



THE PATHWAY

**COLUSA INDIAN COMMUNITY COUNCIL**

3730 CA HWY 45 COLUSA, CA 95932 - (530) 458-8231



# COLUSA INDIAN COMMUNITY COUNCIL

3730 Highway 45, Colusa, CA 95932

(530) 458-6517 Office

<b><u>TABLE OF CONTENTS</u></b>	<b><u>PAGE</u></b>
<b>PROPOSAL INFORMATION</b> _____	<b><u>1</u></b>
<b>PROJECT BID FORM</b> _____	<b><u>15</u></b>
<b>SPECIAL PROVISIONS</b> _____	<b><u>20</u></b>
<b>GENERAL PROVISIONS</b> _____	<b><u>35</u></b>
<b>TECHNICAL SPECIFICATIONS</b> _____	<b><u>77</u></b>



# COLUSA INDIAN COMMUNITY COUNCIL

3730 Highway 45, Colusa, CA 95932

(530) 458-6517 Office

**Project Name: COLUSA CLIENT – The Pathway**

**Renovation Project Location: 3730 Highway 45, Colusa, CA 95932**

## **COLUSA INDIAN COMMUNITY COUNCIL**

Shall receive sealed bids for the above prevailing wage project at 3730 Highway 45, Colusa, CA 95932 until 4:00pm on **September 25<sup>th</sup>, 2024**. The bids will be opened publicly, and bids will be read out loud.

## **GENERAL DESCRIPTION OF WORK**

Pedestrian trail system with park amenities including play, fitness, gathering spaces, to connect the community services to the nearby neighborhood.

## **PROJECT COORDINATION**

1. **Project Management:** CLIENT will be managing the construction of the park and all contractors will be directing communication through **Fernanda Vanetta – Grants Administrator** and on site Project Supervisor **Luke Hook – Director of Construction**. **Ryan Riedlinger – Design Project Manager** – MDG will also be available for any design RFI/Clarifications.
2. **Project Schedule:** The project manager and supervisor will be coordinating all contractors and tasks per the master schedule and will require all tasks and contractor's schedules to be updated regularly.
3. **Weekly Project Meetings:** Once project contractors are on site there will be a weekly Monday meeting at the site or office to coordinate the week's tasks, material needs and deliveries. Each contractor will be responsible for coordinating its trade with the Project Manager / Supervisor and other trades to complete their tasks in proper construction order.
4. **Clarifications / RFI's:** To maintain a smooth-running project the contractors are encouraged to ask questions and clarify the designs early in the process and continually throughout the process. Please contact your PM team for assistance.

### **Project Management Team**

Fernanda Vanetta – Grants Administrator

(530) 458-6527

Luke Hook – Director of Construction

Ryan Riedlinger, MDG – Project Designer

(530) 899-1616

ryan@meltondg.com

Greg Melton, MDG – Project Designer

(530) 899-1616

greg@meltondg.com

## **BIDDER INFORMATION**

The plans and specifications are available in digital format for prime and sub-consultants at the **Colusa Indian Community Council**. **Contact Fernanda Vanetta, Grants Administrator. (530) 458-6527.**  
**CIPList.com**



# COLUSA INDIAN COMMUNITY COUNCIL

3730 Highway 45, Colusa, CA 95932

(530) 458-6517 Office

## **MANDATORY JOB WALK**

A mandatory pre-bid job walk will be conducted on the **18<sup>th</sup> of September at 10:00 AM at 3730 Highway 45, Colusa, CA 95932**. The site will be open for inspection and the landscape architect and CLIENT will be available to answer questions at that time. No attendant will be disqualified for late arrival, all attendants must sign in to be eligible to bid the project.

## **BID SUBMITTAL REQUIREMENTS**

Bidders must submit their bids on the BID FORM and a complete Bid Package. Bids must be submitted in a sealed envelope with the Project Name, Contractor Name, and the Project Bid Date visible on the envelope. Bids are due **4:00 PM, September 25<sup>th</sup>, 2024 at 3730 Highway 45, Colusa, CA 95932**.

## **BID AWARD PROVISIONS; REJECTIONS**

An award of the bid, if a bid is awarded, will be made to **the lowest responsible bidder with any combination of base bid and alternates, whose bid complies with all these documents**, within 10 (or 60) days of the bid date. The CLIENT reserves the right to reject any bid which fails to meet bid requirements in any respect, all bids for any reason whatsoever and to waive minor irregularities in any bid. All bidders must provide a bid for the work described as the "Base Bid" and a bid for the work described as the "Alternate Bid", on the BID FORM.

## **INSURANCE REQUIRED**

The bidder to whom a contract is awarded will be required to furnish, **within 7 days of** the Notice to Proceed, to the CLIENT evidence of insurance coverages, and performance/labor and material bonds in full conformance with the Contract Documents.

### **SB854 NOTICE TO CONTRACTORS:**

The following requirements apply when:

- Work being performed is "Public Works" as defined in Section 1720 et. seq. of California Labor Code; and
- The total cost of the project (with or without materials) exceeds \$1,000.00.

## **CONTRACTOR REGISTRATION REQUIREMENTS:**

Effective January 1, 2015, per California Senate Bill 854, the CLIENT shall provide Notice to Contractors as follows:

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



# COLUSA INDIAN COMMUNITY COUNCIL

3730 Highway 45, Colusa, CA 95932

(530) 458-6517 Office

## **CONTRACTOR REPORTING REQUIREMENTS**

The Labor Commissioner may at any time require contractors and subcontractors to furnish electronic certified payroll records. Beginning January 1, 2016, the requirement to furnish electronic payroll records to the Labor Commissioner will apply to all public works projects regardless of the project start date.

## **PREVAILING WAGE**

Contractor shall incorporate the prevailing hourly rate of per diem wages for this locality and project as determined by the Director of Industrial Relations pursuant to Labor Code 1770 et seq. seq., a copy of which may be accessed on the Internet at <http://www.dir.ca.gov/Public-Works/PublicWorks.html>. If the project requires the employment of work in any apprenticeable craft or trade, once awarded, the Contractor or Subcontractors must apply to the joint apprenticeship council unless already covered by local apprentice standards (Labor Code 1777.5).

Contractor or subcontractor shall forfeit twenty-five (\$25) for each worker employed in the execution of this contract by the respective contractor or subcontractor for each calendar day during which the worker is required or permitted to work more than eight (8) hours in any one calendar day and forty (40) hours in any one calendar week as penalty for violation of California Labor Code section 1813. In addition, any work performed by employees in excess of eight (8) hours per day and forty (40) hours per week shall be compensated for all hours worked in excess of eight (8) hours per day at not less than 1.5 times the basic rate of pay in accordance with Labor Code section 1815.



# COLUSA INDIAN COMMUNITY COUNCIL

3730 Highway 45, Colusa, CA 95932

(530) 458-6517 Office

## PROPOSAL TO DO CERTAIN WORK, DESCRIBED AS:

**Project Name: COLUSA CLIENT – The Pathway**

**Project Location: 3730 Highway 45, Colusa, CA 95932**

**Bids will be received in-person and via mail until 4:00 PM, September 25<sup>th</sup>, 2024 at 3730 Highway 45, Colusa, CA 95932**

**Location: COLUSA CLIENT – The Pathway**

**3730 Highway 45, Colusa, CA 95932**

The award of contract, if awarded, will be to the lowest responsible bidder whose proposal complies with the entire requirement described. The award, if awarded, will be made within five - (5) days after the opening of the bids. All bids will be compared on the basis of the initial Architect's Estimate of quantities of work to be done. Award will be based on the lowest responsible bidder for the combined total of the base bid and add alternate schedules. The CLIENT has the option of accepting none, or any number and combination of bid alternatives.

**TIME FOR COMPLETION:** All work shall be completed by **December 31<sup>st</sup>, 2024** after the Contractor is given a Notice to Proceed.

MILESTONE	DEADLINE
AWARD ANNOUNCEMENT	September 27 <sup>th</sup> , 2024
ENTER INTO CONTRACT	October 1 <sup>st</sup> , 2024
NOTICE TO PROCEED / WORK TO COMMENCE (Pending weather and negotiation of schedule with CLIENT)	October 1 <sup>st</sup> , 2024
PROCUREMENT OF MATERIALS	Fall/ Winter
SUBSTANTIAL TARGET COMPLETION	December 31 <sup>st</sup> , 2024

The undersigned agree that should the work not be completed with the time hereinabove stated from and after the date the Contractor is instructed to proceed by the CLIENT an amount equal to \$500 per day for each day delay after the expiration of such period shall be deducted from the contract sum.

The undersigned has examined the location of the proposed work and is familiar with the Plans, Specifications, and other Documents, and to local conditions at the place where the work is to be performed.

The undersigned has checked carefully all the above figures and understands that the CLIENT will not be responsible for any errors or omissions on the part of the undersigned in making up this Bid.



# COLUSA INDIAN COMMUNITY COUNCIL

3730 Highway 45, Colusa, CA 95932

(530) 458-6517 Office

ADDENDA: The undersigned agrees that all Addenda have been reviewed and acknowledged herein shall become a part of and included in this proposal. This proposal includes the following Addenda. Numbers:

\_\_\_\_\_

NAME OF CONTRACTING FIRM: \_\_\_\_\_

TYPE OF FIRM: \_\_\_\_\_

(Corporation, Partnership, etc.)

ADDRESS: \_\_\_\_\_

CITY & STATE: \_\_\_\_\_

LICENSE NUMBER: \_\_\_\_\_ DATED: \_\_\_\_\_

DIR REGISTRATION NUMBER: \_\_\_\_\_

CONTRACTORS SIGNATURE: \_\_\_\_\_

PRINT NAME: \_\_\_\_\_

Sub-Contractor List attached.



# COLUSA INDIAN COMMUNITY COUNCIL

3730 Highway 45, Colusa, CA 95932

(530) 458-6517 Office

## SUB-CONTRACTOR LIST

Item of Work: \_\_\_\_\_

Subcontractors Name: \_\_\_\_\_

Address/Phone: \_\_\_\_\_

License Number: \_\_\_\_\_ DIR Reg. Number: \_\_\_\_\_

Item of Work: \_\_\_\_\_

Subcontractors Name: \_\_\_\_\_

Address/Phone: \_\_\_\_\_

License Number: \_\_\_\_\_ DIR Reg. Number: \_\_\_\_\_

Item of Work: \_\_\_\_\_

Subcontractors Name: \_\_\_\_\_

Address/Phone: \_\_\_\_\_

License Number: \_\_\_\_\_ DIR Reg. Number: \_\_\_\_\_

Item of Work: \_\_\_\_\_

Subcontractors Name: \_\_\_\_\_

Address/Phone: \_\_\_\_\_

License Number: \_\_\_\_\_ DIR Reg. Number: \_\_\_\_\_

BIDDERS SIGNATURE: \_\_\_\_\_ DATE \_\_\_\_\_



COLUSA INDIAN COMMUNITY COUNCIL

**BID PROPOSAL**

**THE PATHWAY**

TO THE COLUSA INDIAN COMMUNITY COUNCIL.

The undersigned declares to have carefully examined the location of the proposed work, the contract plans and specifications, and read the accompanying General and Special Provisions, and hereby proposes to furnish all materials and do all the work required to complete the said work in accordance with said contract plans, if any, and specifications, and General and Special Provisions, for the unit prices or lump sum set forth in the following attached schedules.

The undersigned further agrees that in case of default in executing the required contract, with necessary bonds within ten (10) days, not including Sunday, after having received notice that the contract is ready for signature, the proceeds of the Bidder's guaranty accompanying the undersigned's bid shall become the property of the COLUSA INDIAN COMMUNITY COUNCIL.

In case of discrepancy between the unit price and the total set forth for a unit basis item, the unit price shall prevail, except as provided in (a) or (b), as follows:

(a) If the amount set forth as a unit price is unreadable or otherwise unclear, or is omitted, or is the same as the amount as the entry in the item total column, then the amount set forth in the item total column for the item shall prevail and shall be divided by the estimated quantity for the item and the price thus obtained shall be the unit price:

(b) (Decimal Errors) If the product of the entered unit price and the estimated quantity is exactly off by a factor of ten, one hundred, etc., or one-tenth, or one-hundredth, etc. from the entered total, the discrepancy will be resolved by using the entered unit price or item total, whichever most closely approximates percentagewise the unit price or item total in the CLIENT's Final Estimate of cost.

If both the unit price and the item total are unreadable or otherwise unclear, or are omitted, the bid may be deemed irregular. Likewise if the item total for a lump sum item is unreadable or otherwise unclear, or is omitted, the bid may be deemed irregular unless the project being bid has only a single item and a clear, readable total bid is provided.

Symbols such as commas and dollar signs will be ignored and have no mathematical significance in establishing any unit price or item total or lump sums. Written unit prices, item totals and lump sums will be interpreted according to the number of digits and, if applicable, decimal placement. Cents symbols also have no significance in establishing any unit price or item total since all such figures are assumed to be expressed in dollars and/or decimal fractions of a dollar. Bids on lump sum items shall be item totals only;

if any unit price for a lump sum item is included in a bid and it differs from the item total, the items total shall prevail.

The foregoing provisions for the resolution of specific irregularities cannot be so comprehensive as to cover every omission, inconsistency, error or other irregularity which may occur in a bid. Any situation not specifically provided for will be determined in the discretion of the CLIENT, and such discretion will be exercised in the manner deemed by the CLIENT to best protect the public interest in the prompt and economical completion of the work. The decision of the CLIENT respecting the amount of a bid, or the existence or treatment of an irregularity in a bid shall be final.

CLIENT Business License No. \_\_\_\_\_

Taxpayer Identification No. \_\_\_\_\_

Dept. of Industrial Relations (DIR) Registration Number: \_\_\_\_\_

Licensed in accordance with an act providing for the registration of contractors:

License No. \_\_\_\_\_

Signature of Bidder: \_\_\_\_\_

(If an individual, so state. If a firm or co-partnership, state the firm name and give names of all individual co-partners composing the firm. If a corporation, state legal name of corporation, also names of president, secretary, treasurer, and manager thereof.)

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

Business Address \_\_\_\_\_

Phone No. \_\_\_\_\_

## **THE PATHWAY**

### **PRE-AWARD QUALIFICATIONS AND QUESTIONNAIRE**

---

The CLIENT has established that prospective bidders shall submit information regarding their qualifications for performing park construction contracts and irrigation sub-contracts for installation of pump station, main line and central control systems of equivalent complexity. Please provide at least three references for both the contractor and irrigation contractor on the following page. Bidders shall submit responses to the Pre-Award Qualification Questionnaire included in this Proposal. Deficiencies noted by the CLIENT prior to Award may be cause for determination that the bidder is not capable of meeting the contract requirements. Deficiencies will be considered negative references and/or 'Yes' answers to any of the questions on the Pre-Award Questionnaire.

If the CLIENT determines it necessary, a pre-award qualification review meeting will be conducted. The apparent low bidder shall participate in a pre-award qualification review meeting conducted by one or more agents of the CLIENT and the Engineer. Notification by the CLIENT will be within 7 days after the bid opening, and will be provided at least 48 hours prior to the qualifications review meeting. Nonattendance to the qualification review meeting by the apparent low bidder shall be just cause for rejection of the bid. At the qualifications review meeting, the low bidder shall be prepared to discuss and answer questions relative to the Pre-Award Qualifications and Questionnaire submitted with the bid. The CLIENT's determination on the bidder's qualifications for performing referenced construction work in a manner that is safe for the workers and the public and of the highest possible quality, will be based on the following:

1. Bidder's experience in construction work of this nature.
2. Qualifications of on-site supervisory personnel capable of completing the work in a safe and timely manner.
3. Safety history of the bidder and its supervisory personnel.

Successful completion of the pre-award qualifications process does not relieve the Contractor of the responsibility for furnishing materials or producing finished work of the quality specified in project plans and specifications.

The second and third apparent low bidders shall participate in pre-award qualifications review meetings if requested to do so by the CLIENT. Non-attendance by the second or third apparent low bidder at any such requested meeting shall be just cause for rejection of bid. The contract provisions described herein shall be considered part of the cost of preparing bids and no separate payment will be made therefore.

## STATEMENT OF QUALIFICATIONS

---

Previous similar projects completed in the last ten years of equivalent complexity with references.

**PRIME CONTRACTOR: Name, Email, and Telephone Number**

---

---

---

**SUBCONTRACTOR REFERENCES (Three Minimum - Name, Email, and Telephone Number)**

---

---

---

## **PRE-AWARD QUALIFICATION QUESTIONNAIRE**

If an explanation is needed, use additional sheet, and sign.

1. Has your contractor's license been revoked at any time in the last 5 years?
2. Has any Contractor's State License Board license held by your firm or its Responsible Managing Employee (RME) or Responsible Managing Officer (RMO) been suspended with in the last 5 years?
3. At any time during the last 5 years, has your firm or any of its owners or officers, been convicted of a crime involving the awarding of a contract of a government construction project, or the bidding or performance of a government contact?
4. In the last 5 years has your firm been denied an award of a public works contract based on a finding by a public agency that your company was not a responsible bidder?
5. At any time during the last 5 years, has any surety company made any payments on your firm's behalf as a result of a default, to satisfy any claims made against a performance or payment bond issued on your firm behalf, in connection with a construction project, either public or private?
6. Has your firm or any of its owners, officers or partners ever been convicted of a crime involving any federal, state or local law related to construction?
7. Has the Federal Occupation Safety and Health Administration cited and assessed penalties against your firm in the past 5 years?

---

Signature of Prospective Bidder

In signing this Questionnaire, the prospective bidder certifies that the information and answers on the "Pre-Award Qualification Questionnaire" are complete and accurate.

**CONTRACTOR'S PROPOSAL FORM  
FOR  
THE PATHWAY**

Pursuant to INVITATION TO BID, and INFORMATION TO BIDDERS, the undersigned hereby proposes and agrees that on award by the CLIENT in accordance with the provisions of the Contract Documents, to execute the Agreement, with necessary bonds, to furnish and install any and all transportation, materials, equipment, tools, excavation, utilities, sheeting, shoring, bracing and supports, plant and other facilities, and all management, superintendence, permits, labor and services for the THE PATHWAY, in accordance with the Contract Documents therefor adopted and on file with the CLIENT, within the time hereinafter set forth and at the price or prices set forth in this Bid as follows:

**PROJECT COORDINATION**

1. **Project Management:** CLIENT will be managing the construction of the park and all contractors will be directing communication through **Fernanda Vanetta – Grants Administrator** and on site Project Supervisor **Luke Hook – Director of Construction. Ryan Riedlinger – Project Manager** . MDG will also be available for any design RFI/Clarifications.
2. **Project Schedule:** The project manager and supervisor will be coordinating all contractors and tasks per the master schedule and will require all tasks and contractors schedules to be updated regularly.
3. **Weekly Project Meetings:** Once project contractors are on site there will be a weekly Monday meeting at the site or office to coordinate the weeks tasks, material needs and deliveries. Each contractor will be responsible for coordinating its trade with the Project Manager / Supervisor and other trades to complete their tasks in proper construction order.
4. **Clarifications / RFI's:** To maintain a smooth-running project the contractors are encouraged to ask questions and clarify the designs early in the process and continually throughout the process. Please contact your PM team for assistance.

**Project Management Team**

Fernanda Vanetta – Grants Administrator

(530) 458-6517

Luke Hook – Director of Construction

Ryan Riedlinger, MDG – Project Manager

530-899-1616

ryan@meltondg.com

Greg Melton, MDG – Principal Architect

530-899-1616

greg@meltondg.com

**SELF PERFORMING/PROVIDED BY CLIENT**

The contractor will coordinate with CLIENT in regard to CLIENT providing some project elements to contractor for install and/or CLIENT installation of elements. The CLIENT also has the following materials to provide to the project. Contractor will request materials as needed and is responsible for all other materials not provided by CLIENT as described below.

**Schedule A -Bidder's Breakdown** - In accordance with provisions of the Contract Documents.

The price breakdown shall be fairly apportioned to the various parts of the Work and shall meet with the CLIENT's approval. If so requested by the CLIENT, the Bidder shall substantiate any price or prices with additional detail breakdown. (Schedule B: see PF-9).

**Schedule B -Bidder's Unit Prices for Additions, Changes, or Deletions** To be provided by Contractor after selected.

The Bidder further proposes that, in the event that additions changes, or deletions are made to or from the Drawings and Specifications for the proposed Work, the total adjustments to the lump sum price shall be computed based on the following unit prices for the following types of construction. Unit prices provided shall be fully loaded and include all costs. The CLIENT reserves the right to request a breakdown from the Contractor on the unit price and, if necessary, to delete these unit prices from the Contract Document if, from the CLIENT's sole judgement, are unbalanced or not reasonable prices for the work.

## SCHEDULE A – Bidder’s Breakdown

### FOR THE PATHWAY

Pursuant to INVITATION TO BID, and INFORMATION TO BIDDERS, the undersigned hereby proposes and agrees that on award by the CLIENT in accordance with the provisions of the Contract Documents, to execute the Agreement, with necessary bonds, to furnish and install any and all transportation, materials, equipment, tools, excavation, utilities, sheeting, shoring, bracing and supports, plant and other facilities, and all management, superintendence, permits, labor and services for THE PATHWAY, in accordance with the Contract Documents therefor adopted and on file with the CLIENT, within the time hereinafter set forth and at the price or prices set forth in this Bid as follows: The lump sum or unit cost for each item must be inclusive of all cost, 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.

### **AWARD – AWARD OF CONTRACT WILL BE BASED ON ANY COMBINATION OF BASE BID AND ALTERNATES.**

**If the owner cannot come to an agreement with the selected lowest bidder, the next lowest bidder will be contacted.**

### **BASE BID ITEMS**

*(Any quantities shown are estimated and for reference only. Bidder is responsible for verifying all quantities.)*

#### **Bids to include:**

- All fine grading and base rock preparation for flatwork
- All footings and concrete work to anchor elements structurally
- Coordinate with all other trades for the completion of the project

No.	Item	Quantity	Unit	Total Cost
1.	Mobilization	1	LS	\$
2.	Traffic Control	1	LS	\$
3.	30 Day Maintenance Period	1	LS	\$
4.	Grading & Soil Prep	1	LS	\$
5.	Demolition Per Plan	1	LS	\$
6.	Base Prep and Utility Connections to Restroom	1	LS	\$
7.	Wood Split Rail Fencing	885	LF	\$
8.	Electrical Panel	1	LS	\$
9.	Irrigation, Amendments, & Landscape	1	LS	\$
10.	Turf	16620	SF	\$
11.	Bark Mulch		SF	

12.	Site Furnishing Installation (Tables, Benches, Trash and Recycle Receptacles, Drinking Fountains (Install Only))	1	LS	\$
13.	Concrete – Sidewalks, Enhanced Sidewalks Pads, Curbs, Footings, Ramps	13700	SF	\$
14.	Concrete Seat Walls	110	LF	\$
15.	Pour-In-Place Surfacing	925	SF	\$
16.	Asphalt	15200	SF	\$
17.	Striping/ Paint	1	LS	\$
18.	Pond (Install Only)	8420	SF	\$
19.	Boulders	200	EA	\$
20.	Parking with Signage and Striping	1	LS	\$
21.	Cobble (Field Stone)	13000	SF	\$
22.	Drainage	1	LS	\$
23.	Decomposed Granite	50000	SF	\$
24.	Life Size Steel Animal Cut Outs (Install Only)	1	LS	\$
25.	Street Crossing Beacon	1	LS	\$
26.				
27.				
28.				
TOTAL				\$ _____

#### ADD ALTERNATE BID ITEMS

No.	Item	Quantity	Unit	Total Cost
A-101	Single Stall Restroom w/ Drinking Fountain	1	LS	
A-102	Double Stall Restroom w/ Drinking Fountain	1	LS	
Total				\$ _____

#### Notes:

- Contractors must use this form to provide bids (no exceptions or alterations are permitted).
- Bid item totals must roll up to the base bid total and include all materials and labor required for a complete installation including all element prep and the complete bid item.
- Permitting Fees by CLIENT

Total Lump Sum Base Bid \$ \_\_\_\_\_

Total Alternative Bid \$ \_\_\_\_\_

Total Base Bid and Add Alternate      \$ \_\_\_\_\_ (In Figures)

\$ \_\_\_\_\_ (In Words)

BID AMOUNT OF EACH OF THE ABOVE BID ITEMS MUST BE FILLED IN AND COMPLETED IN INK.

\*Signature of Bidder: \_\_\_\_\_

Company Name (printed): \_\_\_\_\_

\_\_\_\_\_

\*If Corporation, two officer signatures are required.

## SCHEDULE B - BIDDERS UNIT PRICES

### FOR THE PATHWAY

ITEM NO.	ITEM DESCRIPTION	QUANTITY	UNIT OF MEASURE	TOTAL
1	Finish Grading	1	SF	\$
2	Clearing and Grubbing	1	SF	\$
3	Soil Amendments (Organic)	1	CY	\$
4	Irrigation Mainline 2"	1	LF	\$
5	Irrigation Lateral 2"	1	LF	\$
6	Irrigation Lateral 1-1/2"	1	LF	\$
7	Irrigation Lateral 1"	1	LF	\$
8	Base Rock	1	SF	\$
9	Colorless Broom Finish Concrete	1	SF	\$
10	Enhanced Colored Concrete	1	SF	\$
11	Concrete Curb	1	LF	\$
12	Bark Mulch	1	SF	\$
13	Asphalt	1	SF	\$
14	Soil	1	CY	\$
15	Decomposed Granite	1	SF	\$
16	4' Wooden Split 3 Rail Farm Fence	1	LF	\$
17	Vegetation Screen Fence	1	LF	\$
18	24" Box Tree	1	EA	\$
19	15 Gallon Tree	1	EA	\$
20	5 Gallon Tree	1	EA	\$
21	1 Gallon Tree	1	EA	\$
22	Boulders (1'- 4')	1	EA	\$
23		1	EA	\$
24		1	EA	\$

Notes:

1. Individual unit prices must include all materials and labor required for a complete installation. Unit prices will be utilized for authorized additions or deletions to the scope of work.
2. Contractors must use this form to provide bids (no exceptions or alterations are permitted).

BID AMOUNT OF EACH OF THE ABOVE BID ITEMS MUST BE FILLED IN AND COMPLETED IN INK.

\*Signature of Bidder:\_\_\_\_\_

Company Name (printed):\_\_\_\_\_

\_\_\_\_\_  
\*If Corporation, two officer signatures are required.



Special Provisions  
**COLUSA INDIAN COMMUNITY COUNCIL**  
3730 Highway 45, Colusa, CA 95932  
(530) 458-6517 Office

**PROJECT NAME: The Pathway**

**Project Location: 3730 Highway 45, Colusa, CA 95932.**

**A. DEFINITIONS**

The work described herein shall be done in accordance with the appropriate provisions of the Standard Specifications for Public Works Construction, which specifications are hereinafter referred to as the Standard Specifications so far as the same may apply, and in accordance with the following special provisions.

The Standard Specifications set forth below will control the General Provisions for this Contract, except as amended by the Plans, Special Provisions, or other contract documents.

The following Special Provisions are supplementary and in addition to the provisions of the Standard Specifications unless otherwise noted and the section numbers of the Special Provisions coincide with those of the said Standard Specifications. Only those sections requiring elaborations, amendments, specifying of options, or additions are called out.

CLIENT	COLUSA INDIAN COMMUNITY COUNCIL
CLIENT Designee	Fernanda Vanetta, Grants Administrator
Landscape Architect	Melton Design Group

**B. DESCRIPTION OF WORK**

The work, in general, to be done under this contract consists of installation of concrete pavers, flatwork, curbs, seat walls, railing and asphalt path all within the confines of The Pathway, **3730 Highway 45, Colusa, CA 95932** all in conformance with the attached Contract specifications entitled:

**PROJECT NAME: The Pathway**

**C. MANDATORY PRE-BID JOB WALK**

A mandatory pre-bidders meeting will be held on the **18<sup>th</sup> of September at 10:00 AM** at the project site at **3730 Highway 45, Colusa, CA 95932**, to discuss issues pertaining to the project and answer any contractor questions that may arise.

**D. AWARD**

The award of contract, if awarded, will be to the lowest responsible bidder whose proposal complies with the entire requirement described. The award, if awarded, will be made within ten - (10) days after the opening of the bids. All bids will be compared on the basis of the initial Architect's Estimate of quantities of work to be done. Award will be based on the lowest responsible bidder for the combined total of the base bid and add alternate schedules. The CLIENT has the option of accepting none, or any number and combination of bid alternatives.

**E. REQUIRED LISTING OF PROPOSED SUBCONTRACTORS**

Each proposal shall have listed therein the name and address of each subcontractor, the associated bid item numbers, and the dollar value of the subcontractors work to whom the bidder proposes to subcontract



Special Provisions  
**COLUSA INDIAN COMMUNITY COUNCIL**  
3730 Highway 45, Colusa, CA 95932  
(530) 458-6517 Office

portions of the work, in accordance with the Subletting and Subcontracting Fair Practices Act, commencing with Section 4100 of the Public Contract Code. The list shall include all subcontractors regardless of the value of the subcontract amount. The bidder's attention is invited to other provisions of said Act related to the imposition of penalties for failure to observe its provisions by using unauthorized subcontractors or by making unauthorized substitutions.

A sheet for listing the subcontractors, as required herein, is included in the Proposal. If there will be no subcontractors enter "None" on the subcontractor's listing sheet.

**F. COOPERATION**

Should construction or other work of any other nature be under way by other forces or by other contractors within or adjacent to the limits of the work herein specified, the Contractor shall cooperate with all other such contractors or other forces to the end that any delay or hindrance to their work will be avoided.

**G. PROGRESS OF THE WORK AND TIME FOR COMPLETION**

MILESTONE	DEADLINE
AWARD ANNOUNCEMENT	September 27 <sup>th</sup> , 2024
ENTER INTO CONTRACT	October 1 <sup>st</sup> , 2024
NOTICE TO PROCEED / WORK TO COMMENCE (Pending weather and negotiation of schedule with CLIENT)	October 1 <sup>st</sup> , 2024
PROCUREMENT OF MATERIALS	Fall/ Winter
SUBSTANTIAL TARGET COMPLETION	December 31 <sup>st</sup> , 2024

Substantial Completion is considered the stage in the progress of Construction when the Construction is sufficiently complete in accordance with the Contract Documents so that the CLIENT can occupy or utilize the site for its intended use.

**H. LIQUIDATED DAMAGES**

The Contractor agrees that if the Work is not completed within the Contract Time's damages would be extremely difficult or impracticable to determine. Therefore, and Contractor agree that if Contractor fails to complete the Work within the Contract Time, Contractor shall pay to, on demand, as liquidated damages and not as a penalty, the sum of Five Hundred Dollars (\$500) for each day after the expiration of the Contract Time that the Work remains incomplete, and that this amount is a reasonable estimate of and a reasonable sum for such damages may deduct any liquidated damages owed to the COLUSA INDIAN COMMUNITY COUNCIL, as determined by Melton Design Group, from any payments otherwise payable to Contractor under this Contract.

**I. PLANS AND SPECIFICATIONS FURNISHED**

The Contractor will be furnished, free of charge, three (3) copies of the contract drawings and contract specifications. Any additional copies requested by the Contractor will be furnished to the Contractor at the



Special Provisions  
**COLUSA INDIAN COMMUNITY COUNCIL**  
3730 Highway 45, Colusa, CA 95932  
(530) 458-6517 Office

actual cost of reproduction. The Contractor shall retain an approved set of plans and specifications on the job at all times during the progress of the work.

**J. MATERIALS**

The Contractor shall furnish for use under these Special Provisions all materials required to complete the attached contract.

1. Quantity Certificates: The Contractor shall present a certified weight slip to the Architect or CLIENT Designee for all materials used in the contract measured by weight. The above-mentioned weight slips shall be submitted to the CLIENT Designee on the same day that the material has been delivered to the construction area.
2. Proposed Materials Submittal: The Contractor shall provide a submittal booklet containing product information for the materials proposed for the project. The CLIENT Designee will review and approve the submittals. Material submittals failing to meet the required specifications will be rejected. The Contractor shall re-submit new product information for review and approval by the CLIENT Designee.

**K. QUANTITIES**

The preliminary estimates of the quantities of work to be done and materials to be furnished are approximate only, being given as a basis for the comparison of bids, and the CLIENT does not expressly or by implication agree that the actual amount of work will correspond therewith, but reserves the right to increase or decrease the amount of any class or portion of the work or to omit portions of the work that may be deemed necessary or expedient by the CLIENT DESIGNEE.

**The CLIENT reserves the right to increase or decrease the quantities in excess of 25% without adjustment to the contract unit price.**

**L. CONSTRUCTION PROCEDURES AND DETAILS**

1. **Order of Work: The order of work shall be determined by the Contractor and approved by the CLIENT Designee.**

Order of work shall conform to the provisions the Standard Specifications and these Special Provisions. The Contractor shall submit a construction schedule to the CLIENT Designee for review and approval at least seven working days prior to the distribution of notices as described in Section 7 below. A preconstruction meeting shall occur before work is initiated on site.

2. **Contractor Daily Work Hours:**

The Contractor shall restrict their work hours on all Project related work to 7 a.m. to 9 p.m. daily, except Sundays and holidays, when their work hours shall be from 10 a.m. to 6 p.m. unless otherwise approved by the CLIENT Designee. The restriction shall include all associated move on, set up, equipment and material delivery, and other project activities not strictly related to the daily progress of the project.

Should the Contractor, their subcontractors, or others under the Contractor's control not comply with the requirements contained in this Special Provision, the CLIENT will deduct a penalty charge from the Contractor's next progress payment for each occurrence. The penalty assessed shall be \$500.00 for the first occurrence, and \$1000.00 for each occurrence thereafter.



Special Provisions  
**COLUSA INDIAN COMMUNITY COUNCIL**  
3730 Highway 45, Colusa, CA 95932  
(530) 458-6517 Office

3. **Protection of Work:** The Contractor shall provide adequate protection of all work until final completion. This shall include, but not be limited to, barricades, lights, flags, cones, fencing, barricades, visual surveillance and other devices both to protect the Contractor's work and provide public safety. Payment for protection of work shall be included in other contract items.  
Trees and other site amenities disturbed or damaged by the Contractor's work shall be replaced or restored at the Contractor's expense.
4. **Damage or Loss of Contractor's Supplies or Employee's Property:** The CLIENT does not assume any liability from fire, theft, accident or any other cause resulting in damage or loss of the Contractor's supplies, materials or equipment, or of personal property or belongings of Contractor's employees.
5. **Property Damage:** The Contractor shall note the following:
  - a Any private property or property damaged or altered in any way during the performance of the work under this contract shall be reported promptly to the CLIENT DESIGNEE and shall be rectified in an approved manner back to its former condition, prior to damage, at the Contractor's expense within five (5) calendar days of occurrence.
  - b Any damage noted, or seen, by the Contractor that has occurred by any means other than during the performance of the contractor's work, whether by vandalism or any other means shall be promptly reported to the CLIENT DESIGNEE and shall be rectified in an approved manner back to its former condition, prior to damage, at the Contractor's expense within five (5) calendar days of occurrence. Particularly, all hazardous conditions shall be reported.
6. **Notification of Utilities:** The Contractor shall notify all utility companies, such as Pacific Power or Surprise Valley Electric, 48 hours prior to commencing underground work by contacting Underground Service Alert at 1-800-6422444.
7. **Citizen Notification:** The Contractor shall notify all residents and businesses that may be affected by or are in the immediate vicinity of the construction at least 72 hours prior to construction. Notification shall be in writing and include a brief description of the work, starting date, scheduled date of completion, Contractor contact person and Contractor telephone number. Notification shall be submitted to the CLIENT for review and approval at least 24 hours prior to distribution. Notice to be hand carried by Contractor Representative. Should a change in the work schedule occur after the residents and/or businesses have been notified the Contractor shall notify the residents and/or businesses of the change in schedule within 24 hours of the originally scheduled starting date.  
When the construction requires prohibiting parking, "No Parking" signs shall be posted along the construction routes. The signs shall include the dates and times that no parking periods will be in effect. "No Parking" signs shall be mounted on Class I barricades and placed in the gutter pan not more than 100' apart. Signs shall be posted a minimum of 24 hours in advance of construction and immediately removed upon completion. Should the Contractor not commence work after 24 hours from placement of the signs, the signs shall be removed. If a vehicle is parked in a properly posted no parking area and is prohibiting the progression of work, the Contractor shall notify the Police Department to arrange for removal of the vehicle.  
Failure to comply with the provisions for notification shall result in the suspension of all work until the provisions have been met.



Special Provisions  
**COLUSA INDIAN COMMUNITY COUNCIL**  
3730 Highway 45, Colusa, CA 95932  
(530) 458-6517 Office

Full compensation for conforming to the requirements of this provision shall be considered as included in the prices paid for the various contract items and no additional compensation will be allowed.

8. **Access to Dwellings:** The Contractor shall provide access to all dwellings within the construction zone at all times throughout the project.

9. **Air and Water Pollution Control and Dust Control:** The Contractor shall abide by the following regarding the control of dust:

- a All exposed earth surfaces shall be watered periodically during construction activities. This practice shall be conducted twice during the morning and afternoon work hours. Further, the frequency of watering shall increase if wind speeds exceed 15 miles per hour.
- b Soil, grindings or other debris carried onto street surfaces by construction equipment shall be removed on a daily basis.
- c The Contractor shall submit a water pollution control plan to prevent discharge into the walkway drains, and shall be responsible for adhering to the requirements of the Standard Specifications, including providing such water pollution control measures as called for in these specifications and as directed by the CLIENT DESIGNEE.
- d Compensation for providing air and water pollution control and dust control shall be included in the prices paid for the other items of work in the contract and no additional payment shall be made.
- e All grading operations shall be suspended when winds (as instantaneous gusts) exceed 20 miles per hour as directed by the AQMD.
- f Water active construction sites at least twice daily as directed by the CLIENT DESIGNEE. Frequency shall be based on the type of operation, soil and wind exposure.
- g All trucks hauling dirt, sand, soil or other loose materials shall be covered or shall maintain at least two feet of freeboard (i.e. minimum vertical distance between top of the load and the trailer in accordance with the requirements of CVC 23114.
- h Sweep streets at the end of the day if visible soil materials are carried onto adjacent public paved roads (recommend water sweeper with reclaimed water).
- i Cover inactive storage piles.
- j Post a publicly visible sign with the telephone number and person to contact regarding dust complaints. This person shall respond and take corrective action within 24 hours. The telephone number of the MCAPCD shall also be visible to ensure compliance with MCAPCD Rule 201 & 207 (Nuisance and Fugitive Dust Emissions).

10. **Water:** The Contractor shall furnish for use under these Special Provisions all water required and as set forth under the Standard Specifications.

11. **Notice of Potential Claim:** See General Provisions



Special Provisions  
**COLUSA INDIAN COMMUNITY COUNCIL**  
3730 Highway 45, Colusa, CA 95932  
(530) 458-6517 Office

12. **Confined Space Entry**

If the proposed construction involves the entry into confined spaces as defined in Part 1910 of Title 29 of the Code of Federal Regulations and General Safety Order Article 108, Title 8 of the California Administrative Code. The Contractor shall comply with the requirements of said regulations. The Contractor shall submit copies of an Entry Permit(s) and Confined Space Entry Program addressing operating, rescue procedures, surveillance procedures, and training as required by the state regulations.

13. **Testing**

The Contractor shall pay for all tests as determined by the Client. Shall include all tests normally performed by the Client to check the Contractor's compliance with the contract provisions.

14. **Hazardous Waste in Excavation**

If the Contractor encounters material in excavation which he/she has reason to believe may be hazardous waste, as defined by §25117 of the Health and Safety code, he/she shall immediately so notify the CLIENT DESIGNEE in writing. Excavation in the immediate area of the suspected hazardous material shall be suspended until the CLIENT DESIGNEE authorizes the work to be resumed. If such suspension delays the current controlling operation, the Contractor will be granted an extension of time as provided in the Standard Specifications.

If such suspension delays the current controlling operation more than 2 working days, the delay will be considered a right of way delay and the Contractor will be compensated for such delay as provided in the Standard Specifications.

The Department reserves the right to use other forces for exploratory work to identify and determine the extent of such material and for removing hazardous material from such area.

15. **Unanticipated Cultural Resources Discovery**

Construction operations on this project may unearth or uncover cultural resources of a historic or prehistoric nature. If buried or obscured cultural materials are observed during vegetation removal and/or construction, the work in the area of discovery shall cease, the CLIENT shall be notified, the encountered resource shall then be identified, recorded, and an assessment made of the resource by a qualified archaeologist.

The right is reserved to the CLIENT and its authorized agents, including a qualified archaeologist and appropriate professionals to enter upon the right-of-way for the purpose of investigating and/or excavating and removing such resources. The Contractor shall cooperate with forces engaged in such work, and shall conduct their operations in such a manner to avoid any unnecessary delay or hindrance to the work being performed by such other forces.

The Contractor shall immediately notify the CLIENT of any delays to their operations as a direct result of the discovery of possible cultural resources which were not indicated on the plans or in the Special Provisions. Any such delays will be considered right-of-way delays within the meaning of Section 8-1.09, "Right of Way Delays," and compensation for such delay will be determined in accordance with said Section 8-1.09. The Contractor shall be entitled to no other compensation for any such delay.



Special Provisions  
**COLUSA INDIAN COMMUNITY COUNCIL**  
3730 Highway 45, Colusa, CA 95932  
(530) 458-6517 Office

16. **Right of Public Utilities**

The rights of Public Utilities to enter upon the work for the purpose of making changes necessitated by the improvement are as specified the Standard Specifications.

17. **Maintenance and Control of Traffic**

- a. Description of Work: The Contractor shall supply at their own expense all flagmen, detour signs, barricades and all other traffic control devices and personnel in compliance with provisions of the Standard Specifications, and as ordered by the CLIENT DESIGNEE, necessary to provide a satisfactory level of safety and minimum inconvenience to the general public.

Nothing in these Special Provisions shall be construed as relieving the Contractor from their responsibility as provided in said Section 7-1.09.

The Contractor shall provide the CLIENT DESIGNEE with a Traffic Control Plan for each separate element of work seven (7) working days prior to starting work or the pre-construction meeting, whichever is earliest.

The CLIENT DESIGNEE retains the right to modify the plan as he may determine necessary.

The Contractor or their representative and all subcontractors shall have a copy of the approved Traffic Control Plan pertinent to the work in progress on the jobsite at all times. Failure to adhere to the Traffic Control Plan shall be grounds for the CLIENT to require the Contractor to stop the work until traffic control is in compliance with the approved Traffic Control Plan.

**Should the Contractor or their subcontractors be required to stop work by direction of the CLIENT Designee due to non-compliance with the Traffic Control Plan, the CLIENT will deduct a penalty charge from the Contractor's next progress payment for each occurrence. The penalty shall amount to \$250.00 for the first occurrence and \$500.00 for each occurrence thereafter.**

During Contractor working hours a minimum of one (1) traffic lane (in each direction - 4 lane street), not less than twelve (12') feet wide shall be open for public use. During non-working hours all traveled lanes, on all roadways, shall remain open. Whenever vehicles or equipment are parked on the pavement or on the shoulder, within 6 feet of a travel lane, the parking area shall be delineated with fluorescent traffic cones or portable delineators placed on a taper in advance of the parked vehicles or equipment or along the closed portion of the pavement or shoulder at 25-foot intervals to a point approximately twenty-five (25') feet past the last piece of equipment. A minimum of nine (9) cones or portable delineators shall be used for the taper. A C23 (Road Work Ahead) or C24 (Shoulder Work Ahead), as appropriate, shall be mounted on a telescoping flag tree with flags.

Whenever a traffic lane is to be closed to public traffic, the Contractor shall install a traffic control system in accordance with the current "MANUAL OF TRAFFIC CONTROLS - Warning Signs, Lights, and Devices for Use in Performance of Work Upon Highways."

Designated legal holidays are: January 1st, Martin Luther King's birthday, February 12th, the third Monday in February, the last Monday in May, July 4th, the first Monday in September, November 11th, Thanksgiving Day, and December 25th. When a designated legal holiday falls on a Saturday or Sunday, the preceding Friday or the following Monday shall be designated the legal holiday.

The Contractor shall keep current and notify the local Police, and Fire Departments of the construction operation and traffic control changes three (3) days before work is to begin or traffic changes are made. The Contractor shall at no time obstruct bus stops without prior written authorization from the City. The Contractor shall cooperate with local authorities relative to handling traffic through the area and shall make their own arrangements in keeping the work area clear of parked vehicles.



Special Provisions  
**COLUSA INDIAN COMMUNITY COUNCIL**  
3730 Highway 45, Colusa, CA 95932  
(530) 458-6517 Office

When leaving a work area and entering a roadway carrying public traffic, the Contractor's equipment, whether empty or loaded, shall in all cases yield to public traffic.

Personal vehicles of the Contractor's employees shall not be parked on the traveled way or shoulders, including any section closed to the public.

Wherever the Contractor's operations obliterate pavement delineation (lane lines, either pavement markers or painted lane lines or both), such pavement delineation shall be replaced by either permanent or temporary delineation before opening the traveled way to the traffic. Temporary delineation shall consist of reflective traffic line tape applied in pieces not less than 12 inches long nor less than 4 inches wide spaced no more than 12 feet apart. Reflective traffic line tape shall be applied in accordance with the manufacturer's instructions. Temporary delineation shall be the same color as the permanent delineation. Full compensation for temporary delineation shall be considered as included in the prices paid for the work and no separate payment will be made.

**18. Access to Site and Staging Area**

a. Description of Work: The contractor is responsible for maintaining access to staging area and to fix and repair any damage to area at completion of project as needed to return area to its original condition. If existing pavement at or in access to staging area is damaged, it is the Contractors responsibility to repair paved areas back to its original state at no cost to the CLIENT.

- i. When not in use, all contractors and subcontractor vehicles shall be parked within staging area, leaving existing parking open to the public.
- ii. Prior to starting work, Contractor shall obtain approval of access routes to the site and mark the staging area on site for approval by the CLIENT or CLIENT Inspector. Two sets of keys for staging area gates shall be provided to the CLIENT or CLIENT Inspector. The Contractor shall leave the staging area clean and free of debris.

b. Temporary Fencing: Temporary Chain Link Fence, 6' high, shall be furnished and constructed, maintained and later removed, as per the limit of work shown on the Construction Plan, as specified in these Special Provisions and as directed by the CLIENT Inspector.

- i. Posts shall be either metal or wood at the contractor's option.
- ii. Galvanizing and painting of steel items will not be required.
- iii. Treating wood with wood preservatives will not be required.
- iv. Concrete footings for metal posts will not be required.
- v. Insert posts into portable concrete blocks or steel supports as needed to support fence.
- vi. Install two sets of 8' wide locking gates as needed for access to the staging area. Provide the CLIENT Inspector with two sets of keys to gate locks.
- vii. Temporary fences that are damaged from any cause during the progress of the work shall be repaired or replaced at the Contractor's expense.
- viii. When no longer required for the work as determined by the CLIENT Inspector, temporary fences shall be removed. Removed materials shall become the property of the Contractor and shall be removed from the site of the work.
- ix. Holes caused by the removal of temporary fences shall be backfilled in accordance with the provisions in the Standard Specifications



Special Provisions  
**COLUSA INDIAN COMMUNITY COUNCIL**  
3730 Highway 45, Colusa, CA 95932  
(530) 458-6517 Office

**19. Safety Construction Fencing and Barricades**

- a. Description of Work: Temporary 4' Vinyl Fencing shall be furnished and constructed maintained and later removed as per plans, specifications, these Special Provisions and as directed per the CLIENT or CLIENT Inspector. Locations include drip line around existing trees in areas of construction, per Drawing Notes "Tree Protection Measures" and surrounding open trenches during construction.
- i. Steel, wood or plastic Traffic Barricade with Flasher Light shall be furnished and set in front of all open trenches that are within five feet of pedestrian or vehicular paths and roads.
  - ii. Materials may be of commercial quality providing the dimensions and sizes of said materials are equal to, or greater than the dimensions shown on the plans or specifications.
  - iii. Used materials may be used providing such used materials are structurally sound and suitable for the purpose intended.
  - iv. Posts shall be either metal or wood at the contractor's option. v. Galvanizing and painting of steel items will not be required. vi. Treating wood with wood preservatives will not be required. vii. Concrete footings for metal posts will not be required.
  - viii. Safety fencing and barricades that are damaged from any cause during the progress of the work shall be repaired or replaced at the Contractor's expense.
  - ix. When no longer required for the work as determined by the CLIENT Inspector, safety fences and barricades shall be removed. Removed materials shall become the property of the Contractor and shall be removed from the site of the work.
  - x. Holes caused by the removal of safety fencing and barricades shall be backfilled in accordance with the provisions in the Standard Specifications.

**20. Construction Layout and Staking**

- a. Description of Work: Contractor to provide surveyor staking to establish the lines and grades required for the completion of the work specified in these specifications, on the plans and in the Special Provisions.

**21. Clearing and Grubbing**

- a. Description of Work: Clearing and grubbing shall conform to the Standard Specifications and these Special Provisions.
- The area to be cleared and grubbed shall remain within the excavation and embankment slope lines.

**22. Existing Highway Facilities**

The work performed in connection with various existing highway facilities shall conform to the Standard Specifications and these Special Provisions.

**23. Excavation**

- a. Description of Work: All references to "Excavation" shall be equally interchangeable with "Roadway Excavation". All Excavation shall conform to the provisions of the Standard Specifications and these Special Provisions.



Special Provisions  
**COLUSA INDIAN COMMUNITY COUNCIL**  
3730 Highway 45, Colusa, CA 95932  
(530) 458-6517 Office

Excavation shall consist of performing all operations necessary to excavate earth, rock, and all other materials upon which the fill, aggregate base, or other material is to be constructed; to build embankment, in the location and to the elevation and form required; to backfill ditches and depressions caused by the removal of obstructions; to furnish all equipment necessary for these operations, and the performances of all incidental work of whatever nature that may be required to build the grade and maintain it in the form specified. Included in the work shall be all associated grading areas to drain, and the scarification and recompacting to 90% relative compaction of the top 6 inches of the subgrade.

Surplus Material: All surplus excavated material shall be collected, hauled and deposited at a location specified by the CLIENT DESIGNEE. Only if directed to do so in writing by the CLIENT DESIGNEE may surplus excavated material be collected, hauled and deposited away from the project by the Contractor and shall be paid as a part of this item.

Local Borrow: Local borrow shall conform to the Standard Specifications and these Special Provisions.

**24. Aggregate Base**

- a. Description of Work: Aggregate Base shall conform to the provisions in the Standard Specifications and these Special Provisions and shall be constructed to the thickness and dimensions indicated on the plans. The maximum size of aggregate shall be three-quarters (3/4) inch as set forth in Section 26, or as specified by the CLIENT DESIGNEE. Aggregate Base shall be Class 2.

**25. Water**

- a. Description of Work: The Contractor shall furnish for use under these Special Provisions all water required and as set forth under the Standard Specifications.
- b. Measurement and Payment: The cost for furnishing water shall be considered as being included in the contract unit price paid for other items of work, and no separate payment will be allowed.

**26. Storm Drain Pipe**

**Specified Pipe Materials**

- a. Description of Work: The storm drain pipe shall be installed in conformance with the manufactures construction specifications including trench construction, backfill material selection and backfill construction. In addition applicable portions of the Standard Specifications and these Special Provisions shall apply.
- b. Trench Excavation: In addition to the manufactures construction specifications trench excavation shall conform to the provisions in the Standard Specifications and these Special Provisions. The excavation for storm drain pipe shall not be made further in advance of laying the pipe than is practical to complete the pipe laying and backfill operation each day.
- c. Trench Backfill, Storm Drain: In addition to the manufacturers construction specifications trench backfill shall conform to the provisions in the Standard Specifications and these Special Provisions. Minimum cover shall be maintained during the construction operation by mounding additional material over backfilled storm drain trenches. Storm drainpipes damaged during any project construction operation shall be removed and replaced at the contractor's expense and no additional compensation will be made.



## Special Provisions

# COLUSA INDIAN COMMUNITY COUNCIL

3730 Highway 45, Colusa, CA 95932

(530) 458-6517 Office

### **Alternative Pipe Materials**

- a. Description of Work: If requested in writing alternative pipe materials may be approved by the CLIENT DESIGNER and shall conform to the applicable specifications of the following types of pipe materials. Pipe material shall not vary between structures. Existing pipes extending from structures shall be removed if new pipe being installed is of dissimilar material.

#### Polyvinyl Chloride (PVC) and High Density Polyethylene (HDPE) Pipe

PVC or HDPE pipe shall be in accordance with the Standard Specifications, except that Type C corrugated polyethylene pipe shall not be allowed.

Smooth interior wall ribbed polyvinyl chloride drainpipe shall meet the requirements for materials and installation of the Standard Specifications for sizes 18-inch to 48-inch.

Smooth interior Type S corrugated polyethylene pipe or ribbed profile wall polyethylene pipe shall meet the requirements for materials and installation of the Standard Specifications for sizes 12 inches through 36 inches.

- b. Trench Excavation: Trench excavation shall conform to the provisions in the Standard Specifications and these Special Provisions. The excavation for storm drain pipe shall not be made further in advance of laying the pipe than is practical to complete the pipe laying and backfill operation each day.

Excavation for Laying Pipe: Pipe shall, unless otherwise directed, be laid in open cut. All trenches shall have vertical sides from the bottom to a point at least six (6) inches above the top of the pipe. Above this point in unstable ground, with the written consent of the CLIENT DESIGNER, the trench may be sloped as directed. Trenches shall be six (6) inches minimum, wider on each side, or a total of twelve (12) inches minimum, wider than the exterior diameter of the pipe, exclusive of sockets. In the event that sheeting is required, the width of the trench shall be increased sufficiently to accommodate the sheeting. Shheeting shall not be driven below the invert grade of the pipe unless absolutely necessary due to ground conditions, as sheeting is to be removed in conjunction with the backfilling. If sheeting is driven below the invert grade as required above, it shall remain in place, except that portion two (2) feet above the top of the pipe, which shall be cut off and removed as the backfilling is completed.

When using movable trench support, care shall be exercised not to disturb the pipe locations, jointing or embedment. Any voids left in the embedment material by support removal shall be carefully filled with compacted granular material. Removal of any bracing between sheeting, trench boxes or shields shall only be done where backfilling procedures permit removal without loss of trench support. Any longitudinal movement or disjuncting of pipe which results from movement of trench boxes or shields shall be corrected before additional pipe is placed.

- c. Trenches in rock: Every trench in rock shall be fully opened to a final depth at least thirty (30) feet in advance of any place where pipe is being laid. In rock the trench shall be carried six (6) inches below the external diameter of the pipe. Bedding material consisting of clean washed sand, with a maximum particle size of 1/4 inch, and with a minimum of 70 percent passing a No. 20 screen or graded sand and gravel with a maximum particle size of 3/4 inches conforming to the graduation requirements for Class 2 Aggregate Base per the Standard Specifications, shall be placed, spread and compacted to provide a firm uniform bed for supporting the pipe.



Special Provisions  
**COLUSA INDIAN COMMUNITY COUNCIL**  
3730 Highway 45, Colusa, CA 95932  
(530) 458-6517 Office

27. **Soil Testing:** Should soil conditions such as running water or unstable soils be encountered during trench excavation, the director may require testing in advance of excavation to determine the nature and extent of the conditions. After such determination is made, the Architect or CLIENT DESIGNEE may require modified trenching and embedment procedures, as required by soil conditions.
28. **Preparation of Subgrade:** The subgrade for pipe shall be so prepared that the entire length of each section of pipe shall have a firm and uniform bearing except for such distance as is necessary for bell holes and the proper sealing of the pipe joints. Bell holes below the elevations of the pipe subgrade shall not be larger than one-fourth (1/4) of the distance between pipe joints.
29. **Overcut:** Excavations shall be carried to the exact depth indicated on the plans or as specified. Should the Contractor, through his or her negligence or other fault, excavate below the designed lines, he or she shall replace such excavation with approved materials at their own expense.
30. **Approval of Excavations:** The contractor shall notify the Architect or CLIENT DESIGNEE where excavations for structure or pipes are completed, and no concrete shall be deposited or pipes laid until the excavations are approved.
- a. **Trench Backfill, Storm Drain:** Trench backfill shall conform to the provisions in the Standard Specifications and these Special Provisions.
  - b. **Polyvinyl Chloride and Polyethylene Pipe:** Pipe bedding and shading material from the bottom of the trench to a plane one foot above the top of the plastic pipe shall be clean sand with a maximum particle size 1/4-inch and minimum of 70% passing a No. 20 screen, Class 2 aggregate base, 3/4" maximum grading, compacted to a relative compaction of not less than 95% or Slurry Cement Backfill as specified in the Standard Specifications. Backfill material from a plane one foot above the top of the plastic pipe to subgrade shall meet the above requirements for reinforced concrete pipe.
  - c. **Disposal of Excess Material:** Excess materials which have been excavated from trenches, and which cannot be utilized for backfill, shall be removed in accordance with the Special Conditions.
  - d. **Compaction:** Compaction of backfilled material by ponding or jetting will not be allowed unless specifically authorized by the Architect or CLIENT DESIGNEE.
31. **Miscellaneous Concrete Construction**
- a. **Description of Work:** Curbs, sidewalks and PCC pavement shall conform to the provisions in the Standard Specifications and these Special Provisions.
    - i. Subgrade preparation shall conform to the provisions of the Standard Specifications. The Contractor shall be responsible for performing grading, including furnishing fill material and excavating, as necessary to establish finish grade for placement of concrete sidewalk, driveway, handicap ramp, valley gutter, and mow curb construction. Subgrade shall be compacted to a relative density of 90% in conformance with California Test Method No. 216.
    - ii. No concrete shall be placed until the subgrade and forms have been reviewed for satisfactory compaction, alignment, and grade, and approved by the Architect or CLIENT DESIGNEE.
  - b. **Pre-molded Expansion Joints,** 1/4-inch-wide, shall be installed in all curbs and sidewalks as follows:
    - i. As shown on Drawings.
    - ii. At maximum 48-foot intervals in all new curb and gutter construction.
  - c. **Control Joints,** 1/4-inch-wide, 1/4-inch radius, scored at 1/4-inch-depth of concrete being placed, shall be constructed at maximum 24-foot intervals in all new curbs, gutters, and sidewalks. Weakened plane joints shall be constructed in the ramps in accordance with the applicable provisions of the Standard Specifications.



Special Provisions  
**COLUSA INDIAN COMMUNITY COUNCIL**  
3730 Highway 45, Colusa, CA 95932  
(530) 458-6517 Office

- d. Extruded curb, gutter and sidewalk construction shall not be used without prior approval by the Architect or CLIENT DESIGNEE.
- e. Materials:
  - i. Concrete: Construction of all sidewalks, handicap ramps, curbs, gutters and driveways shall be of Class "A" Portland Cement concrete as specified in the Standard Specifications, and shall conform to the provisions of the Standard Specifications.
  - ii. Adhesives: Adhesives or bonding agents used to join new concrete to existing concrete shall be approved by the Architect or CLIENT DESIGNEE prior to use in the work.
  - iii. Lampblack: Lampblack of approved quality shall be mixed with all concrete used in the work at the rate of one pound per cubic yard of concrete. (If Concrete is not colored)
  - iv. Joint Filler: Pre-molded expansion joint filler shall conform to the provisions of the Standard Specifications.
  - v. Dowels: Steel dowels, where specified, shall conform to the provisions of the Standard Specifications.
  - vi. Curing: The curing method of Portland Cement concrete shall conform to the Standard Specifications. The curing compound shall consist of the compound specified in the Standard Specifications.
- f. Measurement: Concrete curb and/or gutter will be measured by the lineal foot in place. Concrete sidewalks, driveways, PCC Pavement and bus shelter pads shall be measured by the square foot in place. Handicap ramps shall be measured per each.
- g. Payment: The unit price paid per linear foot for installation of concrete curb, flush curb and/or gutter and the unit price paid per square foot for installation of concrete sidewalk and for each handicap ramp shall include full compensation for furnishing all labor, tools, materials and equipment, and for doing all the work involved in installing curbs, gutters, sidewalks, driveways, and handicap ramps, including grading and sand cushion under sidewalk, handicap ramp, and driveways, or aggregate base under curb and gutter, as shown on the plans as required by the Standard Specifications and these Special Provisions, and as directed by the Architect or CLIENT DESIGNEE.

#### **M. UNDERGROUND FACILITIES**

NOTICE IS HEREBY GIVEN THAT there may be underground water, gas, telephone, electric and other utility pipes located beneath the surface of the roadways and park property.

Prior to submittal of bids, and upon obtaining appropriate encroachment permits, prospective bidders may, at their expense, investigate the nature of the site by digging test holes within public right-of-way areas in the vicinity of the work.

The Contractor shall contact the appropriate utility company prior to any excavation and shall determine the exact vertical and horizontal location of any underground facilities.

Following the award of contract for the work, any cost in locating underground facilities shall be considered as included in the cost of other items of the contract and no additional compensation will be allowed.

Payment for removal and disposal of buried man-made objects shall be included in the contract price paid for other items of work and no separate payment shall be allowed.



Special Provisions  
**COLUSA INDIAN COMMUNITY COUNCIL**  
3730 Highway 45, Colusa, CA 95932  
(530) 458-6517 Office

**N. THE PATHWAY**

All work encompassed under this project shall be completed in accordance with the notes and drawings shown on the Plans entitled: **'THE PATHWAY',** Title Sheet through E-5.1"



**ARTICLE 1**  
**GENERAL PROVISIONS**

**1.1 BASIC DEFINITIONS**

1.1.1 APPLICABLE CODE REQUIREMENTS. The term "Applicable Code Requirements" means all laws; statutes; the most recent applicable building standard codes, as modified by State Regulations (Title 24); ordinances; rules; regulations; and lawful orders of all public authorities having jurisdiction over the CLIENT, Contractor, any Subcontractor, the Project, the Project site, the Work, or the prosecution of the Work.

1.1.2 CONTRACT AGREEMENT. The term "Contract Agreement" means the written agreement executed between the CLIENT and the Contractor which requires the Contractor to do all the work and furnish all the labor and materials necessary for the Project, which sets forth the consideration to be paid by CLIENT to the Contractor for such work, and which incorporates by reference these general provisions.

1.1.3 CONTRACT DOCUMENTS. The "Contract Documents" consist of all documents listed in Article 6 of the Contract Agreement.

1.1.4 CONTRACT MODIFICATION. The term "Contract Modification" means (1) an amendment to the Contract Documents, (2) a change order, (3) a field order, or (4) a letter of instruction.

1.1.5 CONTRACT SUM. The term "Contract Sum" means the entire sum to be paid by the CLIENT to the Contractor for all work to be performed on the Project as set forth in the Contract Agreement.

1.1.6 CONTRACT TIME. The term "Contract Time" means the number of days set forth in the Contract Agreement within which full completion of the Work must be achieved. The Contract Time may be adjusted only by change order.

1.1.7 DAY. The term "Day," as used in the bidding requirements and the Contract Documents, shall mean calendar day or any part thereof, unless otherwise specifically provided.

1.1.8 DRAWINGS. The term "Drawings" means the graphic and pictorial portions of the Contract Documents showing the design, location, and dimensions of the Work, generally including plans, elevations, sections, details, schedules, and diagrams. The Drawings are listed in the list of drawings.

1.1.9 FINAL COMPLETION. The term "Final Completion" means the Work has been fully completed in accordance with the Contract Documents as determined by CLIENT's REPRESENTATIVE pursuant to Section 9.7, Final Completion and Final Payment, of the General Conditions.

1.1.10 CLIENT. The term "CLIENT" means The COLUSA INDIAN COMMUNITY COUNCIL.

1.1.11 CLIENT'S REPRESENTATIVE. The term "CLIENT's REPRESENTATIVE" means CLIENT's General Manager or designee identified as such in the Contract Documents.

1.1.12 PRODUCT DATA. "Product Data" are illustrations, standard schedules, performance charts, instructions, brochures, diagrams, and other information furnished by the Contractor to illustrate or describe materials or equipment for some portion of the Work.

1.1.13 PROJECT. The term "Project" means the total construction of the Work performed under the Contract Documents, which may be the whole or a part and which may include construction by the CLIENT or by separate contractors.

1.1.14 SAMPLES. "Samples" are physical examples that illustrate materials, equipment, or workmanship and establish standards by which the Work will be judged.

1.1.15 SHOP DRAWINGS. "Shop Drawings" are drawings, diagrams, schedules, and other data specially prepared for the Work by the Contractor or a Subcontractor to illustrate some portion of the Work.

1.1.16 SPECIFICATIONS. The term "Specifications" means that portion of the Contract Documents consisting of the written requirements for materials, equipment, construction systems, standards and workmanship for the Work, and performance of related services.

1.1.17 SUBCONTRACTOR. The term "Subcontractor" means any person or legal entity who contracts with the Contractor to provide labor, materials, equipment, and/or services required for the construction of the Project.

1.1.18 WORK. The term "Work" means the construction and services required by the Contract Documents and includes all labor, materials, equipment, tools, and services provided or to be provided by the Contractor to fulfill the Contractor's obligations.

## **1.2 INTERPRETATION**

1.2.1 The Contract Documents are complementary, and what is required by one shall be as binding as if required by all. In the case of conflict or inconsistency, the Supplementary Conditions, if applicable, shall control over the General Conditions, and the Specifications shall control over the Drawings. Figured dimensions shall control over scaled measurements.

1.2.2 The Contract Documents may omit modifying words such as "all" and "any," and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement. The use of the word "including," when following any general statement, shall not be construed to limit such statement to specific items or matters set forth immediately following such word or to similar items or matters, whether or not non-limiting language (such as "without limitation," "but not limited to," or words of similar import) is used with reference thereto, but rather shall be deemed to refer to all other items or matters that could reasonably fall within the broadest possible scope of such general statement.

1.2.3 Whenever the context so requires, the use of the singular number shall be deemed to include the plural and vice versa. Each gender shall be deemed to include any other gender, and each shall include a corporation, partnership, trust, or other legal entity whenever the context so requires. The captions and headings of the various subdivisions of the Contract Documents are intended only as a matter of reference and convenience and in no way define, limit, or prescribe the scope or intent of the Contract Documents or any subdivision thereof.

**ARTICLE 2**  
**CLIENT**

**2.1 INFORMATION AND SERVICES PROVIDED BY CLIENT**

2.1.1 If required for the performance of the Work, as determined by the CLIENT's REPRESENTATIVE, the CLIENT will make available a survey describing those physical characteristics, boundaries, easements, and utility locations for the Project site of which the CLIENT has actual knowledge.

2.1.2 Contractor will be furnished, free of charge, such copies of the Contract Documents as CLIENT deems reasonably necessary for the execution of the Work.

**2.2 CLIENT TO PROVIDE ACCESS TO PROJECT SITE**

2.2.1 So long as Contractor is not in default in performance under the Contract documents, CLIENT will provide, no later than the date designated in the current contract schedule accepted by CLIENT's REPRESENTATIVE, the lands, and facilities upon which the Work is to be performed, including such access to other lands and facilities designated in the Contract Documents for use by Contractor.

**2.3 CLIENT'S RIGHT TO STOP THE WORK**

2.3.1 If Contractor fails to correct defective work as required by Section 12.2 or fails to perform the Work in accordance with the Contract Documents, CLIENT or CLIENT's REPRESENTATIVE may direct Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated by Contractor. The Contractor shall not be entitled to any adjustment of Contract Time or Contract Sum as a result of any such order. CLIENT and CLIENT's REPRESENTATIVE shall have no duty or responsibility to Contractor or any other party to exercise the right to stop the Work.

**2.4 CLIENT'S RIGHT TO CARRY OUT THE WORK**

2.4.1 If Contractor fails to carry out the Work in accordance with the Contract Documents, fails to provide sufficient labor, materials, equipment, tools, and services to maintain the contract schedule, or otherwise fails to comply with any material term of the Contract Documents, and fails within four (4) days after receipt of notice from CLIENT to promptly commence and thereafter diligently continue to complete the correction of such failure, CLIENT may, without prejudice to other remedies CLIENT may have, correct such failure at Contractor's expense. In such case, CLIENT shall be entitled to deduct from payments then or thereafter due Contractor the cost of correcting such failure, including compensation for the additional services and expenses of CLIENT's REPRESENTATIVE and CLIENT's consultants made necessary thereby. If payments then or thereafter due Contractor are not sufficient to cover such amounts, Contractor shall pay the additional amount to CLIENT.

**2.5 CLIENT'S RIGHT TO REPLACE CLIENT'S REPRESENTATIVE**

2.5.1 CLIENT may at any time and from time to time, without prior notice to or approval of Contractor, replace CLIENT's REPRESENTATIVE with a new CLIENT's REPRESENTATIVE. Upon receipt of notice from the CLIENT informing the Contractor of such replacement and identifying the new CLIENT's REPRESENTATIVE, the Contractor shall recognize such person or firm as CLIENT's REPRESENTATIVE for all purposes under the Contract Documents.

**ARTICLE 3**  
**CONTRACTOR**

**3.1 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR**

3.1.1 Contractor shall carefully study and compare the Contract Documents with each other and with the information furnished by CLIENT and shall reply in 3 (three) working days in writing to CLIENT's REPRESENTATIVE any errors, inconsistencies, or omissions in the Contract Documents or inconsistencies with Applicable Code Requirements observed by Contractor.

3.1.2 Contractor shall take field measurements, verify field conditions, and carefully compare with the Contract Documents such field measurements, conditions, and other information known to Contractor before commencing the Work. Errors, inconsistencies, or omissions discovered at any time shall be promptly reported in writing to the CLIENT's REPRESENTATIVE.

3.1.3 If Contractor performs any construction activity which it knows or should know involves an error, inconsistency, or omission referred to in Paragraphs 3.1.1 and 3.1.2, without notifying and obtaining the written consent of CLIENT's REPRESENTATIVE, Contractor shall be responsible for the resultant losses, including, without limitation, the costs of correcting defective work.

**3.2 SUPERVISION AND CONSTRUCTION PROCEDURES**

3.2.1 Contractor shall supervise, coordinate, and direct the Work using Contractor's best skill and attention. The Contractor shall be solely responsible for and have control over construction means, methods, techniques, sequences, procedures, and the coordination of all portions of the Work, unless otherwise shown or specified in the Contract Documents or directed in writing by CLIENT's REPRESENTATIVE.

3.2.2 Contractor shall be responsible to CLIENT for acts and omissions of Contractor's agents, employees, and Subcontractors, and their respective agents and employees.

3.2.3 Contractor shall not be relieved of its obligation to perform the Work in accordance with the Contract Documents either by acts or omissions of CLIENT or CLIENT's REPRESENTATIVE in the administration of the Contract Documents, or by tests, inspections, or approvals required or performed by persons or firms other than Contractor.

3.2.4 Contractor shall be responsible for inspection of all portions of the Work, including those portions already performed under the Contract Documents, to determine that such portions conform to the requirements of the Contract Documents and are ready to receive subsequent Work.

3.2.5 Contractor shall at all times maintain good discipline and order among its employees and Subcontractors. The contractor shall provide competent, fully qualified personnel to perform the Work.

3.2.6 Contractor shall furnish CLIENT's REPRESENTATIVE at the beginning of each week with a copy of each of Contractor's daily Project reports prepared by Contractor's superintendent (or other Project manager) for the prior week.

### **3.3 LABOR AND MATERIALS**

3.3.1 Unless otherwise provided in the Contract Documents, Contractor shall provide and pay for all labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

### **3.4 CONTRACTOR'S WARRANTY**

3.4.1 Contractor warrants to CLIENT that all materials and equipment used in or incorporated into the Work will be of good quality, new, and free of liens, Claims, and security interests of third parties; that the Work will be of good quality and free from defects; and that the Work will conform with the requirements of the Contract Documents. If required by CLIENT's REPRESENTATIVE, Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

### **3.5 TAXES**

3.5.1 Contractor shall pay all sales, consumer, use, and similar taxes for the Work or portions thereof provided by Contractor, which are enacted when bids for the Work are received, whether or not yet effective or merely scheduled to go into effect.

### **3.6 PERMITS, FEES, AND NOTICES**

3.6.1 Contractor shall secure and pay for all permits, approvals, government fees, licenses, and inspections necessary for the proper execution and performance of the Work. Contractor shall deliver to CLIENT all original licenses, permits, and approvals obtained by Contractor in connection with the Work prior to the final payment or upon the termination of the Contract Agreement, whichever is earlier.

### **3.7 APPLICABLE CODE REQUIREMENTS**

3.7.1 Contractor shall perform the Work in accordance with the following Applicable Code Requirements:

- .1 All laws, statutes, the most recent applicable building standard codes, ordinances, rules, regulations, and lawful orders of all public authorities having jurisdiction over CLIENT, Contractor, any Subcontractor, the Project, the Project site, the Work, or the prosecution of the Work.
- .2 The Federal Occupational Safety and Health Act and all other Applicable Code Requirements relating to safety.
- .3 Applicable titles in the State of California Code of Regulations.
- .4 Applicable sections in the State of California Labor Code.

3.7.2 If Contractor performs Work which it knows or should know is contrary to Applicable Code Requirements, regardless of notice to CLIENT and CLIENT's REPRESENTATIVE, Contractor shall be responsible for such Work and shall bear the resultant losses, including, without limitation, the costs of correcting defective work.

### **3.8 SUPERINTENDENT**

3.8.1 Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site at all times during the performance of the Work. The superintendent and any replacement superintendent shall be subject to the approval of CLIENT. Upon notice from CLIENT's REPRESENTATIVE requesting the replacement of a superintendent who is unsatisfactory to CLIENT, Contractor shall promptly replace such superintendent with a competent superintendent satisfactory to

CLIENT. The superintendent shall have the authority to act on behalf of the contractor and all communications given to and received from superintendent shall be binding on Contractor.

### **3.9 SCHEDULES REQUIRED OF CONTRACTOR**

3.9.1 Contractor shall submit a preliminary contract schedule to CLIENT's REPRESENTATIVE in the form and within the time limit required by the Specifications. The CLIENT's REPRESENTATIVE will review the preliminary contract schedule with the Contractor within the time limit required by the Specifications.

3.9.2 Contractor shall submit a contract schedule to CLIENT's REPRESENTATIVE in the form and within the time limits required by the Specifications, which must be acceptable to CLIENT's REPRESENTATIVE. Contractor shall submit updated contract schedules, which must be acceptable to CLIENT's REPRESENTATIVE, within five (5) days following the end of each calendar month during which Work is in progress or at such other frequency as may be provided by the plans and Specifications. Failure to provide the required acceptable schedules may result in CLIENT's withholding of partial payments.

3.9.3 The preliminary contract schedule, the contract schedule, and updated contract schedules shall represent a practical plan to complete the Work within the Contract Time. Extension of any schedule beyond the Contract Time shall not be acceptable. Schedules showing the Work completed in less than the Contract Time may be acceptable if judged by the CLIENT's REPRESENTATIVE to be practical. However, acceptance of such a schedule by the CLIENT's REPRESENTATIVE shall not change the Contract Time. The Contract Time, not the contract schedule, shall control the determination of whether liquidated damages should be assessed against the Contractor because of any delay in the completion of the Project.

If a schedule showing the Work completed in less than the Contract Time is accepted, Contractor shall not be entitled to extensions of the Contract Time for Excusable Delays or Compensable Delays or to adjustments of the Contract Sum for Compensable Delays until such delays extend the completion of the Work beyond the expiration of the Contract Time.

3.9.4 Contractor shall prepare and keep current, to the satisfaction of CLIENT's REPRESENTATIVE, a schedule of submittals, as required by the Specifications, and that is coordinated with the contract schedule.

3.9.5 CLIENT's REPRESENTATIVE's review of the form and general content of the preliminary contract schedule, contract schedule, and updated contract schedules is for the purpose of determining, in its judgment, whether the following requirements are satisfied:

- .1 Schedules must be suitable for monitoring the progress of the Work.
- .2 Schedules must provide necessary data about the timing for CLIENT decisions and CLIENT furnished items.
- .3 Schedules must be in sufficient detail to demonstrate adequate planning for the Work.
- .4 Schedules must represent a practical plan to complete the Work within the Contract Time.

Contractor shall plan, develop, supervise, control, and coordinate the performance of the Work so that its progress and the sequence and timing of Work activities conform to the current accepted contract schedule. Contractor shall continuously obtain from Subcontractors information and data about the planning for and progress of the Work and the delivery of equipment, shall coordinate and integrate such information and data into updated contract schedules, and shall monitor the progress of the Work and the delivery of equipment. Contractor shall act as the expeditor of potential and actual delays, interruptions, hindrances, or disruptions for its own forces and those forces of Subcontractors, regardless of tier. Contractor shall

cooperate with CLIENT's REPRESENTATIVE in the development of the contract schedule and updated contract schedules.

The CLIENT's REPRESENTATIVE's acceptance of or its review comments about any schedule or scheduling data shall not relieve Contractor from its sole responsibility to plan for, perform, and complete the Work within the Contract Time. Acceptance of or review comments about any schedule shall not transfer responsibility for any schedule to CLIENT's REPRESENTATIVE or CLIENT nor imply their agreement with (1) any assumption upon which such schedule is based or (2) any matter underlying or contained in such schedule.

Failure of CLIENT's REPRESENTATIVE to discover errors or omissions in schedules that it has reviewed, or to inform Contractor that Contractor, Subcontractors, or others are behind schedule, or to direct or enforce procedures for complying with the contract schedule shall not relieve Contractor from its sole responsibility to perform and complete the Work within the Contract Time and shall not be a cause for an adjustment of the Contract Time or the Contract Sum.

3.9.6 Contractor shall perform the Work in accordance with the current accepted contract schedule.

### **3.10 DOCUMENTS AND SAMPLES AT PROJECT SITE**

3.10.1 Contractor shall maintain the following at the Project site:

- .1 One record copy of the Contract Documents, in good order and marked to record current changes and selections made during construction.
- .2 The current accepted contract schedule.
- .3 Shop Drawings, Product Data, and Samples.
- .4 All other required submittals.
- .5 A copy of each subcontract requiring Work to be done for the Project.

These shall be available to the CLIENT's REPRESENTATIVE and shall be delivered to CLIENT's REPRESENTATIVE for submittal to CLIENT upon the earlier of Final Completion or termination of the Contract Agreement.

### **3.11 SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES**

3.11.1 Shop Drawings, Product Data, Samples, and similar submittals are not Contract Documents. Their purpose is to demonstrate, for those portions of the Work for which submittals are required, how Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents.

3.11.2 Contractor shall review, approve, and submit to CLIENT's REPRESENTATIVE Shop Drawings, Product Data, Samples, and similar submittals required by the Contract Documents with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of CLIENT or of separate contractors. Submittals made by Contractor which are not required by the Contract Documents may be returned without action by CLIENT's REPRESENTATIVE.

3.11.3 Contractor shall perform no portion of the Work requiring submittal and review of Shop Drawings, Product Data, Samples, or similar submittals until the respective submittal has been reviewed by CLIENT's REPRESENTATIVE and no exceptions have been taken by CLIENT's REPRESENTATIVE. Such Work shall be in accordance with approved submittals and the Contract Documents.

3.11.4 By approving and submitting Shop Drawings, Product Data, Samples, and similar submittals, Contractor represents that it has determined or verified materials and field measurements and conditions related thereto, and that it has checked and coordinated the information contained within such submittals with the requirements of the Contract Documents and Shop Drawings for related Work.

3.11.5 If Contractor discovers any conflicts, omissions, or errors in Shop Drawings or other submittals, Contractor shall notify CLIENT's REPRESENTATIVE and receive instruction before proceeding with the affected Work.

3.11.6 Contractor shall not be relieved of responsibility for deviations from requirements of the Contract Documents by CLIENT's REPRESENTATIVE's review of Shop Drawings, Product Data, Samples, or similar submittals, unless Contractor has specifically informed CLIENT's REPRESENTATIVE in writing of such deviation at the time of submittal and CLIENT's REPRESENTATIVE has given written approval of the specific deviation. Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples, or similar submittals by CLIENT's REPRESENTATIVE's review, acceptance, comment, or approval thereof.

3.11.7 Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples, or similar submittals, to revisions other than those requested by CLIENT's REPRESENTATIVE on previous submittals.

### **3.12 USE OF SITE AND CLEAN UP**

3.12.1 Contractor shall confine operations at the Project site to areas permitted by law, ordinances, permits, and the Contract Documents. Contractor shall not unreasonably encumber the Project site with materials or equipment.

3.12.2 Contractor shall, during performance of the Work, keep the Project site and surrounding area free from the accumulation of excess dirt, waste materials, and rubbish caused by Contractor. Contractor shall remove all excess dirt, waste material, and rubbish caused by the Contractor; tools; equipment; machinery; and surplus materials from the Project site and surrounding area at the completion of the Work.

3.12.3 Personnel of Contractor and Subcontractors shall not occupy, live upon, or otherwise make use of the Project site during any time that Work is not being performed at the Project site, except as otherwise provided in the Contract Documents.

### **3.13 CUTTING AND PATCHING**

3.13.1 Contractor shall do all cutting, fitting, or patching of the Work required to make all parts of the Work come together properly and to allow the Work to receive or be received by Work of separate contractors shown upon, or reasonably implied by, the Contract Documents.

3.13.2 Contractor shall not endanger the Work, the Project, or adjacent property by cutting, digging, or otherwise. Contractor shall not cut or alter the Work of any separate contractor without the prior consent of CLIENT's REPRESENTATIVE.

### **3.14 ACCESS TO WORK**

3.14.1 CLIENT, CLIENT's REPRESENTATIVE, their consultants, and other persons authorized by CLIENT shall at all times have access to the Work wherever it is in preparation or progress. Contractor shall provide safe and proper facilities for such access and for inspection.

### **3.15 ROYALTIES AND PATENTS**

3.15.1 Contractor shall pay all royalties and license fees required for the performance of the Work. Contractor shall defend suits or Claims resulting from Contractor's or any Subcontractor's infringement of patent rights and shall indemnify CLIENT and CLIENT's REPRESENTATIVE from losses on account thereof.

### **3.16 CONCEALED OR UNKNOWN CONDITIONS**

3.16.1 If conditions are encountered by Contractor or any Subcontractor at the Project site which are:

- .1 subsurface,
- .2 otherwise concealed and unusual, or
- .3 unknown and unusual physical conditions, which differ materially from those:
  - .1 indicated in or reasonably inferable from the Contract Documents, or
  - .2 discoverable by a reasonable pre-bid Project site inspection, then Contractor shall give notice to CLIENT's REPRESENTATIVE promptly before such conditions are disturbed and no later than three (3) days after the first observance of such conditions. CLIENT's REPRESENTATIVE will promptly, using reasonable efforts to minimize delay to the progress of the Work, investigate and determine if such conditions meet the criteria specified above. If such criteria are met, CLIENT's REPRESENTATIVE will determine what action shall be taken and to what extent, if any, adjustments should be made to the Contract Sum and the Contract Time. The CLIENT's REPRESENTATIVE will state the reasons for such determination in writing.

### **3.17 REPAIR OF DAMAGED WORK**

3.17.1 Contractor shall promptly repair and replace any Work or materials damaged or destroyed prior to Final Completion. If such damage to or loss of the Work does not arise, in whole or in part, from the acts or omissions of Contractor, any Subcontractor, anyone directly or indirectly employed by either of them, or anyone for whose acts either of them may be liable, the following may occur:

- .1 The Contract Time will be subject to adjustment by change order.
- .2 The Contract Sum will be subject to adjustment by change order, if and to the extent that the actual costs of such repair and replacement exceed the greater of the following:
  - .1 The proceeds of insurance received by Contractor for such loss.
  - .2 The amount of insurance proceeds which would have been obtained under the insurance policies required to be maintained by the Contractor under the Contract Documents.
  - .3 The amount of insurance proceeds that would have been obtained under the insurance policies required to be maintained by Contractor under the Contract Documents, but for the insurers' inability or refusal to honor such policies.

### **3.18 DUTY TO DEFEND**

3.18.1 To the fullest extent permitted by law, the Contractor shall defend CLIENT from and against all suits filed against CLIENT alleging Claims (including costs of attorneys' fees) by reason of liability imposed by law and all Claims, including but not limited to, Claims of personal injury, death, damage to property and loss of use thereof, or any Claims arising out of Contractor's performance of the Contract Agreement, or damages

or other relief based on allegations of the failure of the Contractor or its Subcontractors to properly perform its obligations under the Contract Agreement, or the Contractor's violations of any legal duties, even if the allegations of any such suit are groundless, false or fraudulent, and the Contractor may make such investigation and settlement of any such suit as it deems expedient. This duty to defend is separate and independent from the Contractor's duty to indemnify and hold harmless CLIENT from such Claims. Any failure to fulfill this obligation shall be a default of the Contractor's performance obligations under the Contract Agreement.

### **3.19 DUTY TO INDEMNIFY AND HOLD HARMLESS**

3.19.1 The company which is selected as the Contractor shall, at its own expense, protect, defend, indemnify, save and hold harmless CLIENT and its elected and appointed officers, employees, servants, volunteers, and agents from any and all claims, damages, lawsuits, costs and expenses including, but not limited to, all costs from administrative proceedings, court costs and attorney fees that CLIENT and its elected and appointed officers, employees, servants, volunteers, and agents may incur as a result of the acts, omissions or negligence of the Contractor or its employees, servants, agents or subcontractors that may arise out of the agreement or the performance or lack of performance of those obligations on the part of the Contractor to be performed under the agreement.

The Contractor's indemnification responsibility under this section shall include the sum of damages, costs, and expenses that are in excess of the sum of damages, costs, and expenses which are paid out on behalf of or reimbursed to CLIENT, its officers, employees, servants, volunteers, and/or agents by the insurance coverage obtained and/or maintained by the Contractor.

**ARTICLE 4**  
**ADMINISTRATION OF THE CONTRACT**

**4.1 ADMINISTRATION OF THE CONTRACT BY CLIENT'S REPRESENTATIVE**

4.1.1 CLIENT's REPRESENTATIVE will provide administration of the Contract Documents in the manner provided therein and will be the representative of CLIENT as follows:

- .1 During construction.
- .2 Until final payment is due.
- .3 At the CLIENT's request from time to time during the guarantee to repair period described in Section 12.2.

CLIENT's REPRESENTATIVE will have the authority to act on behalf of the CLIENT only to the extent provided in the Contract Documents. The approval by any architect or designer providing design services for CLIENT of any modification to the Drawings or Specifications and/or any time extension is not effective unless and until incorporated into a change order approved by CLIENT's REPRESENTATIVE.

4.1.2 CLIENT's REPRESENTATIVE will visit the Project site at intervals appropriate to the stages of construction to become familiar with the progress and quality of the completed Work and to determine if the Work is being performed in accordance with the Contract Documents. However, no actions taken during such Project site visit by CLIENT's REPRESENTATIVE shall relieve Contractor of its obligations as described in the Contract Documents.

4.1.3 CLIENT's REPRESENTATIVE will not have control over, will not be in charge of, and will not be responsible for construction means, methods, techniques, sequences, or procedures, or for safety precautions and programs in connection with the Work, since these are solely Contractor's responsibility, unless otherwise required by the Contract Documents.

4.1.4 Except as otherwise provided in the Contract Documents or when direct communications have been specifically authorized, CLIENT and Contractor shall communicate through CLIENT's REPRESENTATIVE. Communications by Contractor with CLIENT's consultants shall be through CLIENT's REPRESENTATIVE. Communications by CLIENT and CLIENT's REPRESENTATIVE with Subcontractors shall be through Contractor. Communications by Contractor and Subcontractors with separate contractors shall be through CLIENT's REPRESENTATIVE. The Contractor shall not rely on oral or other non-written communications.

4.1.5 Based on CLIENT's REPRESENTATIVE's Project site visits and evaluations of Contractor's partial payment requests, CLIENT's REPRESENTATIVE will review and certify the amounts, if any, due Contractor and will issue certificates for payment in such amounts.

4.1.6 The CLIENT's REPRESENTATIVE will have the authority to reject the Work, or any portion thereof, which does not conform to the Contract Documents. The CLIENT's REPRESENTATIVE shall have the authority to stop the Work or any portion thereof. Whenever CLIENT's REPRESENTATIVE considers it necessary or advisable for implementation of the intent of the Contract Documents, CLIENT's REPRESENTATIVE will have the authority to require additional inspection or testing of the Work in accordance with the Contract Documents, whether or not such Work is fabricated, installed, or completed. However, no authority of CLIENT's REPRESENTATIVE conferred by the Contract Documents, nor any decision made in good faith either to exercise or not exercise such authority, shall give rise to a duty or responsibility of CLIENT's REPRESENTATIVE to Contractor, Subcontractors, directors, officers, agents, or employees of Contractor or Subcontractors, any other person or firm performing portions of the Work, or third parties.

4.1.7 CLIENT's REPRESENTATIVE will prepare change orders, field orders, and letters of instruction.

4.1.8 CLIENT's REPRESENTATIVE will conduct inspections in connection with Beneficial Occupancy, as described in Section 9.6, and to determine the dates of substantial completion and Final Completion; will receive and forward to CLIENT, for CLIENT's review, any records, written warranties, and related documents required by the Contract Documents and assembled by Contractor; and will issue a final certificate for payment upon Contractor's compliance with the requirements of the Contract Documents.

4.1.9 CLIENT's REPRESENTATIVE shall be, in the first instance, the interpreter of the requirements of the Contract Documents and the judge of performance thereunder by Contractor. Should Contractor discover any conflicts, omissions, or errors in the Contract Documents; have any questions about the interpretation or clarification of the Contract Documents; question whether Work is within the scope of the Contract Documents; or question that Work required is not sufficiently detailed or explained, then, before proceeding with the Work affected, Contractor shall notify CLIENT's REPRESENTATIVE in writing and request interpretation, clarification, or furnishing of additional detailed instructions. CLIENT's REPRESENTATIVE's response to questions and requests for interpretations, clarifications, instructions, or decisions will be made with reasonable promptness. Should Contractor proceed with the Work affected before receipt of a response from CLIENT's REPRESENTATIVE, any portion of the Work which is not done in accordance with CLIENT's REPRESENTATIVE's interpretations, clarifications, instructions, or decisions shall be removed or replaced, and Contractor shall be responsible for all resultant losses.

## **4.2 CLAIMS**

4.2.1 The term "Claim" means a written demand or assertion by Contractor seeking, as a matter of right, adjustment or interpretation of the terms of the Contract Documents, payment of money, extension of time, or other relief with respect to the Contract Documents, or determination of other disputes or matters in question between CLIENT and Contractor arising out of or related to the Contract Documents or the performance of the Work, including Claims alleging an error or omission by CLIENT's REPRESENTATIVE. However, the term "Claim" shall not include, and the claims procedures provided under this Article 4 shall not apply to the following:

- .1 Claims respecting penalties for forfeitures prescribed by statute or regulation which a government agency is specifically authorized to administer, settle, or determine.
- .2 Claims respecting personal injury, death, reimbursement, or other compensation arising out of or resulting from liability for personal injury or death.
- .3 Claims respecting a latent defect, breach of warranty, or guarantee to repair. .4  
Claims respecting stop notices.

4.2.2 A Claim must be stated with specific CLIENT, including identification of the event giving rise to the Claim, the date of the event, and the asserted effect on the Contract Sum and the Contract Time. The Claim shall include adequate supporting data. Adequate supporting data for a Claim for an adjustment of the Contract Time shall include scheduling data demonstrating the impact of the event on completion of the Work. Adequate supporting data for a Claim for an adjustment of the Contract Sum shall include a detailed cost breakdown of items allowed under Section 7.2. If the exact amount of a Claim is not ascertainable at the time such Claim is made, such supporting data as are then available shall be submitted. Supplemental data supporting the exact amount of the Claim shall be submitted as soon as available.

4.2.3 Submission of a Claim, and all supporting data, correspondence, and documentation relating thereto, shall be made in accordance with Section 14.8.

4.2.4 Contractor shall provide written notice to CLIENT's REPRESENTATIVE of a potential Claim for additional time or compensation as soon as possible and before proceeding to execute the Work or portions of the Work giving rise to any such Claim. The written notice of potential Claim shall set forth the reasons the Contractor believes additional compensation or time may be due, the nature of the costs involved, and, insofar as possible, the amount of the potential Claim. Thereafter, Contractor shall submit a more detailed Claim in the manner required by Section 4.3. Contractor hereby expressly waives any Claims of which Contractor was aware, whether or not the exact amounts of such Claims were ascertainable, that are not submitted to CLIENT's REPRESENTATIVE prior to Contractor proceeding to execute the Work or portions of the Work giving rise to such Claims.

### **4.3 ASSERTION OF CLAIMS**

4.3.1 SUBMISSION TO CLIENT's REPRESENTATIVE. All Claims shall be first submitted to CLIENT's REPRESENTATIVE within the time limits provided in Paragraphs 4.2.4 and 4.3.3. Such submission to CLIENT's REPRESENTATIVE shall be a condition precedent to submission of such Claim to mediation or arbitration.

4.3.2 CONTINUING CONTRACT PERFORMANCE. Notwithstanding the making of any Claim or the existence of any dispute regarding any Claim, unless otherwise directed by CLIENT's REPRESENTATIVE, Contractor shall not cause any delay, cessation, or termination in or of Contractor's performance of the Work, but shall diligently proceed with performance of the Work in accordance with the Contract Documents. CLIENT will continue to make payments in accordance with the Contract Documents.

4.3.3 TIME LIMIT ON CLAIMS. Contractor shall submit documentation in support of a Claim, together with adequate supporting data, to CLIENT's REPRESENTATIVE as soon as possible but not later than fourteen (14) days after the occurrence of the event giving rise to the Claim or the date Contractor first recognized, or reasonably should have recognized, the condition giving rise to the Claim, whichever is later. Contractor hereby expressly waives all Claims not made within the aforesaid time limits.

### **4.4 DECISION ON CLAIMS**

4.4.1 CLIENT's REPRESENTATIVE shall promptly review Claims. If CLIENT's REPRESENTATIVE reasonably determines that additional supporting data are necessary, CLIENT's REPRESENTATIVE shall request such additional data within fourteen (14) days after receipt of the Claim. Such data shall be furnished no later than ten (10) days after such request. CLIENT's REPRESENTATIVE shall render a decision promptly, but, in any event, within forty-five (45) days after the later of the receipt of the Claim or the receipt of such additional supporting data; provided that, if the amount of the Claim is in excess of \$50,000, the aforesaid forty-five (45) day period shall be sixty (60) days. Failure of CLIENT's REPRESENTATIVE to render a decision within the aforesaid forty-five (45) or sixty (60) day period shall be deemed a decision denying the Claim and the last day of such period shall be the date of such decision. The decision of CLIENT's REPRESENTATIVE shall be final and binding, subject, however, to arbitration as provided in Paragraph 4.4.2.

4.4.2 If either Contractor or CLIENT disputes CLIENT's REPRESENTATIVE's decision on a Claim, such party (the "Disputing Party") may initiate arbitration not later than one hundred eighty (180) days after the date of service in person or by mail on the Disputing Party of the final written decision of CLIENT's REPRESENTATIVE or, if no written decision has been issued, within two hundred forty (240) days after acceptance of the Work.

4.4.3 If a demand for arbitration is not filed by either party within one hundred eighty (180) days after the written decision of CLIENT's REPRESENTATIVE, that decision shall be final and binding, both parties shall have waived the right to arbitrate, and there shall not be any right to arbitrate or litigate such waiver or any other dispute arising out of the Contract Documents.

#### **4.5 ARBITRATION**

4.5.1 All Claims, disputes, and other matters in question between the parties arising out of or relating to the Contract Documents shall be decided by arbitration in accordance with the provisions of Public Contract Code Sections 10240-10240.13 and 22201 and the rules of the Office of Administrative Hearings. The Contractor's surety may be made a party to the arbitration proceeding and the arbitration decision shall be binding upon the Contractor's surety. The arbitration decision shall be decided under and in accordance with the laws of the State of California, supported by substantial evidence and, in writing, contain the basis for the decision, findings of fact, and conclusions of law.

4.5.2 An Arbitration is commenced by filing with the Office of Administrative Hearings in Sacramento a verified Complaint in Arbitration within one hundred eighty (180) days from receipt of the decision, or, if no written decision has been issued, within two hundred forty (240) days after acceptance of the Work. The Petitioner shall serve copies of the complaint on the Respondent and any other named party.

4.5.3 Unless otherwise agreed in writing, the Contractor shall carry on the Work and maintain its progress during any arbitration proceeding.

4.5.4 Contractor shall include appropriate language requiring arbitration of all disputes as required by this Article 4 in all subcontracts and agreements of all kinds to which it is a party and which relate to any aspect of the Work so that all Subcontractors and material suppliers are subject to and bound by arbitration as set forth in this Article.

4.5.5 The provisions for arbitration and mediation provided in these General Conditions are in lieu of those contained in Article 1.5, Section 20104, of the Public Contract Code, which provisions are not binding upon CLIENT, which is a charter CLIENT governed by the California Constitution, Article XI, Section 5.

#### **4.6 MEDIATION**

4.6.1 If the parties to a dispute agree in writing, any Claim appealed from the decision of CLIENT's REPRESENTATIVE may be submitted to mediation in accordance with the Construction Industry Mediation Rules of the American Arbitration Association ("AAA") then in effect.

## **ARTICLE 5**

### **SUBCONTRACTORS**

#### **5.1 AWARD OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK**

5.1.1 Unless otherwise stated in the Contract Documents, Contractor shall submit in writing, prior to entering into subcontract agreements, the names and addresses of all Subcontractors proposed for the Work that were not previously listed in Contractor's bid. Any Subcontractor may be disqualified if the CLIENT or CLIENT's REPRESENTATIVE determines that such Subcontractor fails to meet the requirements of the Contract Documents or for any other reason.

5.1.2 In accordance with the Subletting and Subcontracting Fair Practices Act, nothing herein shall be deemed to entitle Contractor, without the approval of CLIENT, to substitute other Subcontractors for those named in Contractor's list of Subcontractors and list of changes in Subcontractors due to alternates contained in the completed bid form; and, except with such approval, no such substitution shall be made.

5.1.3 Except as hereinafter provided, any increase in the cost of the Work resulting from the replacement or substitution of a Subcontractor, as required by CLIENT or CLIENT's REPRESENTATIVE pursuant to Paragraph 5.1.1, shall be borne solely by Contractor and Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time on account of such replacement or substitution. However, if a replacement or substitution of any Subcontractor is made as a result of the request of CLIENT or CLIENT's REPRESENTATIVE for any reason other than failure of such Subcontractor to meet the requirements of the Contract Documents, the Contract Sum may be subject to adjustment of an amount equal to the increase or decrease in the original subcontract amount. In such cases and at the request of CLIENT, the replacement Subcontractor shall be selected through a competitive bidding process acceptable to CLIENT.

#### **5.2 SUBCONTRACTUAL RELATIONS**

5.2.1 All subcontracts shall be in writing and shall require the Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to Contractor by the terms of the Contract Documents, to assume toward Contractor all the obligations and responsibilities which Contractor assumes towards CLIENT by the Contract Documents, and to perform such portion of the Work in accordance with the Contract Documents. Each such subcontract shall preserve and protect the rights of CLIENT under the Contract Documents, with respect to the Work to be performed by Subcontractor, so that subcontracting thereof will not prejudice such rights. Contractor shall cause each such subcontract to expressly include the following requirements:

- .1 Subcontractor waives all rights that Subcontractor may have against CLIENT for damages caused by fire or other perils covered by builder's risk property insurance carried by Contractor or CLIENT, except for such rights Subcontractor may have to the proceeds of such insurance held by CLIENT under Article 11.
- .2 CLIENT and entities and agencies designated by CLIENT shall have access to and the right to audit and copy at CLIENT's cost all of Subcontractor's books, records, contracts, correspondence, instructions, drawings, receipts, vouchers, purchase orders, and memoranda relating to the Work. Subcontractor shall preserve all such records and other items for a period of at least three (3) years after Final Completion.
- .3 Subcontractor recognizes the rights of CLIENT under Section 5.3, Contingent Assignment of Subcontracts, and agrees, upon notice from CLIENT that CLIENT has elected to accept said assignment and to retain Subcontractor pursuant to the terms of the subcontract, to

complete the unperformed obligations under the subcontract and, if requested by CLIENT, to execute a written agreement confirming that Subcontractor is bound to CLIENT under the terms of the subcontract.

5.2.2 Nothing contained in the Contract Documents shall create any contractual relationship between any Subcontractor and CLIENT, except when, and only to the extent that, CLIENT elects to accept the assignment of the subcontract with such Subcontractor pursuant to Section 5.3, Contingent Assignment of Subcontracts.

5.2.3 No Subcontractors shall commence to Work at the Project unless and until their subcontract is available for inspection at the Contractor's office at the Project site. Upon request of CLIENT's REPRESENTATIVE, any or all subcontracts shall be produced for inspection. Any failure to produce a requested subcontract for inspection by the CLIENT's REPRESENTATIVE will be cause for CLIENT to withhold partial payments.

### **5.3 CONTINGENT ASSIGNMENT OF SUBCONTRACTS**

5.3.1 Contractor hereby assigns to CLIENT all its interest in subcontracts now or hereafter entered into by Contractor for performance of any part of the Work. The assignment will be effective upon acceptance by CLIENT in writing and only as to those subcontracts which CLIENT designates in writing. CLIENT may accept said assignment at any time during the course of the Work and prior to Final Completion in the event of a suspension or termination of Contractor's rights under the Contract Documents. Such assignment is part of the consideration to CLIENT for entering into the Contract Agreement with Contractor and may not be withdrawn prior to Final Completion.

## **ARTICLE 6**

### **SITE INVESTIGATION AND CONDITIONS**

#### **6.1 SITE INFORMATION PROVIDED BY CLIENT**

6.1.1 The CLIENT has made available to the Contractor, prior to the receipt of bids, all information of which CLIENT is aware as to surface and subsurface conditions in the vicinity of the Project site, including any topographical maps, reports of investigation of soil or subsurface conditions and logs of test borings, written opinions of technical advisers, and other information. All such information was obtained by CLIENT to assist the Project consultants and provide geotechnical data for site preparation, grading and design of foundations.

6.1.2 The information which CLIENT has made available is not part of the Contract Documents and was made available solely for the convenience of the Contractor. It is expressly understood and agreed that the CLIENT assumes no responsibility whatsoever in respect to the sufficiency or accuracy of any investigation CLIENT has made, the records thereof, or of the interpretations set forth therein, and there is no warranty or guaranty, express or implied, that the conditions indicated by such investigations or records are representative of those existing throughout the Project site or any part thereof, or that unanticipated developments may not occur, or that materials other than, or in proportions different from those indicated, may not be encountered.

#### **6.2 CONTRACTOR'S DUTY TO INSPECT SITE**

6.2.1 The availability to the Contractor of CLIENT's information shall not be construed as a waiver of the Contractor's duty to examine the Project site. The Contractor represents that prior to submitting a bid, the Contractor visited the Project site and made such independent investigations and examinations deemed necessary to determine the existing conditions, nature of materials to be encountered and other facts concerning or affecting the Work to be performed under the Contract Documents.

#### **6.3 RISK OF UNANTICIPATED SOIL OR SUBSURFACE CONDITIONS**

6.3.1 The information which CLIENT has made available to Contractor will not relieve the Contractor from the risk of unanticipated soil or subsurface conditions or other physical conditions which were discoverable by a reasonable pre-bid inspection of the project site or from properly fulfilling the terms of the Contract Documents at the Contract Sum.

## **ARTICLE 7**

### **CHANGES IN THE WORK**

#### **7.1 CHANGES**

7.1.1 CLIENT may, from time to time, order additions, deletions, and other changes in the Work. Changes in the Work may be affected by a change order or field order without invalidating the Contract Agreement and without notice to sureties.

7.1.2 Contractor shall proceed promptly with any changes in the Work, unless otherwise provided in the relevant change order, field order, or letter of instruction.

7.1.3 An adjustment of the Contract Time shall not be made unless the change described in the change order affects Work that is on the critical path of the Contract Schedule or otherwise affects critical Work activities.

#### **7.2 CHANGE ORDERS**

7.2.1 A change order is a written instrument prepared by CLIENT's REPRESENTATIVE, which provides for the following:

- .1 A change in the Work, if any.
- .2 An adjustment of the Contract Sum, if any.
- .3 An adjustment of the Contract Time, if any.

Change orders cannot be authorized by CLIENT's project architect or by anyone other than the CLIENT's REPRESENTATIVE, unless specifically authorized by the plans and specifications.

7.2.2 If requested, Contractor shall promptly provide CLIENT's REPRESENTATIVE with a formal change order proposal and by this reference incorporated herein, setting forth Contractor's proposed adjustments of the Contract Sum and the Contract Time, if any, for performing the change in the Work. Adjustments of the Contract Sum shall be determined using the methods described in this Section 7.2.

7.2.3 When Work is omitted by change order, the adjustment to the Contract Sum shall be computed on the basis of one or more of the following:

- .1 Unit prices stated in the Contract Documents or agreed upon by CLIENT's REPRESENTATIVE and Contractor.
- .2 A lump sum agreed upon by the CLIENT's REPRESENTATIVE and Contractor, based upon the estimated costs of the omitted portions of the Work, with no Contractor fee.
- .3 As determined by CLIENT's REPRESENTATIVE, if CLIENT and Contractor cannot agree upon one or both of the methods described above, which determination shall be in accordance with the methods described in Paragraphs 7.2.4 to 7.2.12.

7.2.4 EXTRA WORK PERFORMED BY CONTRACTOR. The Contractor will be paid the direct costs for labor, materials and equipment used in performing extra work approved by CLIENT's REPRESENTATIVE. There will be added a markup for overhead and profit of fifteen percent (15%) to the cost of labor, seven percent (7%) to the cost of materials, and five percent (5%) to the equipment rental. These markups shall constitute full compensation for all profit and overhead costs, regardless of whether the work was performed by Contractor or a Subcontractor, and shall be deemed to include all items of expense not specifically designated as cost or equipment rental.

7.2.5 LABOR. Contractor will be paid the cost of labor for the workers (including supervisors when authorized by the CLIENT's REPRESENTATIVE), used in the actual and direct performance of the work. The cost of labor, whether the employer is the Contractor, Subcontractor, or other forces, will be the sum of the following:

- .1 Actual Wages. The actual wages paid shall include any employer payments to or on behalf of the workers for health and welfare, pension, vacation, and similar purposes.
- .2 Labor Surcharge. To the actual wages, as defined in Subparagraph 7.2.5.1, will be added a labor surcharge set forth in the California Department of Transportation publication entitled Labor Surcharge and Equipment Rental Rates, which is in effect on the date upon which the work is accomplished. The labor surcharge shall constitute full compensation for all payments imposed by State and Federal laws and for all other payments made to or on behalf of the workers, other than actual wages as defined in Subparagraph 7.2.5.1 and subsistence and travel allowance as specified in Subparagraph 7.2.5.3.
- .3 Subsistence and Travel Allowance. The actual subsistence and travel allowance paid to the workers.

7.2.6 MATERIALS. The CLIENT reserves the right to furnish any materials it deems advisable, and the Contractor shall have no claims for costs and markup on these materials.

Only materials furnished by the Contractor and necessarily used in the performance of the work will be paid for. The cost of those materials will be the cost to the purchaser, whether Contractor, Subcontractor or from the supplier thereof, except as the following are applicable:

- .1 If a cash or trade discount by the actual supplier is offered or available to the purchaser, it shall be credited to the CLIENT notwithstanding the fact that the discount may not have been taken.
- .2 If materials are procured by the purchaser by any method which is not a direct purchase from and a direct billing by the actual supplier to the purchaser, the cost of those materials shall be deemed to be the price paid to the actual supplier as determined by the CLIENT's REPRESENTATIVE plus the actual costs, if any, incurred in the handling of the materials.
- .3 If the materials are obtained from a supply or source owned wholly or in part by the purchaser, the cost of those materials shall not exceed the price paid by the purchaser for similar materials furnished from that source on contract items or the current wholesale price for those materials delivered to the job site, whichever price is lower.
- .4 If the cost of the materials is, in the opinion of the CLIENT's REPRESENTATIVE excessive, then the cost of the material shall be deemed to be the lowest current wholesale price at which the materials were available in the quantities concerned delivered to the job site less any discounts as provided in Subparagraph 7.2.6.1.
- .5 If the Contractor does not furnish satisfactory evidence of the cost of the materials from the actual supplier thereof within sixty (60) days after the date of delivery of the material or within fifteen (15) days after acceptance of the Work, whichever occurs first, the CLIENT reserves the right to establish the cost of the materials at the lowest current wholesale prices at which the materials were available in the quantities concerned delivered to the location of the work, less any discounts as provided in Subparagraph 7.2.6.1.

7.2.7 EQUIPMENT RENTAL. The Contractor will be paid for the use of equipment at the rental rates listed for that equipment in the California Department of Transportation publication entitled Labor Surcharge and Equipment Rental Rates, which is in effect on the date upon which the work is accomplished and which is a

part of the Contract Documents, regardless of ownership and any rental or other agreement, if they may exist, for the use of that equipment entered into by the Contractor, except that for those pieces of equipment with a rental rate of \$10.00 per hour or less as listed in the Labor Surcharge and Equipment Rental Rates publication and which are rented from a local equipment agency, other than Contractor owned, the Contractor will be paid at the hourly rate shown on the rental agency invoice or agreement for the time used on the work as provided in Paragraph 7.2.8 "Equipment on the Work." If a minimum equipment rental amount is required by the local equipment rental agency, the actual amount charged will be paid to the Contractor.

If it is deemed necessary by CLIENT'S REPRESENTATIVE to use equipment not listed in the Labor Surcharge and Equipment Rental Rates publication, a suitable rental rate for that equipment will be established by the CLIENT'S REPRESENTATIVE. The Contractor may furnish any cost data which might assist the CLIENT'S REPRESENTATIVE in the establishment of the rental rate. If the rental rate established by the CLIENT'S REPRESENTATIVE is \$10.00 per hour or less, the provisions above concerning rental of equipment from a local equipment agency shall apply. The rental rates paid as above-provided shall include the cost of fuel, oil, lubrication, supplies, small tools, necessary attachments, repairs and maintenance of any kind, depreciation, storage, insurance, and all incidentals.

Operators of rented equipment will be paid for as provided in Paragraph 7.2.5 "Labor."

All equipment shall, in the opinion of the CLIENT'S REPRESENTATIVE, be in good working condition and suitable for the purpose for which the equipment is to be used. Unless otherwise specified, manufacturer's ratings and manufacturer approved modifications shall be used to classify equipment for the determination of applicable rental rates. Equipment which has no direct power unit shall be powered by a unit of at least the minimum rating recommended by the manufacturer.

Individual pieces of equipment or tools not listed in the Labor Surcharge and Equipment Rental Rate publication and having a replacement value of \$500 or less, whether or not consumed by use, shall be considered to be small tools and no payment will be made therefor.

Rental time will not be allowed while equipment is inoperative due to breakdowns.

**7.2.8 EQUIPMENT ON THE WORK.** The rental time to be paid for equipment on the work shall be the time the equipment is in operation on the extra work being performed and, in addition, shall include the time required to move the equipment to the location of the extra work and return it to the original location or to another location requiring no more time than that required to return it to its original location, except that moving time will not be paid for if the equipment is used at the site of the extra work on other than the extra work. Loading and transporting costs will be allowed, in lieu of moving time, when the equipment is moved by means other than its own power, except that no payment will be made if the equipment is used at the site of the extra work on other than the extra work.

The following shall be used in computing the rental time of equipment on the work:

- .1 When hourly rates are listed, less than thirty (30) minutes of operation shall be considered to be 0.5-hour of operation.
- .2 When daily rates are listed, less than four (4) hours of operation shall be considered to be 0.5-day of operation.

7.2.9 EQUIPMENT NOT ON THE WORK. For the use of equipment moved in on the work and used exclusively for extra work paid, the Contractor will be paid the rental rates listed in the California Department of Transportation publication entitled Labor Surcharge and Equipment Rental Rates, which is in effect on the date upon which the work is accomplished, or determined as provided in Paragraph 7.2.7 and for the cost of transporting the equipment to the location of the work and its return to its original location, all in accordance with the following provisions:

- .1 The original location of the equipment to be hauled to the location of the work shall be agreed to by the CLIENT'S REPRESENTATIVE in advance.
- .2 The CLIENT will pay the costs of loading and unloading the equipment.
- .3 The cost of transporting equipment in low bed trailers shall not exceed the hourly rates charged by established haulers.
- .4 The cost of transporting equipment shall not exceed the applicable minimum established rates of the Public Utilities Commission.
- .5 The rental period shall begin at the time the equipment is unloaded at the site of the extra work, shall include each day that the equipment is at the site of the extra work, excluding Saturdays, Sundays, and legal holidays unless the equipment is used to perform the extra work on those days, and shall terminate at the end of the day on which the CLIENT'S REPRESENTATIVE directs the Contractor to discontinue the use of the equipment.  
The rental time to be paid per day will be in accordance with the following:

Hours Equipment is in Operation	Hours to be paid
0	4
0.5.	4.25
1	4.5
1.5.	4.75
2	5
2.5	5.25
3	5.5
3.5	5.75
4	6
4.5	6.25
5	6.5
5.5	6.75
6	7
6.5	7.25

7	7.5
7.5	7.75
8	8
Over 8	hours in operation

The hours to be paid for equipment which is operated less than eight (8) hours due to breakdowns shall not exceed eight (8) less the number of hours the equipment is inoperative due to breakdowns.

When hourly rates are listed, less than thirty (30) minutes of operation shall be considered to be 0.5-hour of operation.

When daily rates are listed, payment for 0.5-day will be made if the equipment is not used. If the equipment is used, payment will be made for one (1) day.

The minimum rental time to be paid for the entire rental period on an hourly basis shall not be less than eight (8) hours or, if on a daily basis, shall not be less than one (1) day.

- .6 Should the Contractor desire the return of the equipment to a location other than its original location, the CLIENT will pay the cost of transportation in accordance with the above provisions, provided the payment shall not exceed the cost of moving the equipment to the work.
- .7 Payment for transporting, and loading and unloading equipment, as above provided, will not be made if the equipment is used on the work in any other way than upon extra work paid for.

When extra work, other than work specifically designated as extra work in the plans and specifications, is to be paid and the CLIENT'S REPRESENTATIVE determines that the extra work requires the Contractor to move on to the work equipment which could not reasonably have been expected to be needed in the performance of the work, the CLIENT'S REPRESENTATIVE may authorize payment for the use of the equipment at equipment rental rates in excess of those listed as applicable for the use of that equipment subject to the following additional conditions:

- .1 The CLIENT'S REPRESENTATIVE shall specifically approve the necessity for the use of particular equipment on that work,
- .2 The Contractor shall establish to the satisfaction of the CLIENT'S REPRESENTATIVE that the equipment cannot be obtained from the Contractor's normal equipment source or sources and those of the Contractor's Subcontractors,
- .3 The Contractor shall establish to the satisfaction of the CLIENT'S REPRESENTATIVE that the proposed equipment rental rate for the equipment from the proposed source is reasonable and appropriate for the expected period of use,
- .4 The CLIENT'S REPRESENTATIVE shall approve the equipment source and the equipment rental rate to be paid by the CLIENT before the Contractor begins work involving the use of that equipment.

**7.2.10 OWNER-OPERATED EQUIPMENT.** When owner-operated equipment is used to perform extra work, the Contractor will be paid for the equipment and operator, as follows:

Payment for the equipment will be made in accordance with the provisions in Paragraph 7.2.7 "Equipment

Rental."

Payment for the cost of labor and subsistence or travel allowance will be made at the rates paid by the Contractor to other workers operating similar equipment already on the project or, in the absence of other workers operating similar equipment, at the rates for that labor established by collective bargaining agreements for the type of workers and location of the work, whether or not the owner-operator is actually covered by an agreement. A labor surcharge will be added to the cost of labor described herein, in accordance with the provisions in Subparagraph 7.2.5.2 "Labor Surcharge."

To the direct cost of equipment rental and labor, computed as provided herein, will be added the markups for equipment rental and labor as provided in Paragraph 7.2.4 "Extra Work Performed by Contractor."

7.2.11 DUMP TRUCK RENTAL. Dump truck rental shall conform to the provisions of Paragraphs 7.2.7 "Equipment Rental," 7.2.8 "Equipment on the Work," and 7.2.9 "Equipment Not on the Work," except as follows:

- .1 Fully maintained and operated rental dump trucks used in the performance of extra work will be paid for at the same hourly rate paid by the Contractor for use of fully maintained and operated rental dump trucks in performing contract item work.
- .2 In the absence of contract item work requiring dump truck rental, the CLIENT'S REPRESENTATIVE will establish an hourly rental rate to be paid. The Contractor shall provide the CLIENT'S REPRESENTATIVE with complete information on the hourly rental rates available for rental of fully maintained and operated dump trucks.
- .3 The provisions in Paragraph 7.2.5 "Labor" shall not apply to operators of rented dump trucks.
- .4 The rental rates listed for dump trucks in the California Department of Transportation publication entitled Labor Surcharge and Equipment Rental Rates shall not apply.
- .5 To the total of the rental costs for fully maintained and operated dump trucks, including labor, there will be added a markup of fifteen percent (15%). No separate markup will be made for labor.
- .6 The provisions of Paragraph 7.2.10 "Owner-Operated Equipment" shall not apply to dump truck rentals.

7.2.12 WORK PERFORMED BY SPECIAL FORCES OR OTHER SPECIAL SERVICES. When the CLIENT's Representative and the Contractor, by agreement, determine that a special service or an item of extra work cannot be performed by the forces of the Contractor or those of any of the Contractor's Subcontractors, that service or extra work item may be performed by a specialist. Invoices for the service or item of extra work on the basis of the current market price thereof may be accepted without a complete itemization of labor, material, and equipment rental costs when it is impracticable and not in accordance with the established practice of the special service industry to provide a complete itemization.

In those instances wherein a Contractor is required to perform extra work necessitating a fabrication or machining process in a fabrication or machine shop facility away from the job site, the charges for that portion of the extra work performed in the facility may, by agreement, be accepted as a specialist billing. To the specialist invoice price, less a credit to the CLIENT for any cash or trade discount offered or available, whether or not the discount may have been taken, will be added fifteen percent (15%) in lieu of the percentages provided in Paragraph 7.2.4 "Extra Work Performed by Contractor."

7.2.13 RECORDS. The Contractor shall maintain records in such a manner as to provide a clear distinction between the direct costs of extra work and the costs of other operations. From the above records, the Contractor shall furnish the CLIENT'S REPRESENTATIVE completed daily extra work reports, either on forms furnished by the CLIENT or on computerized facsimiles of the California Department of Transportation's forms acceptable to the CLIENT'S REPRESENTATIVE, for each day's extra work. The daily extra work reports shall itemize the materials used and shall cover the direct cost of labor and the charges for equipment rental, whether furnished by the Contractor, Subcontractor, or other forces, except for charges described in Paragraph 7.2.12 "Work Performed by Special Forces or Other Special Services." The daily extra work reports shall provide names or identifications and classifications of workers, the hourly rate of pay and hours worked, and also the size, type and identification number of equipment, and hours operated.

Material charges shall be substantiated by valid copies of vendor's invoices. The invoices shall be submitted with the daily extra work reports or, if not available, they shall be submitted with subsequent daily extra work reports. Should the vendor's invoices not be submitted within sixty (60) days after the date of delivery of the material or within fifteen (15) days after completion of the extra work, whichever occurs first, the CLIENT reserves the right to establish the cost of the materials at the lowest current wholesale prices at which those materials were available in the quantities concerned, delivered to the location of work, less any discounts as provided in Subparagraph 7.2.6.1.

Daily extra work reports shall be signed by the Contractor or the Contractor's authorized representative.

The CLIENT'S REPRESENTATIVE will compare his or her records with the completed daily extra work reports furnished by the Contractor and make any necessary adjustments. When these daily extra work reports are agreed upon and signed by both parties, the reports shall become the basis of payment for the work performed, but shall not preclude subsequent adjustment based on a later audit by the CLIENT.

The Contractor's cost records pertaining to extra work shall be open to inspection or audit by representatives of the CLIENT during the life of the Contract Agreement and for a period of not less than four (4) years after the date of the notice of completion or cessation of labor therefor, and the Contractor shall retain those records for that period. Where payment for materials or labor is based on the cost thereof to forces other than the Contractor, the Contractor shall make every reasonable effort to ensure that the cost records of those other forces will be open to inspection and audit by representatives of the CLIENT on the same terms and conditions as the cost records of the Contractor. If an audit is to be commenced more than sixty (60) days after the acceptance date of the notice of completion or cessation of labor, the Contractor will be given a reasonable notice of the time when the audit is to begin.

7.2.14 PAYMENT. Payment as provided in Paragraphs 7.2.4 "Extra Work Performed by Contractor" and 7.2.12 "Work Performed by Special Forces or Other Special Services" shall constitute full compensation to the Contractor for performance of extra work and no additional compensation will be allowed therefor. The payment will be made in accordance with the provisions in Section 9.2 "Partial Payment."

### **7.3 FIELD ORDERS**

7.3.1 A field order describing the scope of the change in the Work and the estimated adjustments of the Contract Sum and the Contract Time may be issued by CLIENT'S REPRESENTATIVE to order a change in the Work before the terms of the change incorporated into a change order. If appropriate, Contractor shall promptly provide CLIENT'S REPRESENTATIVE with a change order proposal, in the form attached hereto marked Exhibit A, setting forth its estimate of the adjustments of the Contract Sum and the Contract Time,

if any, for performing the change in the Work. The field order will be superseded by a change order which shall include the actual adjustments, if any, of the Contract Sum and the Contract Time, as well as the scope of the change in the Work. Only CLIENT'S REPRESENTATIVE has the authority to issue field orders, except when otherwise provided in the plans or Specifications.

7.3.2 If the field order provides for an adjustment of the Contract Sum, the adjustment shall be based upon one of the methods described in Section 7.2.

7.3.3 Upon receipt of a field order, Contractor shall promptly proceed with the change in the Work. Contractor shall advise CLIENT'S REPRESENTATIVE of its agreement or disagreement with the method, if any, provided in the field order for determining the proposed adjustments of the Contract Sum and the Contract Time.

7.3.4 A field order signed by Contractor indicates the agreement of Contractor therewith, including Contractor's agreement to the estimated adjustments of the Contract Sum and the Contract Time and the methods used to determine those adjustments. Such an agreement shall be effective immediately and will be followed with a change order at such time as the actual adjustments are determined.

7.3.5 If the Contractor does not agree to the adjustment of the Contract Sum set forth in a field order, CLIENT'S REPRESENTATIVE shall determine the adjustment of the Contract Sum in accordance with the provisions of Paragraphs 7.2.4.

#### **7.4 LETTERS OF INSTRUCTION**

7.4.1 CLIENT'S REPRESENTATIVE may issue letters of instruction which make interpretations or clarifications of the Contract Documents that do not change the scope of Work or involve an adjustment of the Contract Sum or the Contract Time and that are consistent with the intent of the Contract Documents. Letters of instruction shall be binding upon Contractor. The Contractor shall promptly carry out the requirements of such letters of instruction.

## **ARTICLE 8**

### **CONTRACT TIME**

#### **8.1 COMMENCEMENT OF THE WORK**

8.1.1 The date of commencement of the Work shall be set forth in the notice to proceed. The date of commencement of the Work shall not be postponed by the failure of the Contractor, or of persons or firms for whom Contractor is responsible, to act.

#### **8.2 PROGRESS AND COMPLETION**

8.2.1 By signing the Contract Agreement, Contractor represents to CLIENT that the Contract Time is reasonable for performing the Work and that Contractor is able to perform the Work within the Contract Time.

8.2.2 Contractor shall not, except by agreement or instruction of CLIENT'S REPRESENTATIVE in writing, commence operations on the Project site or elsewhere prior to the effective date of insurance required by Article 11 to be furnished by Contractor. The dates of commencement and completion of the Work shall not be changed by the effective date of such insurance.

8.2.3 Contractor shall proceed expeditiously with adequate forces and shall achieve Final Completion within the Contract Time. If Contractor is not diligently proceeding with the prosecution of the Work as scheduled, Contractor shall, immediately and at no additional cost to CLIENT, take all measures necessary, including working such overtime, additional shifts, Sundays, or holidays, as may be required to correct said delays and to ensure no further delays to the completion of the Work.

#### **8.3 DELAY**

8.3.1 As used herein, the following terms shall have the following meanings:

- .1 "Excusable Delay" means any delay of the completion of the Work beyond the expiration of the Contract Time caused by conditions beyond the control and without the fault or negligence of Contractor such as embargoes, fire, unavoidable casualties, unusual delays in transportation, national emergency, and abnormal stormy and inclement weather conditions in which the Work cannot continue. The financial inability of Contractor or any Subcontractor and any default of any Subcontractor, without limitation, shall not be deemed conditions beyond Contractor's control. An Excusable Delay may entitle Contractor to an extension of the Contract Time, in accordance with Paragraphs 7.1.3 and 8.3.2, but shall not entitle Contractor to any adjustment of the Contract Sum.
- .2 "Compensable Delay" means any delay of the completion of the Work beyond the expiration date of the Contract Time caused by the gross negligence or willful acts of CLIENT or CLIENT'S REPRESENTATIVE, and which delay is unreasonable under the circumstances involved and not within the contemplation of the parties. A Compensable Delay may entitle Contractor to an extension of the Contract Time, in accordance with Paragraph 8.3.2 and subject to Paragraph 7.1.3, and/or an adjustment of the Contract Sum, in accordance with Paragraph 8.3.3. Except as provided herein, Contractor shall have no Claim for damage or compensation for any delay, interruption, hindrance, or disruption.
- .3 "Inexcusable Delay" means any delay of the completion of the Work beyond the expiration of the Contract Time resulting from causes other than those listed in Subparagraphs 8.3.1.1 and 8.3.1.2. An Inexcusable Delay shall not entitle the Contractor to an extension of the Contract Time or an adjustment of the Contract Sum.

### 8.3.2 CLAIMS FOR ADJUSTMENT OF THE CONTRACT TIME FOR DELAYS

Contractor may make a Claim for an extension of the Contract Time, for an Excusable Delay or a Compensable Delay, subject to the following:

- .1 If an Excusable Delay and a Compensable Delay occur concurrently, the maximum extension of the Contract Time shall be the number of days from the commencement of the first delay to the cessation of the delay which ends last.
- .2 If an Inexcusable Delay occurs concurrently with either an Excusable Delay or a Compensable Delay, the maximum extension of the Contract Time shall be the number of days, if any, by which the Excusable Delay or the Compensable Delay exceeds the Inexcusable Delay.
- .3 If an Inexcusable Delay occurs concurrently with both an Excusable Delay and a Compensable Delay, the maximum extension of the Contract Time shall be the number of days, if any, by which the number of days determined pursuant to Subparagraph 8.3.2.1 exceeds the number of days of the Inexcusable Delay.

### 8.3.3 CLAIMS FOR ADJUSTMENT OF THE CONTRACT SUM FOR DELAYS

For a Compensable Delay, Contractor shall only be entitled to an adjustment of the Contract Sum in an amount equal to the sum of the following:

- .1 Actual and unavoidable additional costs of labor, material, and equipment provided by Contractor at the Project site as a result of the Compensable Delay,
- .2 plus actual and unavoidable additional costs incurred by Contractor for labor, material, and equipment provided by Subcontractors as a result of the Compensable Delay,
- .3 plus actual and unavoidable additional wages or salaries and fringe benefits and payroll taxes of supervisory and administrative personnel provided by Contractor and Subcontractors at the Project site as a result of the Compensable Delay,
- .4 plus the amount of the Contractor fee determined by applying the provisions of Paragraph 7.2.4 to the sum of items .1, .2, and .3 above.

To be entitled to an adjustment of the Contract Sum for Compensable Delay, Contractor shall comply with the provisions of Sections 4.2 through 4.5. Except as provided herein, Contractor shall have no Claim for damage or compensation for any delay, interruption, hindrance, or disruption.

8.3.4 The parties agree that CLIENT's exercise of its rights to order changes in the Work, regardless of the extent and number of changes, or to suspend the Work, is within the contemplation of the parties and shall not be the basis for any Claim for Compensable Delay. The rights of Contractor to adjustments of the Contract Time and the Contract Sum, based on changes ordered in the Work or suspension of the Work, shall be solely governed by the provisions of Articles 7 and 13, respectively.

8.3.5 The determination of whether a delay is an Excusable Delay, Compensable Delay, or Inexcusable Delay shall not be affected by the fact that any earlier delay occurred, regardless of fault or causation.

**ARTICLE 9**  
**PAYMENTS AND COMPLETION**

**9.1 COST BREAKDOWN**

9.1.1 Within thirty (30) days after signing the Contract Agreement, but in any event prior to the first partial payment request, Contractor shall submit to CLIENT'S REPRESENTATIVE a cost breakdown of the Contract Sum. The cost breakdown shall itemize as separate line items the cost of each Work activity and all other costs, including warranties, record documents, insurance, bonds, overhead expenses, and the total allowance for profit, the total of which shall equal the Contract Sum. The cost breakdown, when approved by CLIENT, shall become the basis for determining the cost of Work performed for Contractor's partial payment requests.

**9.2 PARTIAL PAYMENT**

9.2.1 CLIENT agrees to pay monthly to Contractor, subject to Paragraph 9.4.2, an amount equal to ninety percent (90%) of the sum of the following:

- .1 Cost of the Work in permanent place as of the end of the preceding month, .2  
plus cost of materials not yet incorporated in the Work, subject to Paragraph 9.3.5,
- .3 less amounts previously paid.

9.2.2 The balance of the Contract Sum shall be paid after Final Completion in accordance with Section 9.7.

**9.3 PARTIAL PAYMENT REQUEST**

9.3.1 On or before the tenth (10th) day of the month or such other date as is established by the Contract Documents, Contractor shall submit to CLIENT'S REPRESENTATIVE an itemized partial payment request for the cost of the Work in permanent place, as approved by CLIENT'S REPRESENTATIVE, which has been completed in accordance with the Contract Documents as of the last day of the preceding month, less amounts previously paid. The partial payment request shall be prepared as follows:

- .1 Use the form acceptable to the CLIENT.
- .2 Itemize in accordance with the cost breakdown.
- .3 Include such data substantiating Contractor's right to payment as CLIENT'S REPRESENTATIVE may reasonably require, such as invoices, certified payrolls, daily time and material records, and, if securities are deposited in lieu of retention pursuant to Section 9.5, a certification of the market value of all such securities as of a date not earlier than five (5) days prior to the date of the partial payment request.
- .4 Itemize retention.

9.3.2 Partial payment requests shall not include requests for payment on account of (1) changes which have not been authorized by change orders or (2) amounts Contractor does not intend to pay a Subcontractor because of a dispute or other reason.

9.3.3 If required by CLIENT, a partial payment request shall be accompanied by (1) a summary showing payments that will be made to Subcontractors covered by such request and (2) unconditional waivers and releases of Claims and stop notices from each Subcontractor listed in the preceding partial payment request covering sums disbursed pursuant to that preceding partial payment request.

9.3.4 Contractor warrants that, upon submittal of a partial payment request, all Work for which partial payment authorizations have been previously issued and payment has been received from CLIENT shall be free and clear of all Claims, stop notices, security interests, and encumbrances in favor of Contractor, Subcontractors, or other persons or firms entitled to make Claims by reason of having provided labor, materials, or equipment relating to the Work.

9.3.5 At the sole discretion of CLIENT, CLIENT'S REPRESENTATIVE may approve for inclusion in the partial payment request the cost of materials not yet incorporated in the Work but already delivered and suitably stored either at the Project site or at some other appropriate location acceptable to CLIENT'S REPRESENTATIVE. In such case, Contractor shall furnish evidence satisfactory to CLIENT'S REPRESENTATIVE (1) of the cost of such materials and (2) that such materials are under the exclusive control of Contractor. Only materials to be incorporated in the Work will be considered for payment. Any payment shall not be construed as acceptance of such materials nor relieve Contractor from sole responsibility for the care and protection of such materials; nor relieve Contractor from the risk of loss to such materials from any cause whatsoever; nor relieve Contractor from its obligation to complete the Work in accordance with the Contract Documents; nor act as a waiver of the right of CLIENT to require fulfillment of all terms of the Contract Agreement.

#### **9.4 PARTIAL PAYMENT AUTHORIZATION**

9.4.1 If Contractor has submitted a partial payment request in accordance with Section 9.3, CLIENT'S REPRESENTATIVE shall, not later than ten (10) working days after the date of receipt of the partial payment request, issue to CLIENT, with a copy to Contractor, a partial payment authorization for such amount as CLIENT'S REPRESENTATIVE determines to be properly due.

9.4.2 Approval of all or any part of a partial payment request may be withheld, a partial payment authorization may be withheld, and all or part of a previous partial payment authorization may be nullified, and that amount withheld from a current partial payment authorization on account of any of the following:

- .1 Defective work not remedied.
- .2 Third-party claims against Contractor or CLIENT arising from the acts or omissions of Contractor or Subcontractors.
- .3 Stop notices.
- .4 Failure of Contractor to make timely payments due Subcontractors for material or labor.
- .5 A reasonable doubt that the Work can be completed for the balance of the Contract Sum then unpaid.
- .6 Damage to CLIENT or a separate contractor for which Contractor is responsible.
- .7 Reasonable evidence that the Work will not be completed within the Contract Time; and that the unpaid balance of the Contract Sum would not be adequate to cover CLIENT's damages for the anticipated delay.
- .8 Failure of Contractor to maintain and update record documents.
- .9 Failure of Contractor to submit schedules or their updates as required by the Contract Documents.
- .10 Performance of Work by Contractor without properly processed Shop Drawings.
- .11 Liquidated damages assessed in accordance with Article 4 of the Contract Agreement.
- .12 Any other failure of Contractor to perform its obligations under the Contract Documents.

9.4.3 Subject to the withholding provisions of Paragraph 9.4.2, CLIENT shall pay Contractor the amount set forth in the partial payment authorization no later than thirty (30) days after the issuance of the partial payment authorization.

9.4.4 Neither a partial payment authorization nor any partial payment made by CLIENT shall constitute acceptance of defective work.

## **9.5 BENEFICIAL OCCUPANCY**

9.5.1 CLIENT reserves the right, at its option and convenience, to occupy or otherwise make use of all or any part of the Work at any time prior to Final Completion upon ten (10) days' notice to Contractor. Such occupancy or use is herein referred to as "Beneficial Occupancy." Beneficial Occupancy shall be subject to the following conditions:

- .1 CLIENT'S REPRESENTATIVE will make an inspection of the portion of the Project to be beneficially occupied and prepare a list of items to be completed or corrected prior to Final Completion. Prior to Beneficial Occupancy, CLIENT will issue a certificate of Beneficial Occupancy on CLIENT's form.
- .2 Beneficial Occupancy by CLIENT shall not be construed by Contractor as an acceptance by CLIENT of that portion of the Work which is to be occupied.
- .3 Beneficial Occupancy by CLIENT shall not constitute a waiver of existing Claims of CLIENT or Contractor against each other.
- .4 The guarantee to repair periods, as defined in Section 12.2, will commence upon the first dates of actual occupancy or use of portions of the Work actually occupied and equipment or systems fully utilized.
- .5 CLIENT shall pay all normal operating and maintenance costs resulting from its use of equipment in areas beneficially occupied.
- .6 CLIENT shall pay all utility costs which arise out of the Beneficial Occupancy.
- .7 Contractor shall not be responsible for providing security in areas beneficially occupied.
- .8 Contractor shall continue to maintain all insurance required by the Contract Documents in full force and effect.

## **9.6 FINAL COMPLETION AND FINAL PAYMENT**

9.6.1 Upon receipt of notice from Contractor that the Work is ready for final inspection, CLIENT'S REPRESENTATIVE will make such inspection. Final Completion shall be when CLIENT'S REPRESENTATIVE determines that the Work is fully completed and in accordance with the Contract Documents. CLIENT will file a notice of completion within thirty (30) days after Final Completion. After receipt of the final payment request, if CLIENT'S REPRESENTATIVE determines that Final Completion has occurred, CLIENT'S REPRESENTATIVE will issue the final authorization for payment.

9.6.2 Neither final payment nor any retention shall become due until Contractor submits the following items to CLIENT'S REPRESENTATIVE:

- .1 The final payment request and all submittals required by Section 9.3 and the Contract Documents.
- .2 If required by CLIENT, conditional releases from Subcontractors entitled to receive any portion of the final payment and unconditional releases from Contractor, such releases to be in a form satisfactory to CLIENT.

- .3 All guarantees and warranties procured by Contractor from Subcontractors, all operating manuals for equipment installed in the Project, record documents, and all other submittals required by the Contract Documents.
- .4 Contractor has furnished to CLIENT written consent from the performance bond and payment bond sureties to such release of retention.

If releases are required, Contractor shall pay or cause to be paid to Subcontractors the amount stated in the conditional releases within five (5) days after receipt of the final payment and shall promptly thereafter furnish evidence of such payment to CLIENT. If CLIENT does not require releases, the final payment shall be made, subject to the satisfaction of all other conditions to final payment, thirty-five (35) days after the filing of the notice of completion.

9.6.3 Acceptance of final payment by Contractor shall constitute a waiver of all Claims, except those previously made in writing and identified by Contractor as unsettled at the time of the final payment request.

## **ARTICLE 10**

### **PROTECTION OF PERSONS AND PROPERTY**

#### **10.1 SAFETY PRECAUTIONS AND PROGRAMS**

10.1.1 Contractor shall be solely responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the performance of the Contract Documents.

#### **10.2 SAFETY OF PERSONS AND PROPERTY**

10.2.1 Contractor shall take adequate precautions for the safety of persons and property and shall provide adequate protection to prevent damage, injury, or loss to the following:

- .1 Employees involved in the Work and other persons who may be affected thereby.
- .2 The Work in place and materials and equipment to be incorporated therein, whether in the storage on or off the Project site, under care, custody, or control of Contractor or Subcontractors.
- .3 Other property at the Project site and adjoining property.

10.2.2 Contractor shall erect and maintain, as required by existing conditions and performance of the Work, adequate safeguards for safety and protection, including providing adequate lighting and ventilation, posting danger signs and other warnings against hazards, promulgating safety regulations, and notifying CLIENT and users of adjacent sites and utilities.

10.2.3 When use or storage of explosives, other hazardous materials, equipment, or unusual methods is necessary for the execution of the Work, Contractor shall exercise the utmost care and carry on such activities only under the supervision of properly qualified personnel.

10.2.4 Contractor shall designate a responsible member of Contractor's organization at the Project site whose duty shall be the prevention of accidents. That person shall be the Contractor's superintendent, unless otherwise designated by Contractor in writing to CLIENT and CLIENT'S REPRESENTATIVE.

10.2.5 Contractor shall not load or permit any part of the Work or the Project site to be loaded so as to endanger the safety of persons or property.

#### **10.3 EMERGENCIES**

10.3.1 In an emergency affecting the safety of persons or property, Contractor shall act to prevent or minimize damage, injury, or loss. Contractor shall promptly notify CLIENT'S REPRESENTATIVE, which notice may be oral followed by written confirmation, of the occurrence of such an emergency and Contractor's action.

**ARTICLE 11**  
**INSURANCE AND BONDS**

**11.1 LIABILITY INSURANCE**

11.1.1 Contractor shall, at its expense, purchase and maintain in full force and effect such insurance as will protect itself and CLIENT, CLIENT's boards and commissions and members thereof, and CLIENT's officers, employees and agents from Claims, such as for bodily injury, death, and property damage, which may arise out of or result from the Work required by the Contract Documents, whether such Work is done by Contractor, by any Subcontractor, by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable.

11.1.2 The following liability policies and coverages shall be furnished by Contractor:

- .1 COMPREHENSIVE OR COMMERCIAL FORM GENERAL LIABILITY INSURANCE in the amount of at least Two Million Dollars (\$2,000,000) single limit for each occurrence, \$4 million for aggregate with a maximum policy deductible of \$500, covering all Work done by or on behalf of Contractor and providing insurance for bodily injury, personal injury, property damage, and contractual liability. Except with respect to bodily injury and property damage included within the products and completed operations hazards, the aggregate limit shall apply separately to Work required of Contractor by these Contract Documents. However, if the insurance under this Subparagraph 11.1.2.1 is written on a claims-made form, coverage shall survive for a period of not less than three (3) years following termination of the Contract Agreement. Coverage shall provide for a retroactive date of placement coinciding with the effective date of the Contract Agreement.
- .2 BUSINESS AUTOMOBILE LIABILITY INSURANCE on an "Occurrence" form in the amount of at least One Million Dollars (\$1,000,000), and covering owned, hired, leased, and non-owned automobiles used by or on behalf of Contractor and providing insurance for bodily injury and property damage.

11.1.3 Contractor's liability insurance as required by Paragraph 11.1.2 shall, by endorsement to the policies, include the following:

- .1 An additional insured provision stating that CLIENT, CLIENT's boards and commissions and members thereof, and CLIENT's officers, employees and agents are covered as insureds with respect to liabilities arising out of work or operations performed by or on behalf of the Contractor, including materials, parts, or equipment furnished in connection with such work or operations, and with respect to liability arising out of automobiles owned, leased, hired, or borrowed by or on behalf of the Contractor. However, coverage shall not extend to indemnity for the active negligence of the additional insureds in any case where an agreement to indemnify the additional insureds would be invalid under Subdivision (b) of Section 2782 of the California Civil Code.
- .2 A severability of interest clause stating that, "The term 'insured' is hereby used severally and not collectively, but the inclusion herein of more than one insured shall not operate to increase the limits of the insurers' liability."

- .3 A cross-liability clause stating that, "In the event of claims being made under any of the coverages of the policies referred to herein by one or more insureds hereunder for which another insured hereunder may be liable, then the policies shall cover such insureds against whom a claim is made or may be made in the same manner as if separate policies had been issued to each insured hereunder. Nothing contained herein, however, shall operate to increase the insurers' limits of liability as set forth in the insuring agreements."
- .4 A provision stating that CLIENT, CLIENT's boards, commissions and members thereof, and CLIENT's officers, employees and agents shall not by reason of their inclusion as insureds incur liability to the insurance carriers for payment of premiums for such insurance.
- .5 A provision stating that the coverage provided by such insurance shall be primary and not in excess of or contributing with respect to any insurance, indemnity coverage afforded by a risk pool, or self-insurance maintained by CLIENT, CLIENT's board, commissions and members thereof, or CLIENT's officers, employees and agents. This provision, however, shall only apply as per the stipulations of Subparagraph 11.1.3.1.
- .6 A provision stating that the coverage provided by such insurance shall not be subject to cancellation or modification without thirty (30) days' prior written notice to CLIENT.

11.1.4 Certificates of insurance evidencing the insurance policies required by this Section 11.1, as well as copies of all endorsements to such policies required by Paragraph 11.1.3, shall be submitted by Contractor to CLIENT prior to commencing Work on the Project. However, acceptance of such certificates of insurance and endorsement by CLIENT shall not in any way limit Contractor's liabilities under the Contract Documents. At the request of the CLIENT, Contractor shall also submit to CLIENT copies of the insurance policies obtained by Contractor.

11.1.5 In the event Contractor does not comply with these insurance requirements, CLIENT may, at its option, provide insurance coverage to protect CLIENT, CLIENT's boards, commissions and members thereof, and CLIENT's officers, employees and agents; and the cost of such insurance shall be paid by Contractor and may be deducted from the Contract Sum.

11.1.6 Contractor shall, by mutual agreement with CLIENT and at CLIENT's cost, furnish any additional liability insurance as may be required by CLIENT. Contractor shall provide certificates of insurance evidencing such additional insurance.

## **11.2 WORKER'S COMPENSATION INSURANCE**

11.2.1 Contractor shall, at its expense, purchase and maintain in full force and effect worker's compensation insurance as required by Federal and State of California law. A certificate of insurance or other documentation acceptable to CLIENT evidencing such insurance coverage shall be provided by Contractor to CLIENT prior to commencing Work on the Project. Contractor shall also require all of its Subcontractors to maintain this insurance coverage.

## **11.3 MISCELLANEOUS INSURANCE PROVISIONS**

11.3.1 Any insured loss is to be adjusted with CLIENT and made payable to CLIENT on behalf of the insureds, as their interests may appear. CLIENT shall have the power to adjust and settle any loss with the insurers unless, within five (5) working days after the loss, one of the parties in interest shall object in writing to CLIENT's exercise of this power; and if such objection be made, the matter shall be subject to resolution as provided in Article 4.

#### **11.4 PERFORMANCE BOND AND PAYMENT BOND**

11.4.1 Contemporaneous with the execution of the Contract Agreement, and before commencement of any Work required by the Contract Documents, Contractor shall provide CLIENT with separate payment and performance bonds, each in a sum at least equal to the Contract Sum. These bonds will be provided on forms acceptable to CLIENT by surety companies licensed and permitted to do business in the State of California and are named in the current list of "Surety Companies Acceptable on Federal Bonds" as published in Circular 570 (amended) by the Audit Staff Bureau of Accounts, U.S. Treasury Department. The surety shall have not less than an "A" minimum rating in the current "Best's Key Rating Guide, Property-Liability."

11.4.2 If the surety on any bond furnished by Contractor is declared bankrupt or becomes insolvent or its right to do business in California terminated, Contractor shall, within five (5) days thereafter, substitute another surety and bond, both of which shall be acceptable to CLIENT.

## ARTICLE 12

### **UNCOVERING AND CORRECTION OF WORK**

#### **12.1 UNCOVERING OF WORK**

12.1.1 All Work shall be inspected by CLIENT'S REPRESENTATIVE before being covered. If any Work is covered before it has been inspected, such Work must, upon written request by CLIENT'S REPRESENTATIVE, be uncovered for CLIENT'S REPRESENTATIVE's observation and be replaced at Contractor's expense without adjustment of the Contract Time or the Contract Sum.

#### **12.2 CORRECTION OF DEFECTIVE WORK AND GUARANTEE TO REPAIR PERIOD**

12.2.1 The term "Guarantee to Repair Period" means a period of one (1) year, unless a longer period of time is specified in the Contract Agreement or Supplementary Conditions, commencing as follows:

- .1 For space beneficially occupied or for separate systems fully utilized prior to Final Completion pursuant to Section 9.6, from the first date of such Beneficial Occupancy or actual use, as established in a certificate of Beneficial Occupancy.
- .2 For all Work other than .1 above, from the date of Final Completion.

12.2.2 Contractor shall (1) correct defective work that becomes apparent during the progress of the Work or during the Guarantee to Repair Period and (2) replace, repair, or restore to CLIENT's satisfaction any other parts of the Work and any other real or personal property which is damaged or destroyed as a result of defective work or the correction of defective work. Contractor shall promptly commence such correction, replacement, repair, or restoration upon notice from CLIENT's REPRESENTATIVE or CLIENT, but in no case later than ten (10) days after receipt of such notice; and Contractor shall diligently and continuously prosecute such correction to completion. Contractor shall bear all costs of such correction, replacement, repair, or restoration, and all losses resulting from such defective work, including additional testing, inspection, and compensation for CLIENT's REPRESENTATIVE's services and expenses. Contractor shall perform corrective work at such times that are acceptable to CLIENT and in such a manner as to avoid, to the extent practicable, disruption to CLIENT's activities.

12.2.3 If immediate correction of defective work is required for life safety or the protection of property and is performed by CLIENT or separate contractors, Contractor shall pay to CLIENT all reasonable costs of correcting such defective work. Contractor shall replace, repair, or restore to CLIENT's satisfaction any other parts of the Work and any other real or personal property which is damaged or destroyed as a result of such defective work or the correction of such defective work.

12.2.4 Contractor shall remove from the Project site portions of the Work and materials which are not in accordance with the Contract Documents and which are neither corrected by Contractor nor accepted by CLIENT.

12.2.5 If Contractor fails to commence correction of defective work within ten (10) days after notice from CLIENT or CLIENT's REPRESENTATIVE or fails to diligently prosecute such correction to completion, CLIENT may correct the defective work in accordance with Section 2.4; and, in addition, CLIENT may remove the defective work and store salvageable materials and equipment at Contractor's expense.

12.2.6 If Contractor fails to pay the costs of such removal and storage as required by Paragraphs 12.2.4 and 12.2.5 within ten (10) days after written demand, CLIENT may, without prejudice to other remedies, sell such materials at auction or at private sale, or otherwise dispose of such material. Contractor shall be entitled to

the proceeds of such sale, if any, in excess of the costs and damages for which Contractor is liable to CLIENT, including reasonable attorneys' fees and expenses and compensation for CLIENT's REPRESENTATIVE's services and expenses. If such proceeds of sale do not cover costs and damages for which Contractor is liable to CLIENT, the Contract Sum shall be reduced by such deficiency. If there are no remaining payments due Contractor or the remaining payments are insufficient to cover such deficiency, Contractor shall promptly pay the difference to CLIENT.

12.2.7 Contractor's obligations under this Article 12 are in addition to and not in limitation of its warranty under Section 3.4 or any other obligation of Contractor under the Contract Documents. Enforcement of Contractor's express warranties and guarantees to repair contained in the Contract Documents shall be in addition to and not in limitation of any other rights or remedies CLIENT may have under the Contract Documents or at law or in equity for defective work. Nothing contained in this Article 12 shall be construed to establish a period of limitation with respect to other obligations of Contractor under the Contract Documents. Establishment of the Guarantee to Repair Period relates only to the specific obligation of Contractor to correct the Work and in no way limits either Contractor's liability for defective work or the time within which proceedings may be commenced to enforce Contractor's obligations under the Contract Documents.

### **12.3 ACCEPTANCE OF DEFECTIVE WORK**

12.3.1 Notwithstanding the provisions of Section 12.2, CLIENT shall have the option, at its sole discretion and by notice to Contractor, to accept defective work instead of requiring its removal or correction, in which case the Contract Sum shall be reduced by an amount equal to the difference between the value to CLIENT such Work would have had were it complete, correct, and in conformity with the Contract Documents and the value to CLIENT of such defective work. Such option shall be exercised solely by notice to Contractor and shall not be implied from any act or omission by CLIENT or CLIENT's REPRESENTATIVE. If there are no remaining payments of the Contract Sum to be made to Contractor or if the remaining payments and retention are insufficient to cover the amount of the reduction of the Contract Sum, Contractor shall promptly pay to CLIENT the amount of any such deficiency.

**ARTICLE 13**  
**STATUTORY REQUIREMENTS**

**13.1 NONDISCRIMINATION**

13.1.1 For purposes of this Section 14.1, the term Subcontractor shall not include suppliers, manufacturers, or distributors.

13.1.2 Contractor shall comply and shall ensure that all Subcontractors comply with the California Fair Employment and Housing Act, as set forth in Section 12900, and the applicable sections that follow, of the California Government Code.

13.1.3 Contractor agrees as follows during the performance of the Work:

- .1 Contractor shall not willfully discriminate against any employee or applicant for employment because of race, color, religion, sex, age, ancestry, national origin, sexual orientation, handicap, veteran's status, medical condition (as defined in Section 12926 of the California Government Code), marital status, or citizenship (within the limits imposed by law or CLIENT's policy). All applicants for employment and employees are to be treated without regard to their race, color, religion, sex, age, ancestry, national origin, sexual orientation, handicap, veteran's status, medical condition (as defined in Section 12926 of the State of California Government Code), marital status, or citizenship (within the limits imposed by law or CLIENT's policy). Such equal treatment shall apply, but not be limited to, 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. Contractor agrees to post in conspicuous places, available to employees and applicants for employment, a notice of equal employment opportunity setting forth the provisions of this Paragraph 14.1.3.
- .2 Contractor and all Subcontractors will permit access to their records of employment, employment advertisements, application forms, and other pertinent data and records by CLIENT or any appropriate agency of the State of California designated by CLIENT for the purposes of investigation to ascertain compliance with this Section 14.1. The outcome of the investigation may result in the following:
  - .1 A finding of willful violation of the provisions of the Contract Agreement or of the Fair Employment and Housing Act may be regarded by CLIENT as (1) a basis for determining that Contractor is not a "responsible bidder" as to future contracts for which such Contractor may submit bids or (2) a basis for refusing to accept or consider the bids of Contractor for future contracts.
  - .2 CLIENT may deem a finding of willful violation of the Fair Employment and Housing Act to have occurred upon receipt of written notice from the Fair Employment Practices Commission that it has (1) investigated and determined that Contractor has violated the Fair Employment and Housing Act and (2) issued an order under the State of California Government Code Section 12970 or obtained an injunction under Government Code Section 12973.
  - .3 Upon receipt of such written notice from the Fair Employment Practices Commission, CLIENT may notify Contractor that, unless it demonstrates to the satisfaction of CLIENT within a stated period that the violation has been corrected, Contractor's bids on future Projects will not be considered.

- .3 Contractor agrees that, should CLIENT determine that Contractor has not complied with this Section 14.1, Contractor shall forfeit to CLIENT, as a penalty, for each day or portion thereof, for each person who was denied employment as a result of such non-compliance, a penalty of Fifty Dollars (\$50.00) per day. Such penalty amounts may be recovered from Contractor; and CLIENT may deduct any such penalty amounts from the Contract Sum.
- .4 Nothing contained in this Section 14.1 shall be construed in any manner so as to prevent CLIENT from pursuing any other remedies that may be available at law.
- .5 Contractor shall meet the following standards for affirmative compliance and provide CLIENT with satisfactory evidence of such compliance upon CLIENT's request, which shall be evaluated in each case by CLIENT:
  - .1 Contractor shall notify its superintendent and other supervisory personnel of the nondiscrimination requirements of the Contract Documents and their responsibilities thereto.
  - .2 Contractor shall notify all sources of employee referrals (including unions, employment agencies, and the State of California Employment Development Department) of the nondiscrimination requirements of the Contract Documents by sending to such sources and by posting the notice of equal employment opportunity.
  - .3 Contractor or its representative shall, through all unions with whom it may have agreements, develop agreements that (1) define responsibilities for nondiscrimination in hiring, referrals, upgrading, and training and (2) implement a nondiscrimination program, in terms of the unions' specific areas of skill and geography, such that qualified minority women, non-minority women, and minority men shall be available and given an equal opportunity for employment.
  - .4 Contractor shall notify CLIENT of opposition to the nondiscrimination requirements of the Contract Documents by individuals, firms, or organizations during the term of the Contract Agreement.
- .6 Contractor shall include the provisions of the foregoing Subparagraphs 14.1.3.1 through 14.1.3.5 in all subcontracts with Subcontractors, so that such provisions will be binding upon each such Subcontractor.

## **14.2 APPRENTICES**

14.2.1 For purposes of this Section 14.2, the term "Subcontractor" shall not include suppliers, manufacturers, and distributors.

14.2.2 Attention is directed to Sections 1777.5, 1777.6, and 1777.7 of the State of California Labor Code and Title 8, California Code of Regulations, Section 200, and the applicable sections that follow. To ensure compliance and complete understanding of the law requiring apprentices, and specifically the required ratio thereunder, Contractor or Subcontractors should, where some question exists, contact the Division of Apprenticeship Standards, 45 Fremont Street, Suite 1050, San Francisco, California, (415) 975-2035, or one of its branch offices prior to commencement of the Work. Responsibility for compliance with these requirements lies with Contractor.

14.2.3 In the event Contractor willfully fails to comply with this Section 14.2, it will be considered in violation of the requirements of the Contract Agreement.

14.2.4 Nothing contained herein shall be considered or interpreted as prohibiting or preventing the hiring by Contractor or Subcontractors of journey worker trainees who may receive on-the-job training to enable

them to achieve journey worker status in any craft or trade under standards other than those set forth for apprentices.

### **14.3 WORK DAY**

14.3.1 Contractor shall not permit any worker to labor more than eight (8) hours during any one (1) calendar day or more than forty (40) hours during any one (1) calendar week, except as permitted by law and in such cases only upon such conditions as are provided by law. Contractor shall forfeit to CLIENT, as a penalty, Twenty-Five Dollars (\$25.00) for each worker employed in the execution of the work by Contractor, or any Subcontractor, for each calendar day during which such worker is required or permitted to work more than eight (8) hours in any one (1) calendar day and forty (40) hours in any one (1) calendar week in violation of the terms of this Paragraph 14.3.1 or in violation of the provisions of any law of the State of California. Such forfeiture amounts may be deducted from the Contract Sum. Contractor and each Subcontractor shall keep, or cause to be kept, an accurate record showing the actual hours worked each calendar day and each calendar week by each worker employed on the Project, which record shall be kept open at all reasonable hours to the inspection of CLIENT, its officers and agents, and to the inspection of the appropriate enforcement agency of the State of California.

**ARTICLE 15**  
**MISCELLANEOUS PROVISIONS**

**15.1 GOVERNING LAW**

15.1.1 The Contract Agreement and all of the Contract Documents incorporated into the Contract Agreement shall be interpreted under and governed by the laws of the State of California.

**15.2 SUCCESSORS AND ASSIGNS**

15.2.1 CLIENT and Contractor respectively bind themselves and their successors, permitted assigns, and legal representatives to the other party and to the successors, permitted assigns, and legal representatives of such other party in respect to covenants, agreements, and obligations contained in the Contract Documents. Neither party to the Contract Agreement shall assign the Contract Agreement, in whole or in part, without prior written consent of the other party. Notwithstanding any such assignment, each of the original contracting parties shall remain legally responsible for all of its obligations under the Contract Documents.

**15.3 RIGHTS AND REMEDIES**

15.3.1 All CLIENT's rights and remedies under the Contract Documents shall be cumulative and in addition to and not in limitation of all other rights and remedies of CLIENT under the Contract Documents or otherwise available at law or in equity.

15.3.2 No action or failure to act by CLIENT or CLIENT'S REPRESENTATIVE shall constitute a waiver of a right afforded them under the Contract Documents, nor shall such action or failure to act constitute approval of or acquiescence in a breach thereunder, except as may be specifically agreed in writing. No waiver by CLIENT or CLIENT'S REPRESENTATIVE of any breach or default shall constitute a waiver of any other breach or default; nor shall any such waiver constitute a continuing waiver.

15.3.3 No provision contained in the Contract Documents shall create or give to third parties any Claim or right of action against CLIENT, CLIENT'S REPRESENTATIVE, or Contractor.

**15.4 SURVIVAL**

15.4.1 The provisions of the Contract Documents which by their nature survive termination of the Contract Agreement or Final Completion, including all warranties, indemnities, payment obligations, and CLIENT's right to audit Contractor's books and records, shall remain in full force and effect after Final Completion or any termination of the Contract.

**15.5 COMPLETE AGREEMENT**

15.5.1 The Contract Documents constitute the full and complete understanding of the parties and supersede any previous agreements or understandings, oral or written, with respect to the subject matter hereof. The Contract Documents may be modified only by a written instrument signed by both parties or as provided in Article 7.

**15.6 SEVERABILITY OF PROVISIONS**

15.6.1 If any one or more of the provisions contained in the Contract Documents should be invalid, illegal, or unenforceable in any respect, the validity, legality, and enforceability of the remaining provisions contained herein shall not in any way be affected or impaired thereby.

## **15.7 CLIENT'S RIGHT TO AUDIT**

15.7.1 CLIENT and entities and agencies designated by CLIENT shall have access to and the right to audit and copy at CLIENT's cost all of Contractor's books, records, contracts, correspondence, instructions, drawings, receipts, vouchers, purchase orders, and memoranda relating to the Work. Contractor shall preserve all such records and other items for a period of at least three (3) years after Final Completion.

## **15.8 NOTICES**

15.8.1 Except as otherwise provided, all notices, requests, demands, and other communications to be given under the Contract Documents shall be in writing and shall be transmitted by one of the following methods:

- .1 Personally delivered.
- .2 Sent by telecopy where receipt is confirmed.
- .3 Sent by courier where receipt is confirmed.
- .4 Sent by registered or certified mail, postage prepaid, return receipt requested.

Such notices and other communications shall be deemed given and received upon actual receipt in the case of all except registered or certified mail; and, in the case of registered or certified mail, on the date shown on the return receipt or the date delivery during normal business hours was attempted. Such notices and communications shall be given at the respective street addresses set forth in such Contract Documents.

## **15.9 TIME OF THE ESSENCE**

15.9.1 Time limits stated in the Contract Documents are of the essence of the Contract Agreement.

## **15.10 NON-DISCRIMINATION CLAUSE**

15.10.1 The company, which is selected as the Contractor, as required by law, shall not discriminate against an employee or applicant for employment with respect to hire, tenure, terms, conditions or privileges of employment, or a matter directly or indirectly related to employment because of race, color, religion, national origin, age, sex, sexual preference, disability, height, weight, or marital status.

## **15.11 APPLICABLE LAW AND VENUE**

15.11.1 The agreement resulting from this RFP shall be construed according to the laws of the State of California. The CLIENT and vendors agree that the venue for any legal action under this agreement shall be the CLIENT of Butte, State of California.

# TECHNICAL PROVISIONS

**The Pathway**

**TABLE OF CONTENTS**  
**THE PATHWAY**

**GENERAL REQUIREMENTS**

ALTERNATIVES	01230
ADMINISTRATIVE REQUIREMENTS	01300
QUALITY REQUIREMENTS	01400
TEMPORARY FACILITIES AND CONTROLS	01500
TEMPORARY UTILITIES	01510
VEHICULAR ACCESS AND PARKING	01550
ENVIRONMENTAL PROTECTION	01570
PRODUCT REQUIREMENTS	01600
EXECUTION REQUIREMENTS	01700
CLOSEOUT PROCEDURES	01770
CLOSEOUT SUBMITTALS	01780
PROJECT RECORD DOCUMENTS	01781
OPERATIONS AND MAINTENANCE DATA	01782

**SITEWORK**

DEMOLITION	02100
SITE CLEARING	02230
LANDSCAPE GRADING	02260
FILL AND BACKFILL	02316
SITE FURNISHINGS	02470
AGGREGATE BASE COURSE	02721
PAVEMENT JOINT SEALANTS	02764
LANDSCAPE INSTALLATION	02905

**SPECIALTIES**

SIGNS AND SIGNPOSTS	10430
CEDAR FOREST PRODUCT RESTROOM SPECIFICATION	10431

CEDAR FOREST PRODUCT STEEL SHELTER SPECIFICATION	10432
CEDAR FOREST PRODUCT WOOD SHELTER SPECIFICATION	10433

### **ELECTRICAL**

ELECTRICAL GENERAL REQUIREMENTS	16050
BASIC MATERIALS AND METHODS	16100
LIGHTING	16500

### **ADDITIONAL SITEWORK**

CONCRETE	30000
CONCRETE FORMING AND ACCESSORIES	31000
CAST IN PLACE CONCRETE	33000
PLAYGROUND EQUIPMENT	116800
SITE PREPARATION	311000
EARTHWORK	312000
STRUCTURAL EXCAVATION AND FILL	312300
TRENCHING BACKFILLING AND COMPACTION	312316
FOUNDATION TIEDOWN ANCHORS	316800
EXTERIOR IMPROVEMENTS LANDSCAPE MAINTENANCE	320190.13
ASPHALT PAVING AND BASE	321216
PAVEMENT MARKINGS AND SIGNS	321223
PERMEABLE DECOMPOSED GRANITE PAVING	321541
CONCRETE SIDEWALK AND CURBS	321600
CHAIN LINK FENCES AND GATES	323113
SITE FURNISHINGS AND EQUIPMENT	323300
PLANTING IRRIGATION	328400
WATER UTILITY DISTRIBUTION PIPING	331100
SANITARY SEWERAGE UTILITIES	333000
SITE DRAINAGE	334000

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. 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: "The Pathway" Site Improvements for the Colusa Indian Community Council, 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.

### 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, 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. 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.
- B. 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).
- C. 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. 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.
- B. 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, crossreferenced 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 oversized 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 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 Owner of unsatisfactory conditions and do not proceed with the Work until unsatisfactory conditions have been corrected in a

manner acceptable to the Owner. 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 Owner.

## **PART 3 - EXECUTION**

### **3.01 PREPARATION**

#### **A. Notification**

Notify the Owner 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 Owner 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 Owner, 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 ensure 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.

#### 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 312000– 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 312000 – Earthwork.

### **PART 3 EXECUTION**

#### 3.01 SITE PREPARATION

- A. Protect and maintain benchmarks and survey control points during construction.

02230-2

- 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 312000 – 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 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.

02230-2

- 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. Owner's Representative'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 Owner's Representative'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 Owner's Representative'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 Owner’s Representative’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 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. Owner's Representative'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 Owner's Representative'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 Owner's Representative'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 Owner’s Representative’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 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 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. Recompect 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. Recompect 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 uncompacted material in accordance with ASTM D 1557 ("modified Proctor").

**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 AWWA 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 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 Sec-

tions 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 6inch- (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 Owner's Representative 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; Urexpand 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: Singlecomponent, 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, neutralcuring, nonsag silicone sealant complying with ASTM D 5893 for Type NS.
  1. Products:
    - a. Crafcro Inc.; RoadSaver Silicone.
    - b. Dow Corning Corporation; 888.
- D. Type SL Silicone Sealant for Concrete and Asphalt: Single-component, lowmodulus, neutral-curing, self-leveling silicone sealant complying with ASTM D 5893 for Type SL.
  1. Products:
    - a. Crafcro 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. Crafcro 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. Crafcro 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. Crafcro 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.

### 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 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 Owner's Representative.
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 Owner's Representative for approval prior to delivery of any soil to the project site. Should the Owner's Representative 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 Owner's Representative 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.

2. 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"

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 Owner's Representative - 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 Owner's Representative. 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 Owner's Representative. If an underground construction or utility line is discovered prior to work, other locations for planting may be selected by the Owner's Representative.

### 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 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 apart 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 ¼ inch high for equipment in device box or boxes 12" or smaller, and ½ 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 rebars 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%

16050-5

maximum dry density at optimum moisture content in layers not be exceed 6" 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" 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>D. 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>B. 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" 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" 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" around all sides for ease of installation. Provide 12" 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 030000

### 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 Owner's Representative.
- 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 Owner's Representative.

## 1.8 DELIVERY, STORAGE, AND HANDLING

- A. The ready-mixed concrete truck driver shall provide the batch ticket to Owner's Representative 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 Owner's Representative. 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 ± 1-1/2	6 ± 1-1/2
3/4	6 ± 1-1/2	5 ± 1-1/2
1-1/2	5-1/2 ± 1=1/2	4-1/2 ± 1-1/2

- c. The level of exposure shall be determined by Owner's Representative.
  - 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; Concreive Liquid (LPL).
  2. Master Builders; Concreive 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 Owner's Representative. 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 Owner's Representative 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 Owner's Representative.
- 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 Owner's Representative. 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 Owner's Representative, 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, Owner's Representative 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 Owner's Representative. 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 Owner's Representative.

### 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 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 6inch- (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 Owner's Representative 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: Singlecomponent, 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, neutralcuring, nonsag silicone sealant complying with ASTM D 5893 for Type NS.

1. Products:

- a. Crafcro Inc.; RoadSaver Silicone.  
b. Dow Corning Corporation; 888.

- D. Type SL Silicone Sealant for Concrete and Asphalt: Single-component, lowmodulus, neutralcuring, self-leveling silicone sealant complying with ASTM D 5893 for Type SL.

1. Products:

- a. Crafcro 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. Crafcro 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. Crafcro 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. Crafcro 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.

### **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 033000

**CAST-IN-PLACE CONCRETE**

**PART 1 - GENERAL**

1.1 SUMMARY

A. Section includes cast-in-place concrete for the following items:

1. Foundation walls.
2. Footings.
3. Supported slabs.
4. Slabs on grade.
5. Control, expansion, and contraction joint devices.
6. Equipment pads.
7. Light pole base.
8. Flagpole base.

B. Related Requirements:

1. Section 031000 - Concrete Forming and Accessories.
2. Section 032000 - Concrete Reinforcing: Requirements for reinforcing steel and supports.
3. Section 033900 - Concrete Curing.

1.2 MEASUREMENT AND PAYMENT

A. Refer to Measurement and Payment section.

1.3 REFERENCE STANDARDS

A. Refer to Engineer's Supplementary Conditions – REFERENCE SPECIFICATIONS.

B. American Concrete Institute:

1. ACI 301 - Specifications for Structural Concrete.
2. ACI 305R - Guide to Hot Weather Concreting.
3. ACI 306.1 - Standard Specification for Cold Weather Concreting.
4. ACI 308.1 - Specification for Curing Concrete.
5. ACI 318 - Building Code Requirements for Structural Concrete. C. ASTM International:

1. ASTM C31 - Standard Practice for Making and Curing Concrete Test Specimens in the Field.
2. ASTM C33 - Standard Specification for Concrete Aggregates.

3. ASTM C39 - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
4. ASTM C42 - Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.
5. ASTM C94 - Standard Specification for Ready-Mixed Concrete.
6. ASTM C143 - Standard Test Method for Slump of Hydraulic-Cement Concrete.
7. ASTM C150 - Standard Specification for Portland Cement.
8. ASTM C172 - Standard Practice for Sampling Freshly Mixed Concrete.
9. ASTM C173 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.
10. ASTM C231 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.
11. ASTM C260 - Standard Specification for Air-Entraining Admixtures for Concrete.
12. ASTM C330 - Standard Specification for Lightweight Aggregates for Structural Concrete.
13. ASTM C494 - Standard Specification for Chemical Admixtures for Concrete.
14. ASTM C595 - Standard Specification for Blended Hydraulic Cements.
15. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.
16. ASTM C685 - Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing.
17. ASTM C845 - Standard Specification for Expansive Hydraulic Cement.
18. ASTM C989 - Standard Specification for Slag Cement for Use in Concrete and Mortars.
19. ASTM C1017 - Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete.
20. ASTM C1064 - Standard Test Method for Temperature of Freshly Mixed Hydraulic-Cement Concrete.
21. ASTM C1107 - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink).
22. ASTM C1116 - Standard Specification for Fiber-Reinforced Concrete.
23. ASTM C1157 - Standard Performance Specification for Hydraulic Cement.
24. ASTM C1218 - Standard Test Method for Water-Soluble Chloride in Mortar and Concrete.
25. ASTM C1240 - Standard Specification for Silica Fume Used in Cementitious Mixtures.
26. ASTM D994 - Standard Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type).
27. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
28. ASTM D1752 - Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction.
29. ASTM D6690 - Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements.
30. ASTM E96 - Standard Test Methods for Water Vapor Transmission of Materials.
31. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
32. ASTM E1643 - Standard Practice for Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.

33. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs.

#### 1.4 COORDINATION

- A. Coordinate placement of joint devices with erection of concrete formwork and placement of form accessories.

#### 1.5 SUBMITTALS

- A. Reports and certifications on proposed materials and mixture proportions for each concrete mixture design shall be submitted prior to conducting the laboratory trial batches for proposed mix designs where applicable.
- B. Aggregate Reports (ASTM C 33): Fine aggregate (source and type, gradation, deleterious materials, specific gravity, sand equivalent); coarse aggregate (source and type, gradation, deleterious materials, abrasion loss, specific gravity); and combined aggregate gradation.
1. Aggregate reports shall be project specific and shall be no more than two years old at time of submittal.
  2. Aggregates shall be sampled and tested in accordance with ASTM C 33. In addition, the bulk specific gravity of each aggregate shall be determined in accordance with ASTM C 127 and ASTM C 128.
  3. Alkali-aggregate reactivity potential shall be determined by one of the following procedures:
    - a. Test fine and coarse aggregates in accordance with ASTM C 1260.  
Aggregates which do not indicate a potential for alkali reactivity may be used without further testing. Aggregates which indicate a potential for alkali reactivity shall be further tested in accordance with ASTM C 1105 or C 1293 (as appropriate), using a cement containing less than 0.6 percent alkalis.
    - b. Test a project-specific mixture, which includes all aggregates and cementitious materials selected for the project, in accordance with ASTM C 1567. This test may only be used for mixtures that contain slag cement or fly ash, and those products shall not have an alkali content greater than 4.0 percent sodium oxide equivalent. Combinations of cementitious materials and aggregates which do not indicate a potential for alkali reactivity may be used without further testing. Mixture combinations which indicate a potential for alkali reactivity shall have the ingredients and/or proportions modified and then the test shall be repeated.
  4. At the discretion of the Engineer, testing in addition to that indicated herein or in Appendix X1 of ASTM C33 may be required on potentially reactive aggregates. Nonreactive aggregates shall be imported if, in the opinion of the Engineer, local aggregates exhibit unacceptable potential reactivity.

- C. Cement: Contractor shall submit certified copies of supplier's (source) test reports showing chemical composition and physical analysis for each shipment used and certifying that the cement complies with ASTM C 150 and these Specifications. The certificate shall be signed by the cement manufacturer.
- D. Cementitious Materials: Type, data sheet, and test report (fly ash, pozzolan, slag cement).
- E. Admixtures: Data sheets and certifications for all admixtures required or proposed (e.g. water reducers, set retarders, plasticizers, activators, air entrainment agents, bond preventers, bonding compounds, etc.) with manufacturer's approval letters.
- F. Mixture Proportions: Provide all proposed mix design(s) to be used for Project per ACI 318. Three-point curves are required; compressive strength at 7 and 28 days; mixture proportions report (slump; water content; air content; water-cementitious materials ratio; brand, type, composition, and quantity of cement; brand, type, composition, and quantity of fly ash; specific gravity of each aggregate; ratio of fine to total aggregates; temperature; unit weight; time of initial set at 70°F and 90°F). Lab testing and reports must have been produced within the past two years; otherwise, trial batching and lab testing must be performed for proposed mix designs.
- G. Water analysis test for mixing water and ice including total chlorides and sulfates (as SO<sub>4</sub>).
- H. Submit data describing the equipment to be used for proportioning, mixing, and transporting concrete. In the case of ready-mixed concrete, certification that the readymix plant complies with the requirements of ASTM C94 will be acceptable. Identify plant location from which concrete will be supplied, plant capacity, and estimated travel time from plant(s) to work site.
- I. For structures with multiple placements, submit placement sequence and construction joints. Joint locations are subject to approval of the Engineer.
- J. Provide reinforcing steel fabrication and placement drawings and bar lists. The bar lists and drawings shall include a reference to the structure in which the reinforcement will be installed and to the Drawing showing the reinforcement. Shop drawings shall include bar lengths, diameters, and bend and splice locations/dimensions. K. Submit the following as specified elsewhere in this section:
  - 1. Certified test reports.
  - 2. Mill certs for reinforcing steel.
  - 3. Manufacturers' Certificates of Compliance, which includes copies of independent test results confirming compliance with specified requirements, shall be submitted for (when used): cement, admixtures, fly ash, slag cement, form coatings, form ties, mechanical connections, membrane curing compound, floor sealer and epoxy bonding agent.
  - 4. Mixture designs and independent testing laboratory test results (minimum of 10 tests).
  - 5. Batch tickets.
  - 6. Field quality control reports.
- L. Submit Product Data and manufacturer's installation instructions for curing materials, joint materials, bonding materials, repair materials, admixtures, steel fibers, sealers and hardeners.
- M. Submit procedures for hot and cold weather concreting when such conditions are anticipated.

- N. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.

#### 1.6 CLOSEOUT SUBMITTALS

- A. Project Record Documents: Record actual locations of embedded utilities and components concealed from view in finished construction.

#### 1.7 STORAGE AND HANDLING

- A. Cement, slag cement, and fly ash shall be stored in suitable moisture-proof enclosures. Cement, slag cement, and fly ash, which have become caked or lumpy, shall not be used.
- B. Aggregates shall be stored so that segregation and the inclusion of foreign materials are prevented. The bottom 6 inches of aggregate piles in contact with the ground shall not be used.
- C. Reinforcing steel shall be carefully handled and shall be stored on supports that prevent the steel from touching the ground until inclusion in the Work.

#### 1.8 QUALITY ASSURANCE

- A. Perform Work according to ACI 318.
- B. Comply with ACI 305R when pouring concrete during hot weather.
- C. Comply with ACI 306.1 when pouring concrete during cold weather.
- D. Acquire cement and aggregate from one source for Work.
- E. Perform Work according to California Building Code standards.
- F. Concrete materials shall be selected, and concrete shall be proportioned, batched, mixed, and delivered in a manner that will minimize shrinkage and cracking as specified herein and in accordance with Chapters 3 and 8 of ACI 224R. Concrete temperatures shall be controlled before and until delivery at the end of the delivery truck chute to minimize cracking. Any rise in concrete temperature caused by environmental conditions that will be conducive to excessive shrinkage shall be controlled.

#### 1.9 AMBIENT CONDITIONS

- A. Maintain concrete temperature after installation at minimum 50 degrees F for minimum seven days.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

A. Concrete:

1. Cement:
  - a. Comply with ASTM C150, Type II - Moderate Sulfate Resistant.
  - b. Type: Portland.
2. Normal Weight Aggregates:
  - a. Comply with ASTM C33.
  - b. Coarse Aggregate Maximum Size: 1 inch.
3. Water:
  - a. Comply with ACI 318.
  - b. Potable, without deleterious amounts of chloride ions. B.

Admixtures:

1. Manufacturers:
  - a. BASF Corporation.
  - b. Euclid Chemical Company.
  - c. GCP Applied Technology.
  - d. Or equal: Refer to the Standard General Conditions and Supplementary Conditions.
  - e. Substitutions: Refer to the Standard General Conditions and Supplementary Conditions.
2. Air Entrainment: Comply with ASTM C260.
3. Chemical:
  - a. Comply with ASTM C494.
4. Fly Ash: Comply with ASTM C618, Class F.
5. Plasticizing:
  - a. Comply with ASTM C1017. C. Joint

Devices and Filler:

1. Joint Filler, Type A:
  - a. Description: Asphalt-impregnated fiberboard or felt.
  - b. Comply with ASTM D994.
  - c. Thickness: ½ inch.

2.2 CONCRETE MIX

- A. Select proportions for concrete according to ACI 318, trial mixtures or field test data or both.
- B. Performance and Design Criteria:
  - 1. See Section 3.5A herein for Table of Concrete Proportions.
  - 2. Cement Type: ASTM C150.
  - 3. Aggregate Type: Normal weight.
  - 4. Aggregate Size:
    - a. Maximum: 1 inch.
  - 5. Maximum Pozzolan Content: 15 percent of cementitious materials by weight. C.

Admixtures:

- 1. Include admixture types and quantities indicated in concrete mix designs only if approved by Engineer.
- 2. Cold Weather:
  - a. Use accelerating admixtures in cold weather.
  - b. Use of admixtures will not relax cold-weather placement requirements.
- 3. Hot Weather: Use set-retarding admixtures.
- D. Average Compressive Strength Reduction: Not permitted.
- E. Ready-Mixed Concrete: Mix and deliver concrete according to ASTM C94.

## 2.3 ACCESSORIES

- A. Non-shrink Grout:
  - 1. Manufacturers:
    - a. Euclid Chemical Company.
    - b. Sika Corporation.
    - c. Or equal: Refer to the Standard General Conditions and Supplementary Conditions.
    - d. Substitutions: Refer to the Standard General Conditions and Supplementary Conditions.
  - 2. Description: Premixed compound consisting of non-metallic aggregate, cement, and water-reducing and plasticizing agents.
  - 3. Comply with ASTM C1107.
  - 4. Minimum Compressive Strength: 2,400 psi in 48 hours and 7,000 psi in 28 days.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Verify requirements for concrete cover over reinforcement.
- B. Verify that anchors, seats, plates, reinforcement, and other items to be cast into concrete are accurately placed, positioned securely, and will not interfere with placing concrete.

### **3.2 PREPARATION**

- A. When manufacturer's installation instructions conflict with Contract Documents, request clarification from Engineer before proceeding.
- B. Previously Placed Concrete:
  - 1. Prepare previously placed concrete by cleaning with steel brush and applying bonding agent.
  - 2. Remove laitance, coatings, and unsound materials.
- C. In locations where new concrete is doweled to existing work, drill holes in existing concrete, insert steel dowels, and pack solid with non-shrink grout.
- D. Remove debris and ice from formwork, reinforcement, and concrete substrates.
- E. Remove water from areas receiving concrete before concrete is placed.

### **3.3 INSTALLATION**

- A. Placing Concrete:
  - 1. Place concrete according to ACI 301.
  - 2. Notify testing laboratory minimum 48 hours prior to commencement of operations.
  - 3. Ensure that reinforcement, inserts, embedded parts, formed expansion and contraction joints are not disturbed during concrete placement.
  - 4. Deposit concrete at final position, preventing segregation of mix.
  - 5. Place concrete in continuous operation for each panel or section as determined by predetermined joints.
  - 6. Consolidate concrete.
  - 7. Maintain records of concrete placement, including date, location, quantity, air temperature, and test samples taken.
  - 8. Place concrete continuously between predetermined expansion, control, and construction joints.
  - 9. Do not interrupt successive placement and do not permit cold joints to occur except where noted on Drawings.
- 10. Screeding:
  - a. Scream equipment pads level.

- b. Surface Flatness: Maximum ½ inch in 10 feet. B. Concrete

Finishing:

- 1. Provide formed concrete finishes as described herein in 3.5.C Schedule - Concrete Finishes.

C. Curing and Protection:

- 1. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.
- 2. Protect concrete footings from freezing for minimum of five days.
- 3. Maintain concrete with minimal moisture loss at relatively constant temperature for period as necessary for hydration of cement and hardening of concrete, not less than seven days.
- 4. Cure concrete slabs and pads according to ACI 308.1 using saturated burlene blankets or membrane-forming curing compound per ASTM C309, Type 1, Class B, dissipating. Concrete walls shall be cured by leaving the forms in place and applying a soaker hose to keep all surfaces wet.

3.4 FIELD QUALITY CONTROL

- A. Inspection and Testing: Furnished and paid for by Owner according to ACI 318 and California Building Code.

- B. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of Work. C. Concrete Inspections:

- 1. Continuous Placement Inspection: Inspect for proper installation procedures.
- 2. Periodic Curing Inspection: Inspect for specified curing temperature and procedures.

D. Strength Test Samples:

- 1. Sampling Procedures: Comply with ASTM C172.
- 2. Cylinder Molding and Curing Procedures:
  - a. Comply with ASTM C31.
  - b. Cylinder Specimens: Standard cured.
- 3. Sample concrete and make one set of three 6x12 or four 4x8 cylinders for every 150 cu. yd. or less of each class of concrete placed each day, and for every 5,000 sq. ft. of surface area for slabs and walls.
- 4. If volume of concrete for a class of concrete would provide less than five sets of cylinders, take samples from five randomly selected batches, or from every batch if less than five batches are used.
- 5. Make one additional cylinder during cold weather concreting and field cure. E. Field Testing:
  - 1. Slump Test Method: Comply with ASTM C143.
  - 2. Air Content Test Method: Comply with ASTM C173.
  - 3. Temperature Test Method: Comply with ASTM C1064.

4. Compressive Strength Concrete:

- a. Measure slump and temperature for each sample.
- b. Measure air content in air-entrained concrete for each sample. F. Cylinder

Compressive Strength Testing:

1. Test Method: Comply with ASTM C39.
2. Test Acceptance: According to ACI 318.
3. Test one cylinder at seven days.
4. Test two 6x12 or three 4x8 cylinders at 28 days.

G. Patching:

1. Allow Engineer to inspect concrete surfaces immediately upon removal of forms.
2. Honeycombing or Embedded Debris in Concrete:

- a. Not acceptable.
- b. Notify Engineer upon discovery.

3. Patch imperfections as directed by Engineer and according to ACI 301. H. Defective

Concrete:

1. Description: Concrete not conforming to required lines, details, dimensions, tolerances, or specified requirements.
2. Repair or replacement of defective concrete will be determined by Engineer.
3. Do not patch, fill, touch up, repair, or replace exposed concrete except upon express direction of Engineer for each individual area.

### 3.5 ATTACHMENTS

A. Table of Concrete Proportions.

End of use Concrete	Tests <sup>(5)</sup>	Min Sacks of Cement per C.Y.	Min 28-day Compression Strength PSI	Max W/C Ratio by Weight <sup>(2)</sup>	Total Air Content <sup>(3)</sup>	Slump	WRDA	Super Plasticizer
Footings below grade and equipment pads	---	5.5	3000	.50	---	3-5	---	---

Notes:

1. A sack of cement weighs 94 pounds. Cement contents may be reduced by 1/4 sack for concrete containing 1½inch coarse aggregates.
2. The W/C ratio is the weight of water divided by the weight of cement plus pozzolan. At the job site when the slump is less than required for proper placement, water may be added to the mix. The measurement of the slump and determination for the need of additional water shall be made as soon as possible after the truck arrival. Add water shall

not exceed 2 gallons per cubic yard of concrete. Insufficient slump after the maximum addition of add water shall be cause for rejection. At any time, if the slump is excessive the concrete is subject to rejection by the Engineer.

3. The total air content is measured in the concrete as deposited in the forms. The air content shall be achieved solely by the addition of an air entraining admixture (AEA).
4. The following list of admixtures and dosages shall be supplied for the Tremie concrete: BASF Master Glenium 7511, 4-8 oz./CWT cement (WRDA); BASF Master Matrix VW 450, 10 oz./CWT cement (ANTI-WASHOUT). The accelerator and anti-washout shall be added at the job site.
5. Testing:
  - a. is three 6x12 or four 4x8 test cylinders for each 150 yards or less of concrete per day;
  - b. is three 6x12 or four 4x8 cylinders for each 100 yards or less of concrete per day;
  - c. is slump, temperature, and air content of the first truck; from all trucks in which the concrete seems to vary from the acceptable mix; and from the trucks from which the test cylinders are taken.

B. Grading of combined fine and coarse aggregates.

1. Grading of combined fine and coarse aggregates shall fall within the following limits:

Sieve Number or Size (inches)	Percentage Passing by Weight	
	One and one-half inch maximum	One inch maximum
Passing a 2-inch	---	---
Passing a 1½-inch	90 - 100	---
Passing a 1-inch	50 - 86	90 - 100
Passing a ¾-inch	45 - 75	55 - 100
Passing a ⅝-inch	38 - 55	45 - 75
Passing a No. 4	30 - 45	35 - 60
Passing a No. 8	23 - 38	27 - 45
Passing a No. 16	1 - 33	20 - 35
Passing a No. 30	10 - 22	12 - 25
Passing a No. 50	4 - 10	5 - 15
Passing a No. 100	1 - 6	1 - 8
Passing a No. 200	0 - 3	0 - 4

C. Schedule - Concrete Finishes:

1. Formed concrete finishes:
  - a. All formed concrete surfaces shall be finished with the applicable finish system described below. The Class C Finish applies to all buried surfaces that are designated to receive a waterproofing or damp-proofing system. The Class B Finish applied to all formed surfaces not receiving a Rough Finish or a Class C Finish.
    - 1) Rough Finish:

- a) Is applicable to all non-waterproofed/damp-proofed buried surfaces. The finish system shall consist of plugging all tie-bolt holes, snap-tie cone depressions, and other surface defects deeper than 2 inches. Mortar fins protruding more than ¼ inch shall be removed. Plugging shall be performed with Cement Mortar on thoroughly saturated concrete or with a proprietary product intended for that purpose that is reviewed and approved by the Engineer.
- 2) Class C Finish:
  - a) Shall consist of patching all tie-bolt holes, snap-tie cone depressions, and other surface defects deeper than 1/8-inch with Cement Mortar. Mortar fins protruding more than 1/16-inch shall be removed except that all mortar fins shall be ground flush with the surrounding surface when it is designed to receive a Waterproof Membrane.
- 3) Class B Finish:
  - a) Shall consist of patching all tie-bolt holes, snap-tie cone depressions, and other surface defects deeper than 1/16-inch or having a dimension larger than 1-inch with Cement Mortar. Mortar fins and other protrusions shall be removed flush with the surface and ground smooth. In addition, the surface shall have a uniform pattern, color and texture. If necessary, the surface shall be Sack Rubbed. The need for and extent of the Sack Rubbed Finish shall be determined by the Engineer upon removal of the forms. The Sack Rubbed Finish shall provide a uniform appearance over the entire surface.
- 4) Cement Mortar:
  - a) For plugging holes and other depressions shall be composed of one-part mortar sand to one-part Type I or Type II Portland Cement and sufficient water to produce a damp cohesive formable mixture. The surface receiving the Cement Mortar shall be thoroughly saturated, damp, and pre-coated with a wet cement slurry just prior to applying the Cement Mortar. In layers not exceeding 1-inch in thickness, the Cement Mortar shall be densely packed into the depression using a smooth faced hammer. Wet curing for three days of the Cement Mortar with burlene or burlap shall proceed the installation unless the plugged area will immediately receive a Sack Rubbed Finish.
- 5) Sack Rubbed Finish:
  - a) Shall be performed as soon as the forms are stripped while the concrete is clean and thoroughly saturated. If performed at a later time the concrete shall be scrubbed and pressure washed clean and soaked with water for three days until the surface is thoroughly saturated prior to sack rubbing.
  - b) Shall consist of applying a two-part cement to one-part fine mortar sand paste to the designated surface and scrubbing the paste into the wall with a burlap sack, rubber float or other device that will produce a uniform texture with the thin layer of paste.
  - c) Shall be wet cured with burlene for three days immediately after it has been applied.

**END OF SECTION**

SECTION 11 68 00

**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 will pay for shipping the equipment. 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

11-68-00-1

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 are not allowed.

PART 2 - PRODUCTS

2.1 PLAYGROUND EQUIPMENT AND STRUCTURES (Contractor Furnished, Contractor Installed)

- A. Refer to plans

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

11-68-00-5

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 321816.13 PLAYGROUND RESILIENT 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 311000  
**SITE PREPARATION**

**PART 1 - GENERAL**

**1.1 SECTION INCLUDES**

- A. Locate and mark existing utilities within the limits of work.
- B. Remove existing trees, including root ball, within the area of work, as indicated on plan.
- C. Remove existing surface improvements within the area of work as indicated on plan.
- D. Remove existing subsurface utilities, including appurtenances, within the area of work, as indicated on plan.
- E. Properly dispose of all excess and unsuitable material.
- F. Strip all areas within the limits of work as indicated on the plan.
- G. Deploy and subsequently remove temporary construction area and tree protection fencing at completion of construction.
- H. Install and maintain erosion control measures.

**1.2 RELATED SECTIONS**

- A. Earthwork - Section 312000
- B. Trenching, Backfilling and Compaction - Section 312316

**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 Plans and Specifications.

**PART 2 - PRODUCTS – NOT USED**

**PART 3 - EXECUTION**

### **3.1 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.

### **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.

### **3.2 CLEARING AND GRUBBING**

- A. Install tree protective fencing around trees designated to be saved, prior to the start of demolition work. See Civil and Landscape Plans and Specifications. Install fencing as far from the trunk as possible to allow for construction of proposed improvements. Maintain fencing throughout duration of construction.
- B. Use only hand methods for grubbing within drip line of remaining trees.

- C. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated.
- D. The area above the natural ground surface shall be cleared of all vegetation such as trees not designated to be saved, roots, brush, grass, weeds, and all other objectionable material including buildings (footings, slabs, etc.), asphalt, concrete, curbs, mulch, headerboard, ramps, stairs, utility piping (including appurtenances), bike racks, fences/gates, site furniture, and similar materials, within the limits of construction.
- E. All concrete and asphalt pavements and other existing improvements within the areas to be developed should be removed during site demolition. At the Contractor's option, salvaged class 2 aggregate base material may be stockpiled for reuse.
- F. Existing building foundations should be entirely removed below final subgrade in the building pad areas, and to a depth of at least three feet in areas outside the building footprints. The excavations beneath the planned building area should be backfilled with engineered fill. See also Section 312000.
- G. The natural ground surface within the entire site, except within the tree protection zones, shall be grubbed to a depth necessary to remove all stumps, buried logs, roots over 2-inches in diameter, and all other unsuitable material. Stumps shall be removed to a depth of at least 24" below original grade.
- H. Existing utilities designated to be removed that do not conflict with proposed improvements may be abandoned in place. If they are abandoned in place, the utility shall be slurried and capped. Any portions of these utilities that conflict with the new improvements shall be removed.
- I. All unsuitable material shall be removed from the construction area and disposed of properly. Comply with hazardous material abatement regulations that may apply.

### **3.3 DEMOLITION SEQUENCING**

- A. Permanent and/or temporary facilities may need to be installed prior to demolition to limit utility outages. Any planned and or necessary interruption of existing utilities shall be coordinated with the Construction Manager. A minimum of one week's notice shall be provided before any such interruption.

### **3.4 STRIPPING**

- A. The upper soils containing grass, small roots, and other vegetation, to a depth of 4+/- inches, shall be stripped from and removed from the site. Deeper stripping may be required in localized areas to remove roots or other concentrations of organic material.
- B. Dust control shall be performed by the contractor during all phases of the construction. Payment for the dust control work involved shall be considered included in the items of work and no additional allowance will be made therefor.
- C. The Geotechnical Engineer will observe the clearing and stripping operations and recommend the maximum depth of stripping required and any additional excavation

necessary due to contamination of materials or concentrations of vegetation.

- D. All suitable stripped material in excess of those needed to backfill landscape and/or planter areas shall be removed from the project site and disposed of properly.

### **3.5 CLEARED MATERIAL**

- A. The objectionable cleared material including buildings (footings, slabs, etc.), curbs, mulch, headerboard, ramps, utility piping (including appurtenances), bike racks, fences/gates, site furniture, etc., shall be removed from the project site and disposed of properly.

### **3.6 STRIPPED MATERIAL**

- A. Excess and objectionable stripped material including asphalt and concrete pavements, grass/vegetation, etc. shall be removed from the project site and disposed of properly. Contractor is encouraged to recycle the existing aggregate base materials for use in hardscape areas only (non-building).

### **3.7 EROSION AND SEDIMENT CONTROL**

- A. Install and maintain erosion control devices/measures, including, but not limited to drainage inlet protection, fiber rolls, silt fence, etc., until such time as all vegetative and hard surface improvements within their individual tributary areas are completed. Provide periodic maintenance of all such devices, and following completion of said improvements, remove and dispose of erosion control devices and repair surfaces to match final specified surface finishes.
- B. Any areas where ground has been disturbed, and where final landscaping has not been installed by October 15, will require the installation and maintenance of erosion control devices by the Contractor, as generally noted in the Erosion Control Notes on the plans.
- C. Additionally, the Contractor shall implement and adhere to the requirements of the Water Pollution Control Plan (WPCP), including, but not limited to, rain event inspections, storm water discharge sampling and analysis, vehicle/equipment maintenance, and cleaning, etc..

### **3.8 SURFACE IMPROVEMENT AND UTILITY REMOVAL AND RELOCATION**

- A. The Contractor shall have Underground Service Alert mark all existing public utilities as a first order of work. Additionally, the Contractor shall have a locating service mark all existing private utilities within the limits of work.
- B. The Contractor shall pothole each existing utility that will be extended or reused at its point of cut and removal to confirm the actual locations and depths as well as all proposed crossings as shown on the drawings. Notify Engineer of results via the RFI process.
- C. Existing water, sewer, storm drain, gas, electrical, communication (data) services and laterals to be abandoned or removed as indicated on the plans shall be provided with replacement facilities as to comply with construction sequencing requirements and limit utility/service outages as required by the Owner.

- D. See Mechanical, Electrical, and Civil plans for detailed removal/replacements requirements.

**3.9 CLEAN UP**

- A. Remove all debris and stains resulting from the work of this section.

**END OF SECTION**

Section 312000  
**EARTHWORK**

**PART 1 - GENERAL**

**1.1 SECTION INCLUDES**

- A. Description of suitable materials for earthwork operations.
- B. Definitions of terms.
- C. Description of the duties and responsibilities of the Geotechnical Engineer.
- D. Excavate earth, rock, and all material regardless of character and subsurface conditions.
- E. Requirements for excavation, overexcavation, and disposal of surplus and unsuitable material off the project site.
- F. Dewatering of excavations.
- G. Spread and compact engineered/import/select fill.

**1.2 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including the Division 01 Specification Section, apply to this Section.
- B. Related Sections include the following:
  - 1. Site Preparation - Section 311000
  - 2. Trenching, Backfilling and Compaction - Section 312316

**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.

**1.4 EXISTING CONDITIONS**

- A. All grading activities shall be in accordance with the project Geotechnical Investigation, prepared by LACO Associates, titled Soils Evaluation Memo, and dated June 26, 2023.
- B. The project site is underlain by interbedded alluvial deposits variously composed of low to high plasticity, medium stiff to very stiff, silty to sandy clay and loose to medium dense silty and clayey sands and gravels.
- C. It is the Contractor's responsibility to achieve the finished grades shown on the plan, and to

determine the quantity of and provide for soil import or export required to achieve plan grades.

#### **1.5 GEOTECHNICAL ENGINEER**

- A. The work covered by these specifications shall be performed under the observation of the Geotechnical Engineer, who shall be retained and paid by the Owner. The Geotechnical Engineer will be present at the site intermittently during the conduct of work to observe the work, and to perform field and laboratory tests to evaluate material quality and compaction. The Contractor shall cooperate with the Geotechnical Engineer in performing the observations and tests. The Geotechnical Engineer shall notify the Contractor of failing test results. The Contractor shall rework these areas until the specified degree of compaction is obtained. At the completion of his work, the Geotechnical Engineer shall submit a report to the Owner, including a tabulation of all tests performed. The Geotechnical Engineer's costs for observing and testing the repair of unsatisfactory work performed by the Contractor shall be billed to the Owner. The Owner shall pay them and then shall deduct the amount from monies due the Contractor.

#### **1.6 SUBMITTALS**

- A. Submit test reports and compaction curve analysis for engineered fill required in accordance with Section 013300.

#### **1.7 DEFINITIONS**

- A. Standard Specifications
1. Where referred to in these specifications, "Standard Specifications" shall mean the State of California Standard Specifications, latest edition. All work shall be carried out in conformance with the Standard Specification, unless otherwise specified herein.
  2. Where referred to in these specifications, "County" shall mean the latest edition of the standard plans and drawings for the County of Mendocino. All work shall be carried out in conformance with the standards.
  3. Where referred to in these specifications, "City" shall mean the latest edition of the standard plans and drawings of the City of Eureka. All work shall be carried out in conformance with the referenced standard.
  4. Site Grading shall comply with the applicable sections of Title 24 and of Appendix J of the California Building Code, latest adopted edition.
- B. Percent Compaction -- As referred to in these specifications, percent compaction is the required in-place dry density of the material, expressed as a percentage of the maximum dry density of the same material determined by the ASTM D 1557 test procedure.
- C. Optimum Moisture Content -- As referred to in these specifications, optimum moisture content is the moisture content, percent (by dry weight), corresponding to the maximum dry density of the same material as determined by the ASTM D 1557 test procedure.
- D. Soil Subgrade -- Where used in these specifications, soil subgrade shall mean within exterior slab areas, the surface on which aggregate base material is placed, and within building areas, the surface on which footings bear and/or on which floor slab structural section is placed.

### **PART 2 - PRODUCTS**

**2.1 IMPORT FILL**

- A. Import fill shall be material consisting of soil and rock mixtures that: 1) are free of organic material. 2) have a Liquid Limit less than 40 and a Plasticity Limit of less than 20, and 3) have a maximum particle size of 6 inches.
- B. In general, the onsite soils, to the extent that they may be available, will be suitable for use as fill, provided they are prepared as described below.
- C. General engineered fill shall be approved by the Soils Engineer prior to fill placement.

## **PART 3 - EXECUTION**

### **3.1 SPILLAGE, DUST AND EROSION CONTROL**

- A. The Contractor shall prevent spillage when hauling on or adjacent to any public streets or highways. In the event that such occurs, the Contractor shall remove all spillage and sweep, wash or otherwise clean such streets or highways as required by local City and County authorities and/or the State of California.
- B. The Contractor shall take all precautions needed to prevent a dust nuisance to adjacent public or private properties and to prevent erosion and transportation of soil to downstream adjacent properties. Any damage so caused shall be corrected or repaired by the Contractor at no cost to the Owner.

### **3.2 EXCAVATION**

- A. Following clearing and stripping, over excavate existing subgrade materials in non-building areas to planned subgrade. The over excavations should extend three feet beyond the edges of exterior hardscape edges, as required. The over excavated materials may be stockpiled and reused as properly placed compacted/engineered fill. The excess and unsuitable excavated material shall be disposed of properly, offsite.
- B. The upper 8" of all exposed exterior hardscape subgrade soils shall be scarified, thoroughly moisture- conditioned to at least 3% above optimum moisture content, and compacted to at least 90% relative compaction. The upper 6" of subgrade in asphalt pavement areas shall be compacted to at least 95% relative compaction.
- C. Once compacted, the subgrade materials should be maintained at least 3 percentage points above optimum moisture content prior to placement of additional fill or aggregate base material. This is likely to require periodic sprinkling during the dry season. Should drying of the soils occur, they should again be scarified, moisture-conditioned to the proper moisture content and recompacted.
- D. Recompacked subgrade shall have a firm and unyielding surface under the observation of the Geotechnical Engineer or their designated representative. If excessive pumping or instability is observed, over excavation and the placement of a stabilizing fabric and a 12" to 18" thick layer of class 2 aggregate base may be required by the project Geotechnical Engineer.
- E. Final surfaces exposed by the completed excavations (cutting) shall be finished true to line and grade. Depressions shall be filled and compacted, and loose material shall be removed.
- F. Temporary construction slopes shall not exceed requirements set forth in Cal-OSHA Industrial Safety Orders, or ratio suggested in the field by the Geotechnical Engineer.
- G. It is the Contractor's responsibility to achieve the finished grades shown on the plan, and to determine the quantity of and provide for soil import or export required to achieve plan grades
- H. Refer to the Geotechnical Investigation Report for further requirements.

### **3.3 FIELD QUALITY CONTROL**

- A. The Geotechnical Engineer will observe the excavation, soil removal, moisture-conditioning and recompaction operations. After the completion of these operations and before placement of fill, the Contractor shall obtain the Geotechnical Engineer's approval of the site preparation in each area.

#### **3.4 DEWATERING**

- A. During excavation activities, groundwater may be encountered. The contractor is responsible for accounting in their bid the necessary equipment required to remove groundwater from excavations to allow for the proper placement of fill per the Geotechnical Report.

- B. Groundwater shall be discharged through a silt-sack type device at the outlet end of the discharge pipe to allow for filtration.
- C. Silty water shall not be discharged to any storm drain.

### **3.5 PLACEMENT MOISTURE CONDITIONING AND COMPACTION**

- A. Exposed subgrade materials shall be ripped, moisture-conditioned, and compacted as noted in Paragraph 3.02B. above. Onsite fill materials to be used in exterior hardscape areas should subsequently be placed in loose, horizontal lifts of 8 inches thick or less, moisture-conditioned to within 2% of optimum moisture content or as directed in the field by the project Geotechnical Engineer, and uniformly compacted to at least 90% relative compaction. The upper 6" of subgrade in asphalt pavement areas shall be compacted to at least 95% relative compaction
- B. All site preparation and fill placement should be observed by a representative of the Geotechnical Engineer.
- C. Where field density tests indicate that required compaction and/or moisture content has not been attained, the fill shall be reconditioned as necessary and recompacted to the required density and/or moisture content prior to placing additional material. The Contractor shall be responsible for placing, moisture conditioning and compacting approved material in accordance with these specifications.
- D. Sufficient testing and inspection should be performed to assure compliance with the recommended compaction standards. Samples of proposed native or imported fill should be submitted to the Geotechnical Engineer material testing laboratory for assessment at least 48 hours prior to placement or importing to the site (whichever is soonest).

### **3.6 FINISH**

- A. Fill slopes shall be compacted by slope rolling and trimming or shall be overfilled and trimmed back to planned grade. The completed fill shall be finished true to line and grade. Depressions shall be filled and compacted and all loose material shall be removed.
- B. After completion of compaction and finish grading operations, fill slopes, horizontal surfaces disturbed by construction operations, and cut slopes shall be moisture conditioned and 'trackwalked' to provide a firm and uniformly roughened surface free of loose material.
- C. See also requirements in landscape specifications for slope and landscaped area requirements.

### **3.7 CLEAN UP**

- A. Remove all debris and stains resulting from the work of this section, including any and all excess material, which shall be removed from the project site.

**END OF SECTION**

SECTION 312316  
**TRENCHING, BACKFILLING AND COMPACTION**

**PART 1 - GENERAL**

**1.1 SECTION INCLUDES**

- A. Locate and mark existing utilities within the limits of work.
- B. Trenching and other excavation needed for the installation of pipe (storm drain, water, sanitary sewer and gas) and appurtenances.
- C. Provide and install bedding material as specified for each type of utility.
- D. Backfill and compact trenches and excavations with suitable material, as specified.
- E. Provide and install subbedding material as required.

**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. Site Drainage – Section 334000
  - 2. Water Utility Distribution Piping – Section 331100
  - 3. Sanitary Sewerage Utilities – Section 333000

**1.3 SUBMITTALS**

- A. In accordance with Section 013300, Submittal Requirements:
  - 1. Sand equivalent and gradation analysis of bedding and backfill materials.

**1.4 REFERENCES**

- A. Standard Specifications
  - 1. Where referred to in these specifications, "Standard Specifications" shall mean the State of California Department of Transportation Standard Specifications, latest edition. All work shall be carried out in conformance with the Standard Specifications unless otherwise specified herein.

**1.5 EXISTING SITE CONDITIONS**

- A. The Contractor shall have Underground Service Alert mark all existing public utilities as a first order of work. Additionally, the Contractor shall have a locating service mark all existing private utilities within the limits of work.
- B. The Contractor shall pothole each existing utility that will be extended or reused at its point

of cut and removal to confirm the actual locations and depths, as well as all proposed crossings as shown on the drawings. Notify Engineer of results via the RFI process.

- C. Existing water, sewer, storm drain, gas, electrical, communication (data), etc. services and laterals to be abandoned or removed as indicated on the plans shall be provided with replacement facilities as to comply with construction sequencing requirements and limit utility/service outages as required by the Owner. See Mechanical, Electrical, and Civil plans for detailed removal/replacements requirements.
- D. The Contractor shall acquaint himself with all site conditions. If unknown/unmarked active utilities are encountered during the work, the Engineer shall be promptly notified for instruction via the RFI process. Failure to notify will make the Contractor liable for damage to these utilities arising from Contractor's operations subsequent to his discovery of such unknown/unmarked utilities.
- E. The Contractor shall review the Soils Investigation and plan their work accordingly.

#### **1.6 QUALITY ASSURANCE**

- A. Testing Agency: The project Geotechnical Engineer representative (Inspector) shall verify the adequacy of sub-bedding conditions and monitor bedding, backfilling, and compaction operations.
- B. Unsatisfactory Conditions: The Inspector will advise the Contractor immediately if unsatisfactory conditions or test results are observed. The area where compaction is unsatisfactory shall be reworked until the required density has been attained. The Inspector shall have the authority to reject structural bedding or backfill until unsuitable material has been replaced and/or rework, as needed, has taken place. It shall be the sole responsibility of the Contractor to achieve the specified degree of compaction.

#### **1.7 PROTECTION FROM CAVING**

- A. Construction Safety Orders
  - 1. Nothing in this section shall be deemed to allow the use of a shoring, sloping, or protective system less effective than that required by the Construction Safety Orders. The Contractor shall take all necessary measures to protect the workmen and adjacent areas and structures from the hazards of the trenching or excavation operations. Sheet piling and other sheeting shall be withdrawn in such a manner as to prevent caving at the walls of excavation or damage to piping or other structures. Except as may be hereinafter modified, no sheeting shall be left in the trench and no backfill shall be made against the sheeting before it is removed. Any sheeting extending below the invert of the pipe shall be left in place by cutting off in a manner satisfactory to the Inspector.
- B. Liability
  - 1. Nothing in this section shall be construed to impose tort liability on the Architect or the Design Engineer.

### **PART 2 - PRODUCTS**

#### **2.1 TRENCH STABILIZATION SUBBEDDING**

- A. Drain rock for trench stabilization subbedding shall be of the nominal sizes designated as 3/4" x 1/4".

**2.2 BEDDING MATERIAL (STORM DRAIN, WATER AND SANITARY SEWER)**

- A. Bedding material shall be well graded sand free from vegetable matter and refuse.
- B. The minimum sand equivalent value shall be 30.
- C. The grading shall conform to the following:

Sieve	Percentage Passing	
	Minimum	Maximum
1"	100	100
3/4"	100	100
3/8"	100	100
No. 4	90	100
No. 200	0	5

**2.3 BEDDING MATERIAL (GAS)**

- A. Bedding material for gas line installation shall be backfill sand meeting the requirements of the PG&E Green Book.

**2.4 BACKFILL**

- A. In non-hardscape areas (as shown on the Increment 3 set of plans), backfill material may be native excavated material free of vegetable matter, refuse and other unsatisfactory material.
- B. The backfill material shall be free of stone and lumps exceeding 4 inches in greatest dimension.
- C. Backfill material shall have minimum Plastic Index (PI) value of 15. Liquid limit (LL) value shall be no more than 40.
- D. Granular trench backfill material may be used in lieu of native material at the Contractor's option.

**2.5 GRANULAR BACKFILL MATERIAL**

- A. Within paved and other hardscape areas, the upper 12" of backfill for trenches shall be Caltrans Class 2 aggregate base.
- B. Granular backfill material, above bedding material, and below class 2 aggregate base, shall be gravel, sand or rock material free from deleterious materials, shall be used in hardscape areas.
- C. Minimum sand equivalent value shall be 25.
- D. Granular backfill material shall conform to the following:

Sieve Size	Percentage Passing
3"	100
3/4"	-
3/8"	-
No. 4	40 - 100
No. 30	10-100
No. 200	-

## PART 3 - EXECUTION

### 3.1 EXCAVATION

- A. The Contractor shall make all necessary excavations to construct the work shown on the Drawings and in accordance with trench detail appropriate to the utility being installed and the City Standards.
- B. The Contractor shall perform all excavations of every description and all substances encountered to the depth indicated on the drawings. During excavation, that material suitable for backfilling shall be deposited in an orderly manner, a sufficient distance from the banks for the trench to avoid overloading and to prevent slides or cave-ins. All excavated material not required or suitable for backfill shall be removed and properly disposed of offsite.
- C. Excavation shall include the removal of all materials or surface obstructions of any nature that would interfere with the execution of the work, and such items shall be returned to their equivalent preconstruction condition after installation of utilities.
- D. All trench excavation work shall conform to the Division of Industrial Safety Construction Safety Orders, which are currently in use.

### 3.2 TRENCH WIDTH AND DEPTH

- A. The maximum allowable width of trench measured at the top of the pipe shall be the outside diameter of the pipe exclusive of bells and collars, plus twenty-four (24) inches, and such maximum width shall be inclusive of all trench sheeting. Minimum width of trench for pipes 18" diameter and less shall be pipe diameter plus 6". Maximum width of trench for pipes 18" diameter and less shall be pipe diameter plus 9". Minimum width of trench for pipes 18" diameter and greater shall be pipe diameter plus 9". Maximum width of trench for pipes 18" diameter and greater shall be pipe diameter plus 12". Whenever the maximum allowable trench width is exceeded for any reason, the Contractor shall, at his expense, embed or cradle the pipe in concrete in a manner satisfactory to the Engineer.
- B. The trench shall be excavated to the dimensions and depth shown on the Drawings and in a manner, which will produce a firm foundation for supporting the entire length of each section of pipe. Bell holes shall be provided so that the load is carried on the pipe barrel.
- C. Minimum cover for domestic and recycled/reclaimed water lines shall be 24".
- D. Minimum cover for fire water lines shall be 42".
- E. Minimum cover for gas lines shall be 30".

### **3.3 CONTROL OF WATER**

- A. The Contractor, at his own expense, shall provide sufficient pumping equipment, and the operation thereof, to remove ground water from the excavation.
- B. Water shall be disposed of in such a manner as to cause no injury to public or private property, nor be a menace to the public health. Discharges directly to storm drainage systems, ditches, and creeks shall not be allowed.
- C. Dewatering shall be performed under a Contractor obtained permit from either the City of Eureka (if discharge is to the sewer system) or the Regional Water Quality Control Board (if discharge is to the storm drain system). The Contractor is advised that both of these agencies may require testing of the proposed dewatering discharge for contaminants. It shall be the sole responsibility of the Contractor to apply for and obtain the necessary permits, obtain and pay for any required water quality tests, design shoring and dewatering systems, and pay any fees associated with discharging the water to the sanitary sewer system if that option is selected. Permits must be obtained prior to any discharge occurring.

### **3.4 UNSUITABLE SUB-BEDDING**

- A. Where soft, wet, spongy, or unsuitable trench foundation is encountered, sub-bedding material shall be placed under the pipe to facilitate construction. The cost of furnishing and placing sub-bedding material shall be included in the price bid for the job.

### **3.5 BRACING EXCAVATIONS**

- A. Excavations shall be so braced and supported that they will be safe, and the ground alongside the excavation will not slide or settle, and all existing improvements of any kind, either on public or private property will be fully protected from damage.
- B. If any damage does result to such improvements, the Contractor shall make the necessary repairs or reconstruction at his own expense.

### **3.6 PIPE BEDDING (STORM DRAIN, WATER AND SANITARY SEWER)**

- A. Bedding material shall be placed under the pipe before the pipe joints have been completed and inspected.

- B. Bedding material shall be placed carefully around and under the pipe in horizontal layers 4 inches thick after compaction.
- C. The bedding material shall be brought up uniformly on each side of the pipe.
- D. Bedding material shall have the proper moisture content to assure maximum compaction by using hand or pneumatic tampers.
- E. Bedding shall be accomplished in a manner which will not disturb the pipe but will secure a relative compaction of 90 percent.
- F. Bedding shall be installed up to 4 inches below and 12" over the top of the pipe.

**3.7 PIPE BEDDING (GAS)**

- A. Bedding material shall be placed under the pipe before the pipe joints have been completed and inspected.
- B. Bedding material shall be placed carefully around and to the sides of the pipe in horizontal layers 4 inches thick after compaction.
- C. No compaction is allowed directly above the pipe until there is at least 12" of cover.
- D. The bedding material shall be brought up uniformly on each side of the pipe.
- E. Bedding material shall have the proper moisture content to assure maximum compaction by using hand or pneumatic tampers.
- F. Bedding shall be accomplished in a manner which will not disturb the pipe but will secure a relative compaction of 90 percent.
- G. Bedding shall be installed at least 2 inches below and 12" over the top of the pipe.

**3.8 TRENCH BACKFILL**

- A. Backfill material shall be placed after the pipe and bedding have been inspected by the Inspector. Native backfill may be used, at the contractor's option, outside of exterior slab and pavement areas. All other areas shall use Caltrans Class 2 aggregate base in the upper 12 inches of the trench backfill. All trenches shall be backfilled to pavement or exterior slab structural section subgrade, or to finished grade in unpaved areas.
- B. Backfill and compaction of utility trenches in and immediately adjacent to building pads, driveways, parking, and other flatwork areas should be such that no settlement will occur.
- C. Where trenches closely parallel a footing and the trench bottom is within a 2 horizontal to 1 (one) vertical plane, projected outward and downward from any structural element, grout slurry should be utilized to backfill that portion of the trench below this plane. The use of slurry backfill is not required where a narrow trench crosses a footing at or near a right angle.

- D. Granular Backfill (Non-native)
  - 1. The backfill material shall be placed in layers not exceeding 6" in uncompacted thickness.
  - 2. Compaction may be accomplished by adding sufficient water to the material as it is placed in the trench to achieve 90 percent relative compaction.
  - 3. Supplemental compactive effort using vibratory means shall be employed if necessary to obtain specified degree of compaction.
  - 4. Ponding or the use of excessive amounts of water will not be allowed.
  - 5. Vibratory or other compaction equipment shall be used whenever necessary to obtain the required compaction, and must be used within 12 inches of pavement subgrade in paved areas, where compaction is required to be 95% R.C.
  
- E. Native Backfill
  - 1. Native backfill material shall be placed in layers not exceeding 6" in uncompacted thickness.
  - 2. Compaction may be accomplished by adding sufficient water to the material as it is placed in the trench to achieve 90 percent relative compaction.
  - 3. Supplemental compactive effort using vibratory means shall be employed if necessary to obtain specified degree of compaction.
  - 4. Ponding or the use of excessive amounts of water will not be allowed.
  - 5. Vibratory or other compaction equipment shall be used whenever necessary to obtain the required compaction.

### **3.9 CLEAN UP**

- A. Remove all debris and stains resulting from the work of this section.

END OF SECTION

## SECTION 316800 FOUNDATION TIEDOWN ANCHORS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Geotechnical Report: "Soils Evaluation Memo" prepared by LACO Associates and dated June 26, 2023, is available in accordance with "Information Available to Bidders".

#### 1.2 SUMMARY

- A. This Section includes:
  - 1. Permanent tiedown anchors used to provide resistance to seismic uplift forces, including drilling, grouting, stressing, load testing and lock-off.

#### 1.3 SYSTEM REQUIREMENTS

- A. Contractor design responsibility: Contractor shall determine the bond length, borehole diameter and grouting method to achieve the performance requirements, subject to the minimum requirements of the Contract Documents.
- B. Performance requirements:
  - 1. Each tiedown anchor shall be capable of sustaining an Ultimate Load (UL) as designated on Drawings, when performance tested in accordance with Part 3 of this Section.
- C. Minimum requirements:
  - 1. Contractor shall not be permitted to adjust the location and number of tiedown anchors or change the anchor bar size or type from that designated in the Contract Documents.
  - 2. Minimum borehole diameter shall be as designated on Drawings.
  - 3. Free-stressing length designated on Drawings is a minimum requirement. Free-stressing length shall not exceed specified minimum by more than five feet unless approved by Owner's Representative, considering effect on anchor elongation.
  - 4. Minimum length of bonded zone shall be as designated on Drawings.
  - 5. Provide the minimum total anchor length designated on Drawings to achieve the required load capacity of anchor groups, where indicated.
- D. Performance Verification: All tiedown anchors shall be tested in accordance with Part 3 of this Section.
  - 1. Contractor shall complete the initial performance testing program prior to installation of additional anchors.

#### 1.4 REFERENCES

- A. Standards listed below apply where designation is cited in this Section. Where the applicable year of adoption or revision is not listed below, the latest edition applies.

- B. ASTM: Standards of the American Society for Testing and Materials (ASTM) apply where cited in this Section.
- C. PTI: Post-Tensioning Institute's "Recommendations for Prestressed Rock and Soil Anchors", 2014 (PTI DC35.1-14)

## **1.5 DEFINITIONS**

- A. Alignment Load (AL): A nominal load applied to an anchor during testing to keep the testing equipment positioned correctly.
- B. Design Load (DL): As designated on Drawings. The Design Load is the maximum anchor load determined using allowable stress load combinations.
- C. Free-stressing length: The length of the anchor bar that is not bonded to the surrounding ground or grout during stressing, measured from the bearing plate.
- D. Lock-off load: The prestressing force after transferring the load from the jack to the foundation, as specified on the Drawings.
- E. Ultimate Load (UL): The maximum load to which performance test anchors are subjected, equal to the maximum load determined based on load combinations for strength design using overstrength factors. Anchors designated for performance testing shall be subjected to UL equal to 240% of DL.
- F. Proof Load (PL): The maximum load to which production anchors are subjected, equal to 160% of DL.
- G. Tiedown: A system used to transfer tensile loads to soil or rock that includes the anchor bar, anchorage, corrosion protection, sheathings, centralizers, and grout.

## **1.6 SUBMITTALS**

- A. Submittal procedures and administrative provisions are established by Division 01 Section "Submittals".
- B. Qualifications: Project lists for the Anchor Installer.
- C. Design calculations: Generate calculations showing test load, nominal borehole diameter, bond length and free-stressing length for each tiedown. Indicate basis for determination of bond length. Identify minimum and maximum anchor deformation under Proof Load.
  - 1. Calculations shall bear the seal and signature of a Civil Engineer registered in the State of California.
- D. Fabrication drawings: Indicate bar size and material. Provide detailed drawing of factory installed corrosion protection and sheath systems, including end terminations. Provide detailed drawing of anchor zone, including all anchorage components. Indicate location and type of centering devices. If utilized, specify location of anchor bar splice.
- E. Installation and monitoring procedures: Provide detailed written procedure to be followed for installing anchors, including description of equipment and methods to be used. Describe procedures for monitoring grout quality, volume of grout, and grouting pressure during installation. Include form proposed for preparation of standard daily log.
- F. Load testing procedures: Describe procedures to be employed for load testing.
  - 1. Submit certified calibration charts for each test jack, pressure gauge, master gauge, and load cell to be used.

- G. Mill test reports: Submit test reports certifying compliance with specified standards to Testing Agency for record purposes.
  - 1. Anchor bars. Include stress-strain curves and creep tests per Section 4.2.2 of PTI document.
  - 2. Cement.
- H. Mix design for grout.
- I. Anchor bar coupler: If utilized, submit code approval report.

## **1.7 QUALITY ASSURANCE**

- A. Installer qualifications: Not less than 5 successfully completed projects within the preceding 5 years with similar site conditions, shaft sizes, and anchor test loads.
- B. Preinstallation conference: Conduct conference at project site to comply with requirements in Division 01 Section "Project Management and Coordination."
  - 1. Schedule: Three weeks minimum prior to installation of tiedown anchors.
  - 2. Attendees: For the Contractor, include representatives of the Anchor Installer and their Professional Engineer. For the Owner, include representatives of the Geotechnical Engineer, Structural Engineer, and Testing Agency.
  - 3. Agenda: General Contractor shall review status of submittals and discuss outstanding items and proposed schedule for work. Anchor Installer shall present procedures for installation, testing, and monitoring. Roles and responsibilities for testing, inspection and monitoring by Contractor, Geotechnical Engineer, and Testing Agency will be reviewed and coordinated. Process for response to field conditions that require modification to approved drawings will be reviewed.
- C. Each anchor shall be load tested by the Contractor, with observation by the **Geotechnical Engineer** and Owner's Testing Agency in accordance with "Load Testing" provisions of this Section.
  - 1. Jacks shall be calibrated, and load versus gauge pressure/load cell reading curves provided for each pressure gauge, for 25 percent and 75 percent of the minimum jack extension for two cycles of loading, over the full range of expected load usage. At least six (6) load increments shall be applied, and all measured points shall be shown on the calibrations.
  - 2. Provide means to measure load application within an accuracy of plus or minus five percent (5%).

## **1.8 PRODUCT HANDLING AND STORAGE**

- A. Handle anchor bars in such a manner to ensure that bars are not bent and that corrugated PVC sheathing is not damaged. Repair damage to sheathing in accordance with the manufacturer's recommendations.
- B. Maintain anchors free of soil. Do not drag on ground. Store off ground on suitable supports.

## **PART 2 - PRODUCTS**

### **2.1 TIEDOWNS**

- A. General: Factory fabricate tiedown anchor assemblies as one continuous unit to achieve 100-year certified PTI Class I (Double Corrosion Protection) in the completed

installation.

- B. Acceptable products: Dywidag Threadbar® Anchors with Double Corrosion Protection, SAS Stressteel Inc. threadbars with DCP, or Williams Threadbar with Multiple Corrosion Protection III (No substitutions).
- C. Anchor bar: Alloy steel threaded bars fabricated from steel conforming to ASTM A722, with a minimum tensile strength of 150,000 psi, and manufacturer's standard threaded deformations.
- D. Factory corrosion protection: Anchor bars shall be encapsulated in a corrugated plastic sheath over the full length of the anchor. The annular space between the bar and the sheath shall be completely filled with encapsulation grout. Encase corrugated sheathing in a smooth plastic sheath over the free-stressing length and tape ends.
  - 1. Plastic sheaths: High density polyethylene (HDPE) according to ASTM D1248, Type III, or polyvinyl chloride (PVC) according to ASTM D1784, Class 13464-B.
    - a. Corrugated sheath: Sheath shall have a minimum wall thickness of 1.5 mils. Inside diameter shall be 1/2-inch minimum larger than the anchor bar diameter, measured from the outside of anchor bar deformations. Outside diameter shall be 1/2-inch minimum larger than inside diameter.
    - b. Smooth sheath: Tube or pipe with a minimum wall thickness of 0.10 inches. Inside diameter shall not be more than 0.25 inches larger than outside diameter of corrugated sheath. Outside diameter shall not exceed 4 inches.
    - c. The materials for accessories such as end caps, grouting caps, grout tubes and sealing caps shall have properties equal to the plastic sheath.
  - 2. Encapsulation grout: A combination of Type I or II Portland cement and potable water. Chemical admixtures that retard set or reduce bleeding may be used. Other admixtures shall be allowed only with approval of Owner's Representative.
  - 3. Tape: 20 mil thick by minimum 2 inch wide polyethelene tape. Same as 3M Scotchrap™ All- Weather Corrosion Protection Tape 51, or approved equal.
- E. Accessories: Furnish manufacturer's standard accessories as necessary for complete installation.
  - 1. Couplers: Shall be as specified by the supplier of the anchor and shall develop at least 100% of the guaranteed minimum ultimate strength of the bar.
  - 2. Anchor nuts and washers: Shall be as specified by the supplier of the anchor and shall develop at least 100% of the guaranteed minimum ultimate strength of the bar. Capable of accommodating variations in angle.
  - 3. Bearing plates: ASTM A36 or ASTM A572, Grade 50 steel.
  - 4. Trumpet: Fabricate from steel pipe according to ASTM A53 with a minimum wall thickness of 0.20 inches. Trumpet shall have an inside diameter larger than the outside diameter of the smooth sheath.
    - a. Trumpet shall be long enough to accommodate movements of the structure and the anchor bar during stressing and testing, but not less than 18 inches. The trumpet shall overlap the smooth sheath by at least 6 inches and the fully encapsulated anchor bar by at least 12 inches.
    - b. Where shown on Drawings, trumpet shall extend full length to bottom of footing to receive waterproofing. Grind inside and outside edges to form

- minimum 1/16 chamfer and epoxy coat bottom 8 inches for corrosion protection.
  - c. The joint between trumpet and bearing plate shall be made watertight by seal welding.
  - d. A seal to retain corrosion inhibiting compound or grout within trumpet shall be provided between the outside of the smooth sheath and inside face of trumpet. A description of the seal shall be provided to the Owner's Representative for approval. Install seal within 3 inches of bottom of trumpet.
  - 5. Centralizers: PVC devices that will position the anchor bar assembly at the center of the shaft and will hold it securely in place during grout placement. The centering devices shall not interfere with grout placement. Place at 10-foot intervals along bond length.
  - 6. Covers: Steel or plastic cover that forms a permanent watertight enclosure for the anchor head. Cover shall provide minimum 1 inch vertical clearance over top of anchor bar. Cover shall positively and securely fasten to bearing plate. Cover shall have provision for filling with corrosion inhibiting compound.
- F. Fabrication:
- 1. Shop fabricate anchor bar assemblies. Field splice only as necessary and with approval of Owner's Representative. Splices are not allowed in the free stressing length of the tie down.
  - 2. Anchor bars shall be cut with an abrasive saw.
  - 3. All of the bond length shall be free of dirt, lubricants, or other deleterious substances that may significantly affect bond or the service life of the anchor.
  - 4. Encapsulation grouting shall be done on an inclined frame or bed by injecting the grout from the low end of the anchor.
  - 5. Joints in the plastic sheath shall be made watertight.

## **2.2 GROUT**

- A. A pumpable mixture of Types I or II Portland cement, water, and admixtures. Chemical additives which can control bleed or retard set may be used. Expansive additives will not be allowed. Additives, if used, shall be mixed in accordance with the manufacturer's recommendations.
- 1. The grout shall achieve a minimum compressive strength of 2,500 psi at 7 days and 3,500 psi at 28 days. Minimum concrete compressive stress at time of stress is 3,500 psi.
  - 2. The grout shall bleed less than 2 percent when allowed to stand for 1 hour.
  - 3. Subject to compliance with requirements, fine aggregate (sand) and/ or fly ash may be added to grout mix.

## **2.3 MISCELLANEOUS**

- A. Corrosion-inhibiting compound: Grease or wax with appropriate moisture-displacing, corrosion-inhibiting additives, and self-healing properties. The compound shall permanently stay viscous and be chemically stable and non-reactive with the prestressing steel, the sheathing material, and the anchor grout. Conform with Table 4-1 of PTI "Recommendations for Prestressed Rock and Soil Anchors."

## **2.4 SOURCE QUALITY CONTROL**

- A. Inspection and testing will be performed under provisions of Division 01 Section, "Quality".
- B. Testing Agency will:
  - 1. Review manufacturer's test reports for compliance with specified requirements.
  - 2. Verify material identification.

## **PART 3 - EXECUTION**

### **3.1 PREPARATION**

- A. Perform field engineering and layout work including furnishing necessary centerlines, offsets, and grade stakes.
- B. Notify the Geotechnical Engineer at least four working days in advance of the beginning of work or on resumption of work after stoppage. Any hole drilled or cast without continuous observation of the Geotechnical Engineer will be rejected.

### **3.2 INSTALLATION**

- A. Install tiedown anchors in accordance with approved layout drawings and installation and monitoring procedures.
- B. Tolerances:
  - 1. Plan location: Plus or minus 3 inches.
  - 2. Vertical alignment: Shafts out of plumb, or differing from prescribed angle, not more than 1.5 percent of length.
  - 3. Where specified tolerances are exceeded, provide corrective construction to compensate for eccentricity as determined by Owner's Representative and DSA.
- C. Minimum formwork: Case top 2 feet of anchor shaft with leave-in place metal, plastic or fiber tube. Formwork may remain in place. Backfill around form with clean sand upon completion of anchor.
- D. Grouting equipment shall be sized to enable anchor shaft to be grouted in one continuous operation.
  - 1. Mixer shall be capable of producing a grout free of lumps and undispersed cement. Mixer shall continuously agitate the grout.
  - 2. Neat cement grouts shall be screened to remove lumps. The maximum size of the screen openings shall be 0.25 inches (6.4 mm).
  - 3. Grout pump shall be equipped with a pressure gauge to monitor grout pressures.
- E. Grouting:
  - 1. Tremie grout from the bottom of the hole. As drill casing is withdrawn pump grout under sufficient pressure to create the bond zone.
  - 2. Record the quantity of the grout and the grout pressures along the height of the shaft.
  - 3. Fill the entire anchor shaft with grout in one continuous operation.
  - 4. Upon completion of grouting, the filled grout tube may remain in the hole.
- F. Post-grouting: The number of phases of post-grouting shall be determined by Installer and proven in Preproduction and Performance Test anchors. Production anchors shall be grouted using the methods and target pressures that were used for installation of acceptable test anchors. Grouting pressures shall be incrementally increased until a refusal is reached or an acceptable amount of grout is pumped.

### 3.3 LOAD TESTING

- A. Test installed tiedowns in accordance with the procedures herein prior to installation of foundations.
- B. Load testing shall be performed by Contractor, under the observation of Geotechnical Engineer.
- C. Testing shall be performed in accordance with provisions of PTI "Recommendations for Prestressed Rock and Soil Anchors", except as modified herein.
- D. Testing apparatus: Apparatus for applying loads shall be in accordance with ASTM D3689.
  - 1. Maintain 8 feet clear distance between test anchor and cribbing.
- E. Test the first 2 production anchors plus 2% of the remaining anchors using Performance Test procedures.
  - 1. Contractor shall propose locations for test anchors. Geotechnical Engineer shall review and approve locations as representative of site conditions.
  - 2. Do not install other anchors until tests are completed and accepted by Geotechnical Engineer.
- F. Performance test procedures:
  - 1. Test anchors using the Performance Test procedures and loading schedule (Table 8.1) of PTI "Recommendations for Prestressed Rock and Soil Anchors" except as modified herein. Add two additional loading steps to Table 8.1 as follows.
    - a. Loading step 7. Apply load according to the following increments: AL, 0.25 DL, 0.50 DL, 0.75 DL, 1.00 DL, 1.20 DL, 1.33 DL, 1.60 DL.
    - b. Loading step 8. Apply load according to the following increments: AL, 0.25 DL, 0.50 DL, 0.75 DL, 1.00 DL, 1.20 DL, 1.33 DL, 1.60 DL, 2.00 UL.
    - c. Loading step 9. Apply load according to the following increments: AL, 0.25 DL, 0.50 DL, 0.75 DL, 1.00 DL, 1.20 DL, 1.33 DL, 1.60 DL, 2.00 DL, 2.40 DL (UL).
  - 2. In the performance test, the anchor is incrementally loaded and unloaded. At each increment, the movement of the anchor bar is recorded. The loading at each increment is held just long enough to obtain movement readings, but not longer than 1 minute. The maximum load is held for a minimum of 10 minutes, with movement readings taken at 1, 2, 3, 4, 6 and 10 minutes.
  - 3. If the total movement between the 1 and 10 minute readings exceeds 0.04 inches, hold the load for 50 additional minutes. The movement shall then be recorded at 15, 20, 25, 30, 45, and 60 minutes.
- G. During performance testing, the movement of the stressing end of the anchor shall be monitored to the nearest 0.001 inches using a free-standing dial gauge. Measurements shall be recorded at each increment of loading and at 1- and 10- minutes.
  - 1. Plot a graph of total anchor movement at each load increment.
  - 2. Acceptance criteria:
    - a. The total elastic movement shall exceed 80% of the theoretical elastic movement of the anchor bar over the free-stressing length.
    - b. The total elastic movement shall not exceed the theoretical elastic movement of the anchor bar over the free-stressing length plus one half of the bonded length.
    - c. The total movement, measured during the final cycle of loading, shall not exceed the designated performance criteria.
    - d. The creep rate does not exceed 0.080 inches/log cycle during the final log cycle of

the test.

- H. Proof tests: All remaining anchors shall be Proof Tested.
  - 1. Test anchors using the Proof Test procedures of PTI "Recommendations for Prestressed Rock and Soil Anchors".
  - 2. The proof test measures the movement of the anchor during one cycle of incremental loading. The loading at each increment is held just long enough to obtain movement readings, but not longer than 1 minute. The maximum load is held for a minimum of 10 minutes, with movement readings taken at 1, 2, 3, 4, 6 and 10 minutes.
  - 3. Apply the Proof Load (PL) according to the following increments: AL, 0.25 DL, 0.50 DL, 0.75 DL, 1.00 DL, 1.20 DL, 1.33 DL, 1.6 DL (PL).
  - 4. Hold Proof Load for 10 minutes. If the total movement between the 1- and 10-minute readings exceeds 0.04 inches, hold the load for 50 additional minutes. The movement shall then be recorded at 15, 20, 25, 30, 45, and 60 minutes.
  - 5. Acceptance Criteria:
    - a. The total movement shall exceed 80% of the theoretical elastic movement of the anchor bar over free-stressing length, when measured between 0.50 DL and PL.
    - b. The creep rate does not exceed 0.080 inches/log cycle during the final log cycle of the test.
- I. When, in the professional opinion of the Geotechnical Engineer, the proof test results for an anchor show significant variation from the performance test results, the Contractor shall perform a performance test on that anchor at no additional cost to Owner.
  - 1. Allow for additional Performance Testing of 5 percent of the total number of anchors in Contract Price.
- J. Defective anchors:
  - 1. If an anchor fails to meet the above acceptance criteria for testing, then that anchor will be rejected. All rejected anchors shall be replaced or supplemented by anchors installed at locations approved by the Owner's Representative and DSA, as required to provide the total anchor capacity indicated on the Drawings.
  - 2. No extension of time or additional compensation will be provided for replacing or installing additional anchors.
- K. Records: The Contractor shall provide the Owner's Representative two (2) copies of test record for each anchor within five (5) days of each test. Test records shall include the information listed below.
  - 1. General: Project identification, anchor identification, bar size and type, bond length, free-stressing length.
  - 2. Grouting data: Date grouted, pressure and grout volume.
  - 3. Test results: Date tested, test type (performance or proof) and graphs of results. Note any adjustments made during test and unusual occurrences during test.

### **3.4 LOCK-OFF**

- A. Preparation: Observe placement, sealing and securing of trumpet immediately prior to placement of foundation concrete. Verify that compressible material is installed over top of shaft.
- B. Upon completion of foundations, stress anchor bars to lock-off and anchor. Provide a method of anchorage which will limit the load loss to not more than five percent of the

lock-off load in the transfer of loads from the jacks to the footing.

- C. Fill trumpet completely with corrosion preventative compound.
- D. Install and seal cover and fill completely with corrosion preventative compound.

### **3.5 FIELD QUALITY CONTROL**

- A. Inspection and testing will be performed under provisions of Division 01 Section "Quality".
- B. Geotechnical Engineer will:
  - 1. Continuously observe drilling for anchors paying attention to the depths of soil and rock materials encountered. Notify Contractor and Owner's Representative when depth of materials encountered varies from expected conditions.
  - 2. Continuously observe tiedown anchor installation. Notify Contractor and Owner's Representative when grout volume or pressure deviates from observations of test program.
  - 3. Monitor load testing and recording of results.
  - 4. Perform final determination of the acceptability of installed tiedown anchors; assign reduced capacity to tiedown anchors that fail to comply with specified requirements.
  - 5. Compile records of each tiedown anchor from Contractor's log, Geotechnical Engineer's observations, load testing, and as-built locations provided by the Contractor.
  - 6. Prepare final report.
- C. Testing Agency will:
  - 1. Sample and test grout for compressive strength in accordance with ASTM C109.
  - 2. Observe final stressing, lock-off and installation of corrosion protection measures.

**END OF SECTION**

SECTION 32 01 90.13

**EXTERIOR IMPROVEMENTS &  
LANDSCAPE MAINTENANCE**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes requirements for:
  - 1. Watering trees and grass.
  - 2. Monitoring adjustment and minor repair of the landscape irrigation system.
  - 3. Mowing, edging and trimming of lawn areas.
  - 4. Monitoring, fertilizing, weeding, and cultivating the lawn areas.
  - 5. Pruning and trimming of plant material.
  - 6. Weed, cultivating and cleaning of planting beds.
  - 7. Application of fertilizers, insecticides, and herbicides.
  - 8. General site clean-up; removal of trash and products of maintenance.
  - 9. Replacement of trees, shrubs, groundcovers, sod and hydromulch.
  - 10. Sediment removal from irrigation, storm and drainage events.
  - 11. Extra services as needed - see Section 1.4 EXTRA SERVICES of this specification.
- B. Related Sections:
  - 1. Section 32 92 00, "Turf and Native/Adaptive Plantings."
  - 2. Section 32 93 13, "Trees, Shrubs, and Ground Covers"
  - 3. Section 32 84 00, "Planting Irrigation."

### 1.3 DEFINITIONS

- A. Backfill: The earth used to replace or the act of replacing earth in an excavation.
- B. Finish Grade: Elevation of finished surface of planting soil.
- C. Manufactured Topsoil: Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil.
- D. Planting Soil: Native or imported topsoil, manufactured topsoil, or surface soil modified to become topsoil; mixed with soil amendments.
- E. Subgrade: Surface or elevation of subsoil remaining after completing excavation, or top surface of a fill or backfill, before placing planting soil.
- F. Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.

### 1.4 EXTRA SERVICES

- A. All services not covered under this contract shall be considered “extra services” and will be charged for separately according to the nature of the item of work. The consent and authorization of the Owner or their authorized representative must be obtained prior to the performance or installation of such “extra services” items and prior to purchase of any chargeable materials.
- B. Plant replacement caused by conditions beyond the contractor’s control. See Section 1.7 NEGLECT AND VANDALISM of this specification.

### 1.5 MAINTENANCE REQUIREMENTS

- A. Maintenance period shall begin upon inspection and approval at Substantial Completion and shall be for ninety (90) days. Maintenance frequency shall be weekly throughout the maintenance period.
- B. Irrigation System: Maintenance of the irrigation system shall consist of monitoring and adjustment of the duration and frequency of the watering schedule, adjustment of heads, emitters, and dripline for coverage and elevation, removal of debris from heads and drip filters, repair of leaks in both mains and lateral lines and all other work required to establish a complete working sprinkler irrigation system.
- C. Trees, Shrubs, Groundcovers and Vines: Maintenance of new planting shall consist of watering, cultivating, weeding, mulching, re-staking, tightening and repairing of guys, resetting plants to proper grades or upright positions, restoration of the planting basins, and furnishing and applying such sprays and invigorants as are necessary to keep the plants free of insects and disease and in thriving condition.

- D. Lawns: Maintenance of new lawns shall consist of mowing, edging, raking, watering, weeding, fertilizing, and repair of all erosion, reseeding and resodding as necessary, to establish a uniform stand of the specified grasses.

#### 1.6 PROTECTION

- A. Protect planting areas and lawns at all times against damage of all kinds for duration of maintenance period. Maintenance includes temporary protection fences, barriers, and signs as required for protection. If any plants become damaged or injured, because sufficient protection was not provided, treat or replace as directed by the Owner's Representative at no additional cost to Owner.

#### 1.7 NEGLECT AND VANDALISM

- A. Turf, shrubs, trees or plants that are damaged or killed due to Contractor's operations, negligence or chemicals shall be replaced at no expense to the Owner. If plant damage or death is caused by conditions beyond the Contractor's control, replacement shall be at the Owner's expense.
- B. Sprinklers, drip irrigation components or structures that are damaged due to the Contractor's operations must be replaced by the Contractor promptly. Likewise, damage to the irrigation system by others shall be corrected immediately by the Contractor, at the Owner's expense.
- C. All man-made water damage, resulting from Contractor's neglect shall be corrected at Contractor's expense.
- D. All damage to or thefts of landscaping and irrigation installations not caused or allowed by the Contractor shall be corrected by the Contractor at the Owner's expense upon receipt of written authorization to proceed.

#### 1.8 EMERGENCIES

- A. Answer emergency or complaint calls regarding conditions in landscaped areas regarding fallen trees or branches or shrubs or trees that obstruct the trail or other pavement within one (1) hour and correct the problem or place warning signs and advise the Owner of the need for major work to be performed within four (4) hours of the initial contract.
- B. Answer emergency calls regarding the landscape irrigation system failure or need of repair.

## 1.9 FINAL ACCEPTANCE

- A. Work under this section will be accepted by Owner's representative upon satisfactory completion of all work, including maintenance, but exclusive of the required guaranteed irrigation obligations, replacement of plant materials and lawns under the Warranty Period. Upon Final Acceptance, the Owner shall assume responsibility for maintenance of the work.
- B. The Contractor shall be responsible to contact the Owner's Representative ten (10) business days prior to end of 90-Day Maintenance Period to schedule Final Acceptance inspection.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- 1. Fertilizers, soil amendments, equipment, or other materials required for installed items shall match those already in use.
- 2. Sample of all materials not specified under other Sections of these Specifications shall be submitted for review by Owner's representative prior to use.

## PART 3 - EXECUTION

### 3.1 REQUIRED EQUIPMENT

- A. Employ the necessary maintenance equipment.

### 3.2 WATERING

- A. It shall be the responsibility of the Contractor to assure that the correct watering of plant materials is being accomplished during plant establishment period through the following irrigation services:
  - 1. Regular deep watering to all new trees until there are definite signs that the trees have established themselves and new growth is apparent. Deep watering shall be accomplished by automatic controller scheduling, hand watering with hoses or water truck equipment. When hand watering, a water wand shall be used to break the water force.
  - 2. Frequent watering to the lawn areas to insure against drying. This may be accomplished by automatic controller scheduling or hand watering.

### 3.3 LANDSCAPE IRRIGATION SYSTEM

- A. Monitor and program the automatic controlling devices to provide optimum moisture levels in all planted areas.
1. Irrigation cycles shall be set to take place prior to sunrise (usually 4:00-5:00 am) unless otherwise instructed by the Owner in writing, except during visits of grounds maintenance personnel; during such visits the irrigation system may be operated as desired by those personnel.
  2. If there is more than one irrigation controller, program to water per design parameters found in Contract Documents. During periods of high rainfall, set rain sensors to turn off irrigation programs until irrigation is needed. Do not switch controller to "off", as this will stop the controller.
  3. Complete irrigation system servicing shall be performed as required to maintain irrigation in correct operating condition, including all required labor. Operation of irrigation systems shall be monitored on a monthly basis to assure proper coverage and operation. Contractor shall provide a written report to Owner within five (5) business days after each monitoring service is complete including observation of performance, modifications to schedules, repairs and adjustments.
  4. Adjust irrigation to avoid water damage to windows, buildings, fences, and walls. Make repairs and alterations to the irrigation system and water lines as needed. All irrigation repairs such as cleaning heads and filters or breaks caused by the Contractor shall be the Contractor's responsibility.
  5. Perform minor additions, subtractions and/or adjustments to irrigation equipment (i.e., addition of sprinkler heads or emitters, riser extensions, etc.) as may be required in order to conform to the irrigation requirements herein specified. Such additions, subtractions and/or realignments to irrigation system equipment shall not materially reduce the extent or value of the irrigation system equipment, and shall be accomplished after securing approval of the Owner.
  6. Supplemental irrigation beyond that which can be provided by the irrigation system shall be provided by the grounds maintenance firm as required in order to assure optimum moisture levels.
  7. Sediment removal from project site as a result of erosion due to over irrigation or broken pipes.

### 3.4 MAINTENANCE OF TURF AREAS

- A. Mowing lawn/grass areas shall be accomplished with sharp, properly adjusted mowers of the correct size for the various areas.

- B. Mowing frequency shall be as per the Maintenance Frequency Schedule per Section 3.6 MAINTENANCE FREQUENCY SCHEDULE of this specification.
- C. Blade heights shall be set according to the following schedule: two (2) inches – initial mowing and two and one half (2-1/2) inches April – November.
- D. In the event of a prolonged rainy period and a surge in leaf growth is anticipated, the mower height may be re-adjusted to prevent “scalping” or “skinning” of lawn on preceding cuts.
- E. Lawn shall be edged evenly at all walks, headers and other structures as per Maintenance Frequency Schedule per Section 3.6 MAINTENANCE FREQUENCY SCHEDULE of this specification.
- F. After seed germinates or after sod is established, approximately four (4) to six (6) weeks after installation, apply a high-quality turf fertilizer that is predominately nitrogen to the lawn areas.
- G. Until the establishment of the turf, the Contractor will be responsible for replacing soils that have eroded onto the paved areas. Residual soils on paving will be removed and if not mingled with objectional materials, may be re-used in eroded areas.
- H. Immediately upon observing any lawn grass spreading into shrub or groundcover areas, the Contractor shall initiate a program of mechanical removal and maintain this program throughout the maintenance period.
- I. Any lawn grass appearing in paved areas shall receive an application of soil sterilant according to manufacturer’s direction. The sterilant shall be approved and will not be detrimental structurally to paved areas.
- J. Removal of debris from the site unrelated to horticultural maintenance (paper, bottles, cans, etc.) shall be the responsibility of the maintenance Contractor and limited to areas designated by the project’s limit of work. Exceptions for debris removal shall be per written direction of Owner.

### 3.5 MAINTENANCE OF TREES, SHRUBS AND GROUNDCOVERS

- A. Contractor shall adjust and tighten as required all tree staking and guying to maintain support and prevent bark wounds due to rubbing. Guying shall remain in place through the one (1) year guarantee period. Removal as directed by Owner’s Representative.
- B. Contractor shall deep water all new trees until there are definite signs the trees have established themselves and are pushing out new growth.
- C. Watering basins shall be removed by contractor after the trees have established themselves or as directed by Owner’s Representative. Basins are normally removed one year from time of planting.

- D. Contractor shall perform pruning work in accordance with standard horticultural pruning practices. Remove from the project all pruned branches and material. Remove and replace plant material excessively pruned or malformed resulting from improper pruning practices at no additional cost to the Owner.
  - 1. 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 Owner's Representative.
  - 2. Prune shrubs to develop natural form of plant. Shrubs shall not be clipped into balled boxed forms unless such is specified by the Contract Documents. Pruning cuts shall be made to lateral branches, buds or flush with the trunk. "Stubbing" and "heading" shall not be permitted.
- E. Contractor shall be continuously alert for signs of insect presence or damage or the presence or damage from plant fungi. Upon locating such evidence, the Contractor shall report it to the Owner's Representative and take action as directed.

### 3.6 MAINTENANCE FREQUENCY SCHEDULE

- A. Mowing, edging, trimming, litter clean-up, weeding, and watering monitoring: four visits per month for ninety (90) days.
- B. Top-dress fertilizer: thirty (30) days after seeding and/or sodding.
- C. Mulching, weeding, weed control and guying adjustment: as required each visit.
- D. Reseeding: as required upon notice.
- E. Tree and plant replacement: as required each visit.
- F. Trash and debris removal: collect all trash and debris at each visit and dispose of off-site.

END OF SECTION 320090.13

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 312000
  - 2. Trenching, Backfilling and Compaction - Section 312316
  - 3. Concrete Sidewalk and Curbs - Section 321600

**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 pedestrian areas shall be Type A, 1/2 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, 3/4 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 312000 - 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 312000 - 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 recompactd 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, foggiess 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**



SECTION 321541

**PERMEABLE 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 Owner's Representative 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 and 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 Owner's Representative, 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 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 duct 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](http://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 form 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 321600  
**CONCRETE SIDEWALKS AND CURBS**

**PART 1 - GENERAL**

**1.1 SECTION INCLUDES**

- A. Construct concrete curbs and sidewalks.
- B. Provide mockup of exterior concrete walk finish.

**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, but are not limited to, the following:
  - 1. Concrete Reinforcing – Section 032000
  - 2. Cast-in-Place Concrete – Section 033000
  - 3. Earthwork – Section 312000
  - 4. Asphalt Paving and Base – Section 321216

**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, Sections 73 (Concrete Curbs and Sidewalks) and 90 (Concrete).

**1.4 SUBMITTALS**

- A. Submit concrete mix design to Engineer for review at least 21 days prior to concrete.
- B. Submit mockup of exterior concrete walk finish, including, but not limited to score pattern, color and texture to Architect for review prior to any concrete installation.

**PART 2 - PRODUCTS**

**2.1 CONCRETE**

- A. Concrete shall comply with the applicable provisions of Section 90 "Concrete" of the Caltrans Standard Specifications for Section 90-2. "Minor Concrete" and meet the following requirements listed below.
  - 1. Concrete shall have a minimum 28-day compressive strength of 3,000 psi.
  - 2. Concrete shall have a maximum slump of 4 inches.
  - 3. Concrete must contain at least 505 pounds of cementitious material per cubic yard.
  - 4. Cementitious material must be Type II or V Portland cement or a combination of Type II or V Portland cement and other approved Supplementary Cementitious Materials (SCM's). Typical SCM's are ground granulated blast furnace slag, fly ash, silica fume, rice hull ash and natural pozzolans such as calcined shale, calcined clay and metakaolin. The amount of SCM's in the concrete mix shall

- not exceed the requirements listed in section 90-1.02B of the Caltrans Standard Specifications.
5. The quantity of free water must not exceed 310 pounds per cubic yard of concrete plus 20 pounds of free water for each required 100 pounds of cementitious material in excess of 550 pounds of cementitious material per cubic yard of concrete.
  6. The maximum coarse aggregate size must not be larger than 1-1/2" or smaller than 3/4" and meet the gradation requirements in section 90-1.02C(4)(b).
  7. Fine Aggregate grading shall meet the gradation requirements in section 90-1.02C(4)(c).
  8. Acceptable admixtures shall conform to Section 90-1.02E. Chemical admixtures must comply with ASTM C 494, Air-entraining admixtures must comply with ASTM C 260.

### **PART 3 - EXECUTION**

#### **3.1 GENERAL**

- A. Curbs and walkways shall conform to the details shown on the plans.
- B. Provide representative mockup of sidewalk including, but not limited to score pattern, color and finish for review and approval by Architect prior to construction.
- C. Concrete finishes along accessible routes of travel shall be at least as slip-resistant as that described as a medium salted finish for slopes of less than 6%, and slip-resistant at slopes of 6% or greater.
- D. Concrete finishes in non-accessible path of travel areas should be a medium broom finish.

#### **3.2 SUBGRADE PREPARATION**

- A. As per Section 312000, Earthwork.
- B. Minimum Class 2 aggregate base material under sidewalks as shown on the Drawings shall be at least 6 inches in compacted thickness, or otherwise noted.
- C. Subgrade and forms shall be wet immediately before concrete placement.
- D. Reinforcement shall be carefully placed and supported.
- E. Steel dowels, reinforcement steel and welded wire reinforcement must comply with Section 52 "Reinforcement" of the California Standard Specifications
- F. Apply soil sterilizer 6" each side of the edges of sidewalks/walkways to prevent growth of vegetation under sidewalks/walkways.
- G. Excavate for thickened edges where they occur.

#### **3.3 EXISTING CURBS, GUTTERS AND WALKWALKS**

- A. Joint shall be cut to a minimum depth of 1-1/2 inches with an abrasive type saw.
- B. Joint shall be at first scoring line at or beyond the planned joint location.

#### **3.4 FORMS**

- A. Smooth face against concrete, true smooth upper edge, and rigid enough to withstand pressure of fresh concrete without distortion.
- B. Clean and oil coated.

- C. Carefully set to alignment, grade and required dimensions.
- D. Adequately secured from movement by stakes, clamps, spreaders, and braces.

### **3.5 CURB AND WALKWAY CONSTRUCTION**

- A. Dimensions as shown on Drawings.
- B. Weakened plane joints shall be constructed at intervals not exceeding 10 feet.
- C. Expansion joints, 1/2-inch-wide, shall be installed where the new walkway joins existing curbs, drainage structures, and other fixed objects and at intervals not exceeding 60'.
- D. Expansion joints shall contain 1/2-inch thick pre-molded joint fillers the full thickness of concrete. Preformed expansion joint filler must comply with ASTM D 1751. Once concrete has cured, expansion joints shall be caulked.
- E. The top and face of curbs, and non-decorative sidewalks, shall be finished with a steel trowel and be given a final fine brush finish.
- F. The top and face of curb shall be true and straight and not vary more than 0.01 foot above or below the staked grade.
- G. Concrete curing shall be as provided in Section 90-1.03B of the California Standard Specifications.
- H. Repairs shall be made by removing and replacing the entire unit between scoring lines or joints.

### **3.6 ADJUST UTILITY BOXES**

- A. The Contractor shall adjust all existing and new utility boxes, and any other service castings falling within the limits of work to exact grade at the same time the concrete improvements are being constructed and shall maintain these appurtenances to true and exact grade until concrete is thoroughly set.

### **3.7 CURING**

- A. Moist Curing: Cover with reinforced waterproof curing paper. Seal all joints and weights down edges. Maintain moist for 14 days.
- B. Liquid Curing Compound: Locations as approved by Architect. Apply a uniform coating within two hours of final troweling.

### **3.8 REPAIRS AND PROTECTIONS**

- A. Repair or replace broken or defective concrete as directed by Architect.
- B. Protect concrete from damage until acceptance of work. Exclude traffic from pavement for at least 14 days after placement. When construction traffic is permitted, maintain pavement as clean as possible by removing surface stains and spillage of materials as they occur.

### **3.9 CLEAN UP**

- A. Remove all debris and stains resulting from the work of this section.

**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 oz., 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 sag 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, clamping 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
- C. Lifting points located on the top of the sign shall be patched in the field by the Contractor with color matching material.

### 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 as detailed on the Contract Documents and 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 WOOD FIBER SURFACING

- A. Contractor to confirm slope construction prior to installation of resilient surfacing.
- B. Subgrade for play area shall be free of segregated material and shall have a relative compaction of not less than 85%. Subgrade shall be finish graded and sloped to drain to the play area catch basin at a 1% minimum slope. See Grading Drawings for more information.
- C. Geotextile Fabric shall be placed on top of the prepared sub-grade as shown on the plans, so as not to allow any contact between the wood fiber and the sub-grade. Geotextile fabric shall be held in place by the use of staples or fasteners along all corners and seams at approximately 10' O.C. or closer as required to hold fabric in place.
- D. Wood Fiber shall be 100% virgin wood fiber comprised of new Incense Cedar. Wood fiber shall have blunt ends, and shall be void of mixed woods, recycled wood, nails, staples, bark, leaves, dirt, twigs or splinters. Wood Fiber shall be non-toxic with no

chemicals or additives, and shall be wheelchair accessible. Wood fiber fall material shall meet CPSC & ASTM Standards for Public Playgrounds.

- E. Wood fiber shall be installed within forty eight (48) hours after play equipment is installed. Wood fiber shall be placed on top of the geotextile fabric as shown on the plans. The wood fiber shall be uniform, level and compacted. Contractor shall thoroughly sprinkle wood fiber during installation and installed in lifts per manufacturers directions, roll each lift with a partially filled lawn roller in all directions for compaction. The wood fiber shall be compacted to a min 12" finished depth at the edges of play area at the time of final acceptance by the Owner. The depth of wood fiber in the center of the play area will be greater.

3.08 INSTALLATION OF PLAYGROUND RESILIENT SURFACING

- A. Refer to Section 32 18 16.13

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**

## 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. Description: 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 programing, seasonal adjust settings in 1% to 300% increments, conditional response programing, 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 programing, 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 discovery 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 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 programing 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 331100 – WATER UTILITY DISTRIBUTION PIPING**

### **PART 1 - GENERAL**

#### **1.1 SECTION INCLUDES**

- A. Locate and verify pipe size at water system connections.
- B. Provide and install water system pressure pipe, fittings, and appurtenances.
- C. Provide and install all water system appurtenances, i.e. post-indicator valve(s), fire department connection(s), backflow preventer(s), hose bibb(s), fitting(s), valves(s), etc.
- D. Provide and install concrete thrust blocks.
- E. Connect new water system to existing service lines.
- F. Disinfection and testing of new water line.

#### **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, fittings, and appurtenances for review prior to ordering.

#### **1.4 REFERENCES**

- A. California Plumbing Code (CPC), latest edition.
- B. California Fire Code (CFC), latest edition.
- C. National Fire Protection Association (NFPA) Standard for the Installation of Private Fire Service main and their Appurtenances, latest edition.
- D. City of Lakeport Standard requirements.

#### **1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING**

- A. Water pipe shall be delivered, handled, and stored in a way that prevents damage to the pipe and the entry of foreign materials into the pipe.
- B. Regardless of cause, damaged pipe shall be replaced with new products at the expense of the Contractor.

## PART 2 - PRODUCTS

### 2.1 WATER SERVICE PIPE AND FITTINGS

- A. All domestic water piping 3-inch diameter and smaller shall be PVC Sch. 80, with solvent cement fittings compatible with the pipe.
- B. All domestic water piping 4-inch in diameter shall be PVC C900, DR18.
- C. All fire and domestic water piping 6-inch diameter and larger shall be PVC C900, DR14.
- D. All recycled/reclaimed water piping 3-inch in diameter and smaller shall be purple PVC Sch. 80, with solvent cement fittings compatible with the pipe.

### 2.2 WATER SYSTEM APPURTENANCES

- A. All domestic water line valves shall be bronze body ball valves centered in a valve box with a PVC riser.
- B. All fire water line valves shall be resilient wedge, non-rising stem suitable for 200 psi minimum working pressure centered in a valve box with a PVC riser.
- C. Domestic and fire water valve boxes shall be model G05 as manufactured by Oldcastle Infrastructure, or approved equal with lid marked "WATER."
- D. All recycled/reclaimed water line valves shall be bronze body ball valves centered in a valve box with a purple PVC riser. Valve handle shall be purple and lettered "RECLAIMED WATER."
- E. Recycled/reclaimed water valve boxes shall be model G05, color coded purple, as manufactured by Oldcastle Infrastructure, or approved equal with lid marked "RECLAIMED WATER."
- F. Post-indicator valves, fire department connections, backflow preventers shall be the model indicated on the plans per the drawing details and the City of Lakeport approved list and standard drawings, or approved equal.

## PART 3 - EXECUTION

### 3.1 GENERAL

- A. Construction of the private domestic and recycled/reclaimed water system shall conform to the requirements of the CPC.
- B. Construction of the private fire water system shall conform to the requirements of the CFC and NFPA 24, and shall be inspected during installation by the local fire authority.

### 3.2 POTHOLING AT CONNECTION POINTS

- A. The exact location and size of existing water service lines is unknown and is depicted on the plans based upon the best information available.
- B. The Contractor shall pothole in the vicinity of each connection point to verify the exact location and size of the existing water line. That information shall be presented in the form of a field sketch through the RFI process, for confirmation by the Engineer that the line as located is adequate to serve the proposed buildings.

### 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, fittings, and valves 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.
- H. Where PVC, SCH 80, pipe is used, pipe ends shall be lightly sanded and wiped just prior to making the joint to assure good adhesion.
- I. The Contractor is advised that the City Fire Department typically inspects private fire main testing and generally requires that testing be performed with exposed joints and with the pipe restrained with partial backfill over the center of the pipe.

### 3.5 FLUSHING AND TESTING

- A. Private Potable Water System
  1. The system shall be flushed with potable water until only potable water appears at the outlet point.
  2. The system shall be disinfected in accordance with Section 609.9 of the CPC.
  3. The system shall be hydrostatically tested in accordance with Section 609.4 of the CPC.
- B. The private fire mains shall be flushed and tested in accordance with NFPA 24:
  1. Pipes shall be flushed at the design flow rate of the system or at a rate which produces a velocity in the pipe of 10 feet per second, whichever is greater.
  2. The systems shall be hydrostatically tested at not less than 200 psi for two hours. Leakage at the joints shall not exceed two quarts per hour per 100 gaskets or joints.
  3. Testing shall be observed by the local fire authority.
- C. Tests shall be made by the Contractor in the presence of the authority having jurisdiction and the Owner's Representative.

**3.6 CONNECTIONS TO EXISTING SERVICES AND MAINS**

- A. Contractor shall make connections to existing mains where indicated on the plans. Said connections shall be made after new water pipe is flushed and tested in accordance with this specification. The Owner's Representative and City of Lakeport Inspector shall observe all tests.
- B. Sawcut, remove, and repair existing pavements as noted on plans.

**3.7 CLEAN UP**

- A. Remove all debris and stains resulting from the work of this section.

**END OF SECTION**

## **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

## **SECTION 334000 – SITE DRAINAGE**

### **PART 1 - GENERAL**

#### **1.1 SECTION INCLUDES**

- A. Provide and install storm and roof drain pipe and appurtenances.
- B. Provide and install subdrain pipe and appurtenances.
- C. Provide and install storm and roof drain system structures, including clean-outs, drainage inlets, etc.

#### **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 storm drain pipe and cleanouts, drainage structures, and drainage grates to Engineer for review prior to ordering.

#### **1.4 PRODUCT DELIVERY, STORAGE, AND HANDLING**

- A. Storm drain and roof drain piping and structures shall be delivered, handled, and stored in a way that prevents damage to the pipe/structures, or the entry of foreign materials into the pipe.
- B. Regardless of cause, damaged pipe/structures shall be replaced with new products at the expense of the Contractor.

#### **1.5 GRADE AND ALIGNMENT CONTROL**

- A. General
  - 1. The necessary installation procedures that will insure the 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 structure locations or grade breaks. At least three grade points shall be checked to verify the set grade.
    - c. Survey instrument set at structure to site between structures 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 STORM DRAIN PIPE

- A. Storm drain and roof pipe 8" to 12" in diameter shall be Polyvinyl Chloride Pipe (PVC), SDR 35, Series 46, High Density Polyethylene (HDPE), Type S, or approved equal.
- B. Storm drain and roof pipe 4" to 6" in diameter and shall be Polyvinyl Chloride Pipe (PVC), SDR 35, Series 46, or approved equal
- C. Storm and roof drain pipe 3" diameter and smaller shall be Polyvinyl Chloride Pipe (PVC), SCH 80, or approved equal.
- D. Subdrain pipe shall be perforated Polyvinyl Chloride Pipe (PVC), SDR 35, Series 46, or approved equal.
- E. PVC pipe (SDR 35) shall be have with water tight, gasketed couplings.
- F. PVC pipe (SCH 80) shall have solvent weld couplings.
- G. PVC pipe shall have fittings (ells, tees, wyes, etc.) compatible to the pipe type.

### 2.2 DRAINAGE STRUCTURES

- A. Drainage inlets (SDDI) noted on the plan as "1212", "1818" or "2424" shall be as manufactured by Oldcastle Infrastructure, or approved equal, and shall be of the model/size indicated on the plans. Grates shall be heavy duty in hard surfaced areas with ½" maximum opening bolt down grates, and standard duty in planting areas, with bolt down grates.
- B. SDDIs placed in concrete areas shall be installed with a paving notch.

## PART 3 - EXECUTION

### 3.1 GENERAL

- A. All construction of the storm drain shall conform to the requirements of the City of Eureka Standards.

### 3.2 VERIFY EXISTING CONDITIONS

- A. The exact location and depth of the existing storm drains is unknown and is shown based on the best information available.
- B. Prior to ordering of 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 storm drain/existing 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 proposed design is adequate to serve the project.

### 3.3 STORM DRAIN PIPE

- A. Trenching shall be as indicated in Section 312316, Trenching, Backfilling and Compaction.
- B. Pipe laying shall be as indicated in paragraph 3.05 herein.
- C. No pipe shall be installed which is cracked, damaged or otherwise unsuitable for use in the opinion of the Engineer.

**3.4 STORM DRAINAGE STRUCTURES**

- A. Excavation and backfill shall conform to Section 312316, Trenching, Backfilling and Compaction.
- B. Joints shall be grouted to form a watertight seal. Any visible leaks shall be permanently plugged.

**3.5 PIPE LAYING**

- A. No pipe shall be laid when trench conditions are unsuitable to allow performing the job in a professional manner.
- B. Where ground water occurs, pumping shall continue until backfilling has progressed to a sufficient height to prevent flotation of the pipe. Water shall be disposed of in such a manner as to cause no property damage or be a hazard to public health in accordance with Section 31 2316, Trenching, Backfilling and Compaction.
- C. Pipe shall be laid with bell ends facing in the direction of laying, and shall progress uphill/upslope.
- D. Pipe deflections where permitted shall not exceed that recommended by the pipemanufacturer.
- E. If High Density Polyethylene (HDPE) pipe is used, the exterior ribbed wall may be removed to avoid conflicts with other utilities. The extent of the removal shall not exceed 18" measured along the length of the pipe.
- F. 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.
- G. At times when pipe laying is not in progress, the open ends of laid pipe shall be closed by a water-tight plug.

**3.6 CLEAN UP**

- A. Remove all debris and stains resulting from the work of this section.
- B. Properly repair all surfaces disturbed by construction.

**END OF SECTION**