or wave ahead of roller wheels.
  - 3. Surface irregularities which exceed 1/2 in. using a 10 ft. long straightedge shall be replaced and properly compacted.
- E. Subgrade and base course shall be kept clean and uncontaminated. Less select materials shall not be permitted to become mixed with gravel. Materials spilled outside pavement lines shall be removed and area repaired.
- F. Portions of subgrade or of construction above which become contaminated, softened, or dislodged by passing of traffic, or otherwise damaged, shall be cleaned, replaced, and otherwise repaired to conform to the requirements of this specification before proceeding with next operation.

### 3.03 BITUMINOUS PAVING

- A. Bituminous paving mixture, equipment, methods of mixing and placing, and precautions to be observed as to weather, condition of base, etc., shall conform to MHD Specifications Section 460

Class I Bituminous Concrete Pavement for roadway and parking areas and Section 701 Sidewalks, Wheelchair Ramps, and Driveways for sidewalks.

- B. Bituminous binder and wearing surface courses shall each be applied individually, in single lifts of full thickness indicated on the Drawings.
- C. Work shall not be performed during rainy weather or when temperature is less than 40°F.
- D. Adjacent work, including concrete, shall be protected from stain and damage during entire operation. Damaged and stained areas shall be replaced or repaired to equal their original condition.
- E. Existing paved surfaces to be overlaid with new bituminous concrete shall be cleaned of foreign and objectionable matter with blowers, power brooms, or hand brooms immediately before applying bituminous pavement. Cracks shall be cleaned and bituminous crack sealer applied to fully seal pavement.
- F. The surface of the pavement to be resurfaced shall receive a bituminous prime coat before laying bituminous binder course. Prime coat shall be applied at rate which will leave Bituminous residue of 5 to 7 gal./100 sq. yd. after evaporation of vehicle. Base surface shall be dry and clean when prime coat is applied. Bituminous paving material shall not be placed until vehicle has completely evaporated from prime coat. Adjoining new paving shall be placed before prime coat has dried or dusted over.
- G. Deliveries shall be timed to permit spreading and rolling all material during daylight hours, unless artificial light, satisfactory to Owner's Representative, is provided. Loads which have been wet by rain or otherwise will not be accepted. Hauling over freshly laid or rolled material will not be permitted.
- H. Placing and rolling of mixture shall be as nearly continuous as possible. Rolling shall begin as soon after placing as mixture will bear the operation without undue displacement. Delays in rolling freshly spread mixture will not be permitted. Rolling shall proceed longitudinally, starting at edge of newly placed material and proceeding toward previously rolled areas. Rolling overlap on successive strips shall be greater than or equal to 1/2 width of roller rear wheel. Alternate trips of roller shall be of slightly different lengths. Corrections required in surface shall be made by removing or adding materials before rolling is completed. Skin patching of areas where rolling has been completed will not be permitted. Course shall be subjected to diagonal rolling, crossing lines of the first rolling while mixture is hot and in compactable condition. Displacement of mixture or other fault shall be corrected at once by use of rakes and application of fresh mixture or removal of mixture, as required. Rolling of each course shall be continued until roller marks are eliminated. Roller shall pass over unprotected edge of course only when paving is to be discontinued for sufficient time to permit mixture to become cold.
- I. In places not accessible to roller, mixture shall be compacted with hand tampers. Hand tampers shall weigh at least 50 lb. and shall have a tamping face less than or equal to 100 sq. in. Mechanical tampers capable of equal compaction will be acceptable in areas in which they can be employed effectively.
- J. Portions of pavement courses which become mixed with foreign material or are in any way defective shall be removed, replaced, replaced with fresh mixture, and compacted to density of surrounding areas. Bituminous material spilled outside lines of finished pavement shall be immediately and completely removed. Such material shall not be employed in the work.
- K. Joints shall present same texture, density, and smoothness as other sections of the course. Continuous bond shall be obtained between portions of existing and new pavements and between successive placements of new pavement. New material at joints shall be thick enough to



allow for compaction when rolling. Compaction of pavement, base, and subgrade at joints shall be such that there is no yielding of new pavement relative to existing pavement when subjected to traffic.

- L. Contact surfaces of previously constructed pavement (if greater than or equal to seven days since binder placed), manholes, and similar structures shall be thoroughly cleaned and painted with a thin uniform coating of bitumen immediately before fresh mixture is placed. Tack coat shall be applied at rate which will leave asphaltic residue of 5 to 7 gal./100 yd.<sup>2</sup> after evaporation of vehicle. Base surface shall be dry and clean when tack coat is applied. Bituminous paving material shall not be placed until vehicle has completely evaporated from tack coat. Adjoining new paving shall be placed before tack coat has dried or dusted over.
- M. Earth or other approved material shall be placed along pavement edges in such quantity as will compact to thickness of course being constructed, allowing at least 1 ft. of shoulder width to be rolled and compacted simultaneously with rolling and compacting surface. Pavement edge shall be trimmed neatly to line before placing earth or other approved material along edge.
  - 1. After final rolling, vehicular traffic shall not be permitted on pavement until it has cooled and hardened, and in no case less than six hours.
- N. Variations in smoothness of finished surface shall be less than or equal to the following tolerances when tested with a 10 ft. straightedge, applied both parallel to and at right angles to centerline of paved area.
  - 1. For roadway and parking pavement surface course - 1/4 in. in 10 ft.
  - 2. For sidewalk pavement surface course - 1/4 in. in 10 ft.
  - 3. At joint with existing pavement, and at other locations where an essentially flush transition is required, pavement elevation tolerance shall not exceed 0.01 ft.
  - 4. At other areas pavement elevation tolerance shall not exceed + 0.05 ft.
  - 5. Irregularities exceeding these amounts or which retain water on surface shall be corrected by removing defective work and replacing with new material conforming to this Section.
- O. The Contractor shall check the final surface for depressions by applying water in the presence of the Owner's Representative or Engineer. Minor depressions (less than 1/8" in depth) need not be corrected, however, in cases where the variation in the surface course exceeds 1/8", the entire area affected shall be removed and replaced with new surface course at the expense of the Contractor.

### 3.04 REPAIRS TO EXISTING PAVEMENT

- A. Subgrade shall be prepared in strict accordance with paragraphs above.
- B. Base course shall be replaced in strict conformance with paragraphs above.
- C. Bituminous concrete paving mixture, equipment, and methods of mixing and placing shall conform to MHD Specifications Section 472 for Bituminous Concrete for Patching, and above.

**END OF SECTION**

SECTION 02821  
**CHAIN LINK FENCE**

PART 1 - GENERAL

1.01 GENERAL PROVISIONS

- A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 01 - GENERAL REQUIREMENTS which are hereby made a part of this Section of the Specifications.

1.02 DESCRIPTION OF WORK

- A. Work Included: BMX Track Builder to provide labor, materials, and equipment necessary to complete the work of this Section (**See sheet BT 1.01 item 6**), including but not limited to the following:
  - 1. Fusion Bonded Fabric and Powder Coated Framework and Fittings.

1.03 SUBMITTALS

- A. Product Data: Provide manufacturer's data for each item showing installation and limitations in use.
- B. Shop Drawings: Supply shop drawings at an approved scale for location, installation and erection of all parts of the work.
- C. Material Selection and Samples: Submit samples showing the complete range of colors, textures and finishes available for all components required for construction. Work includes but is not limited to the following:
  - 1. Sizes: Provide 12 in. square or 12 in. long samples of each material, as required.

1.04 QUALITY ASSURANCE

- A. The Contractor and his Subcontractors shall inspect all sub bases for unstable, unsuitable or improperly prepared areas. Do not begin work over unacceptable areas. Beginning work means the Contractor and his Subcontractors accept the subbase, previous work and conditions and shall be held responsible for any corrections required to properly implement the Contract Documents.
- B. Source: For each type of product required for the work of this Section, provide products of one manufacturer and source for consistency.
- C. The work of this Section shall be completely coordinated with the work of other Sections. Verify dimensions and work of other trades which adjoin materials of this Section before installing items specified.

PART 2 - PRODUCTS

2.01 FUSION BOND CHAIN LINK FENCE, GATES AND BACKSTOP

- A. The types of fencing required for the project are as indicated below, subject to detailed material requirements which follow.
- B. All material shall be new, and products of recognized reputable manufacturers. Used, re-rolled or re-galvanized materials are not acceptable.

C. Like items of materials provided hereinafter shall be the end products of one manufacturer in order to achieve standardization for appearance, maintenance and replacement.

D. Fencing/Backstop Fabric Wire shall conform to the following:

1. Fabric shall be premium grade helically wound and woven steel core wire in accordance with ASTM F668 for Class 2B vinyl fabric. Color to be black.

a. Material specifics shall be as follows:

	Core (inches)	Wire (gauge)	Zinc (oz/S.F.)	Mesh Size
All fencing	0.192	6	.40	1 3/4"

2. Selvages: Fence fabric shall be knuckled selvage at top and bottom.

E. Powdercoated framework shall be steel pipe - Type II: Cold formed and welded steel pipe complying with ASTM F 1043, Group IC, with minimum yield strength of 50,000 psi (344 MPa), sizes as indicated. Protective coating per ASTM F 1043, external coating Type B, zinc with organic overcoat, 0.9 oz/ft<sup>2</sup> (275 g/m<sup>2</sup>) minimum zinc coating with chromate conversion coating and verifiable polymer film. Internal coating Type B, minimum 0.9 oz/ft<sup>2</sup> (275 g/m<sup>2</sup>) zinc or Type D, zinc pigmented, 81% nominal coating, minimum 3 mils (0.08 mm) thick. Color to be black.

1. Schedule of pipe sizes shall be as follows:

Application	Height in Feet	Out. Dim. in Inches	Weight lbs/foot
Terminal/ Corner Posts	12'-0"+	4.000	6.56 min
	10'-0"	2.875	6.56 min.
	8'-0"	2.875	4.64 min.
	6'-0"	2.375	3.12 min.
	4'-0"	2.375	3.12 min.
Line Post	8'-0"	2.375	3.12 min.
	6'-0"	1.90	2.28 min.
	4'-0"	1.90	2.28 min.
Rails and Braces	(all heights)	1.660	1.84 min.

2. Posts shall be of sufficient length to allow for installation into concrete footings to a minimum depth below finish grade as shown on the drawings.

3. Post tops shall be provided with post caps which fit securely and exclude moisture.

F. Top Rails shall have lengths not less than eighteen feet and shall be fitted with min. 6 inch long outside sleeved or internally swaged couplings for connecting the lengths into a continuous run. Provide top rail with pass-through fittings at line posts and rail end cups and brace bands at terminal or gate posts.

G. Middle and Bottom Rails shall be secured to line posts with steel boulevard clamps, and to terminal, corner, gate or pull posts with rail end cups and brace bands.

H. Brace Rails shall be provided for each terminal post with fabric height of six feet or more. Extend brace to each adjacent post at approximate mid-height of fabric and secure with rail end cups and brace bands. Provide diagonal truss bracing with 3/8 inch steel rod and turnbuckle.

- I. Fence fittings and accessories shall be fabricated of steel or cast iron and shall conform to minimum requirements of ASTM F-626, and as below. Following fabrication and galvanizing, all fence fittings shall receive a 10 to 14 mil thick fusion bonded vinyl coating to match fabric color. With the exception of field painting for nuts and bolts, no painted fittings will be accepted.
  1. Stretcher Bars shall not be less than 3/16 by 3/4 inch and not less than 2 inches shorter than the nominal height of the fabric with which they are to be used. One stretcher bar shall be provided for each end and gate post, and two for each corner and pull post.
  2. Fabric connectors shall be provided in sufficient number for attaching the fabric to all line posts at intervals not exceeding twelve inches (12"); and not exceeding twelve inches (12") when attaching fabric to top or bottom rail. Connectors shall be galvanized with a min. 0.8 oz s.f. coating of zinc.
  3. Unless designated otherwise on the details, tie wires shall be fabricated from rolled 9 gauge wire stock which has been cut to required lengths for hand-twisted connections at the site.
  4. Tension Bands shall be provided in sufficient number for attaching the fabric and stretcher bars to all terminal posts at intervals not exceeding twelve inches (12"). Tension bands shall be formed from flat or beveled steel and shall have a minimum thickness after galvanizing of 0.078 inch; and minimum width of 3/4 inch for posts 4 inch O.D. or less; and 0.108 inch thickness by 7/8 inch for posts larger than 4 inch O.D. Brace bands shall be formed from flat or beveled steel and shall have a minimum thickness of 0.108 inch after galvanizing; and a minimum width of 3/4 inch. Attachment bolts shall be 5/16 x 1-1/4 inch galvanized carriage bolts with nuts, ASTM A-307, Grade A.
  5. Other hardware required shall be fabricated from steel, and galvanized in accordance with ASTM A123 and/or ASTM A153.

J. Chain Link Swing Gates:

1. Fabricate chain link swing gates in accordance with ASTM F 900 using galvanized 2" steel tubular members weighing 2.60 lb/ft. Fusion or stainless steel welded connections forming rigid one-piece unit. Frames shall be thermally fused after fabrication with minimum 10 mils per ASTM 1043. Coating before fabrication will not be allowed. Gates over 8' high or 15' wide shall be provided with additional horizontal and vertical members to ensure proper strength.
2. Chain link fabric for gates shall match fabric of fencing.
3. Gate posts shall be steel pipe – type II finished to match fence posts:

<u>Gate leaf</u>	<u>Post Size (inches)</u>	<u>Weight (lb/ft.)</u>
10 ft	4.00	9.11
8 ft and 6 ft	4.00	9.11
4 ft	2.875	5.79

4. Gate hinges shall be heavy-duty offset type. Install gate for 180-degree outward operation. Hinges shall have large bearing surfaces for clamping in position. The hinges shall not twist or turn under the action of the gate. The gates shall be capable of being opened and closed easily by one person.
5. All gates shall be equipped with a positive closure latch and padlock fitting.

6. Double gates shall be equipped with a drop rod to hold the inactive leaf. Provide gate stop pipe to engage center drop rod. Provide locking device and padlock eyes as an integral part of the latch, requiring one pad lock for locking both leaves.
- K. Poured-in-place concrete footings shall have a twenty-eight day compressive strength of 3,000 psi.

## PART 3 – EXECUTION

### 3.01 CHAIN LINK FENCE AND GATES

- A. General: Unless modified herein, installation of fencing shall meet the requirements of ASTM F567. Erect fencing in straight lines between angle points by skilled mechanics experienced in this type of construction.
- B. Post Holes: Post holes for line posts shall be excavated to a minimum size of fifteen inches by forty eight inches (15"x48"). For fences six feet (6') and taller post holes shall be excavated to a minimum size of eighteen inches by forty-eight inches (18" x 48"). Post holes for terminal or gate posts shall have a minimum diameter of eighteen inches (18"), by respective depths as specified.
  1. Backfill concrete to within 6 inches of finished grade and crown top to shed water.
  2. Set posts with plumb vertical alignment.
- C. Space posts in the fence line equally with the maximum spacing shown on Drawings.
- D. Provide corner or pull posts at maximum intervals of 250 ft. O.C., and for any change in direction of 15 degrees or more, and for any abrupt change in grade, with bracing in both directions.
- E. Hanging Fabric:
  1. Fasten chain link fence fabric to terminal posts, and gate posts with tension bars and tension bar bands.
  2. Fasten chain link fence fabric on court side.
  3. Fence fabric shall be secured to all rails and to posts that are not terminal, or gate with wire ties at specified spacing. Tie down wire shall be woven through the fence fabric, completely around the rail and wire shall be twisted securely with three twists on the rail side of the fence and the tails of the wire cut off to preclude untwisting by hand. Twisted tie wire ends shall be turned under at horizontal rails and turned down at vertical rails to reduce potential for human contact.
  4. Stretch fabric as tightly as possible without pulling the material out of shape. Top of fabric shall be parallel with top rail.
- F. Testing of Fence Fabric, each fence panel shall be constructed such that it will pass the following test. Deflection of fence fabric shall be no greater than 2 inches when a force of 30 pounds is applied in the center of the panel, perpendicular to the plane of the fence fabric. Fabric shall return to original position when force is released.
- G. Gates, install gates in conformance with specification and detail requirements. Test swing and latch and adjust as necessary for proper operation.

**END OF SECTION**

SECTION 02870  
**SITE FURNISHINGS**

**PART 1 - GENERAL**

1.01 RELATED INFORMATION

02230 - Subgrade Preparation and Base Material  
03300 - Cast-in-Place Concrete

1.02 REFERENCE AND STANDARDS

- A. All applicable laws, codes and regulations.
- B. ASTM Standards.
- C. Americans With Disabilities Act (ADA) requirements.

1.03 SUBMITTALS

- A. Submit for approval color samples, manufacturer's specifications, and technical data for each specified product.
- B. Submit Shop Drawings to Owner's Representative for approval.

1.04 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Labeling: Furnish standard products in unopened manufacturer's original containers bearing original labels showing quantity, description and name of manufacturer.
- B. Delivery: Deliver and unload at the site in such a manner that no damage occurs to the product.
- C. Storage: Store products in a manner which will preclude all damages. Damaged materials will be rejected. Remove all damaged materials from the job site immediately and replace at no cost to Owner.
- D. Handling: Furnish suitable equipment to locate all site furnishing materials carefully and efficiently. Lift materials using lifting inserts provided by manufacturer where applicable.

1.05 WARRANTY

- A. Description: In addition to manufacturer's guarantees or warranties, warrant all work against defects in materials and workmanship by Contractor.
- B. Repairs: Warranty shall also cover repair and or replacement to any part of the premises or equipment resulting from defects in materials or damaged caused during construction to the satisfaction of the Owner at the contractor's expense.

**PART 2 - MATERIALS**

2.01 SITE FURNISHINGS:

Special Provisions

A. LED Light Stand:

Start Hill Gate Light System (LED) provided by Prostuff, 29 Airport Drive, Rockford, IL 61109. Phone: (815) 226-1241, or approved equal matching drawing detail requirements.

B. Rapid Start Air Ram:

Rapid Start Air Ram-4"- provided by Prostuff, 29 Airport Drive, Rockford, IL 61109. Phone: (815) 226-1241, or approved equal matching drawing detail requirements.

C. Automated Gate Controller-Brain Box:

Automated Gate Controller-Brain Box provided by Prostuff, 29 Airport Drive, Rockford, IL 61109. Phone: (815) 226-1241, or approved equal matching drawing detail requirements. .

D. Crescent Series 8 Person Start Gate:

Crecent Series 8 Person Start Gate provided by Prostuff, 29 Airport Drive, Rockford, IL 61109. Phone: (815) 226-1241, or approved equal matching drawing detail requirements.

E. Start Gate Control Box:

Start Gate Controller Boxes provided by Prostuff, 29 Airport Drive, Rockford, IL 61109. Phone: (815) 226-1241, or approved equal matching drawing detail requirements.

F. Air Compressor:

Start Gate Compressor Air Tank provided by Prostuff, 29 Airport Drive, Rockford, IL 61109. Phone: (815) 226-1241, or approved equal matching drawing detail requirements.

G. Truss Framing for start hills and finish line:

### **PART 3 - EXECUTION**

#### **3.01 MATERIAL INSTALLATION**

- A. Set all work true and square, plumb and level.
- B. Cut all bolts flush with nuts and remove burrs, or countersink nuts and bolts as required.
- C. Securely fasten and/or anchor all equipment with bolts, angles, plates, flanges, concrete footings and/or other items required for proper and complete installation and/or erection of the units.
- D. Install concrete for footings as specified in Section 03300 of these specifications. Slope tops of footings to drain.
- E. Supply all miscellaneous metal units and install as specified herein under the Sections entitled Site Metal. Hot-dip galvanize all metal fastenings, angles, etc., after complete fabrication prior to painting.
- F. Install all equipment in strict conformance with the manufacturer's specifications and/or as approved by the Owner's Representative.
- G. Hammers with scored faces shall not be used in conjunction with site furnishings installation.
- H. Install all footings or miscellaneous materials to depth indicated on drawings or per

manufacturer's recommendations.

- I. Set all trash containers level as recommended by manufacturer.
- J. Transport, store and handle pre-cast units and manufactured items in a manner to avoid hair cracks, staining or other damage. Store units free of the ground and protected from mud or rain splashes. Cover units, secure covers firmly, and protect the units from dust, dirt or other staining material.

### 3.02 PROTECTION AND CLEANING

- A. Remove and replace with acceptable material furnishings which are chipped, cracked and otherwise damaged and which, in the opinion of the Owner's Representative, do not conform to the specification requirements.
- B. Remove concrete scum, grout stains, etc. from surfaces immediately. Take all necessary precautions to protect adjacent in-place work.

**END OF SECTION 02870**



SECTION 03200  
**CONCRETE REINFORCEMENT**

**PART 1 - GENERAL**

1.01 DESCRIPTION:

Provide steel reinforcement for cast-in-place concrete.

1.02 RELATED WORK SPECIFIED ELSEWHERE:

- A. Section 03100-Concrete Formwork
- B. Section 03200-Cast-in-Place Concrete

1.03 DELIVERY AND STORAGE:

- A. Stack reinforcing steel in tiers. Mark each length, size, shape and location. Maintain reinforcement free of dirt, mud, paint or rust.

1.04 REFERENCE STANDARDS:

- A. American Concrete Institute (ACI):
  - 1. ACI 315-80, Manual of Standard Practice for Detailing Reinforced Concrete Structures.
  - 2. ACI 318-77, Building Code Requirements for Reinforced Concrete.
- B. American Society for Testing and Materials (ASTM - latest editions):
  - 1. ASTM A233, Mild Steel Arc Welding Electrodes.
  - 2. ASTM A615, Deformed Billet-Steel Bars for Concrete Reinforcement.
  - 3. ASTM A706, Low-Alloy Steel Deformed Bars for Concrete Reinforcement.
- C. Concrete Reinforcing Steel Institute (CRSI): Manual of Standard Practice, latest edition.
- D. American Welding Society (AWS): Reinforcing Steel Welding Code, D12.1-75, including latest revisions.

1.05 SUBMITTALS:

- A. Shop Drawings: Indicate complete reinforcing method for each concrete member including materials, sizes, bends, dimensions, stirrup spacing, and placing details not shown on drawings.

**PART 2 - PRODUCTS**

2.01 MATERIALS:

- A. Steel Reinforcement: Deformed billet steel, ASTM A615, Grade 60. Minimum 75% Recycled Product.
- B. Welded Steel Reinforcement: Deformed low-alloy steel, ASTM A706, carbon content not exceeding 0.30% and manganese content not exceeding 0.60%. Identify and tag with manufacturer's heat identification number.

2.02 FABRICATION:

- A. Fabricate to sizes, shapes, and lengths detailed in accordance with requirements of ACI 318-71 and ACI 315-65.

**PART 3 - EXECUTION**

3.01 INSTALLATION:

- A. Accurately place reinforcing steel in accordance with Contract Documents. Thoroughly clean reinforcement of any coating which would reduce bonding. Do not heat, cut, or bend bars without approval of Owner's Representative or Engineer. Do not splice reinforcement at points of maximum stress. Stagger splices in adjacent bars and provide a minimum overlap of 30-bar diameters at splices unless specifically noted in Contract Documents.
- B. Securely saddle tie intersections with No. 18 ga. black annealed wire. Rigidly secure reinforcement in place. Provide concrete coverage as specified in Contract Documents.

3.02 WELDING REINFORCEMENT:

- A. Weld deformed steel reinforcement bars in strict accordance with AWS 12.1, using recommended pre-heat temperature and electrode for type of steel being welded.
- B. Do not weld steel reinforcement bars without proper heat identification of bars.

3.03 CLEANUP:

- A. Remove debris and trash resulting from specified work.

**END OF SECTION 03200**

SECTION 03300  
**CAST-IN-PLACE CONCRETE**

**PART 1 – GENERAL**

1.01 RELATED INFORMATION

03100-Concrete Formwork  
03200-Concrete Reinforcement  
03370-Concrete Curing

1.02 SUBMITTALS:

A. Design of Concrete Mixes:

1. Contractor shall be responsible for and pay for design of concrete mixes. Design of concrete mixes shall be performed by a Testing Laboratory selected by Contractor. Design methods to be in accordance with ACI 318-71.
2. Make three trial mixes using aggregate proposed.
3. Make advance tests of trial mixes with proposed materials. Test four cylinders in accordance with ASTM C-39 at 7 days and 28 days. Do not place concrete on project until laboratory reports and breaks of confirmation cylinders indicate that proposed mixes will develop required strengths.
4. Check mix design and revise, if necessary, wherever changes are made in aggregate or in surface water content of aggregate or workability of concrete. Slump shall be the minimum to produce workable mix. Laboratory shall prescribe minimum quantity of water.
5. If Portland Cement reducers or other additives are used, submit control mix design without reducers or additives as well as mix exactly proposed to be used. Submit W.R. Grace Co. recommendations for retarder and shrinkage compensation of slab on grade.
6. Sample of Workmanship: Provide on site, minimum 48"x48" sample (not part of finished project) of each flatwork finish.
7. Forward two copies of design mix to Owner's Representative or Engineer for approval.
8. Soils Investigation Report.

1.04 COORDINATION:

- A. Notify responsible trades of schedules of concrete pours so as to allow adequate time for installation of work and inspection prior to pour. Obtain all materials and other miscellaneous steel items to be cast into concrete. Verify all measurements and layout to avoid any delay.

1.05 QUALITY ASSURANCE

- A. Concrete Testing:

1. Prepare samples by each application crew using the equipment, materials and mix proportions proposed for the Project.
- B. Acceptance: Final acceptance of the shotcrete will be based upon approval of Owner's Representative or Engineer.
- C. Regulatory Requirements: Meet requirements of applicable laws, codes, and regulations required by authorities having jurisdiction over Work.
- D. Contractor Samples:
1. Contractor shall prepare a sample for each paving type indicated in Contract Documents, prior to installation.
  2. Samples of aggregates, texture, color, and finishes shall be completed to the satisfaction of the Owner's Representative or Engineer.
  3. These samples will become the standard of quality by which future paving samples and work will be judged.
  4. Samples to remain on-site and be protected during the course of construction, as a means to compare work in progress.
- E. Concrete Manufacturer Qualifications: Manufacturer of ready-mixed concrete products complying with ASTM C 94 requirements for production facilities and equipment.
- F. Contractor Experience: Provide evidence to indicate successful experience in providing work for facilities similar in scope to that specified herein and can demonstrate successful experience through past project documentation and references.
1. Required Experience: Contractor or Subcontractor must have completed (5) public BMX track facilities with a minimum size of 12,000 square feet, in the last 4 years. Parks must be open and in good operating condition for at least one year.
  2. Evidence of Experience: Contractor or Subcontractor shall submit to Owner's Representative satisfactory documentation of the aforementioned experience and qualification. If a Contractor cannot provide this information or if it is unverifiable, work under this Section and any other related Section cannot be completed by Contractor. This submission must contain the Project Name & Location, Owner's Name & Contact Information, Architect Name & Contact Information, Project Size, Contract Value, Completion Date, and Supervisor and/or Key Personnel responsible for this experience for each of the qualifying projects.
- G. Safety and Performance Guidelines: Comply with all safety and performance requirements and all applicable references as specified in the ASTM F2480 Standard Guide for In-ground Skate Parks (Includes standards for BMX parks).
- H. ACI Requirements: Meet all requirements of ACI 506, Chapter 13, Wet Method and Chapter 5, Shotcrete Crew.

1.05 REFERENCE STANDARDS:

- A. ACI 211.1-81 - Recommended Practice for Selecting Proportions for Normal-Weight Concrete.
- B. ACI 211.3-81 - Recommended Practice for Selecting Proportions for Lightweight Concrete.
- C. ACI 301-73 - Specifications for Structural Concrete for Buildings.
- D. ACI 305-77 - Recommended Practice for Hot Weather Concreting.

- E. ACI 306-72 - Recommended Practice for Cold Weather Concreting.
- F. ACI 318-77 - Building Code Requirements for Reinforced Concrete.
- G. ASTM C33 - Concrete Aggregates.
- H. ASTM C94 - Ready-Mixed Concrete.
- I. ASTM C143 - Test for Slump of Portland Cement Concrete.
- J. ASTM C150 - Portland Cement.
- K. ASTM C260 - Air-Entraining Admixtures for Concrete.
- L. ASTM C494 - Chemical Admixtures for Concrete.
- M. ASTM C618 - Fly Ash and Raw or Calcined Natural Pozzalans for Use in Portland Cement Concrete.

1.06 JOB CONDITIONS:

- A. Environmental Conditions: Submit plan to monitor wind velocity, relative humidity, temperature, and concrete temperature in order to maintain specified maximum rate of evaporation.
- B. Coordination:
  1. Coordinate schedules of concrete pours to allow adequate time for installation of other related work.
  2. Verify that anchor bolts and other embedded steel items to be cast into concrete are properly placed.
  3. Coordinate size and location of mechanical and electrical equipment concrete pads.
  4. Coordinate earthwork and soils report requirements with placement requirements.
  5. Coordinate with form-work and finishes sections to provide finish floor levelness and flatness as specified herein. Slope to drains at grades and percent slope shown on contract documents.

**PART 2 – PRODUCTS**

2.01 MATERIALS:

- A. Portland Cement: ASTM C-150, Type II.
- B. Fine Aggregate: Clean, hard, durable, uncoated natural sand, free from silt, loam or clay, meeting requirements of ASTM C-33.
- C. Coarse Aggregate: Class II-Hard durable, un-coated crushed limestone meeting requirements of ASTM C-33. Unless otherwise noted in aggregate size 1” minimum, No. 5, 56 or 57. Base rock shall conform to local Town code.
- D. Water: Potable.

- E. Admixture: Cement-dispersing, water-reducing compound, ASTM C-494, Type A, as made by Master Builders, Sika, or Gifford-Hill Co., or equal. Depending upon weather conditions at time of placing, ASTM C-494, Type D (water-retarding) or Type E (water-reducing, accelerating) may be used if approved by Owner's representative.

## 2.02 PROPORTIONS AND MIXING:

- A. Proportions and Design: In accordance with approved mix design.  
  
Min. All. Comp.  
Strength (28 days)  
  
4000 PSI
- B. Admixture: No admixtures without approval. Introduce admixtures in quantities and according to methods recommended by admixture manufacturer. Add air-entraining agent to concrete as scheduled.
- C. Slump: Not to exceed 3 ½"
- D. Mixing: Ready mixed concrete in accordance with ASTM C-94. Do not transport or use concrete after 1-1/2 hours have elapsed from time of initial mixing. Supplier of transit-mixed concrete shall have a plant of sufficient capacity, and adequate transportation facilities to assure continuous delivery at required rate, to provide continuous concrete placement throughout a pour.
- E. Grout and Dry Pack: Non-Shrink, Non-Metallic: U.S. Grout Corp. "Five Star Grout" ASTM C-877, C-191, and C-109, 5,000 PSI.

## 2.03 CURING MATERIALS:

- A. Water: Domestic Quality, clear and potable with no chemical content.
- B. Sheet Material: ASTM C171. Moisture loss maximum .055 g/ cm sq.  
Color: White.
- C. Curing Compounds: Cure/ Seal: Curecrete Ashford Formula or equal.

## PART 3 – EXECUTION

### 3.01 INSPECTION:

- A. Inspect subgrade, forms, reinforcing steel, pipes, conduits, sleeves, hangers, anchors, inserts, and other work required to be built into concrete and report any discrepancies. Notify Town's Representative at least 5 working days in advance of scheduled pour.
- B. Correct unsatisfactory work prior to pouring concrete.
- C. Remove rubbish from formwork immediately prior to placing concrete.

### 3.02 INSTALLATION:

#### A. Placing Concrete:

1. Convey and place concrete allowing no separation of ingredients in accordance with ACI 304 and as specified below.
2. Maximum height of concrete free fall: five-feet.
3. Regulate rate of placement to maintain plasticity and flow into position.
4. Deposit concrete continuously until panel or section is completed.
5. Place concrete in horizontal layers 18" maximum thickness.

#### B. Consolidation:

1. Use mechanical vibrating equipment for consolidation.
2. Vertically insert and remove hand-held vibrators at 18" o.c. for 10 to 15 seconds.
3. Do not use vibrators to transport concrete in forms.
4. Provide vibrators with minimum speed of 8000 RPM and with amplitude to consolidate effectively.
5. Thoroughly consolidate concrete and work around reinforcement, embedded items and into corners of forms. Thoroughly consolidate layers of concrete with previous layers.

#### C. Construction Joints:

1. Unless otherwise shown on Drawings, each footing, wall, beam, and slab shall be considered as a single unit of operation and shall be monolithic in construction.
2. Where construction joints are absolutely unavoidable, locate joints as specified in Construction Documents or at or near quarter points of spans where approved by Owner's Representative.
3. Saw Cut joints, Expansion Joints and Key Joints as specified in Contract Documents.

#### D. Expansion Joint Fillers:

1. Refer to Contract Documents for Expansion Joint locations and details.
2. Finish joint material flush with concrete surface.

#### E. Finish:

1. Smooth Trowel. (See sample requirements under submittals).

#### F. Cracking:

1. Cracking from inadequate curing is not allowed. Sawcut joints and construction joints are shown on drawings. Contractor may, with approval of Owner's Representative, recommend and detail other joints required to prevent cracking.

### 3.03 CLEAN UP:

Clean all debris, excess concrete and miscellaneous material associated with work.

**END OF SECTION 03310**

SECTION 03370  
**CONCRETE CURING**

**PART 1 - GENERAL**

1.01 DESCRIPTION:

Provide curing material for cast-in-place concrete flatwork, and concrete walls.

1.02 RELATED WORK SPECIFIED ELSEWHERE:

- A. Section 02514-Concrete Formwork
- B. Section 03200-Concrete Reinforcement
- C. Section 03300-Cast-In-Place Concrete

1.03 SUBMITTALS:

- A. Submit samples and detailed technical data of products proposed for curing to Owner's Representative for approval.
- B. Submit certification that materials meet specification requirements to Owner's Representative and all required certifiers (if applicable).

1.04 DELIVERY AND STORAGE:

Deliver materials in original sealed containers with seal and labels intact. Store in dry place. Use materials out of original containers only.

**PART 2 - PRODUCTS**

2.01 MATERIALS:

- A. Chemcure R90 W.B. or approved equal
- B. Polyethylene Film conforming to AASHTO M-171
- C. Curing Agent: ASTM C 309, non-staining, water or soy based, low or no Volatile Organic compound emitting, compatible with color admixture.

**PART 3 - EXECUTION**

3.01 CURING:

- A. Protect concrete surfaces against rapid drying. Keep moist for necessary amount of time to reach concrete strength and inhibit moisture loss after placing.
- B. Curing Method: Spread curing paper over surfaces, lapping ends and sides a minimum of four inches, and maintain in place by use of suitable weights for necessary duration, then remove.

3.02 CLEANUP:

- A. Remove debris and trash resulting from specified work.

**END OF SECTION 03370**



**PART 1 - GENERAL**

1.01 SCOPE: Provide labor, materials and equipment for the installation of the Site Metal Work as shown on the drawings and as specified.

1.02 RELATED SECTIONS

- A. Section 03100 - Concrete Formwork
- B. Section 03200 - Concrete Reinforcement
- C. Section 03300 - Cast-In-Place Concrete

1.02 QUALITY ASSURANCE

- A. Qualifications of Fabricators: Experienced in fabrication of miscellaneous metals.
- B. Qualifications of Welders: Welding shall be done only by certified welding operators currently qualified according to AWS D1.1.
- C. Qualifications of Workmen: Provide at least one person who shall be present at all times during execution of this portion of the Work, and who shall be thoroughly familiar with the type of materials being installed, the referenced standards, the requirements of this Work, and who shall direct all work performed under this Section. Welds indicated may be made in shop or field with approval.
- D. Reference Standards:
  - 1. Steel: Meet requirements of AISC "Specifications of Architecturally Exposed Structural Steel," latest edition.
  - 3. Welding: Meet requirements of AWS "Structural Welding Code," D1.1, latest edition.

1.03 SUBMITTALS

- A. Shop Drawings:
  - 1. Submit shop drawings for all custom fabricated items under this section. Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners and accessories. Indicate welded connections using standard AWS welding symbols.
  - 2. Verification: Verify all measurements at the job. Show dimensions, sizes, thicknesses, gauges, finishes, joining, attachments, and relationship of work to adjoining construction. Where items must fit and coordinate with finished surfaces and/or constructed spaces, take measurements at site and not from drawings.
  - 3. Coordination: Coordinate with work of Cast-In-Place Concrete Section.
- B. Samples: Required for all Coping and Edging of concrete work. Submit finish metal samples for final finish selection. Submit prior to delivery to site. Attach name, address of manufacturer and/or supplier to each sample.

1.04 DELIVERY, STORAGE AND HANDLING

A. Coordination:

1. Coordinate with work of Cast-In-Place Concrete Section.

B. Storage of Materials:

1. Materials which are stored at the project site shall be above ground on platforms, skids, or other supports. Protect steel from corrosion. Store other materials in a weather-tight and dry place until ready for use.

C. Protection:

1. Use all means necessary to protect miscellaneous metals before, during and after installation and to protect the installed work and materials of all other trades.
2. Protect any adjacent materials or areas below from damage due to weld splatter or sparks during field welding.

D. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the approval of the Owner's Representative and at no additional cost to the Owner.

1.05 JOB CONDITIONS

A. Examine existing conditions in which the work is to be installed. Notify Owner's Representative if conditions are unacceptable to begin work.

B. Do not proceed with the work until unsatisfactory conditions have been corrected.

1.06 COORDINATION

A. Templates and Built-ins: Furnish all anchors, fastenings, sleeves, setting templates and layouts affecting or installed in the work of other trades.

B. Delivery: Where items must be incorporated or built into adjacent work, deliver to trade responsible for such work in sufficient time that progress of work is not delayed. Be responsible for proper location of such items.

1.07 JOB SITE SAMPLE

A. Contractor to provide fabricated, on site sample of metal item(s), complete with approved finish, for review by Owner and Owner's Representative before fabrication of total quantities. Any fabrication of project item(s) by Contractor before Owner review and approval is strictly at his own risk and expense.

B. Approved sample(s) shall be used as the standard of workmanship and shall remain on site until work has been completed and approved by the Owner's Representative.

## **PART 2 - PRODUCTS**

### 2.01 MATERIALS

- A. 2" ROUND STEEL PIPE RAILING-O.D. 2.375, Thickness .154: ASTM A-53, Type E or S (Fy=35 ksi), Grade B or A-501 (Fy=36 ksi).
- B. 1"X1" SQUARE STEEL TUBING- O.D. 2"X2", Thickness .188: ASTM A-53, Type E or S (Fy=35 ksi), Grade B or A-501 (Fy=36 ksi).
- C. 3"X3" SQUARE STEEL TUBING- O.D. 3"X3", Thickness .188: ASTM A-53, Type E or S (Fy=35 ksi), Grade B or A-501 (Fy=36 ksi).
- D. 2"x4" STEEL RAIL TOP: O.D. 2"X4", Thickness .188: ASTM A-53, Type E or S (Fy=35 ksi), Grade B or A-501 (Fy=36 ksi).
- E. WELDING RODS: E-70 series low hydrogen unless otherwise noted on drawings.

2.02 GROUT: Non-shrinking Master Builder's "Embedco", Conrad Sovig's "Metel-Mxs Grout", Sonneborn's "Ferrolith G Redi-Mixed Grout" or approved equal.

2.03 OTHER MATERIALS: All other materials, not specifically described but required for a complete and proper installation of miscellaneous metals, shall be new, first quality of their respective kinds and subject to the approval of the Owner's Representative.

## **PART 3 - EXECUTION**

### 3.01 EXISTING CONDITIONS

- A. Inspection:
  - 1. Prior to all work of this Section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.
- B. Discrepancies:
  - 1. In the event of discrepancy, immediately notify the Owner's Representative.

### 3.02 COORDINATION

- A. General: Carefully coordinate with all other trades to insure proper and adequate interface of the work of other trades with the work of this Section.
- B. Delivery: Insure timely delivery of all metal fabrications which must be installed in other work so as not to delay that work.

### 3.03 INSTALLATION

#### A. General:

1. Install metal fabrications in strict accordance with the Drawings, the approved Shop Drawings, and all pertinent codes, regulations and standards.
2. Obtain Owner's Representative review prior to site cutting or making adjustments which are not part of scheduled work.
3. Install items square and level, accurately fitted and free from distortion or defects.
4. Align all metal fabrications as shown on the Drawings, and where vertical or horizontal members are shown, align them straight, plumb and level within a tolerance of one in 500.
5. Make provisions for erection stresses by temporary bracing. Keep work in alignment.
6. Replace items damaged in course of installation.
7. Perform field welding in accordance with AWS D1.1
8. After installation, grind and touch-up field welds.

### 3.04 WORKMANSHIP

- A. Layout: Set all work plumb, true, rigid, and neatly trimmed out. Miter corners and angles of exposed molding and frames unless otherwise noted.
- B. Fitting: Fit exposed connections accurately together to form tight hairline joints.
- C. Labor: Employ only workmen specifically skilled in such work.

### 3.05 FABRICATION

- A. Shop assemble in largest practicable dimensions, making members true to length so assembling may be done without fillers.
- B. Provide all surfaces free of file marks, dents, hammer marks, wire edges or any unsightly surface defects.
- C. STEEL PIPE COPING: Roll pipe to conform with top radius curve of each bowl and ledge as shown on drawings. Refer to drawings for relational tolerance to concrete surface and other steel.

### 3.06 ATTACHMENTS AND REINFORCEMENTS

- A. Do all cutting, shearing, drilling, punching, threading, tapping, etc., required for site metalwork or for attachment of adjacent work. If applicable, drill or punch holes; do not use cutting torch.
- 3.07 OTHER CONNECTORS: Make all permanent connections in ferrous metal surfaces using welds where at all possible; do not use bolts or screws.
- 3.08 WELDING
- A. Preparation: Remove all rust, paint, scale and other foreign matter. Wire brush all flame-cut edges. Clamp members as required and alternate welds, all as necessary to prevent warping or misalignment.
  - B. Exposed Welds: Uniformly grind smooth (no tolerance) all welds normally exposed to view and feel in the finished work.
  - D. Faulty and Defective Welding: Chip out and replace all welding showing cracks, slag inclusion, lack of fusion, bad undercut or other defects ascertained by visual or other means of inspection. Replace and re-weld at no cost to Owner.
  - E. Field Welding:
    - 1. Procedure: Comply with AWS code of manual shielded metal-arc welding, appearance and quality of welds made, and methods used in correcting welding work.
    - 2. Protection: Protect all adjacent surfaces from damage due to weld sparks, spatter, or tramp metal.
- 3.09 SURFACE TREATMENT AND PROTECTIVE COATINGS
- A. Cleaning:
    - 1. Thoroughly clean all mill scale, rust, dirt, grease and other foreign matter from ferrous metal prior to any galvanizing, or painting.
    - 2. Conditions which are too severe to be removed by hand cleaning, shall be cleaned using appropriate methods for solvent cleaning, power tool cleaning and brush-off blast cleaning.
  - B. Exterior Ferrous Metal:
    - 1. Grind smooth all welds, burrs, and rough surfaces. Clean and hot-phosphate treat completed assembly. Hot phosphate treatment not required on items which are not exposed in the finish work or on those items where size prohibits such treatment.
    - 2. GALVANIZE ferrous metal items unless specified.
    - 2. Indicate on Shop Drawings where treatment is proposed to be omitted, if any.
- 3.10 CLEAN-UP

- A. Keep all areas of work clean, neat and orderly at all times. Keep paved areas clean during installation.
- B. Clean up and remove all debris from the entire work area prior to Final Acceptance to satisfaction of Owner's Representative.

**END OF SECTION 05500**

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SECTION 01230

**ALTERNATIVES**

**PART1 GENERAL**

1.01 SECTION INCLUDES

- A. Alternative submission procedures.
- B. Documentation of changes to Contract Sum and Contract Time.

1.02 RELATED SECTIONS

- A. Construction Agreement: Incorporating monetary value of accepted alternatives.

1.03 ACCEPTANCE OF ALTERNATIVES

- A. Alternatives quoted on Contract Forms will be reviewed and accepted or rejected at Owner's option. Accepted alternatives will be identified in the Owner-Contractor Agreement.
- B. The Owner has the option of accepting none, or any number and combination of Bid Alternatives.
- C. Alternates may be submitted during the construction process. If they are considered to be an equal product by the Owner, then they may be approved.
- D. Coordinate related work and modify surrounding work to integrate the Work of each alternative.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION - NOT USED**

**END OF SECTION**

SECTION 01300  
**ADMINISTRATIVE REQUIREMENTS**

**PART 1 GENERAL**

1.01 SECTION INCLUDES

- A. Preconstruction meeting.
- B. Site mobilization meeting.
- C. Progress meetings.
- D. Construction progress schedule.
- E. Submittals for review, information, and project closeout.
- F. Number of copies of submittals.
- G. Submittal procedures.

1.02 RELATED SECTIONS

- A. Project General Conditions.

**PART 2 PRODUCTS**

NOT USED

**PART 3 EXECUTION**

3.01 PRECONSTRUCTION MEETING

- A. The Owner will schedule a meeting after Notice of Award.
- B. Attendance Required:
  - 1. The Owner
  - 2. Landscape Architect
  - 4. Contractor
  - 5. Landscape Contractor
  - 6. Sub-contractors as requested by the Owner
- C. Agenda
  - 1. Submission of list of Subcontractors, list of Products and schedule of values.
  - 2. Designation of personnel representing the parties to Contract, The Owner, Contractor, Construction Management firm and Landscape Architect.
  - 3. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
  - 4. Critical Path Scheduling.

- D. The Landscape Architect will record minutes and distribute copies after meeting to participants.

### 3.02 SITE MOBILIZATION MEETING

- A. The Landscape Architect will schedule a meeting at the Project site prior to Contractor occupancy.
- B. Attendance Required:
  - 1. Contractor
  - 2. The Owner
  - 3. Landscape Architect
  - 4. Contractor's Superintendent
  - 5. Major Subcontractors
- C. Agenda:
  - 1. Use of premises by The Owner and Contractor.
  - 2. The Owner's requirements and occupancy prior to completion.
  - 3. Permit requirements.
  - 4. Construction facilities and controls provided by Owner.
  - 5. Temporary utilities.
  - 6. Survey and park layout.
  - 7. Security and housekeeping procedures.
  - 8. Critical Path Schedules.
  - 9. Application for payment procedures.
  - 10. Procedures for testing.
  - 11. Procedures for maintaining record documents.
  - 12. Requirements for start-up of equipment.
  - 13. Inspection and acceptance of equipment put into service during construction period.

### 3.03 PROGRESS MEETINGS

- A. Schedule and administer meetings throughout progress of the Work at maximum one-week intervals.
- B. The Owner will make arrangements for meetings, prepare agenda with copies for participants, and preside at meetings.
- C. Attendance Required: Job superintendent, major Subcontractors and suppliers, the Owner and others, as appropriate to agenda topics for each meeting.
- D. Agenda:
  - 1. Review minutes of previous meetings.
  - 2. Review of Critical Path Work progress.
  - 3. Field observations, problems, and decisions.

4. Identification of problems that may impede planned progress.
5. Review of submittals schedule and status of submittals.
6. Review of off-site fabrication and delivery schedules.
7. Submit updated schedule and critical path items.
8. Corrective measures to regain projected schedules.
9. Planned progress during succeeding work period.
10. Maintenance of quality and work standards.
11. Effect of proposed changes on progress schedule and coordination.
12. Other business relating to Work.

E. The Architect will record minutes and distribute copies after meeting to participants.

### 3.04 CONSTRUCTION PROGRESS SCHEDULE

- A. See Contract General Conditions for Schedules Required of Contractor
- B. Construction Timeline Priorities – Contract shall coordinate schedule with Owner’s prefabricated restroom contractor to have utilities stubbed out and restroom pad ready for restroom contractor to install restroom.

### 3.05 SUBMITTALS FOR REVIEW

- A. When the following are specified in individual sections, submit them for review:
  1. Product data.
  2. Shop drawings.
  3. Samples for selection.
  4. Samples for verification.
  5. Ten (10) days before scheduled work, provide mock-up samples onsite for inspection of samples over 50 pounds.
- B. Submit to the Landscape Architect for the limited purpose of checking with information given and the design concept expressed in the contract documents.
- C. Samples will be reviewed only for aesthetic, color, or finish selection.
- D. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below and for record documents purposes described in Section 01780 - CLOSEOUT SUBMITTALS.

### 3.06 SUBMITTALS FOR INFORMATION

- A. When the following are specified in individual sections, submit them for information:
  1. Design data.
  2. Certificates.
  3. Test reports.
  4. Inspection reports.

5. Manufacturer's instructions.
6. Manufacturer's field reports.
6. Other types indicated.

- B. Small size sheets, not larger than 8-1/2 x 11; submit the number of copies which the Contractor requires, plus three copies for the Owner, plus one copy for Landscape Architect.

### 3.07 SUBMITTALS FOR PROJECT CLOSEOUT

- A. When the following are specified in individual sections, submit them at project closeout:
  1. Project record documents.
  2. Operation and maintenance data.
  3. Warranties.
  4. As-built documents.
  5. Other types as indicated.
- B. Submit for the Owner's benefit during and after project completion.

### 3.08 NUMBER OF COPIES OF SUBMITTALS

- A. Documents for Review: Submit the number of copies which the Contractor requires, plus three copies for the Owner, plus one copy for the Landscape Architect.
  1. Small size sheets, not larger than 8-1/2 x 11 inches: Submit the number of copies the Contractor requires, plus two copies, which will be retained by the Landscape Architect.
  2. Larger Sheets, Not Larger Than 11 x 17 inches: Submit to the Owner the number of opaque reproductions which Contractor requires, plus two copies which will be retained by the Landscape Architect.
- B. Documents for Information: Submit two copies.
- C. Documents for Project Closeout: Make one copy of submittal originally reviewed.
- D. Samples: Submit the number specified in individual specification sections, one of which will be retained by the Landscape Architect.
  1. Retained samples will not be returned to Contractor unless specifically so stated.

### 3.09 SUBMITTAL PROCEDURES

- A. Transmit each submittal with AIA Form G810.

- B. Sequentially number the transmittal form. Revise submittals with original number and a sequential alphabetic suffix.
- C. Identify Project, Contractor, Subcontractor or supplier; pertinent drawing and detail number; and specification section number, as appropriate on each copy.
- D. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of Products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with the requirements of the Work and Contract Documents.
- E. Submit three (3) copies of each submittal for the landscape architect to retain plus the number of copies the Contractor would like returned for their use.
- F. Deliver submittals to the Landscape Architect's business address.
- G. Schedule submittals to expedite the Project, and coordinate submission of related items.
- H. Make submissions within the following number of days from issuance of Notice to Proceed:
  - 1. Items needed in initial stages of work, or requiring long lead-time for ordering: 15 days.
  - 2. All electrical equipment items: 21 calendar days
  - 3. All other items including all samples: 30 calendar days
- I. For each submittal for review, allow 15 days excluding delivery time to and from the Contractor.
- J. Identify variations from Contract Documents and Product or system limitations that may be detrimental to successful performance of the completed Work.
- K. Provide space for Contractor and Landscape Architects review stamps.
- L. When revised for resubmission, identify all changes made since previous submission.
- M. Distribute copies of reviewed submittals as appropriate. Instruct parties to promptly report any Inability to comply with requirements.
- N. Submittals not requested will not be recognized or processed.

**END OF SECTION**

SECTION 01400

**QUALITY REQUIREMENTS**

**PART1 GENERAL**

1.01 SECTION INCLUDES

- A. Control of installation.
- B. Testing and inspection services.

1.02 RELATED SECTIONS

- A. General Conditions
- B. Section 01300 Submittals
- C. Section 01700 Contract Closeout
- D. Individual Specifications Section: Submittals, inspection and testing required, and standards for testing.

1.03 REFERENCES

- A. Title 24, California Building Code, current edition.
- B. ASTM C 1077 - Standard Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation.

1.04 TESTING AND INSPECTION AGENCIES

- A. The respective Sections of these specifications contain detailed requirements for materials testing and inspections to be performed by an approved testing laboratory.
- B. All costs incurred for testing laboratory services shall be paid for by the Owner. However, should re-testing be required due to contractor's failure to comply with the Contract Document requirements, the Contractor shall pay costs of re-testing.

1.05 OWNER'S RESPONSIBILITIES

- A. Owners will select and employ a pre-qualified, independent testing laboratory to perform inspections, sampling and testing of materials as specified in the individual Specifications Section.
- B. Owner will pay for all initial testing laboratory services as described within the

Contract Document or not normally required by codes and ordinances.

- C. When the initial tests indicate non-compliance with the Contract Documents, the costs all subsequent re-testing occasioned by the non-compliance shall be deducted by the Owner from the Contract Sum.

#### 1.06 CONTRACTOR'S RESPONSIBILITIES

- A. Cooperate with laboratory personnel, provide access to work, arrange access to manufacturer's operations.
- B. Provide laboratory 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 supplies at the site; facilitate inspections and tests; provide facilities for laboratory's exclusive use for storage and curing of test samples.
- E. Coordinate requests for testing by Owner-employed testing laboratory through the Owner's Representative. Notify Owner's Representative two (2) 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 test indicate that work does not comply with Contract Documents.
- G. Pay for inspections and tests required by code or ordinances or by a plan approval authority, and made by legally constituted authority (i.e., municipal deputy inspector), unless otherwise provided for the Contract Documents.
- H. When required on individual Specifications Section, submit manufacturer's certificate, executed by responsible officer, certifying that product meet or exceed specified requirements. Provide certification in duplicate.

#### 1.07 TESTING LABORATORY RESPONSIBILITIES

- A. Perform specified inspections, sampling and testing of materials and methods of construction, comply with specified standards. Ascertain compliance with requirements of Contract Documents.
- B. Provide prompt notification of irregularities or deficiencies of work observed during performance of services.
- C. Perform additional inspections and tests required by Owner's Representative.



- D. After each inspection and test, promptly submit copies of laboratory report to the Owner. Reports are to include: Date issued, project title and number, name of inspector, date and time of sampling or inspection, identification of product and Specification Section(s), location in the project, type of inspection or test, date of test and results of test, When requested by Owner's Representative provide interpretation of test results.
- E. Testing Laboratory shall have no authority to: release, revoke, alter, or enlarge on requirements of Contract Documents; approve, accept or stop any portion of the work; perform any duties of the Contractor.

**PART 2 PRODUCTS**

NOT USED

**PART 3 EXECUTION**

NOT USED

**END OF SECTION**

## SECTION 01500

### TEMPORARY FACILITIES AND CONTROLS

#### PART 1 GENERAL

##### 1.01 SECTION INCLUDES

- A. Temporary Field Office.
- B. Temporary utilities.
- C. Temporary telephone service.
- D. Temporary sanitary facilities.
- E. Temporary Controls: Barriers and fencing.
- F. Security requirements.
- G. Waste removal facilities and services.
- H. Project identification sign.
- I. Dust control.
- J. Erosion control
- K. Existing Conditions verification.

##### 1.02 RELATED SECTIONS

- A. Section 01510 - Temporary Utilities.
- B. Section 01550 - Vehicular Access and Parking.
- C. 31 25 00 – Erosion and Sedimentation Control
- D. County General Conditions Section 10.

##### 1.03 TEMPORARY UTILITIES - See Section 01510

##### 1.04 TEMPORARY SANITARY FACILITIES

- A. Provide and maintain portable construction toilet facilities for Contractor's employees and Owner Representatives.
  - 1. Toilet Facilities: Provide sufficient suitably enclosed toilets with urinal for use by all trades engaged on project. The Owner shall approve location.
  - 2. Washing Facilities: Provide properly mounted and adequate wash sinks connected to water supply, in location approved by the Owner.
  - 3. Drinking Water Facilities: Provide clean, sanitary, and adequate drinking water.
- B. Maintain daily in clean and sanitary condition.

##### 1.05 BARRIERS AND ACCESS

- A. Provide barriers to prevent unauthorized entry to construction areas, to allow for owner and residents access to their property and to protect existing facilities and adjacent properties from damage from construction operations and demolition.

- B. Provide barricades required by governing authorities for public rights-of-way.
- C. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

#### 1.06 SECURITY

- A. Contractor is responsible for security of areas of his work during the entire time of the Contract. Within this responsibility, the Contractor will repair and/or replace all damages to the work and loss of materials due to vandalism or theft. This includes damages to existing facilities due to construction activities.

#### 1.07 VEHICULAR ACCESS AND PARKING

- A. Coordinate access and haul routes with governing authorities and the Owner.
- B. Provide and maintain access to fire hydrants and the emergency vehicle access and access to adjacent residential housing for the public and the Owner, free of obstructions.
- C. Provide means of removing mud from vehicle wheels before entering streets.

#### 1.08 WASTE REMOVAL

- A. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition.
- B. Provide containers with lids. Dispose of waste off-site weekly.

#### 1.09 PROJECT IDENTIFICATION SIGN

- A. Provide project identification sign to be posted in advance of construction. Provide painted plywood project identification sign, size to be 4' x 6' and must last the duration of the Project. Sign to read: Site Improvements for the Mission Oaks Recreation and Park District, date-to date of construction, construction company name and contact phone number. Design approval of the sign by the Owner and shall be obtained prior to fabrication and construction.
- B. Erect on site at location to be approved by the owner.
- C. No other signs are allowed without Owner permission except those required by law.

#### 1.10 FIELD OFFICE

Contractor may locate a field office trailer onsite. Size and location of trailer to be approved by Owner prior to placement.

### 1.11 DUST CONTROL

- A. Use water wagons or spray from hoses to control dust created by work operations.
- B. Comply with all local and state dust control ordinances.

### 1.12 EROSION CONTROL

- A. Contractor is advised that the State of California has adopted National Pollution Discharge Elimination Requirements in accordance with the requirements of the Clean Water Act. This project is subject to all of the requirements contained in those acts. The contractor shall abide by all of the laws, ordinances, and regulations associated with the NPDES and the Clean Water Act.
- B. The SWPPP must be maintained throughout the course of construction and be available at the construction site. The contractor is advised that he shall conform to this requirement and that he shall implement all of the measures required by the SWPPP, including maintenance of diligent record keeping and logs as required by the SWPPP.
- C. The contractor shall provide copies of the updated SWPPP to the Owner prior to starting construction operations. The contractor shall provide copies of his SWPPP records and logs during the course of construction, on a monthly basis to the Owner. The contractor shall also keep copies of these records and logs with the SWPPP at the construction site for potential viewing by the State of California Regional Water Quality Control Board.
- D. See Section 31 25 00 – “Erosion and Sedimentation Control” for more detailed requirements.

### 1.13 EXISTING CONDITIONS VERIFICATION

- A. Contractor shall record existing site conditions, either by photographs or video, to provide a record of pre-construction site conditions.

### 1.14 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

- A. Remove temporary field office, utilities, equipment, facilities, and materials prior to Final Application for Payment inspection.
- B. Remove underground installations to a minimum depth of 2 feet.
- C. Clean and repair damage caused by installation or use of temporary work.
- D. Unless otherwise directed, restore existing and permanent facilities used during construction to original condition.
- E. Maintenance and Removal:
  - 1. Maintain all temporary facilities and controls as long as needed for safe and proper completion of work. Remove all such temporary facilities and controls as rapidly as progress of work will permit.

2. Non-compliance with requirements within this section may result in payment being withheld and/or deductive change orders for lack of proper facilities and controls. If necessary, the owner will provide such facilities and controls as required and back charge the Contractor.

**PART 2 PRODUCTS**

NOT USED

**PART 3 EXECUTION**

NOT USED

**END OF SECTION**

SECTION 01510

**TEMPORARY UTILITIES**

**PART 1 GENERAL**

1.01 SECTION INCLUDES

- A. Temporary Electricity.
- B. Temporary Water.

1.02 RELATED SECTIONS

- A. Section 01500 - Temporary Facilities and Controls: temporary sanitary facilities required by law.

1.03 TEMPORARY ELECTRICITY

- A. Cost: By Contractor.
- B. It is expected that electrical needs by the Contractor will only require their own generator. If additional electrical services are needed, then the following shall apply;
- C. Provide separate electrical source or metering and reimburse the Owner for cost of energy used. Exercise measures to conserve energy.
- D. Provide temporary electric feeder from electrical service at location as directed.
- E. Complement existing power service capacity and characteristics as required.
- F. Provide power outlets for construction operations, with branch wiring and distribution boxes located as required. Provide flexible power cords as required.
- G. Provide main service disconnect and over-current protection at convenient location and meter.
- H. Permanent convenience receptacles may be utilized during construction.
- I. Provide adequate distribution equipment, wiring, and outlets to provide single-phase branch circuits for power.

1.04 TEMPORARY WATER SERVICE

- A. Cost of Water Used: By Contractor. Contractor to pay for water used for on-site work before irrigation system is connected.
- B. Contractor to coordinate metering of water use with Owner.
- C. Provide and maintain suitable quality water service for construction operations at time of project mobilization.
- D. Extend branch piping with outlets located so water is available by hoses with threaded connections.

**PART 2 PRODUCTS**

NOT USED

**PART 3 EXECUTION**

NOT USED

**END OF SECTION**

SECTION 01550

**VEHICULAR ACCESS AND PARKING**

**PART1 GENERAL**

1.01 SECTION INCLUDES

- A. Parking.
- B. Construction parking controls.
- C. Haul routes.

1.02 RELATED SECTIONS

- A. Section 01500 TEMPORARY FACILITIES AND CONTROLS

**PART 2 – NOT USED**

**PART 3 EXECUTION**

3.01 PARKING

- A. Arrange for temporary parking at staging area to accommodate use of construction personnel.
- B. Locate as approved by the Owner.

3.02 CONSTRUCTION PARKING CONTROL

- A. Control vehicular parking to prevent interference with public traffic and parking, access by emergency vehicles, and Owner's operations.

3.03 HAUL ROUTES

- A. Consult with authority having jurisdiction, establish public thoroughfares to be used for haul routes and site access.
- B. Confine construction traffic to designated haul routes.
- C. Maintain roads in satisfactory condition during the contract time. Repair damages attributable to work of the project at intervals as needed. At completion of Contract, roads and entryways shall be left in condition at least equal to that existing at start of Contract, except as may be otherwise required by Contract Documents.
- D. Temporary access roads are to be provided by and completely removed by the Contractor upon completion of work.

**END OF SECTION**

## SECTION 01570

### ENVIRONMENTAL PROTECTION

#### PART 1 GENERAL

##### 1.01 DESCRIPTION

- A. This section describes the requirements for the conservation and protection of environmental resources at the work site during and as the result of construction activities, except as otherwise specified. State and federal environmental statutes, rules, regulations, and policies have been enacted to protect environmental resources by ensuring that significant environmental impacts of projects are identified and adequate mitigation measures are incorporated into the project. Environmental protection affects several resource areas, including biological resources, cultural resources, air quality, and water quality. Potential impacts may occur through the generation of noise, dust emissions, discharges of pollutants, disturbances to terrestrial and aquatic areas, additional traffic, creation of traffic obstructions and other threats to public safety, and degradation of resources. Construction activities shall be in accordance with environmental and regulatory permits issued for the project and the Contractor may be held responsible for any violations as prescribed by law. If the Contractor's actions cause infractions that require suspension of work, then the Engineer may, without limiting the District's other rights and remedies, suspend work as specified in Article 13 of the General Conditions.
- B. The Contractor shall be responsible for the sequence and control of construction activities, selection and maintenance of equipment, and the conduct of the Contractor's employees at the work site to ensure that specific mitigation measures to reduce or eliminate identified environmental impacts are implemented.
- C. Contractor's personnel failing or refusing to carry out requirements of this section in the opinion of the Engineer, shall be removed from the work site if ordered.
- D. Construction equipment failing to produce the quality of work within the requirements of this section, in the opinion of the Engineer, shall be removed from the work site if ordered.
- E. The Contractor shall minimize construction activities causing disturbances to vegetation, wildlife or cultural resources. Construction activities may be restricted in various ways that include, but are not limited to, the environmental protection and/or mitigation measures specified.

##### 1.02 RELATED SECTIONS

- A. Drawings, General Conditions, Supplementary General Conditions, Special Provisions and other Division 1 sections apply to this section. This section may require direct correlation with the following sections of the contract:

- 1. Section 02260 – Landscape Grading



## 2. Section 02905 – Landscape Installation

### 1.03 REFERENCES

- A. The following publications form a part of this specification to the extent referenced.
1. The District has obtained the following environmental documents/references and permits:
    - a. CEQA — California Environmental Quality Act of 1970:
      - 1) ND — Negative Declaration.
      - 2) Notice of Determination.

### 1.04 SUBMITTALS

- A. The Contractor shall develop and submit five detailed plans for implementing the requirements of this section. The plans shall include but not be limited to the following:
1. Name of Contractor's supervisor responsible for implementing the plans.
  2. Working drawings and data for implementing the requirements of the plans.
  3. Air Quality Control Plan.
  4. Water Quality Control Plan and Storm Water Pollution Prevention Plan (SWPPP) (Update existing SWPPP on file with the District).
    - a. The Storm Water Pollution Prevention Plan (SWPPP) shall be submitted to the Regional Water Quality Control Board (RWQCB) prior to demolition work begins. The SWPPP must be approved by the RWQCB prior to the start of demolition activities.
  5. Fire Prevention and Control Plan.
  6. Noise Control Plan.
  7. Traffic Control Plan.
- B. The Contractor shall submit the above plans including working drawings and data to the District for approval five (5) working days prior to mobilization.
- C. Copies of all of the above plans shall be maintained at the work site throughout the construction period.

## 1.05 DELIVERY, STORAGE, AND HANDLING OF HAZARDOUS MATERIALS

### A. Construction Sites and Equipment:

1. The storage, transportation, transfer, containment, and disposal of hazardous materials, such as fuel, oil, and lubricants have potential for affecting water quality. Fuel, oil and other petroleum products shall be stored only at designated sites. The use of hazardous materials shall be avoided or minimized where possible. Each hazardous material containment container shall be clearly labeled with its identity, handling and safety instructions, and emergency contact. Similar information shall be clearly available and visible in the storage areas. Storage and transfer of such materials shall not be allowed within 100 feet of streams or sites known to contain sensitive biological resources. Storage or use of hazardous materials in or near wet or dry streams shall be consistent with the Fish and Game Code and other State laws. Material Safety Data Sheets (MSDS) shall be made readily available to the Contractor's employees and other personnel at the work site. The accumulation and temporary storage of hazardous wastes shall not exceed 90 days. Soils contaminated by spills or cleaning wastes shall be contained and shall be removed to an approved disposal site. Disposal of hazardous wastes shall be in compliance with all applicable laws and regulations.
2. Petroleum drippings on equipment have potential to result in water pollution during construction. The Contractor shall maintain construction equipment to minimize petroleum drippings. All stationary power equipment such as engines, pumps, generators, welders, and air compressors shall be positioned over drip pans. Equipment used in water shall be free of exterior petroleum products prior to submersion, and shall be checked and maintained daily to keep the equipment exteriors clean.
3. Petroleum products shall be stored in nonleaking containers at impervious storage sites from which runoff is not permitted to escape.
4. Personnel stationed at or near these sites shall be trained in emergency response and spill containment techniques. An ample supply of absorbent pads, pillows, socks, booms, and other spill containment materials shall be maintained at the hazardous materials storage sites for use in the event of spills. Contaminated absorbent pads, pillows, socks, booms, and other spill containment materials shall be placed in nonleaking sealed container until transport to an appropriate disposal facility. The Contractor shall furnish to the Engineer a contact person and telephony number of a company experienced in emergency response for vacuuming and containing spills of oil or other petroleum products.
5. Fuel may be transferred from the storage areas to construction equipment by tanker trucks. Fuel transfers shall take place at least 100 feet from exclusion zones, drainage areas, water bodies and streams.
6. Fuel transfer vehicles shall have absorbent pads, pillows, socks, booms or other spill containment materials placed under the fueling operation (between the fuel

truck and the equipment being serviced). A trained service attendant shall monitor the filling of equipment and shall stop the fuel flow immediately if any spill occurs. Fuel transfer shall not resume until the problem is resolved to the satisfaction of the Engineer. The service attendant shall be trained in emergency response, fire extinguisher use, and spill containment techniques.

#### 1.06 SENSITIVE SPECIES - NOT USED

#### 1.07 COLLECTION AND HARASSMENT OF SPECIES

- A. No intentional harassment, killing, or collection of plants or animals at or around the work site will be allowed.

#### 1.08 BOUNDARIES OF WORK SITE AND LISTED SENSITIVE SPECIES

- A. The boundaries of the work site is as shown on the construction drawings for showing exact location of work and areas that may be occupied by the Contractor. The Contractor and the Contractor's employees shall not leave the right of way or temporary construction easement, without prior written approval.
- B. Preconstruction surveys will be conducted to designate exclusion zones.
- C. Exclusion zones will be marked with either large flagged stakes connected by cord, or survey laths or wooden stakes prominently flagged with survey ribbon or fencing. The Contractor and Contractor's employees shall not encroach into flagged exclusion zones in any manner, whether in vehicles or on foot, without prior written approval.
- D. No pets, camping, firearms, or any other use of the right of way area will be allowed. Harassment, killing, or destruction of dens or burrows of wildlife species is strictly prohibited. Contractor's employees shall not be allowed at the work site during nonworking hours. Only authorized camping areas may be utilized. Exceptions that will not cause environmental impacts to biological resources may be allowed by the Engineer.
- E. Food-related trash, such as wrappers, cans, bottles, and scraps shall be placed in closed containers and removed daily from work sites. All trash or garbage shall be removed to a county approved disposal site at least weekly by the Contractor. The right of way shall be policed daily by Contractor's personnel and monitored by inspectors or environmental personnel.
- F. Traffic shall be restricted to existing roads and flagged right of way or temporary construction easement. Construction related vehicles shall not exceed 25 mph on straight and level roads, with a 10 mph speed limit in areas of steepness or with curves.

### 1.09 BIOLOGICAL RESOURCES (PLANTS AND ANIMALS)

- A. The Construction activities have potential for affecting the biological resources by physical destruction, disturbance, and/or displacement.
- B. The Contractor shall not be permitted in areas where sensitive plant species occur until the sensitive plants are removed or soil seed banks are removed by the District.
- C. Unless otherwise approved, the Contractor shall not apply any rodenticide or herbicide to control any vertebrate or plant pest.

### 1.10 CULTURAL RESOURCES

- A. See also Special Provisions
- B. The construction activities have potential for affecting cultural resources such as historically significant resources, local land uses, commercial establishments, or the activities of local landowners, residents, or recreationalists.
- C. The Contractor shall reduce potential adverse impacts to cultural resources that may be associated with construction by implementing the preservation of culturally significant resources in accordance with the National Historic Preservation Act of 1966, (16 U.S.C.470).
- D. If any potential paleontological, archaeological or historic sites are uncovered, the Owners Representative will be notified prior to proceeding with the work affected. If necessary the Engineer will suspend work as specified in Article 13 of the General Conditions. The Owners Representative will provide for an initial field evaluation of the site within seventy-two (72) hours after receiving notification of Contractor's discovery.
- E. If human remains are exposed, all construction activities shall be halted in the immediate vicinity until the County Coroner has assessed the remains.

### 1.11 AIR QUALITY CONTROL PLAN

- A. See also Special Provisions.
- B. The construction activities have potential for resulting in localized, short-term construction emissions from stationary, mobile and area sources, and fugitive dust from construction equipment, and trucks for hauling.
- C. The Contractor shall reduce these effects by submitting and implementing an Air Quality Control Plan. The following components, if applicable, shall be included in the plan and if not applicable the Contractor shall explain in the plan why that component or portions thereof is not included in the plan.

- D. Fugitive dust shall be minimized by watering, minimizing cleared areas, covering exposed surfaces, seeding, managing activities to keep the active work area small at any given time, applying chemical suppressant or implementing other dust control measures as approved. One or more of the above control measures shall be used sufficiently to prevent fugitive dust from leaving the work site. Increased application of control measures shall be required whenever conditions cause fugitive dust.
- E. The Contractor shall control fugitive dust by:
  - 1. Minimizing areas cleared to facilitate construction, such as storage areas, staging areas, stockpile areas and vehicle parking.
  - 2. Covering spoil piles when necessary.
  - 3. Constructing roadways, driveways, sidewalks, building pads and other graded surfaces.
  - 4. Chipping cleared vegetation and covering exposed areas as work is completed.
  - 5. Performing seeding requirements as required.
  - 6. Minimizing the amount of construction equipment operating during any given time period. This includes scheduling of construction truck trips to reduce peak emission, limit the length of the construction workday, and phasing of construction activities.
  - 7. Covering haul trucks traveling onto or off the work site. Haul trucks traveling on the work site shall be covered as necessary to prevent dust from leaving the work site.

#### 1.12 WATER QUALITY CONTROL PLAN AND STORM WATER POLLUTION PREVENTION PLAN

- A. The construction activities have potential for resulting in localized, short-term impacts to water quality due to fuel or oil leaks or spills at fuel or oil transfer areas, erosion and runoff.
- B. The Contractor shall prepare a Storm Water Pollution Prevention Plan (SWPPP) for the General Construction Storm Water Permit. Development of the SWPPP shall be accomplished by the Contractor using guidelines provided by the State Water Resources Control Board (SWRCB) for containment of construction activity pollutants such as wastes, erosion, and sediments. The SWPPP shall be submitted to the Regional Water Quality Control Board (RWQCB) five (5) working days prior to field mobilization. The SWPPP must be approved by the RWQCB prior to the start of construction activities. Guidelines for the SWPPP are presented in the Construction Storm Water Permit Package available at the Redding, California, office of the RWQCB. The SWPPP shall include provisions for water quality protection and for implementing Best Management Practices (BMPs) chosen to reduce and mitigate construction activity pollutants. The Contractor shall implement this plan during all construction activities by providing BMPs and conforming to the following provisions.
- C. Erosion could potentially cause impacts both on and off the work site. On the work site, erosion could wash away soil and fill material, resulting in the formation of gullies. Off the work site, erosion could result in downstream sedimentation and turbidity impacts. Additionally, the Contractor shall:
  - 1. Restrict personnel to designated roads.

2. Use methods for controlling erosion on designated roads.
3. Use methods for on-site erosion control and sediment capture methods during construction.
4. Minimize erosion during stormy weather at the work site.
5. Use methods for post construction erosion control.
6. If drainage swales are employed as BMPs, they shall be vegetated or otherwise protected to reduce erosion.
7. Contact personnel and emergency procedures shall be posted at the work site to avoid and minimize loss of property and life in case of a significant storm event.
8. The project Storm Water Pollution Prevention Plan (SWPPP) shall be strictly implemented.
9. All settleable solids, oils, and grease shall be contained to prevent their release into the environment. Flocculents may be used on solids that do not readily settle, as long as they do not contaminate water quality.
10. Excess construction and operation materials, rubble, and excavated soil shall be either reused or disposed of in approved sites. All imported fill shall be obtained from approved sources
11. Exposed areas shall be stabilized with temporary mulching, landscaping, and other erosion control methods during and after land disturbance activities.
12. Areas of disturbance with slopes toward a stream shall be stabilized to reduce erosion potential.
13. Stock piles shall be protected from erosion either by covering them or by placing barriers (e.g. silt fence, sand bags) around their perimeter to prevent the escape of sediments.
14. Spoil disposal areas shall be graded to ensure that drainage from these sites will minimize erosion of spoil materials and adjacent native soil material. Grading shall conform with the existing topography of the area.

D. Streams, Creeks, Drainages or Waterbody Crossings:

1. Berms or other diversion structures may be constructed around the work site to allow uninterrupted flow in streams, creeks or waterbody crossings. Construction shall be separated into two phases to maintain flows through half the waterbody width unless otherwise directed. When the diversion is installed, water shall be directed into siltation basins. If straw bales are used to form the basins, water shall be allowed to settle, filter through the straw, and flow over the natural terrain before returning to the stream. If earth fill is used to form the berm, water shall be allowed to settle, and flow over the

protected berm onto the natural terrain before returning to the stream.

2. Earth moving activities shall not occur in streams, creeks, waterbody crossings, or riparian areas within 24 hours of predicted 50 percent chance of National Weather Service anticipated precipitation during the rainy season (November 15 through April 15). Stockpiled topsoil or backfill shall be stored above the stream high water mark, outside any riparian zone, and not in any area where the stockpiled material could be washed back into the stream. Straw bales or other BMPs shall be used at flowing river or creek crossings at the end of each workday during the rainy season, and at the end of each workday during other seasons when rain is forecast. If a major storm is predicted or occurs outside of the rainy season, straw bales or other BMPs shall be implemented immediately.
3. Any diversion site, siltation basin and other measures shall be inspected during day light hours and after normal working hours during adverse weather conditions for proper operation. Any measure not operating properly or effectively shall be corrected immediately.

#### 1.14 FIRE PREVENTION AND CONTROL PLAN

- A. The Contractor shall prepare a fire prevention and control plan in consultation with the Engineer, and responsible fire protection agency(s). The following components, if applicable, shall be included in the plan, and if not applicable the Contractor shall explain in the plan why that component or a portion thereof is not included in the plan:
  1. Procedures and policies for controlling any fires including fires that are off the work site, and other related fire prevention and control procedures developed in consultation with resource agencies and fire protection agency(s).
  2. No fires will be allowed at the work site. Smoking will be allowed only in areas designated for smoking which shall be cleared of vegetation or in enclosed vehicles.
  3. The Contractor shall be responsible for maintaining appropriate fire suppression equipment at the work site. Fire extinguishers, shovels and other fire fighting equipment, shall be inventoried and available at work sites and on construction equipment. Each vehicle on the right of way shall be equipped with a minimum 20 pound (or two 10 pound) fire extinguisher(s) and a minimum of five gallons of water in a fire fighting apparatus (e.g. bladder bag).
  4. At the work site, a sealed fire toolbox shall be located at a point accessible in the event of fire. This fire toolbox shall contain: one backpack pump-type extinguisher filled with water, two axes, two McLeod fire tools, and enough shovels so that each employee at the work site can be equipped to fight fire.
  5. One or more chainsaws of 3-1/2 or more horsepower with a cutting bar 20 inches in length or longer shall be immediately available at the work site.

6. Gasoline powered construction equipment with catalytic converters shall be equipped with shielding or other acceptable fire prevention features. Internal combustion engines shall be equipped with spark arrestors.
7. Welding sites shall include fire prevention provisions.
8. The Contractor shall maintain contact with local fire fighting agencies throughout the fire season for update on fire conditions and such fire conditions shall be communicated to the Contractor's employees and the Engineer daily.
9. Vehicles are restricted to the work site unless otherwise allowed for fire control procedures.
10. Disturbance to the terrestrial or aquatic environment through the use of heavy construction equipment shall be kept to a minimum. Clearing of vegetation shall occur from the outer boundaries of the work area toward the interior. If a fire should start, the appropriate fire protection agencies responsible shall be contacted immediately. Hand crews, fire fighting water trucks or other fire control measures may be used as a first defense. Only as required, heavy construction equipment shall be utilized to contain the fire or protect a structure from damage.

#### 1.15 NOISE CONTROL PLAN

- A. The Contractor shall prepare a Noise Control Plan in consultation with the District and the Engineer. The following components, if applicable, shall be included in the plan. If the components are not applicable, the Contractor shall explain in the plan why the component or portion is not included in the plan.
  1. All construction vehicles and equipment, fixed or mobile, shall be equipped with properly operating and maintained mufflers.
  2. Stockpiling and vehicle staging areas shall be sited as far as practical from residences.
  3. Hours of construction shall be limited to the hours specified in applicable local noise ordinances.

#### **PART 2 PRODUCTS**

NOT USED

#### **PART 3 EXECUTION**

NOT USED

#### **PART 4 PAYMENT**

NOT USED

**END OF SECTION**



## SECTION 01600

### PRODUCT REQUIREMENTS

#### PART 1 GENERAL

##### 1.01 SECTION INCLUDES

- A. General product requirements.
- B. Transportation, handling, storage and protection.
- C. Product option requirements.
- D. Substitution limitations and procedures.
- E. Spare parts and maintenance materials.

##### 1.02 RELATED SECTIONS

- A. Section 01400 - Quality Requirements: Product quality monitoring.
- B. Section 01300 - Submittal; review, information, procedure and project closeout.

##### 1.03 SUBMITTALS

- A. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.
- B. Also see Section 01300 for Submittal requirements.
- C. Shop Drawing Submittals: Prepared specifically for this Project.
- D. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.
- E. Indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

#### PART 2 PRODUCTS

##### 2.01 EXISTING PRODUCTS

- A. Provide interchangeable components of the same manufacture for components being replaced.

##### 2.02 PRODUCT OPTIONS

- A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.
- B. Products Specified by Naming One or More Manufacturers: Use a product of one of the manufactures named and meeting specifications, no options or substitutions allowed.
- C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.

##### 2.03 SPARE PARTS AND MAINTENANCE PRODUCTS

- A. Provide spare parts, maintenance, and extra products of types and in quantities specified in individual specification sections.
- B. Deliver to Project site; provide receipts to owner as part of close out documents.

## **PART 3 EXECUTION**

### **3.01 SUBSTITUTION PROCEDURES**

- A. Instructions to Bidders specify time restrictions for submitting requests for substitutions during the bidding period. Comply with requirements specified in this section.
- B. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents.
- C. A request for substitution constitutes a representation that the submitter:
  - 1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product.
  - 2. Will provide the same warranty for the substitution as for the specified product.
  - 3. Will coordinate installation and make changes to other Work which may be required for the Work to be complete with no additional cost to the Owner.
  - 4. Waives claims for additional costs or time extension which may subsequently become apparent.
- D. Substitution Submittal Procedure:
  - 1. Submit three copies of request for substitution for consideration. Limit each request to one proposed substitution.
  - 2. Submit shop drawings, product data, and certified test results attesting to the proposed product equivalence. Burden of proof is on proposer.
  - 3. The Owner will notify Contractor in writing of decision to accept or reject request.

### **3.02 TRANSPORTATION AND HANDLING**

- A. Transport and handle products in accordance with manufacturer's instructions.
- B. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.
- C. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement or damage.

### **3.03 STORAGE AND PROTECTION**

- A. Store and protect products in accordance with manufacturers' instructions.
- B. Store with seals and labels intact and legible.
- C. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.
- D. For exterior storage of fabricated products, place on sloped supports above ground.
- E. Provide bonded off-site storage and protection when site does not permit on-site storage or protection.
- F. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
- G. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.
- H. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- I. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.
- J. Deliveries of plant materials must be scheduled so that plant materials arrive no more than five calendar days prior to planting. When temperatures exceed 90 degrees F,

plants must be stored under shade cloth and watered at least twice each day, as required to maintain plants in a healthy, turgid condition. Wilted and/or otherwise unhealthy plants shall be immediately removed from the job site.

**END OF SECTION**

## SECTION 01700

### EXECUTION REQUIREMENTS

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

##### 1.2 SUMMARY

- A. This Section includes general procedural requirements governing execution of the Work including, but not limited to, the following:
  - 1. Construction layout.
  - 2. Field engineering and surveying.
  - 3. General installation of products.
  - 4. Coordination of Owner-installed products.
  - 5. Progress cleaning.
  - 6. Starting and adjusting.
  - 7. Protection of installed construction.
  - 8. Correction of the Work.
- B. Related Sections include the following:
  - 1. General Conditions Section "Cutting and Patching" for procedural requirements for cutting and patching necessary for the installation or performance of other components of the Work.
  - 2. Division 1 Section "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.

##### 1.3 SUBMITTALS

- A. Qualification Data: For land surveyor.
- B. Certificates: Submit certificate signed by land surveyor certifying that location and elevation of improvements comply with requirements.
- C. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.

- D. Certified Surveys: Submit two copies signed by land surveyor.
- E. Final Project Survey: Submit digital copies in AutoCAD and Adobe Acrobat format showing the Work performed and recorded survey data.

#### 1.4 QUALITY ASSURANCE

- A. Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.

### **PART 2 - PRODUCTS** Not Used

### **PART 3 - EXECUTION**

#### 3.1 EXAMINATION

- A. Existing Conditions: The existence and location of site improvements, utilities, and other construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence and location of mechanical and electrical systems and other construction affecting the Work.
  - 1. Before construction, verify the location and points of connection of utility services.
- B. Existing Utilities: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning site work, investigate and verify the existence and location of underground utilities and other construction affecting the Work.
  - 1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; and underground electrical services.
  - 2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.
- C. Acceptance of Conditions: Examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
  - 1. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
    - a. Description of the Work.
    - b. List of detrimental conditions, including substrates.

- c. List of unacceptable installation tolerances.
  - d. Recommended corrections.
2. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
  3. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
  4. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
  5. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

### 3.2 PREPARATION

- A. Existing Utility Information: Furnish information to local utility or Owner that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.
- B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to Owner. Include a detailed description of problem encountered, together with recommendations for changing the Contract Documents. Changes to Work due to Contractors negligence to contact Owner for clarification shall be paid by Contractor.

### 3.3 CONSTRUCTION LAYOUT

- A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Owner promptly.
- B. General: Engage a land surveyor to lay out the Work using accepted surveying practices.
  1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.

2. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
  3. Inform installers of lines and levels to which they must comply.
  4. Check the location, level and plumb, of every major element as the Work progresses.
  5. Notify Owner when deviations from required lines and levels exceed allowable tolerances.
  6. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.
- C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and invert elevations.
- D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.
- E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by the Owner.

### 3.4 FIELD ENGINEERING

- A. Identification: Owner will identify existing benchmarks, control points, and property corners.
- B. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.
1. Do not change or relocate existing benchmarks or control points without prior written approval of Owner. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Owner before proceeding.
  2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.
- C. Benchmarks: Establish and maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.
1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
  2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.

3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.
- D. Certified Survey: On completion of foundation walls, major site improvements, and other work requiring field-engineering services, prepare a certified survey showing dimensions, locations, angles, and elevations of construction and site work.

### 3.5 INSTALLATION

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
1. Make vertical work plumb and make horizontal work level.
  2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
  3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.
  4. Maintain minimum headroom clearance of 8 feet (2.4 m) in spaces without a suspended ceiling.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- E. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.
- F. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- G. Anchors and Fasteners: Provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of the Work.
1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Owner.
  2. Allow for building movement, including thermal expansion and contraction.
  3. 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.



- H. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
- I. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

### 3.6 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. Enforce requirements strictly. Dispose of materials lawfully.
  - 1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
  - 2. Do not hold materials more than 7 days during normal weather or 3 days if the temperature is expected to rise above 80 deg F (27 deg C).
  - 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
  - 1. Remove liquid spills promptly.
  - 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Waste Disposal: Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.
- H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

- I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- J. Limiting Exposures: Supervise construction operations to assure that no part of the construction completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

### 3.7 STARTING AND ADJUSTING

- A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- B. Adjust operating components for proper operation without binding. Adjust equipment for proper operation.
- C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Manufacturer's Field Service: If a factory-authorized service representative is required to inspect field-assembled components and equipment installation, comply with qualification requirements in Division 1 Section "Quality Requirements."

### 3.8 PROTECTION OF INSTALLED CONSTRUCTION

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

### 3.9 CORRECTION OF THE WORK

- A. Repair or remove and replace defective construction. Restore damaged substrates and finishes. Comply with requirements in General Conditions Section "Cutting and Patching."
  - 1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.
- B. Restore permanent facilities used during construction to their specified condition.
- C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.
- D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.

E. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

**END OF SECTION**

## SECTION 01770

### CLOSEOUT PROCEDURES

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

##### 1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:

- 1. Inspection procedures.
- 2. Warranties.
- 3. Final cleaning.

- B. Related Sections include the following:

- 1. General Conditions "Payments and Completion" section for requirements for Final Completion and Final Payment.
- 2. Division 1 Section "Execution Requirements" for progress cleaning of Project site.
- 3. Division 1 Section "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
- 4. Division 1 Section "Operation and Maintenance Data" for operation and maintenance manual requirements.
- 5. Divisions 2 through 16 Sections for specific closeout and special cleaning requirements for the Work in those Sections.

##### 1.3 SUBSTANTIAL COMPLETION

- A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.

- 1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
- 2. Advise Owner of pending insurance changeover requirements.

3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
4. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
5. Prepare and submit Project Record Documents, operation and maintenance manuals, damage or settlement surveys, property surveys, and similar final record information.
6. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
7. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
8. Complete startup testing of systems.
9. Submit test/adjust/balance records.
10. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
11. Advise Owner of changeover any applicable utilities.
12. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
13. Complete final cleaning requirements, including touchup galvanized painting.
14. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

B. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, Landscape Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Landscape Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Landscape Architect, that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Results of completed inspection will form the basis of requirements for Final Completion.

#### 1.4 FINAL COMPLETION

A. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:

1. Submit a final Application for Payment according to General Conditions "Payments and Completion".
2. Submit certified copy of Owner's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Owner.

The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.

3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
  4. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.
- B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Landscape Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Owner will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

#### 1.5 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- A. Preparation: Submit three copies of list. Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
1. Organize list of spaces in sequential order.
  2. Organize items applying to each space by major element, including categories for grading, concrete, fences, walls, irrigation and planting.
  3. Include the following information at the top of each page:
    - a. Project name.
    - b. Date.
    - c. Name of Owner Representative
    - d. Name of Contractor.
    - e. Page number.

#### 1.6 WARRANTIES

- A. Submittal Time: Submit written warranties on request of Landscape Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.
- B. Partial Occupancy: Submit properly executed warranties within 15 days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.
- C. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.

1. Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch (215-by-280-mm) paper.
  2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
  3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
- D. Provide additional copies of each warranty to include in operation and maintenance manuals.

## **PART 2 - PRODUCTS**

### **2.1 MATERIALS**

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

## **PART 3 - EXECUTION**

### **3.1 FINAL CLEANING**

- A. General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:
    - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
    - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.

- c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
  - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
  - e. Clean exposed exterior finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
  - f. Remove labels that are not permanent.
  - g. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
    - 1) Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.
  - h. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
  - i. Replace parts subject to unusual operating conditions.
  - j. Leave Project clean and ready for occupancy.
- C. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

**END OF SECTION**



## SECTION 01780

### CLOSEOUT SUBMITTALS

#### PART 1 GENERAL

##### 1.01 SECTION INCLUDES

- A. Project Record Documents.
- B. Operation and Maintenance Data.
- C. Training.
- D. Warranties and bonds.

##### 1.02 RELATED SECTIONS

- A. Section 01300 - Administrative Requirements: Submittals procedures, shop drawings, product data, and samples.
- B. Individual Product Sections: Specific requirements for operation and maintenance data.
- C. Individual Product Sections: Warranties required for specific products or Work.

##### 1.03 SUBMITTALS

- A. Project Record Documents: Submit documents to the Owner with claim for final Application for Payment.
- B. Operation and Maintenance Data:
  - 1. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Melton Design Group will review draft and return one copy with comments.
  - 2. For equipment, or component parts of equipment put into service during construction and operated by the Owner, submit completed documents within ten days after acceptance.
  - 3. Submit 1 copy of completed documents 15 days prior to final inspection. This copy will be reviewed and returned after final inspection, with Melton Design Group comments. Revise content of all document sets as required prior to final submission.
  - 4. Submit two sets of revised final documents in final form within 10 days after final inspection.
- C. Warranties and Bonds:
  - 1. For equipment or component parts of equipment put into service during

- construction with the District's permission, submit documents within ten days after acceptance.
2. Make other submittals within ten days after Date of Substantial Completion, prior to final Application for Payment.
  3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within ten days after acceptance, listing the date of acceptance as the beginning of the warranty period.

## **PART 2 PRODUCTS**

NOT USED

## **PART 3 EXECUTION**

### **3.01 PROJECT RECORD DOCUMENTS**

- A. Maintain on site one set of the following record documents; record actual revisions to the Work:
  1. Drawings.
  2. Specifications.
  3. Addenda.
  4. Change Orders and other modifications to the Contract.
  5. Reviewed shop drawings, product data, and samples.
  6. Manufacturer's instruction for assembly, installation, and adjusting.
- B. Ensure entries are complete and accurate, enabling future reference by the District.
- C. Store record documents separate from documents used for construction.
- D. Record information concurrent with construction progress.
- E. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:
  1. Manufacturer's name and product model and number.
  2. Product substitutions or alternates utilized.
  3. Changes made by Addenda and modifications.
- F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:
  1. Measured horizontal and vertical locations of underground utilities, irrigation and appurtenances, referenced to two permanent surface improvements.
  2. Field changes of dimension and detail.
  3. Details not on original Contract drawings.

### 3.02 OPERATION AND MAINTENANCE DATA

- A. For Each Product or System: List names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.
- B. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.
- C. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.
- D. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

### 3.03 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES

- A. For Each Product, Applied Material, and Finish:
  - 1. Product data, with catalog number, size, composition, and color and texture designations.
  - 2. Information for re-ordering custom manufactured products.
- B. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.
- C. Moisture protection and weather-exposed products: Include product data listing applicable reference standards, chemical composition, and details of installation. Provide recommendations for inspections, maintenance, and repair.

### 3.04 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS

- A. For Each Item of Equipment and Each System:
  - 1. Description of unit or system, and component parts.
  - 2. Identify function, normal operating characteristics, and limiting conditions.
  - 3. Include performance curves, with engineering data and tests.
  - 4. Complete nomenclature and model number of replaceable parts.
- B. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shutdown, and emergency instructions. Include summer, winter, and any special operating instructions.
- C. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and troubleshooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

- D. Provide servicing and lubrication schedule, and list of lubricants required.
- E. Include manufacturer's printed operation and maintenance instructions.
- F. Include sequence of operation by controls manufacturer.
- G. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- H. Additional Requirements: As specified in individual product specification sections.

### 3.05 OPERATION AND MAINTENANCE MANUALS

- A. Prepare instructions and data by personnel experienced in maintenance and operation of described products.
- B. Prepare data in the form of an instructional manual.
- C. Binders: Commercial quality, 8-1/2 x 11 inch three D side ring binders with durable plastic covers; 2 inch maximum ring size. When multiple binders are used, correlate data into related consistent groupings.
- D. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents.
- E. Provide tabbed dividers for each separate product and system, with typed description of product and major component parts of equipment.
- F. Text: Manufacturer's printed data, or typewritten data on 24-pound paper.  
Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

### 3.06 TRAINING

- A. Provide training and orientation of District's operating staff in proper care and operation of equipment, systems and controls.
- B. Submit three copies of certificate, signed by District's Representative, attesting to their having been instructed.

### 3.07 WARRANTIES AND BONDS

- A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within ten days after completion of the applicable item of work. Except for items put into use with the District's permission, leave date of beginning of time of warranty until the Date of Substantial completion is determined.

- B. Verify that documents are in proper form, contain full information, and are notarized.
- C. Co-execute submittals when required.
- D. Retain warranties and bonds until time specified for submittal.

**END OF SECTION**

## SECTION 01781

### PROJECT RECORD DOCUMENTS

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

##### 1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for Project Record Documents, including the following:
  - 1. Record Drawings.
  - 2. Record Specifications.
  - 3. Record Product Data.
- B. Related Sections include the following:
  - 1. Division 1 Section "Closeout Procedures" for general closeout procedures.
  - 2. Division 1 Section "Operation and Maintenance Data" for operation and maintenance manual requirements.
  - 3. Divisions 2 through 16 Sections for specific requirements for Project Record Documents of the Work in those Sections.

##### 1.3 SUBMITTALS

- A. Record Drawings: Comply with the following:
  - 1. Number of Copies: Submit one set(s) of marked-up Record Prints.
- B. Record Specifications: Submit one copy of Project's Specifications, including addenda and contract modifications.
- C. Record Product Data: Submit one copy of each Product Data submittal.
  - 1. Where Record Product Data is required as part of operation and maintenance manuals, submit marked-up Product Data as an insert in manual instead of submittal as Record Product Data.

## PART 2 - PRODUCTS

### 2.1 RECORD DRAWINGS

- A. Record Prints: Maintain one set of blue- or black-line white prints of the Contract Drawings and Shop Drawings.
1. Preparation: Mark Record Prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to prepare the marked-up Record Prints.
    - a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
    - b. Accurately record information in an understandable drawing technique.
    - c. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.
  2. Content: Types of items requiring marking include, but are not limited to, the following:
    - a. Dimensional changes to Drawings.
    - b. Revisions to details shown on Drawings.
    - c. Depths of foundations below first floor.
    - d. Locations and depths of underground utilities.
    - e. Revisions to routing of piping and conduits.
    - f. Revisions to electrical circuitry.
    - g. Actual equipment locations.
    - h. Locations of concealed internal utilities.
    - i. Changes made by Change Order or Construction Work Change Directive.
    - j. Changes made following Landscape Architect's written orders.
    - k. Details not on the original Contract Drawings.
    - l. Field records for variable and concealed conditions.
    - m. Record information on the Work that is shown only schematically.
  3. Mark the Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. If Shop Drawings are marked, show cross-reference on the Contract Drawings.
  4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
  5. Mark important additional information that was either shown schematically or omitted from original Drawings.
  6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.
- B. Record Transparencies: Immediately before inspection for Certificate of Substantial Completion, review marked-up Record Prints with Construction Inspector. When

authorized, prepare a full set of corrected transparencies of the Contract Drawings and Shop Drawings.

1. Incorporate changes and additional information previously marked on Record Prints. Erase, redraw, and add details and notations where applicable.
2. Refer instances of uncertainty to Owner for resolution.
3. Owner will furnish Contractor one set of transparencies of the Contract Drawings for use in recording information.

## 2.2 RECORD SPECIFICATIONS

A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
4. For each principal product, indicate whether Record Product Data has been submitted in operation and maintenance manuals instead of submitted as Record Product Data.
5. Note related Change Orders, Record Product Data, and Record Drawings where applicable.

## 2.3 RECORD PRODUCT DATA

A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
3. Note related Change Orders, Record Specifications, and Record Drawings where applicable.



## **PART 3 - EXECUTION**

### **3.1 RECORDING AND MAINTENANCE**

- A. Recording: Maintain one copy of each submittal during the construction period for Project Record Document purposes. Post changes and modifications to Project Record Documents as they occur; do not wait until the end of Project.
- B. Maintenance of Record Documents and Samples: Store Record Documents and Samples in the field office apart from the Contract Documents used for construction. Do not use Project Record Documents for construction purposes. Maintain Record Documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to Project Record Documents for Owner's reference during normal working hours.

**END OF SECTION**

## SECTION 01782

### OPERATION AND MAINTENANCE DATA

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

##### 1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:

1. Operation and maintenance documentation directory.
2. Emergency manuals.
3. Operation manuals for systems, subsystems, and equipment.
4. Maintenance manuals for the care and maintenance of products, materials, and finishes systems and equipment.

- B. Related Sections include the following:

1. Division 1 Section "Administrative Requirements" for submitting copies of submittals for operation and maintenance manuals.
2. Division 1 Section "Closeout Procedures" for submitting operation and maintenance manuals.
3. Divisions 2 through 16 Sections for specific operation and maintenance manual requirements for the Work in those Sections.

##### 1.3 DEFINITIONS

- A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.
- B. Subsystem: A portion of a system with characteristics similar to a system.

## 1.4 SUBMITTALS

- A. Initial Submittal: Submit 2 draft copies of each manual at least 15 days before requesting inspection for Substantial Completion. Include a complete operation and maintenance directory. Landscape Architect will return one copy of draft and mark whether general scope and content of manual are acceptable.
- B. Final Submittal: Submit one copy of each manual in final form at least 15 days before final inspection. Landscape Architect will return copy with comments within 15 days after final inspection.
  - 1. Correct or modify each manual to comply with Landscape Architect's comments. Submit 3 copies of each corrected manual within 15 days of receipt of Landscape Architect's comments.

## 1.5 COORDINATION

- A. Where operation and maintenance documentation includes information on installations by more than one factory-authorized service representative, assemble and coordinate information furnished by representatives and prepare manuals.

## **PART 2 - PRODUCTS**

### 2.1 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY

- A. Organization: Include a section in the directory for each of the following:
  - 1. List of documents.
  - 2. List of systems.
  - 3. List of equipment.
  - 4. Table of contents.
- B. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.
- C. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.
- D. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.
- E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a

designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

## 2.2 MANUALS, GENERAL

- A. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:
  - 1. Title page.
  - 2. Table of contents.
  - 3. Manual contents.
  
- B. Title Page: Enclose title page in transparent plastic sleeve. Include the following information:
  - 1. Subject matter included in manual.
  - 2. Name and address of Project.
  - 3. Name and address of Owner.
  - 4. Date of submittal.
  - 5. Name, address, and telephone number of Contractor.
  - 6. Name and address of Landscape Architect.
  - 7. Cross-reference to related systems in other operation and maintenance manuals.
  
- C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.
  - 1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.
  
- D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.
  - 1. Binders: Heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch (215-by-280-mm) paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.
    - a. If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders if necessary to provide essential information for proper operation or maintenance of equipment or system.

- b. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter of contents. Indicate volume number for multiple-volume sets.
2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
  3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software diskettes for computerized electronic equipment.
  4. Supplementary Text: Prepared on 8-1/2-by-11-inch (215-by-280-mm) white bond paper.
  5. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.
    - a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
    - b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

## 2.3 EMERGENCY MANUALS

- A. Content: Organize manual into a separate section for each of the following:
  1. Type of emergency.
  2. Emergency instructions.
  3. Emergency procedures.
- B. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:
  1. Fire.
  2. Flood.
  3. Gas leak.
  4. Water leak.
  5. Power failure.
  6. Water outage.
  7. System, subsystem, or equipment failure.
  8. Chemical release or spill.
- C. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.

D. Emergency Procedures: Include the following, as applicable:

1. Instructions on stopping.
2. Shutdown instructions for each type of emergency.
3. Operating instructions for conditions outside normal operating limits.
4. Required sequences for electric or electronic systems.
5. Special operating instructions and procedures.

## 2.4 OPERATION MANUALS

A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:

1. System, subsystem, and equipment descriptions.
2. Performance and design criteria if Contractor is delegated design responsibility.
3. Operating standards.
4. Operating procedures.
5. Operating logs.
6. Wiring diagrams.
7. Control diagrams.
8. Piped system diagrams.
9. Precautions against improper use.
10. License requirements including inspection and renewal dates.

B. Descriptions: Include the following:

1. Product name and model number.
2. Manufacturer's name.
3. Equipment identification with serial number of each component.
4. Equipment function.
5. Operating characteristics.
6. Limiting conditions.
7. Performance curves.
8. Engineering data and tests.
9. Complete nomenclature and number of replacement parts.

C. Operating Procedures: Include the following, as applicable:

1. Startup procedures.
2. Equipment or system break-in procedures.
3. Routine and normal operating instructions.
4. Regulation and control procedures.
5. Instructions on stopping.
6. Normal shutdown instructions.
7. Seasonal and weekend operating instructions.
8. Required sequences for electric or electronic systems.
9. Special operating instructions and procedures.

- D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.
- E. Piped Systems: Diagram piping as installed, and identify color-coding where required for identification.

## 2.5 PRODUCT MAINTENANCE MANUAL

- A. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.
- B. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.
- C. Product Information: Include the following, as applicable:
  - 1. Product name and model number.
  - 2. Manufacturer's name.
  - 3. Color, pattern, and texture.
  - 4. Material and chemical composition.
  - 5. Reordering information for specially manufactured products.
- D. Maintenance Procedures: Include manufacturer's written recommendations and the following:
  - 1. Inspection procedures.
  - 2. Types of cleaning agents to be used and methods of cleaning.
  - 3. List of cleaning agents and methods of cleaning detrimental to product.
  - 4. Schedule for routine cleaning and maintenance.
  - 5. Repair instructions.
- E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.
- F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
  - 1. Include procedures to follow and required notifications for warranty claims.

## 2.6 SYSTEMS AND EQUIPMENT MAINTENANCE MANUAL

- A. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.
- B. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.
- C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:
  - 1. Standard printed maintenance instructions and bulletins.
  - 2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
  - 3. Identification and nomenclature of parts and components.
  - 4. List of items recommended to be stocked as spare parts.
- D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:
  - 1. Test and inspection instructions.
  - 2. Troubleshooting guide.
  - 3. Precautions against improper maintenance.
  - 4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
  - 5. Aligning, adjusting, and checking instructions.
  - 6. Demonstration and training videotape, if available.
- E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.
  - 1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
  - 2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.
- F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.



- G. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.
- H. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
  - 1. Include procedures to follow and required notifications for warranty claims.

## **PART 3 - EXECUTION**

### **3.1 MANUAL PREPARATION**

- A. Operation and Maintenance Documentation Directory: Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance manuals.
- B. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.
- C. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.
- D. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.
  - 1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
  - 2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.
- E. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.
  - 1. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.

- F. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in Record Drawings to ensure correct illustration of completed installation.
1. Do not use original Project Record Documents as part of operation and maintenance manuals.
  2. Comply with requirements of newly prepared Record Drawings in Division 1 Section "Project Record Documents."
- G. Comply with Division 1 Section "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

**END OF SECTION**

## SECTION 01 71 13 MOBILIZATION

### PART 1 – GENERAL

- A. Contractor shall be responsible for all preparatory work and operations required prior to beginning work.

#### 1.01 SECTION INCLUDES

- B. Organization and mobilization of the Contractor's forces.
- C. Transporting construction plant and equipment to the Jobsite and setting up of same.
- D. Transporting various tools, materials, and equipment to the Jobsite.
- E. Erection of temporary buildings and facilities as required for field offices, staging, storage, and construction operations.

#### 1.02 RELATED SECTIONS

- A. Section 01 51 00 Temporary Utilities

#### 1.03 DESCRIPTION

- A. Mobilization shall include mobilization of all construction equipment, materials, supplies, appurtenances, facilities, and the like, staffed and ready for commencing and prosecuting the Work; and the subsequent demobilization and removal from the Jobsite of said equipment, appurtenances, facilities, and the like upon completion of the Work.
- B. Mobilization shall also include assembly and delivery to the jobsite of plant, equipment, tools, materials, and supplies necessary for the prosecution of work which are not intended to be incorporated in the Work; the clearing of and preparation of the Contractor's work area; the complete assembly, in working order, of equipment necessary to perform the required work; personnel services preparatory to commencing actual work; installation of Project sign, and all other preparatory work required to permit commencement of the actual work on construction items for which payment is provided under the Contract.
- C. Establishment of all necessary facilities, including acquisition of easements for the contractor's convenience.
- D. Obtaining permits necessary for the execution of the work.
- E. Providing required bonds and proof of insurance.
- F. Upon completion of the work, contractor shall remove tools, equipment, and unused materials and supplies from the project site and restore all disturbed areas outside the project area to their pre-construction condition.
- G. Owner has the right to reject construction tools, equipment, materials, and supplies which are, in owner's opinion, unsafe, improper, or inadequate.
- H. Contractor shall bring rejected construction tools, equipment, materials, and supplies to an acceptable condition as approved by owner or remove from the project site.

**1.04 SUBMITTALS**

- A. Refer to Section 01 33 00, Submittal Procedures, for submittal requirements and procedures.
- B. Submit a plan of the proposed layout of the construction site, including fences, roads, parking, buildings, staging, and storage areas, within seven Days after the effective date of the Notice to Proceed.

**1.05 DELIVERY**

- A. Delivery to the jobsite of construction tools, equipment, plant, temporary buildings, materials, and supplies shall be accomplished in conformance with local governing ordinances and regulations.

**1.06 TOOLS AND SUPPLIES**

- A. Provide construction tools, equipment, materials, and supplies of the types and quantities necessary to facilitate the timely execution of the Work.
- B. Provide personnel, products, construction materials, equipment, tools, and supplies at the jobsite at the time they are scheduled to be installed or utilized.

**1.07 PLANT LOCATION**

- A. Locate plant, or plants, appropriately close to the portion of the Work for which it will be used.

**1.08 DEMOBILIZATION**

- A. Upon completion of the Work, remove construction tools, apparatus, equipment mobile units and buildings, unused materials and supplies, plant, and personnel from the Jobsite.
- B. Restore all areas utilized for mobilization to their original, natural state or, when called for in the Contract Documents, complete such areas indicated.

**PART 2 – PRODUCTS**

Not Used

**PART 3 – EXECUTION**

Not Used

**END OF SECTION 01 71 13**

## SECTION 02100

### DEMOLITION

#### PART 1 GENERAL

##### 1.01 DESCRIPTION

A. Work includes, but is not limited to the following:

1. The Contractor shall provide all equipment, tools, materials, and labor necessary to complete the Work.
2. Completely coordinate with Work of all other trades.
3. Provide protection for all existing objects or conditions designated on the Drawings to remain on the site or return to the Owner.
4. Provide protection to prevent injury or damage to persons or adjacent properties.
5. Remove and dispose of demolished materials from the site as indicated on the drawings.
6. Comply with applicable codes and ordinances concerning demolition operations.

B. Definition: The term "demolition", as used herein, includes the removal and disposal of all existing objects (except for those objects designated to remain) down to the existing grade level or subgrade level to the extent indicated or as otherwise required to permit new construction and all other Work as described in this Section necessary to complete all Demolition Work.

C. Use of explosives will not be permitted.

##### 1.02 PERMITS, ORDINANCES, ETC.

Procure and pay for all necessary permits or certificates required to complete the Demolition Work specified. Make any and all required notifications and comply with all applicable Federal, State, and Local ordinances concerning demolition operations.

##### 1.03 JOB CONDITIONS

Visit the site and examine the existing conditions and observe the conditions under which the Work is to be performed. Notify the Landscape Architect of unsatisfactory conditions and do not proceed with the Work until unsatisfactory conditions have been

corrected in a manner acceptable to the Landscape Architect. Note all conditions as to character and extent of Work involved.

#### 1.04 PROTECTION

- A. Execute all Demolition Work in an orderly and careful manner with due consideration for any existing condition designated to remain. Provide protection to preserve existing items indicated to remain and to prevent injury or damage to persons or adjacent properties.
- B. Use all means necessary to protect existing conditions designated to remain and adjacent properties. Avoid any encroachment on adjacent properties. In the event of damage or loss to any existing condition designated to remain or adjacent properties, immediately make all repairs and replacements necessary to the approval of the Owner at no additional cost to Owner.
- C. Do not interfere with the normal traffic on roads, streets, walks, or use of adjacent properties. Provide alternate routes around closed or obstructed traffic ways as required by governing regulations.
- D. Protect existing trees per plans.

#### 1.05 CUTTING AND PATCHING

Cut existing sidewalks, roads, and curbs as required to complete Demolition Work. Pavement shall be cut vertically along straight lines forming the edges of the Demolition Work and so as not to damage the adjacent pavement. Repair all pavement as specified in Sections of the specification covering the applicable trades.

#### 1.06 DUST CONTROL

Use all means necessary to prevent the spread of dust during performance of the Work of this Section; thoroughly moisten all surfaces as required to prevent dust being a nuisance to the public, neighbors, and concurrent performance of other work on the site.

### **PART 2 - PRODUCTS**

#### 2.01 OTHER MATERIALS

All other materials, not specifically described but required for proper completion of the Work of this Section, shall be as selected by the Contractor subject to approval by the Landscape Architect.

## **PART 3 - EXECUTION**

### **3.01 PREPARATION**

#### **A. Notification**

Notify the Landscape Architect at least two (2) full working days prior to commencing the Work of this Section.

#### **B. Site Observation**

1. Prior to all Work of this Section, carefully observe the entire site for all objects designated to be removed and to be preserved.
2. Contact the Underground Service Alert (U.S.A.) at 1-800-227-2600 to stake and mark the location of all existing utilities prior to the beginning of Work.
3. Locate all existing utility lines indicated on the Drawings to remain, and determine the requirements for their protection.
4. Locate, if any, all existing utility line indicated on the Drawings to be disconnected and capped, and determine all requirements for disconnecting and capping.

#### **C. Clarification**

1. The Drawings do not purport to show all objects existing on the site.
2. Before commencing the Work of this Section, verify with the Landscape Architect all objects to be removed and all objects to preserve.

#### **D. Scheduling**

1. Schedule all Work in a careful manner with all necessary consideration for adjacent properties and the general public.
2. Avoid interference with the use of, and passage to and from, adjacent properties.
3. Conduct operations so as not to interfere with the use of adjacent roads, streets, drives, walks, service lines, etc.

#### **E. Disconnection of Utilities**

Before starting site construction, arrange for the disconnection of all utility lines designated to be removed, relocated, or capped with the appropriate utility company. Utility company services for this Work shall be paid for by the Contractor.

F. Protection of Utilities

Retain and protect in operating condition all active utilities traversing the site designated to remain.

3.02 DEMOLITION OF OBJECTS

- A. Remove and dispose of all existing objects (except for those objects designated to remain) down to existing grade level or subgrade level to the extent indicated or as otherwise required to permit new construction.
- B. Tree Demolition – remove all of tree, tree trunk and roots, including below grade.

3.03 REQUIREMENTS FOR REMOVAL OF ASPHALT AND CONCRETE PAVEMENT

- A. Remove asphalt pavement to neatly saw edges. Make saw cuts to a minimum depth of one (1) inch below the bottom surface of the pavement. Where only the surface of existing asphalt pavement is to be removed, obtain approval of method from the Landscape Architect, and provide a minimum laying depth of one (1) inch of new pavement material at the join line. Where asphalt pavement adjoins a trench, trim the edges adjacent to the trench to neat straight lines before resurfacing to insure that all areas to be resurfaced are accessible to the rollers used to compact the subgrade or paving materials.
- B. Remove concrete pavement to neatly sawed edges. Make saw cuts a minimum depth of one (1) inch below the bottom surface of the pavement. If a saw cut in concrete pavement falls within three (3) feet of an expansion joint, construction joint, cold joint or edge, move the concrete to the joint or edge. The edges of existing concrete pavement adjacent to trenches, where damaged subsequent to saw cutting of the pavement, saw cut again to neat straight lines for the purpose of removing the damaged pavement areas. Such saw cuts shall be either parallel to the original saw cuts or shall be cut on an angle which departs from the original saw cut not more than one (1) inch in each six (6) inches.
- C. Concrete curbs, gutters, cross gutters, driveways and walks: Remove concrete to neatly sawed edges, with saw cuts made to a minimum depth of one and one-half (1 -1 /2) inches. Concrete sidewalk of driveway to be removed shall be neatly sawed in straight lines, either parallel to the curb or at right angles to the alignment of the sidewalk. No section to be replaced shall be smaller than thirty (30) inches in either length or width. If the saw cut in sidewalk or driveway fall within thirty (30) inches of a construction joint, expansion joint, cold joint or edge, the concrete shall be



removed to the joint or edge, except that where the saw cut would fall within twelve (12) inches of a score mark, the saw cut shall be made in and along the score mark. Curb and gutter shall be sawed to a depth of one (1) inch below the bottom surface in a neat line at right angles to the curb face.

#### 3.04 BACKFILL AND COMPACTION

All excavations left by the Demolition Work shall be filled and compacted to make the surface at these points conform in contour and density to that of the surrounding ground, and as specified per plan and these special provisions.

#### 3.05 DISPOSAL OF DEBRIS

- A. All material removed under this Contract, which is not to be salvaged or reused, or otherwise specified on the Plan shall become the property of the Contractor and be promptly disposed of. It shall be the responsibility of the Contractor to procure dumping facilities or other means of disposal for all items specified to be removed from the site. Storing or permitting refuse to accumulate on the site will not be permitted.
- B. Disposal of all materials from the site shall be done in a lawful manner. Transport all refuse materials from the site without spilling on the streets.
- C. Burning of refuse material on the site will not be permitted.

**END OF SECTION**

SECTION 02230  
**SITE CLEARING**

**PART 1 GENERAL**

1.01 SCOPE OF WORK

- A. Furnish all labor, material, equipment and services necessary to provide all work, complete in place, as indicated on Drawings and specified herein.

Work specified in this Section includes, but is not limited to the following:

1. Site preparation.
  2. Tree protection.
  3. Restore damaged improvements to original condition.
  4. Existing Utilities.
  5. Clearing and Grubbing.
  6. Removing topsoil.
  7. Removing existing improvements.
  8. Backfill requirements.
  9. Disposing of objectionable material.
- B. Related Work Specified in Other Sections
1. SECTION 02300 – EARTHWORK.
- C. Related Documents
3. Section 31 1000 – Site Clearing.
- D. Definitions
1. ANSI: American National Standards Institute.

2. CAL-OSHA: California Occupational Safety and Health Administration.
3. Topsoil: Natural or cultivated surface-soil layer containing organic matter and sand, silt, and clay particles; friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than 2-inches in diameter; and free of weeds, roots, and other deleterious materials.

#### 1.02 SUBMITTALS

- A. Follow Submittal procedure outlined in Section 01330 – Submittal Procedures.
- B. Project Record Documents: Record actual locations of pipe mains, valve, connections and invert elevations. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

#### 1.03 QUALITY ASSURANCE

- A. Do not remove or prune trees without written approval from Owner.
- B. Prune to the standards of the International Society of Arborists and to ANSI 300.

#### 1.04 PROJECT CONDITIONS

- A. Except for materials indicated to be stockpiled or to remain the Owner's property, cleared materials are the Contractor's property. Remove cleared materials from site and dispose of in lawful manner.
- B. Unidentified Materials; if unidentified materials are discovered, including hazardous materials that will require additional removal other than is required by the Contract Documents, immediately report the discovery to the Owner.
- C. If necessary, the Owner will arrange for any testing or analysis of the discovered materials and will provide instructions regarding the removal and disposal of the unidentified materials.

### **PART 2 PRODUCTS**

#### 2.01 SOIL MATERIALS

- A. Backfill excavations resulting from demolition operations with on-site or import materials conforming to structural backfill defined in Section 02300 – Earthwork.

### **PART 3 EXECUTION**

#### 3.01 SITE PREPARATION

- A. Protect and maintain benchmarks and survey control points during construction.

- B. Locate and clearly flag trees and vegetation to remain or to be relocated.
- C. Protect existing site improvements to remain during construction.
- D. Verify existing conditions at the site and include all work evident by site inspection whether or not shown on the Drawings.

### 3.02 TREE PROTECTION

- A. Erect and maintain temporary fence around drip line of individual trees or around perimeter drip line of groups of trees to remain. Remove fence when construction is complete.
- B. Do not store construction materials, debris, or excavated material within drip line of remaining trees.
- C. Do not permit vehicles or equipment within drip line of remaining trees.
- D. Do not excavate within drip line of remaining trees, unless otherwise indicated.
- E. Where excavation for new construction is required within drip line of trees, hand clear and excavate to minimize damage to root systems. Use narrow-tine spading forks, comb soil to expose roots, and cleanly cut roots as close to excavation edge as possible.
  - 1. Cover exposed roots with burlap and water regularly.
  - 2. Temporarily support and protect roots from damage until they are permanently relocated and covered with soil.
  - 3. Coat cut faces of roots more than 1-1/2-inches in diameter with an emulsified asphalt or other approved coating formulated for use on damaged plant tissues.
  - 4. Cover exposed roots with wet burlap to prevent roots from drying out. Backfill with soil as soon as possible.
- F. Also see Tree Protection requirements outlined on Construction Drawings.

### 3.03 RESTORATION

- A. Restore damaged improvements to their original condition, as acceptable to the Owner.
- B. Repair or replace trees and vegetation indicated to remain that are damaged by construction operations, as directed by the Owner.
  - 1. Employ a qualified, licensed arborist, to submit details of proposed repairs and to repair damage to trees and shrubs.
  - 2. Replace trees that cannot be repaired and restored to full-growth status, as determined by the Owner.

### 3.04 UTILITIES

- A. Locate, identify, disconnect, and seal or cap off utilities indicated to be removed or abandoned.
- B. Arrange to shut off indicated utilities with utility companies or verify that utilities have been shut off.
- C. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless authorized in writing by the Owner, and then only after arranging to provide temporary utility services according to requirements indicated.
- D. Coordinate utility interruptions with utility company affected.
- E. Do not proceed with utility interruptions without the permission of the Owner and utility company affected. Notify Owner and utility company affected two working days prior to utility interruptions.
- F. Excavate and remove underground utilities that are indicated to be removed.
- G. Securely close ends of abandoned piping with tight fitting plug or wall of concrete minimum 6-inches thick.

### 3.05 CLEARING AND GRUBBING

- A. Clear the site and remove obstructions, shrubs, grass, and other vegetation to permit installation of new construction. Removal includes digging out stumps and obstructions and grubbing roots.
- B. Remove trash, debris, logs, concrete, masonry and other waste materials.
- C. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated.
- D. Completely remove stumps, roots, obstructions, and debris extending to a depth of 18-inches below subgrade.
- E. Use only hand methods for grubbing within drip line of remaining trees.
- F. In areas not to be further excavated, fill depressions resulting from site clearing. Place and compact satisfactory soil materials per the geotechnical investigation report.
- G. Clear undergrowth and deadwood without disturbing subsoil.

### 3.06 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. Remove trash, debris, weeds, roots, and other waste materials.
- D. Stockpile topsoil materials designated to remain on site at a location approved by the Owner at a location away from edge of excavations without intermixing with subsoil. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust.
- E. Do not stockpile topsoil within drip line of remaining trees.

### 3.07 SITE IMPROVEMENTS

- A. Remove existing above- and below-grade improvements as indicated and as necessary to facilitate new construction.
- B. Remove slabs, paving, curbs, and gutters, as indicated. Where concrete slabs, curb, gutter and asphalt pavements are designated to be removed, remove bases and subbase to surface of underlying, undisturbed soil.
- C. Unless the existing full-depth joints coincide with line of pavement demolition, neatly saw-cut to full depth the length of existing pavement to remain before removing existing pavement. Saw-cut faces vertically.
- D. Remove driveways, curbs, gutters and sidewalks by saw cutting to full depth. If saw cut falls within 30-inches of a construction joint, expansions joint, score mark or edge, remove material to joint, mark or edge.

### 3.08 BACKFILL

- A. Place and compact material in excavations and depressions remaining after site clearing in conformance with Section 02300 – Earthwork.

### 3.09 DISPOSAL

- A. Remove surplus unsuitable soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials, including trash and debris, and legally dispose of them off the Owner's property.

END OF SECTION

## SECTION 02260

### LANDSCAPE GRADING

#### PART 1 - GENERAL

##### 1.01 WORK INCLUDED

- A. Provide all labor, materials services and equipment indicated on Drawings and/or herein specified to complete all Landscape Grading Work
- B. Landscape grading shall consist of importing topsoil to cap turf areas, importing top soil to create landscape berming, importing top soil for tree hole back fill, ripping, establishing finish grade to conform to the contours, grades, line and shapes of rough grades established on Engineer's plans. Work may also include loosening of compacted soils created during the course of construction.
- C. Land alteration of existing topographic conditions to conform to the contours, grades, lines and shapes indicated on Engineer's and the Owner's plans.
- D. Contractor shall furnish, place and settle all required backfill material to conform to the contours, grades, lines and shapes as indicated on the Drawings, and engineer's plans

##### 1.02 RELATED WORK

- A. SECTION 02905 - LANDSCAPE INSTALLATION

##### 1.03 DEFINITIONS

- A. Finish grade: Finish grade: Finish grade shall mean the establishment of grades to .04 feet plus or minus.
- B. Grading intent: Spot elevations (grades) and contours are indicated based on the best available data. Landscape Architect's Drawings are referenced to provide site grading data. The intent is to maintain constant slopes between spot elevations. If a spot elevation is determined to be in error, or the difference in elevation between points change contact the Owner immediately for field adjustments of spot elevations.

##### 1.04 JOB CONDITIONS

- A. Visit the project site and examine the existing conditions under which the Work is to be performed. Note all conditions, as to character and extent of Work involved. This may include pot holing to determine depth of bedrock

### 1.05 EXISTING UTILITIES

- A. Contractor is responsible to contact U.S.A (800-642-2444) to stake and mark the location of all existing utilities before commencing Work. Pot hole as required to determine and verify location and depth.
- B. Retain and protect in operating condition all active utilities traversing the site designated to remain.

### 1.06 PROTECTION OF EXISTING CONDITIONS and ADJACENT PROPERTIES

- A. Use all means necessary to protect existing conditions designated to remain, newly constructed conditions and adjacent properties. Avoid any encroachment on adjacent properties.
- B. Prevent damage to existing bench marks, pavement, utility lines. In the event of damage or loss immediately make all repairs and replacements required to the Owner's approval at no additional cost to the Owner.

### 1.07 QUALITY ASSURANCE

- A. Finish grade shall conform to contours, grades, lines and shapes, as indicated on Landscape Architect's Drawings, with uniform slopes between finish grades or between finish grades and existing grades.
- B. Establish finish landscape grades in a continuous, uniform line, resulting in a uniform surface with no ridges, birdbaths or low spots.
- C. Finish landscape grade tolerance shall be .04 feet plus or minus of final grades indicated on Drawings.
- D. Slope grade away from buildings a minimum of two (2) percent in five (5) feet horizontal distance unless otherwise indicated on Drawings, or Landscape Architect's plans.

### 1.08 SUBMITTALS

- A. Provide one (1) cubic foot sample of import topsoil material for the Owner's approval prior to delivery to the site, but in any case, prior to placement.
- B. Provide horticultural soils report of existing landscape soil after rough grade and submitted topsoil including information on soil texture, filtration rate, nutrient levels and organic matter. Include recommendation for amendment to be added to existing landscape soil and topsoil to mitigate any deficiencies.



## **PART 2 - PRODUCTS**

### **2.01 ONSITE MATERIAL**

- A. Existing onsite excavated surplus material may be acceptable fill or top soil material, if approved by the Owner or Owner's representative and upon submittal of a horticultural soils report and possible amending of existing soil to match criteria specified in this section for import top soil. Excavated surplus material not required for fill material or top soil shall be removed and legally disposed of off site.

### **2.02 IMPORTED TOPSOIL MATERIAL**

- A. Imported topsoil material shall be of friable sandy-loam texture free of refuse, roots, heavy or stiff clays, rocks over 1" in diameter, 15% by volume rock between 1/8" and 1", sticks, other deleterious matter.
- B. Imported topsoil acidity range (Ph) shall be between 6.5 to 7.5, containing a minimum of 4% and a maximum of 25% organic matter.
- C. Imported topsoil shall be free of all noxious weeds and other seeds.
- D. Imported topsoil shall be amended as per soils report (refer to paragraph 1.08 B), at no additional cost to the Owner.
- E. Topsoil shall be stock piled on site in an area free of rock and other deleterious materials. Owner reserves the right to reject topsoil once placed in proper location per Part 3 if deleterious materials mixed in to topsoil.

## **PART 3 - EXECUTION**

### **3.01 GENERAL**

- A. Conduct work in an orderly manner. Dirt shall not be permitted to accumulate on streets or sidewalks nor to be washed into storm drains.
- B. Use all means required to prevent the erosion of freshly graded areas during construction and until such a time as proposed hard surfaces and landscaping have been constructed.
- C. Excess on site material after material has been used to bring site to finished grade shall be removed and legally disposed of off site.
- D. If there is not enough site material to bring site to grade, contractor shall import topsoil.

### 3.02 RIPPING

- A. If, during the course of construction, landscape areas become compacted to greater than 90% relative density, landscape areas with the exception of areas beneath the canopies of existing trees shall be ripped and cross ripped to a depth of 12”.
- B. Rip and cross rip to a depth of 6 inches all areas exposed by engineering cut operations. Remove all rock one inch or larger within 6 inches of finish grades in all non-hydro mulch planted areas.
- C. Rip and cross rip to a depth of 6 inches all turf areas prior to the placement of import topsoil.

### 3.03 TOP SOIL PLACEMENT

- A. Place topsoil to contours indicated on plans to create landscape berming.
- B. Place topsoil in any way as indicated on plans
- C. If insufficient on site soil is available, then contractor shall supply import topsoil.

### 3.04 FINISH LANDSCAPE GRADING

- A. Finish grade shall conform, after settling, to shapes, spot elevations and contours as indicated on Landscape Architect’s Drawings, with uniform levels or slopes between finish elevations or between finish elevations and existing elevations.
- B. Fine grade all planting areas to a smooth, loose and uniform surface. Remove all extraneous matter 1” or larger in size and dispose of off site to create a smooth surface. Finish grades shall slope to drain, without water pockets or irregularities (humps or hollows). Grades shall be or uniform slope between points of fixed elevation establishing vertical curves or roundings at abrupt changes in slope.
- C. Shrub/ground cover planting areas shall be graded two and one-half (4-1/2) inches below adjacent paved areas, sidewalks, valve boxes, headers, drains, etc. in order to receive two (4) inch depth of mulch, establishing final grade one-half (1/2) inches below these surfaces.
- D. Turf areas shall be graded one and one half (1-1/2) inches below adjacent paved areas, sidewalks, valve boxes, headers, drains, etc. in order to receive sod.

### 3.05 FINISH LANDSCAPE GRADING OBSERVATION

- A. Soil preparation: comply with SECTION 02905 - LANDSCAPE INSTALLATION prior to finish grading operations

- B. Finish grade shall conform, after compaction, to shapes, spot elevations and contours as indicated on Drawings, with uniform levels or slopes between finish elevations or between finish elevations and existing elevations.
- C. The Contractor is responsible to spread excess excavated soil material from plant pits in surrounding planting beds.
- D. Fine grade topsoil in all planting areas eliminating rough and low areas to insure positive drainage, to a smooth, loose and uniform surface. Maintain levels, profiles and contours of sub-grades.
- E. Remove stones, roots, grass, weeds, debris and other foreign material while spreading, in excess of one inch in diameter.
- F. Shrub/ground cover planting areas shall be graded two and one-half (4-1/2) inches below adjacent paved areas, sidewalks, valve boxes, headers, drains, etc. in order to receive two (4) inch depth of mulch, establishing final grade one-half (1/2) inches below these surfaces

**END OF SECTION**

## SECTION 02300

### **EARTHWORK**

#### **PART 1 GENERAL**

##### 1.01 SCOPE OF WORK

- A. Furnish all labor, material, equipment, and services necessary to provide all work, complete in place, as indicated on Drawings and specified herein.

Work specified in this Section includes, but is not limited to the following:

1. Rough Grading of site, Excavating, backfilling and grading, as required to obtain contours and elevations indicated on the Drawings.
2. Subgrade preparation.
3. Compaction and Testing.
4. Protection.
5. Disposal.

- B. Related Work Specified in Other Sections

1. SECTION 02230 – SITE CLEARING
2. SECTION 02324 – TRENCHING
3. SECTION 321216 – ASPHALT PAVING AND BASE

- C. Related Documents

1. AASHTO T 180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54 kg (10-lb) Rammer and a 457 mm (18 in.) Drop; American Association of State Highway and Transportation Officials; 1997.
2. ASTM D 698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft<sup>3</sup> (600 kN-m/m<sup>3</sup>)); 2000a.
3. ASTM D 1556 - Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method; 2000.
  
4. ASTM D 1557 - Standard Test Methods for Laboratory Compaction

Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft<sup>3</sup> (2,700 kN m/m<sup>3</sup>)); 2000.

5. ASTM D 2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method; 1994.
6. ASTM D 2419 - Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregates; 1995.
7. ASTM D 2922 - Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth); 1996.
8. ASTM D 3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth); 1996.
9. Geotechnical Investigation for site is available in accordance with Information Available to Bidders.

#### D. Definitions

1. Borrow: Approved soil material imported from off-site for use as Structural Fill or Backfill.
2. Excavation: Removal of material encountered above subgrade elevations.
  - a. Authorized Over-Excavation: Excavation below subgrade elevations or beyond indicated horizontal dimensions as shown on plans or authorized by the Owner's Representative.
  - b. Unauthorized Over-Excavation: Excavation below subgrade elevations or beyond indicated horizontal dimensions without authorization by the Owner's Representative. Unauthorized excavation shall be without additional compensation.
4. Structural Backfill: Soil materials approved by the Owner's Representative and used to fill excavations resulting from removal of existing below grade facilities, including trees. See Section 02324 – Trenching for trench backfill.
5. Structural Fill: Soil materials approved by the Owner's Representative and used to raise existing grades.
6. Rock: Rock material in beds, ledges, unstratified masses, and conglomerate deposits and boulders of rock material  $\frac{3}{4}$ -cubic yards or more in volume that when tested by an independent geotechnical testing agency, according to ASTM D 1586, exceeds a standard penetration resistance of 100 blows/2-inches.
7. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man made stationary features constructed above or below grade.

8. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below subbase, base or topsoil materials.
9. Unsuitable Material: Any soil material that is not suitable for a specific use on the Project. The Owner's Representative will determine if a soil material is unsuitable.
10. Utilities: underground pipes, conduits, ducts and cables.

## 1.02 SUBMITTALS

A. Follow submittal procedures outlined in Section 01300 – ADMINISTRATIVE REQUIREMENTS.

- B. Submit material certificates signed by the material producer and the Contractor, certifying that each material item complies with, or exceeds the specified requirements.
- C. Project Record Documents: Record actual locations of pipe mains, valves, connections, and invert elevations. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

## 1.03 QUALITY ASSURANCE

- A. Testing and Inspection Service (Owner's Representative) shall provide soil testing and inspection services for quality assurance testing during earthwork operations.
- B. Percentage of compaction specified shall be the minimum acceptable. The percentage represents the ratio of the dry density of the compacted material to the maximum dry density of the material as determined by the procedure set forth in ASTM D 1557.
- C. Perform excavation, filling, compaction and related earthwork under the observation of the Owner's Representative. Materials placed without approval of the Owner's Representative will be presumed to be defective and, at the discretion of the Owner's Representative, shall be removed and replaced at no cost to the Owner. Notify the Owner's Representative at least 24-hours prior to commencement of earthwork and at least 48 hours prior to testing.
- D. The Owner's Representative will perform observations and tests required to enable him to form an opinion of the acceptability of the Project earthwork. Correct earthwork that, in the opinion of the Owner's Representative, does not meet the requirements of these Technical Specifications.
- E. Upon completion of the construction work, certify that all compacted fills and foundations are in place at the correct locations, and have been constructed in accordance with sound construction practice. In addition, certify that the materials used are of the

types, quality and quantity required by these Technical Specifications. The Contractor shall be responsible for the stability of all fills and backfills constructed by his forces and shall replace portions that in the opinion of the Owner's Representative have been displaced or are otherwise unsatisfactory due to the Contractor's operations.

F. Finish soil grade tolerance at completion of grading:

1. Top surface of finish grade (unpaved areas):  $\pm 0.05$  feet

#### 1.04 PROJECT CONDITIONS

- A. The Contractor shall assess and evaluate all site conditions and layout the work before any earthwork shall begin.
- B. Protect open excavations, trenches, and the like with fences, covers and railings to maintain safe pedestrian and vehicular traffic passage.
- C. Protect wetland (including setback area) as shown on the plans and as directed by the Environmental Consultant.
- D. Prevent erosion of freshly graded areas during construction and until such time as permanent drainage and erosion control measures have been installed.
- E. Temporarily stockpile fill material in an orderly and safe manner and in a location approved by the Owner.
- F. Provide dust and noise control in conformance with Division 1 General Requirements.
- G. Environmental Requirements: When unfavorable weather conditions necessitate interrupting earthwork operation, areas shall be prepared by compaction of surface and grading to avoid collection of water. Provide adequate temporary drainage to prevent erosion. After interruption, compaction specified in last layer shall be re-established before resuming work.

### **PART 2 PRODUCTS**

#### 2.01 SOIL MATERIALS

- A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from on-site excavations.
- B. Obtain approval of on-site soil materials and borrow materials to be used for structural fill or structural backfill from the Owner's Representative.
- C. On-Site Structural Fill and Structural Backfill: per the County of Sacramento Construction Specifications and Geotechnical Investigation.
- D. Imported Structural Fill and Structural Backfill: per the County of Sacramento

Construction Specifications and Geotechnical Investigation.

**PART 3 EXECUTION**

3.01 GENERAL

- A. Conform to Specifications as modified by the Contract Documents and the Geotechnical Investigation.
- B. Surfaces to receive fill and soils to be compacted shall be free of standing water, and shall not be saturated with water.
- C. Do not use explosives.
- D. In asphalt concrete paved areas, neatly saw cut pavement a minimum of 24 inches beyond the limits of excavations. If edge of pavement is located within 30 inches of limit of excavation, remove pavement to existing edge.
- E. Complete clearing and stripping as indicated on Drawings and in accordance with Section 02230 Site Clearing.
- F. Remove existing utility lines that traverse the site as indicated on Drawings and in accordance with Section 02230 Site Clearing.
- G. Scarify the upper 6 inches of the exposed subgrade-to-receive fill. The loosened soils should be uniformly moisture conditioned to one to three percent over optimum and compacted to  $90 \pm 2$  percent relative compaction per ASTM D 1557. Compact to 95 percent in uppermost six inches of soil subgrade in pavement areas.

DESIGN SURFACE (ELECTRONIC)

If Contractor chooses to use 3D electronic surface (model) for grading in lieu of construction staking:

Contractor shall be responsible for creating their own 3D model based on information provided in Contract Drawings.

Neither the Owner or Engineer shall be responsible for errors or omissions in 3D Model.

Use of Contractor developed 3D model does not relieve the Contractor for grading tolerances or any other requirements stated in this section or the Contract Drawings.

3.02 CONTROL OF WATER AND DEWATERING

- A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding the site and surrounding area. Provide dewatering equipment necessary to drain and keep excavations and site free from water.
- B. Dewater during backfilling operation so that groundwater is maintained a least one foot below level of compaction effort.
- C. Obtain the Owner's Representative's approval for proposed control of water and dewatering methods.



- D. Protect subgrades from softening, undermining, washout and damage by rain or water accumulation.
- E. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations.
- F. Maintain dewatering system in place until dewatering is no longer required.

### 3.03 WET WEATHER CONDITIONS

- A. Do not prepare subgrade, place or compact soil materials if above moisture content indicated on the Geotechnical Investigation.
- B. If the Owner's Representative allows work to continue during wet weather conditions, conform to supplemental recommendations provided by the Owner's Representative.

### 3.04 BRACING AND SHORING

- A. Conform to California and Federal OSHA requirements.
- B. Place and maintain such bracing and shoring as may be required to support the sides of the excavations for the proper protection of workmen; to facilitate the work; to prevent damage to the facility being constructed; and to prevent damage to adjacent structures or facilities. Remove all bracing and shoring upon completion of the work.
- C. Be solely responsible for all bracing and shoring and, if requested by the Owner, submit details and calculations to the Owner. The Owner may forward the submittal to the Owner's Representative, the Consulting Engineer and/or the California Division of Industrial Safety for their review. The Contractor's submittal shall include the basic design, assumed soils conditions and estimation of forces to be resisted, together with plans and specifications of the materials and methods to be used, and shall be prepared by a civil engineer or structural engineer registered in California. No excavations related to the proposed facility shall precede a response to the submittal by the Owner.
- D. Be solely responsible for installing and extracting the sheathing in a manner which will not disturb the position or operation of the facility being constructed or adjacent utilities and facilities.

### 3.05 EXCAVATION

- A. Excavate earth and rock to lines and grades shown on drawings and to the neat dimensions indicated on the Plans, required herein or as required to satisfactorily compact backfill.
- B. Remove and dispose of large rocks, pieces of concrete and other obstructions encountered during excavation.
- C. Where forming is required, excavate only as much material as necessary to permit placing and removing forms.

- D. Provide supports, shoring and sheet piles required to support the sides of excavations or for protection of adjacent existing improvements.
- E. Excavate by hand or vacuum within drip-line of trees to remain. Do not damage trees or roots. Prevent dehydration of exposed roots. Refer to Section 02230 Site Clearing for additional tree protection requirements.
- F. Replace the excavated material or any approved supplementary import material in lifts not to exceed 8 inches in loose thickness and compact per the Geotechnical Investigation.

### 3.06 REMOVAL OF EXISTING FILLS AND UNSUITABLE MATERIAL

- A. Over-excavate areas of existing fills and other unsuitable material encountered during mass grading as directed by the Owner's Representative.
- B. Compensation for increased removal widths and depths that are not required by the Owner's Representative will not be considered, except when such increase is necessary for protection of life and property as determined by and approved by the Owner.
- C. The Owner's Representative will provide written approval for each excavation prior to placement of fill. Allow adequate time after excavation and before filling for the Owner's Representative's review and written approval and, if necessary, time for the Owner to conduct as built survey prior to placing fill. Basis for calculating the quantity of material excavated or placed may be the difference between the grading shown on the Plan and an as built survey of the grading.

### 3.07 GRADING

- A. Provide smooth finished surfaces within specified tolerances, compact with uniform levels or slopes between points where elevations are indicated on Drawings, or between such points and existing grades.
- B. Finish ditches, gutters and swales to the sections, lines and grades indicated and to permit proper surface drainage.
- C. Round tops and bottoms of slopes as indicated or to blend with existing contours.

### 3.08 SUBGRADE PREPARATION

- A. Install underground utilities and service connections prior to final preparation of subgrade and placement of base materials for final surface facilities. Extend services so that final surface facilities are not disturbed when service connections are made.
- B. Prepare subgrades under paved areas, curbs, gutters, walks, structures, other surface facilities and areas to receive structural fill.
- C. Prepare subgrades for paved areas, curbs and gutters by plowing or scarifying surface at

least 6 inches below final subgrade elevations and 5-feet beyond edge of pavement unless specified otherwise by the Owner's Representative. Uniformly moisture condition to one to three percent over optimum moisture contents. Break clods and condition surface by harrowing or dry rolling. Remove boulders, hard ribs and solid rock. Prepare earth uniform for full depth and width of subgrade.

- D. Protect utilities from damage during compaction of subgrades and until placement of final pavements or other surface facilities.
- E. Obtain the Owner's Representative's approval of subgrades prior to placing pavement.

### 3.09 PLACEMENT OF STRUCTURAL FILL

- A. Obtain the Owner's Representative's approval of surface to receive structural fill prior to placement of structural fill material.
- B. Place structural fill on prepared subgrade.
- C. Spread structural fill material in uniform lifts not more than 8-inches in un-compacted thickness and compact.
- D. Place structural fill material to suitable elevations above grade to provide for anticipated settlement and shrinkage.
- E. Overbuild fill slopes, as required by the Owner's Representative, to obtain required compaction. Remove excess material to lines and grades indicated.
- F. Do not drop fill on structures. Do not backfill around, against or upon concrete or masonry structures until structure has attained sufficient strength to withstand loads imposed and the horizontal structural system had been installed.

### 3.10 COMPACTION AND TESTING

- A. General: Control soil compaction during construction providing minimum percentage of density specified for each area classification as indicated below.
- B. Percentage of Maximum Density Requirements: Compact soil to no less than the following percentages of maximum density in accordance with ASTM D 1557.
  - 2. Lawn or Planter Areas: Compact top 6 inches of subgrade and each layer of backfill or fill material at  $85 \pm 2$  percent relative compaction.
  - 3. Vehicular pavements: Compact top 12 inches of subgrade and each layer of backfill or fill material at  $90 \pm 2$  percent relative compaction. The upper 6 inches of pavement subgrade soils shall be compacted to at least 95 percent relative compaction.
- C. Moisture Control: Where subgrade or layer of soil material must be moisture conditioned before compaction, uniformly apply water to surface of subgrade, or layer of

soil material, to prevent free water appearing on surface during or subsequent to compaction operations.

1. Remove and replace or scarify and air dry soil material that is too wet to permit compaction to specified density.
  2. Soil material that has been removed because it is too wet to permit compaction may be stockpiled or spread and allowed to dry. Assist drying by discing, harrowing or pulverizing until moisture content is reduced to a satisfactory value.
- D. Compact soils at water content specified in the Geotechnical Investigation. Aerate material if it is too wet. Add water to material if it is too dry. Thoroughly mix lifts before compaction to ensure uniform moisture distribution.
- E. Perform compaction using rollers, pneumatic or vibratory compactors or other equipment and mechanical methods approved by the Owner's Representative.

### 3.11 PROTECTION

- A. Protection of Graded Areas: Protect newly graded areas from traffic and erosion. Keep free of trash and debris.
- B. Cold Weather Protection: Protect excavation bottoms against freezing when atmospheric temperature is less than 35 degrees F.
- C. Repair and re-establish grades in settled, eroded, and rutted areas to specified tolerances.
- D. Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, re-shape, and compact to required density prior to further construction.

### 3.12 DISPOSAL

- A. Stockpile suitable excess soil material per the Drawings and as directed by the Owner.
- B. Lawfully dispose of all unsuitable excess or surplus material off-site at no cost to the Owner.

END OF SECTION

## SECTION 02316

### **FILL AND BACKFILL**

#### **PART 1 GENERAL**

##### 1.01 SECTION INCLUDES

- A. Filling and compacting for concrete paving and rigid concrete pavements subject to traffic loadings.
- B. Backfilling and compacting for utilities to utility main connections.

##### 1.02 RELATED SECTIONS

- A. General Conditions and Special Provisions for Air and Water Pollution Control and Dust Control
- B. Section 02260 – Landscape Grading
- C. Section 02515 – Site Concrete
- D. Section 02811 – Irrigation: Trenching and Backfill

##### 1.03 REFERENCES

- A. ASTM C 136 - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates; 1996a.
- B. ASTM D 1557 - Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft<sup>3</sup> (2,700 kN m/m<sup>3</sup>)); 1991 (Reapproved 1998).
- C. ASTM D 2487 - Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System); 1998.
- D. ASTM D 2922 - Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth); 1996.
- E. ASTM D 2974 - Standard Test Methods for Moisture, Ash, and Organic Matter of Peat and Other Organic Soils; 1996.
- E. ASTM D 3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth); 1996.
- F. ASTM D 4318 - Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils; 1998.

##### 1.04 PROJECT CONDITIONS

- A. Provide sufficient quantities of fill to meet project schedule and requirements. When necessary, store materials on site in advance of need.
- B. Verify that survey benchmarks and intended elevations for the Work are as indicated.

#### **PART 2 PRODUCTS**

## 2.01 FILL MATERIALS

- A. Engineered Fill: Subsoil excavated on-site.
  - 1. Free of lumps larger than 3 inches, rocks larger than 2 inches, and debris.
  - 2. Conforming to ASTM D 2487 Group Symbol CL, ML, SM, SP.
- B. Engineered Fill: Imported borrow.
  - 1. Graded in accordance with ASTM C 136, within the following limits:
    - a. 3 inch sieve: 100 percent passing.
    - b. 3/4 inch sieve: 70 to 100 percent passing.
    - c. No. 4 sieve: 50 to 100 percent passing.
    - d. 40 sieve: 30 to 100 percent passing.
    - e. 50: 30 to 100 percent passing.
    - f. No. 200: 30 to 70 percent passing.
  - 2. Free of lumps larger than 3 inches, rocks larger than 2 inches, and debris.
  - 3. Conforming to ASTM D 2487 Group Symbol CL, ML, SM, SP.
  - 4. Liquid limit < 30. Plasticity Index < 12.
  - 5. Organic content less than 3%.
  - 6. Expansion potential (UBC 18-2) less than 20.
  - 7. Maximum Dry Density more than 105 pcf.
- C. Topsoil: See Section 02260.
- D. Class 2 Aggregate Base: See Section 02721 Aggregate Base Course.

## 2.02 SOURCE QUALITY CONTROL

- A. Where import fill materials are specified by reference to a specific standard, test and analyze samples for compliance before delivery to site.
- B. If tests indicate materials do not meet specified requirements, change material and retest.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Identify required lines, levels, contours, and datum locations.
- B. See Section 02260 for additional requirements.

### 3.02 PREPARATION

- A. Scarify all areas to receive engineered fill and subgrade surfaces to a depth of 12 inches.
- B. During wet weather or unstable soil conditions, the Contractor shall have the Landscape Architect observe all areas to receive engineered fill and subgrade surfaces prior to implementation of remedial measures.
  - 1. Upon approval of the Landscape Architect, all unstable areas to receive engineered fill and subgrade surfaces shall be disked or ripped to a minimum depth

of 24 inches to allow exposed soil to dry. Depth and frequency of disking and ripping shall be determined by the Landscape Architect upon observation of the unstable soil conditions.

2. Upon approval of the Landscape Architect, all unstable areas to receive engineered fill and subgrade surfaces shall be over excavated 12 to 24 inches below existing grade and be replaced with aggregate base or coarse gravel underlain by geotextile fabric. Final depth of removal shall be determined by the Landscape Architect upon observation of the unstable soil conditions. The geotextile fabric shall be Amoco 2016 (woven) or approved equivalent, placed in accordance with manufacturer's recommendations.
- C. The Contractor shall have the Landscape Architect observe and probe bottom of finish subgrade for its stability within existing trench fill extending to a width of 15 feet on each side of existing sanitary sewer pipelines beneath new pavement improvements.
  1. If loose or soft material is encountered, the existing trench fill shall be removed to a depth of two feet below finished subgrade elevation. The Contractor shall have the Landscape Architect observe and probe the bottom of the excavation for its stability prior to placing compacted engineered fill. If loose or soft material is encountered, geotextile/stabilizing fabric, Amoco 2016 (woven) or approved equivalent, shall be placed at the bottom of the excavation.
- D. Recompact between 88 and 92 percent of maximum dry density at a uniform moisture content between 2 and 5 percent above optimum moisture content at the time of compaction.
- E. Recompact to 95 percent of maximum dry density at a uniform moisture content between 2 and 5 percent above optimum moisture content at the time of compaction in the upper 6 inches of subgrade in all areas to support asphalt or rigid concrete pavements.
- F. Until ready to fill, maintain excavations and prevent loose soil from falling into excavation.

### 3.03 FILLING

- A. Fill to contours and elevations indicated using unfrozen materials.
- B. Fill up to subgrade elevations unless otherwise indicated.
- C. Employ a placement method that does not disturb or damage other work.
- D. Do not fill over porous, wet, frozen or spongy subgrade surfaces.
- E. Uniformly moisture-conditioned to between 2 and 5 percent above optimum moisture content of fill materials to attain required compaction density.
- F. Soil Fill: Place and compact material in equal continuous layers not exceeding 8 inches loose thickness.
- G. Correct areas that are over-excavated.
- H. Compaction Density Unless Otherwise Specified or Indicated:
  1. Between 88 and 92 percent of maximum dry density at a uniform moisture content between 2 and 5 percent above optimum moisture content at the time of compaction.
  2. At 95 percent of maximum dry density in the upper 6 inches of subgrade in all areas to support asphalt or rigid concrete pavements.

- I. Reshape and re-compact fills subjected to construction vehicular traffic.

### 3.04 FILL AT SPECIFIC LOCATIONS

- A. Use engineered fill unless otherwise specified or indicated.
- B. Engineered fill at areas to receive rigid concrete pavements:
  - 1. Fill up to subgrade elevations.
  - 2. Maximum depth per lift: 8 inches, loose thickness.
  - 3. Between 88 and 92 percent of maximum dry density at a uniform moisture content at between 2 and 5 percent above optimum moisture content at the time of compaction.
  - 4. Compact upper 6 inches of subgrade to minimum 95 percent of maximum dry density at between 2 and 5 percent above optimum moisture content at the time of compaction.
- C. At Lawn Areas: See Section 02260 Landscape Grading
- D. At Planting Areas Other Than Lawns: See Section 02260 Landscape Grading
- E. Trench Backfilling:
  - 1. See Storm Drain Pipe, Potable Water Supply Specifications
  - 2. See Section 02811 Irrigation

### 3.05 TOLERANCES

- A. Top Surface of General Filling: See Section 02260 Landscape Grading
- B. Top Surface of Filling Under Paved Areas: Plus or minus 0.05 foot from required elevations.

### 3.06 FIELD QUALITY CONTROL

- A. Compaction density testing will be performed on compacted fill in accordance with ASTM D2922.
- B. Results will be evaluated in relation to compaction curve determined by testing un-compacted material in accordance with ASTM D 1557 ("modified Proctor").

**END OF SECTION**



## SECTION 02324

### TRENCHING

#### PART 1 GENERAL

##### 1.01 SCOPE OF WORK

- A. Furnish all labor, material, equipment and services necessary to provide all work, complete in place, as indicated on Drawings and specified herein.

Work specified in this Section includes, but is not limited to the following:

1. Section includes trenching, backfilling and compacting for water and storm drain utilities.

B. Related Work Specified in Other Sections

1. SECTION 02300 – EARTHWORK
2. SECTION 02510 – WATER DISTRIBUTION
3. SECTION 02630 – STORM DRAINAGE

C. Related Documents

1. ASTM D 1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft<sup>3</sup>); 2000.
2. County of Sacramento Standard Construction Specifications.
3. Geotechnical Investigation for site is available in accordance with Information Available to Bidders.
4. Office of Safety and Health Act (OSHA) Construction Safety Orders.
5. California Code of Regulations Title 8: Construction Safety Orders.

D. Definitions

1. Bedding: Material from bottom of trench to bottom of pipe.
2. Initial Backfill: Material from bottom of pipe to 12-inches above top of pipe.
3. Relative Compaction: Ratio, expressed as a percentage of field dry density as compacted to a maximum dry density of representative sample of the same material determined by American Society for Testing and Materials (ASTM) Test Method D1557 (c).
4. Springline of Pipe: Imaginary line on surface of pipe at a vertical distance of ½ the

outside diameter measured from the top or bottom of the pipe.

5. Subsequent Backfill: Material from 12-inches above top of pipe to subgrade of surface material or subgrade of surface facility or to finish grade.
6. Trench Excavation: Removal of material encountered above subgrade elevations and within horizontal trench dimensions.
  - a. Authorized Trench Over-Excavation: Excavation below trench subgrade elevations or beyond indicated horizontal trench dimensions as shown on plans or authorized by the Owner's Representative.
  - b. Unauthorized Trench Over-Excavation: Excavation below trench subgrade elevations or beyond indicated horizontal trench dimensions without authorization by the Owner's Representative. Unauthorized excavation shall be without additional compensation.

## 1.02 SUBMITTALS

- A. Follow submittal procedures outlined in Section 01330 – SUBMITTAL PROCEDURES.
- B. Product Data: Provide data for Products specified.
- C. Manufacturer's Installation Instructions: Indicate special procedures required to install Products specified.
- D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- E. Project Record Documents: Record actual locations of pipe mains, valves, connections, and invert elevations. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.
- F. Submit name of imported materials source.
- G. Deliver samples of backfill and fill materials to Owner's Representative in quantities sufficient for testing. Deliver at least 15 days prior to use.

## 1.03 QUALITY ASSURANCE

- A. Conform all work and materials to the recommendations or requirements of these Technical Specifications and plans and meet the approval of the Owner's Representative.
- B. Conform all work to the appropriate portion(s) of County of Sacramento Standard Construction Specifications.
- C. Percentage of compaction specified shall be the minimum acceptable. The percentage represents the ratio of the dry density of the compacted material to the maximum dry density of the material as determined by the procedure set forth in ASTM D 1557.

D. The Owner's Representative will perform observations and tests required to enable him to form an opinion of the acceptability of the trench backfill. Correct the trench backfill that, in the opinion of the Owner's Representative, does not meet the requirements of these Technical Specifications.

E. Provide materials of each type from same source throughout the Work.

#### 1.04 PROJECT CONDITIONS

A. The Contractor shall assess and evaluate all site conditions and layout the work before any earthwork shall begin.

B. Protect open, trenches, and utility structure excavations with fences, covers and railings to maintain safe pedestrian and vehicular traffic passage.

C. Stockpile on-site and imported backfill material temporarily in an orderly and safe manner.

D. Provide dust and noise control in conformance with Division 1 General Requirements.

#### 1.05 WARRANTY

A. The Contractor shall warrant against settlement for a period of one year after the date of final acceptance, and shall repair damage caused by settlement within that time. For the purpose of this Specification, settlement will be deemed to have occurred if on paved surfaces, the depression falls 3/8-inches below the average of the sides of the uncut portion.

### **PART 2 PRODUCTS**

#### 2.01 PIPE BEDDING AND INITIAL BACKFILL

A. Conform to Sacramento County Standards

#### 2.02 WARNING TAPE

A. See Section 33 1300 – Water Distribution.

#### 2.03 SUBSEQUENT BACKFILL

A. Conform to on-site or imported structural backfill in Section 02300 – Earthwork.

#### 2.04 CONTROLLED DENSITY FILL (CDF) (in trenches)

A. Provide non-structural CDF, from bottom of trench to finish subgrade of subbase or Technical Specifications

base material, that can be excavated by hand and produce unconfined compressive 28-day strengths from 50-psi to a maximum of 150-psi. Provide aggregate no larger than 3/8-inch top size. The 3/8-inch aggregate shall not comprise more than 30% of the total aggregate content.

- B. Cement: Conform to the standards as set forth in ASTM C-150, Type II Cement.
- C. Fly Ash: Conform to the standards as set forth in ASTM C-618, for Class F pozzolan. Do not inhibit the entrainment of air with the fly ash.
- D. Air Entraining Agent: Conform to the standards as set forth in ASTM C-260.
- E. Aggregates need not meet the standards as set forth in ASTM C-33. Any aggregate, producing performances characteristics described herein will be accepted for consideration. The amount of material passing a #200 sieve shall not exceed 12% and no plastic fines shall be present.
- F. Provide CDF that is a mixture of cement, Class F pozzolan, aggregate, air entraining agent and water. CDF shall be batched by a ready mixed concrete plant and delivered to the job site by means of transit mixing trucks.
- G. The Contractor shall determine the actual mix proportions of the controlled density fill to meet job site conditions, minimum and maximum strengths, and unit weight. Entrained air content shall be a minimum of 4.0%. The actual entrained air content shall be established for each job with the materials and aggregates to be used to meet the placing and unit weight requirements. Entrained air content may be as high as 20% for fluidity requirements.
- H. Mix design shall meet the Owner's Representative's approval.

#### 2.05 CONCRETE STRUCTURE BEDDING AND BACKFILL

- A. Precast Structures: Same materials to the same heights as specified for pipe bedding and backfill, or other material approved by the Owner's Representative.
- B. Poured-in-Place Structures:
  - 1. Bedding: Bedding shall meet the approval of the Owner's Representative. In general, bedding is not required, pour bases against undisturbed native earth in cut areas and against engineered fill compacted to 90% relative compaction in embankment areas.
  - 2. Side Backfill: On-site or imported structural fill meeting the requirements given in Section 02300.

#### 2.06 FILTER FABRIC

- A. Filter Fabric:

1. Mirafi 140N (Mirafi Inc., Charlotte, NC) (Tel. 800-438-1855) or equal.

## **PART 3 EXECUTION**

### **3.01 PREPARATION AND EXAMINATION**

- A. Underpin adjacent structures, which may be damaged by excavation Work, including utilities.
- B. Maintain trench crossings for vehicular and pedestrian traffic at street crossing, driveways and fire hydrants.
- C. Identify required lines, levels, contours, and datum locations.
- D. Locate, identify, and protect utilities that remain and protect from damage.
- E. See Section 02300 Earthwork for additional requirements.

### **3.02 TRENCHING AND EXCAVATION**

- A. Existing PCC or AC Areas: Cut PCC or AC to full depth at a minimum distance of 12-inches beyond the edge of the trench.
- B. Excavate by hand or machine. For gravity systems begin excavation at the outlet end and proceed upstream. Excavate sides of the trench parallel and equal distant from the centerline of the pipe. Hand trim excavation. Remove loose matter.
- C. Excavation Depth for Bedding: Minimum of 4-inches below bottom of pipe or as otherwise allowed or required by the Owner's Representative, except that bedding is not required for nominal pipe diameters of 2-inches or less.
- D. Excavation Width at Springline of Pipe:
  1. Up to a nominal pipe diameter of 24-inches: Minimum of twice the outside pipe diameter, or as otherwise allowed or required by the Owner's Representative.
  2. Nominal pipe diameter of 30-inches through 36-inches: Minimum of the outside pipe diameter plus 2-feet, or as otherwise allowed or required by the Owner's Representative.
  3. Nominal pipe diameter of 42-inches through 60-inches: Minimum of the outside pipe diameter plus 3-feet, or as otherwise allowed or required by the Owner's Representative.
- E. Over-Excavations: Backfill trenches that have been excavated below bedding design subgrade, with approved bedding material.
- F. Comply with the Owner's limitations on the amount of trench that is opened or partially opened at any one time. Do not leave trenches open overnight without the approval of the Owner.
- G. Where forming is required, excavate only as much material as necessary to permit

placing and removal of forms.

- H. Bottoms of trenches will be subject to testing by Owner's Representative. Correct deficiencies as directed by the Owner's Representative.
- I. Grade bottom of trench to provide uniform thickness of bedding material and to provide uniform bearing and support for pipe along entire length. Remove stones to avoid point bearing.

### 3.03 CONTROL OF WATER AND DEWATERING

- A. Be solely responsible for dewatering trenches and excavations and subsequent control of ground and surface water. Provide and maintain such pumps or other equipment as may be necessary to control ground water and seepage to the satisfaction of the Owner's Representative and the Owner until backfilling is completed.
- B. Dewater during backfilling operation so that groundwater is maintained a least one foot below level of compaction effort.
- C. Obtain the Owner's Representative's approval for proposed control of water and dewatering methods.
- D. Reroute surface water runoff away from open trenches and excavations. Do not allow water to accumulate in trenches and excavations.
- E. Maintain dewatering system in place until dewatering is no longer required.

### 3.04 BRACING AND SHORING

- A. Conform to California and Federal OSHA requirements.
- B. Place and maintain such bracing and shoring as may be required to support the sides of the excavations for the proper protection of workmen; to facilitate the work; to prevent damage to the pipes and appurtenances being constructed; and to prevent damage to adjacent structures or facilities. Remove all bracing and shoring upon completion of the work.
- C. Be solely responsible for all bracing and shoring and, if requested by the Owner, submit details and calculations to the Owner. The Owner may forward the submittal to the Owner's Representative, the Consulting Engineer and/or the California Division of Industrial Safety for their review. The Contractor's submittal shall include the basic design, assumed soils conditions and estimation of forces to be resisted, together with plans and specifications of the materials and methods to be used, and shall be prepared by a civil engineer or structural engineer registered in California. No excavations in trench section or around structures shall precede a response to the submittal by the Owner.
- D. Be solely responsible for installing and extracting the sheathing in a manner which will not disturb the line, grade, or backfill compaction or operation of the utility being installed or adjacent utilities and facilities.

### 3.05 PIPE BEDDING

- A. Obtain approval of bedding material from the Owner's Representative.
- B. Pipe Bedding shall be per the City of Sacramento Standards and per the Geotechnical Investigation report.
- C. Upon completion of bedding operations, and prior to the installation of pipe, notify the Owner's Representative, who will inspect the bedding layer. Do not commence pipe laying until the Owner's Representative has approved the bedding.

### 3.06 WARNING TAPE

- A. Install in accordance with Section 033 1100 – Water Distribution.

### 3.07 BACKFILLING

- A. Obtain approval of backfill material from Owner's Representative.
- B. Bring initial backfill up simultaneously on both sides of the pipe, so as to prevent any displacement of the pipe from its true alignment. Initial Backfill shall be per the City of Sacramento Standards and per the Geotechnical Investigation report. Jetting or ponding of initial backfill material will not be permitted.
- C. Bring subsequent backfill to subgrade or finish grade as indicated. Subsequent Backfill shall be per the City of Sacramento Standards and per the Geotechnical Investigation report. Jetting or ponding of subsequent backfill material will not be permitted.
- D. Do not use compaction equipment or methods that produce horizontal or vertical earth pressures that may cause excessive pipe displacement or damage the pipe.
- E. Utility backfill shall be inspected and tested by the Owner's Representative during placement. Cooperate with the Owner's Representative and provide working space for such tests in operations. Backfill not compacted in accordance with these specifications shall be re-compacted or removed as necessary and replaced to meet the specified requirements, to the satisfaction of the Owner's Representative and the Owner prior to proceeding with the Project.

### 3.08 CLEANUP

- A. Leave unused materials in a neat, compact stockpile during progress of work.
- B. Remove unused stockpiled materials. Leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.
- C. Upon completion of utility earthwork all lines, manholes catch basins, inlets, water meter boxes and other structures shall be thoroughly cleaned of dirt, rubbish, debris

- and obstructions of any kind to the satisfaction of the Owner.
- D. Leave borrow areas in a clean and neat condition. Grade to prevent standing surface water.
  - E. The Contractor shall remove and dispose of all excess excavated material to a suitable site. The proper and legal disposal shall be the responsibility of the Contractor.

END OF SECTION



## SECTION 02470

### SITE FURNISHINGS

#### **PART 1 - GENERAL**

##### 1.01 SCOPE OF WORK

The work included in this section generally consists of providing all labor, equipment and materials necessary to install all site furnishings complete as shown on the plans and as described herein.

##### 1.02 RELATED SECTIONS

A. Section 02515 - Concrete Paving

##### 1.03 SUBMITTALS

Submit 6 copies of manufacturer's cut sheet and specification for approval within two weeks of notice to proceed.

##### 1.04 DELIVERY, STORAGE AND HANDLING

Contractor assumes all responsibility for storage of all materials relative to this project. Owner assumes no liability for losses or damages from any cause as a result of such storage.

##### 1.05 PROJECT CONDITIONS – PROTECTION

A. After site furnishings are installed, all damage to surrounding paving, turf, and irrigation system shall be repaired by the contractor at the contractor's expense.

B. All trees and shrubs in and around the project site shall be protected by the contractor and, if damaged, replaced at the contractor's expense. This provision is in effect until acceptance by owner of the complete project

##### 1.06 LOCATION INSPECTION

No equipment, apparatus or foundations for same shall be placed until location stakes have been inspected and accepted by the Owner.

##### 1.07 GUARANTEE & LIABILITY INSURANCES

A. Manufacturer shall guarantee all materials and workmanship for a period of one (1) year exclusive of vandalism.

B. The manufacturer will be required to provide complete installation drawings including specifications and a replacement parts list for all products.

- C. Contractor shall provide a written guarantee on his firm's letterhead for all materials and workmanship for a period of one (1) year, exclusive of vandalism. Written guarantee shall be submitted to the Owner at the final inspection prior to final acceptance of the work.

## **PART 2 – PRODUCTS**

### **2.01 MATERIALS**

- A. Aluminum: Alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated; free of surface blemishes and complying with the following:
1. Rolled or Cold-Finished Bars, Rods, and Wire: ASTM B 211 (ASTM B 211M).
  2. Extruded Bars, Rods, Wire, Profiles, and Tubes: ASTM B 221 (ASTM B 221M).
  3. Structural Pipe and Tube: ASTM B 429.
  4. Sheet and Plate: ASTM B 209 (ASTM B 209M).
  5. Castings: ASTM B 26/B 26M.
- B. Steel and Iron: Free of surface blemishes and complying with the following:
1. Plates, Shapes, and Bars: ASTM A 36/A 36M.
  2. Steel Pipe: Standard-weight steel pipe complying with ASTM A 53, or electric-resistance-welded pipe complying with ASTM A 135.
  3. Tubing: Cold-formed steel tubing complying with ASTM A 500.
  4. 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; zinc coated internally and externally.
  5. Sheet: Commercial steel sheet complying with ASTM A 1011/A 1011M.
  6. Expanded Metal: Carbon-steel sheets, deburred after expansion, and complying with ASTM F 1267.
  7. Malleable-Iron Castings: ASTM A 47/A 47M, grade as recommended by fabricator for type of use intended.
  8. Gray-Iron Castings: ASTM A 48/A 48M, Class 200.
- C. Stainless Steel: Free of surface blemishes and complying with the following:
1. Sheet, Strip, Plate, and Flat Bars: ASTM A 666.
  2. Pipe: Schedule 40 steel pipe complying with ASTM A 312/A 312M.
  3. Tubing: ASTM A 554.
- D. Fiberglass: Multiple laminations of glass-fiber-reinforced polyester resin with UV-light stable, colorfast, nonfading, weather- and stain-resistant, colored polyester gel coat, and manufacturer's standard finish.
- E. Plastic: Color impregnated, color and UV-light stabilized, and mold resistant.

1. Polyethylene: Fabricated from virgin plastic HDPE resin.
- F. Anchors, Fasteners, Fittings, and Hardware: Manufacturer's standard, corrosion-resistant-coated or noncorrodible materials; commercial quality, tamperproof, vandal and theft resistant, concealed, recessed, and capped or plugged.
- G. Nonshrink, Nonmetallic Grout: Premixed, factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107; recommended in writing by manufacturer, for exterior applications.
- H. 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.
- I. Galvanizing: Where indicated for steel and iron components, provide the following protective zinc coating applied to components after fabrication:
  1. Zinc-Coated Tubing: External, zinc with organic overcoat, consisting of a minimum of 0.9 oz./sq. ft. (0.27 kg/sq. m) 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 (0.0076 mm) thick.
  2. Hot-Dip Galvanizing: According to ASTM A 123/A 123M, ASTM A 153/A 153M, or ASTM A 924/A 924M.

## 2.02 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 AWPA 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.

#### 2.03 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

#### 2.04 ALUMINUM FINISHES

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.

#### 2.05 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.

#### 2.06 IRON FINISHES

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.

#### 2.07 STAINLESS-STEEL FINISHES

- A. Remove tool and die marks and stretch lines or blend into finish.

- B. Grind and polish surfaces to produce uniform, directionally textured, polished finish indicated, free of cross scratches. Run grain with long dimension of each piece.

### **PART 3 – EXECUTION**

#### **3.01 LAYOUT**

Contractor shall stake/mark locations for all slabs and foundations and shall obtain the approval of their location from Landscape Architect prior to commencing any digging. Locations shall be adjusted to provide minimum clear distances required from all edges of slabs, trees, irrigation heads, or other obstructions.

#### **3.02 CONCRETE WORK**

All concrete work shall conform to the Standard Plans, and those of Section 02515. Contractor shall obtain the approval of all forming from the Landscape Architect prior to pouring any concrete slabs. Foundations holes shall be inspected and approved by the Public Works Inspector prior to pouring concrete.

#### **3.03 INSTALLATION**

- A. Unless otherwise indicated, install site furnishings after landscaping and paving have been completed.
- B. Install site furnishings level, plumb, true, and securely anchored and positioned at locations indicated on Drawings.
- C. .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 (19 mm) 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.
- D. All site furnishings shall be installed with vandal-proof hardware or made vandal-proof (deforming or peening).
- E. Maintain specific required distance between top of paving and product, drinking fountain, bench, etc).
- F. Comply with manufacturer's written installation instructions unless more stringent requirements are indicated. Complete field assembly of site furnishings where required.
- G. All products to be installed according the manufacturers' specifications. If discrepancies occur, notify Owner's Representative as soon as possible before proceeding with installation.

H. Contractor to repair, repaint all minor damage during installation.

### 3.04 PROTECTION OF EXISTING IMPROVEMENTS

Contractor shall protect all existing improvements from damage. All disturbed turf areas shall be fine graded filling all depressions, wheel ruts and irregularities and shall be reseeded with seed mix specified by the Landscape Architect. Contractor shall make all repairs and restore all damaged turf areas at his sole expense.

### 3.05 CLEAN-UP

- A. After completing site furnishing installation, inspect components. Remove spots, dirt, and debris. Repair damaged finishes to match original finish or replace component.
- B. Contractor shall clean up and legally dispose of all unused materials, excess soil, and debris at regular intervals throughout the duration of the work, and as directed by the Owner.

**END OF SECTION**

SECTION 02510  
**WATER DISTRIBUTION**

**PART 1 GENERAL**

1.01 SCOPE OF WORK

- A. Furnish all labor, material, equipment and services necessary to provide all work, complete in place, as indicated on Drawings and specified herein.

Work specified in this Section includes, but is not limited to the following:

1. Pipe and fittings for site domestic water.
2. Valves and appurtenances.

- B. Related Work Specified in Other Sections

1. SECTION 02324 – TRENCHING

- C. Related Documents

1. American Water Works Association (AWWA) C104/A21.4 - Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water; American Water Works Association; 2003 (ANSI/AWWA C104/A21.4).
2. AWWA C111/A21.11 - Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings; American Water Works Association; 2000 (ANSI/AWWA C111/A21.11).
3. AWWA C151/A21.51 - Ductile-Iron Pipe, Centrifugally Cast, for Water; American Water Works Association; 2002 (ANSI/AWWA C151/A21.51).
4. AWWA C508 - Swing-Check Valves for Waterworks Service, 2 In. Through 24 In. NPS; American Water Works Association; 2001 (ANSI/AWWA C508).
5. AWWA C509 - Resilient-Seated Gate Valves for Water Supply Service; American Water Works Association; 2001 (ANSI/AWWA C509).
6. AWWA C900 - Polyvinyl Chloride (PVC) Pressure Pipe, 4 In. Through 12 In., for Water Distribution; American Water Works Association; 1997 (ANSI/AWWA C900/C900a).

## 1.02 SUBMITTALS

- A. See Section 01330 - SUBMITTAL PROCEDURES.
- B. Product Data: Provide data acknowledging that products meet requirements of standards referenced.
- C. Manufacturer's Installation Instructions: Indicate special procedures required to install Products specified.
- D. Restraint Calculation: Provide calculations for mechanical restraint distances for all pipe joints. Provide data acknowledging that calculations provided conform to manufacturer's recommendations for size of pipe, type of pipe, and site soil type.
- E. Project Record Documents:
  - 1. Record location of pipe runs, connections, valves, restraints and invert elevations.
  - 2. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

## 1.03 QUALITY ASSURANCE

- A. Comply with requirements of utility supplying water. Do not operate existing valves or tap existing piping without written permission and/or presence of utility company representative.
- B. Comply with the following requirements and standards:
  - 3. NSF 61: "Drinking Water System Components-Health Effects" for materials for potable water.
  - 4. NFPA 24: "Installation of Private Fire Service Mains and Their Appurtenances" for materials, installations, tests, flushing, and valve and hydrant supervision.
  - 5. NFPA 70: "National Electric Code" for electrical connections between wiring and electrically operated devices.
- C. Provide listing/approval stamp, label, or other marking on piping and specialties made to a specified standard.

## 1.04 MATERIAL DELIVERY, STORAGE AND HANDLING

- A. Preparation for Transport: Prepare valves, according to the following:
  - 1. Ensure that valves are dry and internally protected against rust and corrosion.
  - 2. Protect valves against damage to threaded ends and flange faces.



3. Set Valves in best position for handling. Set valves closed to prevent rattling.
- B. Deliver piping with factory-applied end-caps. Maintain end-caps through shipping, storage and handling to prevent pipe end damage and to prevent entrance of dirt, debris and moisture.
- C. Handling: Use slings to handle valves whose size requires handling by crane or lift. Rig valves to avoid damage to exposed parts. Do not use handwheels or stems as lifting or rigging points.
- D. During Storage: Use precautions for valves according to the following.
  4. Do not remove end protectors, unless necessary for inspection, then reinstall for storage.
  5. Protection from Weather: Store indoors and maintain temperature higher than ambient dew-point temperature. . Support off the ground or pavement in watertight enclosures when outdoor storage is necessary.
- E. Do not store plastic pipe and fittings in direct sunlight.
- F. Protect pipe, fittings, flanges, seals and specialties from moisture, dirt and damage.
- G. Protect linings and coatings from damage.
- H. Handle precast boxes, vaults and other precast structures according to manufacturer's written instructions.
- I. Protect imported bedding and backfill material from contamination by other materials.

## 1.05 COORDINATION

- A. Coordinate connection to existing water mains with Owner
- B. Coordinate piping materials, sizes, entry locations, and pressure requirements with building domestic water distribution piping and fire protection piping.

## **PART 2 PRODUCTS**

### 2.01 PIPE MATERIALS

- A. Ductile Iron: Ductile Cast Iron cement lined pressure class 350.
- B. Plastic - 4 inches and over: PVC pipe shall be minimum Class 200 AWWA C900 (minimum Class 165 AWWA C905 for pipes 16 inches and larger). Underwriters' Laboratories, Inc. (UL) listed, Factory Mutual and National Sanitation Foundation (NSF) approved. Pipe shall be furnished in minimum standard lengths of 20 feet

1. Fittings: AWWA C111, cast iron mechanical joint type, 250 pound working pressure, ductile iron, mechanical joints with SBR rubber ring gaskets. Flanged outlets shall conform to ANDI B16.1, 125 pounds.
2. Bolts and nuts for flanges shall be Type 304 stainless steel, American Society for Testing and Materials (ASTM) A193, Grade B8M hex head bolts and American Society for Testing and Materials A194, Grade 8M, hex head nuts. Washers shall be of the same material as the bolts.

## 2.02 VALVES

- A. Valves: Manufacturer's name and pressure rating marked on valve body.
- B. Valves 2 inches through 12 inches:
  1. Gate valve: per City of Winters Standards

## 2.03 BEDDING AND COVER MATERIALS

- A. Bedding and Cover: As specified in Section 312333 Trenching and Backfilling.

## 2.04 COUPLINGS AND SLEEVES

- A. General: All couplings and sleeves shall be a minimum of 250 psi working pressure-rated unless otherwise noted.
- B. For DIP and PVC pipe:
  1. Unless otherwise noted, couplings and sleeves for DIP and PVC shall be ductile iron conforming to AWWA C153, size 3 through 24 inch and AWWA C110 greater than 24 inch, and shall be 350 psi working pressure rated. AWWA C100 fittings shall be ductile iron only. Couplings, sleeves, and accessories shall be manufactured by U.S. Pipe TrimTyte, Union Foundry, Tyler; or equal.
  2. Unless otherwise noted, flanges on all DIP spools shall conform to AWWA C115.
  3. Push-on joints shall have SBR rubber ring gaskets.
  4. All fittings shall be restrained joints. Pipes shall be restrained using a wedge-action, self-actuating lug type restraint device as manufactured by EBAA Iron Sales, StarGrip, or equal. Concrete thrust blocks are not permitted except at connections to existing unrestrained pipe or fittings or at fire hydrants.
  5. All pipe joints within the minimum distances listed in the following table shall be restrained. Restraint shall be by use of locking gasket for ductile iron pipe. Restraint for PVC pipe shall be by use of a restraint harness EBAA Series 2800, StarGrip, or equal.

Pipe Diameter, inches	Minimum Restraint Length, feet						
	Horizontal Elbows				Tee, Run & Branch	One-Size Reducer	Dead End
	11.25	22.5	45	90			
3	1	2	3	8	8		24
4	1	2	4	10	10	9	29
6	1	3	6	14	14	21	42
8	2	4	7	18	18	23	55
10	2	4	9	21	21	22	66
12	2	3	7	17	17	26	53
14	2	4	8	20	20	16	61
16	2	4	9	22	22	16	69
18	2	5	10	25	25	16	77
20	3	5	11	27	27	16	84
24	3	6	13	32	32	30	100
30	4	8	16	38	38	42	121
36	4	9	18	45	45	43	143

## 2.05 ACCESSORIES

### A. Mechanical Restraints:

1. PVC Pipes: Certain Teed Certa Lock, Romac Grip Rings, or equal.
2. Ductile Iron Pipes: Field Lock Gaskets, Mega Lug 1100 series, TR Flex, or equal.

B. Valve Boxes: Precast concrete with cast iron traffic covers with the word WATER embossed on the top surface of the lid. Christy G5 or equal. Cover shall be painted light blue (ICI Devoe DC41000 semi gloss or equal). For all valves an identification number shall be welded onto valve box rim. Identification number shall be assigned in advance by Owner.

C. Miscellaneous nuts and bolts shall be stainless steel.

D. Rods and Clamps: Socket clamps shall be stainless steel, four bolt type, equipped with stainless steel socket clamp washers and nuts Grinnell Fig. 595 and 594, Elcen Fig. 37 and 37X, or equal.

1. Rods shall be stainless steel, 3/4 inch diameter.

E. All underground water piping shall be accompanied by a Solid Core #10 copper tracer wire. Both ends of tracer wire shall be accessible at all utility valve boxes.

F. Line Marker: Underground-type conductive line marker, permanent, brightly colored, continuous-printed plastic tape, intended for direct burial service; not less than 6 inches wide by 4 mils thick. Provide blue tape with "CAUTION WATER LINE BURIED BELOW" in black letters; Allen Systems Inc., Emed Co. Inc., or equal.

G. Tapping Sleeve: Cast iron or stainless mechanical joint type sleeve, sized specifically for

actual O.D. and piping material, Mueller, Clow, or equal.

## **PART 3 EXECUTION**

### **3.01 PREPARATION**

- A. Cut pipe ends square, ream pipe and tube ends to full pipe diameter, remove burrs.
- B. Remove scale and dirt on inside and outside before assembly.
- C. Prepare pipe connections to equipment with flanges or unions.

### **3.02 TRENCHING**

- A. See Section 02324 - TRENCHING for additional requirements.
- B. Hand trim excavation for accurate placement of pipe to elevations indicated.
- C. Buried pipe shall have at least 36 inches of cover and 12 inches of clearance from other utilities.
- D. Backfill around sides and to top of pipe with cover fill, tamp in place and compact, and then complete backfilling.

### **3.03 INSTALLATION - PIPE**

- A. Have on hand all installation manuals, brochures, and procedures for the equipment and materials concerned.
- B. Follow manufacturer instructions, where such are provided, in all cases that cover points not shown on the Drawings or specified herein. Manufacturer's instructions do not take precedence over the Drawings and Specifications. Where manufacturer's instructions are in conflict with the Drawings and Specification, submit the conflicting instructions to the Owner's Representative for clarification before performing the work.
- C. Use fittings to make all changes in direction and size unless otherwise indicated on the Drawings.
- D. Maintain factory plastic end covers on the pipe during storage. Caps shall be removed upon installation of pipe to insure cleanliness.
- E. Lay piping on a bed of the specified sand, at least 6-inches thick, on firm undisturbed earth. Remove loose rock, clods, and debris from the trench before placing bedding sand and before laying any pipe.
- F. The piping shall be made up with the pipe barrel bearing evenly along its full length on the sand bed on the bottom of the trench.
- G. In the case of steel or other rigid joint piping, excavate holes under joints and connections for access for making up, welding, testing and wrapping joints.

- H. Thoroughly clean out each section of pipe and fitting before lowering into the trench. Clean each pipe or fitting by swabbing-out, brushing-out, blowing-out with compressed air, washing-out with water, or by any combination of these methods necessary to remove all foreign matter.
- I. If cleaned pipe sections and fittings cannot be placed in the trench without getting dirt into the open ends, tie tightly woven canvas or other type of approved cover over the ends of the pipes and fittings until they have been lowered into position in the trench. After removal of the covers in the trench, completely remove foreign matter from the pipe ends and fittings.
- J. Do not lower any pipe or fitting into a trench that contains water. Pump water from wet trenches, and keep the trenches dry until the joints have been completed and the open ends of the pipes have been closed with watertight plugs or bulkheads. Do not remove the plug or bulkhead unless the trench is dry.
- K. Assemble lengths of PVC that are joined by couplings, Tyton type push-on joints, Ring-Tite, Fluid-Tite, or equal, such that centerline of two pipes being joined do not form an angle exceeding 2 inches in any plane. In addition, the angle formed in the vertical plane shall not exceed 1-1/2 inch.
- L. Install trace wire on top of pipe.
- M. Install continuous line marker 18 inches above top of pipe; coordinate with Section 02324 - TRENCHING.

### 3.04 INSTALLATION - VALVES

- A. Set valves on solid bearing.
- B. Center and plumb valve box over valve. Set box cover flush with finished grade.

### 3.05 CONNECTIONS TO EXISTING WATER SYSTEM

- A. Under no circumstances shall existing lines or utilities be interrupted without prior approval of the Owner. Submit a request for this approval to the Owner's Representative, and also state the maximum duration of shutdown. The Contractor may have to adjust work or perform during off-hours.
- B. Schedule all outages for utility tie-in work well in advance, and by written notice to the Owner at least 7 working days in advance of the desired shutdown.
- C. In preparation for tie-ins to the utility systems, the Contractor shall coordinate with the Owner's Representative before draining and/or blowing the existing piping prior to start of tie-in work by the Contractor. In all cases, the Owner will close the appropriate valves to isolate the area of work.

### 3.06 FLUSHING

- A. The entire piping system shall be thoroughly flushed out until acceptance of the Owner's Representative. All tests shall be conducted at such times as directed by and in the

presence of the Owner's Representative.

### 3.07 PIPE TESTING

- B. Water piping shall be hydrostatically tested at 150 psi pressure for four hours and proven watertight. Provide all instruments, facilities, and labor to conduct testing and placing in operation.
- C. Piping shall be tested in sections. Testing under this Section of the work shall be done before final connections to existing utility piping is made, with the provision that subsequent leaks, if developed, at these conditions shall be corrected.
- D. Any part of the system, including all accessories, that shows failure during testing shall immediately be repaired or replaced with new materials. The system shall be completely retested after repair for replacement. This procedure shall be repeated, if necessary, until all parts of the system withstand the specified tests. All retesting costs shall be part of the Contract.
- E. Leakage rate shall not exceed 1.5 gallons/hour/1000 feet of pipe over a 2-hour test period.
- F. Tests shall be witnessed by the Owner's Representative. At least 48 hours advance notice before testing shall be given to Owner's Representative.

### 3.08 DISINFECTION

- A. All domestic water piping shall be disinfected upon installation according to the City of Chico Standards.

### 3.09 FIELD QUALITY CONTROL

- A. Perform field inspection and testing in accordance with City of Chico Standards.

### 3.10 DISPOSAL

- A. Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials, including trash and debris, and legally dispose of them off the Owner's property.

END OF SECTION

## SECTION 02630

### STORM DRAINAGE

#### PART 1 GENERAL

##### 1.01 SCOPE OF WORK

- A. Furnish all labor, material, equipment and services necessary to provide all work, complete in place, as indicated on Drawings and specified herein.

Work specified in this Section includes, but is not limited to the following:

1. Storm drainage piping, fittings, and accessories.
2. Connection of drainage system to existing drainage system.
3. Inlets.

- B. Related Work Specified in Other Sections

1. SECTION 02324 – TRENCHING

- C. Related Documents

1. ASTM:
  - a. ASTM D 3034 - Standard Specification for Type PSM Poly Vinyl Chloride (PVC) Sewer Pipe and Fittings; 2004a.
  - b. ASTM D 2321 - Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications; 2005.

##### 1.02 SUBMITTALS

- A. See Section 01330 - SUBMITTAL PROCEDURES.
- B. Product Data: Provide data acknowledging that products meet requirements of standards referenced.
- C. Manufacturer's Installation Instructions: Indicate special procedures required to install Products specified.
- D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- E. Project Record Documents:

1. Record location of pipe runs, connections, inlets, manholes and invert elevations.
2. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

#### 1.03 DELIVERY, STORAGE AND HANDLING

- A. Do not store plastic structures, pipe and fittings in direct sunlight.
- B. Protect pipe, fittings, and seals from dirt and damage.
- C. Handle precast concrete pipe, manholes and other precast structures according to manufacturer's written instructions.
- D. Protect imported bedding and backfill material from contamination by other materials.

### **PART 2 PRODUCTS**

#### 2.01 DRAINAGE PIPE MATERIALS

- A. Plastic Pipe: ADS N-12, AASHTO M52 or approved equal, inside nominal diameter as indicated on Drawings.
- B. Plastic Pipe Joint Seals: Pipe shall be joined using a bell & spigot joint meeting the requirements of AASHTO M252, AASHTO M294, or ASTM F2306.
- C. Fittings: Same material as pipe molded or formed to suit pipe size and end design, in required tee, bends, elbows, cleanouts, reducers, traps and other configurations required. Fittings shall conform to AASHTO M252, AASHTO M294, or ASTM F2306. Bell and spigot connections shall utilize a welded bell and valley or saddle gasket meeting the soil-tight joint performance requirements of AASHTO M252, AASHTO M294, or ASTM F2306.

#### 2.02 PIPE ACCESSORIES

- A. Line Marker: Provide warning detectable tape; permanent, bright-colored, continuous-printed plastic tape, intended for direct burial service; not less than 6 inches wide by 4 mils thick. Provide green tape with "CAUTION STORM LINE BURIED BELOW" in black letters.

#### 2.03 CATCH BASINS

- A. Drainage Sumps in turf & non-turf areas: 12" or as indicated on Drawings.
- B. Catch Basins with Drain inlets in splash ground areas: 12" or as indicated on Splash Ground Drawings

#### 2.04 FLARED END SECTION

- B. Flared end section: Precast concrete as indicated on Drawings. Hanson Pipe &



Precast or approved equivalent.

## 2.05 BEDDING, COVER AND GALLERY MATERIALS

A. Pipe Bedding Material: As specified in Section 02324 – TRENCHING.

B. Pipe Cover Material: As specified in Section 02324 – TRENCHING.

C. Gallery Material: As specified per Civil Plan

## PART 3 EXECUTION

### 3.01 TRENCHING

A. See Section 02324 – TRENCHING for additional requirements.

B. Hand trim excavation for accurate placement of pipe to elevations indicated.

C. Backfill around sides and to top of pipe with cover fill, tamp in place and compact, then complete backfilling.

### 3.02 INSTALLATION - PIPE

A. Lay piping beginning at low point of system, true to grades and alignment indicated on Drawings, with unbroken continuity of invert.

B. Install pipe, fittings, and accessories in accordance with manufacturer's instructions. Seal watertight.

1. Plastic Pipe: Also comply with ASTM D 2321.

C. Lay pipe to slope gradients noted on layout drawings; with maximum variation from true slope of 1/8 inch in 10 feet.

D. Install continuous line marker 18 inches above top of pipe; coordinate with Section 02324 – TRENCHING.

### 3.03 INSTALLATION - CATCH BASINS

A. Provide as recommended by manufacturer.

### 3.04 PIPE PENETRATIONS

A. For pipe penetrations through existing manholes, core through, provide gasket around pipe, grout penetration on both sides and provide a minimum of 6 inches around collar outside of the manhole or inlet structure penetration.

### 3.05 TAP CONNECTIONS

A. Make connections to existing piping and underground structures so that finished Work will conform as nearly as practicable to requirements specified for new Work.

B. Into underground structures or pipes 24 inches and larger: Cut opening into unit

sufficiently large to allow 3 inches of concrete to be packed around entering connection. Cut ends of connection passing through pipe or structure wall to conform to shape of and be flush with inside wall. On outside of pipe or structure wall, encase entering connection in 6 inches of concrete for minimum length of 12 inches to provide additional support of collar from connection to undisturbed ground. Provide 3000 pounds per square inch concrete. Use epoxy bonding compound as interface between new and existing concrete and piping materials.

- C. Take care while making tap connections to prevent concrete or debris from entering existing pipe or structure. Remove debris, concrete, or other extraneous material, which may accumulate.

### 3.06 CLEANING

- A. Clean pipe to be tested by propelling a snug fitting inflated rubber ball through the pipe with water to remove any debris.

### 3.07 LEAK TESTING

- A. Testing of all portions of the storm drain system including manholes is required.
- B. For either exfiltration or infiltration test, the maximum leakage shall not exceed 250 gallons per inch of pipe diameter per mile per 24 hours as measured over a period of 30 minutes minimum. Should the leakage exceed the maximum allowable rate, the contractor shall repair, overhaul, or rebuild the defective portion of the sewer line. After repairs have been completed by the Contractor, the line shall be retested as specified above.
- C. Manholes shall be filled with water to the rim of the frame casting and shall lose no more than 2 inches over a period of 30 minutes.
- D. The final test shall be performed after the line has been laid and all backfill placed and compacted. The Contractor, at his option, may test the line at any time during construction. However, the final test for acceptance shall be made only after all backfill is in place and compacted. In the event that the exfiltration test prescribed above is impractical due to wet trench conditions, these portions of the storm drain line where such conditions are encountered will be tested for infiltration. The Owner's Representative shall determine whether the exfiltration or infiltration test will be used.
- E. Even though the test for leakage is within the prescribed limits, the Contractor shall repair any obvious leaks.
- F. Low pressure air testing may be used in lieu of water testing at the option of the Contractor. Water testing may be required by the Owner's Representative. The following procedure shall be used for air testing:
  1. Plug all pipe outlets with suitable test plugs. Brace each plug securely.
  2. If the pipe to be tested is submerged in ground water, insert a pipe probe, by

boring or jetting, into the backfill material adjacent to the center of the pipe, and determine the pressure in the probe when air passes slowly through it. This is the back pressure due to ground water submergence over the end of the probe. All gauge pressures in the test should be increased by this amount.

3. Add air slowly to the portion of the pipe installation under test until the internal pressure is raised to 5.0 psig.
4. Check exposed pipe and plugs for abnormal leakage by coating with a soap solution. If any leakage is observed, bleed off air and make necessary repairs.
5. After an internal pressure of 5.0 psig. is obtained, allow at least two minutes for air temperature to stabilize, adding only the amount of air required to maintain pressure.
6. After the two minute period, disconnect the air supply and start stopwatch. The pressure of 5.0 psig. shall be maintained for 5 minutes.
7. As an alternate, the contractor may request the air testing procedure as presented in Section 306-1.4.4 of the 1997 edition of the "Greenbook" Standard Specifications.

### 3.08 DEFLECTION TESTING (PIPES GREATER THAN 8 INCHES ONLY)

- A. After pipe installation and placement and compaction of backfill, but prior to placement of pavement, all PVC and HDPE pipe shall be cleaned and then mandrel tested for obstructions, such as, but not limited to, deflections, joint offsets and lateral pipe intrusions. A rigid mandrel shall be pulled through the pipe by hand. The minimum length of the circular portion of the mandrel shall be equal to the nominal diameter of the pipe. All obstructions encountered by the mandrel shall be corrected by the Contractor. Obstructions due to deflection shall be corrected by replacement of the overdeflected pipe. Mechanical re-rounding is not permitted.
- B. If a section of pipe fails to meet the mandrel test and is reinstalled and fails the second time, said section(s) of pipe shall be replaced with rigid pipe material approved by the Owner's Representative.

### 3.09 DISPOSAL

- A. Lawfully dispose of all unsuitable and excess or surplus material off-site at no cost to the Owner.

END OF SECTION

## SECTION 02721

### AGGREGATE BASE COURSE – SITE CONCRETE PAVING AND FOOTINGS

#### PART 1 GENERAL

##### 1.01 SECTION INCLUDES

- A. Aggregate base course.
- B. Paving aggregates.

##### 1.02 RELATED SECTIONS

- A. Section 02260 – Landscape Grading.
- B. Section 02316 - Fill and Backfill.
- C. Special Provisions: Aggregate Base, Asphalt Concrete, Storm Drain Pipe, Sanitary Sewer, Sewer and Storm Drain Manholes, Potable Water Supply and Miscellaneous Concrete Construction
- D. Section 02515 – Site Concrete
- E. Section 02811 – Irrigation: Trenching and Backfill

##### 1.03 REFERENCES

- A. ASTM C 136 - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates; 1996a.
- B. ASTM D 1557 Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft<sup>3</sup> (2,700 kN m/m<sup>3</sup>)); 1991 (Reapproved 1998).
- C. ASTM D 2487 - Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System); 1998.
- D. ASTM D 2922 - Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth); 1996.
- E. ASTM D 3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth); 1996.

##### 1.04 SUBMITTALS

- A. Materials Sources: Submit name of imported materials source.
- B. Aggregate Composition Test Reports: Results of laboratory tests on proposed and actual materials used.
- C. Compaction Density Test Reports.

##### 1.05 PROJECT CONDITIONS

- A. Provide sufficient quantities of aggregate to meet project schedule and requirements. When necessary, store materials on site in advance of need.

- B. Verify that survey benchmarks and intended elevations for the Work are as indicated.

## **PART 2 PRODUCTS**

### **2.01 MATERIALS**

- A. Aggregate Base: Coarse aggregate, conforming to Section 26 of the State of California Highway Department Standards for 3/8-inch maximum Class 2 Aggregate Base.

### **2.02 SOURCE QUALITY CONTROL**

- A. If tests indicate materials do not meet specified requirements, change material and retest.
- B. Provide materials of each type from same source throughout the Work.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify subgrade has been inspected, gradients and elevations are correct, and is moist but not pumping.

### **3.02 PREPARATION**

- A. Correct irregularities in subgrade gradient and elevation by scarifying, reshaping, and re-compacting.
- C. Do not place aggregate on soft, muddy, or frozen surfaces.

### **3.03 INSTALLATION**

- A. Under Concrete Paving and Footings:
  1. Place aggregate base to a total compacted thickness as indicated on the Project Drawings.
  2. Compact to 95 percent of maximum dry density.

### **3.04 TOLERANCES**

- A. Variation From Design Elevation: Within 0.05 feet.

### **3.05 FIELD QUALITY CONTROL**

- A. Compaction density testing will be performed on compacted aggregate base course in accordance with ASTM D2922 and ASTM D3017.
- B. If tests indicate work does not meet specified requirements, remove work, replace and retest.

C. Proof roll compacted aggregate at surfaces that will be under paving.

### 3.06 CLEAN-UP

A. Remove unused stockpiled materials, leave area in a clean and neat condition in accordance with Section 02260.

**END OF SECTION**

SECTION 02764

**PAVEMENT JOINT SEALANTS**

**PART 1 - GENERAL**

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:

- 1. Expansion and contraction joints within cement concrete pavement.
- 2. Joints between cement concrete and asphalt pavement.

- B. Related Sections include the following:

- 1. Section 02515 Site Concrete for constructing joints in concrete pavement.

1.3 SUBMITTALS

- A. Product Data: For each joint-sealant product indicated.

- B. Samples for Verification: For each type and color of joint sealant required. Install joint-sealant samples in 1/2-inch- (13-mm-) wide joints formed between two 6-inch- (150-mm-) long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.

- C. Qualification Data: For Installer and testing agency.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: An employer of workers trained and approved by manufacturer.

- B. Source Limitations: Obtain each type of joint sealant through one source from a single manufacturer.

## 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to Project site in original unopened containers or bundles with labels indicating manufacturer, product name and designation, color, expiration date, pot life, curing time, and mixing instructions for multi-component materials.
- B. Store and handle materials to comply with manufacturer's written instructions to prevent their deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes.

## 1.6 PROJECT CONDITIONS

- A. Do not proceed with installation of joint sealants under the following conditions:
  - 1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer.
  - 2. When joint substrates are wet or covered with frost.
  - 3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
  - 4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

## **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, products listed in other Part 2 articles.

### 2.2 MATERIALS, GENERAL

- A. Compatibility: Provide joint sealants, backing materials, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer based on testing and field experience.
- B. Colors of Exposed Joint Sealants: As selected by Landscape Architect from manufacturer's full range.



## 2.3 COLD-APPLIED JOINT SEALANTS

- A. Multicomponent Jet-Fuel-Resistant Sealant for Concrete: Pourable, chemically curing elastomeric formulation complying with the following requirements for formulation and with ASTM C 920 for type, grade, class, and uses indicated:
1. Urethane Formulation: Type M; Grade P; Class 12-1/2; Uses T, M, and, as applicable to joint substrates indicated, O.
    - a. Products:
      - 1) Pecora Corporation; Urexpan NR-300.
  2. Coal-Tar-Modified Polymer Formulation: Type M; Grade P; Class 25; Uses T and, as applicable to joint substrates indicated, O.
    - a. Products:
      - 1) Meadows, W. R., Inc.; Sealtight Gardox.
  3. Bitumen-Modified Urethane Formulation: Type M; Grade P; Class 25; Uses T, M, and, as applicable to joint substrates indicated, O.
    - a. Products:
      - 1) Tremco Sealant/Waterproofing Division; Vulkem 202.
- B. Single-Component Jet-Fuel-Resistant Urethane Sealant for Concrete: Single-component, pourable, coal-tar-modified, urethane formulation complying with ASTM C 920 for Type S; Grade P; Class 25; Uses T, M, and, as applicable to joint substrates indicated, O.
1. Products:
    - a. Sonneborn, Div. of ChemRex, Inc.; Sonomeric 1.
- C. Type NS Silicone Sealant for Concrete: Single-component, low-modulus, neutral-curing, nonsag silicone sealant complying with ASTM D 5893 for Type NS.
1. Products:
    - a. Crafco Inc.; RoadSaver Silicone.
    - b. Dow Corning Corporation; 888.

D. Type SL Silicone Sealant for Concrete and Asphalt: Single-component, low-modulus, neutral-curing, self-leveling silicone sealant complying with ASTM D 5893 for Type SL.

1. Products:

- a. CrafcO Inc.; RoadSaver Silicone SL.
- b. Dow Corning Corporation; 890-SL.

E. Multicomponent Low-Modulus Sealant for Concrete and Asphalt: Proprietary formulation consisting of reactive petropolymer and activator components producing a pourable, self-leveling sealant.

1. Products:

- a. Meadows, W. R., Inc.; Sof-Seal.

## 2.4 HOT-APPLIED JOINT SEALANTS

A. Jet-Fuel-Resistant Elastomeric Sealant for Concrete: Single-component formulation complying with ASTM D 3569.

1. Products:

- a. CrafcO Inc.; Superseal 444/777.
- b. Meadows, W. R., Inc.; Poly-Jet 3569.

B. Jet-Fuel-Resistant Sealant for Concrete and Tar Concrete: Single-component formulation complying with ASTM D 3581.

1. Products:

- a. CrafcO Inc.; Superseal 1614A.
- b. Meadows, W. R., Inc.; Poly-Jet 1614.
- c. Meadows, W. R., Inc.; Poly-Jet 3406.
- d. Meadows, W. R., Inc.; Poly-Jet 3569.

C. Elastomeric Sealant for Concrete: Single-component formulation complying with ASTM D 3406.

1. Products:

- a. CrafcO Inc.; Superseal 444/777.
- b. Meadows, W. R., Inc.; Poly-Jet 3406.

D. Sealant for Concrete and Asphalt: Single-component formulation complying with ASTM D 3405.

1. Products:

- a. Koch Materials Company; Product No. 9005.
- b. Koch Materials Company; Product No. 9030.
- c. Meadows, W. R., Inc.; Sealtight Hi-Spec.

## 2.5 JOINT-SEALANT BACKER MATERIALS

A. General: Provide joint-sealant backer materials that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by joint-sealant manufacturer based on field experience and laboratory testing.

B. Round Backer Rods for Cold- and Hot-Applied Sealants: ASTM D 5249, Type 1, of diameter and density required to control sealant depth and prevent bottom-side adhesion of sealant.

C. Backer Strips for Cold- and Hot-Applied Sealants: ASTM D 5249; Type 2; of thickness and width required to control sealant depth, prevent bottom-side adhesion of sealant, and fill remainder of joint opening under sealant.

D. Round Backer Rods for Cold-Applied Sealants: ASTM D 5249, Type 3, of diameter and density required to control sealant depth and prevent bottom-side adhesion of sealant.

## 2.6 PRIMERS

A. Primers: Product recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

# PART 3 - EXECUTION

## 3.1 EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.

1. Proceed with installation only after unsatisfactory conditions have been corrected.

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### 3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions.
- B. Joint Priming: Prime joint substrates where indicated or where recommended in writing by joint-sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

### 3.3 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Install backer materials of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
  - 1. Do not leave gaps between ends of backer materials.
  - 2. Do not stretch, twist, puncture, or tear backer materials.
  - 3. Remove absorbent backer materials that have become wet before sealant application and replace them with dry materials.
- D. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
  - 1. Place sealants so they directly contact and fully wet joint substrates.
  - 2. Completely fill recesses provided for each joint configuration.
  - 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- E. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
  - 1. Remove excess sealants from surfaces adjacent to joint.
  - 2. Use tooling agents that are approved in writing by joint-sealant manufacturer and that do not discolor sealants or adjacent surfaces.

- F. Provide joint configuration to comply with joint-sealant manufacturer's written instructions, unless otherwise indicated.
- G. Provide recessed joint configuration for silicone sealants of recess depth and at locations indicated.

#### 3.4 CLEANING

- A. Clean off excess sealants or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved by manufacturers of joint sealants and of products in which joints occur.

#### 3.5 PROTECTION

- A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately and replace with joint sealant so installations with repaired areas are indistinguishable from the original work.

**END OF SECTION**

## SECTION 02811

### IRRIGATION

#### **PART 1 - GENERAL**

##### 1.01 CONDITIONS

- A. The general provisions of the Contract, including General and Supplementary Conditions and Special Provisions (if any) apply to the work specified in this Section.

##### 1.02 SCOPE OF WORK

- A. Furnish all labor, materials, processes, and equipment necessary to complete the irrigation system work as indicated on the Drawings and specified herein.
- B. Test the entire irrigation system to assure proper operation.
- C. Furnish all labor, materials, and equipment necessary to restore all disturbed areas resulting from the work as indicated on the Drawings and specified herein.
- D. All incidental parts, which are not shown on the plans or specified herein and are necessary to complete or modify the existing system shall be furnished and installed as though such parts were shown on plans or specifications. All systems shall be in satisfactory operation at the time of completion.
  - 1. Related work specified in other sections:
    - a. Section 01600 – **PRODUCT REQUIREMENTS**
    - b. Section 01780 - **CLOSEOUT SUBMITTALS**
    - c. Section 02100 - **DEMOLITION**
    - d. Section 02905 - **LANDSCAPE INSTALLATION**
    - e. Section 02970 - **LANDSCAPE MAINTENANCE**

##### 1.03 QUALITY ASSURANCE & REQUIREMENTS

- A. Permits and Fees: The Contractor shall obtain and pay for all permits and all observations as required.
- B. Manufacturer's Directions: Manufacturer's directions and detailed Drawings shall be followed in all cases where the manufacturers of articles used in this Contract furnish directions covering points not shown in the Drawings and Specifications
- C. Ordinances and Regulations

- A. All local, municipal and state laws, rules and regulations governing or relating to any portion of this work are hereby incorporated into and made a part of these Specifications and their provisions shall be carried out by the Contractor.
- B. All rules and regulations governing or relating to the California Code of Regulations, Title 23, Division 2, Chapter 2.7, 2015 Updated Model Water Efficient Landscape Ordinance are hereby incorporated into and made a part of these Specifications and their provisions shall be carried out by the Contractor.
- C. The materials and work of this section shall conform to all applicable provisions of the latest editions of the Uniform Plumbing Code, the National Electrical Code, and all codes properly governing the materials and work at the project site.
- D. All electrical materials and work shall conform to California Administrative Code, Title 23, Part 3, Basic Electrical Regulations, and Article 18 E 110-16.
- E. Anything contained in these Specifications shall not be construed to conflict with any of the above rules and regulations or requirements of the same. However, when these Specifications and Drawings call for or describe materials, workmanship, or construction of a better quality, higher standard, or larger size than is required by the above rules and regulations, the provisions of the Specifications and Drawings shall take precedence.

#### D. Explanation of Drawings

1. Not all offsets, fittings, sleeves, main line, lateral, etc., which may be required are shown on plans. Carefully investigate the structural and finish conditions affecting all the work and plan the work accordingly furnishing such fittings; etc., as may be required to meet such conditions. Drawings are generally diagrammatic and indicative of the work to be installed. Due to the scale of the Drawings, it is not possible to indicate all offsets, fittings, sleeves, etc., which may be required to complete the irrigation system.
2. Before proceeding with any work, the Contractor shall check and verify all dimensions, quantities, pressures and flows and shall immediately inform the District of any discrepancy between the drawing and/or the Specifications and actual conditions. No work shall be done in any area where there is such a discrepancy until the District has given written approval for the same. The Contractor shall assume full responsibility for work installed without approval.
3. The materials and work shall be installed in such a manner as to avoid conflicts between irrigation system and planting, existing or proposed utilities, and all other construction features.
4. Contractor shall verify prior to and during construction, that his contract documents reflect the latest revisions and change orders. Contractor shall be able to produce such documents at the request of the District.
5. Pipe sizes indicated on the Drawings are minimum allowable.

#### 1.04 EXISTING CONDITIONS

- A. The Contractor shall exercise due care to protect all existing facilities, structures and utilities both above ground and underground on the site.
- B. The contractor shall also exert every effort to maintain amenities, including specimen trees and natural areas integral to the aesthetic of the park design.
- C. Information on the Drawings, relative to existing conditions, is approximate only. Deviations found necessary during construction to conform to actual conditions, as approved by the District, shall be made without additional cost.
- D. Where it is necessary to excavate in areas of existing utilities, the contractor shall dig a pothole to confirm exact locations of existing utilities. Exercise extreme care in excavating and working near existing utilities. The Contractor shall be responsible for all damages to existing utilities that are caused by his operation or neglect. In case of interruption of utilities caused by the contractor's operations or neglect, the contractor shall be responsible to have the utilities in service as soon as possible and in no case shall the interruption be longer than a twenty-four (24) hour period. In such case that the contractor needs more than a twenty-four (24) hour period, prior approval shall be acquired from the District in writing.
- E. Excavation in proximity to existing trees shall conform to the Tree Protection Measures per Contract Documents.

#### 1.05 EXISTING IRRIGATION SYSTEM

- A. All existing sprinklers, rotors, controllers, quick coupler valves, undamaged utility boxes, remote control valves, isolation valves shall be removed and salvaged by the Contractor. Deliver only salvageable items to District maintenance yard in stackable plastic bins. All salvaged products shall be inventoried by Contractor prior to delivery. All other items shall be disposed of by the Contractor.
- B. Existing pipelines shall be abandoned in place except in those areas designated to retain and protect. If an existing irrigation pipe is encountered during the installation of new pipe, a section of the existing pipe shall be cut and removed. Remove two (2) feet of the existing pipeline on both sides of the new pipe and/or to a depth of eighteen (18) inches, whichever comes first.

#### 1.06 SUBMITTALS

##### A. Material List

1. Contractor shall furnish the articles, equipment, materials, or processes specified by name in the Drawings and Specifications. Product names are used as standards only; other materials or methods shall not be used unless approved in writing by the District. Burden of proof as to equality of proposed material shall be on the Contractor; the District's decision is final. Only one request for substitution shall be considered for each item. Equipment capacities specified are minimum acceptable.



2. A complete material list (6 copies) shall be submitted to the District for approval prior to performing any work. The material list shall clearly identify the manufacturer, model number and description of materials and equipment to be used, including but not limited to the following:
  - a. Irrigation Controller and Accessories
  - b. Hand Held Remote Control
  - c. Isolation Valves
  - d. Master Valve and Flow Sensor
  - e. Remote Control and Drip Valves
  - f. 2-Wire Valve and Sensor Decoders
  - g. Concrete Valve Boxes and Security Lids
  - h. Gear Drive Rotors
  - i. Pop Up Sprinklers and Nozzles
  - j. Bubblers and Riser Assemblies
  - k. Drip Irrigation Tubing and Fittings
  - l. Swing Joint Assemblies
  - m. PVC Gasketed Main Line Pipe
  - n. Main Line Fittings and Joint Restraints
  - o. PVC Solvent Weld Lateral Pipe and Fittings
  - p. PVC and HDPE Sleeves
  - q. PVC Conduit
  - r. PVC Solvent Cement and Primer
  - s. 2-Wire Decoder Cable
  - t. Water Proof Wire Connectors
  - u. Controller and Decoder Earth Ground Systems
3. The contractor shall provide additional submittals as required for products not listed above but which are used on site. Approval of submittals is required before installation.
4. Equipment or materials installed or furnished without prior approval of the District shall be rejected and the Contractor shall be required to remove such materials from the site at his own expense.
5. Approval of any item, alternate or substitute indicates only that the product or products apparently meet the requirements of the Drawings and Specifications based on the information or samples submitted.

#### B. Record Drawings

1. The Contractor shall dimension from two (2) permanent points of reference, building corners, sidewalks, or road intersections, etc., the location of the following items:
  - a. Connection to Irrigation and Potable Water Lines (Note Depth)
  - b. Electrical Power Connection and Conduits (Note Depth)
  - c. Irrigation Controller
  - d. Main Line Valves – Isolation, Quick Coupler and Air Release
  - e. Master Valves and Flow Sensors

- f. Remote Control and Drip Valves
  - g. Routing of irrigation pressure lines; dimension maximum 100' along routing and at turns in direction and utility crossovers. (Note Depth)
  - h. Routing of conduit and 2-wire decoder cable when not adjacent to main line.
  - i. Main Line, Lateral and Electrical Sleeves at both ends (Note Depth)
  - j. Electric pull/splice boxes (note decoder identification addresses)
  - k. Other related equipment as directed by the District.
2. Two (2) weeks prior to the date of the final observation, the Contractor shall deliver reproducible record drawings and digital media to the Landscape Architect for review. Delivery shall not relieve the Contractor of the responsibility of furnishing required information that may be omitted from the plans or digital media or from the requirements of the Close Out Documents.

#### C. Controller Charts

1. The District shall approve record Drawings before controller charts are prepared.
2. Provide one (1) controller chart for each controller supplied.
3. The chart shall show or explain the area controlled by the automatic controller and shall be the maximum size that the controller door will allow.
4. The chart shall be either a reduced drawing or a written description of the actual record drawing system. In the event the controller sequence is not legible when the drawing is reduced, it shall be enlarged to a size that is readable.
5. When completed and approved, the chart shall be hermetically sealed between two (2) pieces of plastic, each piece being a minimum ten (10) mils thick.
6. These charts shall be completed and approved prior to final observation of the irrigation system.

#### D. Operation and Maintenance Manuals

1. Prepare and deliver two (2) operation manuals as specified and as follows:
  - a. Approved irrigation material list as described in Section 1.05.A.2
  - b. Parts lists for approved irrigation material list.
  - c. Operation manuals for approved irrigation material list.
3. Guarantee Statement for Irrigation System
4. Landscape Irrigation Water Audit

- E. Before final observation can occur, the above-mentioned material submittals, record drawings, controller charts, operations and maintenance manuals, guarantee statement for irrigation system, central control certificate and landscape irrigation water audit shall be turned over to the District.

1.06 Equipment to be Furnished:

A. Irrigation Products to be Furnished

1. Supply as a part of this Contract the following tools:

- a. Two (2) key sets for locking irrigation controller.
- b. Two (2) valves of each size and type used.
- c. Two (2) decoders of each type used.
- d. Five (5) rotors of each type used.
- e. Five (5) pop up sprinklers of each type used.
- f. Five (5) complete nozzle sets of each type used.
- g. Five (5) bubblers of each type used.
- h. One Hundred (100) feet of drip tubing for each type used.
- i. Ten (10) drip emitters for each type used.
- j. Two (2) sets of special tools required for removing, disassembling and adjusting each type of sprinkler used
- k. Two (2) sets of special tools required for removing, disassembling and adjusting each type of joint restraint used.
- l. Two (2) lock and key sets for controller enclosures (keyed as per District specifications)
- m. Two (2) quick coupler keys and matching hose swivels
- n. Two (2) 60" isolation valve opening keys
- o. Four (4) Security keys for concrete valve boxes
- p. Two (2) hand-held remote-control transmitters and cases
- q. Two (2) hand-held decoder programmers

2. The above-mentioned equipment shall be turned over to the District at the conclusion of the project. Written evidence that the District has received materials must be provided to the Landscape Architect prior to scheduling final observation.

1.07 PRODUCT DELIVERY, STORAGE AND HANDLING

Handling of PVC Pipe and Fittings: The Contractor is cautioned to exercise care in handling, loading, unloading, and storing of PVC pipe and fittings. All PVC pipe shall be transported in a vehicle that allows the length of pipe to lie flat so as not to subject it to undue bending or concentrated external load at any point. Any section of pipe that has been dented or damaged will be discarded and if installed replaced with new.

1.08 GUARANTEE

1. The guarantee for the irrigation system shall be made in accordance with the form shown on the following page. A copy of the guarantee form shall be included in the operations and maintenance manual. The guarantee form shall be re-typed onto the Contractor's letterhead and contain the following information:

**GUARANTEE FOR IRRIGATION SYSTEM**

We hereby guarantee that the irrigation system we have furnished and installed is free from defects in materials and workmanship, and the work has been completed in accordance with the Drawings and Specifications, ordinary wear and tear and unusual abuse or neglect excepted. We agree to repair or replace any defects in material or workmanship, which may develop during the period of one (1) year from date of final acceptance and to repair or replace with originally specified materials. Any damage resulting from the repairing or replacing of such defects shall be replaced and repaired by the contractor at no additional cost to the District. We shall make such repairs or replacements within a 48-hour period, after receipt of written notice. In the event of our failure to make such repairs or replacements within said period after receipt of written notice from the District, we authorize the District to proceed to have said repairs or replacements made at our expense and we will pay the costs and charges therefore upon demand.

PROJECT: \_\_\_\_\_

LOCATION: \_\_\_\_\_

SIGNED: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

PHONE: \_\_\_\_\_

DATE OF ACCEPTANCE: \_\_\_\_\_

## PART 2 - PRODUCTS

### 2.01 MATERIALS

#### A. Trench Backfill

##### 1. Native Material

- a. Native backfill material, if approved by the District, shall be used for backfill material.
- b. Native Backfill: Prepared as necessary to be non-expansive, free of debris, organic material and lumps larger than three (3) inches, rocks larger than two (2) inches,
- c. Unless otherwise specified in the Special Provisions, the Contractor has the option to use imported granular material for trench backfill in place of native material excavated at the work site.

1.) The optional use of imported granular material for trench backfill will be at the Contractor's expense.

##### 2. Imported Soil

- a. Imported Backfill: Non-expansive soil, free of debris, organic material and lumps larger than three (3) inches, rocks larger than two (2) inches, with a liquid limit no greater than 40 and a plasticity index no greater than 15.

##### 3. Graded Sand

- a. Graded sand backfill must be free from vegetable matter, lumps, balls of clay, or adherent films of clay, and must have a minimum Cleanliness Value of 60 as determined by California Test 227.
- b. The percentage composition by weight of graded sand must conform to the following gradations:

Sieve Size	Percentage Passing by Weight
9.5 mm (3/8")	100
4.75 mm (#4)	92-100
2.36 mm (#8)	90-100
1.18 mm (#16)	80-100
600 µm (#30)	65-100
300 µm (#50)	40-80
150 µm (#100)	0-40
75 µm (#200)	0-12

##### 4. Crushed Rock or Gravel

- a. Crushed rock or gravel backfill material shall be graduated so that 100 percent will pass the 3/4 inch sieve and not more than 15 percent will pass the number 8 sieve.
- b. Clean crushed rock must have a minimum Cleanliness Value of 60 as determined by California Test 227. At least 75 percent of the crushed rock particles must have 2 or more fractured faces.

#### B. Woven Geotextile Fabric

1. The woven geotextile fabric must be a high modulus woven fabric consisting of long chain polymeric monofilaments, slit film tapes, or multifilaments of tape and nonwoven yarn of polypropylene, polyester or nylon, and must be inert to commonly encountered chemicals, rotproof and resistant to ultraviolet light exposures, insects, and rodents.
2. The fabric must be woven into a stable network and the edges of the fabric must be selvaged or surged in such a way that fabric will not unravel or fray during installation or usage.
3. The geotextile must conform to the physical property requirements as below:
  - a. Grab tensile strength (any direction), lb. ASTM D 4632 200 lbs.
  - b. Weight, oz/yd<sup>3</sup> ASTM D 5261 6.0 oz/yd<sup>3</sup>
  - c. Permittivity, sec-1 ASTM D 4491 0.5 sec-1
  - d. Mullen Burst strength, psi ASTM D 3786 400 psi
  - e. The fabric must have an Equivalent Opening Size no larger than U.S. Standard Sieve Number 50 as determined by U.S. Corps of Landscape Architects Specification CW-02215.

#### C. Irrigation Pipe Sleeve

1. Irrigation Sleeve 4" and smaller shall be PVC Schedule 40 with solvent-weld joints.
  - a. Pipe shall be made from NSF approved Type I, Grade I, PVC compound conforming to ASTM resin specification D1785. All pipes shall meet requirements set forth in Federal Specification PS-21-70. (Solvent-weld Pipe)
2. Irrigation Sleeve 6" and larger shall be corrugated HDPE with smooth interior wall.
  - a. HDPE shall be made from high-density polyethylene with an integrally formed smooth interior conforming to AASHTO M252, AASHTO M294, Type S.

#### D. PVC Pipe and Fittings

1. Main Line Pressure Pipe and Fittings.

- a. Pressure main line piping four (4) inch and larger shall be PVC Class 200, rubber ring joint type.
  - 1.) Couplings with grooves for sealing rings either shall be a separate machined part with two (2) sealing rings or manufactured as an integral part at one end of each pipe length. Pipe shall be made from an NSF (National Sanitation Foundation) approved Type I, Grade I, PVC compound conforming to ASTM resin specification D2241. All pipes shall meet requirements as set forth in Federal Specification PS22-70, with an appropriate standard dimension ratio (S.D.R. Pipe).
  - 2.) Lubricant for assembling gasketed pipe and fittings shall be as per manufacturer's specifications.
  - 3.) Main line fittings and valves two and one half (2-1/2) inch and larger shall be mechanically restrained using integral joint restraints or approved equal.
- b. Pressure main line piping three (3) inch to two and one half (2-1/2) inch shall be PVC Class 315 and two (2) inch and smaller shall be PVC Schedule 40.
  - 1.) Main line fittings three (3) inch and smaller shall be PVC Schedule 80
- c. All PVC pipe shall be marked continuously and permanently with the following information: Manufacturer's name, nominal pipe size, schedule or class of pipe, pressure rating in P.S.I. extrusion, NSF approval and date of extrusion.
- d. All PVC fittings shall bear the manufacturer's name or trademark, material designation, size, applicable I.P.S. schedule and NSF seal of approval.

2. Lateral Non-Pressure Pipe and Fittings

- a. PVC pipe 2-1/2 inch and larger shall be PVC Class 315.
- b. PVC pipe 2 inch and smaller shall be PVC Schedule 40.
- c. Pipe shall be made from NSF approved Type 1, Grade PVC compound conforming to ASTM resin specification 1785. All pipes shall meet requirements as set forth in Federal Specification PS-21-70. (Solvent-weld pipe).
- d. Lateral pipe fittings downstream of remote control valves shall be solvent welded PVC Schedule 40 unless otherwise noted in details and drawings.

E. Main Line Joint Restraints

1. All gate valves, ductile iron bends, reducers, tees and pipe bell and gasket joints adjacent to restrained joints shall be mechanically restrained in accordance to the manufactures recommended design criteria and guide. Concrete thrust blocks are not to be used.
2. The mechanical joint restraint shall be capable of securing the PVC pipe directly to the gate valve, ductile iron bends, reducers and tees without the use of bolts, links and adapters.
3. Joint restraints shall be manufactured from ductile iron, grade 65-45-12 in accordance with ASTM A-536.
4. Bolts and nuts used on joint restraints shall be provided as part of the restraint assembly.
5. All joint restraints shall be installed using methods recommended by the manufacturer. All bolts and nuts shall be tightened as per manufacturer's recommended torque ratings.

F. Main Line Detectable Marking Tape

1. Detectable marking tape shall consist of a 5.0 mil (0.005") thickness, five-ply composition, ultra-high molecular weight, 100 percent virgin polyethylene and acid, alkaline and corrosion resistant.
2. The tape tensile strength is in accordance with ASTM D882-80A and will not be less than 7800 PSI. The tape will have a 2.0 mil (0.0020") solid aluminum foil core, encapsulated within 2.55 mil (0.00255") polyethylene backing.
3. Tape width shall be three (3) inch minimum width or as specified by manufacturer for pipe size.
4. Detectable marking tape for irrigation water shall be blue in color with "Caution: Irrigation Water Line Buried Below"

G. Concrete

1. ASTM Class B concrete shall be used for fill concrete.
2. Concrete shall have a 3,500-PSI compressive strength at 28 days and shall have maximum water to cement and dispersing agent ration of 56%. Concrete shall have a minimum cement content of 470 lbs. (5 bags) per cubic yard concrete. Nominal maximum size of coarse aggregate shall be three-quarter (3/4) inch.

H. PVC Threaded Nipples:

1. PVC Schedule 80 nipples shall be produced from extruded stock grade PVC compounds.
  - a. No molded nipples shall be used.



- b. PVC Schedule 80 nipples shall be made from NSF approved PVC compound conforming to ASTM D1784, Cell Classification 12454

#### I. Manual Valves

1. All mainline valves shall be resilient wedge and conform to AWWA C153 standards.
  - a. Material shall be ductile iron per ASTM A-536, Grade 65-45-12.
  - b. Epoxy coating on all interior and exterior surfaces shall be fusion bonded epoxy, 12-14 mil thickness.
  - c. Gate valves shall be available in spigot x bell and bell x bell models to mechanically connect to fittings or plastic pipe. Valve bell end shall be deep bell, gasket and equipped with cast joint restraint clamps to securely fasten to plastic pipe.
  - d. Restraints shall have blunt cast serrations. Machined threaded restraints will not be allowed.
  - e. Valves shall have a shroud around the 2" operating nut to accept IPS PVC sleeve which provides dirt-free access to actuate the valve.
2. Valves two (2) inch and smaller shall be bronze, full port ball valve with threaded ends.
  - a. Ball valves shall be equipped with a cast bronze cross or tee handle.

#### J. Quick Coupling Valves

1. Quick coupling valves shall have a brass two-piece body designed for working pressure of 150 P.S.I. operable with quick coupler key. Key size and type shall be as shown on the Drawings.

#### K. Remote Control Valve

1. Remote control valves shall be of the same type, manufacturer and model shown on drawings.
2. Remote control valves shall be operated by a 2-wire decoder with a separate decoder address for each valve station and be of the same type, manufacturer and model as shown on the drawing.
3. Remote control valves shall be labeled with a valve identification tags of the same type, manufacture and model shown on drawings.

#### L. Valve Identification

1. Remote control valve tags shall be of the same type, manufacturer and model shown on drawings.
2. Remote control valve tags shall be manufactured from polyurethane Behr Desopan, with a reinforced attachment hole and will be 2-1/4" x 2.3/4" in size.
  - a. Remote control valve identification tags shall be yellow in color with double sided stamped controller and valve designation.
  - b. Manual and remote-control valve identification tags shall be blue in color with double sided stamped "Non-Potable Water" on both sides.

#### B. Wiring

1. Two-wire cable shall be a twisted, solid-core wire suitable for direct burial, color-coded red and blue.
2. All connections in the two-wire path shall be made with 3M DBRY-6 waterproof connectors or approved equal.
3. Two-wire cable earth grounding shall be per manufacture's specifications.

#### C. Irrigation Controller

1. The irrigation controller shall be of the same type, manufacture and size as shown on the drawing.
2. The irrigation controller shall operate the remote-control valves using a two-wire path.
3. The irrigation controller shall have a minimum of six (6) sensor outputs.
4. The irrigation controller shall be equipped with two (2) hand held remote programmers that use wireless induction to program and communicate with decoders in the field.
5. Irrigation Controller shall have a five (5) year manufacturer's warranty.

#### D. Master Valve and Valve Flow Sensor Assembly

1. The master valve and flow sensor assembly shall be of the same type, manufacture and size as shown on the drawing.
2. The master valve shall be operated by a 2-wire decoder.
3. The Flow Sensor shall be connected to the controller through a 2-wire path sensor decoder as per manufacture specification.

#### E. Earth Ground

1. Earth Grounding for electronic irrigation controller shall be made in accordance with Article 250 of the National Electrical Code (NEC) and manufacturer written specifications. At the very minimum, the grounding circuit shall include a copper clad steel ground rod, a solid copper ground plate and one hundred (100) pound of PowerSet earth contact material or approved equal.
2. Ground Rods shall be 5/8" diameter by 10' length copper clad with a surface area of 238 square inches.
3. Copper Ground Plates shall be 12" by 36" by 1/16" solid copper with a surface area of 870 square inches.
  - a. Copper Ground Plates shall come with 25 feet of 6AWG copper wire welded to the plate.
  - b. Copper Ground Plates shall conform to N.E.C. requirements.
4. Bare Copper Wire shall be soft-annealed, uncoated copper, 6AWG and conforming to UL standard 719.
  - a. Bare Copper Wire shall be permanently welded to ground rods and ground plates, so the connection doesn't loosen or corrode.
  - b. Exothermic reaction welding process shall be used and shall conform to N.E.C. requirements.
5. Earth Contact Backfills shall be superior conductive material, non-hardening or hardening such as PowerFill or PowerSet or approved equal.

#### F. Irrigation Heads

1. All irrigation heads shall be of the same size, type and deliver the same rate of precipitation with the diameter (or radius) of throw, pressure, and discharge as shown on the plans and/or specified herein or approved by the District.
2. Rotor heads shall be gear drive with stainless steel riser and factory installed check valve.
3. Pop Up Sprinkler bodies shall be equipped with pressure regulation, heavy-duty spring and factory installed check valve.
  - a. Pop Up Sprinklers shall come equipped with rotary nozzles and matched precipitation.
4. All irrigation heads of similar functions shall be of common manufacture and shall be marked with the manufacturer's name and model identification in a position where they may be identified without being removed from the system.

#### G. Valve and Electric Boxes

1. Valve boxes installed in decomposed granite areas shall be tan colored; valve boxes installed in planter areas shall be green colored.
2. Valve boxes shall be per plans and details with bolt down kit and a skid resistant marked surface.
3. Valve box lids shall be per plans with diamond plated surface texture with a locked and secure improved wing design securely locking the cover in place from inside the enclosure.
  - a. Valve box lids shall come equipped with a vandal resistant security bolt and a specialized key to open.
  - b. Valve box lids shall have a welded identification plate attached by the manufacturer to say irrigation.

### **PART 3 - EXECUTION**

#### **3.01 GENERAL**

A. Appoint a competent resident superintendent to be onsite whenever the WORK is in progress. The superintendent shall not be replaced without notice to the Landscape Architect.

B. Contractor is responsible for locating and avoiding underground utilities, for notifying all appropriate agencies prior to beginning excavation, and for any damage caused by Contractor. Contractor is required to notify Landscape Architect and the utility company should there be any damage to utilities.

#### **3.02 SITE CONDITIONS**

1. Contractor shall protect all existing site development including, but not limited to, existing buildings, equipment, underground utilities, walls, materials, etc. Any existing site development damaged by willful or negligent acts of Contractor or any of Contractor's employees shall be replaced or repaired at no expense to District and in a manner satisfactory to Landscape Architect before Project acceptance is given. This provision applies to onsite damage as well as to that which may occur to adjacent properties
2. All scaled dimensions are approximate. The Contractor shall check and verify all site dimensions and notify the District if site conditions have changed from those specified in the drawings.
3. The Contractor shall check and verify all site water and electrical services and notify the District if site conditions have changed from those specified in the drawings.
4. The Contractor shall carefully check all grades to satisfy him that he may safely proceed before starting work on the irrigation system.

5. The contractor shall obtain permits and call for inspections as required by local codes and regulation. All installations shall conform to local codes and accepted construction practices.

### 3.03 PREPARATION

#### A. Physical Layout

1. Locations on Drawings are diagrammatic and approximate only and shall be changed and adjusted as necessary and as directed by the District to meet existing conditions and obtain complete water coverage.
2. Prior to installation, the Contractor shall stake out points of connection, power connections to controllers, location of mainlines, valve groupings and obtain review by the District before installation. The District prior to installation shall approve all layouts in writing. If equipment is incorrectly located without said approval, it is the Contractor's responsibility to relocate it as per the District's directions without additional cost.
3. Prior to installation in Turf Fields, the Contractor shall stake out points of connection to main line, location of mainlines, valves groupings and sprinkler heads that define the layouts of the Turf Fields and obtain review by the District before installation.
4. The Contractor shall install and extend the system as shown on the Drawings, and as necessary to carry out the intent of the Drawings and Specifications.

### 3.03 WATER, ELECTRICAL AND TELEPHONE SERVICES

#### A. Water Supply

1. Coordinate with the District the irrigation water supply point of connection as indicated on the Drawings. Field verify connection location and size. The contractor is responsible for any changes caused by actual site conditions. Notify the District of any discrepancies prior to beginning construction.

#### B. Electrical Supply

1. Contractor shall provide all materials and connections to supply electrical power to the irrigation controller(s) and other electrical components as needed.
2. Connection shall be made at approximate location(s) as indicated on the Drawings. The Contractor is responsible for minor changes caused by actual site conditions and for the coordination of all electrical service connections to the controllers.
3. A licensed Electrical Contractor shall perform electrical work. Materials and workmanship for electrical service shall conform to the latest edition of the National Electric Code and local codes, ordinances and governing authorities having jurisdiction.

### 3.04 INSTALLATION

#### A. Trenching

1. Dig trenches straight and support pipe continuously on bottom of trench. Lay pipe to an even grade. Trenching excavation shall follow layout indicated on the Drawings and as noted.
2. Provide for twenty-four (24) inches cover for all pressure lines. Contractor shall be responsible to review Grading Plan to control depth of mainline.
3. Provide eighteen (18) inches cover for rotor and sprinklers on non-pressure lines.
4. Provide for a minimum of twelve (12) inches cover for drip manifolds on non-pressure lines.
5. Provide for twenty-four (24) inches cover for all control wiring.
6. Provide twenty-four (24) inches of cover for all pressure lines, non-pressure lines and control wiring under auto traffic areas.
7. Trench width shall be as needed to provide minimum horizontal clearance between pipes and minimum of four (4) inches of clearance between edge of pipes and edges of trench.
8. No pipe shall be laid directly over another pipe.

#### B. Laying and Jointing Geotextile

1. Placed geotextile directly on prepared subgrade in the trench to conform loosely to the shape of the trench. The geotextile shall be laid flat, but not stretched on the soil, avoid folds and creases.
2. Overlap geotextile side-to-side minimum one and one half (1-1/2) feet. Apart from the one longitudinal overlap no longitudinal joints shall be permitted.
  - a. Curves may be accomplished by folding or cutting the fabric to conform to the curve.
  - b. Staple overlap at four (4) foot longitudinal intervals using six (6) inch galvanized U-shaped landscape pins.
3. Successive sheets shall be overlapped to form transverse field splices. The splices shall have a minimum overlap of 500 mm and shall be anchored with securing pins to ensure this required overlap is maintained. Alternatively, sewn joints will be accepted subject to the approval of the Landscape Architect.
4. Where outlet pipe passes through the geotextile, a separate piece of geotextile of sufficient size shall be wrapped around the pipe and flared against the side of the geotextile wrapped pipe.

### C. Backfilling

1. Excavate bottom of trench to uniform grade to achieve stable trench conditions and satisfactory compaction of foundation or bedding materials. Pipes must have firm, uniform bearing for the entire length of each pipe line. Wedging or blocking of pipe will not be permitted
2. Place Geotextile to prevent particle migration from the in-situ into open graded embedment materials.
3. Place sand backfill six (6) inches in depth below the pipe and compact to 85 percent of the maximum dry density determined according to ASTM D 698.
4. Manually spread sand backfill around the pipe to provide uniform bearing and side support when compacted. Perform placement and compaction directly against the undisturbed soils in the trench sidewalls.
5. Place sand backfill six (6) inches in depth above the pipe and compact by at least two passes manual tamping to 85% relative compaction. Ponding or jetting methods will not be permitted.
6. Backfill lateral lines with approved backfill material. Backfill material shall be free from organic materials, large clods of earth or rocks larger than three (3) inches in diameter, trash, debris, rubbish, broken cement, asphalt material or other objectionable substances.
7. If settlement occurs and subsequent adjustments in pipe, valves, sprinklers heads, lawn or planting, or other construction are necessary, the Contractor will make all the required adjustments at Contractor's expense.

### D. Trenching and Backfilling Under Paving

1. Trenches located under areas where paving, asphaltic concrete or concrete shall be installed, shall be backfilled with sand, a layer six (6) inches below the pipe and six (6) inches above the pipe and compacted in layers to 85% compaction, using manual or mechanical tamping devices. All trenches shall be left flush with the adjoining grade. The Contractor shall set in place; cap and pressure test all piping under paving prior to the paving work.
2. Generally piping under existing walks is done by jacking, boring or hydraulic driving, but where any cutting or breaking of sidewalks and/or concrete is necessary, it shall be done and replaced by the Contractor as part of the Contract cost. Permission to cut or break sidewalks and/or concrete shall be obtained from the District in writing. No hydraulic driving shall be permitted under concrete paving.

### E. Sleeving

1. Sleeving shall be installed for irrigation pressure main line pipe, non-pressure lateral pipe and electrical wiring that crosses pavement, walkways, paths, mow curbs, concrete, and other hardscape elements as needed whether shown on drawing or not.
2. Install irrigation and electrical sleeving as needed whether indicated on the Drawings. Contractor shall coordinate the installation of sleeving with the work of other trades. Sleeving shall extend a minimum of six (6) inches past hardscape.
3. Sleeves shall be sized to easily accommodate piping and/or control wiring as called for in the drawings leaving a minimum of 25% void space inside sleeve.
  - a. The contractor shall be responsible to verify sleeving sizes based on field verification of pipe and wire crossings.
4. Separate sleeves shall be provided for:
  - a. Main line and lateral piping.
  - b. 120V electric service
  - c. Irrigation 2-wire decoder cable
  - d. Irrigation ground wire.
5. Sleeves shall have both ends capped during installation to prevent dirt and debris from entering the sleeve.
6. Identify location of sleeve ends from two permanent points of reference and mark on record drawings.
7. When utilizing existing sleeving, the contractor will remove existing pipe and wire and remove debris from sleeve prior to installing new irrigation components.

#### F. PVC Pipe

1. Routing of irrigation pipe as indicated on the Drawings is diagrammatic. Install lines, stub outs and valve manifolds to conform to the details shown on the drawings.
2. Install irrigation main line a minimum of five (5) feet from tree locations to avoid conflict with mature rooting systems.
3. Install no multiple assemblies on plastic lines. Provide each assembly with its own outlet.
4. Changes in directions and depth on irrigation main line shall be made with 45° bends. No 90° bends shall be used.
5. Install all assemblies specified herein in accordance with respective detail. In absence of detail Drawings or specifications pertaining to specific items required to complete work, provide shop drawing in accordance with best standard practice to Landscape Architect for review and approval prior to installation.



6. PVC pipe and fittings shall be thoroughly cleaned of dirt, dust and moisture before installation. Installation shall be as recommended by the pipe and fitting manufacturer.
7. PVC pipe shall be installed so that there will be a small amount of excess length in the pipe to compensate for contraction and expansion of the pipe. This shall be accomplished by "snaking" the pipe in the trench during installation.
8. Center load pipe with small amounts of backfill to prevent arching and slopping under pressure. Leave joints exposed for inspection during testing.
9. No water shall be permitted in the pipe until inspections have been completed and a period of at least 24 hours has elapsed for solvent weld setting and curing.
10. Plastic to metal connections shall be made with plastic male adapters and female metal adapter, hand tightened, plus one turn with a strap wrench. Teflon tape or approved equal shall be used on all threaded PVC to metal joints.
11. Gasket Joint: Use gasket lube as recommended by pipe manufacturer.
12. Solvent Weld Joint: The Contractor must make solvent weld joints with non-synthetic bristle brush in the following sequence:
  - a. Apply a liberal, even coat of purple PVC primer to the pipe and fitting immediately before applying the solvent.
  - b. Apply a liberal even coat of solvent to the inside of the fitting and then to the outside of the pipe, making sure that the coated area is equal to the depth of the fitting socket. Section 20 - Landscaping 20.15 1/1/16 3.
  - c. Insert the pipe quickly into the fitting and turn the pipe approximately one-quarter (1/4) turn to distribute the solvent and remove air bubbles. Hold the joint for approximately fifteen (15) seconds so the fitting does not push off the pipe.
  - d. Use a clean rag and wipe off all excess solvent.
  - e. To prevent disturbing the last completed joint, the pipe must not be twisted when making subsequent joints.
  - f. Allow at least fifteen (15) minutes setup time for each welded joint before moving.
13. Threaded joints shall be wrapped with Teflon tape as per manufacturer's instructions.
14. Flush all debris out of pipe prior to installing valves and heads.

15. Install detectable marking tape 12” above main line pipe along the entire length of the main line run, including main line branches and irrigation crossover sleeves.
16. When utilizing existing main line, make connections to new main line using long-barrel self-restraint repair couplers.

#### G. Line Clearance

1. Irrigation lines shall have a minimum horizontal and vertical clearance of four (4) inches from each other. Parallel lines shall not be installed directly over one another.
2. Horizontal and vertical clearance of irrigation lines from lines from other trades shall be as per local codes and regulations.
3. Line clearances shall be inspected and approved by the District prior to backfilling trenches.

#### H. Joint Restraint System

1. Install Joint Restraint System as per details and manufacturer’s specifications.

#### I. Gate Valves

1. Install as gate valves as per details and manufacturer's specifications.
2. Install where shown on Drawings. Locate, in valve boxes, twelve (12) inches from walk, curb, header board, etc., for easy access unless otherwise noted on drawings.
3. Install one gate valve per valve box. Provide extension units as required as per details. Install valve boxes in shrub planting areas whenever possible.
4. Install a T. Christy I.D. water quality tag on all gate valves. Attach the identification tags to the valve stem using a nylon cable tie.
5. It is the intent of the irrigation design to minimize valve boxes within the turf field area. When valve boxes are required to be installed in the soccer field, the contractor shall submit proposed locations to Landscape Architect to review and approve prior to installation

#### J. Quick Coupler Valve

1. Install as quick coupler valve as per details and manufacturer's specifications.
2. Install where shown on Drawings. Locate, in valve boxes, twelve (12) inches from walk, curb, header board, etc., for easy access unless otherwise noted on drawings.

3. Install one quick coupler valve per valve box. Provide extension units as required as per details. Install valve boxes in shrub planting areas whenever possible.
4. Install a T. Christy I.D. water quality tag on all gate valves. Attach the identification tags to the valve stem using a nylon cable tie.
5. It is the intent of the irrigation design to minimize valve boxes within the turf field area. When valve boxes are required to be installed in the turf field, the contractor shall submit proposed locations to Landscape Architect to review and approve prior to installation

#### K. Electric Remote-Control Valves

1. Install with 2-wire decoder and pressure regulator as per details and manufacturer's specifications.
2. Install where shown on Drawings. Locate valve boxes twelve (12) inches from, and perpendicular to walk, curb, header board, etc., for easy access.
3. Install one (1) remote control valve per valve box as per detail. Provide extension units as required so as valve is protected by adjacent native soil.
4. Install valve boxes in shrub planting areas wherever possible.
5. Provide twenty-four (24) inch expansion loop at all electrical connections wrapped neatly along interior wall of valve boxes.
6. Install a T. Christy I.D. tags on all valves identifying the controller and station number of the valve and water quality. Attach the identification tags to the valve stem using a nylon cable tie.
7. It is the intent of the irrigation design to minimize valve boxes within the turf field area. When valve boxes are required to be installed in the turf field, the contractor shall submit proposed locations to Landscape Architect to review and approve prior to installation

#### L. Master Valve and Flow Sensor

1. Install shall be in accordance with the corresponding detail in the Standard Drawings.
  - a. Install with a minimum upstream and downstream length of straight pipe per manufacturer's specifications
2. Install with 2-wire decoder and sensor decoder per details and manufacturer's specifications.
3. Install a T. Christy I.D. tags on all valves identifying the controller and station number of the valve and water quality. Attach the identification tags to the valve stem using a nylon cable tie.

4. Contractor shall be responsible to calibrate flow sensor per manufacturer's specifications.
  - a. Run flow test on each completed irrigation remote control valve to identify actual field flow using the controller learned flow system capabilities. Contractor shall work with manufacturer's representative as needed to perform accurate flow test.
  - b. Contractor shall use field flow test results to schedule flow zones on controller system as part of schedule programming.

#### M. Automatic Controller

1. Install as per manufacturer's specifications, drawings and details.
2. Controller shall be securely mounted in the location as indicated on the Drawings or approved by the District in such a manner that all normal operations can be conveniently made by the operator.
3. The Contractor shall properly ground the controllers per contract documents and in accordance with N.E.C and local codes and as per manufacturer's specifications.
4. The Contractor shall take all decoder cables to the controller and make all required connections for their installation.
5. Contractor shall be responsible to program controller per contract documents. Run flow test for each control valve and use to program flow zones. Schedule remote control valves to maximize system pump efficiency and minimize system run times.
  - a. The irrigation schedule provided per contract documents shall be used as a guide only. It is the Contractor's responsibility to adjust controller watering schedules based on actual site conditions including but not limited to plant species, soil conditions, slope, weather, irrigation application method, etc.
  - b. At no time shall the contractor allow the pooling or runoff of water on the site due to length of irrigation cycle. Adjust run and soak times as needed to avoid pooling of water and runoff.

#### N. 2-Wire Decoder Cable

1. Install 2-wire decoder cable in conduit. Route along supply line piping wherever practical.
2. No cable splices shall be allowed between controller and valves and between valve to valve that are less than 500 feet apart.

3. Use one waterproof splice pack per splice. Indicate all splices on the “As-built” plan. Cable splice connections shall be per manufacture specifications.
4. Where control wires pass under paving, they shall pass through a Schedule 40 PVC sleeve.
5. Ground decoder 2-wire cable per manufacturer’s specifications.
6. Install twenty-four (24) inch service loop neatly coiled inside the perimeter of the valve box to allow for valve, decoders and splices to be pulled to surface for servicing. Coil service loop neatly along inside wall of valve box.

O. Conduit

1. PVC Schedule 40 conduit with 2-wire decoder cable shall be installed as shown on plans and adjacent to irrigation mainline wherever possible.
2. The ends of the conduits, whether shop or field cut, shall be reamed to removed burrs and rough edges. Cuts shall be made square and true.
3. Install conduit couplers onto pipe ends when in direct contact with 2-wire decoder cable.
4. The ends of the conduit shall be capped until the pulling of wiring is started. Conduit shall be free of soil and debris.
5. Conduit bends, except factory bends, shall have a radius of not less than six times the inside diameter of the conduit.
6. Install a one-quarter (1/4) inch polypropylene pull tape in conduit. Loop pull tape into each valve box and splice box.
7. When utilizing existing conduit, the contractor will remove existing control wire, vacuum debris from conduit prior to installing new 2-wire cable through existing conduit. Install electric boxes as shown and as needed to facilitate installing new 2-wire cable in existing conduit.

P. Controller Earth Ground

1. Install earth grounding in accordance to Article 250 of the National Electrical Code and as per manufacturer’s specifications.
2. Ground rods shall be driven a minimum of ten (10) feet into the ground in a vertical or oblique position. The angle of the rod relative to the vertical shall be no more than 45-degree angle.
3. Ground plates shall be installed in a horizontal position a minimum of 30” below ground level.

4. Grounding conductors shall be installed to avoid sharp bends. When bends are required to pass through buildings and equipment, they must have a minimum angle of 90° and a minimum radius of 8", which equates to a standard 1-1/2" PVC sweep conduit elbow.
5. Ground rods shall be installed in soils with minimum moisture content of 15% within the sphere of influence. Use supplemental irrigation as needed to meet this requirement.
6. Use "Earth Contact Materials" as needed and as per manufacturer's specifications to obtain desired soil resistivity.
7. Use permanent welded connections to connect grounding conductors to ground rods. Solder shall not be used for this connection.
8. The grounding grid shall be field tested to verify that resistance readings are no more than 10 ohms.

#### Q. 2-Wire Decoder Earth Ground

1. Install 2-wire decoder system earth grounding in accordance manufacturer's specifications.

#### R. Valve Boxes

1. Valve boxes installed in decomposed granite areas shall be tan colored; valve boxes installed in planter areas shall be green colored.
2. Install valve boxes in shrub planter areas wherever possible.
3. Install valve boxes in groupings as shown to facilitate long-term maintenance. Contractor to stake out dimensions of each valve box bank location for review and approval by Landscape Architect prior to installation.
4. Install valve boxes as per details unless otherwise noted on plans.
5. It is the intent of the irrigation design to minimize valve boxes within the soccer field area. When valve boxes are required to be installed in the soccer field, the contractor shall submit proposed locations to Landscape Architect to review and approve prior to installation

#### S. Electric Pull Boxes

1. Pull boxes must be installed at the following locations:
  - a. At all 2wire decoder cable splices, except splices made in valve boxes.
  - b. At every 5<sup>th</sup> bend or at intervals not to exceed one hundred and fifty (150) feet (150') along any 2wire decoder cable path, whichever comes first.

- c. Within five feet (5') of irrigation controllers or within five feet (5') of cabinets housing one (1) or more controllers.
  - d. At conduit stub outs.
  - e. At the ends of conduit crossover sleeves. Include eighteen-inch (18") of 2-wire decoder cable loop along inside of pull box.
  - f. At other locations shown on the Plans.
  - g. The tops of all pull boxes must be flush with the surrounding finished grade.
  - h. When utilizing existing conduit to install new 2-wire decoder cable, Contractor shall be responsible to install electric pull boxes as needed to facilitate installation.
  - i. It is the intent of the irrigation design to minimize electric boxes within the turf field area. When electric boxes are required to be installed in the turf field, the contractor shall submit proposed locations to Landscape Architect to review and approve prior to installation.
2. When approved by the District, the Contractor may install additional pull boxes to facilitate the work. Additional pull boxes installed for the contractor's convenience will be at the Contractor's expense.

#### T. Irrigation Heads

- 1. Install irrigation heads as detailed on the Drawings. Irrigation heads to be installed in this work shall be as per approved submittals.
- 2. Irrigation heads shall be installed plumb and vertical to finish grade unless otherwise noted on plan.
- 3. Replace all clogged nozzles with new nozzles.
- 4. Adjust rotor, rotator arcs and radii as needed to prevent overspray onto hardscapes, walkways, buildings, etc.
- 5. Spacing of heads shall not exceed the maximum indicated on the Drawings. In no case shall the spacing exceed the maximum recommended by the manufacturer. Adjust radii to obtain head to head coverage as per manufacturer's specifications.
- 6. Swing joints shall be in accordance with the details and approved submittals.
- 7. Swing joints for heads shall be the same size as the inlet opening of the sprinkler body.
- 8. Add additional heads as needed to provide head to head coverage with no additional cost to the District.

#### U. Irrigation Head Replacement – Turf Field

1. The contractor shall remove existing irrigation heads, clean and return to District per drawing notes.
2. Cap existing swing joint risers to prevent dirt and debris from entering irrigation system piping.
3. Flag or mark by approved methods location of irrigation head to be replaced.
4. After finished grade is established in soccer fields, install new rotors per contract documents.
5. Flush irrigation lines clear of dirt and debris prior to installing nozzles.
6. Install nozzles and adjust radii and arc as per plan.
7. Contractor shall be responsible to make final head layout adjustments as needed based on actual field conditions at no additional cost to District.

#### 3.05 SYSTEM ADJUSTMENT

- A. The Contractor shall flush and adjust all irrigation heads for optimum performance and to prevent over-spray onto walks, windows, roadways, and buildings as much as possible.
- B. If it is determined that adjustments in the irrigation equipment shall provide proper and more adequate coverage, the Contractor shall make such adjustments after written approval by the District. Adjustments shall include changes in head locations, nozzle size and degrees of arc as required without additional contract costs.
- C. If it is determined that any irrigation equipment is improperly installed, the contractor shall reinstall the equipment to conform to construction documents.
- D. All irrigation heads shall be set perpendicular to finished grades unless otherwise designated on the Drawings.

#### 3.06 TESTING OF THE IRRIGATION SYSTEM

The Contractor shall request the presence of the District at least two (2) working days in advance of testing or as noted below.

##### A. Existing Main Line Pressure Test in Turf Fields - BASELINE

1. Contractor shall perform baseline pressure test on existing main line in soccer field to be retained and protected prior to start of work.
  - 1.) Contractor shall provide a proposed method to perform pressure test based on requirements listed here within to Landscape Architect for approval prior to start of work.



2.) Contractor shall comply to contract document requirements for Main Line Pressure Test.

B. Main Line Pressure Test

1. Except for non-rigid pipelines and lateral irrigation lines, pressure testing for leakage must be performed on all supply lines installed by the Contractor.
2. Pipelines must be tested in place and all open ends of the pipeline and fittings must be plugged or capped prior to testing.
3. The Contractor must notify the District at least twenty-four (24) hours prior to performing any pressure test. Pressure test must be performed only between the hours of 8:00 a.m. and 5:00 p.m. except that no pressure tests shall be made on Saturdays, Sundays, or legal holidays unless otherwise approved in writing by the District.
4. Test all pressure lines and connections to remote control valves and gate valves under hydrostatic pressure of one hundred and twenty (120) pounds per square inch.
5. Pipelines to be tested must be filled with water, and a pressure gauge must be connected to the pipeline. The pipe must then be placed under a pressure of one hundred twenty (120) pounds per square inch, after which the source of pressure must be cut off, leaving the line under the required pressure.
6. The pressure gauge must be calibrated from zero (0) to two hundred (200) pounds per square inch (psi) in five (5) pound increments and must be accurate within a tolerance of two (2) pounds.
7. The Contractor must provide the necessary pump and equipment required for this test.
8. The pipeline must be tested under the required pressure for a period of two (2) hours. The pressure gauge must remain in place until each test period has been completed.
  - a. Leaks that develop in the tested portion of the system must be located and repaired after each test period when a drop of more than two (2) pounds is indicated by the pressure gauge when testing pipe over one hundred feet (100') in length. There must be no pressure drop permitted when testing pipe from one (1) foot to one hundred feet (100') in length.
  - b. After such leaks have been repaired, the two (2) hour pressure test must be repeated and additional repairs made until pressure test passes.
9. If testing by means of water pressure, air must be expelled from the pipe prior to testing.

10. Tests on pressure lines must be completed prior to backfilling; however, sufficient backfill must be placed in trenches between fittings to insure the stability of the line under pressure.
  - a. In all cases, fittings and couplings must be open to visual inspection for the full period of the test. No testing shall be done until the last solvent welded joint has had twenty-four (24) hours to cure.
11. All hydrostatic tests shall be made only in the presence of the District. No pipe shall be backfilled, except for center loading, until it has been observed, tested and approved in writing by the District.
  - a. Should any work be covered up before such observation and tests are completed, the Contractor shall, at his own expense, uncover the work; and after it has been observed, tested and approved, he then shall make all repairs with such materials as required to restore all work disturbed to original and proper condition.
12. Contractor must disinfect potable water lines according to AWWA standards.

#### C. Repairs and Coverage

1. All leaks that develop and all defective material in any portion of the irrigation system installed by the Contractor must be repaired or replaced by the Contractor.
2. The entire system must be checked and, if necessary, adjusted for uniform and complete coverage after installing the sprinklers.
3. The risers for sprinklers on slopes must be set approximately perpendicular to the slope. Each series of sprinklers must be installed, and test operated. Nozzles of all sprinklers and bubblers must be adjusted for proper rate of flow and coverage. Sprinklers and/or bubblers must be relocated as required to produce uniform coverage.
4. A coverage test shall be performed after the irrigation system is completed, an irrigation water audit has been performed and recommended adjustments to the irrigation system have been made.
5. Furnish all materials and perform all work required to correct any inadequacies of coverage due to deviations from the Drawings or where the system has been willfully installed as indicated on the Drawings, when it is obviously inadequate without bringing this to the attention of the District.
6. The sprinkler coverage test shall be completed and approved before landscape material is planted.

#### 3.07 TEMPORARY REPAIRS

- A. The District reserves the right to make temporary repairs as necessary to keep the irrigation system in operating condition. The exercise of this right shall not relieve

the Contractor of his responsibilities under the terms of the guarantee as herein specified.

### 3.08 IRRIGATION WATER AUDIT

- A. The Contractor shall conduct an Irrigation Water Audit using a Certified Irrigation Auditor after the final field observation has been completed and all irrigation components are installed in accordance with the plans and specifications and the irrigation system is accepted by the District.
- B. The Irrigation Water Audit shall be conducted in accordance with the latest California Code of Regulations, Title 23, Division 2, Chapter 2.7, Model Water Efficient Landscape Ordinance.
- C. Contractor shall incorporate Irrigation Water Audit results while programing Irrigation Controller for specific control zones including but not limited calculations for Zone Flow, Precipitation Rates, Irrigation Efficiency and Distribution Uniformity.
- D. The Irrigation Water Audit shall be included in a binder complete with:
  - 1. Cover Sheet with Location, Date, Owner and Certified Irrigation Auditor contact information.
  - 2. Irrigation System Evaluation Checklist
  - 3. Sprinkler Evaluation Data Sheet for each zone
  - 4. Other information as required by latest California Code of Regulations, Title 23, Division 2, Chapter 2.7, Model Water Efficient Landscape Ordinance.
- E. Contractor shall be responsible to make recommended adjustments to the irrigation system based on Irrigation Water Audit Report, at no additional cost to owner when adjustments required are due to the Contractors installation inaccuracies of irrigation head placement.
- F. Submit Irrigation Water Audit with Close Out Documents.

### 3.09 MAINTENANCE

Provide maintenance as per SECTION 02970 - **LANDSCAPE MAINTENANCE**.

### 3.10 CLEAN-UP

Clean up shall be made as each portion of work progresses. Refuse and excess dirt shall be removed from site. All walks and paving shall be broomed or washed down, and any damage sustained to the work of others shall be repaired to original conditions acceptable to the District.

### 3.11 OBSERVATION PRIOR TO FINAL ACCEPTANCE

- A. The Contractor shall operate each system in its entirety for the District at time of final observation. Any items deemed not acceptable shall be reworked to the complete satisfaction of the District.

- B. The Contractor shall show evidence to the District that the District has received all accessories, charts, Record Drawings and equipment as required before final observation can occur.

### 3.12 INSPECTION SCHEDULE

- A. The Contractor shall be responsible for notifying the Landscape Architect in advance for the following observations according to the time indicated:
  - 1. Staking points of connection, power connections to controllers, location of irrigation main lines, remote control valves– two (2) working days
  - 2. Staking of laterals and irrigation heads - two (2) working days
  - 3. Sprinkler head coverage test and finish grade review prior to planting - two (2) working days
- B. No site visits shall commence without all items noted in previous Observation Reports, either completed or remedied, unless such compliance has been waived. Failure to accomplish punch list tasks or prepare adequately for desired observations shall make the Contractor responsible for reimbursing the Landscape Architect at his current billing rates per hour, plus transportation costs.
- C. Normal progress observations shall be requested by the Contractor from the Landscape Architect as per observations listed in specifications SECTION 02905 - **LANDSCAPE INSTALLATION**.
- D. No final observation shall commence without Record Drawings. In the event the Contractor calls for an observation without Record Drawings, without completing previously noted corrections or without preparing the system for observations, he shall be responsible for reimbursing the District at the hourly rate in effect at the time of the observation (plus transportation costs) for the inconvenience. No further observations will be scheduled until this charge has been paid.

### 3.13 FINAL TEST

A final test of the irrigation system shall be made in the presence of the Landscape Architect at the end of the landscape maintenance period. The system will be accepted only when the entire system performs as set forth on the drawings and specifications and all contract documentation has been received and approved.

#### A. CLOSE OUT DOCUMENTS

- G. Record Drawings; The Contractor must maintain neat and accurate record drawings in conformance with these specifications.
  - 1. Drawings shall be subject to the inspection of the District at all times and must be kept current with all work instructions, change orders, substitutions, and construction adjustments shown thereon and initialed by the inspector.

2. Immediately following the start of the Plant Establishment Period, the Contractor must submit to the District one (1) full size set of Record Drawings.
    - a. Record drawings will be reviewed by the Landscape Architect and shall be returned to the Contractor with comments for revisions, if necessary.
    - b. Notes and dimensions must be drafted on the record drawings in a neat and legible manner. Drawings must be of sufficient quality to allow further black and white reproduction of the original to be clear.
    - c. Illegible, inaccurate, or incomplete record drawings will be returned to the Contractor for revisions.
  3. The work will not be formally accepted until the Record Drawings are approved by the Landscape Architect. Upon approval by the Landscape Architect, two (2) bond sets of record drawings must be delivered to the District in good and acceptable condition prior to final acceptance of the Work.
- H. Controller Charts: The Contractor must provide two (2) sets of 11" x 17" charts for each controller. One copy must be placed on the inside of the controller enclosure door. The second copy must be provided to District maintenance personnel.
1. The base plan for the controller charts must be the approved irrigation Record Drawings.
  2. Each controller chart must show the as-built condition of the area controlled by the automatic controller.
  3. All symbols must be readable at the final reduced size.
  4. The controller chart must include:
    - a. Connections to existing water lines (point-of-connections).
    - b. Location of backflow preventer(s) and controller(s)
    - c. Routing of pressure lines and sleeves (show typical station offset and/or dimensions on record drawings)
    - d. Routing of irrigation conduit and pull boxes
    - e. Locations of remote control valves, gate valves, and quick coupling valves (show station offset and/or dimensions on record drawings)
    - f. Other items as directed by the District.
  5. The chart must be color-coded to easily identify each valve and the respective hydrozone area it irrigates.

6. When completed and approved, the chart must be hermetically sealed between two (2) pieces of 10 mil plastic, minimum.
  7. Each chart must be completed and approved prior to final inspection of the irrigation system.
- I. Operation and Maintenance Manual: The Contractor must provide two (2) binders complete with the following information for all irrigation components installed on project:
1. Operating instructions
  2. Parts list and breakdown diagram
  3. Complete copy of “Approved” irrigation submittals
  4. Controller charts and irrigation scheduled for plan establishment and mature water requirements.
  5. Irrigation audit report.
  6. Acceptance letter that Owner has received “Equipment to be Furnished” and “Training” from contractor as per contract documents.
  7. Certificate of Completion
  8. Written guarantee and certificate of insurance from the Contractor.
- D. Equipment to be Furnished: The Contractor must deliver all tools and equipment called for on the plans and described herein to the District.
1. Two (2) key sets for locking irrigation controller.
  2. Two (2) valves of each size and type used.
  3. Two (2) decoders of each type used.
  4. Five (5) rotors of each type used.
  5. Five (5) pop up sprinklers of each type used.
  6. Five (5) complete nozzle sets of each type used.
  7. Five (5) bubblers of each type used.
  8. One Hundred (100) feet of drip tubing for each type used.
  9. Ten (10) drip emitters for each type used

10. Two (2) sets of special tools required for removing, disassembling and adjusting each type of sprinkler used.
  11. Two (2) sets of special tools required for removing, disassembling and adjusting each type of joint restraint used.
  12. Two (2) lock and key sets for controller enclosures (keyed as per District specifications)
  13. Two (2) quick coupler keys and matching hose swivels
  14. Two (2) 60" isolation valve opening keys
  15. Four (4) security keys for locking valve boxes
  16. Two (2) hand-held remote-controls transmitters and cases
  17. Two (2) hand-held 2-wire decoder programmers
- E. System Walkthrough and Training with District: After the system has been installed and approved and close out documents have been received by the District, the Contractor shall schedule an onsite system walkthrough and training with the District. The system walkthrough will be no less than 2 hours and shall cover the following:
- a. Operation of controller system including programming of features and alert systems.
  - b. Operation of hand held remote for remote operation of field valves include testing of field valves.
  - c. Operation of field decoder programmer including programming sample decoder.
  - d. Calibration of flow sensor and running flow test.
  - e. Maintenance requirements for valves, sprinklers and nozzles.

**END OF SECTION**

## SECTION 02905

### LANDSCAPE INSTALLATION

#### **PART I - GENERAL**

##### 1.01 CONDITIONS

- A. The general provisions of the Contract, including General and Supplementary Conditions and General Requirements (if any) apply to the work specified in this Section.

##### 1.02 SCOPE OF WORK

- A. Furnish all labor, material, equipment and services necessary to provide all landscape work, complete in place, as indicated on Drawings and specified herein.

Work specified in this Section, but is not limited to the following:

1. Soil preparation
  2. Decomposed Granite Paving
  3. Planting
  4. Fertilizer
  5. Tree Staking
  6. Sodding
  7. Clean-up
- B. Related Work Specified in Other Sections
    1. SECTION 02260 - **LANDSCAPE GRADING**
    2. SECTION 02811 - **IRRIGATION SYSTEM**
    3. SECTION 02970 - **LANDSCAPE MAINTENANCE**

##### 1.03 QUALITY ASSURANCE

- A. Source Quality Control
  1. Submit documentation to the Owner at least sixty (60) days prior to start of planting that all plant material has been ordered. Arrange procedure for observation of plant material with the Owner at time of submission.



2. Plants shall be subject to observation and approval of the Owner upon delivery for conformity to specifications. Such approval shall not impair the right of observation and rejection during progress of the work.

#### 1.04 PRODUCT DELIVERY, STORAGE AND HANDLING

##### A. Delivery

1. The Contractor, upon request by the Owner, shall provide receipts, delivery tickets, load tickets, etc. of all items delivered to the job site to verify products and total quantities.
2. Deliver fertilizer to site in original unopened containers bearing manufacturer's guaranteed chemical analysis, name trademark, and conformance to State Law.
3. Deliver plants with legible identification labels.
  - a. Label trees, evergreens, bundles of containers of like shrubs, or ground cover plants.
  - b. State correct plant name and size indicated on plant list.
  - c. Use durable waterproof labels with water-resistant ink which will remain legible for at least sixty (60) days.
6. Protect plant material during delivery to prevent damage to root ball or desiccation of leaves.
7. The Contractor shall notify the Owner forty-eight (48) hours in advance of delivery of all plant materials for observation either at the site or at the local nursery.

##### B. Storage

1. Store plant material in shade and protect from weather.
2. Maintain and protect plant material. Contractor shall be responsible for replacement of material due to theft or vandalism.

##### C. Handling

1. Do not drop plant materials.
2. Do not pick up container plant material by stems or trunks.

#### 1.05 JOB CONDITIONS

- A. Planting: Perform actual planting only when weather and soil conditions are suitable in accordance with locally accepted practice.
- B. Scheduling: Install trees, shrubs, and ground cover plant material before lawn areas are installed and after irrigation system is operable.
- C. Protect work and materials from damage due to construction operations by other contractors and trades and by vandalism. Maintain protection during installation.

#### 1.06 SAMPLES AND TESTS

- A. The Owner reserves the right to take and analyze samples of materials for conformity to specifications at any time. The Contractor shall furnish samples upon request by Owner. Rejected materials shall be immediately removed from the site at Contractor's expense. Cost of testing of materials not meeting specifications shall be paid by the Contractor.
- B. Provide horticultural soils report of existing landscape soil after rough grade and submitted topsoil including information on soil texture, filtration rate, nutrient levels and organic matter. Include recommendation for amendment to be added to existing landscape soil and topsoil to mitigate any deficiencies.

#### 1.07 GUARANTEE AND REPLACEMENT

- A. Guarantee: All plant material and other materials installed under the Contract shall be guaranteed against any and all poor, inadequate or inferior materials and/or workmanship for a period of one (1) year. Any plant found to be dead or not in a satisfactory or healthy condition due to faulty materials, workmanship, or improper maintenance as determined by the, shall be replaced by the Contractor at his expense.
- B. Replacement: Any materials found to be dead, missing or not in a satisfactory or healthy condition during the Contract period shall be replaced immediately. The Owner shall be the sole judge as to the condition of material. Material to be replaced within the guarantee period shall be replaced by the Contractor within fifteen (15) days of written notification by the Owner. All replacement materials and installation shall comply with the Drawings and Specifications.

### **PART 2 - PRODUCTS**

#### 2.01 GENERAL

All materials shall be of standard, approved and first-grade quality and shall be in prime condition when installed and accepted. Any commercially processed or packaged material shall be delivered to the site in the original unopened container bearing the manufacturer's guaranteed analysis. The Contractor shall supply the Owner with a sample of all supplied materials accompanied by analytical data from an approved laboratory source illustrating compliance of bearing the manufacturer's guaranteed analysis.

#### 2.02 PRODUCTS

A. Soil Conditioner

1. Gro-Power Plus: Humus (bacteria included based fertilizer and soil conditioner with soil penetrant shall consist of the following percents by weight:

- 5 % nitrogen
- 3 % phosphoric acid
- 1 % potash
- 50 % humus
- 15 % humic acids

B. Soil Amendment

1. Nitrogen Stabilized Shavings: 0.56 to 0.84% N based on dry weight for fir bark mulch, treated with relative form of nitrogen (NH<sub>3</sub>).
  - a. Particle Size: 95% - 100% passing 6.35 mm standard sieve.  
80% - 100% passing 2.33 mm standard sieve.
  - b. Salinity: The saturation extract conductivity shall not exceed 3.5 mil/centimeter at 25 degrees (25°) centigrade as determined by saturation extract method.
  - c. Iron Content: Minimum 0.08% dilute acid soluble Fe on dry weight basis.
  - d. Ash: 0 - 6.0% (dry weight)

C. Fertilizer

1. Fertilizer: Shall be Gro-Power Plus (bacteria included) with soil penetrant and shall consist of the following percents by weight:

- 5% nitrogen
- 3% phosphoric acid
- 1% potash
- 50% humus
- 15% humic acid

2. Fertilizer: Shall consist of the following percents by weight:

- 6% nitrogen
- 20% phosphoric acid
- 20% potash

3. Ammonia Sulfate: Shall consist of the following percents by weight:

- 21% nitrogen
- 0% phosphoric acid
- 0% potash

4. Turf Starter Fertilizer: Shall consist of the following percents by weight:
  - 16% nitrogen
  - 6% phosphoric acid
  - 8% potash
5. Planting Tablets: Slow-release 21 gram tablets as manufactured by Agriform or approved equal, containing the following percent-ages of nutrients by weight:
  - 20 % nitrogen
  - 10 % phosphoric acid
  - 5 % potash
6. Inoculum: Shall be Grow-Life Mycorrhizal Inoculum / Soil Conditioner

#### D. Imported Soil

1. Imported soil shall be obtained from a source approved by the Landscape Architect.
2. Imported topsoil shall be of friable sandy-loam texture free of refuse, roots, heavy or stiff clay, rocks, sticks, brush or other deleterious materials. Topsoil acidity range (pH) shall be between 6.5 to 7.5 containing a minimum of 4% and a maximum of 25% organic matter. Topsoil shall be free of all noxious weeds. Topsoil samples and analysis shall be submitted to the Landscape Architect for approval prior to delivery of any soil to the project site. Should the Landscape Architect reject any portion of the delivered soil, for any reason, it shall be removed immediately at no cost to the Owner.
3. Topsoil, if rejected, shall be amended to meet specifications. Submit amended topsoil analysis to Landscape Architect for verification.
4. See also Landscape Grading Section 02260.

#### E. Plant Material

1. The plant material indicated on the Drawings by the listed names shall conform to "Standardized Plant Names", second edition, except for names not covered there in, the established customs of the nursery trade is followed. All plants shall be true to name, above one of each bundle or lot shall be tagged with the name and size of the plant, in accordance with the standards of practice recommended by the American Association of Nurserymen. All plant materials shall meet the specifications of Federal, State and County laws, requiring observation for plant diseases and insect infestations. Plants shall be symmetrical, typical for variety and species, sound, healthy, vigorous, free from plant diseases, insect pests or other eggs, and shall have healthy, normal root systems, while filling their containers, but not to the point of being root bound. Use only plant materials that are first class representative of the species and cultivars specifies and that

conform to all State and local laws governing the sale, transportation, and observation of plant materials. Plants shall have straight, single trunks, unless otherwise specified on the plans. Those specified to be multi-trunk shall have at least three (3) main leaders from the base. Any and all plants that have any encircling roots (not root bound) shall have root balls lightly slashed on a minimum of three (3) sides to stop encircling root growth. The height and spread of all plant materials shall be measured with branches in their normal position. Sizes of plants shall be as stated on the plant list, five and fifteen (5 & 15) gallon can container stock shall have been grown in that container not less than six (6) months, but shall not have been overgrown in the containers so as to have become root bound.

- The size of the plants will correspond with that normally expected for species and variety of commercially available nursery stock or as specified in the Special Conditions or Drawings. The minimum acceptable size of all plants, measured before pruning with the branches in normal position, shall conform with the measurements, if any, specified on the Drawings in the list of plants to be furnished. Plants larger in size than specified may be used with the approval of the Owner, but if the use of larger plants is approved, the ball of earth or spread of roots for each plant will be increased proportionally. Plant material shall conform to the following Specifications for container stock:

SHRUBS

<u>SIZE</u>	<u>TYPE</u>	<u>EXAMPLE</u>	<u>HEIGHT</u>	<u>SPREAD</u>	<u>CALIPER</u>
1 Gal.	low growing	Pitt. tobira - etc.	8-10"	6-8"	
1 Gal.	tall growing	Pitt. eugen. - etc.	10-12"	6-8"	
5 Gal.	low growing	Pitt. tobira - etc.	15-18"	15-18"	
5 Gal.	tall growing	Pitt. eugen. - etc.	24-30"	15-18"	
15 Gal.	low growing	Pitt. tobira - etc.	30-36"	30-36"	
15 Gal.	tall growing	Pitt eugen. - etc.	42-48"	36-42"	

TREES

5 Gal.	slow growing	Quercus - etc.	5-6'	12-18"	1/4 - 1/2"
5 Gal.	fast growing	Euc. - Prunus - etc.	6-7'	12-18"	1/2 - 3/4"
15 Gal.	slow growing	Quercus - Pyrus - etc.	7-8'	24-30"	3/4 - 1"
15 Gal.	fast growing	Euc. - Prunus - etc.	8-10'	30-36"	1- 1 1/4"
24" Box	slow growing	Quercus - Pyrus - etc.	8-10'	3-4'	1 1/2-1 3/4"
24" Box	fast growing	Euc. - Prunus - etc.	10-12'	4-5'	1 3/4-2 1/2"
30" Box	slow growing	Quercus - Pyrus - etc.	12-14'	6-7'	2 1/2 - 3"
30" Box	fast growing	Euc. - Prunus - etc.	12-14'	6-7'	2 1/2 - 3"
36" Box	slow growing	Quercus - Pyrus - etc.	14-16'	8-10'	2 1/2 - 3"
36" Box	fast growing	Euc. - Prunus - etc.	14-16'	8-10'	2 1/2 - 3"
36" Box	fast growing	Euc.- Prunus - etc.	14-16'	8-10'	2 1/2 - 3"

- All plants not conforming to the requirements herein specified, shall be considered defective and such plants, whether in place or not, shall be marked as rejected and immediately removed from the site of the work and replaced with new plants at the Contractor's expense. The plants shall be of the species, variety, size, and condition specified herein or as shown on the Drawings. Under no conditions will there be any substitution of plants or sizes listed on the plans, except with the expressed written approval of the Owner.

4. At no time shall trees or plant materials be pruned, trimmed or topped prior to delivery and any alteration of their shape shall be conducted only with the approval and when in the presence of the Owner and/or as noted on the Planting Specifications.
5. Nursery Grown and Collected Stock
  - a. Plant materials shall conform with the best edition of ANSI Z60.1-1990 American Standard for Nursery Stock.
  - b. Grown under climatic conditions similar to those in locality of project.
  - c. Container-grown stock in vigorous, healthy condition, not root bound or with root system hardened off.
  - d. Use only linear stock plant material which is well established in removable containers or formed homogeneous soil sections.
6. Ground Cover: Ground cover plants shall be grown in flats, peat pots, or taken as cuttings, as indicated on the plans. Flat grown plants (rooted cuttings) shall remain in those flats until transplanting. The flat's soil shall contain sufficient moisture so that it will not fall apart when lifting the plants. If plants from peat pots are used, the pots shall be protected at all times prior to planting to prevent unnecessary drying of the rootball.

#### F. Tree Staking Material

1. Stakes for Tree Support
  - a. Wood Tree Stakes: Lodge pole pine stakes full-length treated with copper naphthanate. Minimum nominal size: two inches in diameter x eight feet (2"x 8') long and pointed at one (1) end (adjust length to fit tree). Stakes shall be free from knots, checks, splits, or disfigurements.
2. Ties
  - a. 24" length cinch tie as manufactured by V.I.T. Company 1-714-871-2309 or approved equal.
3. Duckbill Total System tree anchor kit with white vinyl coated cable by Foresight Products, Inc., 1-800-325-5360.
  - a. Safety sleeve one-half (1/2) inch black polyethylene tubing.

#### G. Mulch

1. Mulch shall be walk-on fir bark mulch as manufactured by Lassen Forest Products, Red Bluff CA., 1-800-621-8557 or approved equal.

2. The mulch shall consist of fir bark mulch with a particle range of three-quarter to one and one-half (3/4 -1 1/2) inch in diameter. Shredded redwood bark ("gorilla hair") is not acceptable.

#### H. Sod

1. Sod varieties shall be as specified on Drawings. Sod shall be healthy, weed free, and obtained from a certified sod growing nursery or farm.
2. All sod shall be cut within twenty-four (24) hours prior to installation.

#### L. Fungicide

1. "Subdue" (Cibiba-Geigy) or approved equal.
2. Sod Planting – Fungicide labeled for fungi known to effect turf grass in Northern Central Valley or Northern California.

#### M. Pre-emergent

1. Pre-emergent, as approved by the Landscape Architect - prevent annual weed development in hydromulch applications. Do not use in hydromulch mixes incorporating annual wildflower or grass seeds.

#### N. Weed Control

1. Use Enide (Upjohn), Dymid (Elanco Products Co.), Treflan, Eptan, Surflan or approved equal.

#### O. Root Barrier

1. By Deep Root Corp. model numbers UB-18-2 or approved equal.

#### P. Miscellaneous Materials

1. Sand: wash river sand or equal.
2. Tree wound paint: as approved. Morrison Tree Seal, Cabot Tree Paint, or approved equal.

### **PART 3 - EXECUTION**

#### 3.01 OBSERVATION

The Owner's Representative to verify that topsoil has been imported, and final grades have been established prior to beginning planting operations. The Owner to observe, shrubs and liner stock plant material for injury, insect infestation and trees and shrubs for

improper pruning. Do not begin planting of trees until deficiencies are corrected or plants replaced.

### 3.02 LAYOUT OF PLANTING AREAS

- A. Stake or mark with lime locations for plants and outline of planting beds on ground. Do not begin excavation until plant locations and plant beds are acceptable to the Landscape Architect. The irrigation system shall be operational and approved prior to planting.
- B. Locations for plants and outlines of areas to be planted shall be marked on the ground by the Contractor before any plant pits are dug. All such locations shall be approved by the Landscape Architect. If an underground construction or utility line is discovered prior to work, other locations for planting may be selected by the Landscape Architect.

### 3.03 INSTALLATION

#### A. Preparation of planting areas areas:

- 1. Amend soil per recommendations of soil analysis outlined in Section 02905 Paragraph 3.07.
- 2. All soil areas shall be compacted and settled by application of heavy irrigation to a minimum depth of twelve (12) inches.
- 3. After grading and de-rocking, and prior to planting, add 3” of imported soil in turf areas, and incorporate amendments in Section 02905 Paragraph 2.02. to a depth of four (4) inches.
- 4. At time of planting, the top six (6) inches of all areas to be planted shall be free of stones, stumps, or other deleterious matter one (1) inch in diameter or larger, and shall be free from all wire plaster, or similar objects that would be a hindrance to planting and maintenance. All rock larger than 1 inch to be removed by mechanical means, either by sieve for loose rock and by heavy equipment if solid bedrock.

#### B. Final Grades

- 1. Finished grading shall insure proper drainage of the site. Conform to specification SECTION 02260 - **LANDSCAPE GRADING**.
- 2. The following areas shall be graded so that the final grades shall be established below adjacent paved areas, sidewalks, valve boxes, clean outs, area drains, curbs, etc. as follows:
  - a. Shrub/ground cover areas: 2-1/2 inches
  - b. Sod areas: 1-1/2 inches



3. Surface drainage shall be away from all building foundations, where applicable.
4. Dispose of excess or unacceptable soil from the site.

### 3.04 PLANT INSTALLATION

#### A. General

1. Actual planting shall be performed during those periods when weather and soil conditions are suitable and in accordance with locally accepted practice, as approved by the Owner.
2. Only as many plants as can be planted and watered on that same day shall be distributed in a planting area.
3. Container shall be opened and plants shall be removed in such a manner that the ball of earth surrounding the roots is not broken and they shall be planted and watered as herein specified immediately after removal from the containers. Containers shall not be opened prior to placing the plants in the planting area.

#### B. Layout of Major Plantings

1. Locations for plants and outlines of areas to be planted shall be marked on the ground by the Contractor before any plant pits are dug. All such locations shall be approved by the Owner. If an underground construction or utility line is discovered prior to work, other locations for planting may be selected by the Owner.

#### C. Planting of Trees and Shrubs

1. Excavation for planting shall include the stripping and stocking of all acceptable topsoil encountered within the areas to be excavated for trenches, tree holes, plant pits and planting beds.
2. Excess soil generated from the planting holes and not used as backfill or in establishing the final grades shall be removed from the site.
3. Excavating for Planting:
  - a. Shape
    - i. Vertical sides and flat bottom.
    - ii. Plant pits to be square for box material, circular for canned material.
    - iii. Scarify sides and bottom of each pit.
  - b. Size: All trees and shrubs shall have planting pits dug twice the diameter of the root ball. Backfill around the root ball with prepared backfill mix.

4. Protect all areas from excessive compaction when trucking plants or other materials to planting site.
5. Install Root Barrier at all locations where tree is with 5'-0" of concrete or other hardscape.
6. Can Removal
  - a. Cut cans on two (2) sides with an acceptable can cutter.
  - b. Do not injure the root ball.
  - c. Do not cut cans with spade or ax.
  - d. Carefully remove plants without injury or damage to root ball.
  - e. After removing plant, manually scarify root ball to loosen perimeter roots.
7. Box Removal
  - a. Remove bottom of plant boxes before planting.
  - b. Remove sides of box without damage to root ball after positioning plant and partially backfilling.
8. Center plant in pit.
9. Face plants with fullest growth into prevailing wind.
10. Set plant plumb and hold rigidly in position until soil has been tamped firmly around ball roots.
11. Remainder of planting pit shall be backfilled with:
  - a. Amended soil per Soil Analysis and Drawing Detail.
  - b. Grow Power-Plus per rate of manufacture's recommendations.
  - c. Specified type and quantity of planting tablets
12. All plants which settle shall be raised to the correct level. After the plant has been placed, additional backfill shall be added to the hole to cover approximately one-half (1/2) of the height of the root ball. Water shall be added to the top of the partly filled hole to thoroughly saturate the root ball and adjacent soil.
13. After the water has completely drained, planting tablets shall be placed adjacent to but not in contact with root ball:  
  
One (1) tablet per 1-gallon container  
Two (2) tablets per 5-gallon container  
Three (3) tablets per 15-gallon container

Four (4) tablets per 24" box  
Five (5) tablets per 30" box  
Six (6) tablets per 36" box  
Seven (7) tablets per 42" box  
Eight (8) tablets per 48" box and larger box sizes

14. The remainder of the hole shall be backfilled.
15. After backfilling an earthen basin shall be constructed around each plant. Each basin shall be of a depth sufficient to hold at least two (2) inches of water. Basin shall be of a size suitable for the individual plant. In no case shall the basin for fifteen (15) gallon plant be less than four (4) feet in diameter; a five (5) gallon plant less than three (3) feet in diameter. The basins shall be constructed of amended backfill materials and shall not be constructed for trees in turf areas. Edge of planter to be 2-1/2" below finish grade to allow for bark and prevent spilling onto sidewalk and existing parking lot.
16. Pruning: Pruning shall be limited to the minimum necessary to remove injured twigs and branches and to compensate for loss of roots during transplanting, but never to exceed one-third (1/3) of the branching structure. Upon approval of the Owner, pruning may be done before delivery of plant, but not before plants have been observed and approved. Cuts over three-quarter (3/4) inch in diameter shall be painted with tree wound paint.
17. Staking and Guying
  - a. Staking of all trees shall conform to tree staking and tree guying details.
  - b. Flagging: All guys are to be flagged 90% of the wire length and shall be covered with black polyethylene one-half (1/2) inch diameter tube.
  - c. One (1) tree of each size shall be staked and approved by the Owner prior to continued staking.

#### D. Planting of Ground Cover

1. Ground cover shall be planted in straight rows and evenly spaced, unless otherwise noted, and at intervals called out in the Drawings. Triangular spacing shall be used unless otherwise noted on the Drawing.
2. Each rooted plant shall be planted with its proportionate amount of flat soil or in a peat pot in a manner that will insure minimum disturbance of the root system, but in no case shall this depth be less than two (2) nodes. To avoid drying out, planting shall be immediately irrigated after planting until the entire area is soaked to the full depth of each hole, unless otherwise noted on the Drawing.
3. Care shall be exercised at all times to protect the plants after planting. Any damage to plants by trampling or other operations of this Contract shall be repaired immediately.

#### E. Sod Planting

1. Soil Preparation: As per paragraph 3.03 A.
2. Grading and Rolling: Carefully smooth all surfaces to be sodded. Roll area to expose soil depressions or surface irregularities. Regrade as required.
3. Fertilizing: Spread turf fertilizer (16-6-8) onto the soil evenly at the rate of four (4) pounds per 1,000 square feet of lawn area.
4. Laying sod: Lay first strip of sod along a straight line (use a string in irregular areas). Butt joints tightly, but do not overlap edges. On second strip, stagger joints. Use a sharp knife to cut sod to fit curves, edges and irrigation heads.
5. Watering: Do not lay whole lawn before watering. When a conveniently large area has been sodded, water lightly to prevent drying. Continue to lay sod and to water until installation is complete.
6. Rolling sod: After laying all sod, roll lightly to eliminate irregularities and to form good contact between sod and soil. Avoid a very heavy roller or excessive initial watering which may cause roller marks.
7. Irrigation: Water thoroughly the completed lawn surface. Soil should be moistened at least eight (8) inches deep. Repeat irrigation at regular intervals to keep sod moist at all times until rooted. After sod is established, decrease frequency and increase amount of water per application as necessary.
8. Replacement: Replace all dead or dying sod with equal material as directed by the Owner.

#### H. Weed Control

1. Apply weed control to all non-turf areas after completion of all planting and one (1) complete watering (to "set" plants).
2. Apply as per manufacturer's specifications.

#### I. Fungicide

1. Apply fungicide to all turf following installation
2. Apply as per manufacturer's specifications.
3. After initial application apply at two-week intervals as required to prevent fungus until end of Contract period.

#### J. Hardpan Conditions

1. Where hardpan exists, whether it is in the form of caliche or other impervious clay, and it is within the top two-and-one-half feet (2-1/2') of soil, use powered equipment to break through completely at each plant location to allow drainage and root growth. Remove hardpan at least one-and-one-half feet (1-1/2') greater than the rootball diameter of plant. Backfill with soil mix as specified.
2. Where hard pan is within the first twelve (12) inches of soil, it shall be completely penetrated for all trees and shrubs.

### 3.05 OBSERVATION SCHEDULE

A. The Contractor shall be responsible for notifying the Owner in advance for the following observations according to the time indicated:

1. Pre-construction conference - 7 days.
2. Rough grade review - 48 hours.
3. Controller and backflow preventer installation review - 48 hours.
4. Irrigation pressure line and lateral line installation and testing - 48 hours.
5. Irrigation sprinkler coverage test - 48 hours.
6. Finish grade review - 48 hours.
7. Plant material review - 48 hours.
8. Plant layout review - 48 hours.
9. Soil preparation, plant layout, and planting operations. One (1) tree with each type of specified shall be approved prior to planting of trees - 48 hours.
10. End of landscape installation - 48 hours.
11. Final Acceptance - 48 hours

B. No site visits shall commence without all items noted in previous Observation Reports either completed or remedied, unless such compliance has been waived. Failure to accomplish punch list tasks or prepare adequately for desired observations shall make the Contractor responsible for reimbursing the Owner at his current billing rates per hour, plus transportation costs.

### 3.06 CLEAN UP

After all planting operations have been completed; remove all trash, excess soil, empty plant containers or rubbish from the property. All scars, ruts or other marks in the ground caused by this work shall be repaired and the ground left in a neat and orderly condition throughout the site. The Contractor shall pick-up all trash resulting from this work no

less frequently than each Friday before leaving the site, once a week, and/or the last working day of each week. All trash shall be removed completely from the site. The Contractor shall leave the site area broom-clean and shall wash down all paved areas within the Contract area, leaving the premises in a clean condition acceptable to the Owner.

**END OF SECTION**

## SECTION 02970

### LANDSCAPE MAINTENANCE

#### PART 1 - GENERAL

##### 1.01 CONDITIONS

- A. The general provisions of the Contract, including General and Supplementary Conditions and General Requirements (if any) apply to the work specified in this Section.

##### 1.02 SCOPE OF WORK

- A. Furnish all labor, material, equipment, and services required to maintain landscape in a healthy growing condition and in a neat and attractive appearance throughout the maintenance period.
- B. Related Work Specified in Other Sections:
  - 1. SECTION 02811 - **IRRIGATION SYSTEM**
  - 2. SECTION 02905 - **LANDSCAPE INSTALLATION**

##### 1.03 QUALITY ASSURANCE

The Maintenance Contractor shall be experienced in horticulture and landscape maintenance, practices, and techniques, and shall provide sufficient number of workers with adequate equipment to perform the work during the maintenance period.

##### 1.04 MAINTENANCE PERIOD

- A. Continuously maintain the entire project area during the progress of the work and during the sixty (60) calendar-day, maintenance period or until final acceptance of the project by the Landscape Architect.
- B. Sections of the project may begin the maintenance period before others if project schedule is divided into thirds or an alternate schedule that is accepted by the Architect. A prime requirement is that lawn and landscape areas shall be planted and that lawn areas shall show an even, healthy stand of grass seedlings or sod, either of which shall have been mown twice. If such criteria are met to the satisfaction of the Landscape Architect, a written notification shall be issued to establish the effective beginning date of maintenance period for each section of the project.
- C. Any day of improper maintenance, as determined by the Landscape Architect, shall not be credited as an acceptable maintenance period day. The maintenance period shall be extended on a daily basis if the work is not in accordance to the Plans and Specifications. Project shall not be segmented into maintenance areas or phases unless authorization of the Landscape Architect is obtained.
- D. Maintenance shall continue beyond the sixty (60) day maintenance period, as required, until final acceptance is given by the Landscape Architect.

## 1.05 GUARANTEE AND REPLACEMENT

- A. Guarantee: All plant material and other materials installed under the Contract shall be guaranteed for one (1) year from time of final acceptance against any and all poor, inadequate or inferior materials and/or workmanship or improper maintenance, as determined by the Landscape Architect, shall be replaced by the Contractor at his expense.
- B. Replacement: Any materials found to be dead, missing, or not in a satisfactory or healthy condition during the maintenance period shall be replaced immediately. The Landscape Architect shall be sole judge as to the condition of material. Material to be replaced within the guarantee period shall be replaced by the Contractor within five (5) days of written notification by the Landscape Architect. All replacement materials and installations shall comply to the Plans and Specifications. Any plant missing due to suspected theft shall be replaced by the Contractor. If the Contractor suspects that theft may be a problem, the Contractor shall provide written documentation to the Landscape Architect that security on this site needs to be intensified. The Contractor may relieve himself of theft responsibility if after the security notice, with no result, a written notice to the Landscape Architect shall be given that plant material will not be replaced for theft or vandalism due to lack of site security being maintained. This procedure may take place only during the Landscape Maintenance Period.

## 1.06 OBSERVATION SCHEDULE

Normal progress observations shall be requested by the Contractor from the Landscape Architect as per observations listed in specifications SECTION 02905 - **LANDSCAPE INSTALLATION**.

## 1.07 FINAL ACCEPTANCE OF THE PROJECT

- A. Upon completion of all project work, including maintenance period, the Landscape Architect will, upon proper request, make an observation to determine final project acceptability.
- B. Where observed work does not comply with the Plans and Specifications, replace rejected work and continue specified maintenance period until re-inspected by the Landscape Architect and determined to be acceptable. All replacement materials and installations shall be in accordance with the Plans and Specifications. Remove rejected work and materials immediately from project. Prior to the date of final observation, Contractor shall provide the Owner with all Record Drawings and written Guarantee Statement in accordance with the Plans and Specifications.

## **PART 2 - PRODUCTS**

### 2.01 MATERIALS

- A. All materials used shall either conform to Specifications in other sections or shall otherwise be acceptable to the Landscape Architect. The Landscape Architect shall



be given a monthly record of all herbicides, insecticides and disease control chemicals used.

- B. Fertilizer – Ammonium sulfate (21-0-0)

## **PART 3 - EXECUTION**

### **3.01 MAINTENANCE**

- A. General: Proper maintenance, including watering, weeding, mowing, edging, fertilization, repairing and protection shall be required until entire project is finally accepted, but in any event for a period of not less than the specified maintenance period after planting.
- B. Watering: Thoroughly water to insure vigorous and healthy growth until work is accepted. Water in a manner to prevent erosion due to application of excessive quantities of water. When hand watering use a water wand to break the water force.
- C. Weeding: Keep plant basins and areas between plants free of weeds. Control weeds with pre-emergent herbicides. If weeds develop, use legally approved herbicides. Avoid frequent soil cultivation that destroys shallow roots. Weeding also shall be included in all paved areas including public or private sidewalks.
- D. Pruning
1. Trees: Prune trees to select and develop permanent scaffold branches; to eliminate narrow V-shaped branch forks that lack strength; to reduce toppling and wind damage by thinning out crowns; to maintain a natural appearance and to balance crown with roots. Prune only as directed by the Landscape Architect.
  2. Shrubs: Same objectives as for trees. Shrubs shall not be clipped into balled boxed forms unless such is required by the landscape plans. All pruning cuts shall be made to lateral branches, buds or flush with the trunk. "Stubbing" and "heading" shall not be permitted.
  3. Only skilled workmen shall perform pruning work in accordance with standard horticultural pruning practices. Remove from the project all pruned branches and material. Remove and replace any plant material excessively pruned or malformed resulting from improper pruning practices at no additional costs to the Owner.
- E. Staking and Guying: Stakes and guys shall remain in place through the guarantee period (one year) and shall be inspected and adjusted to prevent rubbing that causes bark wounds.
- F. Insect, Animal, Rodent and Disease Control: Maintain proper control with legally approved materials as required as part of the Contract.
- G. Protection: The Contractor shall maintain protection of the planted areas. Damaged areas shall be repaired or replaced at the Contractor's expense.
- H. Trash: Remove trash weekly in all planted areas, pedestrian walkways, and plazas.

I. Replacement: As per Guarantee and Replacement Specifications of this Section.

### 3.02 MAINTENANCE FERTILIZER

Fertilization: During maintenance period an application of Maintenance Fertilizer (21-0-0), shall be made at thirty (30) days and again at sixty (60) days from the date of landscape installation at a rate of five (5) pounds per 1,000 square feet, or as per manufacturer's recommendations.

### 3.03 IRRIGATION SYSTEM

- A. System Observation: The Contractor shall check all systems for proper operation. Lateral lines shall be flushed out after removing the last sprinkler head or two at each end of the lateral. All heads are to be adjusted as necessary for unimpeded coverage.
- B. Controllers: Set and program automatic controllers for seasonal water requirements. Give the Town's representative instructions on how to turn off system in case of emergency.
- C. Repairs: Repair all damages to irrigation system at the Contractor's expense. Repairs shall be made within twenty-four (24) hours.

**END OF SECTION**

## SECTION 10430

### SIGNS AND SIGN POSTS

#### A. SCOPE

This section consists of furnishing and installing sign panels, sign posts, fastening hardware, back braces, straps and saddle brackets at the locations shown on the plans or as designated by the Owners Representative. All work shall conform to Section 56 of the State Standard Specifications unless otherwise stated within these specifications.

#### B. MATERIALS

**SINGLE SHEET ALUMINUM SIGN** shall be fabricated from sheet aluminum alloy 6061-T6 or 5052-H38 and shall not have a vertical splice in the sheet aluminum. Aluminum sheeting must be free of buckles, warps, dents, cockles, burrs and defects resulting from fabrication and installation. All single sheet aluminum signs shall conform to Section 56 of the State Standard Specifications.

**RETROREFLECTIVE SHEETING** shall be Type IV microprismatic, or approved equal. Retroreflectivity of the sheeting for sign background and legend shall conform to the requirements in ASTM Designation D 4956. Retroreflective sheeting must have Class 1, 3, or 4 adhesive backing and shall be applied to sign panels as recommended by the retroreflective sheeting manufacturer without stretching, tearing, and damage. The orientation of the legend must comply with the retroreflective sheeting manufacturer's instructions. The retroreflective sheeting must be a single, contiguous sheet without splices except for the splices produced during the manufacturing process of the retroreflective sheeting. The adhesive backing shall be pressure sensitive and fungus resistant.

**METAL SIGN POSTS** shall be 2" diameter galvanized post and conform to the City of Oroville Standard Detail 601. Galvanizing shall conform to the provisions in Section 75-1.05 of the State Standard Specifications. Sign posts shall be free of buckles, warps, dents, cockles, burrs and defects resulting from fabrication and installation.

**SIGN PANEL FASTENING HARDWARE:** Framing assemblies for multiple sign installations shall be fabricated of structural steel conforming to the requirements in ASTM A36/A36M, or of aluminum alloy as shown on the Plans. Frames fabricated of structural steel shall be hot-dip galvanized after fabrication.

Back braces for signs shall be commercial quality, mild steel, hot-dip galvanized after fabrication.

Straps and saddle brackets for mounting sign panels on electroliers, sign structure posts and traffic signal standards or where shown on the Plans shall be stainless steel conforming to the requirements in ASTM A 167, Type 302 or 304. Theft-proof bolts shall be stainless steel with a chromium content of at least 16 percent and a nickel content of at least 8 percent.

Lag screws, bolts (except theft-proof bolts), metal washers and nuts shall be commercial quality steel, hot-dip galvanized after fabrication. Fiber washers shall be of commercial quality.

Galvanizing shall conform to the provisions in Section 75-1.05 of the State Standard Specifications.

Components of bolted assemblies shall be galvanized separately before assembly.

#### C. WORKMANSHIP

**POSTS:** Excavate post holes to the depth shown. Place posts in the holes. Backfill material for posts must be Class B concrete as provided in Section TS 9, "Concrete Work", of these Technical Specifications. Surplus excavated material shall be disposed of in a uniform manner within the project limits as directed by the Engineer. The line between the center of the top of a post and the center of a post at the ground line shall be plumb within a tolerance of not to exceed 0.02 foot in 10 feet.

**SIGN PANELS:** Sign information must be imprinted in 1/4-inch upper case letters and numerals. Locate this information on the back, lower right of each sign panel so that it will not be blocked by a sign post or mounting frame. Sign information must include:

1. Sign fabricator's name
2. Month and year of fabrication
3. Type of retroreflective sheeting
4. Sheeting manufacturer's identification and lot number for the retroreflective sheeting

Sign information must be imprinted at the fabrication plant by die-stamping on aluminum panels or by an equivalent method for aluminum signs, such as affixing a die-stamped aluminum tag. The information must not be painted, screened, inked, or engraved. The information must be imprinted in a way that does not damage the face of the sign.

Sign panels shall be installed by the Contractor in conformance with the details on the Plans or as directed by the Owners Representative. Any chipping or bending of sign panels shall be considered as sufficient cause to require replacement of panels at the Contractor's expense.

All fastening hardware shall be furnished by the Contractor.

Signs shall be free from blemishes that may affect the serviceability and detract from the general sign color and appearance when viewing during daytime and nighttime from a distance of 25 feet. The face of each finished sign shall be uniform, flat, smooth, and free of defects, scratches, wrinkles, gel, hard spots, streaks, extrusion marks, and air bubbles. The front, back, and edges of the sign panels shall be free of router chatter marks, burns, sharp edges, loose rivets, delaminated skins, excessive adhesive over-spray and aluminum marks.

#### D. CERTIFICATES OF COMPLIANCE

The California Department of Transportation maintains a list of Prequalified and Tested Signing and Delineation Materials. The Engineer shall not be precluded from sampling and testing products on the list of Prequalified and Tested Signing and Delineation Materials.

The Contractor shall work with the manufacturer of products on the list of Prequalified and Tested Signing and Delineation Materials and furnish the Engineer a Certificate of Compliance in conformance with the provisions in Section 6- 1.07, "Certificates of Compliance," of the State Standard Specifications for each type of traffic product supplied.

For those categories of materials included on the list of Prequalified and Tested Signing and Delineation Materials, only those products shown within the listing may be used in the work. Other categories of products, not included on the list of Prequalified and Tested Signing and Delineation Materials, may be used in the work provided they conform to the requirements of the State Standard Specifications.

E. MEASUREMENT

Measurement of Signs and Sign Posts will be made as a field count of each sign post with sign installed as a single unit per the drawings and these technical specifications.

## SECTION 16050

### ELECTRICAL GENERAL REQUIREMENTS

#### PART 1 GENERAL

##### 1.1 WORK INCLUDED

- A. Furnish and install all necessary labor, materials, tools and equipment to perform and completely finish the work according to the intent of this specification, and the accompanying drawings.
- B. Furnish and install any incidental work which can reasonably be inferred as required and necessary to provide complete and workable systems.
- C. Provide connections of all equipment including installation and connection of all motors, relays, remote starters, etc.
- D. The requirements of the General and Supplemental Conditions, and Division 1 apply to this Division and these specifications. All sections in Division 16 are interrelated. Work specified in order sections, as applicable, shall apply to all work here under.

##### 1.2 LOCAL CONDITIONS

- A. Examine site; verify dimensions and locations against drawings and become informed of all conditions under which work is to be done before submitting proposal. No allowance will be made for extra expenses because of omission on Contractor's part to include cost of work under prevailing conditions.
- B. Information shown relative to services is based upon available records and data shall be regarded as approximate only. Minor deviations found necessary to conform with actual locations and conditions shall be made without extra cost.

##### 1.3 PERMITS AND INSPECTIONS

- A. Obtain and pay for all permits and service charges required in installation of the work. Arrange for required inspections and secure approvals from authorities having jurisdiction.
- B. During its progress, work shall be subject to inspection by Project Inspector.

##### 1.4 CODES AND STANDARDS

- A. Work and materials shall be in full accordance with California Occupational Safety Health Act (CAL-OSHA), California Electrical Code (CEC), State Fire Marshal, Electrical Safety Orders (Title 8, Subchapter 5), the National Fire Protection Association, California Building Code (CBC); California Code of Regulations – Title 24 and other applicable State or local laws or regulations. Nothing in the Drawings or Specifications shall be construed to permit work not conforming to these codes.

- B. Electrical materials shall bear the label of, or be listed by, the Underwriter's Laboratories (UL) unless of a type for which label or listing service is not provided.
- C. Materials and components shall conform to Industry Standards, including:
  - 1. NEMA – National Electrical Manufacturer's Association
  - 2. ANSI – American National Standard Institute
  - 3. ASTM – American Society for Testing Material Association
  - 4. IPCEA – Insulated Power Cable Owners Representative's Association
  - 5. CBM – Certified Ballast Manufacturers
- D. When Contract Documents differ from governing codes, furnish and install larger size or higher standards called for without extra charge.

### 1.5 REVIEW OF MATERIALS

- A. Prior to commencement of work and within 35 days after award of contract, submit for approval in accordance with General Conditions all equipment and materials to be furnished including all substitutions.
  - 1. Equipment / Product submittals shall be bound and indexed by their referenced specification section and shall include a table of contents listing all equipment submitted including description of product and part numbers. Where a group or series of products are submitted, each item does not have to be listed only the series need to be identified.
  - 2. Shop drawings submittals shall be neat and professionally done using CAD (computer aided drafting), hand-drawn submittals will not be accepted. Shop drawings shall have sufficient information to clearly indicate work to be performed and be complete including device / equipment locations, wire sizes, wire types and number of wires, symbol list or legend, point-to-point connections, wiring diagrams, and equipment anchorage detail where needed.
- B. Substitutions
  - 1. Substitution will be considered 10 days prior to the award of the contract on each item of material or equipment. No substitutions will be considered thereafter. Substitutions will be interpreted to be all manufacturers other than those specifically listed by model or catalog number. Should the original submittal of a proposed substitution be rejected, the specified item shall be furnished.
  - 2. Submit complete information or catalog data to show equality of equipment or material offered to that specified. No substitutions will be allowed unless requested and approved in writing. Materials of equal merit and appearance, in the opinion of the Owners Representative, will be approved for use. Owners Representative reserves the right to require originally specified item.

3. Acceptance of a substitute is not to be considered a release from the Specifications. Any deficiencies in an item, even though approved, shall be corrected by the Contractor at his expense.
4. Responsibility for installation of approved substitution is include herein. Any changes required for installation of approved substituted equipment shall be made without additional cost to Owner.
5. Where it is in the best interest of the Owner, Owners Representative may give written consent to a submittal received after expiration of designated time limits, or for an additional resubmittal.
6. Submit for approval in ample time to avoid delay of construction, shop drawings or submittals on all items of equipment and materials covered in list mentioned above. Submit in accordance with General Conditions in a complete package; partial submittals will not be considered.
7. Failure to comply with any of the preceding requirements will necessitate that the specified materials be submitted and supplied.

#### 1.6 RECORD DRAWINGS

- A. Upon completion of Work, furnish Owners Representative with complete sets of plans on reproducible vellums (not marked blueprints) upon which shall be shown all Work installed under Contract, which are note in accordance with Original Contract Drawings.
- B. All symbols and designations used in preparing Record Drawings shall match those used in Contract Drawings.
- C. Show all buried and concealed conduit, stubs-outs, etc. Locate all buried conduit and stub-outs by dimensions from permanent, easily located and identifiable portions of structure; also dimension ends of stub-outs, etc. Note depth of buried items below grade.

#### 1.7 ADDENDA AND CHANGE ORDERS

- A. Changes in the plans and specifications shall be made by Addenda or Change Orders signed by the Owners Representative.

### **PART 2 PRODUCTS**

#### 2.1 MATERIALS

- A. Materials mentioned herein or on drawings require that each item listed be provided and of quality noted, or an approved equal. All material shall be new, full weight and standard in all respects and in first-class conditions. Where possible, all materials used shall be of the same brand or manufacturer throughout for each class of material or equipment.



- B. Grade or quality of materials desired is indicated by trade names or catalog numbers stated herein. Dimensions, sizes and capacities shown are a minimum and shall not be changed without permission of Owners Representative.

## **PART 3 EXECUTION**

### **3.1 DRAWINGS AND COORDINATION**

- A. Examine Drawings and Site; be familiar with types of construction where electrical installation is involved.
- B. Work shall be neatly installed in a workmanlike manor in accordance with NECA Standard of Installation. Work shall be coordinated with other trades to avoid conflicts. Clarifications will be made by Owners Representative and minor adjustments shall be made without additional cost to Owner. Obtain ruling from Owners Representative concerning any obvious discrepancies or omissions in work before bidding. All work involved in correcting obvious errors or omissions after award of Contract shall be performed as directed by Owners Representative without additional cost to Owner
- C. Layouts of equipment, accessories and wiring systems are diagrammatic (not pictorial), but shall be followed as closely as possible. Drawings and Specifications are for assistance and guidance, and exact locations, distances, levels, etc., will be governed by Site.
- D. All equipment (devices, conduits, boxes, etc.) shall be flush or semi-flush mounted unless otherwise noted. Where conditions do not allow flush mounting and where acceptable to the Architect, equipment may be surface mounted.

### **3.2 WORKING SPACE**

- A. Provide adequate working space around electrical equipment in compliance with Article 4 of Electrical Safety Orders. In general, provide 36 inches minimum clear work space in front of panelboards and controls of 120/208 volt systems and 42 inches minimum for 277/480 volt systems.

### **3.3 CABLE AND CLEANING**

- A. All broken, damaged or otherwise defective parts shall be repaired or replaced without additional cost to Owner. Work shall be left in a condition satisfactory to Owners Representative. At completion, carefully clean and adjust all equipment, fixtures and trim installed as part of this work. Systems and equipment shall be left in a satisfactory operating condition.
- B. All surplus materials and debris resulting from this work shall be cleaned out and removed from site; this includes surplus excavated material.

### 3.4 EXCAVATING AND BACKFILLING

- A. Excavate and backfill as required for installation of electrical work. Restore all surfaces, roadways, sod, walks, curbs, walls, existing underground installation, etc., cut by installations to original condition in an acceptable manner. Maintain all warning signs, barricades, flares and lanterns as required by the Safety Orders and local ordinances.
- B. Excavation: Dig trenches straight and true to line and grade, with bottom clear of any rock points. Support conduit for entire length on undisturbed original earth. Minimum conduit depth of pipe crown shall be 2 feet below finished grade.
- C. Backfill: All backfill material shall be local material free of rubble, rubbish or vegetation. Provide sand as backfill material where specified. Trenches shall be backfilled and compacted to 90% (per ASTM D1557) of maximum dry density at optimum moisture content in layers not to exceed 6" when compacted.

### 3.5 PROTECTION

- A. In performance of work, protect work from damage. Protect electrical equipment, stored and installed from dust, water or other damage.

### 3.6 EQUIPMENT IDENTIFICATION

- A. Panelboards, remote control switches, terminal boxes, etc., shall be properly identified with a descriptive nameplate. Nameplate shall be made of 3/32 inch laminated plastic with black background and white letters. Size of letters shall be 1/4 inch high for equipment in device box or boxes 12" or smaller, and 1/2 inch high for panelboard, terminal can, or larger items. Letters shall be machine engraved. Punched strip type nameplates and cardholders in any form are not acceptable. Nameplates shall be attached with oval head machine screw tapped into front panel.
- B. Indicate type of equipment and equipment designation, ex. "MAIN SWITCHBOARD-MSB", "LIGHTING CONTROL PEDESTAL - SP", Etc.

### 3.7 RUST INHIBITOR

- A. Channels, joiners, hangers, straps, clamps, brackets, caps, nuts and bolts and associated parts shall be plated electrolytically with zinc followed immediately thereafter by treating freshly deposited zinc surfaces with chromic acid to obtain a surface which will not form a white deposit on surface for an average of one hundred twenty (120) hours when subjected to a standard salt spray cabinet test, or shall be hot dipped galvanized.

### 3.8 EQUIPMENT PADS

- A. Concrete reinforced pads for mounting of equipment (i.e. switchboard, transformers, freestanding panels, etc.) shall be minimum 3000 psi, 6" thick with #4 rebar at 12" on center each way. Rebars shall be centered in pad. Pad shall extend 2" beyond equipment and 1-1/2" above surrounding area. Backfill and compact to 95%

maximum dry density at optimum moisture content in layers not be exceed  $6^2$  when compacted.

### 3.9 EQUIPMENT ANCHORAGE

- A. All equipment shall be braced or anchored to resist a horizontal force acting in any direction using the following criteria:
- B. Fixed Equipment on Grade: 75% of operating weight.
- C. Fixed Equipment on Structure: 50% of operating weight.
- D. Simultaneous Vertical Force – Use  $1/3 \times$  Horizontal Force.
- E. Where anchorage details are not shown on the drawings the field installation shall be subject to the approval of the Structural Owners Representative.

### 3.10 TEST

- A. Test all wiring and connections for continuity and grounds; where such test indicate faulty insulation or other defects, located, repair and retest. Balance load at panelboards. Furnish all testing equipment.

### 3.11 CLOSING OF AN UNINSPECTED WORK

- A. Do not allow or cause any work installed hereunder to be covered up or enclosed before it has been inspected and approved.
- B. Should any work be enclosed or covered up before is has been approved, uncover such work and after is has been inspected and approved, make all repairs necessary to restore work of others to conditions in which it as found at time of cutting, all without additional cost.

### 3.12 WARRANTY

- A. All materials and installation shall be provided with one (1) year warranty, which shall include replacement parts, labor, retesting, and travel to and from the job site. The warranty period shall begin after final acceptance of the project. The warranty shall cover but is not limited to the following:
- B. Defective workmanship and installation
- C. All system components, devices, conduit, wires, etc.
- D. Manufactured items such as light fixtures, receptacles, switchboard, panelboard, transformer, switches, etc.
- E. Basic materials such as conduit, wires, boxes, cabinets, etc.
- F. Certain manufactured items will have longer warranty periods. Refer to specific item and specification section for warranty information and terms.

**END OF SECTION**

## **SECTION 16100**

### **BASIC MATERIALS AND METHODS**

#### **PART 1 GENERAL**

##### **1.1 SCOPE**

- A. The work of this Section consists of basic materials and methods for all work included under Division 16. Additional specifications requirements for electrical work are specified under other sections of Division 16 and where those requirements differ from the requirements of this Section, they shall govern.

##### **1.2 SUBMITTALS**

- A. Submit product data per Section 16050.

#### **PART 2 PRODUCTS**

##### **2.1 CONDUIT**

- A. Rigid Steel Conduit: Standard weight, mild steel pipe, zinc coated on both inside and outside by a hot dipping or sherardizing process. Inside and outside of conduit shall be finished with a protective coating. All threads galvanized after cutting. Meets UL 6, UL Card #DYIX, and ANSI C80.1.
- B. Intermediate Metallic Conduit (IMC): Intermediate weight, mild steel pipe, meeting same requirements for finish and material as rigid steel conduit. Meets UL 1242, UL Card #DYIX, and ANSI C80.6.
- C. Electrical Metallic Tubing (EMT): Cold rolled steel tubing, hot-dipped galvanized, with zinc coating on outside and protective lubricating coating on inside. Fittings shall meet same requirements for finish and material as EMT. Meets UL 797 and ANSI C80.3.
- D. Liquid Tight (LT) Flexible Conduit: Flexible steel, zinc coated on both inside and outside by hot dipping or sherardizing process with extruded polyvinyl covering and with watertight connectors. Conduit to be one continuous length, no couplings, minimum LT 1”.
- E. PVC Conduit
  - 1. Type 40, 90°C, UL listed, composed of polyvinyl chloride, conforming to NEMA TC-2, Fed Spec WC1094A, UL651 Standards. Material shall have minimum tensile strength of 6,500 psi at 73.4°F, flexural strength of 12,500 psi and compressive strength of 9,000 psi per ASTM testing. PVC conduit shall be suitable for direct burial without concrete encasement. Fitting shall be of same manufacture. All joints shall be solvent welded.

2. Type 80, similar to type 40 except with extra heavy wall.

F. Raceway Fittings:

1. Rigid Steel Conduit: Fittings, such as couplings, connectors, condulets, elbows, bends, etc., shall be subject to same requirements as for rigid steel conduit. Couplings and unions shall be threaded type, assembled with anti-corrosion, conductive anti-seize compound at joints made absolutely tight to exclude water. Connectors shall be threaded hubs with bonding insulated metallic bushings. Unions shall be equal to Crouse Hinds UNY or UNF.
2. IMC: Fittings shall be as specified for rigid steel conduit.
3. EMT: Fittings shall be steel, box connectors shall have insulated throat. Connectors and couplings to be compression type.
4. Flexible Metallic Conduit: Connectors to be insulated. Metallic connectors (except for liquid-tight) shall be steel "squeeze" type via a screw, Steel City XC-90X and XC-49X series. Liquid-tight metallic connectors shall be watertight approved for such use.
5. Bushings: Metallic insulated type. Weatherproof or dust-tight installations; liquid-tight with sealing ring and insulated throat, OZ/Gedney type "KR".
6. All box connectors to be insulated throat type.
7. Conduit Straps: Galvanized steel, 2-hole straps. 1-hole straps may be used for conduit sizes 1" and smaller concealed in wall or above ceiling.

G. Metallic conduits, raceways, and fittings shall be listed and approved as grounding means.

## 2.2 BOXES

- A. Boxes located outdoors, or in wet or damp locations shall be rated cast type with gasketed plates.

## 2.3 WIRES

- A. Wire shall be copper only, manufactured by General Cable Co., Rome, General Electric Co., or Anaconda. Wire shall have type THW, THWN or XHHW insulation. Wire installed in high temperature areas, including branch circuits in ballast enclosures shall have type RHW-2 or XHHW-2 90° insulation.
- B. Wire shall Code type copper wire of not less than 98% conductivity. Wires #8 gauge and larger, shall be stranded. Wire shall bear the Underwriters' label, be color coded and be marked with gauge, type and manufacturer's name on 24<sup>2</sup> centers. Wires smaller than #8 may be solid or stranded. Where stranded wire is used, provide solid pigtail for connection to screw terminals of receptacles, switches, etc.

C. Color coding to be as follows:

<u>208/120 Volts</u>	<u>480/277 Volts</u>	
Phase A	Black	Brown
Phase B	Red	Orange
Phase C	Blue	Yellow
Neutral	White	Natural Grey
Ground	Green	Green

E. Switch legs shall use the same branch circuit phase color coding which they are connected to.

F. Bring wires to job in original unbroken packages.

#### 2.4 CONVENIENCE OUTLETS

A. Shall be "Specification" grade rated 20 amperes at 125 volts, composition base with slots to accommodate parallel plug caps with grounding peg. Contact shall grip both sides of plug prongs. Outlet shall be UL listed.

<u>Receptacle</u>	<u>Hubbell</u>	<u>A-H</u>	<u>P&amp;S</u>	<u>Leviton</u>
20A duplex GFI.	GF5352	GF5242	2091S	6898

C. Weatherproof covers for receptacles shall be of heavy-duty die cast construction, self-closing type with hinged flip-lids and gasket. Each receptacle in a duplex receptacle shall have an individual lid. While-in-use rated covers shall be used at all locations.

D. Provide a separate GFI duplex receptacle at each location identified on the drawings. Through wiring is not acceptable.

#### 2.5 SAFETY/DISCONNECT SWITCHES

A. Type "HD" Heavy-Duty safety switches with externally operated handle. Switches shall be manufactured by Westinghouse, General Electric, Square D or approved equal. Switches shall be rated 250 and 600 volts, A.C., of size and poles as shown on drawings and as required. Disconnects used outdoor shall be in NEMA-3R. Provide fused switches with proper sized fuses where required by equipment manufacturer. All switches shall have pad-locking cover with cover interlock. Label switch per section 16050

## 2.6 PULL LINE

- A. Furnish and install pull line in all unused (empty) raceways. 1/8<sup>2</sup> diameter braided line of polypropylene or Jet-Line #232, or approved equal line of continuous fiber polyolefin. Minimum break strength, 200 lbs.
- B. Provide pull line in conduits for utility company systems, size and type per their requirements.

## 2.7 PRECAST CONCRETE PULLBOXES/HANDHOLES

- A. Boxes shall be size as indicated on the drawings. Design loads shall consist of live, dead, impact hydrostatic, and other loads. Design loads shall be sixteen KIPS. Concrete shall be per ASTM-C-33-64. Lightweight concrete shall conform to ASTM-C-33-64T. Cement shall be Portland Cement meeting ASTM-C-150 Type II standards. Compressive strength shall be minimum 4,000 psi at 28 days.
- B. Boxes: Precast high-density reinforced concrete with end and side knockouts, and extension as required. Minimum 1-1/2<sup>2</sup> wall thickness. Acceptable manufacturers shall be Forni, Christy or equal.
- C. Covers: Reinforce concrete covers shall have hold-down bolts. All covers shall be factory marked, see drawings for marking/label required. If not noted, use the following markings:

<u>SYSTEM</u>	<u>MARKING</u>
Power 600 volts or less	Electrical
Telephone	Telephone
Lighting	Lighting

- D. Installation
  - 1. Excavate around area to accept box, a minimum of 4<sup>2</sup> around all sides for ease of installation. Provide 12<sup>2</sup> of compacted pea gravel for bedding and/or to facilitate drainage.
  - 2. Backfill shall be concrete.
  - 3. Grout and seal conduits at box entry with cement. Provide with end bells.
- E. Utility Company boxes shall be per their requirements. Provide with ground rod as required.

## 2.8 LIGHTING CONTACTORS

- A. Contactors shall be UL listed, electrically operated, for all types of lighting loads. Short circuit withstand rating shall exceed maximum available short circuit amps. Coil voltage shall match control voltage. Square-D class 8903 type LO (electrically held) or equal.



- B. Contactors shall be installed on vibration isolators.

## 2.9 GROUND RODS

- A. Ground rods shall be  $\frac{3}{4}$  in dia. X 10 ft. copper clad steel.

## 2.10 SERVICE PEDESTAL

- A. Pedestal enclosures shall be fabricated from 12 gauge hot dipped galvanized steel. Internal parts shall be fabricated from 14 gauge cold rolled steel. The pedestal shall be of all welded construction with welding materials specifically designed for the material used. All fasteners, hinged, latches and hardware shall be of stainless steel and hinges shall be continuous piano style. There shall be no exposed nuts, bolts, screws, rivets, or other fasteners on the exterior.
- B. Pedestals shall be NEMA 3R and NEMA 12 with fully framed side hinged outer doors with swaged close tolerance sides for flush fit with top drip lip and closed cell neoprene flange compressed gaskets. The door shall have 2,000 lb. stress rated stainless steel hasp, welded to cabinet and door. The pedestals shall have hinged deadfront panel with  $\frac{1}{4}$  turn latch and knurled knobs. Deadfront shall be hinged on the same side as the front door and shall open on a minimum of 102°.
- C. Pedestal finish shall be dry powder polyurethane plastic electrostatically applied to produce a finish of 3 to 5 mils thickness. The coating shall be commercially smooth, substantially free of flow lines, paint washout, streaks, blisters and other defects that would impair serviceability or detract from general appearance.
- D. Panel shall include circuit breakers for each load with through-deadfront operating handles. Provide facilities for power company watt hour meter.
- E. Provide terminal blocks for all wiring connections. Bundle and neatly install wiring in panel.
- F. Provide pedestal mounting kit of standard design by control panel manufacturer for bolting to concrete slab.
- G. Provide thermostatically controlled condensation heaters to help keep moisture from condensing in control panel.
- H. Provide a 120V light with switch, to light up inner door and provide a weatherproof 20-ampere duplex receptacle.
- I. Provide lightning arrester or surge suppressors to protect control equipment from lightning induced surges or high voltage transients.
- J. Provide additional equipment and controls as indicated on drawings.
- K. Current transformers and metering shall be as required by Power Utility company. All equipment shall be factory installed by the switchboard manufacturer.

- L. Make provisions for the installation of utility's metering equipment and entrance conductors, all in strict conformance with the requirements of the utility company and as shown on the Drawings. Pedestal manufacturer shall be held to have submitted shop drawings of the service entrance and metering provisions to the Utility prior to manufacture. Owners Representative's shop drawing approval does not imply conformance with utility requirements. Provide for off site metering if required by the local serving utility company.
- M. Small wiring, necessary fuse blocks and terminal blocks within the board shall be furnished when required. All groups of control wires leaving the switchboard shall be provided with terminal blocks with suitable numbering strips. All hardware used on conductors shall have a high tensile strength and an anti-corrosive zinc plating.
- N. A one-piece copper ground bus complete with lugs shall be furnished firmly secured to each vertical section structure and shall extend the entire length of the switchboard and shall be front accessible.
- O. Ground bus current rating to be same as main device.
- P. Pedestal main and distribution circuit breakers shall be molded case bolt-on type with trip rating as scheduled on Drawings.
- Q. Pedestal shall be labeled to serve as "Service Entrance Equipment".
- R. Each circuit breaker shall be identified with an engraved laminated phenolic plate showing the load served or the function of the circuit breaker and trip rating. The nameplate shall be attached with oval head machine screws tapped into the front of the board. Equip breaker handles with padlocking "lock-off" devices.
- S. Pedestal shall be completely factory assembled, wired and tested before delivery and shall conform to UL where applicable, WUESSC, National Electrical Code Standards and State of California requirements.
- T. Where pedestal has facilities for revenue metering, comply with the requirements of servicing utility company. Provide heaters with control thermostat to maintain temperature of 55 degrees Fahrenheit minimum inside switchboard.
- U. The board shall be as manufactured by Tesco or approved equal.

## **PART 3 EXECUTION**

### **3.1 CONDUITS**

- A. All Exposed Conduits shall be rigid steel or IMC. Obtain Architect approval prior to installing any exposed conduits.

- B. Provide flexible connections of short length to equipment subject to vibration or movement and to all motors. Provide a separate bonding conductor in all flexible connections. Flexible conduit shall be one continuous length with couplings.
- C. Support conduit with straps and secure to concrete by means of insert or expansion bolts. Expanders and shields shall be steel or malleable iron.
- D. Conduits installed in contact with ground shall be PVC-40 conduits.
  - 1. Install PVC conduit in a 2" sand or fine earth envelope below ground. Provide a minimum of 2" of sand or fine earth bedding at the bottom of the trench before laying conduits. Risers, including elbows, shall be double-wrapped rigid steel or PVC coated rigid steel conduit; except that risers, including elbows and bends; at in-ground pull box locations shall be PVC-40, concrete encased.
  - 2. When installing underground conduits to specified depth, depth shall be taken from the top of the conduit to the finished grade level. Unless otherwise specified, underground conduits shall be installed with topside not less than 24" below finished grade.
  - 3. Utility Company (electric, telephone, etc.) conduits shall be installed per their depth and backfill requirements. Minimum depth shall be 24" below finished grade. Minimum conduit shall be PVC-40. Where the utility company allows use of a "lesser" grade conduit, i.e. DB120, PVC-40 shall be used.
  - 4. The minimum size of conduits shall be 1".
  - 5. Bends shall be wide sweeping type with radius equal to 10 times O.D. and minimum 24 inch.
  - 6. Place a 6" wide non-biodegradable plastic tape at 12" below grade, labeled "CAUTION ELECTRIC LINE BURIED BELOW". Fluorescent red for electric power conduits and fluorescent orange for telephone conduits. Tape shall be continuous for full length of trench.
- E. Although circuiting is shown as diagrammatic, their point-to-point destinations and their indication above/below ground route shall be followed as much as possible. Where site conditions dictate that an alternate means of routing will alleviate conflicts, the alternate means will be considered with prior approval by the Architect. Route conduits below paved roadways where possible.
- F. Feeder conduits connected to panels/switchboard shall have ground lug bushing connected to equipment ground bus.

### 3.2 CAPPING

- A. Cap conduits during construction with manufactured seals. Swab out conduits before wires are pulled in.

- B. Cap all empty conduits below grade and in pull boxes with manufacturer's caps to prevent entrance of water and debris, attach pull string to cap.

### 3.3 CONDUCTORS

- A. Splices and joints shall be made with Burndy, T & B or approved equal, solderless tool applied pressure lugs and connectors, Uninsulated lugs and wire ends shall be insulated with layers of plastic tape equal to insulation of wire and with all irregular surfaces properly padded with "Scotchfil" putty tape prior to application of tape. Tape shall equal to Scotch #33, General Electric #AW-1 or approved equal. Feeder splicing is not permitted.
- B. Conductor splices below grade where approved shall meet ANSI C119.1-1986 and UL 486D standards. Raychem RVA or RVC series. Conductors to be joined with compression sleeve connectors.
- C. Use only UL approved wire pulling compound as lubricant.
- D. Lace conductors together with waxed linen lacing cord, T & B "Ty-Rap", Holub "Quik-Wrap" or equal, in a neat and workmanlike manner in panelboards, wireways, raceways, pull boxes and similar locations.
- E. #10 AWG wire shall be minimum size wire used.
- F. All conductors shall be in conduit unless otherwise indicated.
- G. Conduit sizes shall be based on code fill table for THW insulated wires to accommodate the number, size and type of wires shown or specified.
- H. Wiring installed in pull boxes or junction boxes, shall be pulled through without splices. shall have a service loop around the interior of the box for 360 degrees utilizing the largest circumference.
- I. Where conductors are increased in size and number (such as for voltage drop reasons), and such that conductors will not fit the standard breaker or panel lugs, terminate in one of the following manners:
  - 1. Provide larger breaker frame.
  - 2. Provide oversized lugs.

### 3.4 GROUNDING

- A. Ground fittings shall be approved manufactured type, installed and connected conform with Code requirements.
- B. Neutral conductors and noncurrent-carrying parts of equipment at each installation shall be grounded in accordance with applicable code. Ground conductor shall be copper having a current capacity sized in accordance with CEC.

- C. All equipment cases, equipment frames, etc., shall be completely grounded to satisfy requirements of CEC. Install bond wire in flexible conduit. Install copper bond wire, sized in accordance with CEC, in all nonmetallic raceways and bond to all metallic parts using approved fittings.
- D. Service ground conductor shall be connected to “Ufer” electrode, concrete encased ground, per CEC 250.
- E. Ground resistance shall not exceed 25 ohms as measured at MSB.
- F. All connections shall be made with solderless connectors or molded fusion-welding process.
- G. Equipment grounding conductors shall be insulated with a continuous green outer finish along its entire length. Conductors size #4 AWG and larger may be identified (with green electrical tape applied half-lapped) at each end and at every point where the conductor is accessible
- H. Insulated grounded (neutral) conductors shall be identified with a continuous white outer finish along its entire length. Neutral conductors #4 AWG or larger can be identified by a distinctive white marking (applied half-lapped with white electrical tape) for the last 12 inches at each end.
- I. Where equipment is 1000 volts or above, fence grounding shall be provided with a ground rod at each fixed gate post and at each corner post. Attach #4 ground wire exothermic weld to ground rod, and with compression ground post clamp to post. Each gate shall be bonded to its gatepost by flexible braided copper strap.

### 3.5 FIELD TESTS

- A. Provide required labor, materials, equipment and connections to perform tests. Document results and submit them to the Owners Representative. Repair or replace all defective work.
- B. Perform Megger test on all feeders and motor branch circuits.
- C. Verify operation of all controls and adjust time settings per Architect.
- D. Each ground rod shall be tested. A ground rod which does not have a resistance to ground of 25 ohms or less shall be augmented by one additional ground rod at no less than 8 ft. from each other.
- E. CLEANING
- F. Brush and clean work prior to concealing, painting and acceptance. Performed in stages if directed.
- G. Clean and repair soiled or damaged painted exposed work and match adjoining work before final acceptance.
- H. Remove debris from inside and outside of material, equipment and structures.

**END OF SECTION**

## **SECTION 16500**

### **LIGHTING**

#### **PART 1 GENERAL**

##### **1.1 SECTION INCLUDES**

Furnish and install a complete lighting system consisting of overhead luminaires, structural lighting and appurtenances as show on drawings and specified.

##### **1.2 WORK INCLUDED**

A. The requirements of Sections 16050, 16100 and 16550 apply to the Work of the Section.

##### **1.3 SUBMITTALS**

A. ground information, photometric data, fixture efficiency, ballasts information, lamp information, weights, accessories, etc.

B. Submit per Section 01330

#### **PART 2 PRODUCTS**

##### **2.1 LUMINAIRES**

A. Weatherproof fixtures shall have weatherproof gaskets on fixture trim and door assemblies. Fixture shall be UL listed for wet locations.

B. Luminaire voltage indicated on the plans is for reference. Verify actual voltage required based on the branch circuit.

C. Housing shall be prefinished. Color to be selected by Architect.

##### **2.2 LIGHT POLES**

A. Poles shall be as shown on the drawings with a minimum wind rating 90 mph with a 1.3 gust factor. Base dimensions shall be as directed by the structural engineer at each pole location.

B. Reflector optical systems shall be high reflectance prefinished.

#### **PART 3 EXECUTION**

##### **3.1 INSTALLATION**

- A. Mounting of luminaires shall be in strict accordance the CEC Section 410.
- B. Install per manufacturer's specifications for all specified (or approved equal) products.

**END OF SECTION**



## SECTION 03 00 00

### CONCRETE

#### PART 1 - GENERAL

##### 1.1 WORK INCLUDED

- A. Contractor shall furnish all labor, tools, and equipment for the construction of reinforced cast-in-place concrete.
- B. This section includes basic finishing and curing methods, accessory control, and expansion and contraction joint devices.

##### 1.2 RELATED WORK

- A. The following is a list of specifications which may be related to this section:
  - 1. Section 01 31 00, Project Management and Coordination.
  - 2. Section 03 11 00, Concrete Forming. (ACI 347)
  - 3. Section 03 15 00, Construction Joints.
  - 4. Section 03 21 00, Reinforcing Steel. (ASTM A615) (ACI 315-65)
  - 5. Section 03 35 00, Concrete Finishing.
  - 6. Section 03 39 00, Concrete Curing.
  - 7. Section 07 92 00, Sealants.
  - 8. Section 31 00 00, Earthwork.
  - 9. Section 32 16 00, Sidewalks, Curbs, and Gutters.
  - 10. Section 32 84 00, Planting Irrigation.

##### 1.3 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
  - 1. ASTM International (ASTM):
    - a. C33, Standard Specification for Concrete Aggregates.
    - b. C94/C94M, Standard Specification for Ready-Mixed Concrete.

- c. C150, Standard Specification for Portland cement.
  - d. C260, Standard Specification for Air-entraining Admixtures for Concrete.
  - e. C494/C494M, Standard Specification for Chemical Admixtures for Concrete.
  - f. C979, Standard Specification for Pigments for Integrally Colored Concrete.
  - g. C1059, Standard Specification for Latex Agents for Bonding Fresh to Hardened Concrete.
2. American Concrete Institute (ACI):
- a. 211, Standard Practice for Selecting Proportions for Concrete.
  - b. 301, Specifications for Structural Concrete.
  - c. 305.1, Specification for Hot Weather Concreting.
  - d. 306.1, Specification for Cold Weather Concreting.
  - e. 309, Standard Practice for Consolidating Concrete.
  - f. 504, Guide to Joint Sealants.

#### 1.4 SUBMITTALS

- A. Provide product data on the following:
- 1. Ready-mixed concrete mix designs.
  - 2. Fly ash.
  - 3. Admixtures (such as air-entraining and water-reducing admixtures).
  - 4. Form release agents.
  - 5. Bonding agents.
  - 6. Colorant.
  - 7. Grout.
- B. Shop Drawings: Provide shop drawings that indicate formwork, dimensions, reinforcement, accessories and control and expansion joint layout.
- C. Record Drawings: Provide accurate locations, measured from two permanent visible locations, all embedded utilities, sleeves, and components that will be concealed from view upon completion of concrete work.

#### 1.5 COORDINATION

- A. Coordinate with other trades affecting or affected by work of this section.
- B. Verify that pipe sleeving and other conduits, of sizes and types specified, are installed as required prior to placing concrete.

## 1.6 QUALITY ASSURANCE

- A. **Manufacturer Qualifications:** A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
- B. **Installer Qualifications:** A qualified installer who employs project personnel qualified as ACI-certified Flatwork Technician and Finisher and/or a supervisor who is an ACI-certified Concrete Flatwork Technician.
- C. **Testing Agency Qualifications:** An independent agency qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.
- D. **Personnel conducting field tests** shall be qualified as ACI Concrete Field-Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.
- E. **Personnel performing laboratory tests** shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician, Grade I. Testing agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician, Grade II.

## 1.7 MOCK UP

- A. Cast concrete mock up to demonstrate typical joints, surface finish, texture, tolerances, and standard of workmanship.
- B. Mock up shall be a minimum 25 sq. ft. for formed surface in the location indicated or, if not indicated, as directed by Landscape Architect.
- C. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion. Demolish and remove concrete mockups when directed by Landscape Architect.

## 1.8 DELIVERY, STORAGE, AND HANDLING

- A. The ready-mixed concrete truck driver shall provide the batch ticket to Landscape Architect at the time of concrete delivery. The ticket shall summarize the following information legibly in an easily discernible table:
  - 1. Weight in pounds of all materials, excepting the water reducing and air entraining agents which shall be in ounces.
  - 2. Cubic yards batched.
  - 3. The ratio of water to cementitious (W/C) materials ratio.
  - 4. Temperature of the concrete at the time it was batched.

5. Time of batching.
6. Free moisture in the fine and coarse aggregates in percent of weight of aggregate.
7. Gallons of water that may be added at the site without exceeding the permissible W/C ratio.
8. Ratio of colorants to cementitious materials ratio.
9. Concrete Mix Design Number.

## 1.9 FIELD CONDITIONS

- A. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
  1. When average high and low temperature is expected to fall below 40 deg F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
  2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
  3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.
- B. Hot-Weather Placement: Comply with ACI 301 and as follows:
  1. Maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
  2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

## PART 2 - PRODUCTS

### 2.1 GENERAL REQUIREMENTS

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.

- B. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.
- C. Installation of concrete other than approved mixes shall be replaced at the expense of the Contractor.

## 2.2 MATERIALS

- A. Acquire cement and aggregate from the same source for all work.
- B. Cement: Cement shall be Portland cement Type II, unless otherwise indicated on the Drawings.
- C. Aggregate:
  - 1. Fine Aggregate: Fine aggregate shall consist of hard, strong, durable particles complying with the provisions of ASTM C33.
  - 2. Coarse Aggregate: Coarse aggregate shall conform to the provisions of ASTM C33. Aggregate shall be crushed aggregate or angular screened natural aggregate. Hydraulic - cement aggregate is unacceptable.
- D. Water: Water shall be clean and free from injurious amounts of oils, acids, alkalis, salts, organic materials, or other substances that may be deleterious to concrete or steel. Mixing water for prestressed, pretensioned and prestressed post-tensioned concrete or for concrete which will contain aluminum embedments shall not contain deleterious amounts of chloride ion.
- E. Admixtures: Admixtures to be used in concrete shall be subject to prior acceptance by Landscape Architect. The admixture shall maintain the same composition and performance throughout the Work as the product used in the concrete proportions established in accordance with ACI 211. Admixtures containing chloride ions shall not be used.
  - 1. Air Entrainment:
    - a. An air-entraining agent shall be used in all concrete. The agent used shall conform to ASTM C260.
    - b. Unless otherwise shown on the Drawings, the amount of airentraining agent used in each concrete mix shall be such as will affect the entrainment of the percentage of air shown in the following tabulation in the concrete as discharged from the mixer or pumper discharge hose if applicable. Table 1 is applicable for concrete strengths less than five thousand (5,000) psi

<b>Table 1</b>		
<b>Nominal Max. Aggregate Size (Inch)</b>	<b>Average Air Content (Percent)</b>	
	<b>Severe Exposure</b>	<b>Moderate Exposure</b>
3/8	$7-1/2 \pm 1-1/2$	$6 \pm 1-1/2$
3/4	$6 \pm 1-1/2$	$5 \pm 1-1/2$
1-1/2	$5-1/2 \pm 1=1/2$	$4-1/2 \pm 1-1/2$

- c. The level of exposure shall be determined by Landscape Architect.
  - d. When a batch of concrete delivered to the Project does not conform to the minimum specified air content, an air-entraining admixture may be added, one (1) time only for the batch, at Contractor's option prior to consideration for rejection. After the admixture is added, the concrete shall be remixed for a minimum of twenty (20) revolutions of the mixer drum at mixing speed. The concrete shall then be retested and if found acceptable, may be placed in accordance with the Specifications.
2. Water Reducing, Set-Controlling Admixture: Contractor shall use a "midrange" water reducing, set controlling admixture, Polyheed 997, or equal. The water-reducing admixture shall be used in all concrete and shall conform to ASTM C494/C494M, specifically Types A, B, C, D, and E.
  3. Finely Divided Mineral Admixtures (Fly Ash): Mineral admixtures shall be limited to fly ash conforming to ASTM C618, Class C or Class F. Class C fly ash is not permitted where sulfate resistant cement is required.
- F. Evaporative Retardant: In accordance with Section 03 29 00, Concrete Curing.
  - G. Bituminous Coating: Bituminous Coating for aluminum pipes will be in accordance with AASHTO M-190 Type A.
  - H. Grout: In accordance with Section 03 60 00, Grouting.
  - I. Epoxy Bonding Agent:
    1. Master Builders; Concrevice Liquid (LPL).
    2. Master Builders; Concrevice Standard Liquid.

## 2.3 COMPRESSIVE STRENGTH

- A. Concrete compressive strength requirements consist of a minimum strength that must be obtained before various loads of stresses are applied to the concrete and, for concrete designated by strength, a minimum strength at the age of twenty-eight (28) days. Unless otherwise shown on the DRAWINGS, the twenty-eight (28) day compressive strength of structural concrete shall be a minimum of four thousand five hundred (4,500) psi.
- B. The mix shall be designed for required strengths in accordance with ACI 301. The ratio of water to the sum of concrete plus pozzolan shall not exceed 0.45 by weight for durable, watertight, concrete. The amount of fly ash in the mix shall be between fifteen and twenty percent (15 and 20%) by weight of the total cementitious materials.
- C. Unless otherwise permitted or specified in the DRAWINGS, the concrete shall be proportioned and produced to have a slump not to exceed four (4) inches or less than two and one-half (2-1/2) inches. Concrete not consolidated by internal vibration shall be proportioned to have a slump not to exceed five and one-half (5-1/2) inches or less than four (4) inches.

## 2.4 SOURCE QUALITY CONTROL

- A. Batching:
  - 1. Measuring and batching of materials shall be done at a batching plant.
  - 2. Portland Cement:
    - a. Either sacked or bulk cement may be used. No fraction of a sack of cement shall be used in a batch of concrete unless the cement is weighed. Bulk cement shall be weighed on scales separate and distinct from the aggregate hopper or hoppers. Batching shall be such that the accuracy of batching shall be plus or minus one percent of the required weight.
  - 3. Water:
    - a. Unless water is to be weighed, the water-measuring equipment shall include an auxiliary tank from which the measuring tank shall be filled. In lieu of the volume method, Contractor shall be permitted to use a water-metering device.
  - 4. Aggregates:
    - a. Aggregates shall be handled from stockpiles or other sources to the batching plant in such a manner as to secure a uniform grading of the material. Aggregates that have become segregated, or mixed with earth or foreign material, shall not be used. Batching shall be so conducted as to result in the

weights of material required for each type aggregate within a tolerance of two percent (2%).

- b. Free water contents of the coarse and fine aggregates shall be continuously tested and concrete mixture adjusted for moisture conditions of the aggregate in order to meet the designated water/cement ratio.

5. Fine Aggregate:

- a. The proportion of fine aggregate shall be between thirty-six and forty-four percent (36 and 44%) by volume of the total aggregates in the concrete.

B. Mixing:

1. Ready-mixed concrete shall be either “central mixed” or “shrink mixed” concrete as defined in ASTM C94/C94M. “Truck mixed” concrete as defined in ASTM C94/C94M shall not be permitted. Mixing time shall be measured from the time water is added to the mix, or cement contacts the aggregate. All concrete shall be homogeneous and thoroughly mixed, and there shall be no lumps or evidence of undispersed cement. Mixers and agitators, which have an accumulation of hard concrete or mortar, shall not be used. Ready-mixed concrete shall be mixed and transported in accordance with ASTM C94/C94M.
2. The temperature of mixed concrete, immediately before placing shall not be less than fifty degrees Fahrenheit (50°F) or more than ninety degrees Fahrenheit (90°F). Aggregates and water shall be heated or cooled as necessary to produce concrete within these temperature limits. Neither aggregates nor mixing water shall be heated to exceed one hundred fifty degrees Fahrenheit (150°F).
3. The time elapsing from the time water is added to the mix (or the cement comes in contact with aggregate) until the concrete is deposited in place at the site of the WORK shall not exceed sixty (60) minutes when the concrete is hauled in non-agitating trucks, nor more than ninety (90) minutes when hauled in truck mixers or truck agitators.
4. The batch shall be so charged into the drum that a portion of the mixing water shall enter in advance of the cement and aggregates. The flow of water shall be uniform and all water shall be in the drum by the end of the first one-quarter (1/4) of the specified mixing time.
5. Cement shall be charged into the mixer by means that will not result in loss of cement because of the effect of wind, or in accumulation of cement on surfaces of hoppers or in other conditions which reduce or vary the required quantity of cement in the concrete mixture.

C. Transporting Mixed Concrete; Mixed Concrete or Truck Mixers:

1. Transporting of mixed concrete shall conform to ASTM C94/C94M.



2. Truck agitators shall be loaded not to exceed the manufacturer's guaranteed capacity. They shall maintain the mixed concrete in a thoroughly mixed and uniform mass during hauling.
3. No additional mixing water shall be incorporated into the concrete during hauling or after arrival at the delivery point, unless approved by Landscape Architect. If additional water is to be incorporated into the concrete at the site, the drum shall be revolved not less than thirty (30) revolutions at mixing speed after the water is added and before discharge is commenced. One (1) addition of water at the site to adjust mix workability is permitted but the maximum water cement ratio shall not be exceeded.
4. Contractor shall furnish a water-measuring device in good working condition, mounted on each transit mix truck, for measuring the water added to the mix on the site. All water tanks on transit mix trucks shall be filled prior to being batched and arrive at the construction site one hundred percent (100%) full.
5. Each load of ready mixed concrete delivered at the job shall be accompanied by the ticket in accordance with Article Delivery, Storage, and Handling.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Prior to placing concrete, Contractor shall remove all debris and thoroughly dampen the surfaces that may be in contact with the concrete to be placed.
- B. Contractor shall use compressed air from an air compressor to blow out construction debris and dirt at the bottom of members to be placed such as walls, beams, and columns, prior to final placement of forms that may obscure any joint. Contractor shall demonstrate to Landscape Architect that all debris, such as concrete particles, saw dust, loose tie wire, bar tags, tape, trash and dirt, have been thoroughly removed.
- C. All surfaces of forms and embedded materials that have become encrusted with dried mortar or grout from concrete previously placed shall be cleaned of all such mortar or grout before the surrounding or adjacent concrete is placed.
- D. No concrete shall be placed until all formwork, reinforcement, installation of parts to be embedded, bracing of forms, and preparation of surfaces involved in the placing have been reviewed by Landscape Architect.
- E. Immediately before placing concrete, all surfaces upon or against which the concrete is to be placed shall be free from standing water, mud, debris, or loose materials.
- F. No concrete shall be placed when form surfaces that may be in contact with the concrete, reinforcement, embedded items or sub-base is less than thirty-two degrees

Fahrenheit (32°F). When the mean daily outdoor temperature is less than forty degrees Fahrenheit (40°F), the temperature of the concrete shall be maintained between fifty degrees Fahrenheit (50°F) and seventy degrees Fahrenheit (70°F) for the required curing period. When necessary, arrangements for heating, covering, insulating, or housing the concrete work shall be made in advance of placement and shall be adequate to maintain the required temperature without injury as a result of concentration of heat. Combustion heaters shall not be used during the first twenty-four (24) hours unless precautions are taken to prevent exposure of the concrete to exhaust gases which contain carbon dioxide.

- G. Concrete shall not be placed against forms exposed to heating unless the temperature of the forms is first cooled to less than or equal to ninety degrees Fahrenheit ( $\leq 90^{\circ}\text{F}$ ).

### 3.2 PLACEMENT

- A. Placement shall conform to ACI 301, Chapter 8, ACI 304, ACI 306.1, ACI 305.1, and ACI 309. No concrete shall be placed in water except with the written permission of Landscape Architect. The surfaces of absorptive materials against or upon which concrete is to be placed shall be moistened thoroughly so that moisture will not be drawn from the freshly placed concrete. The concrete shall be placed by equipment that will prevent segregation or loss of ingredients. The stream of concrete shall not be allowed to separate by permitting it to fall freely over rods, spacers or other embedded materials.
- B. Unless otherwise called out in these Specifications or shown on the Drawings, the placement lift depth of concrete in walls shall be limited to two (2) feet or less to minimize surface defects such as air voids that can form on concrete surfaces. Lift depths shall be limited to one (1) foot if, in the opinion of Landscape Architect, the quality of the finish is unacceptable at the two- (2- ) foot lift depth.
- C. Concrete shall be placed so as to avoid segregation of the materials and the displacement of the reinforcement.
- D. Concrete shall not be dropped more than five (5) feet unless confined by closed chutes or pipes. Care shall be taken to fill each part of the form by depositing the concrete as near final position as possible. The coarse aggregate shall be worked back from the forms and worked around the reinforcement without displacing the bars. After initial set of the concrete, the forms shall not be jarred and strain shall not be placed on the ends of projecting reinforcement.
- E. Where steep slopes are required, the chutes shall be equipped with baffle boards or be in short lengths that reverse the direction of movement.
- F. Concrete shall not be pumped through aluminum alloy pipe.
- G. All chutes, troughs, and pipes shall be kept clean and free from coatings of hardened concrete.

### 3.3 CONSOLIDATION

- A. Concrete vibrators for consolidating concrete shall be two and one-half inch (2-1/2") diameter "high cycle" vibrators with a frequency under load of eight thousand (8,000) to ten thousand four hundred (10,400) vibrations per minute (vpm). Concrete vibrators of lesser capacity are unacceptable for use in any part of the construction. Contractor shall have at least one standby concrete vibrator ready for use for every two (2) concrete vibrators in use during a concrete placement.
- B. All concrete shall be thoroughly consolidated with internal vibrators as recommended in ACI 309 immediately after deposition. The concrete shall be thoroughly worked around the reinforcing steel, around embedded items and into corners of forms. Vibration shall be supplemented by spading, rodding, or forking to eliminate all honeycomb and voids around embedded items.
- C. The vibrator shall be inserted vertically, allowing it to penetrate rapidly to the bottom of the lift and at least six (6) inches into the previous lift. The vibrator shall be held at the bottom of lift for five to fifteen (5 - 15) seconds. The vibrator shall be pulled up at a rate of about three (3) inches per second.
- D. The vibrator shall be inserted so that the fields of action overlap. The field of action is approximately eight (8) times the vibrator's head diameter. Thus for a two and one-half (2-1/2) inch diameter vibrator, the spacing of each insertion shall be approximately twenty (20) inches.
- E. Vibration shall be stopped when the concrete surface takes a sheen and large air bubbles no longer escape.
- F. Do not use a vibrator to move concrete horizontally.

### 3.4 OPENINGS AND INSERTS

- A. Pipe sleeves, inserts for pipe connections, anchors, and forms for pipe holes shall be accurately placed and securely fastened to the forms in such a manner that the placing of concrete shall not alter their alignment or location. In the event that openings are inadvertently omitted or improperly placed, Landscape Architect may require the concrete to be cored at the proper location. Filling of improperly placed openings shall be done with expansive grout or dry pack or mortar applied with an accepted epoxy adhesive. The surfaces of the opening shall be roughened prior to filling.

### 3.5 EMBEDDED ITEMS

- A. At the time of concrete placement, embedded items shall be clean and free from mud, oil, and other coatings that may adversely affect bonding capacity. Aluminum embedments shall be coated with a bituminous material to prevent electrolytic action between the embedded item and reinforcing steel that results in concrete deterioration.

Embedment items shall be accurately placed and securely fastened to the forms in such a manner that the placing of concrete shall not alter their alignment or location. Contact between embedded items and reinforcing steel or tendon ducts is unacceptable and is not permitted.

### 3.6 CONSTRUCTION JOINTS

- A. The location of all construction joints shall be subject to the acceptance of Landscape Architect. The surface of all construction joints shall be thoroughly cleaned and all laitance and standing water removed. Clean aggregate shall be exposed by abrasive blast cleaning. Wire brushing and air water jets may be used while concrete is fresh provided results are equal to abrasive blast cleaning. Construction joints shall be keyed at right angle to the direction of shear. Except where otherwise shown on the Drawings, keyways shall be at least one and one-half (1-1/2) inch in depth over at least twenty five percent (25%) of the area of the section.

### 3.7 EVAPORATIVE RETARDANT

- A. The use of an evaporative retardant is required to assist in proper placement of concrete in accordance with Section 03 29 00, Concrete Curing. Apply two (2) times; after screeding and after the first floating operation. The retardant should be applied at a rate of one (1) gallon of sprayable solution per two hundred to four hundred (200 - 400) square feet by spraying with an industrial type sprayer. If the nozzle of the sprayer becomes plugged, Contractor shall clean, or replace, the nozzle. Under no circumstances shall the retardant be used except by spraying a mist with a nozzle. The retardant shall be applied in strict conformance with the manufacturer's recommendations and precautions. In no case shall the retardant be used as a finishing agent. The use of an evaporative retardant requires review and approval by Landscape Architect.

### 3.8 FIELD QUALITY CONTROL

- A. Contractor shall assist Owner or the concrete testing consultant as requested during the performance of quality control testing. When concrete is placed using a concrete pumper, concrete for testing will be taken from the pumper discharge hose.

END OF SECTION 03 00 00

## SECTION 116800

### PLAYGROUND EQUIPMENT

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

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

##### 1.2 SUMMARY

- A. This Section includes the following:
- B. Playground Equipment coordination and installation.
  - 1. Playground Equipment will be Owner-provided and installed by Contractor except where noted.
  - 2. Contractor is responsible for scheduling the delivery and the off-loading of the equipment.
  - 3. Contractor is responsible for coordinating with the Manufacturer on all required submittals and shop drawings and processing those submittals with the Owner and the Owner's Representatives.
  - 4. Contractor is responsible for coordinating the work with all related trades and materials suppliers, including site elements, safety surfacing, and utilities.
  - 5. Contractor will select and pay for Playground Safety Inspector prior to layout of play area and installation. Contractor is responsible for scheduling the reviews and inspections. Related Sections include the following:
    - a. Section 32 18 16.13 "Playground Protective Surfacing" for protective surfacing under and around playground equipment.

##### 1.3 DEFINITIONS

- A. Fall Height: According to ASTM F 1487, "the vertical distance between a

designated play surface and the protective surfacing beneath it."

- B. HDPE: High-density polyethylene.
- C. IPEMA: International Play Equipment Manufacturers Association.
- D. LLDPE: Linear low-density polyethylene.

- E. MDPE: Medium-density polyethylene.
- F. Use Zone: According to ASTM F 1487, "the area beneath and immediately adjacent to a play structure that is designated for unrestricted circulation around the equipment and on whose surface it is predicted that a user would land when falling from or exiting the equipment."

#### 1.4 PERFORMANCE REQUIREMENTS

##### A. Safety

1. Installation of playground equipment, including any specialty concrete, shall meet the safety requirements of the current CPSC and ASTM F 1487 and Title 22. Social Security; Division 4. Environmental Health; Chapter 22. Safety Regulations for Playgrounds.

#### 1.5 SUBMITTALS

- A. Provide submittals in accordance with Section 013300. Contractor shall provide submittals in a timely manner to facilitate the ordering of equipment and to allow installation in accordance with the approved construction schedule.

##### B. Installer Qualifications

1. Installer Certificates: Signed by manufacturers certifying that installers comply with requirements.
2. Provide evidence the installer of the play equipment possesses liability insurance of at least \$1,000,000 from a reputable insurance company covering defects in materials, workmanship, and installation. This liability shall cover any bodily harm resulting from a failure of play equipment due to installation defects.
3. Qualification Data:
  - a. For Installer: Submit a listing of at least five installations where the brand of play equipment with similar units to those proposed has been installed and has been in successful service for at least five years. This list shall include owner or purchaser; address of installation; service or maintenance organization; date of installation; and contact person and phone number.
  - b. For Manufacturer: Submit documentation that the Playground Equipment Manufacturer is ISO 9001 certified (Quality Management Standard) and ISO 14001 certified (Environmental Management Standard)

- C. Product Data: For each type of product indicated submit two bound copies of play

equipment product data, catalog cuts, photo brochures, specifications, and installation procedures, (including diagrams, instructions, scale models) or other printed information in sufficient detail and scope to verify compliance with requirements of the contract documents

- D. Provide a Certificate of Insurance from the manufacturer, covering both product and general liability, of not less than \$1,000,000. The issuing underwriter shall be AA rated.



- E. Coordination Drawings: Plans, drawn to scale, on which the following items are shown and coordinated with each other, based on input from installers of the items involved:
1. Extent of surface systems and use zones for equipment.
  2. Critical heights for playground surface or fall heights for equipment.
  3. Minimum dimensions from all obstructions, such as curbs and paving, to extent line of fall zones.
- F. Product Certificates: For each type of playground equipment, signed by product manufacturer.
- G. Material Samples for Final Color Selection: For each type of material incorporated within the selected play equipment configuration.
- H. Manufacturer Compliance Letter: Play Equipment Manufacturer shall provide Contractor and Owner a letter stating that the equipment design and detailing meets all professional standards of care for playground equipment, including compliance with ASTM, USCPSC Guidelines for Public Playground Safety,
- I. Material Certificates: For the following items, signed by manufacturers:
1. Shop finishes.
  2. Recycled plastic.
- J. Submit a statement by the material supplier or equipment manufacturer asserting that the supplied material or equipment meets and is installed according to the specified requirements.
- K. Maintenance Data: For playground equipment and finishes to include in maintenance manuals.
1. Submit two bound copies of procedures and instructions pertaining to frequency of preventive maintenance, inspection, adjustment, lubrication, and cleaning necessary to minimize corrective maintenance and repair for play equipment. A list of all parts and components for the system, by manufacturer's name, part number, and nomenclature, shall be attached.
  2. Supply a maintenance kit with each custom play structure that shall include wrenches for tamper-proof hardware, one (1) can of graffiti remover, primer, and spray paint to match the color of the structure, sandpaper, and a comprehensive maintenance manual. The maintenance manual shall include a complete plan drawing of the structure, inspection procedures, inspection report forms, and installation instructions and parts list. The entire kit is to be sent directly to the Owner's representative.

- L. Field quality-control test reports.
- M. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for playground equipment.
- N. Warranty: Special warranty specified in this Spec section, See 1.7.

1. Provide manufacturer's standard warranty against all defects in materials and workmanship for the installed play equipment.
- O. Testing Agency Qualifications: Contractor shall provide an independent agency qualified according to ANSI Z34.1 for testing indicated.
  1. Submit IPEMA certification showing compliance with all applicable portions of the current ASTM F-1487 Standard.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Equipment shall be delivered and stored in accordance with the manufacturer's recommendations.
- B. Protect materials from adverse weather.

#### 1.7 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace playground equipment components that fail in materials or workmanship within specified warranty period.
  1. Failures include, but are not limited to, the following:
    - a. Structural failures including chipping, breaking or bending.
    - b. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
  2. Play Equipment Warranty Period:
    - a. 3 YEAR LIMITED WARRANTY for all moving parts; swing seats and hangers; track ride trolleys and bumpers; spring assemblies for all rocking equipment and any other equipment not included above against failure due to corrosion, deterioration or workmanship.
    - b. 10 YEAR LIMITED WARRANTY for all aluminum; posts, clamps, beam, and caps, against structural failure due to corrosion, deterioration or workmanship. This warranty does not include any cosmetic issues.
    - c. 15 YEAR LIMITED WARRANTY for all plastic and steel components, against structural failure due to corrosion, deterioration or workmanship. This warranty does not include any cosmetic issues.
    - d. 15 YEAR LIMITED WARRANTY for protective plastic coating against structural failure due to corrosion, deterioration or workmanship. This warranty does not include any cosmetic issues.
  3. General Warranty:
    - a. Manufactured playground equipment shall be guaranteed against

defects in workmanship, materials, or installation for a minimum period of one year after Substantial Completion. Warranty shall include but not be limited to such defects as bubbling, delamination, peeling, loss of integrity, poor ultraviolet stability, lack of permeability, or general deterioration due to weather. All posts shall be guaranteed against deterioration for ten years. All rotationally molded components shall be guaranteed for five years.

## 1.8 SUBSTITUTIONS

- A. Contractor shall coordinate and install the play equipment shown on the drawings and described in this section. Substitutions can be approved by the client and the landscape architect on items that haven't been pre-purchased by the client.

## PART 2 - PRODUCTS

### 2.1 PLAYGROUND EQUIPMENT AND STRUCTURES (Contractor Furnished, Contractor Installed except where noted)

### 2.2 MATERIALS

- A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
  - 1. Cast aluminum: ASTM B 179
- B. Steel: Comply with the following:
  - 1. Steel Plates, Shapes, and Bars: ASTM A 36, hot-dip galvanized.
  - 2. Steel Pipe: ASTM A 53 or ASTM A 135, standard-weight, hot-dip galvanized.
  - 3. Steel Tubing: ASTM A 500 or ASTM A 513, cold formed, hot-dip galvanized.
- C. Stainless-Steel Sheet: ASTM A 240 or ASTM A 666; Type 304.
- D. Fittings: ASTM A 467, Class CS, 4/0 or 5/0, commercial-quality, hot-dip galvanized steel connectors and swing or ring hangars.
- E. Castings and Hangers: Malleable iron, ASTM A 47, Grade 32510, hot-dip galvanized.
- F. Hardware: Manufacturer's standard; commercial-quality; corrosion-resistant; hot-dip galvanized steel and iron, stainless steel, or aluminum; of a secure and vandal-resistant design.
- G. Fasteners: Manufacturer's standard; corrosion-resistant; hot-dip galvanized or plated steel and iron, or stainless steel; permanently capped, and theft resistant.
- H. Opaque Plastic: Color impregnated, UV stabilized, and mold resistant.

1. Polyethylene: Fabricated from 96 percent recycled, purified, fractional-melt plastic resin; rotationally molded HDPE, LLDPE, or MDPE with not less than 1/4-inch wall thickness.
  - I. Rotationally Molded Poly Parts: These parts shall be molded using prime compounded linear low-density polyethylene with a tensile strength of 2500 psi per ASTM D 638 and with color and UV stabilizing additives. Wall thickness varies by product from .187 inches (3/16 inch) to .312 inches (5/16 inch). Color shall be specified (four standard colors are available).
  - J. Permalene Parts: These parts shall be manufactured from .75 inches thick high-density polyethylene that has been specially formulated for optimum UV stability and color retention. Compression-molded products shall meet or exceed density of .933 G/cc per ASTM D 1505, tensile strength of 2400 psi per ASTM D 638. Color shall be specified (standard solid colors are tan, red, blue, green, and yellow). Some permalene parts are available in two-color laminate product with (2) .070 inches thick exterior layers over a .610 inches interior core of contrasting color. Color shall be specified (eight standard two-color options are available).

- K. Custom Components: These parts shall be manufactured in sizes and shapes as shown on the drawings and as required to complete the play equipment layout. Custom components shall meet or exceed ASTM standards as set forth in the General Requirements section. All custom components must be approved by the Owner's Representative.
- L. Stepped Play Surfaces: Provide stepped platforms where indicated on Drawings.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Examine areas and conditions, with Installer present, for compliance with requirements for site clearing, earthwork, site surface and sub-grade drainage, and other conditions affecting performance.
  - 1. Do not begin installation before final grading required for placing protective surfacing is completed, unless otherwise permitted by the Owner's representative.
  - 2. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.2 PREPARATION**

- A. Prior to start of excavation, Contractor shall lay out the entire outdoor play area and stake location of all elements, including playground equipment, use zones, pathways, planters, and hard surfaces, based on actual playground equipment supplied to be installed. Use zones shall not overlap hard surfaces, and shall meet criteria of current releases of CPSC, ASTM F 1292 and ASTM F 1487. The Owner's representative reserves the right to adjust the equipment locations and other elements to meet field conditions and use zone safety requirements.

### **3.3 INSTALLATION, GENERAL**

- A. General: Comply with manufacturer's written installation instructions, unless more stringent requirements are indicated. Anchor playground equipment securely, positioned at locations and elevations indicated.
  - 1. Maximum Equipment Height: Coordinate installed heights of equipment and components with finished elevations of protective surfacing. Set equipment so fall heights and elevation requirements for age group use and accessibility are within required limits. To meet the impact attenuation requirements of the playground safety surface in accordance with ASTM F1292 and Section 32 18 16 PLAYGROUND PROTECTIVE SURFACES,

the maximum accessible height of playground equipment shall be as specified by the manufacturer. Verify that playground equipment elevations comply with requirements for each type and component of equipment.

2. All components of the equipment shall be installed accurately to produce true plumb and level installation.

#### B. Post and Footing Installation



1. Excavation: Excavate holes for posts and footings as indicated in firm, undisturbed or compacted sub-grade soil.
2. Post Set on Sub-grade: Level bearing surfaces with drainage fill to required elevation.
3. Post Set with Concrete Footing: Comply with ACI 301 for measuring, batching, mixing, transporting, forming, and placing concrete.
  - a. Set equipment posts in/on concrete footing. Protect portion of posts above footing from concrete splatter. Verify that posts are set plumb or at the correct angle, alignment, height, and spacing.
  - 1) Place concrete around posts and vibrate or tamp for consolidation. Hold posts in position during placement and finishing operations until concrete is sufficiently cured.
  - b. Embedded Items: Use setting drawings and manufacturer's written instructions to ensure correct installation of anchorages for equipment.
  - c. Concrete Footings: Smooth top, and shape to shed water.

#### 3.4 PLAY AREA LAYOUT REVISIONS

- A. The play area equipment layout, as shown on the Drawings, is based on the use of specific equipment designed for specific aesthetic character, play value and activities. The use of other equipment suppliers with different configurations, if approved, will require the Contractor to provide a revised play equipment layout and obtain approval of both the equipment and the play area layout from the Owner's Representative. Contractor shall be responsible for all costs to revise the layout including review of the layout and documentation of the revised layout by Owner's consultant. The revised play equipment layout shall include appropriate safety use zone clearances for the equipment selected.

#### 3.5 LEVEL OF SAFETY SURFACING

- A. All play equipment located in areas of sand, wood fiber, or other loose fill surfacing shall be clearly marked to indicate the finished level of safety surfacing material to meet impact- attenuating requirements. All metal posts, springs or supports shall be as marked by the manufacturer. Those items not marked by the manufacturer shall be marked with a 3/4" circle painted with black epoxy paint.

#### 3.6 QUALITY CONTROL, INSPECTION AND ACCEPTANCE

- A. Arrange for playground equipment manufacturer's technical personnel to inspect playground and playground equipment and components during installation and at final completion and to certify compliance with the following:

1. ASTM F 1487.
  2. CPSC No. 325.
- B. Notify the Owner's representative at least 48 hours in advance of date and time of final inspection.
- C. Replace all defective or damaged play equipment prior to acceptance.

D. Prior to final inspection and acceptance, remove all rubbish and excess material for disposal as approved, and leave area in a neat, satisfactory condition.

E. CERTIFICATION INSPECTION

1. All play equipment shall be inspected by a Playground Safety Inspector with a valid certification from the National Playground Safety Institute (NPSI) for compliance in accordance with ASTM F 1487-98 and the USCPSC Handbook for Public Playground Safety. Contractor to provide a signed documentation of compliance certification.

**END OF  
SECTION**

**SECTION 31 25 00**  
**EROSION AND SEDIMENTATION CONTROL**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. This work shall consist of temporary measures needed to control erosion and water pollution. these temporary measures shall include, but not be limited to, berms, dikes, dams, sediment basins, fiber mats, netting, gravel, mulches, grasses, slope drains, and other erosion control devices or methods. These temporary measures shall be installed at the locations where needed to control erosion and water pollution during the construction of the project, and as directed by engineer, and as shown on the drawings.
- B. The erosion control plan presented in the drawings serves as a minimum for the requirements of erosion control during construction. contractor has the ultimate responsibility for providing adequate erosion control and water quality throughout the duration of the project. Therefore, if the provided plan is not working sufficiently to protect the project areas, then contractor shall provide additional measures as required to obtain the required protection. Contractor shall include in the bid price for erosion control a minimum of all items shown on the erosion control plan and any additional items that may be needed to control erosion and water pollution.

**1.02 RELATED SECTIONS**

- A. Section 01 57 19, Temporary Environmental Controls
- B. Section 31 23 19, Dewatering.
- C. Section 31 11 00, Clearing and Grubbing.
- D. Section 31 14 13, Topsoil and Wetland Stripping and Stockpiling.

**1.03 REFERENCES**

- A. National Pollutant Discharge Elimination System (NPDES) 2022 Issuance of General Permit for Stormwater Discharges From Construction Activities.

**1.04 SUBMITTALS**

- A. Storm Water Pollution Prevention Plan (SWPPP).
- B. Product data for materials proposed for use.
- C. All applicable permits for Erosion Control.

**1.05 REGULATORY REQUIREMENTS**

- A. County of Humbolt Phase II MS4 General Permit for Construction activities.
- B. Contractor is legally obligated to comply with all terms and conditions of the permit including testing for effluent limitations.
- C. Contractor shall allow the California Department of Public Health and Environment or other representatives to enter the site to test for compliance with the permit.
- D. Non-compliance with the permit can result in stoppage of all work.
- E. In the event of conflict between these requirements and erosion and pollution control laws, rules, or regulations of other Federal, State, or local agencies, the more restrictive laws, rules, or regulations shall apply.

**1.06 SCHEDULING**

- A. No site work shall begin until Contractor provided SWPPP has been approved.

**PART II - MATERIALS**

- B. All materials shall be submitted for approval prior to installation.
- C. Materials may include hay bales, straw, fiber mats, fiber netting, wood cellulose, fiber fabric, gravel, and other suitable materials, and shall be reasonably clean, free of deleterious materials, and certified weed free.
- D. Grass Seed:
  - 1. Temporary grass cover (if required) shall be a quick growing species, suitable to the area, in accordance with local criteria and permit requirements, which will provide temporary cover, and not compete with the grasses sown for permanent cover.
  - 2. All grass seed shall be approved by ENGINEER and in accordance with local regulations prior to installation.
  - 3. Fertilizer and soil conditioners shall be approved by ENGINEER and in accordance with local regulations prior to installation.

**PART III EXECUTION**

**1.07 GENERAL**

- A. Costs for SWPPP Preparation, monitoring, reporting (QSD and QSP) shall be the responsibility of the Contractor.
- B. All temporary and permanent erosion and sediment control practices shall be maintained and repaired as needed to ensure continued performance of their intended function.
- C. Owner will monitor Contractor's erosion control and work methods.
- D. If the overall function and intent of erosion control is not being met, Owner will require Contractor to provide additional measures as required to obtain the desired results.
- E. Costs for any additional erosion control measures shall be paid for at contract unit prices.
- F. The erosion control features installed by Contractor shall be adequately maintained by Contractor until the Project is accepted.

**1.08 PROTECTION OF ADJACENT PROPERTIES**

- A. Properties adjacent to the site of a land disturbance shall be protected from sediment deposition.
- B. In addition to the erosion control measures required on the DRAWINGS, perimeter controls may be required if damage to adjacent properties is likely.

**1.09 CONSTRUCTION**

- A. Stabilization of Disturbed Areas:
  - 1. Temporary sediment control measures shall be established within five (5) days from time of exposure/disturbance.
  - 2. Permanent erosion protection measures shall be established within five (5) days after final grading of areas.
- B. Stabilization of Sediment and Erosion Control Measures:

1. Sediment barriers, perimeter dikes, and other measures intended to either trap sediment or prevent runoff from flowing over disturbed areas shall be constructed as a first step in grading and be made functional before land disturbance takes place.
2. Earthen structures such as dams, dikes, and diversions shall be stabilized within five (5) days of installation.
3. Stormwater outlets shall also be stabilized prior to any upstream land disturbing activities.

C. Stabilization of Waterways and Outlets:

1. All onsite stormwater conveyance channels used by CONTRACTOR for temporary erosion control purposes shall be designed and constructed with adequate capacity and protection to prevent erosion during storm and runoff events.
2. Stabilization adequate to prevent erosion shall also be provided at the outlets of all pipes and channels.
3. Storm Sewer Inlet Protection: All storm sewer inlets which are made operable during construction or which drain stormwater runoff from a construction site shall be protected from sediment deposition by the use of filters.

D. Construction Access Routes:

1. Wherever construction vehicles enter or leave a construction site, a Stabilized Construction Entrance is required.
2. Where sediment is transported onto a public road surface, the roads shall be cleaned thoroughly at the end of each day.
3. Sediment shall be removed from roads by shoveling or sweeping and be transported to a sediment controlled disposal area.
4. Street washing shall be allowed only after sediment is removed in this manner.

**1.10 DISPOSITION OF TEMPORARY MEASURES**

- A. All temporary erosion and sediment control measures shall be disposed of within thirty (30) days after final site stabilization is achieved or after the temporary measures are no longer needed as determined by OWNER.
- B. Trapped sediment and other disturbed soil areas resulting from the disposition of temporary measures shall be permanently stabilized to prevent further erosion.
- C. Substantial Completion of Erosion Control Measures:
  1. At the time specified in the Contract Documents, and subject to compliance with specified materials and installation requirements, contractor shall receive a Substantial Completion Certificate for temporary erosion control measures.
  2. Maintenance of Erosion Control Measures after Substantial Completion: Contractor shall be responsible for maintaining temporary erosion control measures as specified in the Plans and Contract Documents until such time as work has been accepted by Owner as specified in Section 01 77 00, Closeout Procedures.
- D. Final Completion and Acceptance of Erosion Control Measures:
  1. After Engineer and Owner have determined that the drainage area has stabilized, contractor shall remove all remaining temporary erosion control measures.

2. Any damage to the site shall be repaired to the satisfaction of Engineer and at no cost to Owner.

**END OF SECTION**

**HYDROSEED GROWTH MEDIUM**

**GENERAL**

**1.01 SUMMARY**

- A. This section specifies the hydraulically-applied erosion control product category of High Performance-Flexible Growth Medium (HP-FGM). The HP-FGM shall be is a biodegradable, High Performance-Flexible Growth Medium (HP-FGM) composed of 100% recycled, thermally refined virgin wood fibers, crimped biodegradable interlocking fibers derived from regenerated cellulose sourced from sustainably harvested wood, micro-pore granules, naturally derived cross-linked biopolymers and water absorbents. The HP-FGM is patented, made in the US, plastic-free, and phytosanitized to eliminate potential weed seeds and pathogens. The product requires no curing period and upon application forms an intimate bond with the soil surface to create a continuous, porous, absorbent and flexible erosion resistant blanket that allows for rapid germination and accelerated plant growth.
- B. Related Sections: Other Specification Sections, which directly relate to the work of this Section include, but are not limited to the following:
  - 1. Section 01500 – Temporary Facilities and Controls
  - 2. Section 02300 – Earthwork

**1.02 SUBMITTALS**

- A. Product Data: Submit manufacturer’s product data and installation instructions. Include required substrate preparation, list of materials and application rate.
- B. Certifications: Manufacturer shall submit a letter of certification that the product meets or exceeds all technical and packaging requirements and is made in the U.S.A.

**1.03 DELIVERY, STORAGE AND HANDLING**

- A. Deliver materials and products in UV and weather-resistant factory labeled packages. Store and handle in strict compliance with manufacturer’s instructions and recommendations. Protect from damage, weather, excessive temperatures and construction operations.

**PRODUCTS**

**2.01 MATERIALS**

- A. The HP-FGM shall conform to the following typical property values when uniformly applied at a rate of 3,500 pounds per acre (3,900 kilograms/hectare) under laboratory conditions.

Property	Test Method	Tested Value (English)	Tested Value (SI)
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<b>Physical</b>			
Mass/Unit Area	ASTM D6566	≥11.6 oz/yd <sup>2</sup>	≥390 g/m <sup>2</sup>
Thickness	ASTM D6525 <sup>1</sup>	≥ 0.22 inch	≥ 5.6 mm
Ground Cover	ASTM D6567 <sup>1</sup>	≥ 99%	≥ 99%
Water Holding	ASTM D7367	≥ 1,700%	≥ 1,700%
Material Color	Observed	Green	Green
<b>Performance</b>			
Cover Factor <sup>2</sup>	ASTM D8298-	≤ 0.01	≤ 0.01
% Effectiveness <sup>3</sup>	ASTM D8298-	≥ 99%	≥ 99%
Vegetation	ASTM D7322 <sup>1</sup>	≥ 800%	≥ 800%
Functional Longevity <sup>4</sup>	ASTM D5338	≤ 18 months	≤ 18 months
Cure Time	Observed	0 - 2 hours	0 - 2 hours
<b>Environmental</b>			
Ecotoxicity <sup>5</sup>	EPA 2021.0	Non-Toxic	Non-Toxic
Biodegradability	ASTM D5338	Yes	Yes
Certified BioPreferred <sup>®</sup>	ASTM D6866	100%	100%
Biobased Content	ASTM D8082	Pass	Pass
Elemental Impurity			
Carbon Footprint <sup>6</sup>	Life Cycle Assessment	≤0.4 Unit CO <sub>2</sub> e/ Unit of product <sup>7</sup>	≤0.4 Unit CO <sub>2</sub> e/ Unit of product <sup>7</sup>

1. ASTM test methods developed for Rolled Erosion Control Products and have been modified to accommodate Hydraulically-Applied Erosion Control Products.
2. Cover Factor is calculated as soil loss ratio of treated surface versus an untreated control surface.
3. % Effectiveness = One minus Cover Factor multiplied by 100%.
4. Large scale testing conducted at Utah Water Research Laboratory. For specific testing information please contact a Manufacturer representative.
5. Functional Longevity is estimated time period, based upon ASTM D5338 testing and field observations, that a material can be anticipated to provide erosion control and agronomic benefits as influenced by composition, as well as site-specific conditions, including; but not limited to – temperature, moisture, light conditions, soils, biological activity, vegetative establishment and other environmental factors.
6. Cradle to factory gate (Conover, NC) life cycle assessment.
7. “Carbon dioxide equivalent” or CO<sub>2</sub>e is a term for describing different greenhouse gases in a common unit. For any quantity and type of greenhouse gas, CO<sub>2</sub>e signifies the amount of CO<sub>2</sub> which would have the equivalent global warming impact. The unit of CO<sub>2</sub>e per unit of product is a consistent ratio based on mass, regardless of what unit of mass is chosen. For instance, there is 0.4 kg of CO<sub>2</sub>e per kg of product or 0.4 oz CO<sub>2</sub>e per oz of product.

## 2.02 COMPOSITION

- A. All components of the HP-FGM shall be pre-packaged by the Manufacturer to assure both material performance and compliance with the following values. Under no circumstances shall field mixing of components be permitted. No chemical additives with the exception of fertilizer, soil neutralizers and biostimulant materials should be added to this product.

1. Thermally Processed\* (within a pressurized vessel) Virgin Wood Fibers – 80%  
\*Heated to a temperature greater than 380 degrees Fahrenheit (193 degrees Celsius) for 5 minutes at a pressure greater than 50 psi (345 kPa)
2. Wetting agents (including high-viscosity colloidal polysaccharides, cross-linked biopolymers, and water absorbents) – 10%
3. Crimped Biodegradable Interlocking Fibers derived from regenerated plant sources – 5%
4. Micro-Pore Granules – 5%

### **2.03 PACKAGING**

- A. Bags: Net Weight – 50 lb (22.7 kg), UV and weather-resistant plastic film  
Pallets: Weather-proof, stretch-wrapped with UV resistant pallet cover  
Pallet Quantity: 40 bags/pallet or 1 ton (909 kg)/pallet

### **EXECUTION**

#### **3.01 SOIL TESTING**

- A. Soil Samples shall be taken and sent to a third-party, independent lab for analysis and in compliance with Section 02 24 23 – Chemical Sampling and Analysis of Soils, if applicable.
- B. The tests shall include analysis and interpretation of results.
- C. The soil testing methods used shall be compliant with recognized agronomic testing standards, as outlined in Section 02 24 23, for revegetation of disturbed sites.
- D. Soil Analysis shall include results for:
1. Soil pH
  2. Soluble Salts
  3. Excess Carbonate
  4. Organic Matter
  5. Nutrient readings for:
    - i. Nitrogen, Phosphorus, Potassium
    - ii. Magnesium, Calcium, Sodium, Manganese, Sulfur, Zinc, Copper, Iron, Boron
  6. Cation Exchange Capacity
  7. Percent Base Saturation Sodium
- E. Any soil amendments or soil neutralizers shall be specified according to Section 32 01 90.16 – Amending Soils and applied with the hydroseeding slurry at Manufacturer recommended rates based on soil test results.

#### **3.03 SUBSTRATE AND SEEDBED PREPARATION**

- A. Examine substrates and conditions where materials will be applied. Apply products to geotechnically stable slopes that have been designed and constructed to divert runoff away from the face of the slope. Do not proceed with installation until satisfactory conditions are established.

- B. Depending upon project sequencing and intended application, prepare seedbed in compliance with other specifications under Section 1.01 B

### 3.04 INSTALLATION

- A. Strictly comply with equipment manufacturer's installation instructions and recommendations. Use approved hydroseeding machines with fan-type nozzle (50-degree tip). To achieve optimum soil surface coverage, apply HP-FGM from opposing directions to soil surface. Rough surfaces (rocky terrain, cat tracked and ripped soils) may require higher application rates to achieve 100% cover. Slope interruption devices or water diversion techniques are recommended when slope lengths (3H:1V) exceed 100 feet (30 m). Slope interruption intervals may need to be decreased based on steeper slopes or other site conditions. HP-FGM is not recommended for channels or areas with concentrated water flow unless used in conjunction with a rolled erosion control product designed to accommodate the anticipated hydraulic conditions. Unless approved by the Manufacturer, no chemical additives with the exception of fertilizer, soil neutralizers and biostimulant materials should be added to this product.
- B. For Erosion Control and Revegetation: To ensure proper application rates, measure and stake area. For maximum performance, apply HP-FGM in a two-step process\*:
1. Step One: Apply fertilizer with specified prescriptive agronomic formulations and typically 50% of specified seed mix with a small amount of HP-FGM for visual metering. Do not leave seeded surfaces unprotected, especially if precipitation is imminent.
  2. Step Two: Mix balance of seed and apply HP-FGM at a rate of 50 lb per 125 gallons (22.7 kg/475 liters) of water over freshly seeded surfaces. Confirm loading rates with equipment manufacturer.

\*Depending upon site conditions HP-FGM may be applied in a one-step process where all components may be mixed together in single tank loads. Consult with Manufacturer for further details.

Best results and more rapid curing are achieved at temperatures exceeding 60°F (15°C). Curing times may be accelerated in high temperature, low humidity conditions with product applied on dry soils.

- C. Mixing: A mechanically agitated hydroseeding machine is strongly recommended:
1. Fill 1/3 of mechanically agitated hydroseeder with water. Turn pump on for 15 seconds and purge and pre-wet lines. Turn pump off.
  2. Turn agitator on and load low density materials first (i.e. seed).
  3. Continue slowly filling tank with water while loading fiber matrix into tank.
  4. Consult application and loading charts to determine number of bags to be added for desired area and application rate. Mix at a rate of 50 lb of HP-FGM per 125 gallons (22.7 kg/475 liters).
  5. All HP-FGM should be completely loaded before water level reaches 75% of the top of tank.
  6. Top off with water and mix until all fiber is fully broken apart and hydrated (minimum of 10 minutes — increase mixing time when applying in cold conditions). This is very important to fully activate the bonding additives and to obtain proper viscosity.
  7. Add fertilizer and any other remaining amendments.
  8. Shut off recirculation valve to minimize potential for air entrainment within the slurry.
  9. Slow down agitator and start applying with a 50-degree fan tip nozzle.
  10. Spray in opposing directions for maximum soil coverage.

- D. Application Rates: These application rates are for standard conditions. Application rates may need to be increased to accommodate rough surfaces.

<b>Slope Gradient / Condition</b>	<b>English</b>	<b>SI</b>
≤ 4H to 1V	2,500 lb/ac	2,800 kg/ha
> 4H to 1V and ≤ 3H to 1V	3,000 lb/ac	3,400 kg/ha
> 3H to 1V and ≤ 2H to 1V	3,500 lb/ac	3,900 kg/h
> 2H to 1V and ≤ 1H to 1V	4,000 lb/ac	4,500 kg/ha
> 1H to 1V	4,500 lb/ac	5,100 kg/ha
Below ECB or TRM	1,500 lb/ac	1,700 kg/ha
As infill for TRM*	3,500 lb/ac	3,900 kg/ha

\*Use only approved and tested Turf Reinforcement Mats (TRMs) to infill with the HP-FGM

For additional details including mixing ratios/loading rates for specific machine sizes and visual keys for proper application, please consult the Manufacturer’s Application Guide for High Performance – Flexible Growth Medium.

### **3.05 CLEANING AND PROTECTION**

- A. Refer to planting for seed species and quantities.

### **3.06 CLEANING AND PROTECTION**

- B. Always flush residual slurry from hydraulic seeding/mulching equipment immediately following each application, at the end of each work period or when equipment will be left unattended. Compounds containing residual Urea, Nitrogen, Phosphorus, Potassium and other substances may form and can be hazardous to human health and equipment.
- C. Clean spills promptly. Advise owner of methods for protection of treated areas. Do not allow treated areas to be trafficked or subjected to grazing.

### **3.07 INSPECTION AND MAINTENANCE**

- A. All inspections and maintenance recommendations shall be conducted by qualified professionals consistent with the owner, engineer/specifier and regulatory entity(s) expectations.
- B. Initial inspections shall insure installations are in accordance with the project plans and specifications with material quantities and activities fully documented.
- C. Subsequent inspections shall be conducted at pre-determined time intervals and corrective maintenance activities directed after each significant precipitation or other potentially damaging weather or site event.

**END OF SECTION**

## SECTION 321216

### ASPHALT PAVING AND BASE

#### PART 1 - GENERAL

##### 1.1 SECTION INCLUDES

- A. Provide, spread, and compact aggregate base as shown on the Contract Documents and as specified herein.
- B. Provide, spread, and compact asphaltic concrete pavement.
- C. Adjust to finish grade: any, and all, new or existing utility cleanouts, drainage structures, valve boxes, etc., which are included in the limits of work.

##### 1.2 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including the Division 01 Specification Sections apply to this Section.
- B. Related Sections includes, but are not limited to the following:
  - 1. Earthwork - Section 02300
  - 2. Trenching - Section 02324
  - 3. Concrete - Section 030000

##### 1.3 REFERENCES

- A. Reference Data:
  - 1. If the year of the adoption or latest revision is omitted from the designation, it shall mean the specification, manual or test designation in effect the date the Notice to Proceed with the Work is given.
- B. Caltrans Standard Specifications.

##### 1.4 QUALITY ASSURANCE

- A. Testing and inspection of the aggregate base, aggregate subbase and asphaltic concrete shall be done by a testing laboratory retained and paid for by the County. Any areas receiving failing tests shall be reworked by the Contractor to achieve the minimum specified degree of compaction. It shall be the sole responsibility of the Contractor to achieve satisfactory results.
- B. Test Methods: Unless otherwise indicated, tests shall be made in conformance with the following standard methods:
  - 1. Relative compaction shall be determined by Test Method No. California 216 and 231.
  - 2. Caltrans Standards and Specifications, most recent edition.

##### 1.5 SUBMITTALS

- A. Submit certificate of compliance for aggregate base.
- B. Submit gradation and strength analysis of any recycled Class 2 aggregate base.
- C. Submit asphalt mix design parameters and certificates of compliance.
- D. Submittals shall conform to the requirements of Section 013300.

#### PART 2 - PRODUCTS

##### 2.1 AGGREGATE BASE

- A. Aggregate for aggregate bases shall be clean and free of vegetable matter and other deleterious substances.
- B. Aggregate base shall be of such a nature that it can be compacted readily under watering and rolling to form a firm, stable base.
- C. Aggregate base shall be Class 2, and the combined aggregate shall conform to the 3/4 inch maximum grading specified in Section 26-1.02A "Class 2 Aggregate Base" of the Caltrans Standard Specifications.

- D. Recycled Class 2 Aggregate base materials meeting the gradation and strength requirements of virgin material is acceptable for use in hardscape areas only (non-building areas).

## **2.2 ASPHALT CONCRETE**

- A. The asphalt concrete in park areas shall be Type A, ½ inch maximum, medium and shall conform to the applicable portions of Section 39 of the Caltrans Standard Specifications.
- B. The asphalt concrete in vehicular areas shall be Type A, ¾ inch maximum, medium and shall conform to the applicable portions of Section 39 of the Caltrans Standard Specifications

## **PART 3 - Execution**

### **3.1 SUBGRADE PREPARATION FOR BASE MATERIAL**

- A. Subgrade preparation shall conform to the requirements in Section 02300 - Earthwork, and shall not vary more than 0.05 foot above, or 0.05 foot below the grade established by the Plans.
- B. Prepared subgrade shall be inspected by the independent testing laboratory retained by the District prior to the placement of any aggregate base.
- C. As per Section 02300 - Earthwork.

### **3.2 SPREADING**

- A. Aggregate base shall be delivered to the roadbed as uniform mixtures and shall be graded in layers or windrows. Segregation shall be avoided and the base/subbase shall be free from pockets of coarse or fine material.
- B. The aggregate base, after spreading as above specified, shall be shaped to such thickness that after watering and compacting the completed base will conform to the required grade and cross section, within the tolerances specified in Section 26-1.05 "Compacting" of the Caltrans Specifications.
- C. The base shall be spread, watered and compacted in layers not to exceed 6 inches in compacted thickness to achieve the specified thickness.

### **3.3 COMPACTION AND TOLERANCE**

- A. The relative compaction of the base shall not be less than 95 percent.
- B. The finished surface of the aggregate base shall not vary more than 0.05 foot from the design grades.
- C. Aggregate base which fails to meet the specified tolerances shall be reshaped, dewatered, and recompacted at the Contractor's expense.

### **3.4 SUBGRADE PREPARATION FOR ASPHALT CONCRETE**

- A. All construction beneath the subgrade shall be completed, including pipeline testing, prior to asphalt concrete placement.
- B. Subgrade shall not vary more than 0.05 foot above or below design grade.
- C. Any soft spots in the subgrade shall be repaired by the Contractor, regardless of cause, prior to paving.
- D. Minimum Class 2 aggregate base material under private walkways as shown on the Drawings shall be 6" in compacted thickness, unless otherwise noted.

### **3.5 TACK COAT**

- A. Apply tack coat of RS-1 or CRS1 Emulsion to vertical surfaces of existing surfacing that will come into contact with asphalt concrete.

### **3.6 SPREADING AND COMPACTING ASPHALT CONCRETE**

- A. Shall be in accordance with Section 39 of the Caltrans Standard Specifications.

### **3.7 STRUCTURE ADJUSTMENT**

- A. The Contractor shall mark the location of all structures to be adjusted to grade and shall be responsible for their location after paving operations are completed.

- B. After surfacing or resurfacing is completed, the Contractor shall construct or reconstruct the structures to grade as shown on the plans.

**3.8 FLOW TEST**

- A. Finished pavement areas shall be flow tested in the presence of the Inspector of record to confirm that positive gradients, that facilitate proper and complete surface drainage, have been achieved in all paved areas.
- B. Any areas that fail the flow test, defined as any area where depth of ponding water exceeds 1/8 inch or where the surface of a ponding area exceeds 10 square feet, shall be repaved to achieve positive drainage.

**3.9 CLEAN UP**

- A. Remove all debris and stains resulting from the work of this section.

**END OF SECTION**



SECTION 321223  
**PAVEMENT MARKINGS AND SIGNS**

**PART 1 - GENERAL**

**1.1 Section Includes**

- A. Furnish materials and install painted parking stalls, pavement markings, crosswalk striping.
- B. Furnish and paint curbs.
- C. Furnish materials and install signs and posts.

**1.2 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Related Sections include the following:
  - 1. Asphalt Concrete Paving and Base – Section 321216
  - 2. Concrete Sidewalk and Curbs – Section 321600

**1.3 SUBMITTALS**

- A. In accordance with Section 013300, Submittal Requirements:
  - 1. Paint product data.
  - 2. Sign product data.

**1.4 REFERENCES**

- A. California Manual of Uniform Traffic Control Devices (MUTCD), latest edition.
- B. California Code of Regulations, Title 24, Part 2 – California Building Code (CBC), latest edition.
- C. American with Disabilities Act (ADA), latest edition.

**PART 2 - PRODUCTS**

**2.1 STRIPING PAINT**

- A. The paint to be used on striping shall be commercial quality paint and be applied in two coats to achieve the designed coverage. Thinner shall not be mixed with paint.
- B. White paint shall be used on all parking stall, pavement markings and crosswalk striping.
- C. Blue paint shall be used on ADA parking stalls where indicated on the details.
- D. Red paint shall be used on curbs where indicated on the drawings.
- E. Refer to Architectural drawings for color(s) of playground striping.

**2.2 SIGNS**

- A. Accessible signs shall also comply with the applicable sections of California Title 24 regulations and the ADA.
- B. Signs shall be mounted at standard heights on 2” diameter steel posts set in concrete as detailed on the plans.

**PART 3 - EXECUTION**

**3.1 STRIPING**

- A. No striping shall be started until all paving work on the entire job has been completed, and the various finished surfaces are sufficiently cured to prevent undue tracking onto new striping.
- B. All stripes for parking spaces shall have a width of four inches. All widths shall be within 1/4-inch of the specified widths.

- C. All lines and other shapes shall be clean and sharp as to dimensions and shall be painted in the locations shows on the plans. Ragged ends of segments, fogginess along the sides, or objectionable dribbling along the unpainted portions of the stripe shall not be permitted.
- D. The finished product shall have an opaque, well painted appearance with no black or other discolorations showing through. Any smears shall be painted out with black paint to the satisfaction of the Owner's Representative.
- E. The Contractor shall take all reasonable precautions to protect the paint during drying time and may be required to paint out all objectionable tracking. Appropriate traffic control necessary to insure non-tracking as well as reasonable traffic flows shall be the Contractor's responsibility.
- F. Painted stripes shall receive two coats of paint to achieve the desired coverage.
- G. No work shall be done when the pavement is appreciably damp.

### **3.2 SIGNS**

- A. Signs shall be installed in the locations shown on the plans and in accordance with the referenced standards for height, setbacks, and embedment.
- B. Signs for disabled accessibility shall be installed in accordance with the requirements of the California Building Code.

### **3.3 CLEAN UP**

- A. Remove all debris and stains resulting from the work of this section.

**END OF SECTION**

**PERMEABLE STABILIZED DECOMPOSED GRANITE PAVING**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section includes:
  - 1. Permeable Stabilized Decomposed Granite (DG) Paving
- B. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to Work of this Section
- C. Work included: All service, labor, materials, transportation and equipment necessary to perform the Work indicated on the Drawings and as specified.

**1.2 SYSTEM DESCRIPTION**

- A. Decomposed Granite paving locations are per plan.
- B. Compacted base depth to be per geotechnical recommendation, unless otherwise indicated.

**1.3 SUBMITTALS**

- A. Comply with Section 013300- Submittal Procedures, unless otherwise indicated.
- B. Submit product data and manufacturer's instructions for:
  - 1. Decomposed granite
  - 2. Stabilizer binder
  - 3. Metal header
  - 4. Geotextile fabric
- C. Samples:
  - 1. Contractor shall provide a material sample consisting of 1/2 pint container of decomposed granite (DG) to the Owner's representative for approval prior to installation.

**1.4 QUALITY ASSURANCE/FIELD QUALITY CONTROL**

- A. Installer qualifications: Installer to provide evidence to indicate successful commercial installations of decomposed granite surfacing containing GraniteCrete admixture. Contact manufacturer for certified installers. If product is installed by a non-certified installer, Contractor to coordinate review of installation process by a GraniteCrete personnel. Failure to coordinate this oversight will void the manufacturer warranty. If the warranty is voided by the manufacturer due to lack of Contractor coordination, the Contractor will repair or replace unsatisfactory product at his or her own expense.

## **1.5 MOCK UP**

- A. Construct a 20-sf mock-up of the Stabilized aggregate paving, including edging material and base course, at an owner-approved location, 5 days prior to installation. If approved, this mock-up will be the basis to demonstrate color, texture and standard of workmanship for the remainder of the project.
- B. Notify the Owner's Representative 3 days prior to placing mock up.
- C. Obtain approval of the mock-up prior to completing stabilized aggregate paving, the mock-up may remain as part of the project.

## **1.6 GENERAL REQUIREMENTS**

- A. Contractor shall be responsible for damages caused by his operations.
- B. Metal Header and geotextile fabric shall be in place before installation of DG.
  - 1. Scaled dimensions are approximate. Before proceeding with any work, the Contractor shall carefully check and verify all dimensions.
  - 2. Contractor shall acquaint himself with all site conditions prior to submitting bid proposal.

## **1.7 DELIVERY, STORAGE, AND HANDLING**

- A. Packing and Shipping: Deliver products in original unopened packaging with legible manufacturer's identification.
- B. Storage and Protection: Comply with manufacturer's recommendations.
- C. Store in a cool, dry place out of direct sunlight.
- D. Protect from damage by the elements and construction procedures.
- E. Store at temperature above 40 degrees F.

## **1.8 FIELD CONDITIONS**

- A. Do not install crushed aggregate blended with GraniteCrete admixture surfacing when sub-base is wet at saturated field capacity.
- B. Do not install GraniteCrete materials during rainy conditions or below 40 degrees Fahrenheit.

## **1.9 MAINTENANCE**

- A. The Maintenance Period begins on the day the Landscape Architect has given notice of substantial completion and shall continue thereafter for no less than ninety (90) continuous calendar days
- B. The Contractor shall continuously maintain and repair all involved areas of the Contract during the progress of the work an during the Maintenance Period until the Final Acceptance of the work.
- C. The Contract completion date of the Maintenance Period will be extended, when in the opinion of the Landscape Architect, improper maintenance is evident at the termination of the scheduled Maintenance Period. The Contractor shall be responsible for additional maintenance of the work at no charge in Contract price until all of the work is completed and acceptable.

- D. The contractor shall be responsible for maintaining adequate protection of the areas. Damaged areas shall be repaired immediately at the Contractor's expense.
- E. The Contractor shall physically remove any and all weed growth from DG areas.

**1.10 WARRANTY**

- A. Contractor shall provide warranty for performance of product. Contractor shall warranty installation of product for the time of one year from completion.

**PART 2 - PRODUCTS**

**2.1 MATERIALS**

**A. Decomposed granite:**

1. Description: Shall be 3/8-inch maximum gradation, produced from naturally friable rock/granite with enough fines to produce a smooth walking surface. Materials should be free from clay lumps, organic matter and deleterious material. Blends of coarse sand and rock dust are not acceptable. Color to be natural sand/golden.
2. Use a single supply source for the entire quantity required.
3. Gradation:

Sieve Sizes	% Passing
3/8"	100
#4	85-100
#8	70-80
#16	50-65
#30	40-50
#50	25-35
#100	15-25
#200	10-15

**B. Aggregate Binder:**

1. Provide GraniteCrete admixture or approved Equal, Color: natural
2. Manufacturer: GraniteCrete (1-800-670-0849) or approved Equal. Contact Mick Wells at SBI Building Materials (707) 975-0216

**C. Metal header:**

1. Description: 3/16" thick by 5" deep heavy-duty steel edging with (7) 16-inch long stakes per 16' section.
2. Product: DURAEDGE, or approved equal
3. Manufacturer: J.D. Russell Company (1-800-888-7425, www.jdrussellco.com), or approved equal. Available from Wyatt Irrigation Supply 707-578-3747 or John Deere Landscape 707-526-1171.

- 4. Color: Black, Powder Coat
- D. Geotextile Fabric:
  - 1. Description: Product: Non-woven geotextile with 3 oz/sy minimum weight.
  - 2. Product: 140 N (135 gal/ min flow rate)
  - 3. Manufacturer: Mirafi or approved equal. Contact Eric Gibson at 310-903-2120.
- E. Aggregate Base
  - 1. Class II Permeable Base Rock, see aggregate base specification
- F. EXCESS MATERIAL
  - 1. Provide Owner with excess materials for use in future maintenance- provide at minimum 1/2 yard of aggregate in 50 lb sacks.

**PART 3 - EXECUTION**

**3.1 EXAMINATION**

- A. Verification of Conditions: Examine areas and conditions under which Work is to be performed and identify conditions detrimental to proper or timely completion.
  - 1. Do not proceed until unsatisfactory conditions have been corrected.

**3.2 BLENDING STABILIZER**

- A. Blend 12 to 16-lbs (call manufacturer for exact blend) of stabilizer per 1-ton of decomposed granite or crushed 3/8" aggregate screenings. It is critical that the stabilizer be thoroughly and uniformly mixed throughout decomposed granite. Bucket blending is not acceptable. Blending with a rake or shovel is not acceptable. Blend material dry as water will make the material hard.

**3.3 INSTALLATION**

- A. Comply with manufacturer's recommendations for product installation.
- B. Layout stabilized decomposed granite paved areas(DG) per Drawings. Owner's Representative to approve layout prior to excavation.
- C. Do not proceed with installation of DG until all walls, curbs, headers, and paving and utility work in the area has been installed.
- D. Excavate and compact the subgrade to depths, slopes and widths as shown on the Drawings. Do not over- excavate compacted subgrades of adjacent pavement or structures.
- E. Confirm that the subgrade is at the proper elevation and compacted as required. Subgrade elevations slope parallel to the finished grade and/or as shown on the Drawings to provide positive drainage.
- F. Set metal landscape edging per drawings and in accordance with manufacturer's specifications. Headers shall be set and staked to provide tight, clean lines, both vertically and horizontally. Set top of steel edging to provide positive drainage.

- G. Install geotextile fabric per drawings and in accordance with manufacturer's specifications.
- H. After pre- blending with stabilizer, place the stabilized decomposed granite on prepared sub-grade. Level to grade and cross section per plans.
- I. Water heavily for full depth moisture penetration, per manufacturer. Water activates the stabilizer.
- J. Compact per manufacturer recommendations. Do not use a vibratory plate. Roll and compact within 3 to 48 hours after placement. Product can be compacted up to 48 hours after placement.
  - 1. Upon final compaction – finished surface of walkway shall be smooth, uniform, and solid. There shall be no evidence of chipping or cracking. Cured and compacted pathway shall be firm throughout profile with no spongy areas. Loose material will not be present on the surface after installation but may appear after use and according to environmental conditions. Pathway should remain stable underneath the loose granite on top. It is a natural looking pathway, yet stable throughout. Any significant irregularities in path surface shall be repaired to the uniformity of entire installation.
- K. Saw Cut/trowel/install expansion joints every 12' and at every engineered stress area (vertical change)
- L. Completed finished surface shall be consistent quality and free of deleterious materials such as organic materials, stones and loose material. Surface shall not have depressions or humps greater than 1/4 " in ten feet. Cold joints, if any should be inconspicuous.
- M. Protect adjacent walls, walks and utilities from damage or staining by DG. Any damage to paving or architectural work caused by DG installation shall be repaired by the Contractor at the Contractor's expense.

#### **3.4 OBSERVATION SCHEDULE**

- A. The Contractor shall be responsible for notifying Owner's Representative 72 hours (3 working days) in advance for the following observations:
  - 1. Layout of areas to receive DG
  - 2. Preparation of subgrade, prior to placing geotextile fabric
  - 3. Upon final compaction

#### **3.5 CLEAN-UP**

- A. As project progresses, Contractor shall maintain all areas in a neat manner and remove unsightly debris as necessary. After completion of project, Contractor shall remove all debris and containers used in accomplishing work, and clear paving and planting areas of DG.

**END OF SECTION**

SECTION 32 18 16.13

**PLAYGROUND RESILIENT SURFACING  
TOTTURF POURED IN PLACE (PIP) TPV SUPREME .5-1.5mm**

**PART 1 - GENERAL**

**1.01 WORK SCOPE**

- A. Furnish labor, material, and equipment necessary to install the poured-in-place, resilient surfacing system as shown on the drawings and specified herein.
  - a. Work shall include, but not be limited to the following: layout; excavation; backfill; furnishing and installing of base material; furnishing and installing of poured-in-place, resilient surfacing and all other incidental work to provide a complete resilient surfacing system.
  - b. Poured in place playground surfacing shall consist of a polyurethane binder mixed with recycled rubber, which will make up the attenuation cushion layer. The attenuation cushion layer is capped with TPV granules, mixed with a polyurethane binder creating the Wear Course.
  - c. Surfaces shall comply with ADA and CPSC guidelines as well as ASTM Standards. Manufacturer is to be certified by IPEMA, a third-party testing organization for playground surfaces and equipment.

**1.02 PERFORMANCE REQUIREMENTS**

- A. Area Safety: Poured in place within playground use zones shall meet or exceed the performance requirements of the CPSC, ADA and Fall Height Test ASTM F1292-18. The surface must yield both a peak deceleration of no more than 200 G-max and a Head Injury Criteria (HIC) value of no more than 1,000 for a head-first fall from the highest accessible portion of play equipment being installed as shown on drawings. IPEMA certification is required. (ASTM F1292-18, section 15 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 (UFAS) FED-STD-795 and the Architectural



and Engineer Instructions (9AEI) Design Criteria.

- C. 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.
- D. Poured in place surfaces 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 F 1951-14 and ASTM F1292-18.

### **1.03 APPLICABLE STANDARDS**

- A. ASTM International
- B. ASTM D2047 - 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 C1028.
- C. ASTM D412 – Standard test methods for vulcanized rubber and thermoplastic rubbers and thermoplastic elastomers-tension.
- D. ASTM D624 - Standard test method for tear strength of conventional vulcanized rubber and thermoplastic elastomers.
- E. ASTM D2859 – Standard test method for flammability of finished textile floor covering materials.
- F. ASTM E303 – Standard test method for measuring surfacing frictional properties using the British Pendulum tester.
- G. ASTM F1292-18 – Standard specification for impact attenuation of surface systems under and around playground equipment.
- H. ASTM F1951 – Standard specification for determination of accessibility of surface systems under and around playground equipment.

- 1.04** Poured in place surfaces shall be manufactured and installed by trained, experienced company employees or certified installers who have successfully completed the

“Certified Installers Training Program” required by Robertson Industries Inc.

**1.05 SUBMITTALS: THE FOLLOWING SHALL BE SUBMITTED**

- A. The Contractor shall submit a complete set of the material submittals, as required, including manufacturer’s name and address, specific trade names, catalog and model numbers, illustrations and descriptive material, and samples of the proposed material for this project clearly marked as to proposed items for approval by the Owner’s representative.
- B. Products submitted as equal must include hard copies of manufactures written specifications, warranty, purchase and use of materials.
- C. Manufacturer’s descriptive data and installation instructions.
- D. Manufacturer’s details showing depths of wear course and sub-base materials, anchoring systems and edge details.
- E. Upon request, a listing of at least five installations where products similar to these proposed for use have been installed and have been in service for a minimum period of three years. The list shall include owner or purchaser, address of installation, date of installation, contact person, and phone number.
- F. A signed statement by an authorized official certifying that the surfacing system meets the requirements of ASTM F1292-18, section 15 for a head-first fall from the highest accessible portion of the specified playground equipment.
- G. A signed statement from the manufacturer of the poured in place surfacing attesting that all materials under this section shall be installed only by the Manufacturer’s Trained Installers.
- H. A Certificate of Insurance shall be provided by the Manufacturer for poured in place surfacing for use as playground safety surfacing, covering general and product liability, of not less than \$1,000,000 for each occurrence, \$2,000,000 general aggregate, with an excess/umbrella liability of \$25,000,000. The issuing underwrite shall be AA rated.
- I. **IPEMA Certification mandatory**

- 1.06** Delivery, Storage and Handling: Materials and equipment shall be delivered and stored in accordance with the manufacturer's recommendations.
- 1.07** Project Site Conditions: Poured in Place surfacing must be installed on a dry sub- surface, with no prospect of rain within the initial drying period, and within the recommend temperature range of the manufacturer. Installation in weather condition of extreme heat, cold (less than 55°F), and/or high humidity may affect cure time, and the structural integrity of the final product. Immediate surrounding sites must be reasonably free of dust conditions or this could affect the final surface look.
- 1.08** Sequencing and Scheduling: Poured in Place surfacing shall be installed after all playground equipment, shade structures, signs and any other items that will be within the surfacing area. Coordinate with General Contractor.
- 1.09** Surface installation coordinated by manufacturer representative.
- 1.10** Warranty: Poured in Place surface shall maintain required impact attenuation characteristics and be guaranteed against defects in workmanship AND material for a limited seven-year period or as specified and agreed upon per alternate contract. Warranty will be specific to maintenance requirements and performance standards of completed product. Warranty is void if not installed by Manufacturers Trained and Certified Poured in Place Surfacing Installers.
- 1.11** Testing: NOTE: Critical Fall Height Four feet through 10 feet have been tested in accordance with Section 15 – Critical Fall Height Test Procedure of ASTM F1292-18.

## **PART 2 – PRODUCTS**

- 2.01** Safety surfacing shall consist of both recycled and synthetic materials meeting the requirements of this specification. The type of safety surfacing shall be Robertson Industries Inc., manufactured and installed by Robertson Industries Inc., or it's Certified Installers. Telephone: (800) 858-0519.

### **2.02 PRODUCT SCOPE**

- A. Poured in Place Surface: The poured in place surface shall consist of recycled rubber mixed with a polyurethane binder, then capped with .5-1.5mm TPV granules mixed with an aliphatic binder.

- B. It shall consist of a uniform material manufactured in such a way that the top portion meets the requirements specified herein for wear surface.
- C. The type of safety surfacing shall be a poured-in-place system and shall be indicated on the drawings.

### **2.03 ATTENUATION CUSHION LAYER SECTION**

- A. Impact attenuation cushion layer consists of these materials; recycled styrene butadiene rubber (SBR) and/or cryogenic crumb rubber and/or pre consumer postindustrial reclaimed scrap rubber adhered with a 100% solids polyurethane binder to form a resilient porous material.
- B. Strands of SBR may vary from 0.5 mm – 2.0 mm in thickness by 3.0 mm – 20 mm in length.
- C. Chunk Premium Black Rubber Granules are 5/8” granules: This rubber is pre-consumer, post-industrial, reclaimed rubber, granulated through a 5/8” screen and contains less than 2% dust.
- D. SBR Crumb Rubber (5-9 Mesh) using sieve analysis ASTM D5644 with a fiber content of .1% or less mixed in.
- E. Binder shall be between 7-12% of the total weight of the material and shall provide 100 % coating of the particles.
- F. The attenuation cushion layer shall be compatible with the wear course and must meet requirements herein for impact attenuation.

### **2.04 WEAR COURSE**

- A. Wear course shall consist of .5-1.5mm Thermal Plastic Vulcanized (TPV) granules with polyurethane binder formulated to produce an even, uniform, seamless surface. Installation of surfacing shall be seamless (unless otherwise agreed upon by owner).
- B. TPV shall be peroxide cured with an TPV content of 26% and shall include a processing aid to prevent hardness with 26% poly content to maintain dynamic testing characteristics, weatherization and UV stability.

- C. ASTM D2240 (Shore A) hardness of 55-65, not less than 26 percent rubber hydrocarbons.
- D. Size of TPV granules .5-1.5mm across. Binder shall be not less than 20% of total weight of rubber used in the wear surface and shall provide 100% coating of the particles.
- E. Thickness of wear course shall be a minimum .5” (12.7 mm).
- F. The wear course shall be porous.

**2.05 BINDER**

- A. No Toluene Diphenyl Isocyanate (TDI) shall be used.
- B. No filler materials shall be used in urethane such as plasticizers and the catalyzing agent shall contain no heavy metals.
- C. Weight of polyurethane shall be no less than 8.5 lbs. /gal (1.02 Kg/1) and no more than 9.5 lbs. /gal (1.14 Kg/1).
- D. Manufacturer is permitted to modify the type of urethane required to match extreme weather conditions. Substitutions must be equal to or exceed original quality.

**2.06 MATERIALS**

**A. Wear Course – TPV Granules**

Manufacturers: Rosehill Polymers  
 As Distributed by: Robertson Industries Inc. (800) 858-0519  
 Location Used: Playground Area

**B. Attenuation cushion layer – Robertson Industries Inc. Shredded and/or Chunk Rubber**

As Distributed by: Robertson Industries Inc. (800) 858-0519

Location Used: Playground Area

**C. Binder – Aliphatic Urethane Premium, Non-Ambering**

Manufacturer: Accella Polyurethane Systems

As Distributed by: Robertson Industries Inc. (800) 858-0519

Location Used: Playground Area

**D. Chunk Premium Black Rubber Granules**

Manufacturer: American Recycling Center, Inc. (989) 725-5100

655 Wabasse Drive

Owosso, MI 48867

As Distributed by: Robertson Industries Inc. (800) 858-0519

Location Used: Playground Area

**PART 3 – EXECUTION**

**3.01 SITE PREPARATION**

- A. Finished Grade/Slope: Verify that finished elevations or adjacent areas are as indicated on the architectural or site plans, that the appropriate sub-grade elevation has been established for the 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. Aggregate Subbase: Tolerance of aggregate sub-base shall be within .5” in depth. Verify that aggregate sub-base has been fully compacted. Per ADA Guidelines: compacted Aggregate sub-base – 4” of .75” minus irregular stone with fines compacted to 95% in 2” watered lifts.
- C. Concrete Sub-Base: Tolerance of concrete or bituminous sub-base shall be with .125” (3.0 mm) in 10’ (3050 mm). Per ADA Guidelines: Concrete a minimum of 3’ – 4’ at a minimum 2500 PSI. Concrete must cure for 7 days prior to application of attenuation cushion layer. Concrete must cure 21 days if wear course is to be applied directly to concrete surface. If poured in place surfacing is installed, verify that the concrete sub-base has cured (all areas appear white in color usually at 7 days) and that all concrete curing compounds and other deleterious substances that might adversely affect adhesion have been removed. Surface shall be clean and dry.
- D. Asphalt Sub-Base: Asphalt cure time requires 21-28 days. Once the new asphalt has cured, it must be pressure washed prior to the surfacing being installed. The contractor shall be responsible for flooding the pad to ensure proper slope and tolerance. Any

areas holding enough water to cover a flat nickel shall be patched prior to the arrival of our installation crews.

- E. Drainage: Verify that sub-surfacing drainage, if required, has been installed to provide positive drainage.

### **3.02 INSTALLATION**

- A. Poured in Place Surfacing: Components of the poured in place surfacing shall be mixed on site in a rotating tumbler to ensure components are thoroughly mixed and are in accordance with manufactures recommendations. Installation of surfacing shall be seamless up to 2,000 square feet per day. Material shall cover all foundations and fill around all elements penetrating the surface.
- B. Attenuation Cushion Layer: Whenever practical, attenuation cushion layer of surfacing material shall be installed in one continuous pour on the same day of up to 2,000 square feet. When a second pour is required, step the seam (see detail) and fully coat the step of the previous work with polyurethane binder to ensure 100% bond with new work. Apply adhesive in small quantities so that new attenuation cushion layer can be placed before the adhesive dries.
- C. Wear Course: Wear course must be quality peroxide cured TPV granules. wear surface shall be bonded to attenuation cushion layer. If necessary, additional primer will be used between the attenuation cushion layer and wear course. Apply adhesive to attenuation cushion layer in small quantities allowing the wear course to be applied before adhesive dries. Surface shall be hand troweled to a smooth, even finish. Expect continuous and seamless up to 2,000 square feet per day (contact sales representative for seamless in excess of 2,000 square feet). Where seams are required due to color change, size or adverse weather, a step configuration will be constructed to maintain wear course integrity. The edge of initial pour shall be coated with adhesive and wearing surface mixture shall be immediately applied. Pads with multiple seams are encouraged to include a top coat of urethane before being placed into use. Butt joint seams are not acceptable except for repairs. Under special conditions and with Owners written approval seams may be permitted in same color pad. Consult with Manufacturer for specific applications.
- D. Perimeter: For installations over existing concrete, the perimeter shall be saw cut to provide a keyway 1” deep x 1” wide, or formed during the pour, with surfacing rolled down into the void. Primer adhesive must be applied to all sides of the void. When

connecting to a concrete curb or border, the inside vertical edge shall be primed with adhesive and the final 2” of the attenuation cushion layer shall be tapered to allow the wear surface material to be 1.5”– 2” thick where it joins the concrete.

- E. Asphalt: When installing over new asphalt, a curb or other type of border is recommended around the entire pad to separate the new surface from other ground materials. Primer adhesive must be applied to the inside vertical edge of the border before poured in place surface installation.
- F. Asphalt: When installing over existing asphalt, a key way cut of 1” deep by 1” side for the poured in place to taper into and terminate with required ADA slope.
- G. Thickness: Construction methods such as the use of measured screeds or guides shall be employed to ensure that the full depth of 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.
- H. Clean Up: Manufacturer installers shall work to minimize excessive adhesive on adjacent surfaces or play equipment. Spills of excess adhesive shall be promptly cleaned.
- I. Protection: The safety surface shall be allowed to fully cure in accordance with Manufacturer’s instructions. The surface shall be protected by the owner from all traffic during the curing period of at a minimum of 48 hours or as instructed by the Manufacturer.
- J. Manufacturer Services: For poured in place safety surfacing, a Manufacturer’s representative who is experienced in the installation of playground safety surfacing shall be provided. The representative shall supervise the installation to ensure that the system meets the impact attenuation requirements as specified herein.

### **3.03 SITE AREA CLEAN UP**

The site shall be kept clean and free of tools, trash, and debris and installation materials daily. Products may be stored on site during installation with appropriate protective measures and approval by the Owner’s representative.

**END OF SECTION**



## SECTION 323113

### CHAIN LINK FENCES AND GATES

#### PART 1 - GENERAL

##### 1.01 DESCRIPTION

###### A. Work Included:

1. Provide all labor, materials, equipment, and services necessary to furnish and install chain link fencing and gates per Plans and these specifications.

###### B. Related Work:

1. SECTION 31 22 00 – SITE GRADING
2. SECTION 32 13 13 - CONCRETE PAVING.

##### 1.02 QUALITY ASSURANCE

###### A. Erector Qualifications:

1. Minimum of two years experience installing similar fencing.

##### 1.03 SUBMITTALS

###### A. Submit the following:

1. Materials list of items proposed to be provided under this Section.
2. Manufacturer's specifications and other data needed to prove compliance with the specified requirements.
3. Shop Drawings with sufficient detail to show fabrication, installation, anchorage, and interface of the work of this Section with the work of adjacent trades.
4. Manufacturer's recommended installation procedures which, when approved by the District Representative, will become the basis for accepting or rejecting actual installation procedures use on the Work.

#### PART 2 - PRODUCTS

##### 2.01 DIMENSIONAL DATA

###### A. General:

1. Pipe sizes indicated are commercial pipe sizes.

2. Tube sizes indicated area nominal outside dimensions.
3. H-section sizes indicated are normal flange dimensions.
4. Roll-formed section sizes indicated are the nominal outside dimensions.

## 2.02 GALVANIZING

- A. On steel framework and appurtenances, provide galvanized finish with not less than the following weight of zinc per square foot.
  1. Pipe: 1.8 oz., complying with ASTM A120.
  2. Hardware and accessories: Comply with Table I of ASTM A153.
  3. Fabric: 0.3 ox., complying with Class II of ASTM A121.

## 2.03 FABRIC:

- A. Provide 9 gauge or as noted on plan (core diameter) 3 ½ x 5. " mesh, with top and bottom selvages twisted and barbed.
- B. Provide fabric in one-piece widths.
- C. Fabric to be Black Vinyl Finish.

## 2.04 POSTS, RAILS, AND ASSOCIATED ITEMS:

- A. End, corner, pull posts, and line posts: Provide at least the following minimum sizes and weight:

Pipe, 2-7/8 " outside dimensions Schedule 40 steel pipe.
- B. Gate Posts: Provide gateposts for supporting single gate leaf, or one leaf of a double gate installation, for nominal gate widths as follows:

Pipe, 4" outside dimension Schedule 40 steel pipe
- C. Top rails and intermediate horizontal rails:
  1. Use 1.660" outside diameter Schedule 40 steel pipe.
  2. Provide intermediate horizontal rails as shown on plans.
  3. Provide in manufacturer's longest lengths, with expansion type couplings approximately 6" long for each joint.
  4. Provide means of attaching top rail securely to each gate, corner, pull, slope, and end post.
- D. Tension cable: Provide number 7 gage galvanized coiled spring wire at bottom of fabric.

E. Post tops:

1. Provide steel, wrought iron, or malleable iron, designed as weather tight closure cap.
2. Provide on cap for each post.
3. Provide caps with openings to permit through passage of top rail.

F. Stretcher bars:

1. Provide one-piece lengths equal to full height of fabric, with a minimum cross-section of 3/16" x 3/4".
2. Provide one stretcher bar for each gate and end post, and two for each corner, slope, and pull post, except where fabric is woven integrally into the post.

G. Stretcher bar bands:

1. Provide steel, wrought iron, or malleable iron, spaced not over 15" on centers, to secure stretcher bars to end, corner, pull, slope, and gate posts.
2. Bands may be used also with special fittings for securing rails to end, corner, pull, slope, and gate posts.

2.05 GATE

A. General:

1. Fabricated gate perimeter frames of pipe members.
2. Provide additional horizontal and vertical members to assure proper operation of the gate, and for attachment of fabric, hardware, and accessories.

4. Fabricate gate frames from:

Pipe 1.90" outside diameter Schedule 40 steel pipe.

B. Fabrication

1. Assemble gate frames by welding with special malleable or pressed steel fittings and rivets for rigid connections.
2. Use same fabric as used in the fence.
3. Install fabric with stretcher bars at vertical edges as a minimum.
4. Attach stretchers to gate frame at not more than 15" on centers.

5. Attach hardware with rivets or by other means which will provide security against removal and breakage.
6. Provide diagonal cross-bracing consisting of 3/8" diameter adjustable length truss rods on gates where required to provide frame rigidity without sage or twist.

D. Gate Hardware: As noted on plans

E. All items in this section are to have Black Vinyl Finish

## PART 3 - EXECUTION

### 3.01 SURFACE CONDITIONS:

A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the work. Do not proceed until unsatisfactory conditions are corrected.

### 3.02 INSTALLATION:

A. General:

1. Verify areas to receive fencing are completed to final grades and elevations.
2. Ensure property lines and legal boundaries of work are clearly established.
3. Install chain link fence in accordance with ASTM F 567 and manufacturer's instructions.
4. Install posts at a maximum spacing of 8 feet on centers.

B. Excavating:

1. Drill holes for post footings in firm, undisturbed or compacted soil, strictly adhering to the dimensions and spacing shown on plans.
2. Concrete set all posts: Drill holes in firm, undisturbed or compacted soil. Holes shall have diameter 4 times greater than outside dimension of post, and depths approximately 6" (152 mm) deeper than post bottom. Excavate deeper as required for adequate support in soft and loose soils, and for posts with heavy lateral loads. Set post bottom 36" (914 mm) below surface when in firm, undisturbed soil. Place concrete around posts in a continuous pour. Trowel finish around post. Slope to direct water away from posts.
2. Spread soils from excavations uniformly adjacent to the fence line, or on adjacent areas of the site if as directed by the project District Representative.

3. When solid rock is encountered near the surface, drill into rock at least 12" for line posts and at least 18" for end, pull, gate, and corner post. Drill hole at least 1" greater diameter than the largest dimension of the post to be placed.
4. If solid rock is below soil overburden, drill to full depth required, except penetration into rock need not exceed minimum depths specified above.

C. Setting posts:

1. Remove loose and foreign materials from sides and bottoms of holes and moisten soil prior to placing concrete.
2. Center and align posts in holes.
3. Place concrete around posts in a continuous pour and vibrate or tamp for consolidation.
4. Check each post for vertical and top alignment and hold in position during placement and finishing operations.
5. Set keeps, stops, sleeves, and other accessories into concrete as required.
6. Keep exposed concrete surfaces moist for as least seven days after placement, or cure with membrane curing material or other curing method approved by the District Representative.
7. Grout-in those posts which are set into sleeved holes, concrete constructions, or rock excavations, using non-shrink Portland Cement grout or other grouting material approved by the District Representative.

D. Concrete strength:

1. Allow concrete to attain at least 75% of its minimum 28-day strength before rails, tension wires, and/or fabric is installed.
2. Do not, in any case, install such items in less than seven days after placement of concrete.
3. Do not stretch and tension fabric and wire, and do not hang gates, until concrete has attained its full design strength.

E. Rails and bracing:

1. Install fencing with a top rail, intermediate rail and bottom rail.
2. Bracing: Install horizontal pipe brace at mid-height for fences 6' (1829 mm) and over, on each side of terminal posts. Firmly attach with fittings. Install diagonal truss rods at these points. Adjust truss rod, ensuring posts remain plumb.

2. Install top rail continuously through post caps or extension arms. Install lengths, 21' (6400 mm). Connect joints with sleeves for rigid connections for expansion/contraction.
3. Tension Wire: Install Tension Wire between posts with fittings and accessories.
4. Provide expansion couplings as recommended by the fencing manufacturer.

F. Installing fabric:

1. Leave approximately 2" between finish grade and bottom selvage.
2. Excavated high points in the ground to clear the bottom of the fence.
3. Place and compact fill to within 1" of the bottom of the fabric in depressions.
4. Pull fabric taut and tie to posts, rails, and tension wires.
5. Install fabric on outward side facing side of fence, and anchor to framework so that the fabric remains in tension after pulling force is removed.
6. Attach fabric with wire ties to line posts at 15" (381 mm) on center and to rails, braces, and tension wire at 24" (600 mm) on center.
6. Tension (stretcher) bars: Pull fabric taut; thread tension bar through fabric and attach to terminal posts with bands or clips spaced maximum of 15" (381 mm) on center.

G. Installing gates:

1. Install gates plumb, level, and secure for full opening without interference.
2. Install ground-set items in concrete for anchorage in accordance with the fence manufacturer's recommendations as approved by the District Representative.
3. Lubricate and adjust the hardware for smooth operation.

H. Miscellaneous:

1. Use U-shaped tie wires, conforming to diameter of pipe to which attached, clasping pipe and fabric firmly with ends twisted at least two full turns.
2. Bend ends of wire to minimize hazards to persons and clothing.
3. Fasteners:
  - a. Install nuts for tension band and hardware bolts on side of fence opposite fabric side.

- b. Peen the ends of bolts to prevent removal nuts.
- 3. Repair galvanized coatings damaged in the shop or field erection, using a hot-applied repair compound applied in accordance with its manufacturer's recommendations as approved by the District Representative.

### 3.03 CLEANING

- A. Clean up debris and unused material and remove from the site.

END OF SECTION

## SECTION 323300

### SITE FURNISHINGS AND EQUIPMENT

#### PART 1- GENERAL

##### 1.01 CONDITIONS

- A. The general provisions of the Contract, including General and Supplementary Conditions and General Requirements apply to the work specified in this Section.

##### 1.02 DESCRIPTION

- A. Work includes but is not limited to the following:
  1. Furnish all labor, materials, tools, equipment, operation or methods listed, mentioned or scheduled on the Contract Documents and/or herein specified in this Section.
  2. Although such Work is not specifically indicated, furnish and install all supplementary or miscellaneous items, appurtenances and devices incidental to or necessary for a sound, secure and complete installation.
  3. Completely coordinate with work of all other trades.

##### 1.03 QUALITY ASSURANCE

- A. All products or items described herein shall be new, unless otherwise specified, and shall be from the specified manufacturer or approved equal. Products shall be complete in all respects, properly installed, and in perfect working order.

##### 1.04 QUALIFICATION OF INSTALLER

- A. Installer shall be thoroughly trained and experienced in the skills required, and shall be completely familiar with the products and their installation as specified on the Contract Documents and in this Section. Installer shall be present at all times during progress of Work of this Section and shall direct all work performed.

##### 1.05 COORDINATION

- A. Contractor shall be charged with the responsibility of making arrangements for the coordination of his construction operations with those of all others on the job, and he shall permit other forces so engaged to accomplish their portion of the Work without undue interference or delay.



- B. Contractor shall place order for all site furnishings and equipment immediately after award of bid to ensure adequate time for manufacturing, shipping and installation. If any materials or equipment are not ordered in time, additional costs made by equipment manufacturer's to their equipment in time to meet construction schedule together with any special handling costs, shall be borne by the Contractor. **NO** project extension shall be granted due to improper lead time in ordering.

#### 1.06 SUBMITTALS

- A. Submit one (1) electronic copy (preferred) or one (1) hard copy of manufacturer's catalog cuts off all products to the Owners Representative for approval. Catalog cuts shall clearly identify product, finishes, color, schedule and installation.
- B. Submit one (1) electronic copy (preferred) or one (1) hard copy of the play equipment shop drawings to the Owner's Representative approval. Shop drawings shall clearly identify product, materials, connections, equipment, safety railings, finishes, color, schedule and installation.
- C. All approvals must be granted prior to ordering product.

### **PART 2 - PRODUCTS**

#### 2.01 PARK SIGNS

- 2.01 Submit shop drawings for approval prior to ordering signs. Refer to construction plans for design; all products shall be as specified or approved equal.

### **PART 3 - EXECUTION**

#### 3.01 GENERAL

- A. Work shall be set true to line and shall present a neat and finished appearance. Includes setting each item in its correct place, fastening it, connecting it, or incorporating it into other portions of work, as each item may require; testing and operating equipment to assure proper functioning. Furnish anchors and adhesives required for installing and attaching the equipment specified herein.
- B. Install per manufacturer's instructions and specifications.

#### 3.02 INSTALLATION OF PARK SIGN

- A. Park sign shall be located as indicated on the Contract Documents for Owner's Representative approval prior to installation.
- B. Contractor shall be responsible for installation any footing, as detailed by the manufacturer, onsite for signs with base

### 3.03 INSTALLATION OF BENCHES

- A. Locate benches as indicated on Contract Documents for Owner's Representative approval prior to installation.
- B. Install items level and plumb.
- C. Surface mount in conformance with manufacturer's specifications.

### 3.04 INSTALLATION OF PICNIC TABLES

- A. Locate picnic tables as indicated on Contract Documents for Owner's Representative approval prior to installation.
- B. Install items level and plumb.
- C. Surface mount as detailed on the Contract Documents and in conformance with manufacturer's specifications.

### 3.05 INSTALLATION OF TRASH RECEPTACLE

- A. Install as detailed on the Contract Documents and in conformance with the manufacturer's specifications.

### 3.06 INSTALLATION OF PLAY EQUIPMENT

- A. Install as detailed on the Contract Documents and in conformance with the manufacturer's specifications. Equipment shall be composed of such material and constructed as specified by the individual manufacturer's specifications. All posts shall be steel. The contractor will be responsible for receiving and storing the play equipment until it is installed. Manufacturer to provide repair kit with paint, details, specifications and all necessary tools.
- B. Coordination of all play equipment components in relation to the depth of components within the specified play area surfacing material and drainage items will be required to be verified prior to placement of order of play equipment. Verify specific play components with the type of surfacing material(s) to ensure required depths are achieved.

- C. Contractor shall assemble and install playground equipment, required signs and labels in compliance with the written instructions of the manufacturer. The playground equipment shall be assembled and installed by or under the direct supervision of an individual who is authorized by the manufacturer to assemble and install the equipment.
- D. Prior to final project approval and acceptance, the playground equipment shall be inspected by a Certified Playground Safety Inspector who shall certify in writing that the equipment, insofar as it can be seen without disassembling it or digging into the surfacing, is in compliance with ASTM F-1487-98 and CPSC Handbook Publication number 325.
- E. Install in conformance with all applicable playground accessible requirements and consumer Product Safety Commission Guidelines for public playground safety.
- F. The Contractor shall install a 6'-0" high temporary barrier fence around the play area, until final acceptance has been granted.

3.07 INSTALLATION OF PLAYGROUND RESILIENT SURFACING

- A. Refer to Section 32 18 16.13

3.08 INSTALLATION OF STEEL BASKETBALL HOOPS/MULTIGOALS

- A. Install as detailed on the Contract Documents and in conformance with the manufacturer's specifications.

3.09 PROTECTION

- A. Adequately protect all work from damage by subsequent construction operations. Damaged work shall be replaced by Contractor and at Contractor's expense.

**END OF SECTION**

## SECTION 32 84 00

### PLANTING IRRIGATION

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

##### 1.2 SUMMARY

- A. Work of this section includes all labor and materials necessary to construct and / or modify the irrigation system as shown on the drawings and specified herein.
- B. The work includes all labor, materials, processes, and equipment necessary to complete and test the irrigation system work as indicated on the Drawings and specified herein.
- C. All incidental parts, which are not shown on the plans or specified herein and are necessary to complete or modify the existing system shall be furnished and installed as though such parts were shown on plans or specifications.
- D. The work includes, but is not limited to, the following:
  - 1. Pipes and fittings.
  - 2. Manual and Automatic Control Valves.
  - 3. Rotors, Rotators, and Sprinklers.
  - 4. Drip distribution tubing and emission devices.
  - 5. Controller(s) and control elements.
  - 6. Low voltage control wire and connections
  - 7. Valve boxes and enclosures.
- E. Related Documents and Sections:
  - 1. Section 01 31 00 "Project Management and Coordination"
  - 2. Section 01 56 39 "Temporary Tree and Plant Protection"
  - 3. Section 01 78 00 "Closeout Submittals"

4. Section 03 30 00 “Cast-In-Place Concrete”
5. Section 31 00 00 “Earthwork”
6. Section 32 90 00 “Planting”
7. Section 32 94 45 “Landscape Maintenance”

### 1.3 DEFINITIONS

- A. American Public Works Association (APWA)
- B. American Standards for Testing and Materials (ASTM)
- C. American Water Works Association (AWWA)
- D. National Electric Code (NEC)
- E. Uniformed Plumbing Code (UPC)
- F. Manufacturer’s Standardization Society of Valve and Fitting Industry (MSS)

### 1.4 SUBMITTALS

- A. Product Submittals: Submit three (3) copies of the proposed irrigation construction materials to the Landscape Architect for review and approval a minimum of then (10) working days prior to commencement of work. The plan must follow the specifications and design criteria as outlined herein.
  1. Each submittal shall include manufacturer’s product information (‘cut’) sheets for all components and materials proposed for use in fabricating and install the irrigation system, including but not limited to:
    - a. Pipes and fittings.
    - b. Manual valves.
    - c. Pressure-reducing valves.
    - d. Automatic control valves and accessories.
    - e. Transition fittings.
    - f. Rotors, Rotators, and Sprinklers.
    - g. Quick couplers.
    - h. Drip irrigation specialties.
    - i. Controllers.
    - j. Boxes for manual and automatic control valves.
    - k. Enclosures for backflow preventers and controllers.
    - l. Include rated capacities, and operating characteristics.
- B. Record Copy Drawings: During the course of installation, carefully show all field changes in red line on a print of the irrigation system as installed. This drawing shall be

labeled “Record Copy”, and shall be made available for inspection. The status of the “Record Drawing” shall correlate directly with the percentage of work completed as described in the Contractor’s Pay Request and may be used as a guide when approving payments.

- C. As-Built Drawings: Upon completion of the work of this section and as a condition of its acceptance, the Contractor shall deliver to the Landscape Architect the following:
1. Drawings: Submit three (3) prints and one (1) reproducible and/or electronic file of as-built drawings. As-Built drawings shall clearly show all original components of the Record Copy and all changes documented in the Record Copy. Main lines, valves, valve boxes, and valve markers and other buried equipment shall be positively located by a minimum of two dimensions each from two (2) fixed reference points.
  2. Maintenance Manual: Submit three (3) copies containing the following:
    - a. Catalog cut sheets of all irrigation materials installed.
    - b. Contractor’s name, address and telephone number.
    - c. The duration of the guarantee periods
    - d. The name and address of the local manufacturer’s representative.
    - e. List and description of routine maintenance procedures, including winterization, start-up, and recommended watering times for each zone.
    - f. Troubleshooting guide.
- D. Landscape Irrigation Audit: Upon completion of the work of this section and as a condition of its acceptance, the Contractor shall deliver to the Landscape Architect the following:
1. Landscape Irrigation Audit Certificate: Submit two (2) copies of the Irrigation Audit Report prepared by a certified landscape irrigation auditor. Proof of certification must be provided with the signed and dated report.
  2. Landscape Irrigation Audit must be submitted and approved prior to the Date of Final Completion.
  3. Landscape Irrigation Audit shall be in compliance with the latest edition of the State of California Model Water Efficient Landscape Ordinance (MWELo). The MWELo is also referenced by Title 24, Part 11, Chapters 4 and 5 CalGreen Building Code.
  4. Landscape Irrigation Audit shall be conducted by a local agency landscape irrigation auditor or a third-party certified landscape irrigation auditor. Landscape audits shall not be conducted by the person who designed or installed the landscape irrigation system.

## 1.5 QUALITY ASSURANCE

- A. Proprietary items shown on the drawings and specified herein are shown to establish standards of quality, utility, design and function. Equivalent units by other manufacturers (substitutions) will be considered provided they are similar in characteristics. They shall be substituted only if approved by the Landscape Architect.
- B. The Contractor shall store all PVC pipe and fittings out of direct sunlight and protect from physical damage.
- C. The Contractor shall store and protect all specified components from adverse weather conditions until installation is complete.
- D. The Contractor shall handle all components as directed by the manufacturer's handling and installation instructions. Damage from transport or other handling of materials shall be the responsibility of the Contractor.
- E. All local, municipal and state laws and rules and regulations governing or relating to any portion of this work and hereby incorporated into and made a part of these specifications and the Contractor shall carry out their provisions. Any specification herein contained, shall not be construed to conflict with the above rules, regulations or requirements.

## 1.6 PROJECT CONDITIONS

- A. Inspection of the site: The Contractor shall inspect the site prior to construction and verify the extent of the work required. Commencement of construction by the Contractor designates acceptance of the site conditions apparent at outset. The Contractor shall obtain approval to access system components for inspection prior to commencement of construction.
- B. The Contractor shall verify the locations of all existing utilities, structures, and services before commencing work. The location of utilities, structures, and services shown on these plans are approximate only. Any discrepancies between these plans and the actual field conditions shall be reported to the Landscape Architect immediately.
- C. Weather Limitations: Work shall be performed only when weather conditions do not detrimentally affect the quality of work as intended and shown on these plan sheets.
- D. Project Limits: Areas, as specified within which work is to be performed.
- E. If new mainline is required in areas not currently described on the construction documents, submit a shop drawing of location, hydraulics, and system layout for new extension to Landscape Architect for approval prior to commencement of construction.
- F. The Contractor shall protect all areas of work defined on the drawings and any existing on-site vegetation, structures, utilities, etc. All damage which occurs as a result of work

under this contract shall be repaired at no cost to the Owner. The contractor shall be responsible for the provision of traffic control, barricades, safety guards, and any other structures or improvements necessary for the complete protection of the public. The Contractor shall verify water sources and install labeled components as required by state and federal laws.

- G. The Contractor shall verify, locate, and protect all existing utilities and features on and adjacent to the project site during construction and shall repair, at their own expense: all damage as a result of construction activities.
- H. The Contractor shall, at all times, take adequate precautions to keep rock, dirt, gravel, debris, and all other foreign materials from entering piping, valves, and other irrigation equipment.

#### 1.7 COORDINATION

- A. Coordinate with other trades affecting or affected by work of this section.
- B. Verify that sleeving and other conduits, of sizes and types specified, are installed as required.
- C. Prior to the start of work the Contractor shall verify that the performance and components of the existing site systems are in accord with current jurisdictional requirements and that all necessary components are located as shown on the drawings.
- D. The Contractor shall protect the existing site systems and maintain their performance at all times during the work of this section unless otherwise approved by the Landscape Architect. The Contractor shall cap all lines that are cut by new construction and/or re-route to maintain existing system performance.
- E. The Irrigation Contractor shall have a Supervisor on-site at all times while work is being performed. Supervisor must be available to communicate with other project personnel at all times.

#### 1.8 GUARANTEE

- A. The Contractor guarantees that all new irrigation components installed, as part of this work shall be free from defects in materials, design, and workmanship for a period of one year from Date of Final Acceptance.
- B. Upon notice from the Landscape Architect of failure on any part of the installed equipment during the guarantee period, due to material fatigue, normal wear or faulty installation procedures, new replacement parts shall be promptly furnished and installed by the Contractor at no additional cost to the Owner. Damages to property or site improvements resulting from the failure of specified components shall be repaired promptly, at no additional cost to the Owner.



- C. The Contractor shall be responsible for grade settlement, and/or erosion of soil surfaces resulting from defects in irrigation installation throughout the specified warranty period.

## 1.9 DAMAGES

- A. Any structures or facilities or surfaces damaged due to work of this project shall be restored equal or better to their original condition at Contractor's expense and to the satisfaction of the Owner and the Landscape Architect
- B. The Contractor shall be responsible for all damage caused by leaks or breaks in pipe furnished or installed in this contract for one year after Date of Final Acceptance.

## 1.10 EXISTING UTILITIES

- A. Locate and identify, with visible marking, existing underground utilities in the areas of work. If utilities are to remain in place, provide adequate means of protection during excavation operations.
- B. Should uncharted piping or other utilities be encountered during excavation, consult the Landscape Architect and Owner immediately for directions. Cooperate with the Owner and public or private utility companies in keeping their respective services and facilities in operation. Repair damaged utilities to the satisfaction of the utility owner and Owner. The cost of repairing charted or known utilities shall be paid by the contractor.
- C. Do not interrupt existing utilities service facilities occupied and used by the Owner or others, except when permitted in writing by the Landscape Architect and then only after acceptable temporary utility services have been provided.
- D. Point-of-connection to incoming water services for irrigation shall be made upstream of any other services.

## PART 2 - PRODUCTS

### 2.1 GENERAL PRODUCT REQUIREMENTS

- A. Materials and equipment shall be new, delivered to site in original factory condition, and as specified in this section.

### 2.2 PVC PIPE

- A. Pipe Sleeves

1. Pipe Sleeves Pipe sleeves six (6) inch and larger shall be High Density Polyethylene (HDPE) with smooth interior wall and annular exterior corrugations meeting ASTM F2648 or approved equal.
2. Pipe sleeves four (4) inch and smaller shall be PVC Schedule 40 Bell End, Type 1 white, NSF approved, for solvent weld meeting requirements meeting ASTM D1785 or approved equal.

B. Pressure Main Line

1. Pressure main line pipe four (4) inch and larger shall be PVC Class 200 Gasket Joint, Type 1 white, NSF approved, gasket push on pipe meeting requirements ASTM D2241.
2. Pressure main line pipe two and one half (2-1/2) to three (3) inch shall be PVC Class 315 Bell End, Type 1 white, NSF approved, for solvent weld meeting requirements ASTM D2241.
3. Pressure main line pipe two (2) inch and smaller shall be PVC Schedule 40 Bell End, Type 1 white, NSF approved, for solvent weld meeting requirements ASTM D1785.

C. Non-Pressure Lateral Line

1. Non-pressure lateral line two and one half (2-1/2) to four (4) inch: PVC Class 315, Type 1 white, NSF approved, solvent weld pipe meeting the requirements of ASTM D2241.
2. Non-pressure lateral lines two (2) inch and smaller shall be PVC Schedule 40, Type 1 white, NSF approved, solvent weld pipe meeting the requirements of ASTM D1785.
  - a. Solvent weld for assembly shall be as per manufacturer's specifications.
  - b. Non-pressure lateral fittings two and one half (2-1/2) to four (4) inch shall be PVC Schedule 40 socket and/or threaded fittings.

2.3 PVC NIPPLES

- A. Pipe nipples shall be extruded PVC Schedule 80, Type 1, Schedule 80, one piece gray, standard weight with machine threads, both ends, to meet ASTM D1784, or approved equal.

2.4 IPS PVC FLEX PIPE

- A. IPS PVC Flex Pipe shall be UV and Algae resistant, heavy wall, black meeting the requirements of ASTM D2287 and ASTM D1599, maximum operating pressure 60PSI @ 73° F.

- B. IPS PVC Flex Pipe shall be compatible for use with PVC Schedule 40 fittings.

## 2.5 PVC PIPE FITTINGS

- A. Pressure Mainline Gasket Pipe Fittings.

1. Manufacturer and model as per drawings, or approved equal.
2. Joint Restraints shall be epoxy coated, ductile iron to meet ASTM A-536, Grade 65-45-12 & AWWA C153.
3. Restraints shall have blunt cast serrations. Machined threaded restraints shall not be allowed.

- B. Pressure Mainline Solvent Weld Pipe Fittings.

1. Fittings shall be schedule 80, polyvinyl chloride, standard weight, or approved equal, to meet ASTM D-2467.

- C. Non-Pressure Lateral Pipe Fittings.

1. Fittings shall be schedule 40, polyvinyl chloride, standard weight, or approved equal, to meet ASTM D-2466.

- D. IPS PVC Flex Pipe Fittings.

1. Fittings shall be schedule 40, polyvinyl chloride, standard weight, or approved equal, to meet ASTM D-2466.

## 2.6 PVC CONDUIT AND FITTINGS

- A. PVC Conduit shall be Schedule 40, gray, listed to UL 651 and manufactured in accordance with NEMA TC2, labeled or marked showing evidence of third-party listing to product standard, listed as sunlight resistant, listed for use with 90° conductors.

- B. PVC Conduit Fittings shall be Schedule 40, gray, including fabricated fittings, junction-box adapters, threaded adapters shall be listed to UL 651 and manufactured in accordance with NEMA TC-3.

## 2.7 PIPE JOINING COMPOUNDS

- A. Lubricant for gasket joint pipe and joint restraints shall be as recommended by manufacturers of PVC pipe and Joint Restraints.

- B. PVC Primer shall be low VOC emission, non-bodied, fast acting, purple to meet ASTM F 656 Standard and as recommended by PVC pipe and fitting manufacturer, or approved equal.
- C. PVC Solvent Cement for PVC pressure mainline pipe and fittings shall be heavy bodied, medium setting, low VOC emission, gray to meet ASTM D2564 and as recommended by PVC pipe and fitting manufacturer, or approved equal.
- D. PVC Solvent Cement for PVC non pressure lateral pipe and fittings shall be medium bodied, fast setting, Low VOC emissions, clear to meet ASTM D2564 and as recommended by PVC pipe and fitting manufacturer, or approved equal.
- E. PVC Solvent Cement for IPS PVC flexible pipe shall be medium bodied, fast setting, low VOC emissions, solvent cement for use on flex/flex and flex/rigid PVC, blue to meet ASTM D2564 and as recommended by IPS PVC flexible pipe manufacturer, or approved equal.
- F. Teflon (PTFE) Paste for PVC threaded fittings shall be non-hardening, lubricating anti-sieve formulation, silicon free, suitable for sealing threads in metals, ABS, PVC, CPVC and Nylon piping systems, NSF approved to meet and exceed TT-5-1732.
- G. Teflon (PTFE) Tape for PVC threaded fittings shall be medium density, white and as recommended by PVC fitting manufacturer, or approved equal.

## 2.8 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: AWWA C219, epoxy coated ductile iron sleeve-type coupling with styrene butadiene rubber gaskets and five-eighth (5/8) inch high strength bolts for underground pressure piping,
- C. Plastic-to-Metal Transition Fittings: PVC Schedule 80, one-piece fitting with one end with threaded male iron pipe threads and one solvent-cement-socket end.
- D. Plastic-to-Metal Transition Unions: PVC Schedule 80, four-part union with one brass threaded end, one plastic threaded end, rubber O-ring, and union nut.

## 2.9 BACKFLOW PREVENTER

- A. Backflow Preventer: Manufacturer and model as shown on drawings and as approved by local authorities.
- B. Backflow Preventer Enclosure: Vandal and weather resistant enclosure formed from stainless steel tubing and rod that is coated in a high-performance polymer coating, all

locking and mounting hardware is manufactured entirely of stainless steel, to meet This cage has an ASSE 1060 Class III rating. Manufacturer and model as shown on drawings, or approved equal.

- C. Backflow Preventer Insulated Cover: Slip on cover with grommets on both sides, R19 insulation rating using Radiant Barrier Foil (RBF) inserted between acrylic polyester and air bubble pack. Manufacturer and model as shown on drawings, or approved equal.

## 2.10 MAINLINE MANUAL VALVES

- A. Iron Gate Valve: Manufacturer and model as shown on drawings, or approved equal. Ductile iron gate valve shall be ANSI/AWWA C509 with rubber encapsulated resilient seated wedge, fusion bonded epoxy coating, non-rising stem, Class 125 flanged ends and two (2) inch operating nut. Operating wrenches for iron gate valve shall be steel, tee-handle with one pointed end, stem of length to operate deepest buried valve, and socket matching valve operating nut for Project.
- B. Bronze Ball Valve: Manufacturer and model as shown on drawings, or approved equal. Low lead bronze ball valve shall be NSF/ASNI Listed 372, full port (not reduced) rated to 400 WOG, 350°F and supplied with TFE Teflon seat, threaded ends (FNPT), cast bronze cross or stainless steel “T” handle.
- C. Plastic Ball Valve: Manufacturer and model as shown on drawings, or approved equal.  
  
PVC Schedule 80 ball valve shall be MSS SP-12, full port (not reduced), rated to 235 psi, 140°F and supplied with Teflon TFE seat, EPDM seals and threaded ends (FNPT) with unions both sides.
- D. Bronze Garden Valve: Manufacturer and model as shown on drawings, or approved equal. Garden Valve shall be heavy duty bronze body, bent nose, NSF/ANSI 37, FNPT, 125 psi, 180 deg F, heavy duty bronze body.

## 2.11 QUICK COUPLING VALVE

- A. Quick Coupling Valve: Manufacturer and model as shown on drawings, or approved equal. Factory-fabricated, bronze or brass, two-piece assembly. Include coupler water-seal valve; removable upper body with spring-loaded or weighted, locking rubber-covered cap; hose swivel with ASME B1.20.7, 3/4-11.5NH threads for garden hose on outlet; and operating key.

## 2.12 FLOW SENSOR

- A. Flow Sensor: Manufacturer and model as per drawings, or approved equal. Impeller based technology with digital output pulse proportional to flow in PVC mounting tee or saddle, flow range 0.25-15 feet per second (FPS), 240 PSI maximum working pressure,

HDPE impeller, with signal output up to 2000 feet using direct burial, twisted triad shielded cable.

## 2.13 AUTOMATIC MASTER VALVES

- A. Bronze, Automatic Master Valve: Manufacturer and model as shown on drawings, or approved equal. Cast-bronze, normally open, dual chamber design provides no minimum flow capability, external plumbing of filter assembly, FNP, nylon reinforced EPDM diaphragm, 24volt solenoid, 0-300 GPM, 20-200 PSI.

## 2.14 AUTOMATIC CONTROL VALVES

- A. Plastic, Automatic Control Valves: Manufacturer and model as shown on drawings, or approved equal. Glass-filled nylon body, normally closed, double beaded diaphragm seal, fabric-reinforced EPDM diaphragm and seat, captive bonnet screws, encapsulated solenoid with captive plunger, flow control, with optional pressure regulator.

## 2.15 SPRINKLERS

- A. General Requirements: Designed for uniform coverage over entire spray area indicated at available water pressure.
- B. Gear-Drive Rotor: Manufacturer and model as shown on drawings, or approved equal. Description: 1" female NPT inlet, ABS plastic pop-up body, patented automatic arc return, part or full circle in one model, non-strippable drive mechanism, optional stainless-steel riser, factory installed drain check, color coded nozzles, radius range 37'-71', flow 3.8-31.5 GPM, recommended pressure 40-100 PSI
- C. Gear-Drive Rotor: Manufacturer and model as shown on drawings, or approved equal. Description: 3/4" female NPT inlet, ABS plastic pop-up body, patented automatic arc return, part or full circle in one model, non-strippable drive mechanism, patented FloStop feature, factory installed drain check, color coded nozzles, radius range 17'-46', flow 0.36-14.8 GPM, recommended pressure 20-100 PSI
- D. Pop-Up Sprinkler Body: Manufacturer and model as shown on drawings, or approved equal. Description: 1/2" female NPT inlet, 6" pop-up height, ABS plastic pop-up body, co-molded wiper seal, heavy-duty spring, factory installed drain check, compatible with all female threaded nozzles, operational pressure range: 15-100 PSI.
- E. Rotator Nozzle: Manufacturer and model as shown on drawings, or approved equal. Description: multi-trajectory rotating stream delivery system, female threaded nozzle, low precipitation rate, automatic matched precipitation, double-flush feature on nozzle, wind-resistant technology, full circle, adjustable arc 45°-360°, and specialty patterns, radius range 6'-35', flow range 0.17-4.27 GPM, operating pressure 30-55 PSI.

## 2.16 ROOT ZONE WATERING SYSTEMS

- A. Root Zone Watering System: Manufacturer and model as shown on drawings, or approved equal. Descriptions: Preassembled solid mesh tube with perforated top, internal baffles to divert water to all levels of root zone, durable locking cap, built in swing joint, pressure compensating bubbler, flow rates 0.25 and 0.50 GPM, pressure range 15-70 PSI, with fabric sleeve to prevent soil intrusion.

## 2.17 SPRINKLER RISERS

- A. PVC Swing Joints: Manufacturer and model as shown on drawings, or approved equal. Description: Prefabricated PVC design, 3/4" and 1" MPT ends, rotating joint sealed with O-ring constructed that parts joined are moveable either so that one of the parts may be rotated relative to the other or so that one of the parts in addition to being rotated relative to the other may be moved on its own axis, in 8", 12" and 18" lay arm lengths, pressure rated to 315 PSI.
- B. Polyethylene (PE) Swing Joints: Manufacturer and model as shown on drawings, or approved equal. Description: Prefabricated swing assembly with 1/2" MPT unique swivel elbows on both ends and linear low density polyethylene tubing in 6" and 12" lay lengths, pressure rated to 150 PSI.

## 2.18 DRIP IRRIGATION SPECIALTIES

- A. Drip Irrigation Control Zone Kit: Manufacturer and model as per drawings, or approved equal. Description: Factory assembled kit to include glass-filled nylon body remote control valve with fabric reinforced EPDM diaphragm, and 24volt solenoid, filter with 150 mesh stainless steel screen, and pressure regulator available in 25 PSI or 40 PSI. Kit shall come with four (4) flow ranges: low flow 0.5-15 GPM, medium flow 2-20 GPM and two (2) high flow kits 20-80 GPM and 20-100 GPM with operational pressure up to 120 PSI.
- B. Blank Supply Tubing: Description: 0.600" x 0.700" thick-walled polyethylene, UV resistant, kink resistant, maximum operating pressure 80 PSI. Use with compression or threaded lock fittings, size per tubing size.
- C. Distribution Tubing: .250" x .170" high quality polyethylene tubing, UV stabilized, maximum operating pressure 60 PSI. Use with 1/4" barbed acetal fittings.
- D. Line Source Drip Tubing: Manufacturer and model as shown on drawings, or approved equal. Description: 0.660" x 0.560" (17mm), surface or subsurface drip tubing with in-line pressure compensating emitters with check valve (check valve to hold water to a height of at least 6'), anti-siphon feature, emitter spacing 12" - 24", flow range 0.4 to 0.9 GPH, pressure range 15 - 60 PSI. Use with barbed or threaded lock fittings, size per tubing size.

- E. Point Source Emitter: Manufacturer and model as shown on drawings, or approved equal. Description: Pressure compensating 20 to 50 PSI, flow range 0.5 to 6.0 GPH, color-coded by flow, self-flushing diaphragm, self-piercing ¼” barb. Use with ¼” distribution tubing.
- F. Air/Vacuum Relief Valves: Manufacturer and model as per drawings, or approved equal. Description: UV protected housing, corrosion-resistant internal parts, operating range up to 80 PSI, release air pockets without premature closure, leak free closure after release.
- G. Automatic Flush Valve: Manufacturer and model as per drawings, or approved equal. Description: Flushes debris automatically at every system startup, reversible diaphragm to coordinate with low flows 2-5 GPM or high flows 5-12 GPM, pressure range up to 60 PSI, with 17 mm barbed connection or ½” MPT connection.
- H. Drip Tubing Fittings: Fittings shall be as recommended by tubing manufacturer.
  - 1. Lock Fittings: 1/2” polyethylene tubing and line source drip tubing having an inside diameter range from .520” to .620” made with UV resistant glass reinforced polypropylene with large threaded swivel connectors, operating pressure 0-60 PSI.
  - 2. Barbed Fittings: 17 mm Acetal fitting to be used with vinyl and PE tubing with dual barb design, operating range up to 100 PSI.
  - 3. Compression Fittings: polyethylene compression fitting for tubing sizes .680” to .704” OD.

## 2.19 CONTROLLER

### A. GENERAL

- 1. The controller shall be a full-featured commercial-industrial product for the purpose of irrigation management and monitoring of control valves, flow, and sensors, via traditional wire or two-wire decoder connections.
- 2. Controller manufacturer and model shall be as shown on drawings, or approved equal.
- 3. Controller shall have 12-255 station capability, 6 flow sensor inputs, 6 power/master valve outputs, 32 automatic programs with 10 start times each, block function to group stations, local weather sensor input, station flow “learned” mode or manual input, real-time flow monitoring, flow management to optimize watering at safe pipe velocities, true calendar date OFF programming, seasonal adjust settings in 1% to 300% increments, conditional response programming, two level user management password protection, optional plug-in communication modules for cloud or network control, optional plug-in



communication modules for Wi-Fi/LAN/CELL, detailed alarm logs, non-water window programming, hand-held remote compatible.

4. Controller shall be enclosed in a stainless steel, weather resistant, wall mount enclosure or as a drop-in panel for installing in a top-entry enclosure.

#### B. CONVENTIONAL CONTROLLER

1. The controller shall have a 12-station base unit with 6-station expansion modules up to 54-stations, works with 24volt solenoids using single conductor direct burial wire, simultaneous station operation of up to 14 solenoids, station output 0.8 amp each, grey metal cabinet for interior wall mount, stainless steel cabinet for exterior wall mount, drop-in panel for top-entry exterior stand-alone enclosure.

#### C. DECODER CONTROLLER

1. The controller shall have a 75-station base unit with 75-station expansion modules up to 225-stations, works with 24volt solenoids with decoder modules using 2-wire twisted pair cable, up to 3 two-wire paths per output module, simultaneous station operation of up to 30 solenoids, up, grey metal cabinet for interior wall mount, stainless steel cabinet for exterior wall mount, drop-in panel for top-entry exterior stand-alone enclosure, diagnostics for decoder inventory, wire tracker and solenoid finder.
2. Decoders for Valves and Sensors shall be compatible with controller, 1,2,4, and 6 station versions, sensor decoders, field programmable accepts station number directly, can be programmed before installation at the controller interface or wireless programming after installation using the two-wire path, integrated surge protection, color coded wiring connections. Maximum distance from decoder to solenoid is 150'.
3. Hand-Held Decoder Programmer shall be able to program or re-program decoder stations, in order of skip stations for future expansion, sensor test function, built in multimeter, communicates with decoder through wireless electromagnetic induction, USB or battery power, fused test leads for unpowered decoder functions, with carry case.
4. Universal Decoder Stake shall be 10.8" to raise decoder off ground in end-up position for convenient access and wireless programming without removal, sturdy construction made of recycled materials, include zip ties to secure decoder to stake.

### 2.20 CONTROLLER WIRE, CABLE, AND ELECTRIC BOXES

#### A. Conventional Control, Common, and Spare Wire:

1. Single conductor insulated wire size 14 AWG, nominal O.D. 0.154 inches, soft drawn bare copper meeting ASTM B-3, utilizing low density high molecular weight polyethylene insulation, suitable for direct burial applications for operating temperatures up to 60°C. Listed by UL or ETL or CSA.
2. Wire insulation shall be color coded black or red for control wire. Common wire shall be white. Spare wire shall be a color different from control and common wires.

B. 2-Wire Decoder Cable:

1. Jacketed cable containing two wires, single conductor, twisted, suitable for direct burial, for operation up to 600 volts, and temperatures up to 60°C. Soft drawn bare copper meeting the requirements of ASTM specification B-3 or B-8. Insulation shall be low density high molecular weight polyethylene and a thickness of 0.045", per Paige Electric specification P7079D. The two conductors (blue and red) shall be twisted with a minimum lay of 4".
2. 14 AWG Decoder Cable for up to 10,000' with decoders. 12 AWG Decoder Cable for up to 15,000' with decoders.
3. Jacket cover shall be a different color for each wire path.

C. Wire Splices

1. Wire splices shall consist of R/Y+ connector with steel spring and flame retardant insulator, high impact UV-resistant light blue polypropylene tube, 3.7" length, 1" diameter, prefilled with moisture-resistant grease 711B, C UL US listed, UL Standard 486D, File No. E102356, listed for use in wet, damp direct bury and submersible locations with UF type cable, maximum voltage rating: 600V.

D. Electric Boxes

1. 14" x 19" body shall be gray, tapered and has a minimum wall thickness of 0.187". The body has a double wall at the top cover seat area with a minimum thickness of 0.200". The cover shall be gray, seat area has 18 structural support ribs on the underside of the seat, each with a minimum thickness of 0.200". The bottom of the body has a 0.500" flange. The 14" x 19" cover has an average thickness of 0.200". The valve box has a 3/8" 304 Brass nut for the bolt-down as a standard feature.

## 2.21 ENCLOSURE FOR CONTROLLER

- A. Top entry, vandal and weather resistant, stainless-steel enclosure, 16"W, 38"H, 15.5"D, louvered main housing with filter screens, removable stainless-steel tray and backboard for mounting electronics. Top entry lid includes a stainless-steel piano hinge and a three-point locking mechanism at the front with two gas springs to assist with opening and closing. A cam style lock secures the flush mounted front entry door and includes

provisions for a padlock. A continuous drainage channel around all sides of door face provides a water-tight seal with the tear drop shaped, hollow center, thermoplastic door seal. The inside door also provides adequate storage for instructions or plans. This enclosure is NEMA 3R rated and UL 508A listed.

- B. Enclosure shall be equipped with a thermostatically controlled fan, manufacturer same as enclosure.
- C. Enclosure shall be equipped with a vandal resistant rain witch enclosure, manufacturer and model as shown on drawings, or approved equal.
- D. Concrete Base: Reinforced precast concrete four (4) inches thick, and six (6) inches greater in each direction than overall dimensions of controller. Include opening for wiring.

## 2.22 BOXES FOR VALVES

- A. GENERAL: Manufacturer and model as shown in drawings, or approved equal. High-impact, high-density, injection-molded structural foam polyethylene construction with a melt index between 10-12, overlapping covers prevent dirt and grass from settling in between body and cover, UV inhibitors prevent discoloration and cracking, corrugated sidewalls and reinforced lids.
- B. PLASTIC BOXES
  - 1. 6" round body is tapered and has a minimum wall thickness of 0.200". The body has a double wall at the top cover seat area with a minimum thickness of 0.130". The bottom of the body has a 0.250" flange. The 6" round cover has an average thickness of 0.187".
  - 2. 10" round body is tapered and has a minimum wall thickness of 0.250". The cover seat area has 8 structural support ribs on the underside of the seat, each with a minimum thickness of 0.250". The bottom of the body has a 0.500" flange. The 10" round cover has an average thickness of 0.300". The valve box has a 3/8" 304 Brass nut for the bolt-down as a standard feature.
  - 3. 14" x 19" body is tapered and has a minimum wall thickness of 0.187". The body has a double wall at the top cover seat area with a minimum thickness of 0.200". The cover seat area has 18 structural support ribs on the underside of the seat, each with a minimum thickness of 0.200". The bottom of the body has a 0.500" flange. The 14" x 19" cover has an average thickness of 0.200". The valve box has a 3/8" 304 Brass nut for the bolt-down as a standard feature.
  - 4. 13" x 24" body is tapered and has a minimum wall thickness of 0.270". The body has a double wall at the top cover seat area with a minimum thickness of 0.270". The cover seat area has 18 structural support ribs on the underside of the seat, each with a minimum thickness of 0.250". The bottom of the body has a 1.000"

flange. The 13" x 24" cover has an average thickness of 0.320". The valve box has a 3/8" 304 Brass nut for the bolt-down as a standard feature.

5. Plastic valve box and lid shall be green when installed in turf and bark mulch areas. Plastic box and lid shall be tan when installed in decomposed granite area.

C. Valve Box Drainage Backfill: Cleaned gravel or crushed stone, extending 2" greater in each direction than overall dimensions of valve box.

D. Valve Box Wire Mesh: Wire mesh shall be twenty-three (23) gauge, one quarter (1/4) inch square, hot-dipped galvanized woven or welded mesh, heavy zinc or PVC coating, corrosion resistant, extended 2" greater in each direction than overall dimensions of valve box.

## 2.23 MISCELLANEOUS SPECIALTIES

A. Pressure Gauges: ASME B40.1. Two (2) inch diameter dial, glycerin filled stainless steel case shall be ASME B40.100 compliant with 200 psi dial and one-quarter (1/4) inch NPT bottom outlet.

## 2.24 MARKING PRODUCTS

A. Mainline Detectable Marking Tape: Detectable marking tape shall be one hundred (100) percent virgin polyethylene, acid/alkaline and corrosion resistant, 5.0mil thick, five-ply composition, blue in color with continuous marking "Caution: Irrigation Water Line Buried Below", with 2.0mil solid aluminum foil core, encapsulated within 2.55mil polyethylene backing. Tape width shall be per manufacturer's specification for mainline pipe size.

B. Valve Identification Tag: Manufacturer and model as shown on drawings, or approved equal. Valve identification tags shall be polyurethane Behr Desopna, with a reinforced attachment hole, two and one quarter (2-1/4) inch by two and three quarter (2-3/4) inch in size, yellow in color with double sided stamped controller and valve designation.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

A. Site Verification of Conditions:

1. Contractor shall be acquainted with all site conditions. Should utilities or other work not shown on the plans be found during excavations, Contractor shall promptly notify Landscape Architect for instructions as to further action. Failure to do so will make Contractor liable for any and all damage arising from operations subsequent to discover of such utilities not shown on plans.

2. Contractor shall take necessary precautions to protect site conditions. Should damage be incurred Contractor shall repair damage to its original condition or furnish and install equal replacement.

### 3.2 LAYOUT

- A. Consideration will not be given to design changes until after award of contract.
- B. Lay out work as closely to that shown on the Contract Drawings as possible. Contract Drawings are diagrammatic in nature. Adjust layout as necessary to accommodate actual site conditions. Locate pipe and valves shown under paving in adjacent planting area.
- C. Full and complete coverage is required. Contractor shall make minor adjustments to layout as required to assure full and complete coverage. When such adjustments require exceeding radius limitations shown on irrigation legend, contact Landscape Architect for direction.
- D. Substitutions for smaller pipe sizes will be not be accepted.
- E. Contact Landscape Architect forty-eight (48) hours in advance for layout review of points of connection, backflow and controller location, mainline routing when not as shown on drawings, gate valve and remote control valve locations.

### 3.3 EARTHWORK

- A. Perform excavation as required for installation of work included under this Section. Restore all surfaces, existing underground installations, etc., damaged or cut as a result of excavations, to their original condition.
- B. Should utilities not shown on the plans be found during excavation, promptly notify Landscape Architect for instructions as to further action. Failure to do so will make Contractor liable for any and subsequent discovery of such utilities. Indicate such utility crossings on the Record Drawings promptly.
- C. Dig trenches wide enough to allow a minimum of 4-inches between parallel pipe lines. Trenches shall be of sufficient depth to provide minimum cover from finish grade as follows:
  1. Over pipe on pressure side of irrigation control valve, control wires and quick coupling valves: 24 inches.
  2. Over pipe on non-pressure side of irrigation control valve: 18 inches.
  3. Over pipe on sleeves: 24 inches.
  4. Over pipe on drip tubing: 4 inches

- D. Trenching within the drip-line of existing trees shall not employ the use of mechanical trenching devices. Hand dig without severing roots which exceed 1-1/2" in diameter. Notify the Landscape Architect immediately if site conditions prohibit such action.

### 3.4 PIPING INSTALLATION

#### A. General:

1. Location and Arrangement: Drawings indicate location and arrangement of piping systems. Install piping as indicated unless deviations are approved on Coordination Drawings.
2. Clean all pipes and fittings of dirt and moisture before assembly.
3. Install piping free of sags and bends.
4. Install groups of pipes parallel to each other, spaced to permit valve servicing.
5. Install fittings for changes in direction and branch connections.
6. Install unions on both sides of valves.
7. Lay piping on solid sub-base, uniformly sloped without humps or depressions.
8. Install ductile-iron piping according to AWWA C600.
9. Install PVC piping in dry weather when temperature is above 40 deg F. Allow joints to cure at least 24 hours at temperatures above 40 deg F before testing.
10. Install pressure mainline pipes a minimum of 5 feet from tree locations to avoid conflict with mature root systems.

#### B. Solvent-Welded Joints and Lubricants for PVC Pipes:

1. Use primer, solvents, lubricants and methods as recommended by fitting and pipe manufacturers.
2. Cure joint a minimum of one hour before applying any external stress on the piping and at least twenty-four (24) hours before placing the joint under water pressure.

#### C. Threaded Joints for Plastic Pipes:

1. Use Teflon tape on the threaded PVC fittings.
2. Use strap-type friction wrench only. Do not use metal-jawed wrench.

3. When connection is plastic to metal, PVC Schedule 80 male adaptors shall be used. The male adaptor shall be hand tightened, plus one turn with a strap wrench. Joint compound shall be Teflon tape or approved equal.

D. Laying of Pipe:

1. Pressure mainline pipes shall be bedded in at least 2-inches of sand with 2-inches of sand cover over top of piping.
2. Install detectable marking tape along entire length of pressure mainline piping with a maximum of 12-inches cover.
3. Pressure mainline pipe changes in direction shall be made only using 45° elbows.
4. Non-pressure lateral pipes shall be bedded in at least 2-inches finely divided material with no rocks or clods over 1-inch diameter to provide a uniform bearing.
5. Pipe shall be snaked from side to side of trench bottom to allow for expansion and contraction as recommended by pipe manufacturer. One additional foot per 100 feet of pipe is the minimum allowance for snaking.
6. PVC Pipe shall not be laid when there is water in the trench.
7. Install piping in sleeves under parking lots, roadways, sidewalks, and walls.
8. Cut plastic pipe with PVC pipe cutters or hacksaw to ensure a square cut. Remove burrs at cut ends prior to installation to ensure that a smooth unobstructed flow will be obtained.
9. All plastic-to-plastic joints shall be solvent-weld joints. Only primer and solvents recommended by the pipe manufacturer shall be used. Install plastic pipe and fittings as outlined and instructed by pipe manufacturer.
10. It shall be the Contractor's responsibility to make arrangements with the pipe and fitting manufacturers for any field assistance that may be necessary. Contractor shall assume full responsibility for the correct installation.

### 3.5 EQUIPMENT INSTALLATION

- A. Gate Valves: Group valves together and locate in shrub planters where possible. Install in valve casing with valve box flush with finish grade.
- B. Irrigation Control Valves: Install control valves in valve boxes where shown on drawings and group together where practical in groups not to exceed three valves per location unless otherwise shown on drawings. Install in shrub planters wherever possible. Place no closer than 12-inches and perpendicular to walk edges, buildings, and

walls. Valve boxes shall be flush with finish grade. Install valve identification tags as per Drawings.

- C. Pressure-Reducing Backflow Device: Install above ground as per manufacturer's recommendation. Install with backflow enclosure and weather resistant cover. Contractor shall be responsible to have valve certified within seven (7) days of connection to potable water source. Contact locale water agency for approved list of certification providers.
- D. Quick Coupling Valves: Install quick coupling valves on a swing joint assembly as detailed on the Drawings. Place no closer than 12-inches and perpendicular to walk edges, buildings, and walls. Valve boxes shall be flush with finish grade.
- E. Sprinkler Heads
  - 1. Install sprinklers after hydrostatic test is completed.
  - 2. Place all rotary pop-up sprinkler heads in lawn areas on swing joints as detailed on Drawings with top of heads 1-Inch above finish grade. Place part-circle rotary pop-up sprinkler heads 8-inches from edge of and flush with top of adjacent walks, header boards, curbs, mowing bands, or paved areas at time of installation. Install rotary sprinklers on a swing joint assembly as detailed.
  - 3. Install sprinkler heads on a swing joint assembly as detailed on the Drawings.
- F. Root Zone Watering System
  - 1. Install root zone watering systems using preinstalled fabric sleeve and swing joint to PVC fitting prior to attaching to lateral line.
  - 2. After placing tree or shrub in a prepared planting hole, space the root one watering system evenly around the root ball and flush with finished grade. Each tree or shrub should have a minimum of two units.
  - 3. Backfill the hole around the root zone watering system and compact to same relative density as surrounding area.
- G. Drip Irrigation Specialties
  - 1. Install freestanding emitters on distribution tubing riser to mounting height indicated.
  - 2. Install drip supply tubing with 4 inches of cover.
  - 3. Install in line emitter tubing as shown on drawings with 4 inches of cover.
  - 4. Install vacuum relief valves in piping at high points in system and in control-valve boxes. Set valve boxes flush to finish grade.



5. Install flush valves in valve boxes with 2 cubic feet of drain rock. Set valve boxes flush to finish grade.

#### H. Automatic Controller:

1. Install per local code and manufacturer's latest printed instructions.
2. Connect remote control valves to controller in clockwise sequence to correspond with station setting beginning with stations 1, 2, 3, etc.
3. Affix controller name (i.e. "Controller A") on side of controller cabinet door with letters minimum of 1 inch high.
4. Affix a non-fading copy of irrigation diagram to cabinet door below controller name. Seal irrigation diagram between two sheets of 20 mil (minimum) plastic.
5. Irrigation diagram shall be a reduced copy of the as-built drawing and shall show clearly all valves operated by the controller, showing station number, valve size, and type of planting irrigated.
6. Install earth ground as shown on Drawings and as recommended by controller manufacturer.

#### I. Control Wiring

1. Install control wires in conduit with piping in common trenches wherever possible. Lay to the side of pipe line. Provide 24 inch service looped at valves neatly coiled along interior of valve box.
2. Use approved wire splices at remote control valves and at line splices. Line splices will be allowed only on runs of more than 500 feet. Splices at valves shall be installed within valve boxes. Line splices shall be installed in electric box.
3. Install pull boxes at a maximum of 150 feet and or at every 5th turn in conduit direction.
4. Install field ground rods and surge protection as recommended by controller manufacturer.

#### J. Closing of Pipe and Flushing of Lines:

1. Cap or plug all openings as soon as lines have been installed to prevent entrance of materials that would obstruct the pipe. Leave in place until removal is necessary for completion of installation.
2. Thoroughly flush out all water lines before installing heads, valves and other equipment.
3. Test as specified.

4. Upon completion of testing, complete assembly and adjust sprinkler heads for proper distribution.
- K. All sprinkler heads and quick coupling valves shall be set perpendicular to finished grades unless otherwise designated on the Drawings, or otherwise specified. Sprinkler heads adjacent to existing walls, curbs and other paved areas, shall be set to grade. Sprinkler heads which are to be installed in lawn areas where the turf has not yet been established shall be set 1-inch above the proposed finish grade. Heads installed in this manner will be lowered to grade when the turf is sufficiently established to allow walking on it without appreciable destruction. Such lowering of heads shall be done by Contractor as part of the original contract with no additional cost to the Owner.

### 3.6 BACKFILL AND COMPACTING:

- A. After system is operating and required tests and inspections have been made, backfill excavations and trenches with clean soil free of debris.
- B. Backfill for all trenches, regardless of the type of pipe covered, shall be compacted to minimum 95 percent density under pavements, and 85 percent under planted areas.
- C. Compact trenches in areas to be planted by thoroughly tamping backfill. Flooding and jetting shall not be used.
- D. Dress off all areas to finish grades.

### 3.7 FIELD QUALITY CONTROL

- A. Perform tests and inspections. Notify the Landscape Architect a minimum of forty-eight (48) hours prior to performing pressure test and inspections.
- B. Perform hydrostatic tests when welded PVC joints have cured per manufacturer's instructions.
  1. Pressurized Mains:
    - a. Completely install mains, gate valves, and control valves. Do not install laterals.
    - b. Fill all lines with water.
    - c. Pressurize the main to 120 PSI. Monitor gauge for pressure loss for four (4) hours. Maximum allowable loss over four (4) hour period - 2 psi for piping systems over 100 feet.
    - d. Leave lines and fittings exposed throughout testing period.
    - e. Leaks resulting from tests shall be repaired and tests repeated until the system passes.
    - f. Test all gate valves for leakage.
    - g. Contractor must provide necessary pump and equipment required for test.

2. Non-Pressure Laterals:
  - a. Test piping after laterals and risers are installed and system is fully operational.
  - b. Leave trenches open to detect possible leaks.
- C. Submit written requests for inspections to the Landscape Architect at least forty eight (48) hours prior to anticipated inspection date.
- D. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
  1. Operational Test: After electrical circuitry has been energized, operate controllers and automatic control valves to confirm proper system operation.
  2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- E. Any irrigation product will be considered defective if it does not pass tests and inspections.
- F. Prepare test and inspection reports.

### 3.8 ADJUSTING

- A. Adjust settings of controllers.
- B. Adjust automatic control valves to provide flow rate at rated operating pressure required for each sprinkler circuit.
- C. Adjust sprinklers and devices so they will be flush with, or not more than 1/2 inch above, finish grade.

### 3.9 CLEAN UP

- A. Clean up shall be performed as each portion of work progresses. Remove all debris from the entire work area and remove from site. All walks and paving shall be broomed or washed down, and any damage or stains sustained due to the work shall be repaired to conditions acceptable to the Landscape Architect.

### 3.10 INSPECTION SCHEDULE

- A. The Contractor shall be responsible for notifying the Landscape Architect forty-eight (48) hours in advance for the following inspections:
  1. Layout review

2. Open trench prior to pipe installation – include base layer
  3. Mainline pressure test – test shall be conducted with backflow preventor, quick couplers and control valves in place and prior to backfilling.
  4. Sprinkler coverage test – after system adjustments are made
  5. Substantial Completion
  6. Final Inspection
- B. The Contractor shall be responsible to be prepared for inspections including having updated record drawings available for review, correcting previously identified punch list items and adequately preparing the site for inspection.
- C. In the event the Contractor calls for an inspection without having updated field record drawing available for review, correcting previously identified punch list items, or adequately preparing the site for inspection, the Contractor shall be responsible for compensating the Landscape Architect time and materials at current billing rates per hour, plus transportation costs.
1. In the event that Landscape Architect submits an invoice for compensation to the Contractor, said invoice shall be paid in full prior to scheduling subsequent inspections.

### 3.11 SUBSTANTIAL COMPLETION

- A. The Contractor shall request inspection once the irrigation system is operational, adjustments have been made and site has been cleaned.
- B. The Contractor shall submit written request for Substantial Completion inspections to the Landscape Architect at least forty-eight (48) hours prior to anticipated inspection date.

### 3.12 IRRIGATION WATER AUDIT

- A. Contractor shall be responsible to provide an irrigation water audit after Substantial Completion and prior to Final Acceptance.
- B. The irrigation water audit shall be performed by a Certified Irrigation Auditor and in accordance with the latest edition of the California Code of Regulations, Title 23, Division 2, Chapter 2.7, Model Water Efficient Landscape Ordinance.
- C. The irrigation water audit shall be included in a binder with:
  1. Cover sheet with location, date, owner and auditor contact information
  2. Irrigation system evaluation checklist

3. Sprinkler evaluation data sheet for each control zone.
4. Other information as required by the latest edition of Model Water Efficient Landscape Ordinance

### 3.13 DEMONSTRATION

- A. The Contractor shall schedule an irrigation demonstration with Owner after the system has been installed and Substantial Completion corrections have been completed.
- B. The Demonstration shall be no less than two (2) hours and shall include the following:
  1. Operation of controller system including programming demonstration, review of flow monitoring features and explanation of alerts and alarms.
  2. Operation of hand-held remote equipment including field operation of system valves.
  3. Operation of hand-held field decoder programmer including programming sample decoder.
  4. Calibration of flow sensor and running automatic “learned” flow test.
  5. Review of troubleshooting checklist for system equipment including controller, sensors, valves, filters, decoders, sprinklers and nozzles.

### 3.14 CLOSE OUT DOCUMENTS AND EQUIPMENT

- A. Close Out Documents shall be submitted to the Landscape Architect a minimum of two (2) weeks prior to scheduling Final Inspection.
  1. Record Drawings – full size set of irrigation drawings including revisions and dimensions representing the installed irrigation system. Record Drawings must be neat and legible and of sufficient quality to allow black and white reproduction of the original to be clear. Once approved by the Landscape Architect, the Contractor shall submit two (2) sets on bond prior to Final Acceptance.
  2. Controller Chart – provide two (2) charts, 11 inches by 17 inches for each controller. Place one copy inside the controller enclosure. Place the other copy in Operation and Maintenance Manual. The controller chart shall be a color-coded schematic representation of the irrigation system with each valve zone identified by a unique color. The controller chart shall include a legend identifying the color, valve number, plant type and controller programming schedule including days of week and run times. Once approved by Landscape Architect, the Contractor shall submit two (2) copies hermetically sealed between two (2) pieces of 10 mil plastic.

3. Operation and Maintenance Manual – provide two (2) binders including operating instructions, parts list and breakdown diagram for each type of equipment installed, complete copy of “approved” irrigation submittals, controller chart, irrigation schedule for each valve zone, Irrigation Audit report, signed acceptance letter from Owner for equipment received, contractor contact information, local manufacturer’s representatives contact information for equipment installed, signed Contractor Guarantee and Certificate of Insurance.
- B. Equipment to be Furnished – The Contractor shall deliver to Owner all tools and equipment called for on the plans and described herein.
1. Two (2) sets of keys for locking the controller cabinet and backflow enclosure.
  2. Two (2) spare valves for each type and size installed
  3. Two (2) decoders for each type installed
  4. Five (5) sprinklers for each type installed
  5. Five (5) complete nozzle sets for each type installed
  6. One hundred (100) feet of drip tubing for each type installed
  7. Ten (10) drip emitters for each type installed
  8. Two (2) sets of special tools for removing, disassembly and adjusting irrigation equipment installed.
  9. Two (2) valve opening keys
  10. Two (2) quick coupler keys and hose swivels
  11. Two (2) hand held remotes control transmitters and cases
  12. Two (2) hand held decoder programmers
- C. Guarantee – The Contractor shall include a signed letter of warranty for all materials installed and workmanship for a period of one (1) year from final acceptance.

### 3.15 FINAL INSPECTION

- A. The Contractor shall request Final Inspection after all corrections from previous inspections are complete, demonstration of the irrigation system is complete, approved close out documents are received, and equipment to be furnished is received by Owner.
- B. The Contractor shall submit written request for Substantial Completion inspection to the Landscape Architect at least forty-eight (48) hours prior to anticipated inspection date.

1. Final Inspection shall include review of outstanding corrections identified during Substantial Completion inspection.
- C. The Landscape Architect shall issue to Owner a Certificate of Final Acceptance once all outstanding corrections identified during the final inspection have been completed.

END OF SECTION 328400

SECTION 333000  
**SANITARY SEWERAGE UTILITIES**

**PART 1 - GENERAL**

**1.1 SECTION INCLUDES**

- A. Locate and verify invert elevation of existing pipe at proposed point of connection.
- B. Provide and install gravity sewer pipe.
- C. Provide and install sewer cleanouts.

**1.2 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including the Division 01 Specification Sections, apply to this Section.
- B. Related Sections include the following:
  - 1. Trenching, Backfilling and Compaction - Section 312316

**1.3 SUBMITTALS**

- A. In accordance with section 013300, Submittal Requirements:
  - 1. Submit choice of pipe and appurtenances for review prior to ordering.

**1.4 REFERENCES**

- A. California Plumbing Code (CPC), latest edition.
- B. City Standards

**1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING**

- A. Sewer pipe and appurtenances shall be delivered, handled, and stored in a way that prevents damage to the pipe and prevents entry of foreign materials into the pipe.
- B. Regardless of cause, damaged pipe and appurtenances shall be replaced with new products at the expense of the Contractor.

**1.6 GRADE AND ALIGNMENT CONTROL**

- A. General
  - 1. Necessary installation procedures, as needed to ensure pipes are installed at the location and grade staked in the field, shall be used.
- B. Method
  - 1. One of the following methods shall be utilized to control grade and alignment:



- a. Batter boards set at 25' intervals with a string line set over at least three batter boards.
  - b. Electronic 'Laser' beam set at manhole locations or grade breaks (with at least three grade points shall be checked to verify the set grade).
  - c. Survey instrument set at cleanout to site, between cleanouts at the set grade.
- C. Equipment
1. The Contractor shall furnish all equipment necessary to install and inspect the pipe installation. Grade rod shall be held to a minimum in all cases.

## PART 2 - PRODUCTS

### 2.1 GRAVITY SEWER PIPE AND SERVICE LATERALS

- A. Sewer pipe 6 inches in diameter and smaller shall be PVC, SDR 35 with gasketed joints, or approved equal.
- B. Pipe shall be green in color.

### 2.2 CLEANOUTS

- A. As shown and detailed on the Drawings.
- B. Lids shall be concrete, marked "sewer".

## PART 3 - EXECUTION

### 3.1 GENERAL

- A. Construction of the private sewer system shall conform to the requirements of the CPC, as well as City Standards, Drawings, and Details.

### 3.2 VERIFY EXISTING CONDITIONS

- A. The exact location and depth of existing sewer lines is unknown and is shown based upon the best information available.
- B. Prior to ordering any materials, Contractor shall pot hole in the vicinity of each point of connection and crossing with existing utilities to verify the exact location (horizontal and vertical) and size of the existing sanitary sewer/utilities. This information shall be presented in the form of a field sketch through the RFI process for review and confirmation by the Engineer that the existing line and proposed design is adequate to serve the project.

### 3.3 PIPE DISTRIBUTION AND HANDLING

- A. Pipe distribution shall not take place too far in advance of laying operations.
- B. Pipe shall be handled carefully to avoid damage. Pipe handling by mechanical equipment shall be in accordance with the pipe manufacturer's recommendations.
- C. The spigot ends of pipes and fittings that utilize polyvinyl chloride or polyurethane factory applied flexible compression joints shall not rest on the ground or pavement.
- D. All pipe and fittings shall be carefully lowered into the trench by means of a derrick, ropes, or other suitable tools or equipment, in such a manner as to prevent damage to

pipe materials, protective coatings and linings. Under no circumstances shall pipe materials be dropped or dumped into the trench.

#### **3.4 PIPE LAYING**

- A. No pipe shall be laid in water or when trench conditions are unsuitable to allow performing the job in a professional manner.
- B. Pipe shall be laid with bell ends facing in the direction of laying and shall progress uphill.
- C. Pipe deflections where permitted shall not exceed that recommended by the pipe manufacturer.

- D. Pipe and fittings which do not allow sufficient space for joints shall be removed and replaced with pipe and fittings of proper dimensions.
- E. Every precaution shall be taken to prevent foreign material from entering the pipe. If necessary, a heavy, tightly woven canvas bag of suitable size shall be placed over each end and left there until the connection is to be made to the adjacent pipe. During laying operations, no debris, tools, clothing or other materials shall be placed in the pipe. If foreign materials do enter the pipe, they shall be removed continuously as work progresses.
- F. At times when pipe laying is not in progress, the open ends of laid pipe shall be closed by a watertight plug.
- G. Wherever the jointing material specified is cement, two or more lengths of pipe shall be in place ahead of each joint before such joint is finished.

### 3.5 TESTING

- A. All new sewer laterals shall be tested in accordance with procedures specified in the CPC, Section 712.2 (Water Test) as described herein. The tests shall be observed by the Owner's Representative.
- B. The water test shall be applied to the drainage and vent systems either in its entirety or in sections. If the test is applied to the entire system, openings in the piping shall be tightly closed, except the highest opening, and the system filled with water to point of overflow. If the system is tested in sections, each opening shall be tightly plugged, except the highest opening of the section under test, and each section shall be filled with water, but no section shall be tested with less than a ten (10) foot (3,048 mm) head of water. In testing successive sections, not less than the upper ten (10) feet (3,048 mm) of the next preceding section shall be tested, so that no joint or pipe in the building (except the uppermost ten (10) feet (3,048 mm) of the system) shall have been submitted to a test of less than a ten (10) foot (3,048 mm) head of water. The water shall be kept in the system, or in the portion under test, for not less than fifteen (15) minutes before inspection starts. The system shall then be tight at points.
- C. A City Inspector shall witness all sewer utility testing.

### 3.6 CLEAN UP

- A. Remove all debris and stains resulting from the work of this section.

END OF SECTION

# Appendix

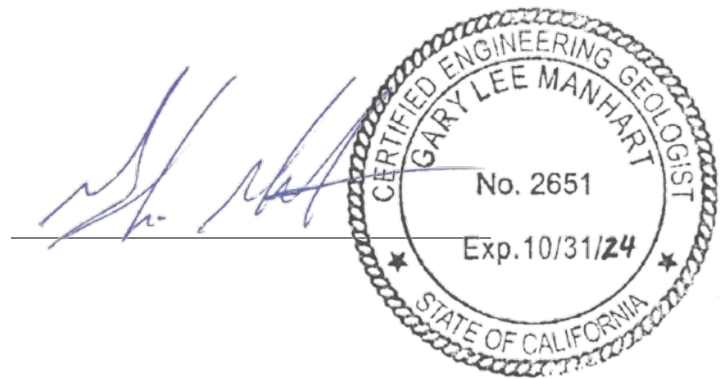
1. Geologic Exploration Soils Evaluation and Recommendations
2. Stormwater Control Plan

# TECHNICAL MEMORANDUM

Geologic Exploration  
Soils Evaluation and Recommendations  
School Road McKinleyville, California  
Assessor's Parcel Number 508-247-043

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Date: June 26, 2023  
Project No.: 9698.09  
  
Prepared For: Melton Design Group  
  
Prepared By: Gary L. Manhart, CEG  
Senior Engineering Geologist  
CEG No. 2651; Exp. 10/31/24



Attachments: Figure 1: Location map  
Figure 2: Site Map  
  
Appendix 1: Boring Logs  
Appendix 2: Laboratory Test Results

---

## 1.0 INTRODUCTION

This Memorandum presents the results of a geotechnical exploration performed by LACO Associates, Inc. (LACO) for Melton Design Group (Client) in connection with a soils evaluation on the area north of School Road, McKinleyville, California (Assessor's Parcel Number 508-247-043). We evaluated the Site of a proposed BMX track, basketball court, pickleball court, playground, and concession stand with restrooms. The Site is located northwest of the intersection of School Road and Washington Avenue. See the Location Map, presented in Figure 1. The purpose of this geotechnical exploration was to assess the stability of the existing native soils and perform the necessary evaluations to support preparation of grading plans. It is our understanding that the plans will be used to assist the Client in obtaining a grading permit for development of the aforementioned structures.

## 2.0 EXPLORATION

On May 24, 2023, LACO observed the surface and subsurface conditions at the Site that extended from School Road to approximately 240 feet to the north. Our geotechnical exploration consisted of a hand auger subsurface exploration and laboratory testing program. Five hand auger borings (HB-1 through HB-5) were installed at the approximate locations shown on the site map Figure 2. Our geologist logged the existing exposed cut slopes in general accordance with the American Society for Testing and Materials (ASTM) Test Procedure D2488 Visual-Manual Procedures and completed shallow hand auger borings to collect soil samples for laboratory analysis. Soil profile logs are attached as Appendix 1.

Soil samples were transported to our laboratory, examined to confirm field classifications, and to select samples for laboratory testing. Selected soil samples were subjected to the following tests and are presented in Appendix 2:

- Finer than #200 (ASTM C-117)
- Moisture content (ASTM C566).
- Density of soils in place (ASTM D 2937).

## 3.0 SITE CONDITIONS

The Site consists of a relatively flat area with some tree and brush cover. The area around the site is developed with houses. The site appears undisturbed and covered with native material that primarily consists of topsoil containing organics overlying silty sand with gravel.

### 3.1 Surface Conditions

The existing site lot slopes slightly towards the south. The slope is gradual and appears stable with no visible surface erosional features. The entirety of the Site is covered in thick grass and scattered brush with some trees growing on the Site.

### 3.2 Subsurface Conditions

Boring HB-1 through HB-5 encountered undisturbed native soils throughout the site. Native soils generally comprise 6 to 24 inches of silt with fine sand topsoil, which is moist and loose in composition and containing some organics. Underlying the topsoil is silty sand that is yellow-brown in color, moist, and medium-dense in composition with an in-place dry density of 18.7 pounds per cubic foot at HB-3 and 10.8 pounds per cubic foot at HB-4. Native soils at HB-4 at 5 feet below ground surface (bgs) had 27.9% materials finer than a #200 sieve. Native soils at HB-5 at 3 feet bgs had 23.3% materials finer than a #200 sieve. Lab results are summarized on the Boring Logs (Attachment 1) and the reports are included as Appendix 2.

## 4.0 RECOMMENDATIONS

### 4.1 Site Preparation and Grading

Areas to be graded should be stripped of vegetation, topsoil containing organic material, and undocumented fill. Bushes and designated trees should be removed, and their roots grubbed. These materials are not suitable for reuse as engineered fill-in building areas. Engineered fill should extend a minimum of 3 feet beyond the footprint of the planned structure and 3 feet beyond exterior sidewalks and

flatwork and extend a minimum of 12 inches below lowest adjacent grade. Foundation excavation depths should be adjusted such that all foundations bear on native yellow-brown silty sand.

Prior to placing fill, a qualified LACO representative should observe the exposed soil excavation bottom. The approved excavation bottom then should be scarified to a depth of 6 inches, moisture conditioned to near optimum moisture content, and compacted to at least 90 percent relative compaction. Material proposed for use as engineered fill should be free of organic or other deleterious material and rocks with a maximum dimension greater than 3 inches, and should meet the following criteria:

Fraction Finer than No. 200 Sieve:	Between 5 percent and 60 percent
Plasticity Index:	15 percent or less
Liquid Limit:	35 percent or less

Our exploration indicates that the on-Site soils below the topsoil are suitable for use as engineered fill. Following excavation operations and prior to placement, material proposed for use as fill should be observed, tested, and approved by LACO for conformance to these requirements. Fill should be placed in lifts no greater than 6 inches in loose thickness, moisture conditioned to near optimum moisture content, and compacted to at least 90 percent relative compaction. In areas to receive vehicular loads, the upper 6 inches of soil subgrade should be compacted to at least 95 percent relative compaction and be firm and unyielding when subjected to proof-rolling during construction. Fill should be placed in thin layers (typically 8-inch lifts, approximately 12 inches loosely placed) on a relatively flat surface, thoroughly moisture conditioned to the optimum moisture content, and compacted to at least 90 percent relative compaction. Fill should be benched into sloping ground, both parallel and transverse to the embankment crest. Benches should extend into stiff soil. Fill surfaces should be finished smooth and unyielding.

## **4.2 Foundations**

### **4.2.1 Slab on Grade Floors**

We recommend that the restroom and concession stand building be supported on structurally reinforced slab-on-grade floors and be supported entirely on a minimum of 12 inches of engineered fill that extends a minimum of 3 feet beyond the edge of the slab. Building foundations can be designed using a maximum allowable bearing pressure of 2,000 psf. This value can be increased by one-third when considering wind or seismic loads. Lateral load resistance may be developed via: (1) skin friction between the footing bottoms and underlying soil; and (2) passive resistance between the vertical faces of footings. For design, use an allowable friction coefficient of 0.3 and a passive 150 pcf equivalent fluid pressure. Passive pressure should be neglected in the upper 1 foot of soil unless confined by concrete slabs or pavements. If friction and passive resistances are to be combined, reduce the lesser value by 50 percent.

Prior to slab construction, the subgrade should be scarified to a depth of 6 inches, compacted per the recommendations presented in the Site Preparation and Grading section of this Memorandum (Section 6.1), and maintained wet-of-the optimum moisture content. To provide a capillary moisture break between the slab and the supporting soil, we recommend a 4-inch-thick layer of crushed rock be placed on the prepared subgrade. The crushed rock should be kept wet and placed as soon as possible after slab subgrade preparation to reduce the potential for drying and cracking of the moisture-conditioned subgrade material.



Where the risk of moisture vapor movement through the slab may be detrimental to the intended use of the slab, the capillary break material should be covered by an impermeable membrane consisting of 15-mil Stego® Wrap sheeting, or equivalent, installed in accordance with the manufacturer's recommendations. Joints between membrane sheets and utility piping openings should be lapped and taped. Care should be taken during slab construction to protect the plastic membrane against punctures.

Special precautions should be taken during the placement and curing of all concrete slabs. Excessive slump (high water-cement ratio) of the concrete and/or improper curing procedures used during either hot-or cold-weather conditions could lead to excessive shrinkage, cracking, or curling of the slabs. High water-cement ratio and/or improper curing also greatly increase the water vapor permeability of concrete. We recommend concrete placement and curing operations be performed in accordance with the American Concrete Institute (ACI) manual.

#### 4.2.2 Exterior Slabs and/or Concrete Flatwork

Exterior slabs and/or concrete flatwork can be supported entirely on a minimum of 12 inches of engineered fill that extends a minimum of 3 feet beyond the edge of the slab. Prior to slab construction, the subgrade should be scarified to a depth of 6 inches, compacted following the recommendations presented in the Site Preparation and Grading section (Section 6.1) of this Memorandum, and maintained in a wet-of-optimum moisture content condition. Special precautions should be taken during the placement and curing of all concrete slabs. Excessive slump (high water-cement ratio) of the concrete and/or improper curing procedures used during either hot-or cold-weather conditions could lead to excessive shrinkage, cracking, or curling of the slabs. High water-cement ratio and/or improper curing also greatly increase the water vapor permeability of concrete. We recommend concrete placement and curing operations be performed in accordance with the American Concrete Institute (ACI) manual.

### 4.3 Seismic Design Parameters

Earthquake design parameters presented herein are based on the CBC and the standard "Minimum Design Loads and Associated Criteria for Buildings and Other Structures," (ASCE 7-16), which, in turn, is based on a maximum considered earthquake ground motion, defined as the motion caused by an event with a 2-percent probability of exceedance within a 50-year period (recurrence interval of approximately 2,500 years). We used site parameters, location (40.93470666, -124.10792598), site class (D), and risk category (II) as project input to Seismic Design Maps tool co-developed by the Structural Engineers Association of California (SEAOC) and California's Office of Statewide Health Planning and Development (OSHPD) (SEAOC/OSHPD, 2023). Values of those inputs and model outputs are presented in Table Y.

We refer the building designer to the exemptions listed in ASCE 7-16 to determine whether a site-specific ground motion analysis is required.

Table 4. Seismic Design Parameters

Site Class	F <sub>a</sub>	F <sub>v</sub>	S <sub>s</sub>	S <sub>1</sub>	S <sub>M5</sub>	S <sub>M1</sub>	S <sub>D5</sub>	S <sub>D1</sub>	T <sub>s</sub>
D	1.2	1.700	2.567	1.081	2.567	1.838	1.711	1.225	0.716

\* F<sub>v</sub>, S<sub>M1</sub>, and S<sub>D1</sub> may only be used for calculation of T<sub>s</sub>.

Latitude, Longitude: 40.93470666, -124.10792598

The factors are defined as follows:

- $S_s$  - Mapped spectral response acceleration, 5 percent damped, at 0.2 second period (times g).
- $S_1$  - Mapped spectral response acceleration, 5 percent damped, at 1.0 second period (times g).
- $F_a$  - Short period coefficient to modify 0.2 second period of mapped spectral response accelerations.
- $F_v$  - Long-period coefficient to modify 1.0 second period of mapped spectral response accelerations.
- $S_{MS}$  - Maximum considered earthquake spectral response acceleration, 5 percent damped, at 0.2 seconds (times g).
- $S_{M1}$  - Maximum considered earthquake spectral response acceleration, 5 percent damped, at 1.0 second period (times g).
- $S_{DS}$  - Design spectral response acceleration, 5 percent damped, at 0.2 second period (times g).
- $S_{D1}$  - Design spectral response acceleration, 5 percent damped, at 1.0 second period (times g).
- $T_s$  -  $S_{D1}/S_{DS}$ .

Note that under ASCE 7-16 Supplement 3, a site-specific ground motion analysis is required unless a structure's design can incorporate using a value of  $S_{M1}$  that is 50 percent higher than that presented above. In this case, that is  $S_{M1}$  equal to 2.757 g with a corresponding value for  $S_{D1}$  using equation 11.4-4 of 1.847 g.

## 5.0 FUTURE GEOTECHNICAL SERVICES

LACO should be retained to observe and test (as necessary) the earthwork and foundation phases of construction in order to: a) check that subsurface conditions exposed during construction are substantially the same as those interpolated from our subsurface exploration, on which the analysis and design were based; b) observe compliance with the geotechnical design concepts, specifications, and recommendations; and c) allow design changes in the event that subsurface conditions differ from those anticipated. The recommendations in this Memorandum are based on limited subsurface information. The nature and extent of variation across the Site may not become evident until construction. If variations are then exposed, it will be necessary to re-evaluate our recommendations.

## 6.0 LIMITATIONS

This Memorandum has been prepared for the exclusive use of the Client, their agents, contractors, consultants, and appropriate public authorities for specific application to development of the Site. LACO has exercised a standard of care equal to that generated for this industry to ensure that the information contained in this Memorandum is current and accurate. The opinions presented in this Memorandum are based upon information obtained from subsurface excavations, a Site Reconnaissance, review of geologic maps and data available to us, and upon local experience and engineering judgment, and the opinions have been formulated in accordance with generally accepted geotechnical engineering practices that exist in California at the time this Memorandum was prepared. In addition, geotechnical issues may arise that are not apparent at this time. No other warranty, expressed or implied, is made or should be inferred. A brochure prepared by ASFE (Association of Firms Practicing in the Geosciences) has been included in Appendix 3 of this report. We recommend that all individuals reading this report also read this brochure.

Data generated for this Memorandum represents information gathered at that time and at the widely spaced locations indicated. Subsurface conditions may be highly variable and difficult to predict. As such,

the recommendations included in this Memorandum are based, in part, on assumptions about subsurface conditions that may only be observed and/or tested during subsequent project earthwork. Accordingly, the validity of these recommendations is contingent upon review of the subsurface conditions exposed during construction in order to check that they are consistent with those characterized in this Memorandum. Upon request, LACO can discuss the extent of (and fee for) observations and tests required to check the validity of the recommendations presented herein.

The opinions presented in this Memorandum are valid as of the present date for the property evaluated. Changes in the condition of the property can occur over time, whether due to natural processes or the works of people, on this or adjacent properties. In addition, changes in applicable standards of practice can occur, whether from legislation or the broadening of knowledge. Accordingly, the opinions presented in this Memorandum may be invalidated, wholly or partially, by changes outside our control. Therefore, this Memorandum is subject to review and should not be relied upon after a period of three years, nor should it be used, or is it applicable, for any property other than that evaluated. This Memorandum is valid solely for the purpose, Site, and project described in this document. Any alteration, unauthorized distribution, or deviation from this description will invalidate this Memorandum. LACO assumes no responsibility for any third-party reliance on the data presented. Additionally, the data presented should not be utilized by any third-party to represent data for any other time or location.

## 7.0 REFERENCES

- ASCE [American Society of Civil Engineers], 2013, Minimum Design Loads for Buildings and Other Structures: ASCE Standard 7-16
- CBC [California Building Code], 2022, California Code of Regulations, Title 24, Part 2, Volume 2. California Building Standards Commission.
- SEAOC/OSHPD [Structural Engineers Association of California/Office of Statewide Health Planning and Development's], Seismic Design Map application, <https://seismicmaps.org/> (July 2020)

## FIGURES

**Figure 1**

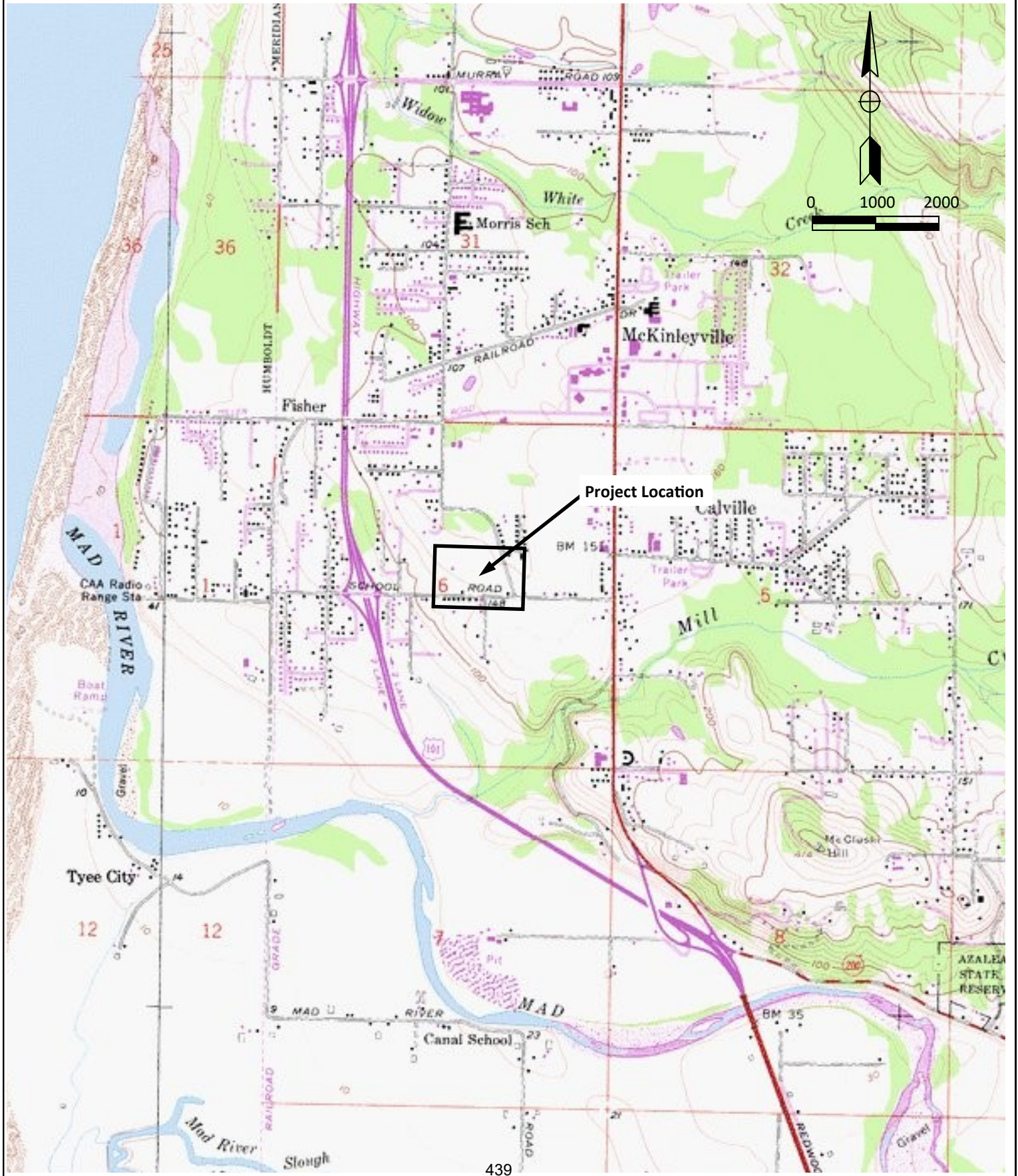
**Location Map**

**Figure 2**

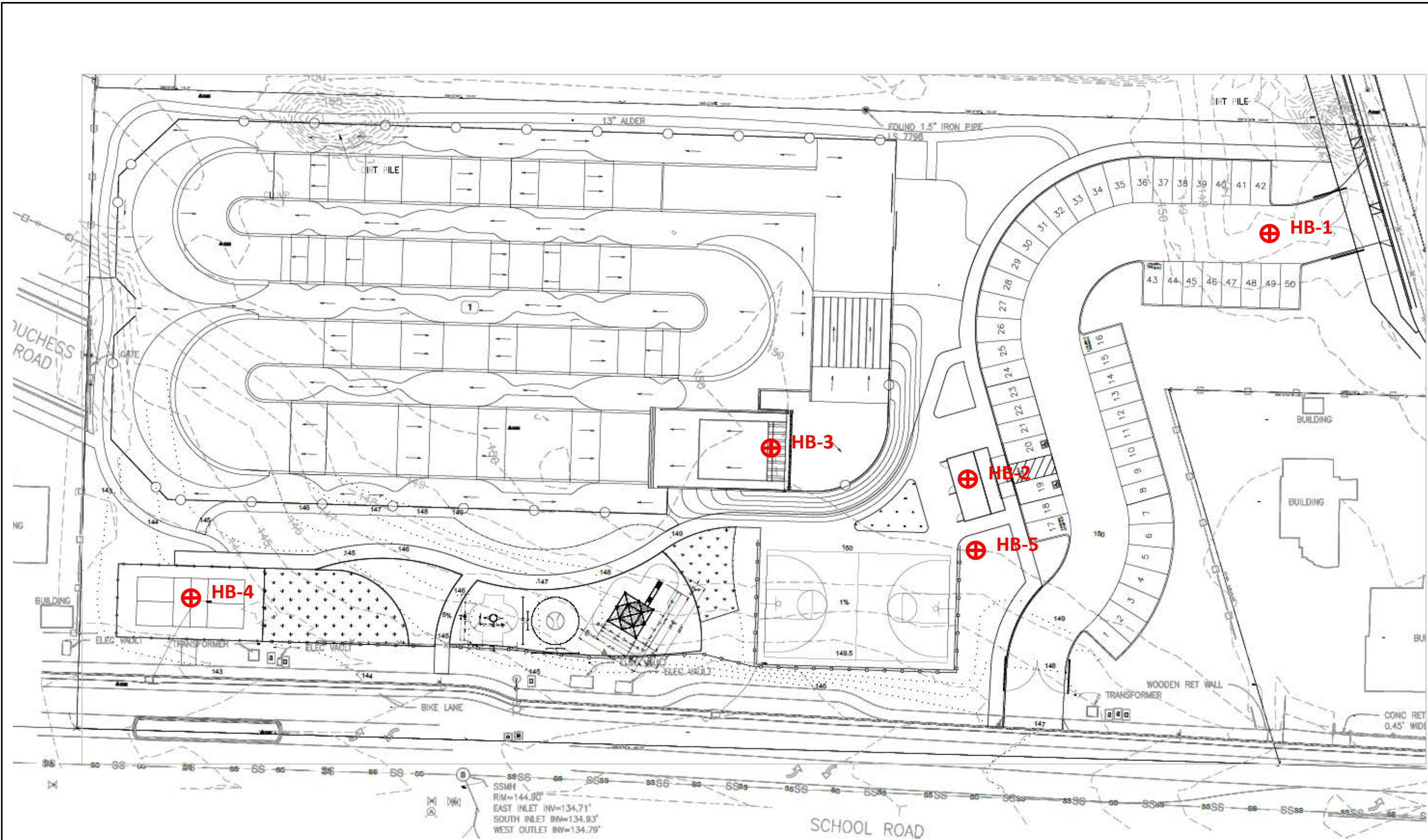
**Site Map**

PROJECT	MCSO BMX PARK	BY	GLM	FIGURE	1
CLIENT	Milton Design Group	DATE	6/1/23		
LOCATION	School Road, McKinleyville, CA	CHECK		JOB NO.	9698.09
	Location Map	SCALE	1" = 2000'		

REUSE OF DOCUMENTS: This document and the ideas and designs incorporated herein, as an instrument of professional service is the property of LACO Associates and shall not be reused in whole or part for any other project without LACO Associates' express written authorization.







**Legend**

**⊕ HB** Approximate Boring Location

Not to Scale

BY	DATE	CHECK	SCALE

MCSD BMX PARK  
 School Road, McKinleyville  
 Site Map

FIGURE  
 1  
 JOB NO.

9698.09

## APPENDIX 1

### **Boring Logs**

**CLIENT** Melton Design Group  
**PROJECT NUMBER** 9698.09  
**DATE STARTED** 5/24/23 **COMPLETED** 5/24/23  
**DRILLING CONTRACTOR** LACO  
**DRILLING METHOD** Hand Auger  
**LOGGED BY** SLF **CHECKED BY** GLM  
**NOTES** \_\_\_\_\_

**PROJECT NAME** MCSD BMX Park  
**PROJECT LOCATION** School Road, McKinleyville CA  
**GROUND ELEVATION** \_\_\_\_\_ **HOLE SIZE** 4 inches  
**GROUND WATER LEVELS:**  
**AT TIME OF DRILLING** --- NO GROUNDWATER ENCOUNTERED  
**AT END OF DRILLING** --- NO GROUNDWATER ENCOUNTERED

GEOTECH BORING NEW - GINT STD US LAB GDT - 6/1/23 15:41 - P:\19600\9698 MELTON DESIGN GROUP\9698.09 MCSD BMX\08 GEOLOGY\FIELD DATA\9698.09 GINT LOGS 5.24.23.GPJ

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	TESTS AND REMARKS	Pocket Penetrometer (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS (%)			FINES CONTENT (%)
										LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		Silt with fine sand, dark brown, moist, loose, some organics											
1													
2			GB										
3		(SP-SM) Fine sand with silt, medium brown, dry to moist, medium dense, fine roots and buried branches that are approximately 2 inches thick	GB										
4		(SM) Silty sand, yellow brown, dry to moist, medium dense, roots and buried branches											

Bottom of borehole at 4.8 feet.



**CLIENT** Melton Design Group  
**PROJECT NUMBER** 9698.09  
**DATE STARTED** 5/24/23      **COMPLETED** 5/24/23  
**DRILLING CONTRACTOR** LACO  
**DRILLING METHOD** Hand Auger  
**LOGGED BY** SLF      **CHECKED BY** GLM  
**NOTES** \_\_\_\_\_

**PROJECT NAME** MCSD BMX Park  
**PROJECT LOCATION** School Road, McKinleyville CA  
**GROUND ELEVATION** \_\_\_\_\_      **HOLE SIZE** 4 inches  
**GROUND WATER LEVELS:**  
**AT TIME OF DRILLING** --- NO GROUNDWATER ENCOUNTERED  
**AT END OF DRILLING** --- NO GROUNDWATER ENCOUNTERED

GEOTECH BORING NEW - GINT STD US LAB.GDT - 6/1/23 15:41 - P:\9600\9698 MELTON DESIGN GROUP\9698.09 MCSD BMX\08 GEOLOGY\FIELD DATA\9698.09 GINT LOGS 5.24.23.GPJ

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	TESTS AND REMARKS	Pocket Penetrometer (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS (%)			FINES CONTENT (%)
										LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		Topsoil											
1		(ML) Silt with fine sand and gravel, light brown, dry, medium dense											
		(GP) Gravel layer											

Bottom of borehole at 1.8 feet.

**CLIENT** Melton Design Group  
**PROJECT NUMBER** 9698.09  
**DATE STARTED** 5/24/23 **COMPLETED** 5/24/23  
**DRILLING CONTRACTOR** LACO  
**DRILLING METHOD** Hand Auger  
**LOGGED BY** SLF **CHECKED BY** GLM  
**NOTES** \_\_\_\_\_

**PROJECT NAME** MCSD BMX Park  
**PROJECT LOCATION** School Road, McKinleyville CA  
**GROUND ELEVATION** \_\_\_\_\_ **HOLE SIZE** 4 inches  
**GROUND WATER LEVELS:**  
**AT TIME OF DRILLING** --- NO GROUNDWATER ENCOUNTERED  
**AT END OF DRILLING** --- NO GROUNDWATER ENCOUNTERED

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	TESTS AND REMARKS	Pocket Penetrometer (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS (%)			FINES CONTENT (%)
										LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		Topsoil, light brown											
1		(ML) Very fine sandy silt with clay, orange brown, dry to moist, medium dense, fine roots	GB										
2			SH				86	26					
3			GB										

Bottom of borehole at 3.2 feet.

GEOTECH BORING NEW - GINT STD US LAB GDT - 6/1/23 15:41 - P:\9600\9698 MELTON DESIGN GROUP\9698.09 MCSD BMX\08 GEOLOGY\FIELD DATA\9698.09 GINT LOGS 5.24.23.GPJ

**CLIENT** Melton Design Group  
**PROJECT NUMBER** 9698.09  
**DATE STARTED** 5/24/23      **COMPLETED** 5/24/23  
**DRILLING CONTRACTOR** LACO  
**DRILLING METHOD** Hand Auger  
**LOGGED BY** SLF      **CHECKED BY** GLM  
**NOTES** \_\_\_\_\_

**PROJECT NAME** MCSD BMX Park  
**PROJECT LOCATION** School Road, McKinleyville CA  
**GROUND ELEVATION** \_\_\_\_\_      **HOLE SIZE** 4 inches  
**GROUND WATER LEVELS:**  
**AT TIME OF DRILLING** --- NO GROUNDWATER ENCOUNTERED  
**AT END OF DRILLING** --- NO GROUNDWATER ENCOUNTERED

GEOTECH BORING NEW - GINT STD US LAB GDT - 6/1/23 15:41 - P:\19600\9698 MELTON DESIGN GROUP\9698.09 MCSD BMX\08 GEOLOGY\FIELD DATA\9698.09 GINT LOGS 5.24.23.GPJ

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	TESTS AND REMARKS	Pocket Penetrometer (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS (%)			FINES CONTENT (%)
										LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0.0		Topsoil											
2.5		(ML) Sandy silt, light yellow brown, dry to moist, soft to firm  (SM) Silty sand, light yellow brown, dry to moist, soft to firm	SH					84	22				
5.0		(CL) Medium plasticity sandy clay with silt, light orange brown, moist, soft to firm (SP-SC) Poorly graded sand with clay, light orange brown, wet, soft (SP) Poorly graded sand, gray brown, moist, soft											28
7.5													
10.0													

Bottom of borehole at 10.0 feet.

**CLIENT** Melton Design Group  
**PROJECT NUMBER** 9698.09  
**DATE STARTED** 5/24/23      **COMPLETED** 5/24/23  
**DRILLING CONTRACTOR** LACO  
**DRILLING METHOD** Hand Auger  
**LOGGED BY** SLF      **CHECKED BY** GLM  
**NOTES** \_\_\_\_\_

**PROJECT NAME** MCSD BMX Park  
**PROJECT LOCATION** School Road, McKinleyville CA  
**GROUND ELEVATION** \_\_\_\_\_      **HOLE SIZE** 4 inches  
**GROUND WATER LEVELS:**  
**AT TIME OF DRILLING** --- NO GROUNDWATER ENCOUNTERED  
**AT END OF DRILLING** --- NO GROUNDWATER ENCOUNTERED

GEOTECH BORING NEW - GINT STD US LAB GDT - 6/1/23 15:41 - P:\19600\9698 MELTON DESIGN GROUP\9698.09 MCSD BMX\08 GEOLOGY\FIELD DATA\9698.09 GINT LOGS 5.24.23.GPJ

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	TESTS AND REMARKS	Pocket Penetrometer (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS (%)			FINES CONTENT (%)
										LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		Topsoil											
1													
2		(ML) Silt with fine sand, dark brown, moist, soft											
3		(SP-SM) Fine sand with silt, light tan brown, moist, loose	GB										23
4													

Bottom of borehole at 4.3 feet.

## APPENDIX 2

### **Laboratory Test Results**



<b>MOISTURE / DENSITY</b> <b>ASTM D-2216 / 2937</b>
--

PROJECT	McKinleyville BMX Track Civil	SHEET	1/1
CLIENT	Melton Design Group	JOB NO.	9698.09
LAB ID		23-037EK	
LOCATION	McKinleyville, CA	TEST BY	AMC
DATE		6/1/23	
SOIL TYPE	VARIOUS	CHECKED BY	
CHECK DATE			

SAMPLE LOCATION	HB-3	HB-4			
DEPTH (ft)	1.5	2			
SOIL TYPE (USCS)	VARIOUS	VARIOUS			
WET SOIL+PAN+TUBE	2941.6	2738.7			
DRY SOIL + PAN + TUBE	2673.3	2533.2			
PAN + TUBE	1626.4	1603.3			
MOISTURE CONTENT (%)	25.6	22.1			
TUBE DIAMETER (cm)	7.40	7.30			
TOTAL TUBE LENGTH (cm)	30.5	30.5			
EMPTY TUBE LENGTH (cm)	12.8	13.9			
NET SPECIMEN LENGTH (cm)	17.7	16.6			
TARE WEIGHT OF TUBE (gm)	819.5	809.7			
NET WET SOIL + TUBE (gm)	2134.7	1945.1			
WET SOIL (gm)	1315.2	1135.4			
VOLUME OF WET SOIL (cf)	0.027	0.025			
WET DENSITY (pcf)	107.9	102.1			
DRY DENSITY (pcf)	85.9	83.6			
VOID RATIO	0.9	1.0			
% SATURATION	73.2	59.7			



<b>MOISTURE / DENSITY</b>
<b>ASTM D-2216 / 2937</b>

PROJECT	McKinleyville BMX Track Civil	JOB NO.	9698.09	SHEET
CLIENT	Melton Design Group	LAB ID	23-037EK	1 of 1
LOCATION	McKinleyville, CA	TEST BY	AMC	DATE
SOIL TYPE	VARIOUS	CHECKED BY		6/1/23
				CHECK DATE

<b>Sample Location</b>	HB-3	HB-4						
<b>Sample Depth (ft bgs)</b>	1.5	2.0						
<b>Soil Type (USCS)</b>	VARIOUS	VARIOUS						
<b>Moisture Content (%)</b>	25.6	22.1						
<b>Wet Density (pcf)</b>	107.9	102.1						
<b>Dry Density (pcf)</b>	85.9	83.6						
<b>Void Ratio*</b>	0.9	1.0						
<b>% Saturation</b>	73.2	59.7						

\*Void ratio calculation assumes a specific gravity of 2.65



<b>FINER THAN #200 SIEVE</b> <b>ASTM C117/ASTM D-1140</b>
--

PROJECT	McKinleyville BMX Track Civil	JOB NO.	9698.09	SHEET	
CLIENT	Melton Design Group	SAMPLE ID	23-037EK	1 of 1	
LOCATION	McKinleyville, CA	TEST BY	AMC	DATE	5/31/23
SOIL TYPE	VARIOUS	CHECKED BY		CHECK DATE	

<b>HB-4 @ 5.0'</b>
--------------------

(B)	Net sample (Dry)	121.3	gms
(C)	Dry sample after washing	87.5	gms
	Total Material finer than 200 sieve	33.8	gms

(A) % Material finer than 200 sieve      **27.9%**  
 $A = [(B-C)/B] \times 100$

<b>HB-5 @ 3.0'</b>
--------------------

(B)	Net sample (Dry)	164.3	gms
(C)	Dry sample after washing	126.1	gms
	Total Material finer than 200 sieve	38.2	gms

(A) % Material finer than 200 sieve      **23.3%**  
 $A = [(B-C)/B] \times 100$



## APPENDIX 3

### **ASFE Brochure**

# Important Information About Your Geotechnical Engineering Report

*Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.*

*The following information is provided to help you manage your risks.*

## **Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects**

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical engineering study conducted for a civil engineer may not fulfill the needs of a construction contractor or even another civil engineer. Because each geotechnical engineering study is unique, each geotechnical engineering report is unique, prepared *solely* for the client. No one except you should rely on your geotechnical engineering report without first conferring with the geotechnical engineer who prepared it. *And no one — not even you — should apply the report for any purpose or project except the one originally contemplated.*

## **Read the Full Report**

Serious problems have occurred because those relying on a geotechnical engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

## **A Geotechnical Engineering Report Is Based on A Unique Set of Project-Specific Factors**

Geotechnical engineers consider a number of unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical engineering report that was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light industrial plant to a refrigerated warehouse,

- elevation, configuration, location, orientation, or weight of the proposed structure,
- composition of the design team, or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes—even minor ones—and request an assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

## **Subsurface Conditions Can Change**

A geotechnical engineering report is based on conditions that existed at the time the study was performed. *Do not rely on a geotechnical engineering report* whose adequacy may have been affected by: the passage of time; by man-made events, such as construction on or adjacent to the site; or by natural events, such as floods, earthquakes, or groundwater fluctuations. *Always* contact the geotechnical engineer before applying the report to determine if it is still reliable. A minor amount of additional testing or analysis could prevent major problems.

## **Most Geotechnical Findings Are Professional Opinions**

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ—sometimes significantly—from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most effective method of managing the risks associated with unanticipated conditions.

## **A Report's Recommendations Are *Not* Final**

Do not overrely on the construction recommendations included in your report. *Those recommendations are not final*, because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations only by observing actual



subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's recommendations if that engineer does not perform construction observation.*

### **A Geotechnical Engineering Report Is Subject to Misinterpretation**

Other design team members' misinterpretation of geotechnical engineering reports has resulted in costly problems. Lower that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Contractors can also misinterpret a geotechnical engineering report. Reduce that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing construction observation.

### **Do Not Redraw the Engineer's Logs**

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

### **Give Contractors a Complete Report and Guidance**

Some owners and design professionals mistakenly believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise contractors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure contractors have sufficient time* to perform additional study. Only then might you be in a position to give contractors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

### **Read Responsibility Provisions Closely**

Some clients, design professionals, and contractors do not recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that

have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations" many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

### **Geoenvironmental Concerns Are Not Covered**

The equipment, techniques, and personnel used to perform a *geoenvironmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical engineering report does not usually relate any geoenvironmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own geoenvironmental information, ask your geotechnical consultant for risk management guidance. *Do not rely on an environmental report prepared for someone else.*

### **Obtain Professional Assistance To Deal with Mold**

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the *express purpose* of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, a number of mold prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; ***none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.***

### **Rely, on Your ASFE-Member Geotechnical Engineer for Additional Assistance**

Membership in ASFE/The Best People on Earth exposes geotechnical engineers to a wide array of risk management techniques that can be of genuine benefit for everyone involved with a construction project. Confer with you ASFE-member geotechnical engineer for more information.



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**Stormwater Control Plan**  
Prepared For  
**Melton Design Group, Inc**  
Mckinleyville BMX Track and Park Development

**Project Location**  
Washington and School Road  
Mckinleyville, CA  
APN 508-242-043  
LACO Job #9698.09  
Owner: Mckinleyville Community Services Dept



**PREPARED BY**  
LACO ASSOCIATES  
1209 Esplanade Unit 4  
Chico, Ca 95926  
(707) 462-0222

November 2023

**Prepared by**  
**Paul A Peck, RCE No.58602**



My License Expires 31, December 2024

## **Introduction:**

This report has been prepared for the purposes of evaluating the drainage conditions of parcel APN: 508-242-043 located at Washington Ave and School Road McKinleyville, California. This report recommends improvements to the existing condition which will serve the proposed development.

Proposed Drainage Management Areas (DMAs) were delineated for the purposes of estimating runoff to various Best Management Practice (BMP) facilities.

## **Methodology:**

Humboldt Low Impact Development Stormwater Manual, v3.0 dated August 18, 2021, was used for design standards.

## **Project Description:**

The McKinleyville BMX Track and Park Development project (hereinafter "Project") consists of hardscape improvements including paved parking areas, sidewalks, bathroom facilities, play area, picnic area and pickle ball court. The BMX track portion of the project was not analyzed as part of this stormwater control plan. Landscape improvements include bio-retention areas (BRAs), and self-treating areas (SRAs) located on a 3.00-acre lot, (hereinafter "Site").

The Project will create and replace under one acre of impervious surfaces. This will generate a net increase in impervious surface that is under one acre and qualifies the site as a regulated project. The LID requirements for the project are therefore to utilize LID features to result in no net increase in runoff during post-construction 2-year, 24-hour storm event as compared to the pre-project condition.

## **Existing Topography and Drainage:**

The project existing site consists of 100% grass and tree cover. The soil on the existing site has less than fifty percent fines and a percolation rate greater than one inch per hour. The water table depth at the site is greater than fifty feet (USDA Soil Survey). The existing site generally drains with sheet flow over vegetation from the north side of the property to School Rd., where it then drains into the city storm drain system through curb inlets.

## **Proposed Drainage Description:**

Our proposed drainage design will capture and infiltrate runoff in accordance with the requirements of the Humboldt LID manual. The post development hydrology has been broken up into eight DMAs; please refer to Appendix 4, LID Site Plan for exact locations. Overland flow will be directed to proposed BRAs located within each of these DMAs.

## **100-Year Flood Control**

The on-site overland flow will be designed to adequately convey stormwaters from the 100-year storm event and minimize the potential flood impacts.

## **Stormwater Control Plan (SCP) Requirements:**

The Humboldt County Low Impact Development Stormwater Manual v3.0, dated August 18, 2021 (hereinafter "LID Manual") was utilized to develop a stormwater management plan to capture, treat, and infiltrate stormwater runoff to account for stormwater produced by an increase in impervious area. The LID Manual classifies all projects that create or replace greater than or equal to 5000 SF of impervious surface as Regulated Projects. Under this classification the LID Manual requires a site assessment, delineation of drainage management areas (DMA) and a calculation quantifying the reduction in stormwater runoff by using site design measures. The findings must be delivered in a Stormwater Control Plan (SCP).

This Site Design measures proposed to be used in this project consist of constructing BRAs and SRAs as mentioned in the Proposed Drainage Description. Within the approximate 3.0 acre site, an approximate area totaling 33,829 square feet is proposed to be impervious surface and an

approximate area totaling 96,789 square feet is proposed to be comprised of pervious surfaces (including natural vegetation, SRAs, and BRAs) The BMPs have been sized to handle the projected runoff from the 85<sup>th</sup>-percentile, 24-hour storm event. New and existing trees were counted for runoff reduction credits in the LID Calculations.

**Pollution Prevention Measures:**

Source control pollution prevention measures would include parking area sweeping, and all onsite Trash Enclosures shall be covered.

**Types of BMPs**

The selected BMPs for the developed site will include the following:

BMP LID Features

Bio-retention Areas

Self-retaining Areas

**Level of Treatment and Volume Capture**

Our proposed drainage design will intercept runoff, capture, infiltrate, via bio-retention facilities and self-retaining areas located throughout the site. The volume capture design goal has been achieved in all eight of the DMAs per the Humboldt County LID designs provisions. See Table 1 for sizing below, and calculations in appendices.

*Table 1*

<b>Volume Capture Goals and Retention Sizing</b>				
DMA #	Required Retention Size (Square feet)	Achieved Size (Square feet)	Required Retention Volume (gallons) per 24hrs	Achieved Volume (gallons) per 24hrs
1	393	525	3,968	3,990
2	284	412	2,867	3,082
3	248	348	2,603	2,505
4	82	143	1,070	831
<b>Site Total</b>	<b>1,007</b>	<b>1,431</b>	<b>10,508</b>	<b>10,408</b>

**Maintenance and Funding**

BMPs shall be inspected and maintained as described in the Humboldt County Low Impact Development Stormwater Manual.

**Maintenance of BMPs**

The maintenance of selected BMPs is recommended as follows:

Bio-retention Areas

At a minimum maintenance shall include the following:

- Dry street sweeping upon completion of construction
- Dry street sweeping annually, and
  - When water is observed flowing in the gutter during a low intensity storm.
  - Algae is observed in the gutter.
  - Sediment/debris covers 1/3 of the gutter width or more.
- Inspect twice annually for sedimentation and trash accumulation in the gutter. Obstructions and trash shall be removed and properly disposed of.
- Inspect twice during the rainy season for ponded water.
- Pesticides and fertilizers shall not be used in the bioretention area.
- Plants should be pruned, weeds pulled, and dead plants replaced as needed.

Appendices:

1. SCP for Regulated Projects Worksheet
2. Stormwater Worksheets
3. BMP Sizing Calculations
4. LID Site Exhibit
5. Bioretention Specifications
6. Operation and Maintenance Template
7. New Trees Planting Plan

# Stormwater Control Plan for Regulated Projects (≥ 5000 sq. ft.)

<p><b>For Office Use Only</b>                  Application No. _____                  Received By: _____</p>
--

**Instructions**

Based on the Stormwater Information Sheet in Humboldt LID Stormwater Manual – Part A, you have determined that your project is classified as a Regulated Project. Use this form to assist you in designing your project to comply with the MS4 General Permit post-construction requirements for Regulated Projects. This completed and signed Stormwater Control Plan for Regulated Projects including additional supporting documents as required, must be submitted with your project application to the applicable PBS department with project location jurisdiction.

**A. Project Information and Description**

<p><b>Project Name:</b> _____</p> <p><b>Physical Site Address:</b> _____</p> <p><b>Assessor’s Parcel Number:</b> _____</p> <p><b>Project Applicant:</b> _____</p> <p><b>Mailing Address:</b> _____</p> <p><b>Phone:</b> _____</p> <p><b>Email:</b> _____</p> <p><b>Name, email and address of project consultant, if any (e.g., engineer, architect, designer):</b></p> <p><b>Name:</b> _____</p> <p><b>Firm:</b> _____</p> <p><b>Address:</b> _____</p> <p><b>Phone:</b> _____</p> <p><b>Email:</b> _____</p> <p><small>Type of Application/Project:                  What type of application is this checklist accompanying?</small></p> <p> <input type="checkbox"/> Grading Permit                          <input type="checkbox"/> Use Permit                          <input type="checkbox"/> Subdivision  <input type="checkbox"/> Building Permit                          <input type="checkbox"/> Design Review                          <input type="checkbox"/> Other (please specify) _____                 </p>	
<b>Project Type and Description:</b>	
<b>Total Pre-Project Impervious Surface Area (square feet)</b>	
<b>Total New or Replaced Impervious Surface Area (square feet)</b> <small>[Sum of impervious area that will be constructed as part of the project]</small>	
<b>Total Post-Project Impervious Surface Area (square feet)</b>	

This Regulated Projects Stormwater Control Plan provides guidelines and methods for assessing site conditions, determining runoff values for site DMAs, implementing site design measures with the goal of reducing stormwater runoff values from impervious surfaces, and determining the size of bioretention facilities (if required). Strategic use of site design measures may enable compliance without the need for bioretention facilities or equivalent.





# Stormwater Control Plan for Regulated Projects ( $\geq 5000$ sq. ft.)

## B. Site Assessment (Opportunities and Constraints)

### 1. Soil Characteristics

I. Soil characterization method \_\_\_\_\_

II. Were infiltration rates assessed for the site?  Yes  No

*If Yes, please attach soils testing report*

### 2. Depth to Groundwater

I. What is the depth (below ground surface) to groundwater (in feet)? \_\_\_\_\_

II. How was this determined? \_\_\_\_\_

### 3. Existing Vegetation and Natural Areas

I. Are there any key natural vegetation areas, sensitive habitats, or mature trees on the site?

Yes  No

If yes, please draw and label these features on the existing conditions site plan map and attach to this document.

### 4. Drainage and Hydrograph

I. Are there any natural drainage or wet area features such as: natural ponds, springs, vernal pools, marshes, and wet meadows on the site or directly adjacent to the site?

Yes  No

If yes, consult with applicable PBS department staff with jurisdiction for project location as additional project area restrictions may apply.

### 5. Potential Contamination

I. Is the project site within or near to a registered contaminated site, according to the State Water Resources Control Board Geotracker Website (<http://geotracker.waterboards.ca.gov/>)?

Yes  No

If yes, please attach the applicable contaminated site report from the Geotracker website, and note the location of the contaminated site on the existing conditions site plan map. Please attach a description explaining how this contamination will affect your project design.

# Stormwater Control Plan for Regulated Projects ( $\geq 5000$ sq. ft.)

## C. Project Layout Optimization

Optimizing the site layout can be done through the following methods:

1. Define the development envelope and protected areas, identifying areas that are most suitable for development and areas to be left undisturbed.
2. Concentrate development on portions of the site with less permeable soils and preserve areas that can promote infiltration.
3. Limit overall impervious coverage of the site from paving and roofs.
4. Set back development from creek, wetlands, and riparian habitats, to maximize vegetative buffer widths.
5. Preserve significant trees.
6. Conform the site layout along natural landforms.
7. Avoid excessive grading and disturbance of vegetation and soils.
8. Replicate the site's natural drainage patterns.
9. Detain and retain runoff throughout the site.

Based on the features included in the existing conditions site plan, please ensure your project site plan applies project layout optimization measures to the greatest extent practicable, while still meeting the objectives of your project.

Have you attached a short description of how site optimization techniques have been integrated into the project design?

Yes       No

## D. Source Controls

Does your project contain potential pollutant-generating activities or sources?

Yes       No

If Yes, please complete the Source Control Worksheet (Appendix 7) and list and identify the source or treatment control measure and locations and include as an attachment to the SCP document.

# Stormwater Control Plan for Regulated Projects (≥ 5000 sq. ft.)

## E. Drainage Management Areas

On the project site plan please delineate and label all drainage management areas (refer to Sec. 6 of the manual).

For each Drainage Management Area identified on the project site plan, complete the Regulated Projects Runoff Worksheets (attached) to document runoff values, implementation of Site Design Measures, and bioretention facility sizing (if required). Every DMA within the project shall be listed in Worksheet 1(attached)

In accordance with section E.12 of the MS4 General Permit, Site Design Measures shall be implemented based on the objective of capturing (retaining) stormwater runoff from the 85<sup>th</sup> percentile 24-hour storm event, to the extent technically feasible. Any remaining runoff, from impervious DMAs, may then be directed to one or more bioretention facilities or equivalent. Projects over 1 acre must adhere to hydromodification standards if applicable. (refer to Sec. 5.8 of the manual).

## F. Runoff Reduction Measures

Worksheet 1 provides a method for project applicants to document compliance with runoff reduction requirements through a site design methodology that directs stormwater runoff from impervious surface areas to pervious self-retaining areas for capture and infiltration (as detailed in LID Manual – Section 6.0). Using this methodology, all stormwater runoff from the 85<sup>th</sup> percentile 24-hour storm event for each DMA can be captured and retained on site and compliance with the MS4 General Permit runoff reduction requirements can be met.

Capturing stormwater runoff using the site design methodology where runoff from impervious surface areas is directed to pervious self-retaining areas is a convenient alternative for achieving compliance with the MS4 General Permit runoff reduction requirements, while avoiding the need for bioretention facilities. Worksheet 1 provides a simple calculation for determining if stormwater runoff reduction measures have been met using this design methodology.

Due to site constraints, not all projects or project DMAs may be able to achieve compliance with runoff reduction requirements by directing impervious surface stormwater runoff to pervious self-retaining areas. The project applicant will need to complete Worksheet 2 for each DMA (*6.0 Documenting Your Design*) that cannot meet compliance with runoff reduction measures as determined using Worksheet 1.

Worksheet 2 will be used to apply Site Design Measures in addition to any pervious self-retaining areas with the goal of reducing stormwater runoff values from impervious surfaces such that a no net stormwater runoff value (using the design storm) for each DMA is achieved. The worksheet process is an iterative exercise. If compliance cannot be met during the first iteration of calculations alter the site design measures to increase capturing capacity and rerun the calculator.

Site Design Measures include the following:

- 1. Tree Planting and Preservation
- 2. Rain Barrels or Cisterns
- 3. Impervious Area Disconnection
- 4. Soil Quality Improvement
- 5. Green Roof
- 6. PPPP (alternative engineered hardscapes)
- 7. Vegetated Swales
- 8. Stream Setbacks and Buffers
- 9. On-site Infiltration (trench, dry well, gallery, or system)

Multiple Site Design Measures may be applied to best meet site conditions in order to reduce stormwater runoff values from impervious surface areas.

After application of Site Design Measures, any remaining stormwater runoff from each DMA, must then be directed to one or more bioretention facilities or equivalent in accordance with Section 6.3 of the manual and the MS4 General Permit.

## G. Bioretention Facility

Indicate whether a Bioretention Facility or equivalent is required for this project.

- Yes
- No



# Stormwater Control Plan for Regulated Projects (≥ 5000 sq. ft.)

## H. Operation and Maintenance in Perpetuity

Indicate whether an *Operation and Maintenance Plan* is accompanying this document, required for bioretention facilities or equivalent).

Yes       No

## I. Signature and Certification:

This Stormwater Control Plan is required for all Regulated Projects. This document will be used by the plan checker to confirm that adequate stormwater control measures are being implemented on the project.

Indicate whether all supporting materials and worksheets are accompanying this document, Stormwater Control *Plan*

Yes       No

I, the below signed, confirm that I have accurately described my project to the best of my ability, and that I have not purposely omitted any detail affecting my project’s classification for storm water regulation. I hereby certify that the site design measures and storm water flow treatment measures identified herein as being incorporated into my project have been designed in accordance with the Site Design Measure sheets or equivalent and are included in the final site plans submitted to the applicable Planning and/or Building Services Department with project location jurisdiction. I also hereby certify that my project meets the storm water runoff reduction criteria identified in the SCP, or as determined through other approved means.

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

\_\_\_\_\_  
Print Name

I am the:

Property Owner       Contractor       Applicant



# Stormwater Control Plan for Regulated Projects (≥ 5000 sq. ft.)

## J. Checklist:

Items on Site Plan	Items within the SCP
<input type="checkbox"/> Site Boundary	<input type="checkbox"/> Narrative of site features and conditions that constrain or provide opportunity for stormwater control
<input type="checkbox"/> Soil types and areal extents. Test pit/infiltration test locations (if required)	<input type="checkbox"/> Narrative describing the use of runoff reduction measures (sec. F), building features, pavement selections, etc., that reduce runoff
<input type="checkbox"/> Environmentally-sensitive areas and areas to be preserved	<input type="checkbox"/> Completed Worksheet 1 self-retaining area
<input type="checkbox"/> Existing natural hydrological features (depressions, watercourses, wetlands, riparian areas, undisturbed natural areas)	<input type="checkbox"/> Completed Worksheet 2 site design runoff reduction measures for each DMA
<input type="checkbox"/> Existing and proposed sited drainage network and connections to MS4 conveyances off-site	<input type="checkbox"/> Treatment/Bioretenion Operation and Maintenance Plan, including: inspection and , maintenance schedule, checklist and certification form and legally binding agreement
<input type="checkbox"/> Proposed site design measures used to reduce runoff	<input type="checkbox"/> Bioretention Checklist (if utilized)
<input type="checkbox"/> DMA delineation labeled with unique identifier	<input type="checkbox"/> Narrative describing (treatment/ baseline hydromodification)/bioretention facilities including the calculations and location of each facility.
<input type="checkbox"/> Proposed locations and footprints of improvements creating new, or replaced, impervious surfaces	<input type="checkbox"/> Source Control Worksheet (if required)
<input type="checkbox"/> Locations and footprints of bioretention (treatment/baseline hydromodification) facilities (if required)	<input type="checkbox"/> Soil percolation/infiltration testing documentation
<input type="checkbox"/> Areas of soil and/or groundwater contamination	
<input type="checkbox"/> Existing utilities and easements	
<input type="checkbox"/> Pollutant generation source areas, including loading docks, food service areas, refuse areas, outdoor processing and storage areas, vehicle cleaning facilities/areas, repair or maintenance areas, fuel dispensing area, equipment washing areas	



**Regulated Projects Worksheet 1 - Humboldt Low Impact Development Stormwater Manual**

DMA Name	Total Post Project Impervious Surface Area (square feet)	Pervious Self-Retaining Area <sup>1</sup> (square feet)	Ratio of Impervious Surface Area to Self-Retaining Pervious Surface Area	Does Ratio Achieve 3.5 : 1 ratio or better of Impervious Surface Area to Self-Retaining Pervious Surface Area (Yes or No) <sup>2</sup>
Example A	500	150	3.3 : 1	YES
Example B	500	100	5.0 : 1	NO
DMA 1	11811	519	22.8 : 1	NO
DMA 2	8004	412	19.4 : 1	NO
DMA 3	7408	348	21.3 : 1	NO
DMA 4	2960	466	6.4 : 1	NO
DMA 5	1620	465	3.5 : 1	YES
DMA 6	783	223	3.5 : 1	YES
DMA 7	1024	293	3.5 : 1	YES
DMA 8	136	39	3.5 : 1	YES
			:	
			:	
			:	
			:	
			:	
			:	
			:	
			:	

**1: Self-Retaining Areas where impervious surface runoff is directed to the Pervious Self-Retaining Area in accordance with Humboldt LID Manual - Part C, Section 6.0**  
**2: If "Yes", Ratio of Impervious Surface Area to Self-Retaining Pervious Surface Area is equal to 3.5:1 or better (1.3:1 or better in the Shelter Cove MS4 area), then compliance with runoff reduction measures have been met for DMA.**  
**If "No", Ratio of Impervious Surface Area to Self-Retaining Pervious Surface Area does not achieve 3.5:1 or better (1.3:1 in Shelter Cove), then compliance with runoff reduction measures have not been met for DMA (Complete Worksheet 2).**

**Regulated Projects Worksheet 2**  
**Humboldt Low Impact Development Stormwater Manual**

Mckinleyville BMX						Formulas/Notes
<b>DMA Name: DMA 1</b>						
Total Post-Project Impervious Surface Area (square feet)	A	11811	square feet			
24 hour - 85th Percentile Design Storm	B	0.65	inch			B = Select Design Storm Value (0.65-inch Humboldt Bay Area, 1.3-inch Shelter Cove)
<b>Impervious Surface Runoff Value</b> (Potential Stormwater Runoff due to impervious surface area and design storm value)	C	4766	Gallons per 24 hours			C = A x B x 0.083 x 7.48
<b>Pervious Self-Retaining Area (SRA) Credit (if applicable, if none enter 0)</b>						
Self-Retaining Area (square feet)		519		3.5	SRA Credit	1817 square feet
						SRA Credit = Self-Retaining Area x Multiplier Select Multiplier (3.5 Humboldt Bay Area, 1.3 Shelter Cove)
<b>Site Design Measure Credits</b>						
<b>Tree Planting and Preservation</b>						
New Trees						
		# of trees				
100 square feet per deciduous tree	D	6	E	600	square feet	E = D x 100
200 square feet per evergreen tree	F	5	G	1000	square feet	G = F x 200
Existing Trees (Credit for 50% of existing canopy area)						
		Canopy diameter (feet)				
Tree #1	H <sub>1</sub>	28	J <sub>1</sub>	308	square feet	J <sub>1</sub> = 3.14 x (H <sub>1</sub> /2) <sup>2</sup> x 0.50
Tree #2	H <sub>2</sub>	12	J <sub>2</sub>	57	square feet	J <sub>2</sub> = 3.14 x (H <sub>2</sub> /2) <sup>2</sup> x 0.50
Tree #3	H <sub>3</sub>	6	J <sub>3</sub>	14	square feet	J <sub>3</sub> = 3.14 x (H <sub>3</sub> /2) <sup>2</sup> x 0.50
<b>Rain Barrel or Cisterns (55 gallon minimum)</b>						
Square foot credit per gallon based on 24-hour, 85th Percentile Design Storm	K	2.48				K = Select square foot credit per gallon (2.48 Humboldt Bay Area, 1.24 Shelter Cove)
Gallons						
Rain Barrels	L		M	0	square feet	M = L x K
Cisterns	N		O	0	square feet	O = N x K
<b>Infiltration Trench/Basin (55 gallon minimum ~ 21 ft<sup>3</sup>)</b>						
cubic feet						
volume(ft <sup>3</sup> ) = length x width x depth	P	0	Q	0	square feet	Q = P x R x K x 7.48
porosity (approximate %)	R	35%				
<b>Subsurface Infiltrators (55 gallon minimum)</b>						
Proprietary units vary, insert estimated storage in ft <sup>3</sup>	S	0	T	0	square feet	T = S x 7.48
<b>Impervious Area Disconnection</b>						
Credit per square foot of impervious area feeding into pervious area	U				square feet	U = Enter square foot value
<b>Soil Quality Improvement</b>						
Credit per square foot of soil quality improvement	V				square feet	V = Enter square foot value
<b>Green Roof</b>						
Credit per square foot of green roof installation	W				square feet	W = Enter square foot value
<b>PPPP (Alternative engineered hardscaping surfaces)</b>						
Credit per square foot of PPPP	X				square feet	X = Enter square foot value
<b>Vegetated Swales</b>						
Credit per square foot of vegetated swale	Y				square feet	Y = Enter square foot value
<b>Stream Setbacks and Buffers</b>						
Credit per square foot of stream setback and buffer <sup>#</sup>	Z				square feet	Z = Enter square foot value
<b>Credits Total</b>	AA	3795	square feet			AA = SRA Credit + E + G + J <sub>1</sub> + J <sub>2</sub> + J <sub>3</sub> + M + O + Q + T + U + V + W + X + Y + Z
<b>Post-Project Impervious Surface Area minus Site Design Measure Credits</b>	BB	8016	square feet			BB = A - AA
<b>NEW Impervious Surface Runoff Value</b> (Potential Stormwater Runoff due to impervious surface area and design storm after implementation of Site Design Measures)	CC	3235	Gallons per 24 hours			CC = BB x B x 0.083 x 7.48
<b>Percent reduction in Impervious Surface Runoff Value*</b>	DD	32.1	%			DD = ((C - CC) / C) x 100%
*If value for DD is not greater than or equal to %100 then bioretention is required for treating remaining runoff from impervious area indicated by value BB. Design and implement bioretention facility in accordance with Humboldt LID Stormwater Manual - Part C.						
**Infiltration Trench/Basin calculations are based on porosity (35%). Increased trench dimensions (volume) are required to meet 55 gallon minimum capacity.						

Green Fill In [Enter Value]

Red Calculated Value

Black Fixed Value/Selectable Value

Conversions Used:

1 inch = 0.083 feet

1 cubic foot = 7.48 gallons

Regulated Projects Worksheet 2, Version 2.0 - June 29, 2016

# check with agency with project area jurisdiction for requirements

3.5	2.48	0.65
1.3	1.24	1.3

**Regulated Projects Worksheet 2**  
**Humboldt Low Impact Development Stormwater Manual**

Mckinleyville BMX						Formulas/Notes
<b>DMA Name: DMA 2</b>						
Total Post-Project Impervious Surface Area (square feet)	A	8004	square feet			
24 hour - 85th Percentile Design Storm	B	0.65	inch			B = Select Design Storm Value (0.65-inch Humboldt Bay Area, 1.3-inch Shelter Cove)
<b>Impervious Surface Runoff Value</b> (Potential Stormwater Runoff due to impervious surface area and design storm value)	C	3230	Gallons per 24 hours			C = A x B x 0.083 x 7.48
<b>Pervious Self-Retaining Area (SRA) Credit (if applicable, if none enter 0)</b>						
Self-Retaining Area (square feet)		0		3.5	SRA Credit	0 square feet
						SRA Credit = Self-Retaining Area x Multiplier Select Multiplier (3.5 Humboldt Bay Area, 1.3 Shelter Cove)
<b>Site Design Measure Credits</b>						
<b>Tree Planting and Preservation</b>						
<b>New Trees</b>						
		# of trees				
100 square feet per deciduous tree	D	5	E	500	square feet	E = D x 100
200 square feet per evergreen tree	F	2	G	400	square feet	G = F x 200
<b>Existing Trees (Credit for 50% of existing canopy area)</b>						
		Canopy diameter (feet)				
Tree #1	H <sub>1</sub>		J <sub>1</sub>	0	square feet	J <sub>1</sub> = 3.14 x (H <sub>1</sub> /2) <sup>2</sup> x 0.50
Tree #2	H <sub>2</sub>		J <sub>2</sub>	0	square feet	J <sub>2</sub> = 3.14 x (H <sub>2</sub> /2) <sup>2</sup> x 0.50
Tree #3	H <sub>3</sub>		J <sub>3</sub>	0	square feet	J <sub>3</sub> = 3.14 x (H <sub>3</sub> /2) <sup>2</sup> x 0.50
<b>Rain Barrel or Cisterns (55 gallon minimum)</b>						
Square foot credit per gallon based on 24-hour, 85th Percentile Design Storm	K	2.48				K = Select square foot credit per gallon (2.48 Humboldt Bay Area, 1.24 Shelter Cove)
<b>Gallons</b>						
Rain Barrels	L		M	0	square feet	M = L x K
Cisterns	N		O	0	square feet	O = N x K
<b>Infiltration Trench/Basin (55 gallon minimum ~ 21 ft<sup>3</sup>)</b>						
		cubic feet				
volume(ft <sup>3</sup> ) = length x width x depth	P	0	Q	0	square feet	Q = P x R x K x 7.48
porosity (approximate %)	R	35%				
<b>Subsurface Infiltrators (55 gallon minimum)</b>						
Proprietary units vary, insert estimated storage in ft <sup>3</sup>	S	0	T	0	square feet	T = S x 7.48
<b>Impervious Area Disconnection</b>						
Credit per square foot of impervious area feeding into pervious area	U				square feet	U = Enter square foot value
<b>Soil Quality Improvement</b>						
Credit per square foot of soil quality improvement	V				square feet	V = Enter square foot value
<b>Green Roof</b>						
Credit per square foot of green roof installation	W				square feet	W = Enter square foot value
<b>PPPP (Alternative engineered hardscaping surfaces)</b>						
Credit per square foot of PPPP	X				square feet	X = Enter square foot value
<b>Vegetated Swales</b>						
Credit per square foot of vegetated swale	Y				square feet	Y = Enter square foot value
<b>Stream Setbacks and Buffers</b>						
Credit per square foot of stream setback and buffer <sup>#</sup>	Z				square feet	Z = Enter square foot value
<b>Credits Total</b>	AA	900	square feet			AA = SRA Credit + E + G + J <sub>1</sub> + J <sub>2</sub> + J <sub>3</sub> + M + O + Q + T + U + V + W + X + Y + Z
<b>Post-Project Impervious Surface Area minus Site Design Measure Credits</b>	BB	7104	square feet			BB = A - AA
<b>NEW Impervious Surface Runoff Value</b> (Potential Stormwater Runoff due to impervious surface area and design storm after implementation of Site Design Measures)	CC	2867	Gallons per 24 hours			CC = BB x B x 0.083 x 7.48
<b>Percent reduction in Impervious Surface Runoff Value*</b>	DD	11.2	%			DD = ((C - CC) / C) x 100%
*If value for DD is not greater than or equal to %100 then bioretention is required for treating remaining runoff from impervious area indicated by value BB. Design and implement bioretention facility in accordance with Humboldt LID Stormwater Manual - Part C.						
**Infiltration Trench/Basin calculations are based on porosity (35%). Increased trench dimensions (volume) are required to meet 55 gallon minimum capacity.						

Green Fill In [Enter Value]

Red Calculated Value

Black Fixed Value/Selectable Value

Conversions Used:

1 inch = 0.083 feet

1 cubic foot = 7.48 gallons

Regulated Projects Worksheet 2, Version 2.0 - June 29, 2016

# check with agency with project area jurisdiction for requirements

3.5	2.48	0.65
1.3	1.24	1.3



**Regulated Projects Worksheet 2**  
**Humboldt Low Impact Development Stormwater Manual**

Mckinleyville BMX						Formulas/Notes
<b>DMA Name: DMA 3</b>						
Total Post-Project Impervious Surface Area (square feet)	A	7408	square feet			
24 hour - 85th Percentile Design Storm	B	0.65	inch			B = Select Design Storm Value (0.65-inch Humboldt Bay Area, 1.3-inch Shelter Cove)
<b>Impervious Surface Runoff Value</b> (Potential Stormwater Runoff due to impervious surface area and design storm value)	C	2989	Gallons per 24 hours			C = A x B x 0.083 x 7.48
<b>Pervious Self-Retaining Area (SRA) Credit (if applicable, if none enter 0)</b>						
Self-Retaining Area (square feet)		0		3.5	SRA Credit	0 square feet
SRA Credit = Self-Retaining Area x Multiplier Select Multiplier (3.5 Humboldt Bay Area, 1.3 Shelter Cove)						
<b>Site Design Measure Credits</b>						
<b>Tree Planting and Preservation</b>						
New Trees # of trees						
100 square feet per deciduous tree	D	0	square feet	E	0	E = D x 100
200 square feet per evergreen tree	F	6	square feet	G	1200	G = F x 200
Existing Trees (Credit for 50% of existing canopy area) Canopy diameter (feet)						
Tree #1	H <sub>1</sub>		square feet	J <sub>1</sub>	0	J <sub>1</sub> = 3.14 x (H <sub>1</sub> /2) <sup>2</sup> x 0.50
Tree #2	H <sub>2</sub>		square feet	J <sub>2</sub>	0	J <sub>2</sub> = 3.14 x (H <sub>2</sub> /2) <sup>2</sup> x 0.50
Tree #3	H <sub>3</sub>		square feet	J <sub>3</sub>	0	J <sub>3</sub> = 3.14 x (H <sub>3</sub> /2) <sup>2</sup> x 0.50
<b>Rain Barrel or Cisterns (55 gallon minimum)</b>						
Square foot credit per gallon based on 24-hour, 85th Percentile Design Storm	K	2.48				K = Select square foot credit per gallon (2.48 Humboldt Bay Area, 1.24 Shelter Cove)
Gallons						
Rain Barrels	L		square feet	M	0	M = L x K
Cisterns	N		square feet	O	0	O = N x K
<b>Infiltration Trench/Basin (55 gallon minimum ~ 21 ft<sup>3</sup>)</b> cubic feet						
volume(ft <sup>3</sup> ) = length x width x depth	P	0	square feet	Q	0	Q = P x R x K x 7.48
porosity (approximate %)	R	35%				
<b>Subsurface Infiltrators (55 gallon minimum)</b>						
Proprietary units vary, insert estimated storage in ft <sup>3</sup>	S	0	square feet	T	0	T = S x 7.48
<b>Impervious Area Disconnection</b>						
Credit per square foot of impervious area feeding into pervious area	U		square feet			U = Enter square foot value
<b>Soil Quality Improvement</b>						
Credit per square foot of soil quality improvement	V		square feet			V = Enter square foot value
<b>Green Roof</b>						
Credit per square foot of green roof installation	W		square feet			W = Enter square foot value
<b>PPPP (Alternative engineered hardscaping surfaces)</b>						
Credit per square foot of PPPP	X		square feet			X = Enter square foot value
<b>Vegetated Swales</b>						
Credit per square foot of vegetated swale	Y		square feet			Y = Enter square foot value
<b>Stream Setbacks and Buffers</b>						
Credit per square foot of stream setback and buffer <sup>#</sup>	Z		square feet			Z = Enter square foot value
<b>Credits Total</b>	AA	1200	square feet			AA = SRA Credit + E + G + J <sub>1</sub> + J <sub>2</sub> + J <sub>3</sub> + M + O + Q + T + U + V + W + X + Y + Z
<b>Post-Project Impervious Surface Area minus Site Design Measure Credits</b>	BB	6208	square feet			BB = A - AA
<b>NEW Impervious Surface Runoff Value</b> (Potential Stormwater Runoff due to impervious surface area and design storm after implementation of Site Design Measures)	CC	2505	Gallons per 24 hours			CC = BB x B x 0.083 x 7.48
<b>Percent reduction in Impervious Surface Runoff Value*</b>	DD	16.2	%			DD = ((C - CC) / C) x 100%
*If value for DD is not greater than or equal to %100 then bioretention is required for treating remaining runoff from impervious area indicated by value BB. Design and implement bioretention facility in accordance with Humboldt LID Stormwater Manual - Part C.						
**Infiltration Trench/Basin calculations are based on porosity (35%). Increased trench dimensions (volume) are required to meet 55 gallon minimum capacity.						

Green Fill In [Enter Value]

Red Calculated Value

Black Fixed Value/Selectable Value

Conversions Used:

1 inch = 0.083 feet

1 cubic foot = 7.48 gallons

Regulated Projects Worksheet 2, Version 2.0 - June 29, 2016

# check with agency with project area jurisdiction for requirements

3.5	2.48	0.65
1.3	1.24	1.3

**Regulated Projects Worksheet 2**  
**Humboldt Low Impact Development Stormwater Manual**

Mckinleyville BMX						Formulas/Notes
<b>DMA Name: DMA 4</b>						
Total Post-Project Impervious Surface Area (square feet)	A	2960	square feet			
24 hour - 85th Percentile Design Storm	B	0.65	inch			B = Select Design Storm Value (0.65-inch Humboldt Bay Area, 1.3-inch Shelter Cove)
<b>Impervious Surface Runoff Value</b> (Potential Stormwater Runoff due to impervious surface area and design storm value)	C	1194	Gallons per 24 hours			C = A x B x 0.083 x 7.48
<b>Pervious Self-Retaining Area (SRA) Credit (if applicable, if none enter 0)</b>						
Self-Retaining Area (square feet)		0		3.5	SRA Credit	0 square feet
						SRA Credit = Self-Retaining Area x Multiplier Select Multiplier (3.5 Humboldt Bay Area, 1.3 Shelter Cove)
<b>Site Design Measure Credits</b>						
<b>Tree Planting and Preservation</b>						
<b>New Trees</b>						
		# of trees				
100 square feet per deciduous tree	D	7	E	700	square feet	E = D x 100
200 square feet per evergreen tree	F	1	G	200	square feet	G = F x 200
<b>Existing Trees (Credit for 50% of existing canopy area)</b>						
		Canopy diameter (feet)				
Tree #1	H <sub>1</sub>		J <sub>1</sub>	0	square feet	J <sub>1</sub> = 3.14 x (H <sub>1</sub> /2) <sup>2</sup> x 0.50
Tree #2	H <sub>2</sub>		J <sub>2</sub>	0	square feet	J <sub>2</sub> = 3.14 x (H <sub>2</sub> /2) <sup>2</sup> x 0.50
Tree #3	H <sub>3</sub>		J <sub>3</sub>	0	square feet	J <sub>3</sub> = 3.14 x (H <sub>3</sub> /2) <sup>2</sup> x 0.50
<b>Rain Barrel or Cisterns (55 gallon minimum)</b>						
Square foot credit per gallon based on 24-hour, 85th Percentile Design Storm	K	2.48				K = Select square foot credit per gallon (2.48 Humboldt Bay Area, 1.24 Shelter Cove)
Gallons						
Rain Barrels	L		M	0	square feet	M = L x K
Cisterns	N		O	0	square feet	O = N x K
<b>Infiltration Trench/Basin (55 gallon minimum ~ 21 ft<sup>3</sup>)</b>						
		cubic feet				
volume(ft <sup>3</sup> ) = length x width x depth	P	0	Q	0	square feet	Q = P x R x K x 7.48
porosity (approximate %)	R	35%				
<b>Subsurface Infiltrators (55 gallon minimum)</b>						
Proprietary units vary, insert estimated storage in ft <sup>3</sup>	S	0	T	0	square feet	T = S x 7.48
<b>Impervious Area Disconnection</b>						
Credit per square foot of impervious area feeding into pervious area	U				square feet	U = Enter square foot value
<b>Soil Quality Improvement</b>						
Credit per square foot of soil quality improvement	V				square feet	V = Enter square foot value
<b>Green Roof</b>						
Credit per square foot of green roof installation	W				square feet	W = Enter square foot value
<b>PPPP (Alternative engineered hardscaping surfaces)</b>						
Credit per square foot of PPPP	X				square feet	X = Enter square foot value
<b>Vegetated Swales</b>						
Credit per square foot of vegetated swale	Y				square feet	Y = Enter square foot value
<b>Stream Setbacks and Buffers</b>						
Credit per square foot of stream setback and buffer <sup>#</sup>	Z				square feet	Z = Enter square foot value
<b>Credits Total</b>	AA	900	square feet			AA = SRA Credit + E + G + J <sub>1</sub> + J <sub>2</sub> + J <sub>3</sub> + M + O + Q + T + U + V + W + X + Y + Z
<b>Post-Project Impervious Surface Area minus Site Design Measure Credits</b>	BB	2060	square feet			BB = A - AA
<b>NEW Impervious Surface Runoff Value</b> (Potential Stormwater Runoff due to impervious surface area and design storm after implementation of Site Design Measures)	CC	831	Gallons per 24 hours			CC = BB x B x 0.083 x 7.48
<b>Percent reduction in Impervious Surface Runoff Value*</b>	DD	30.4	%			DD = ((C - CC) / C) x 100%
*If value for DD is not greater than or equal to %100 then bioretention is required for treating remaining runoff from impervious area indicated by value BB. Design and implement bioretention facility in accordance with Humboldt LID Stormwater Manual - Part C.						
**Infiltration Trench/Basin calculations are based on porosity (35%). Increased trench dimensions (volume) are required to meet 55 gallon minimum capacity.						

Green Fill In [Enter Value]

Red Calculated Value

Black Fixed Value/Selectable Value

Conversions Used:

1 inch = 0.083 feet

1 cubic foot = 7.48 gallons

Regulated Projects Worksheet 2, Version 2.0 - June 29, 2016

# check with agency with project area jurisdiction for requirements

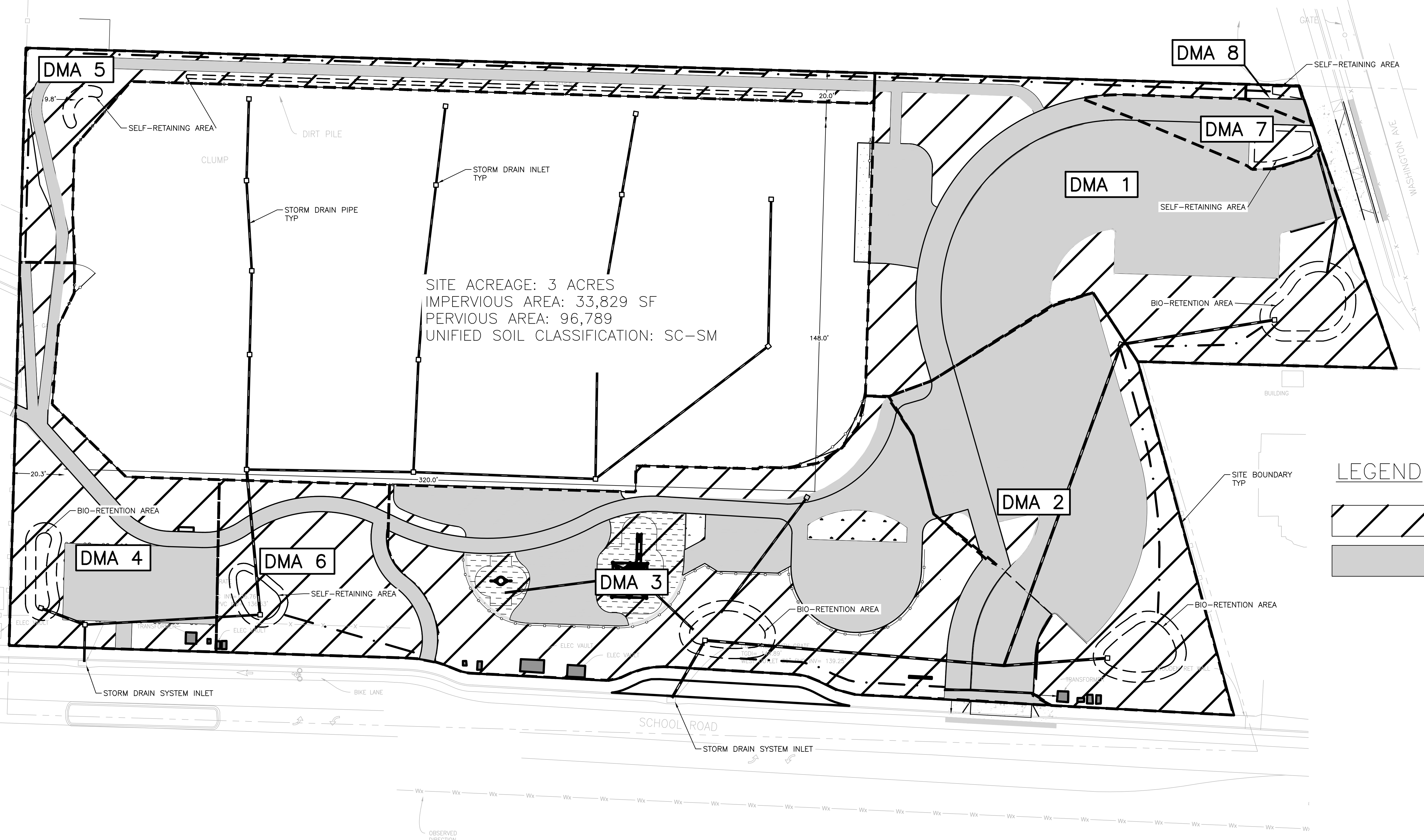
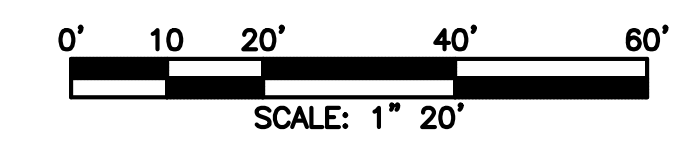
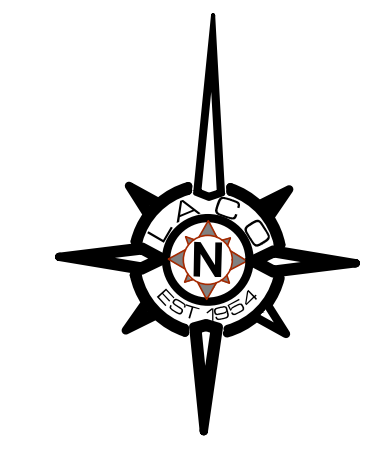
3.5	2.48	0.65
1.3	1.24	1.3

<b>DMA-1</b>	
AREA OF BRA (SF)	525
AREA REQUIRED FOR TREATMENT (SF) (BB FROM WORKSHEET 2)	9,833
SIZING FACTOR	0.04
REQUIRED AREA OF BRA (SF)	393
% OF REQUIRED TREATMENT ACHIEVED	133%
DEPTH OF SOIL LAYER AND GRAVEL LAYER WITHIN BRA (FT)	2.5
CAPTURE VOLUME REQUIRED (GAL) (CC FROM WORKSHEET 2)	3968
VOLUME CAPTURE PROVIDED (GAL) (A*DEPTH*MEDIA POROSITY)	3990
PERCENT OF VOLUME CAPTURE REQUIREMENT ACHIEVED	101%

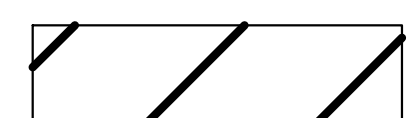

<b>DMA-2</b>	
AREA OF BRA (SF)	412
AREA REQUIRED FOR TREATMENT (SF) (BB FROM WORKSHEET 2)	7,104
SIZING FACTOR	0.04
REQUIRED AREA OF BRA (SF)	284
% OF REQUIRED TREATMENT ACHIEVED	145%
DEPTH OF SOIL LAYER AND GRAVEL LAYER WITHIN BRA (FT)	2.5
CAPTURE VOLUME REQUIRED (GAL) (CC FROM WORKSHEET 2)	2867
VOLUME CAPTURE PROVIDED (GAL) (A*DEPTH*MEDIA POROSITY)	3082
PERCENT OF VOLUME CAPTURE REQUIREMENT ACHIEVED	107%

<b>DMA-3</b>	
AREA OF BRA (SF)	348
AREA REQUIRED FOR TREATMENT (SF) (BB FROM WORKSHEET 2)	6,208
SIZING FACTOR	0.04
REQUIRED AREA OF BRA (SF)	248
% OF REQUIRED TREATMENT ACHIEVED	140%
DEPTH OF SOIL LAYER AND GRAVEL LAYER WITHIN BRA (FT)	2.5
CAPTURE VOLUME REQUIRED (GAL) (CC FROM WORKSHEET 2)	2505
VOLUME CAPTURE PROVIDED (GAL) (A*DEPTH*MEDIA POROSITY)	2603
PERCENT OF VOLUME CAPTURE REQUIREMENT ACHIEVED	104%

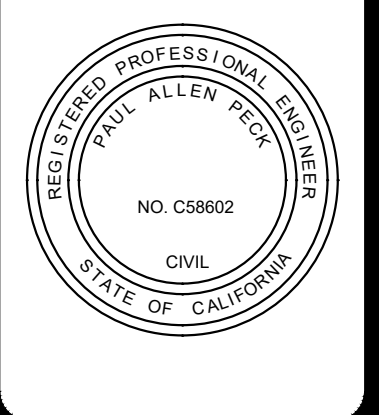
<b>DMA-4</b>	
AREA OF BRA (SF)	143
AREA REQUIRED FOR TREATMENT (SF) (BB FROM WORKSHEET 2)	2,060
SIZING FACTOR	0.04
REQUIRED AREA OF BRA (SF)	82
% OF REQUIRED TREATMENT ACHIEVED	174%
DEPTH OF SOIL LAYER AND GRAVEL LAYER WITHIN BRA (FT)	2.5
CAPTURE VOLUME REQUIRED (GAL) (CC FROM WORKSHEET 2)	831
VOLUME CAPTURE PROVIDED (GAL) (A*DEPTH*MEDIA POROSITY)	1070
PERCENT OF VOLUME CAPTURE REQUIREMENT ACHIEVED	129%



LEGEND

-  DMA PERVIOUS AREA
-  DMA IMPERVIOUS AREA

DATE	
NO.	
REVISION	



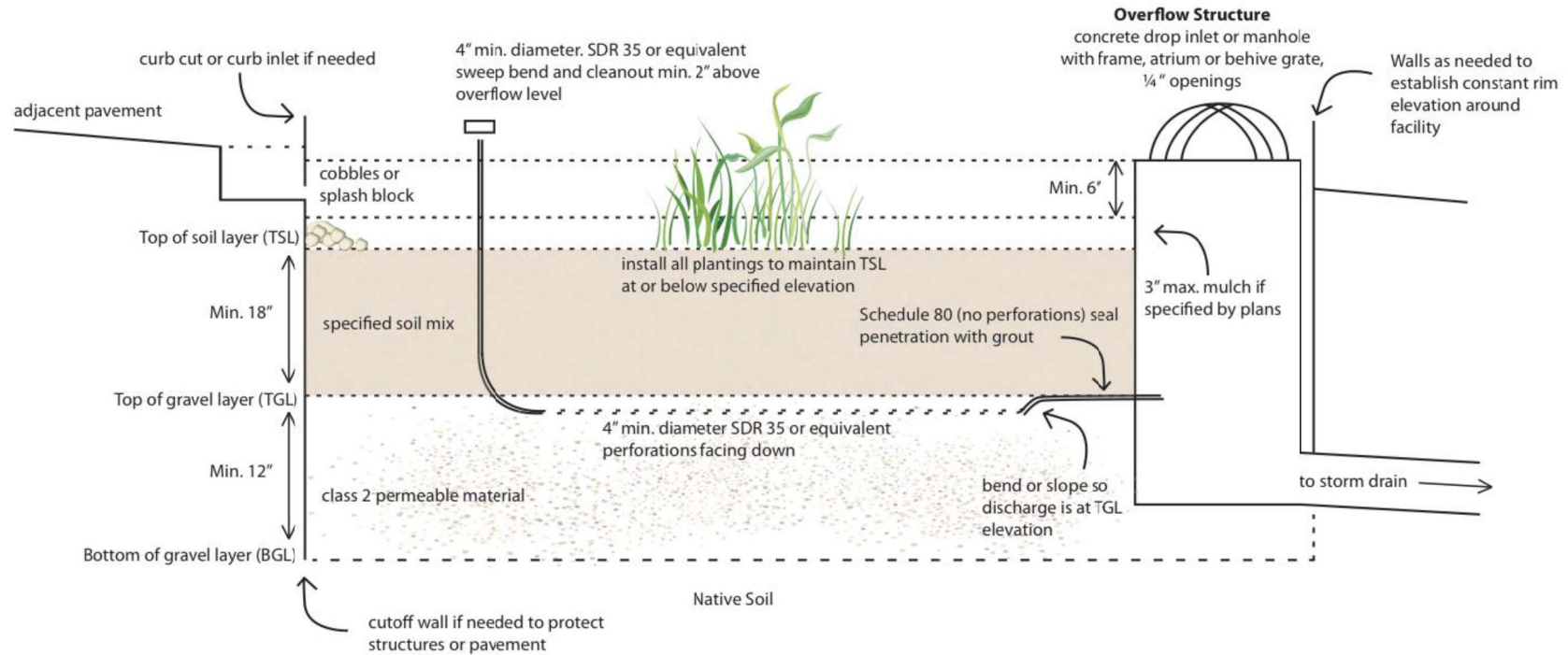
**BMX TRACK AND PARK DEVELOPMENT**  
 MCKINLEYVILLE, CA  
 LID SITE PLAN

PLAT NO.	
JOB NO.	9698.09
DATE	SEPT 15, 2023
DESIGNER	PAP
CHECKED	PAP DRAWN BC
SHEET	1 OF 1

Date: Nov 01, 2023, 9:48am User ID: hrcad1  
 File: T:\Coastlines\9698.09\_MCSB\_BMX\Civil\DWG\REF\9698.09\_LID.dwg



## Bioretention Facility not to scale



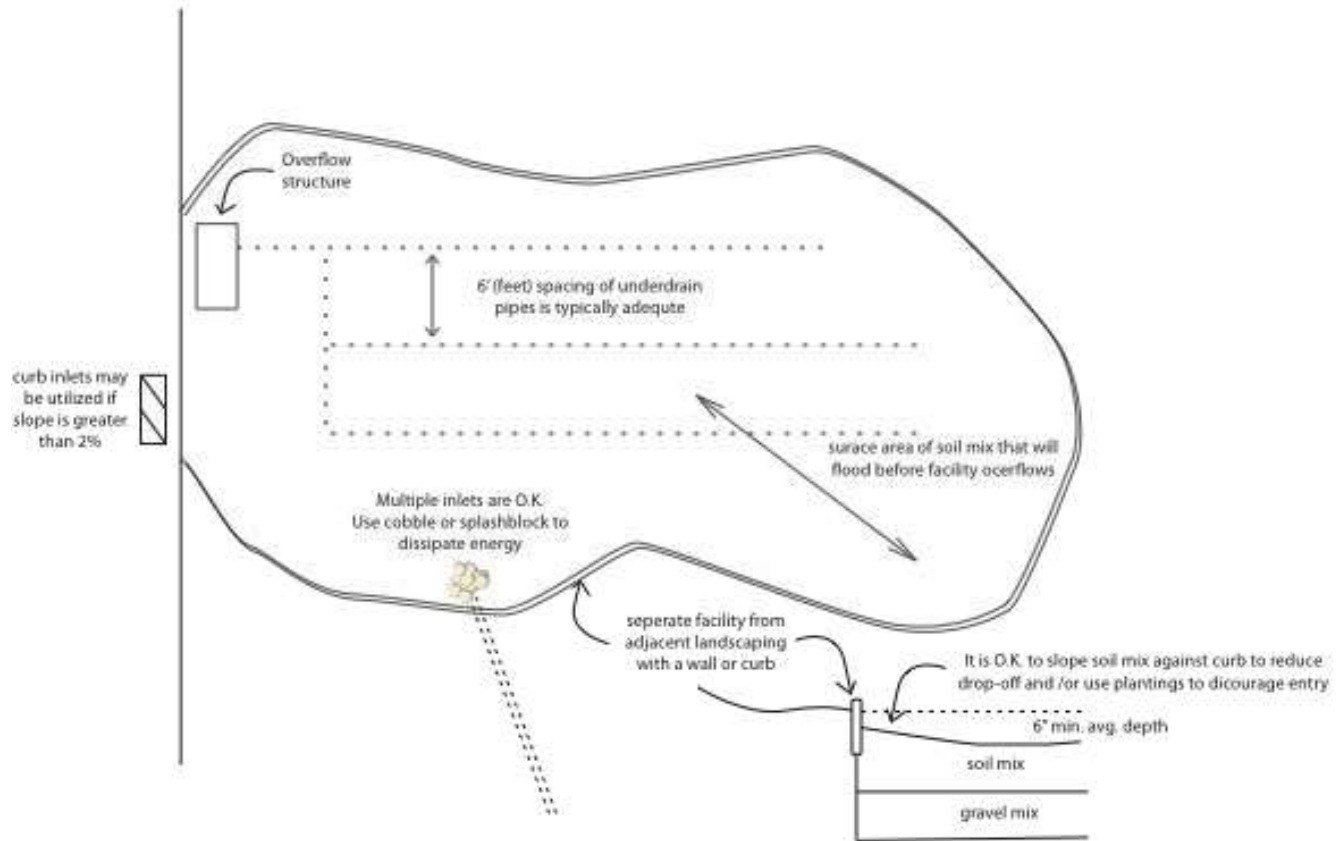
### Allowed variations for special site conditions:

- Facilities located within 10 feet of structures or other potential geotechnical hazards may incorporate an impervious cutoff wall
- Facilities with documented high concentrations of pollutants in underlying soil or groundwater, facilities where infiltration could contribute to a geotechnical hazard, and facilities located on elevated plazas or other structures may incorporate an impervious liner between the native soil and the BGL and locate the underdrain discharge at the BGL (flow-through planter configuration)
- Facilities located in areas of high groundwater, highly infiltrative soils, or where connection of the underdrain to a surface drain or subsurface storm drain are infeasible may omit the underdrain

### Notes:

- No liner, no filter fabric, no landscape cloth.
- Maintain BGL, TGL, TSL throughout facility area at elevations to be specified in plan.
- Class 7 permeable layer may extend below and underneath drop inlet.
- Elevation or underdrain discharge is at top of gravel layer.
- See Section 6.3 for instructions on facility sizing and additional specifications

### Bioretention Facility - Overview not to scale



**Note:**  
 Show all elevations of curb, pavement, inlet, top of soil layer (TSL), top of gravel layer (TGL), and bottom of gravel layer (BGL) at all inlets and outlets and at key points along edge of facility.



## Soil/Compost and Gravel Specifications for Bioretention Facility

Compost shall be a well-decomposed, stable, weed-free organic matter source derived from waste materials including yard debris, wood wastes or other organic materials not including manure or biosolids, and shall meet the standards developed by the US Composting Council (USCC). The product shall be certified through the USCC Seal of Testing Assurance (STA) Program (a compost testing and information disclosure program).

### Compost Quality Analysis:

Before delivery of the soil, the supplier shall submit a copy of the lab analysis performed by a laboratory that is enrolled in the USCC’s Compost Analysis Proficiency (CAP) program and using approved Test Methods for the Evaluation of Composting and Compost (TMECC). The lab report shall verify that the compost parameters are within the limits specified below.

Parameter	Range	Reported as (units)
Organic Matter Content	35-75	%, dry weight basis
Carbon to Nitrogen Ratio	15:1 to 25:1	ratio
Maturity (Seed Emergence and Seedling Vigor)	>80	average % of control
Stability (CO <sub>2</sub> Evolution Rate)	<8	mg CO <sub>2</sub> -C/g unit OM/day
Soluble Salts (Salinity)	<6.0	mmhos/cm
pH	6.5 - 8.0 May vary with plant species	units
Heavy Metals Content	PASS	PASS/FAIL: US EPA Class A standard, 40 CFR § 503.13, tables 1 and 3.
<b>Pathogens</b>		
Fecal coliform	PASS	PASS/FAIL: US EPA Class A standard, 40 CFR § 503.32(a) levels
Salmonella	PASS	PASS/FAIL: US EPA Class A standard, 40 CFR § 503.32(a) levels
<b>Nutrient Content (provide analysis, including):</b>		
Total Nitrogen (N)	≥0.9	%
Boron (Total B)	<80	ppm
Calcium (Ca)	For information only	%
Sodium (Na)	For information only	%
Magnesium (Mg)	For information only	%
Sulfur (S)	For information only	%

## Soil/Compost and Gravel Specifications for Bioretention Facility

### Gravel Layer

The gravel layer used in the bioretention facility must consist of *Class 2 Permeable Material* as specified in the State of California’s Business, Transportation and Housing Agency, Department of Transportation; Standard Specifications 2010, manual ([http://www.dot.ca.gov/hq/esc/oe/construction\\_contract\\_standards/std\\_specs/2010\\_StdSpecs/2010\\_StdSpec s.pdf](http://www.dot.ca.gov/hq/esc/oe/construction_contract_standards/std_specs/2010_StdSpecs/2010_StdSpec s.pdf)).

The specific section, Subsurface Drains, Sec. 68, of the manual is used because it offers specific specifications for subsurface drains. In addition to the standardized permeable layer, a membrane layer of pea gravel or other intermediate-sized material is recommended at the top of the gravel layer to prevent fines from the soil/compost layer from moving downward into the gravel layer.

### 68-2.02F (1) General

Permeable material for use in backfilling trenches under, around, and over underdrains must consist of hard, durable, clean sand, gravel, or crushed stone and must be free from organic material, clay balls, or other deleterious substances.

Permeable material must have a durability index of not less than 40.

### 68-2.02F (3) Class 2 Permeable Material

The percentage composition by weight of Class 2 permeable material in place must comply with the grading requirements shown in the following table:

#### Class 2 Permeable Material\* Grading Requirements

Sieve sizes	Percentage passing
1"	100
3/4"	90–100
3/8"	40–100
No. 4	25–40
No. 8	18–33
No. 30	5–15
No. 50	0–7
No. 200	0–3

\*Class 2 permeable material must have a sand equivalent value of not less than 75.





## Bioretention Facility Construction Checklist

### Layout (to be confirmed prior to beginning excavation permit approval stage)

<input type="checkbox"/>	Square footage of the facility meets or exceeds minimum shown in Stormwater Control Plan
<input type="checkbox"/>	Site grading and grade breaks are consistent with the boundaries of the tributary Drainage Management Area(s) (DMAs) shown in the Stormwater Control Plan
<input type="checkbox"/>	Inlet elevation of the facility is low enough to receive drainage from the entire tributary DMA
<input type="checkbox"/>	Locations and elevations of overland flow or piping, including roof leaders, from impervious areas to the facility have been laid out and any conflicts resolved
<input type="checkbox"/>	Rim elevation of the facility is laid out to be level all the way around, or elevations are consistent with a detailed cross-section showing location and height of interior dams
<input type="checkbox"/>	Locations for vaults, utility boxes, and light standards have been identified so that they will not conflict with the facility
<input type="checkbox"/>	Facility is protected as needed from construction-phase runoff and sediment

### Excavation (to be confirmed prior to backfilling or pipe installation)

<input type="checkbox"/>	Excavation conducted with materials and techniques to minimize compaction of soils within the facility area
<input type="checkbox"/>	Excavation is to accurate area and depth
<input type="checkbox"/>	Slopes or side walls protect from sloughing of native soils into the facility
<input type="checkbox"/>	Moisture barrier, if specified, has been added to protect adjacent pavement or structures.
<input type="checkbox"/>	Native soils at bottom of excavation are ripped or loosened to promote infiltration

### Overflow or Surface Connection to Storm Drainage (to be confirmed prior to backfilling with any materials)

<input type="checkbox"/>	Grating excludes mulch and litter (beehive or atrium-style grates recommended)
<input type="checkbox"/>	Overflow is connected to storm drain via appropriately sized
<input type="checkbox"/>	No knockouts or side inlets are in overflow riser
<input type="checkbox"/>	Overflow is at specified elevation
<input type="checkbox"/>	Overflow location selected to minimize surface flow velocity (near, but offset from, inlet recommended)
<input type="checkbox"/>	Grating excludes mulch and litter (beehive or atrium-style grates recommended)
<input type="checkbox"/>	Overflow is connected to storm drain via appropriately sized



## Bioretention Facility Construction Checklist

### Underground connection to storm drain/outlet orifice

- Perforated pipe underdrain (PVC SDR 35 or approved equivalent) is installed with holes facing down
- Perforated pipe is connected to storm drain at specified elevation (typ. bottom of soil elevation)
- Cleanouts are in accessible locations and connected via sweep

### Drain Rock/Subdrain (to be confirmed prior to installation of soil mix)

- Rock is installed as specified, 12" min. depth. Class 2 permeable, Caltrans specification 68- 2.02F(3) recommended
- Rock is smoothed to a consistent top elevation. Depth and top elevation are as shown in plans
- Slopes or side walls protect from sloughing of native soils into the facility
- No filter fabric is placed between the subdrain and soil mix layers

### Soil Mix

- Soil mix is as specified.
- Mix installed in lifts not exceeding 12"
- Mix is not compacted during installation but may be thoroughly wetted to encourage consolidation
- Mix is smoothed to a consistent top elevation. Depth of mix (18" min.) and top elevation are as shown in plans, accounting for depth of mulch to follow and required reservoir depth

### Irrigation

- Irrigation system is installed so it can be controlled separately from other landscaped areas
- Smart irrigation controllers and drip emitters are recommended and may be required by local code or ordinance.
- Spray heads, if any, are positioned to avoid direct spray into outlet structures



## Bioretention Facility Construction Checklist

### Planting

- Plants are installed consistent with approved planting plan, consistent with site water allowance
- Any trees and large shrubs are staked securely
- No fertilizer is added; compost tea may be used
- No native soil or clayey material are imported into the facility with plantings
- 1"-2" mulch may be applied following planting; mulch selected to avoid floating
- Final elevation of soil mix maintained following planting
- Curb openings are free of obstructions

### Final Engineering Inspection

- Drainage Management Area(s) are free of construction sediment and landscaped areas are stabilized
- Inlets are installed to provide smooth entry of runoff from adjoining pavement, have sufficient reveal (drop from the adjoining pavement to the top of the mulch or soil mix, and are not blocked)
- Inflows from roof leaders and pipes are connected and operable
- Temporary flow diversions are removed
- Rock or other energy dissipation at piped or surface inlets is adequate
- Overflow outlets are configured to allow the facility to flood and fill to near rim before overflow
- Plantings are healthy and becoming established
- Irrigation is operable
- Facility drains rapidly; no surface ponding is evident
- Any accumulated construction debris, trash, or sediment is removed from facility
- Permanent signage is installed and is visible to site users and maintenance personnel



Unified Soil Classification (Surface)—Humboldt County, Central Part, California  
(Washington Ave. and School Rd. Soils)



Map Scale: 1:950 if printed on A landscape (11" x 8.5") sheet.

0 10 20 40 60 Meters

0 45 90 180 270 Feet


Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84



Unified Soil Classification (Surface)—Humboldt County, Central Part, California  
(Washington Ave. and School Rd. Soils)

**MAP LEGEND**










**Area of Interest (AOI)**

 Area of Interest (AOI)

**Soils**

**Soil Rating Polygons**

-  CH
-  CL
-  CL-A (proposed)
-  CL-K (proposed)
-  CL-ML
-  CL-O (proposed)
-  CL-T (proposed)
-  GC
-  GC-GM
-  GM
-  GP
-  GP-GC
-  GP-GM
-  GW
-  GW-GC
-  GW-GM
-  MH
-  MH-A (proposed)
-  MH-K (proposed)
-  MH-O (proposed)
-  MH-T (proposed)
-  ML









































-  ML-A (proposed)
-  ML-K (proposed)
-  ML-O (proposed)
-  ML-T (proposed)
-  OH
-  OH-T (proposed)
-  OL
-  PT
-  SC
-  SC-SM
-  SM
-  SP
-  SP-SC
-  SP-SM
-  SW
-  SW-SC
-  SW-SM
-  Not rated or not available

**Soil Rating Lines**


-  CH
-  CL
-  CL-A (proposed)
-  CL-K (proposed)
-  CL-ML
-  CL-O (proposed)
-  CL-T (proposed)
-  GC
-  GC-GM
-  GM
-  GP
-  GP-GC
-  GP-GM
-  GW
-  GW-GC
-  GW-GM
-  MH
-  MH-A (proposed)
-  MH-K (proposed)
-  MH-O (proposed)
-  MH-T (proposed)
-  ML
-  ML-A (proposed)
-  ML-K (proposed)
-  ML-O (proposed)
-  ML-T (proposed)
-  OH
-  OH-T (proposed)
-  OL
-  PT
-  SC
-  SC-SM
-  SM

-  SP
-  SP-SC
-  SP-SM
-  SW
-  SW-SC
-  SW-SM
-  Not rated or not available

**Soil Rating Points**

-  CH
-  CL
-  CL-A (proposed)
-  CL-K (proposed)
-  CL-ML
-  CL-O (proposed)
-  CL-T (proposed)
-  GC
-  GC-GM
-  GM
-  GP
-  GP-GC
-  GP-GM
-  GW
-  GW-GC
-  GW-GM
-  MH
-  MH-A (proposed)
-  MH-K (proposed)
-  MH-O (proposed)
-  MH-T (proposed)
-  ML
-  ML-A (proposed)
-  ML-K (proposed)
-  ML-O (proposed)
-  ML-T (proposed)
-  OH
-  OH-T (proposed)
-  OL
-  PT
-  SC
-  SC-SM
-  SM
-  SP
-  SP-SC
-  SP-SM
-  SW
-  SW-SC
-  SW-SM
-  Not rated or not available






**Water Features**

 Streams and Canals

**Transportation**

 Rails

## MAP INFORMATION

-  Interstate Highways
-  US Routes
-  Major Roads
-  Local Roads
- Background**
-  Aerial Photography

The soil surveys that comprise your AOI were mapped at 1:24,000.

**Warning:** Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service  
Web Soil Survey URL:  
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Humboldt County, Central Part, California  
Survey Area Data: Version 10, Aug 28, 2023

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 1, 2022—Jun 19, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

## Unified Soil Classification (Surface)

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
146	Halfbluff-Tepona-Urban Land, 2 to 9 percent slopes	CL-ML	0.0	0.4%
225	Arcata and Candymountain soils, 0 to 2 percent slopes	SC-SM	2.9	99.6%
<b>Totals for Area of Interest</b>			<b>2.9</b>	<b>100.0%</b>

### Description

The Unified soil classification system classifies mineral and organic mineral soils for engineering purposes on the basis of particle-size characteristics, liquid limit, and plasticity index. It identifies three major soil divisions: (i) coarse-grained soils having less than 50 percent, by weight, particles smaller than 0.074 mm in diameter; (ii) fine-grained soils having 50 percent or more, by weight, particles smaller than 0.074 mm in diameter; and (iii) highly organic soils that demonstrate certain organic characteristics. These divisions are further subdivided into a total of 15 basic soil groups. The major soil divisions and basic soil groups are determined on the basis of estimated or measured values for grain-size distribution and Atterberg limits. ASTM D 2487 shows the criteria chart used for classifying soil in the Unified system and the 15 basic soil groups of the system and the plasticity chart for the Unified system.

The various groupings of this classification correlate in a general way with the engineering behavior of soils. This correlation provides a useful first step in any field or laboratory investigation for engineering purposes. It can serve to make some general interpretations relating to probable performance of the soil for engineering uses.

For each soil horizon in the database one or more Unified soil classifications may be listed. One is marked as the representative or most commonly occurring. The representative classification is shown here for the surface layer of the soil.

### Rating Options

*Aggregation Method:* Dominant Condition

*Component Percent Cutoff:* None Specified

*Tie-break Rule:* Lower

*Layer Options (Horizon Aggregation Method):* Surface Layer (Not applicable)



# O&M Plan Checklist and Certification for Regulated Projects

<p><b>For Office Use Only</b>                  Application No. _____                  Received By: _____</p>
--

## A. Designate the *Responsible Individual (RI)*.

The *RI* is the person that will have direct responsibility for the maintenance of storm water controls, maintain self-inspection records, and sign any correspondence with the PBS departments with project location jurisdiction.

Name of RI: \_\_\_\_\_

Phone: \_\_\_\_\_

Project Name: \_\_\_\_\_

Physical Site Address and/or APN: \_\_\_\_\_

- Include the site plan delineating the DMAs and the locations of the bioretention or equivalent facilities.
- Include the final construction drawings of the storm water facilities:
  - Plans, elevations, and details of bioretention facilities.
  - Construction details and specifications, including: depths of sand and soil, compaction, pipe materials, and bedding.
  - Location and layouts of inflow piping and piping to off-site discharge
  - Native soils (lenses beneath the facilities)

## B. Scheduled Maintenance Activities

The following activities will need to occur on an annual basis, frequency may need to be adjusted depending on facility.

- **Refuse removal**, remove trash the collects near the inlets or that is trapped by vegetation. Clean out soil and debris blocking inflets or overflows.
- **Control weeds**, manual methods and soil amendments; non-natural (synthetic) pesticides should not be used.
- **Add mulch**, add mulch to maintain a mulch layer thickness of ~ 3 inches.
- **Pruning and replanting vegetation**, it may be necessary to replace or remove vegetation to ensure the proper functioning of the facility.
- **Check irrigation**, if irrigation exists, check to make sure the system is working as intended.

An annual self-certification letter will be mailed to the RI. This letter will serve as verification that all the storm water facilities on the property are being maintained and remain operational. The letter should be signed and returned within 30 days.





# O&M Plan Checklist and Certification for Regulated Projects

## C. Updates to the O & M Plan

Contact information for the Responsible Individual should be current. If the RI changes, the PBS departments with project location jurisdiction should be notified with the appropriate revisions.

## D. O & M plans for other Facility Types

If your project included a non-standard storm water treatment facility that was approved by the Planning and Building Services Department, such as a tree-box type system, than the O & M should reflect the manufacturer’s recommended maintenance scheduling.

## E. Signature and Certification:

“I, the RI/applicant accept responsibility for operation and maintenance of storm water treatment and flow-control facilities until such time as this responsibility is transferred to a subsequent owner.” Furthermore, a condition on the property deed will be recorded with the County Recorder’s office indicating that a storm water facility is present on the property and that the maintenance responsibility will transfer with property ownership in perpetuity.

\_\_\_\_\_  
Signature of the RI

\_\_\_\_\_  
Date

\_\_\_\_\_  
Print Name

I am the:

Property Owner

Applicant

Contractor



## O and M: Inspection and Maintenance Checklist: Bioretention Facility

### Example of Inspection Maintenance Document

Responsible Individual: \_\_\_\_\_

Facility Name: \_\_\_\_\_

Date of Inspection: \_\_\_\_\_

Item	Conditions When Maintenance Is Needed	Maintenance Needed? (Y/N)	Comments (Describe maintenance completed; and if any needed maintenance was not conducted, note what is needed and when it will be done)	Results Expected When Maintenance Is Performed
General				
Trash and Debris	Trash and debris accumulated in basin Visual evidence of dumping			Trash and debris cleared from site.
Contaminants and Pollution	Any evidence of oil, gasoline, contaminants or other pollutants			No contaminants or pollutants present.
Vegetation	When the planted vegetation becomes excessively tall.  When nuisance weeds and other vegetation start to take over.			Vegetation mowed per specifications or maintenance plan, or nuisance vegetation removed so that flow is not impeded. Vegetation should never be mowed lower than the design flow depth. Remove clippings from the area and dispose appropriately.

This or a similar document should remain with the facility. Inspection and maintenance records should be available upon request from the PBS departments with project location jurisdiction.



### O and M: Inspection and Maintenance Checklist: Bioretention Facility

Item	Conditions When Maintenance Is Needed	Maintenance Needed? (Y/N)	Comments (Describe maintenance completed; and if any needed maintenance was not conducted, note what is needed and when it will be done)	Results Expected When Maintenance Is Performed
<b>Tree/Brush Growth and Hazard Trees</b>	Growth does not allow maintenance access or interferes with maintenance activity  Dead, diseased, or dying trees			
<b>Erosion</b>	Eroded over 2 in. deep where cause of damage is still present or where there is potential for continued erosion.			Cause of erosion is managed appropriately. Areas remulched to fill in void areas.
<b>Sediment</b>	Accumulated sediment affects inletting or outletting condition of the facility.			Sediment removed and area reseeded if necessary to control erosion.
<b>Damaged Pipes</b>	Any part of the piping that is crushed or deformed more than 20% or any other failure to the piping.			Pipe repaired or replaced.
<b>Rodent Holes</b>	If facility acts as a dam or berm, any evidence of rodent holes, or any evidence of water piping through dam or berm via rodent holes.			The design specifications are not compromised by holes. Any rodent control activities are in accordance with applicable laws and do not affect any protected species

This or a similar document should remain with the facility. Inspection and maintenance records should be available upon request from the PBS departments with project location jurisdiction.

